

# Responses to Iben Browning's Prediction of a 1990 New Madrid, Missouri, Earthquake

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U.S. Geological Survey Circular 1083

## COVER

On the date for Iben Browning's predicted earthquake—December 3, 1990—local horseback riders wait by the Mississippi River's levee at New Madrid and, with amazement, watch the activity surrounding satellite transmission trucks. Photo by Todd Wilson (Standard Democrat, Sikeston, Mo.).

## ABOUT THIS REPORT

Iben Browning predicted that a major earthquake would strike the region of New Madrid, Mo., on about December 3, 1990. Although nearly all seismologists rejected Browning's prediction, it was so well publicized that public agitation rose to serious levels. This report tells how this earthquake prediction became credible to many members of the media, emergency preparedness personnel, and the general public. Appendixes to the report include many press clippings, some of Browning's work, and other material pertaining to this episode.

**RESPONSES TO IBEN BROWNING'S  
PREDICTION OF A 1990 NEW MADRID,  
MISSOURI, EARTHQUAKE**

# A Major Earthquake has been projected by Dr. Iben Browning to strike this area on December 3, 1990...

Should you and your family prepare...now?  
This exclusive video interview with Dr. Browning can help you decide.

**Dr.** Iben Browning is a remarkable man. His track record of documented projections related to geological activities is truly incredible. These include the eruption of Mount St. Helens, the devastating Novado del Ruiz volcano in Colombia and, most recently, the 1989 earthquake in San Francisco. His accuracy is of great importance to you personally: *Dr. Browning is now projecting a major earthquake on the New Madrid fault within 24 hours of December 3, 1990.*

**"He is, perhaps, the most intelligent person I've ever met."**

— Dr. David Stewart, Center for Earthquake Studies, Southeast Missouri State University

## One Eye Opening Video Tape

You may not have heard of Dr. Browning until recently. This is because he shuns the media and rarely grants interviews. However, earlier this year in an interview recorded on the announcement of his retirement at age 73, Dr. Browning sat for over an hour and a half of probing questions. He did so because he wanted to leave a permanent record for posterity. And, because he felt it important that Americans prepare now for the challenges just ahead.

It was in this interview that Dr. Browning made his detailed projection of the December 3, 1990 New Madrid earthquake. This is the same exclusive interview that has resulted in extensive coverage in regional and national news media. This is the same interview which led both the Arkansas and the Missouri National Guards to order earthquake drills for the period around December 3, 1990.

## How To Obtain Your Video

For a very limited time only, a 30-minute excerpted version of Dr. Browning's interview is available for \$39. The video contains all the material directly related to his track record in geological forecasting, and his December 3, 1990 projection. If you live anywhere near the New Madrid fault, you should *seriously* consider ordering a copy.

Or, if you prefer, you may purchase the complete 100 minute interview for \$99. Thousands have been sold at that price. Either video comes with a report recapping his methodology, a list of other important "trigger" dates between now and 1993, and specific ways you can prepare for a major earthquake.

Should you take Dr. Browning's projection seriously? Should you and your family take steps now to prepare? *Order your tape today and decide for yourself.*

To charge your video on Mastercard or Visa, call 1-800-528-0559. Or, return the coupon below with your check made payable to: Research Publications.

Because much of this material is time-dated, this offer ends November 15, 1990. Don't miss out on this rare opportunity to secure your personal copy of this important video. *Act Today.*

## Here's How To Order

To order your copy of the videotaped interview with Dr. Iben Browning as well as the written report which accompanies it and which contains additional details on his projections as well as information on how to prepare for a major earthquake...

**Call 1-800-528-0559**

*(Operators on duty 7am - 8pm CST. Please try again if lines are busy.)*

### You have two options:

1. Purchase the 30-minute video with Dr. Browning which fully describes how he projects geological events, as well as specific details on the December 3, 1990 earthquake. *30-Minute Video & Report: \$39.*
2. Purchase the unabridged 100-minute version. In addition to details on the earthquake, it contains a wide range of important information on long-term weather patterns, developing economic threats and more. *100-Minute Video & Report: \$99.*

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Advertisement for videos of interview with Iben Browning, in which he spoke of the 50-50 chance of a New Madrid earthquake on December 3, 1990. This advertisement ran in the St. Louis Post-Dispatch, the Commercial Appeal, and other regional newspapers.

# Responses to Iben Browning's Prediction of a 1990 New Madrid, Missouri, Earthquake

By WILLIAM SPENCE, ROBERT B. HERRMANN,  
ARCH C. JOHNSTON, *and* GLEN REAGOR

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U.S. GEOLOGICAL SURVEY CIRCULAR 1083



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# RESPONSES TO IBEN BROWNING'S PREDICTION OF A 1990 NEW MADRID, MISSOURI, EARTHQUAKE

By William Spence, Robert B. Herrmann,  
Arch C. Johnston, and Glen Reagor\*

## INTRODUCTION

On December 3, 1990, residents of New Madrid, Mo., and the central Mississippi Valley region anxiously awaited the outcome of the prediction of a major earthquake by Iben Browning, an independent business consultant from near Albuquerque, N. Mex. The small community of New Madrid, Mo., was overwhelmed by some 30 TV satellite and radio vans, each equipped with a reportorial crew serving to document the predicted earthquake, IF it were to happen. For weeks, national and international media had been following the response of the central United States to this earthquake prediction. The media hype and public agitation surrounding this prediction were remarkable considering Browning's lack of qualifications in seismology and the denunciation of this prediction by practically all earthquake seismologists.

This report documents how this prediction became credible to many members of the media, the emergency preparedness corps, and the general public. It relies on print sources, although major roles also were played by television and radio. The Browning episode stimulates several questions which need further study. First, although nearly all seismologists rejected Browning's prediction, why were they ineffective in publicly discrediting it? Second, why did print, television, and radio media intensify coverage of the prediction, even though most scientists warned against its validity? Third, why did many emergency preparedness personnel not question the merit of the prediction? Fourth, what long-term gains and losses for earthquake preparedness have resulted from the Browning episode? Finally, what have scientists learned from this experience that will enable them to better cope with future predictions (whether valid or invalid) of catastrophic natural events?

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We thank the following newspapers, magazines, organizations, and individuals for permission to reproduce copyrighted material contained in this report: the American Society of Newspaper Editors, the Arkansas Democrat-Gazette (Little Rock), the Associated Press, the Belleville News-Democrat (Illinois), the Breeze-Courier (Taylorville, Ill.), the Browning Newsletter, the Central West End Journal (St. Louis), the Chicago Tribune, the Clarion-Ledger (Jackson, Miss.), the Commercial Appeal



Sunday, December 2, 1990. At least seven satellite transmission trucks occupy a downtown New Madrid parking lot.



Late afternoon on December 2. Satellite dishes in downtown New Madrid are poised to transmit information on the predicted earthquake, should it occur.

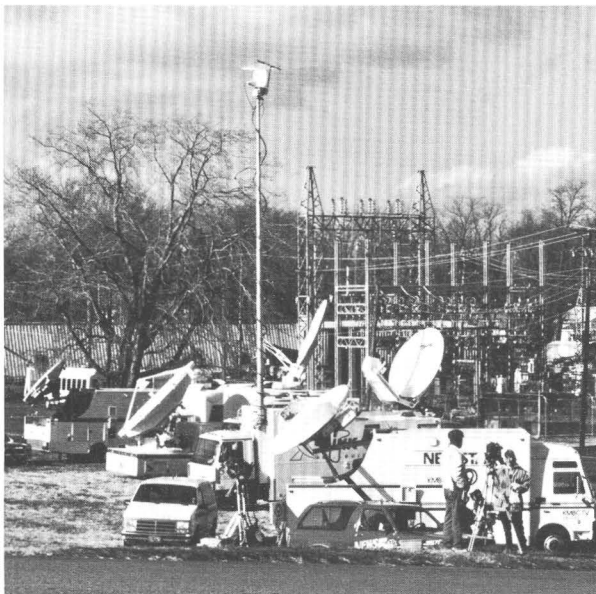
(Memphis), the Courier-Journal (Louisville), the Courier News (Blytheville, Ark.), the Dallas Morning News, the Indianapolis Star, the Jackson Sun (Mississippi), the Jonesboro Sun (Arkansas), the Los Angeles Times, Dan Lynch, the Memphis Flyer, the Miami Herald, the New Republic, the New York Times, the News-Leader (Springfield, Mo.), Newsday, Newsweek magazine, North American Syndicate (New York), the Paducah Sun (Kentucky), the Riverfront Times (St. Louis), Science magazine, the Southeast Missourian (Cape Girardeau), the Southern Illinoisan (Carbondale), the St. Louis Post-Dispatch, the Standard Democrat (Sikeston, Mo.), the State Gazette (Dyersburg, Tenn.), Time magazine, USA Today, the Webster-Kirkwood Journal (St. Louis), the Weekly Record (New Madrid, Mo.), Todd Wilson, and Michael Zimmerman.

### IMPACT OF IBEN BROWNING'S PREDICTION

The progression of events leading up to December 3, 1990, is indicated by the press clippings in appendix C. These clippings are a representative fraction of the total written material that pertains to Browning's prediction. They form a chronological record of the information that typically was available to the public and of the changing responses of the media and public to Browning's prediction. Reference to a specific one of the chronologically arranged press articles is noted by the date of the article in brackets: [month-day-year]. If more than one article is

included for the cited date, the name of the source publication or the author also is noted. Although the newspapers most completely represented here are the St. Louis Post-Dispatch and the Commercial Appeal, there was wide coverage by newspapers of Cape Girardeau and New Madrid, Mo., Jackson, Miss., Little Rock, Ark., and Paducah and Louisville, Ky., and of other regional population centers. The prediction was covered in at least 10 issues of USA Today and by stories or columns in the Wall Street Journal, the New York Times, the San Francisco Chronicle, the Miami Herald, the Chicago Tribune, and all other major newspapers throughout the nation.

In the days and weeks before December 3, earthquake survival tips and safety precautions were disseminated through regional television, radio, and newspapers. Major earthquake drills included those for the National Disaster Medical System [6-24-90], the City of St. Louis emergency management response team, and the National Guards of Missouri and Arkansas [7-11-90; 12-2-90, St. Louis Post-Dispatch (Landa); 12-3-90, St. Louis Post-Dispatch, Linsalata and Manor; Courier News]. In Missouri alone, homeowners paid out nearly \$22 million to add earthquake insurance to their policies [12-9-90 (Hernon and Allen)]. State Farm Insurance reported applications for coverage in Missouri to have been about 2,000 per day prior to December 3, and about 50 per day afterwards. Addition of earthquake insurance to homeowner policies increased significantly in Illinois, Indiana, Kentucky, Tennessee, Arkansas, and even in States as distant as Michigan and Nebraska. School closures caused up to 40,000 student absences on



Monday morning, December 3. Satellite transmission trucks are across from the New Madrid Historical Museum, pocketed between an electrical substation and the Mississippi's levee. At right, an ABC cameraman readies his equipment (photo by Todd Wilson of the Standard Democrat, Sikeston, Mo.), and a television newscaster gives a "newsbreak" from downtown New Madrid.



December 3, 1990, in Missouri alone [11-28-90, USA Today].

At Memphis State University, the Center for Earthquake Research and Information (CERI) sent out 10,000 earthquake preparedness kits and fielded thousands of phone calls in response to Browning's prediction [12-4-90, Jackson Sun]. A St. Louis area Red Cross chapter nearly exhausted its supply of 230,000 earthquake preparedness guides [11-18-90 (Allen and Gross)]. Staff members of Missouri's Emergency Management Agency spent weeks answering thousands and thousands of phone calls. The Central United States Earthquake Consortium (CUSEC) offices in Missouri, Tennessee, Arkansas, Illinois, Indiana, Kentucky, and Mississippi were swamped with thousands of inquiries. At Saint Louis University, students and faculty were inundated with requests for information. There were similar demands on personnel at Washington University and other regional institutions. The distant U.S. Geological Survey information offices in Reston, Va., and in Golden, Colo., were swamped for weeks with requests for information. By November, Golden's National Earthquake Information Service was averaging about 100 phone inquiries per day about Browning's prediction. Often three phone lines were in use simultaneously. Requests for written information doubled from the pre-prediction average.

Officials at these centers reported spending months fighting unfounded rumors and rampant misconceptions

about earthquake risks. Most callers were upset about the perceived threat of a catastrophic earthquake. These people expressed fear, anxiety, panic, hysteria, and related symptoms. Telephone hotlines to crisis centers were established by state and city agencies to disseminate earthquake information or to suggest sources for such information.

## BROWNING AND HIS PREDICTION

Iben Browning graduated in 1937 at age 19 from Southwest Texas State Teachers College, majoring in math and physics. He received his M.A. (1947) and Ph.D. (1948) degrees in zoology (with minors in genetics and bacteriology) from the University of Texas at Austin. He wrote four books and held over 60 patents, work often done in collaboration with various associates. The books<sup>1</sup> deal with relationships between climate and the affairs of men, robots, and AIDS. The patents for which Browning is the first-named patentee primarily involve optics and photographically based copying

devices.\* According to his entry in Who's Who in America, Browning had been a climatological and business consultant to the Mitchell Hutchins and PaineWebber brokerage firms since 1975. Also, he sold a \$225/yr business newsletter (see appendix A) and was a business consultant to the Midwest Research Institute, Northrop Corporation, various farmers' organizations, and other businesses and groups. Browning had developed a diverse and loyal clientele. His popularity as a lecturer supported a lecture fee of \$2,500 [10-21-90, Arkansas Gazette; 11-11-90, Arkansas Gazette]. Although Browning was not a seismologist, his image as a high-powered consultant prompted many nonseismologists to give his earthquake prediction some credibility. Iben Browning died of a heart attack on July 18, 1991.

Browning never formally presented his prediction, as the term is defined in the scientific community.† Rather, he made a series of comments in his newsletters and during talks to groups of businessmen. The report of the New Madrid Working Group of the National Earthquake Prediction Evaluation Council (NEPEC) (appendix B) traces the beginnings of the Browning prediction to his 1985 handwritten table (appendix A), wherein December 3, 1990, was one of a half dozen times of "increased geological danger" throughout the world during the coming five-year interval. These times of geological danger were based on higher than usual tidal loading in the Earth's crust. Browning first publicly specified an earthquake threat for the North American midcontinent when he told an Atlanta business seminar in February 1988 that a damaging earthquake could occur near Memphis in early December 1990.<sup>3</sup> The earliest known press reports of Browning's prediction were a brief Associated Press piece [11-27-89] and a lengthier article by Michael Kelley of the Commercial Appeal [11-28-89]. On December 11, 1989, as an invited speaker at the Missouri Governor's Conference on Agriculture, Browning again predicted that a

damaging earthquake would occur near Memphis on December 3, 1990 [12-12-89].<sup>3</sup>

Details of Browning's prediction became known only gradually, and this composite from many of his statements was put together by the specially convened Working Group of NEPEC (appendix B):

*The catalog of the \* \* \*  
National Earthquake  
Information Center  
shows that no  
earthquakes as large  
as magnitude 6  
occurred anywhere  
on Earth during the  
interval November 25-  
December 10, 1990.*

I. Browning has proposed that there is a 50 percent probability that a tidally triggered, magnitude 6.5 to 7.5 earthquake will occur in the New Madrid region of the Central United States on December 2-3, 1990, plus or minus 2 days (December 1-5, 1990). I. Browning also believes that the maxima of a 179-year tide cycle triggered the late 1811 and early 1812 New Madrid earthquakes and will again affect the region on December 2-3, 1990. I. Browning also predicts a greater than 50 percent probability of a magnitude 8.2 earthquake in Tokyo, Japan, and a slightly less than 50 percent probability of a magnitude 6.5-7.5 earthquake on the Hayward fault in California.

Additionally, a memo by David Stewart (see appendix A) used conversations with Browning to clarify that:

\* \* \* in the aggregate, [there is] an 87% probability that at least one of these three [earthquakes] will go December 3. [Browning] is virtually 100% certain that some major quake will occur in [the 30°-60° N.] band of latitudes on or about that date.

A map of seven of Browning's reported predictions of earthquakes and volcanic eruptions near December 3, 1990, was published by the St. Louis Post-Dispatch [8-26-90]. The catalog of the U.S. Geological Survey's National Earthquake Information Center shows that no earthquakes as large as magnitude 6 occurred anywhere on Earth during the interval November 25-December 10, 1990.

Browning's hypothesis was that peaks of tidal loading in the solid earth could trigger earthquakes in regions of high tectonic stress, much like pulling the trigger on a loaded gun. Browning specified regions of particularly high earthquake risk by calculating which latitudinal bands of the Earth would be subject to high amplitudes of tidal loading and then finding specific locations within these bands that were being studied by seismologists for possible recurrence of large or great earthquakes. The latter was taken as an indicator that these regions have high tectonic stress.

To evaluate tidal loading as a possible trigger for earthquakes, we briefly review prior work done on this problem. Earth tides are caused as the rotating Earth is influenced by the combined gravitational pull of the Moon and Sun. Tidal loading is higher than average at the time

\*News stories attribute 67 or 68 patents to Browning [8-26-90; 10-21-90, Arkansas Gazette]. A search of U.S. patents from 1949 to 1992 shows Browning to be first-named on 23 of them. His first patent (shared with L.S. Lockington) was issued in 1957 for a micromanipulator, and his last was issued in 1991 for an ultrasonic cleaning method.

†The Seismological Society of America defines an earthquake prediction as the specification of the time, place, magnitude, and probability of occurrence of an anticipated earthquake.<sup>2</sup> Browning preferred the term projection, which he defined as determining the time of a future event based on calculation. He considered "prediction" to be akin to tea-leaf reading or other forms of psychic foretelling.

of each new and full moon, because the alignment of the Sun and Moon with the Earth serves to reinforce their gravitational stresses on the Earth. While ordinary tidal loading causes easily observed deformations in large bodies of water, similar but much smaller deformations are caused in the crust of the solid Earth. Small variations in factors such as the Earth-Moon distance can cause small variations in the size of the fortnightly high tides. A slightly larger than usual tidal loading for December 3, 1990, was the primary basis for Browning's prediction.

Tidal loading of the Earth's solid crust can cause deformation (strain) as large as one-sixteenth inch distributed over a span of 20 miles (about one part in 20 million). Thus it is natural to speculate that if a seismic region were stressed critically, then tidal loading may trigger an earthquake. Attempts to relate seismicity rates to tidal loading are not new. The earliest may have been by Alexis Perrey<sup>4</sup> in studies published over the period 1847–75. Many subsequent studies have variously reported positive<sup>5</sup> or negative<sup>6,7</sup> correlations. The most careful studies do not reveal statistically meaningful correlations of earthquake occurrence with tidal loading. Thus Browning's prediction of specific earthquakes was based on a hypothesis whose tests yield ambiguous results.\*

Browning's prediction of a New Madrid earthquake on December 2–3, 1990, was based on a particular high tide that was to occur at a time of minimum Earth-Moon distance (December 2) nearly coincident with a time of alignment of the Moon and Sun with the Earth (December 1), and with a time of maximum northern declination of the Earth (December 3) (appendix B). While this set of circumstances may seem noteworthy, the corresponding tidal loading is only 1.006 times that of a peak on December 30, 1982, and 0.993 times that of a peak on December 19, 1964. No significant earthquakes occurred on those dates. For consistent comparisons, the NEPEC Working Group (appendix B) calculated these tidal loads using the method of Harrington,<sup>9</sup> the same method used by Browning. For the period 1988–1990, the NEPEC study found many examples of peak tidal shear strain within 10 percent of that forecast for New Madrid on December 2–3, 1990. If Browning's hypothesis were correct, then these times

*The most careful studies do not reveal statistically meaningful correlations of earthquake occurrence with tidal loading.*

would correlate with triggered earthquakes, but this was not the case. The changes in stress caused by these high tides are about 0.3 millibars, less than those often caused by atmospheric pressure changes.

Browning further asserted that a 179-year-period, very high amplitude tide may have contributed to triggering the great New Madrid earthquakes of 1811–12 and that a return of this high-amplitude tide would help trigger the December 2–3, 1990, predicted earthquake (appendix B; also see text of Browning's talk to Faultless Starch/Bon

Ami, appendix A). A reexamination of tidal loading curves by the NEPEC Working Group, again using the method of Harrington,<sup>9</sup> indicates that a long-period swell of high amplitude tidal loading similar to that for 1990–92 indeed occurred during 1812–14. The calculations in the preceding paragraph yield the total tidal loading, including the component due to the long-period swell. Because these long-period

tidal swells cause such small stress changes in crustal rocks, the rate of increasing tidal stress<sup>9</sup> is an unlikely cause of the 1811–12 earthquakes. Additionally, because the 1811–12 earthquakes began before the 1812–14 peak loading, those earthquakes could not have been triggered by the peak tidal stresses. This element of Browning's prediction is only a very weak hypothesis and not a scientifically valid basis for prediction of an earthquake.

## SEISMOLOGICAL BACKGROUND

One reason that Browning's prediction found fertile ground was the prior occurrence of great earthquakes in the New Madrid seismic zone. In fact, this area was the site of the three largest earthquakes ever known to occur in a "stable continental interior."<sup>10</sup> (The great majority of earthquakes strike near continental margins or in other areas where the large lithospheric plates that make up the Earth's crust are colliding or moving past each other. New Madrid is far removed from any such setting.) These earthquakes, which all occurred within a 2-month span, were on December 16, 1811 (magnitude  $M=8.2$ ), January 23, 1812 ( $M=8.1$ ), and February 7, 1812 ( $M=8.3$ ).<sup>11</sup>  $M$  denotes moment magnitude, which is the best available representation of the true size of an earthquake. These magnitude estimates were determined by one of us (ACJ) from information in Otto Nuttli's seminal paper on the New Madrid earthquakes.<sup>12</sup> Nuttli, of St. Louis University, used data in the 1912 report of M.L. Fuller,<sup>13</sup> of the U.S. Geological Survey, who documented the areal severity of shaking for

\*Interestingly, the evidence that tidal loading does not trigger earthquakes suggests that the stress in tectonic zones does not inexorably increase to the point of failure. Rather, another failure process, such as accelerating unstable slip,<sup>8</sup> must elevate subcritical stress to that needed for rock failure.

the 1811–12 main shocks and over 200 damaging aftershocks.

The main 1811–12 earthquakes were felt as far as the Gulf Coast, the Atlantic shore, and northeastward at least to the Province of Quebec. The February 1812 event leveled the town of New Madrid, apparently for a time reversed the flow of a section of the Mississippi River, caused widespread surface deformation (including the formation of Reelfoot Lake), and toppled chimneys in Louisville, some 250 miles away.<sup>13</sup> The area of strong shaking associated with the 1811–12 earthquakes is two to three times that of the  $M=9.2$ , 1964 Alaska earthquake and ten times that of the 1906 San Francisco earthquake.<sup>14</sup>

Eyewitness accounts indicate the power of these earthquakes. Louis Bringier saw thousands of trees fall and saw hills of sand and carbonized wood form around deep holes.<sup>15</sup> Godfrey Lesieur had similar observations:

The earth was observed to be rolling in waves of a few feet in height, with a visible depression between. By and by these swells burst, throwing up large volumes of water, sand, and a species of charcoal \* \* \*. When these swells burst, large, wide, and long fissures were left.<sup>15</sup>

From a boat, William Pierce observed numerous spoutings on the Mississippi River. One of these rose at least 30 feet above the surface. Pierce also observed such spoutings along an island's beach, where he found

\* \* \* large circular holes in the sand, formed much like a funnel. These holes were of various dimensions; one of them I observed most particularly, it was 16 feet in perpendicular depth, and 63 feet in circumference at the mouth \* \* \*. For a great distance around the orifice, vast quantities of coal have been scattered, many pieces weighing from 15 to 20 lbs, were discharged 160 measured paces \* \* \*.<sup>15</sup>

Lesieur, Bringier, and Pierce had observed sandblows in progress. Modern investigation shows these sandblows to have been widespread and to be the most direct physical evidence that remains of the 1811–12 earthquakes.

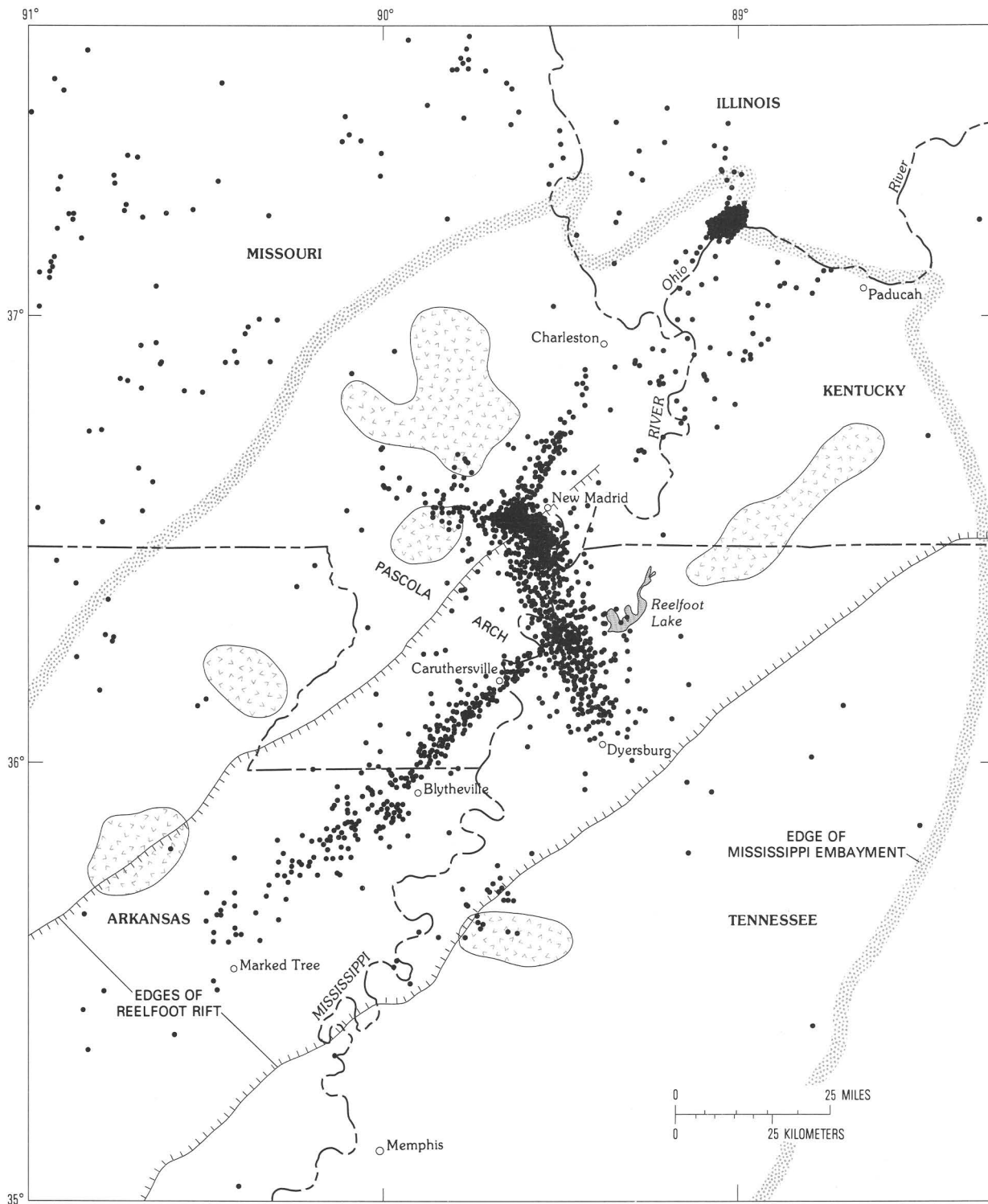
The 1811–12 earthquakes were the stuff of Indian legends. When the great Shawnee chief Tecumseh had trouble rallying other tribes to unify against encroachments of the Europeans, he announced as proof that he was sent by the Great Spirit, that the earth would shake when he stamped his foot on a specific future day. This prophecy is said to have been fulfilled by the New Madrid earthquakes.<sup>15</sup> Another legend tells of Reelfoot, a Chickasaw chief with a clubfoot and lumbering gait, who fell in love with and abducted Laughing Eyes, a Choctaw princess. As the two were being married the earth rocked with the tom-toms and the Father of Waters roared over the village, forming Reelfoot Lake and fulfilling a prescient dream of Reelfoot.<sup>3,15</sup>

Such stories and legends of earthquake predictions are well known in the central United States. So, the public followed with interest as detailed seismotectonic studies of

the region of the 1811–12 earthquakes began in earnest in the early 1970's. Otto Nuttli showed that seismic surface wave energy propagates much more efficiently in the middle and eastern U.S. than in the western U.S.,<sup>12,16</sup> explaining the great areas over which the 1811–12 earthquakes caused damage and were felt. In 1976, William Stauder, also of St. Louis University, used data from a newly installed regional array of seismometers to show that small earthquakes in the New Madrid area concentrate in distinct linear zones, which probably represent the faults that ruptured during the 1811–12 earthquakes.<sup>17</sup>

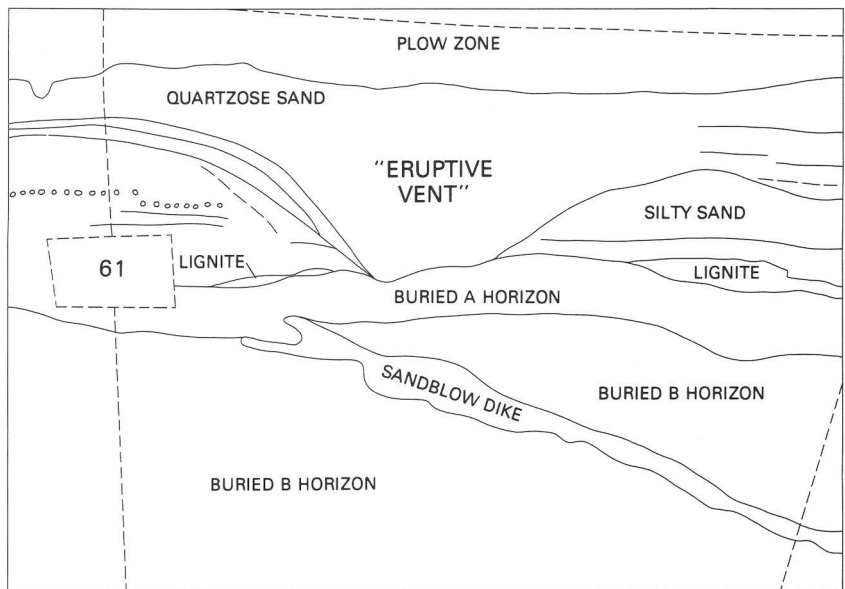
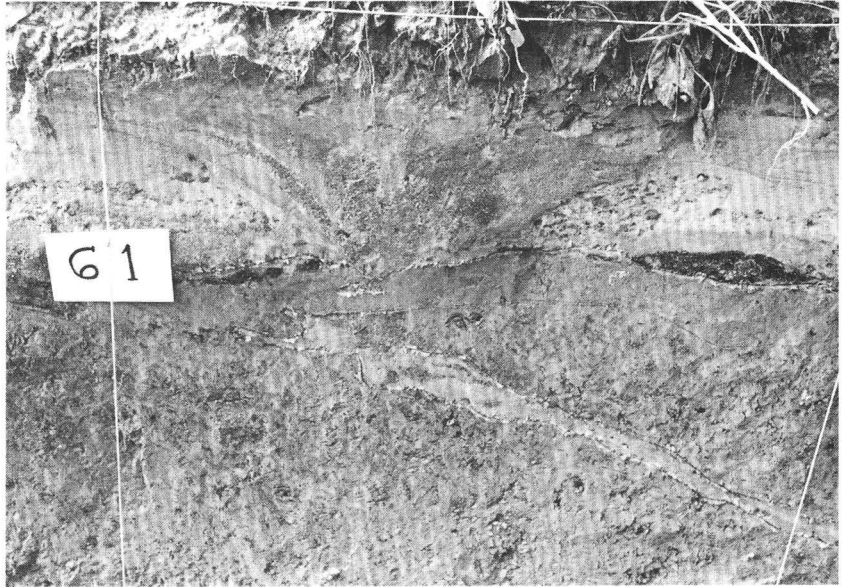
Martin Kane, Thomas Hildenbrand, and others of the U.S. Geological Survey showed that concentrations of regional earthquakes were at the same locations as pronounced variations in the regional magnetic and gravity fields.<sup>18</sup> This result suggests that an unusual geological feature is associated with this earthquake activity. This feature is interpreted as a failed continental rift—that is, an area where the North American continent began to be pulled apart, but did not actually separate, between 500 and 750 million years ago. This failed rift, named the Reelfoot rift (see map), is more than 300 km long and 70 km wide, and has 2–3 km of structural relief. Molten rock (magma) invaded the deeper parts of the Reelfoot rift as it opened, but the magma has long since cooled and solidified. It is this solidified magma that causes the variations in the regional magnetic and gravity fields, for its physical properties differ from those of the surrounding rock. Haydar Al-Shukri and Brian Mitchell, of St. Louis University, provide evidence that fluid-filled cracks are in the same linear zones in which earthquakes are concentrated.<sup>19</sup> This evidence implies that earthquakes concentrate along weakened zones in the Reelfoot rift. The compressional forces that cause modern earthquakes at the rift are unlike the extensional forces that originally caused the rift. In spite of our increasing understanding of the New Madrid seismic zone and of earthquake processes in other areas, we still have no explanation for earthquake occurrence in the heart of a continent. There is no proved physical model that can lead to valid predictions of future earthquakes that might be like those of 1811–12.

Geological evidence suggests that the 1811–12 earthquakes may be extremely rare occurrences. In the absence of surface faulting due to the 1811–12 earthquakes, the most direct physical evidence of these great earthquakes is the great number of sandblows and fissures that are observed in the New Madrid region. (See photo and diagram on p. 8.) They are prevalent in an elongated 10,500-km<sup>2</sup> area that overlies the present-day trends of earthquake epicenters.<sup>20</sup> Sandblows most commonly form during a strong earthquake in areas with a high water table and a weak overlying layer of soil. Assuming the continual presence of a high water table,



Earthquakes and structural features of the New Madrid seismic zone. The earthquakes (shown by dots) are concentrated in linear zones, presumably reflecting the New Madrid fault zone. Boundaries of the Reelfoot rift shown by the nearly parallel lines. Igneous plutons (solidified rock that formerly was molten) shown by irregular blotches. Stippled line is edge of Mississippi embayment. Adapted from U.S. Geological Survey Circular 1066.<sup>14</sup>

Photograph and interpretive sketch of an excavated sandblow or "eruptive vent" that was formed near Blytheville, Ark., during the 1811–12 New Madrid earthquakes.<sup>21</sup> This vertical section is about 1 meter wide. Prior to the 1811–12 earthquakes the ground surface was at the top of the layer marked "Buried A horizon." On top of the A horizon is about 30 centimeters (or 1 foot) of sand and lignite (carbonized wood) that was erupted during the 1811–12 earthquakes. Sandblows originate when strong motions of water-saturated, sandy soils cause their consolidation and overpressuring. Because the effective weight of particles is reduced by fluid pressure, this overpressuring can lead to liquefaction of the affected layer. If the overpressuring exceeds the buoyant weight of the overlying material, then the liquefied layer will try to burst to the surface.<sup>22</sup> In this figure, the sand and lignite were carried from a deeper source through the sandblow dike in the weak B horizon.



any predecessor great New Madrid earthquake should have caused widespread sandblows.

A few prehistoric sandblows and other signs of liquefaction have been noted near Reelfoot Lake<sup>23</sup> and in southeastern Missouri,<sup>14</sup> and in 1895 an  $M=6.8$  earthquake caused localized sandblows near Charleston, Mo.<sup>24</sup> Although the meandering Mississippi tends to ream out its valley, soil profiles as old as 5,000–10,000 years still exist at many sites. Diligent searches for time-correlated, widespread sandblows have found only those for the 1811–12 earthquakes, implying that if 1811–12 style earthquakes have occurred previously then the repeat time for these

earthquakes may be greater than 5,000 years.<sup>20,23–25</sup> This contrasts sharply with the 700-yr repeat time assumed by Nuttli<sup>26</sup> and the 1,000-yr interval implied the rate of strain accumulation observed in the west-central part of the Reelfoot rift by Liu and others.<sup>26</sup>

Recent studies of the statistics of earthquakes in the New Madrid seismic zone indicate about a 50 percent probability for an  $M=6$  or greater earthquake sometime within the next 15–30 years.<sup>27</sup> The probability of a magnitude 7 earthquake occurring in a specified 2-day period is about 1 in 60,000 (appendix B). Probabilities become much smaller for increasing earthquake sizes. The lack of



documented major earthquakes prior to the catastrophic events of 1811–12 makes any estimates of the recurrence of similar earthquakes very conjectural. There have been two earthquakes greater than  $M=6$  in the New Madrid seismic zone since the immediate aftershocks to the 1811–12 earthquakes: in 1843 ( $M=6.5$ ) near Marked Tree, Ark. and in 1895 ( $M=6.8$ ) near Charleston, Mo.<sup>11</sup> These earthquakes occurred near the southern and northern ends, respectively, of the probable zone of the 1811–12 earthquakes and may be due to continuing stress redistribution in those areas.<sup>14</sup>

Many other geological and seismotectonic studies in the region, as well as debates concerning the need for seismic building codes in Memphis and St. Louis, have given the public an increased awareness of the regional potential for earthquakes. Thus when Iben Browning began to mention that December 3, 1990, plus or minus a couple of days, was a "date of geological danger" for the New Madrid region, he had a ready audience.

While the occurrence of a magnitude 6.5–7.5 earthquake was not unimaginable, seismologists were agreed that the lack of a physical model for earthquakes in the New Madrid seismic zone made Browning's prediction implausible. The hypothesis that peaks of tidal loading can trigger earthquakes has been thoroughly tested and is ambiguous, at best. A reliable method of earthquake prediction, using any means, may be decades away. The ingredients for a valid earthquake prediction for the New Madrid seismic zone simply do not exist.

## PROMOTION OF BROWNING'S PREDICTION

Established scientific findings should have led to an early and total invalidation of Browning's prediction. However, the conclusions of careful, mainstream science were overcome by a perception of validity attached to Browning's prediction by many members of the media, the emergency preparedness corps, and the general public. This section traces how this perception took hold; it is largely based on information in the appendixes.

The Loma Prieta (or "World Series") earthquake of October 17, 1989, caused spectacular damage in San Francisco and Santa Cruz and was heavily covered by the media in the Midwest. This  $M=6.9$  earthquake accelerated plans for earthquake preparedness in the Midwest [10–27–89, 10–31–89, 2–5–90]. Browning's prediction of a New Madrid earthquake for December 3, 1990, took on special significance because he claimed to have predicted the Loma Prieta earthquake just 10 days prior to the event, during his invited talk at the 1989 Blanchard New Orleans Investment Conference. (See advertisement and Browning Newsletter, appendix A.) Browning also

claimed successful predictions of the earthquakes in 1971 near San Fernando, Calif., and in 1972 in Managua, Nicaragua, as well as the volcanic eruptions in 1980 of Mount St. Helens, Wash., and in 1985 of Nevado del Ruiz, Colombia.

Because of the increasing media coverage of Browning's prediction, the Central United States Earthquake Consortium (CUSEC) requested on May 18, 1990, that the National Earthquake Prediction Evaluation Council (NEPEC) evaluate the Browning prediction. NEPEC is a self-directed advisory board of earth scientists that reports to the director of the U.S. Geological Survey (USGS). Jerome Hauer, director of Indiana's emergency response agency and chairman of the board for CUSEC, wanted a scientific response to Browning's prediction, saying "I basically have taken the position we are not going to ignore this prediction" [6–22–90, Jonesboro Sun; 7–16–90]. NEPEC's original response was to not evaluate this prediction, deeming it scientifically insignificant. This is the same way NEPEC has treated most of the 300 earthquake predictions submitted to it since 1977 [7–26–90]; it has made full investigations of only those predictions deemed to have scientific validity. It was not until September 20, 1990, that the U.S. Geological Survey requested NEPEC to perform a full evaluation of Browning's prediction and to advise CUSEC.

Meanwhile, on June 18, 1990, David Stewart wrote a 13-page memo to five key regional seismologists and natural hazards officials. (See appendix A.) In this memo, which became widely circulated, Stewart vouched for Browning's track record and spelled out many specific risks should Browning's predicted earthquake for the New Madrid fault come to pass. William Allen of the St. Louis Post-Dispatch, using this memo and subsequent interviews, wrote an article [7–21–90] that caused much concern. The headline, in 3/8-inch type, read "Quake Prediction Taken Seriously." The article repeated Browning's claims of accurately predicting recent catastrophic earthquakes and volcanic eruptions and quoted Stewart:

From a scientific viewpoint, we can neither verify nor discredit this projection. \* \* \* What Dr. Browning is doing cannot be explained merely by chance. Although his accuracy is not 100 percent, his methodology does seem to be promising and worthy of serious and thorough consideration.

This key article was picked up by the AP wire services and widely repeated in newspapers throughout the region. Stewart's endorsement of consideration of the Browning prediction carried much weight with nonseismologists, because he recently had been the executive director of CUSEC and currently was director of the Center for Earthquake Studies at Southeast Missouri State, Cape Girardeau, Mo., as well as being a primary source on earthquake risk and preparedness for the State of Missouri [10–21–90, St. Louis Post-Dispatch].

Considerable media coverage dealt with strong denials of Browning's prediction by regional seismologists. Robert Herrmann, professor of geophysics at St. Louis University, called Browning's prediction "alarmist and irresponsible" [1-27-90]. Brian Mitchell, chairman of the Earth and Atmospheric Sciences Department, St. Louis University, and Arch Johnston, director of the Center for Earthquake Research and Information at Memphis State University, sent a memo to several state and federal emergency management officials and scientists, stating " \* \* \* it is important to show that [Browning's method] is ineffective for predicting earthquakes \* \* \*" and that the prediction "should not be considered seriously" [7-14-90]. Even Stewart said "I'm not saying I agree with Dr. Browning; I'm saying let's find out what he's doing and draw our conclusions" [9-23-90, the News-Leader].

However, Stewart, who was communicating with Browning, qualified as the independent supporting source needed for a story. Thereafter, media coverage of Browning's prediction continued, such as a lead editorial [7-25-90] and a lead front-page story [Sunday, 8-26-90], both in the St. Louis Post-Dispatch. Appendix C shows that press coverage accelerated in September, with Stewart giving many interviews and talks. Stewart apparently believed in the correctness of Browning's claimed successes, saying "Here's a man who verifiably has hit several home runs, and he's up to bat. \* \* \* you can't ignore the batting record" [7-22-90, Dallas Morning News] and, similarly, "Will he hit another on December 3? We don't know, but that's no excuse for not being prepared." [8-20-90, the New York Times]. Both the engaging Browning and Stewart were skilled lecturers. They each certainly appeared to believe they were doing the right thing and their sincerity was convincing to a noncritical, nontechnical audience [9-10-90, 11-16-90]. Stewart was an effective speaker on the topic of earthquake preparedness. The public impression was that two Ph.D.'s must know what they're talking about in regard to the prediction. Neither was a recognized researcher in the difficult field of earthquake prediction nor known to have consulted with such researchers in regard to the New Madrid prediction. Browning's lack of expertise in earthquake prediction is very important to this story but largely was overlooked by many media members and emergency preparedness officers.

Emergency preparedness officers were acting autonomously. Some gave informed opinions. An official with the Illinois Emergency Services and Disaster Agency advised the public to accept what most seismologists were saying: that specific predictions cannot be made. He

advocated instead a more rational, long-term approach to preparedness [9-23-90, St. Louis Post-Dispatch]. G. Tracy Mehan, director of the Missouri Department of Natural Resources, cautioned, "The probability of a significant quake occurring on or about Dec. 3 is not greater than any other day." [9-29-90]. At a December 3 meeting of the Memphis Business Emergency Preparedness Council, a top Memphis official stated "Browning has absolutely no cred-

*Stewart apparently believed in \* \* \* Browning's claimed successes, saying "Here's a man who verifiably has hit several home runs, and he's up to bat. \* \* \* you can't ignore the batting record."*

ibility \* \* \*. I came to this meeting with some reluctance, because I was concerned that some people might think I was giving Browning's forecast public credence." [12-4-90, Arkansas Gazette]. Other emergency management officers were responding without using expert scientific evaluation of the Browning prediction. A spokesperson at the Springfield-Greene County Emergency Management Office said, of Browning, "He's been correct on so many things. I think that everybody ought to take him seriously." [8-5-90]. The director of public safety in Sikeston, Mo., said "Even if he isn't

correct, he's doing a great service for emergency preparedness, because people are finally listening." Plans were underway to train at least 10 percent of the city's 30,000 residents [9-9-90]. In St. Louis, the director of the city's emergency management office stated "We don't take a position that an earthquake will or will not happen. We're here to educate people about how to prepare \* \* \* "[9-20-90]. Jill Stevens, the Seismic Resource Center Manager at Memphis State's Center for Earthquake Research and Information, noted:

Some state and local emergency management agencies, unsure about the legitimacy of the prediction, unwittingly gave it credibility by using it as an opportunity to promote earthquake preparedness. In some areas, these agencies helped to increase anxiety levels by presenting worst-case scenarios as a highly probable consequence of a major earthquake.<sup>28</sup>

Earthquake survival kits were available from many stores and churches. Residents were advised to store these kits in basements, upstairs rooms, and automobile trunks. The kits included canned meats, crackers, dried and canned fruit, first aid kits, flashlights, wrenches to turn off water and gas valves, extra batteries, soft drinks, and bottled water. Wal-Mart Stores in Arkansas, Illinois, Indiana, Missouri, and Tennessee not only issued survival-tip pamphlets (appendix E) but prepared for the survival of customers by placing plastic garbage cans filled with blankets, foodstuffs, bottled water, and first aid kits at several places in each store.

A video interview with Browning, which included some details of his New Madrid prediction, was recorded

on February 19, 1990. Because of Browning's declining health, this video was intended to be a record for posterity of Browning's views [10-21-90, Arkansas Gazette]. In the TV and print marketing for this video, Browning was portrayed as a truly remarkable scholar. The frontispiece shows some of this marketing, published in regional newspapers, which highlights a quote from Stewart's June 18 memo (appendix A). The video was available either as a 100-minute unabridged interview on long-term weather patterns, developing economic threats, and projected geological events (\$99) or an abridged version dealing with projected geological events, including details on the December 3, 1990, earthquake (\$39). These tapes were sold by Tansaafl ("There ain't no such thing as a free lunch") Communications of Palm Springs, Calif. [9-29-90]. On this tape, Browning predicted a 50-50 chance of a New Madrid earthquake between the evening of December 2 and the morning of December 3. He estimated the magnitude of this earthquake to be at least 7, and possibly as large as 8, on the Richter scale.

Browning did not profit directly from the video, as money from this venture was to go directly into a college trust fund for his grandchildren [9-29-90; 10-21-90, Arkansas Gazette]. Stories based on personal interviews with Browning appeared in the St. Louis Post-Dispatch [8-26-90], the Arkansas Gazette [10-21-90], and the Miami Herald [11-25-90].

Public statements and interviews made it clear that Browning was not backing off from his prediction. On June 19, 1990, Browning's daughter, Evelyn Browning Garriss, told the Mid-America Regulatory Conference in St. Louis that while there may not definitely be an earthquake on December 3, "I would at least lay the china flat" [6-20-90; 6-22-90, St. Louis Post-Dispatch]. Browning himself spoke on November 15 in St. Louis to 600 people at a \$25-a-plate lunch [11-16-90]. Here he predicted that tidally produced increases in volcanic activity will cause great global cooling, attendant very low grain yields in 1992, and a consequent severe depression. He showed several graphs linking tidal forces to volcanic activity, revolutions, and wars [11-16-90; 11-18-90, Chicago Tribune; 11-18-90, Paducah Sun; 1-91, ASNE Bulletin]. Asked about his earthquake prediction, he replied "If a person has any doubt about whether I'm wrong or not, he should at least take care of his children" [11-16-90]. On November 28, 1990, Evelyn Browning Garriss said in a telephone

interview with the Associated Press, "We have not changed our projection" [11-29-90, Courier Journal].

The last 30 years of Browning's career ranged from zoological experiments to pronouncements on the stability of governments. A July 12, 1976, New York Times article noted that he had worked as a weapons systems analyst for Sandia National Laboratory. He was funded by that laboratory in the early sixties to study navigational control of donkeys by use of remote-control electrodes implanted in the pain and pleasure centers of the animals' brains.<sup>29</sup> If this worked, the proposal was to use similar methodology to navigate whales equipped with hydrogen bombs into harbors of Soviet port cities<sup>29</sup> [12-3-90, Commercial Appeal (Bazell)]. Such research was popular in that era. As a paid consultant to NASA prior to the 1969 Apollo landing, he concluded that the Moon was covered with a layer of fine dust, so thick that neither human-occupied nor robotic spacecraft could possibly

*In his December 8, 1989, breakfast talk, \* \* \* Browning warned of the coming earthquake risk \* \* \*. Here he stated also "there's at least a 50-50 probability that the federal government of the U.S. will fall in 1992."*

land on it.<sup>29</sup> Browning increasingly delved into climatological change. The above-noted New York Times article described Browning's methods, observing that he went much further than other climatologists in linking climate and history and in "projecting" effects. (See second footnote on p. 4.) Such "projections" were one reason for Browning's popularity. He was frequently quoted in major newspapers, often in regard to projections concerning climatic trends. His unsuccessful projections were discounted, but successful ones, such as projecting the 1988 drought in the U.S. Farm Belt, were lauded. John Coleman, senior vice president in charge of PaineWebber's institutional sales division in Chicago, was quoted in the July 3, 1988, Los Angeles Times: "He's very good. He's done a lot of good predicting. He's the most popular consultant we've had."

Examples of the style and content of Browning's presentations are indicated by the transcripts of two of his talks, reproduced in appendix A. In a speech given in Chicago on October 31, 1989, Browning projected that the period including December 3, 1990, through January 18, 1992, would see some of the stormiest weather in our history, since 1760, and mentioned that California, New Madrid, and the Philippines would be at risk of earthquakes. In his December 8, 1989, breakfast talk to Faultless Starch/Bon Ami Company, Kansas City, Mo., Browning warned of the coming earthquake risk from the New Madrid fault. Here he stated also "there's at least a 50-50 probability that the federal government of the U.S. will fall in 1992." These texts

of Browning's talks show that he tied the depletion of the ozone layer and the South American warming currents to volcanic eruptions, disregarding the conclusions of much research on depletion of the ozone layer and on the El Niño phenomenon.\* He hypothesized that isostatic processes, due to removal of sediment load by the Mississippi, caused earthquakes in the New Madrid region (in spite of the fact that these earthquakes are characterized by horizontal compression). Browning showed a tendency to observe correlations between phenomena and to state how the phenomena were physically linked, without the necessary scientific steps of hypothesis testing, including placing the hypothesis in the context of research by other scientists. Browning was an entertaining and popular lecturer, and his "projections" primarily were general in character.

Browning's claims for successful predictions of earthquakes and volcanic eruptions have not been verified (appendix B). For example, in regard to his statements 10 days prior to the October 17, 1989, Loma Prieta

earthquake, a transcript of an audience member's tape of Browning's talk showed that he had said only, "There will probably be several earthquakes around the world, Richter 6-plus, and there may be a volcano or two" around October 16 [10-19-90, St. Louis Post-Dispatch]. Because Browning did not specify a location, the NEPEC report (appendix B) emphasized that his statement cannot be taken as a valid prediction for the specific Loma Prieta earthquake [10-19-90, St. Louis Post-Dispatch]. According to the NEPEC report, Browning told a Portland, Oreg., audience 6 days before the May 18, 1980, climactic eruption of Mt. St. Helens, that this eruption was likely within about a week. Because the volcano had been having minor eruptions since March 27, its north flank was widely reported to be bulging at about 2 meters per day, and geologists were publicly warning about an imminent major eruption [10-30-90], Browning's statement can only be taken as a logical inference rather than a precise, data-based prediction.

\*The El Niño affects global weather patterns; among other effects, it causes the abruptly warming currents at the west coast of South America. Also, although the eruptions of El Chichon and Mt. Pinatubo have led to decreases in stratospheric ozone, studies show that such eruptions play a minor role in ozone depletion, relative to chlorofluorocarbons released by human activity. Moreover, these eruptions cannot be linked to tidal loading.

*Because high tides occur with each new and full moon, and because about 110 earthquakes greater than magnitude 6 occur each year, there is a significant random chance of occasional major earthquakes roughly coinciding with a high tide.*

Similarly, Browning's claimed successful predictions of the eruption of Nevado del Ruiz, Colombia, on November 13, 1985; the earthquake near San Fernando, Calif., in February 1971 (magnitude 6.5); and the earthquake near Managua, Nicaragua, in December 1972 (magnitude 6.2) cannot be substantiated (appendix B) [10-30-90]. These events occurred near times of high tides. Because high

tides occur with each new and full moon, and because about 110 earthquakes greater than magnitude 6 occur each year, there is a significant random chance of occasional major earthquakes roughly coinciding with a high tide. The lack of verification of Browning's claimed predictions has led to the suggestion that Browning actually associated these events with high tides only after the actual events occurred (appendix B) [10-21-90, Dallas Morning News]. Such results are known to seismologists as "retrodictions" or "post-dictions." Thomas Heaton of the U.S. Geological Survey, a member of the New Madrid Working Group of NEPEC, emphasizes that testing a prediction model on past data will move virtu-

ally any investigator to choose data that lead to the desired result.<sup>7</sup> Prediction of future earthquakes is the only valid test of an earthquake prediction algorithm.

Browning's loose style carried over into his specific prediction of the New Madrid earthquake. The existing 50 percent chance for a magnitude 6 or greater earthquake in the next 15-30 years<sup>27</sup> apparently led to his estimate of an M 6.5-7.5 size for the predicted earthquake. In his video Browning said that the predicted quake would be smaller than the 1811-12 temblors. However, according to Stewart's memorandum (see appendix A), Browning predicted the collapse of bridges crossing the Mississippi River and damage to a third of the buildings in Chicago. Such damage implies ground motion for the predicted earthquake to be similar to that observed for the M=8+ earthquakes of 1811-12. He assumed that tectonic stresses were great enough that a particular high solid-earth tide of December 3, 1990, would have a 50 percent chance of triggering the predicted earthquake. The details of Browning's prediction contained flawed assumptions and severe inconsistencies with the results of mainstream seismological research. Such details, combined with intensified media attention to the 1811-12 earthquakes and Browning's failure to disavow the prediction, led to a public perception that the predicted earthquake would be truly catastrophic, such as one of those of 1811-12.

How could a reputable scientist such as David Stewart have endorsed consideration of Browning's prediction

for a New Madrid earthquake? Aside from recently having been executive director of CUSEC and being current director of the Center for Earthquake Studies at Southeast Missouri State, Stewart has M.S. and Ph.D. degrees in geophysics from the University of Missouri at Rolla, and had been director of the McCarthy Geophysics Laboratory at the University of North Carolina at Chapel Hill from 1971 to 1978. After Browning's prediction became public, Stewart traveled to Albuquerque to consult with Browning and provided media members with personal introductions to Browning. While Stewart repeatedly stated that he was unsure about the Browning prediction, he also repeatedly called attention to the prediction, for example to an audience of more than 2,000 in Arnold, Mo. [9-10-90], and to 1,200 in Terre Haute, Ind., in the fall of 1990. The press clippings in appendix C show that Stewart was far more frequently quoted than Browning himself.

Stewart's credibility was publicly challenged on October 21, 1990, when William Allen, of the St. Louis Post-Dispatch, and Lee Hancock, of the Dallas Morning News, simultaneously broke key investigative stories that, in the mid-1970's, Stewart had worked with California psychic Clarissa Bernhardt to predict an  $M=8$  earthquake on or about January 17, 1976, in the region of Wilmington and Southport, N.C. Allen's lead had originated with a confidential source but he got Stewart to confirm the story during an after-dinner conversation. (Allen and Stewart had collaborated on several previous projects and so had been on friendly terms.)

In 1975 Stewart warned<sup>30</sup> that bulges along the North Carolina coast might presage an earthquake in the Wilmington area, which could pose a particular threat to a nuclear reactor being built there at the time. This prediction was invalidated when key data he used were shown to be erroneous. Then, after he read an article in the National Enquirer that told of Bernhardt's predictions of three earthquakes, he invited her to North Carolina. He accompanied Bernhardt on a surveillance tour by airplane and auto, during which she made thirteen specific and general earthquake predictions for the region, with the Wilmington area earthquake to be the largest of all. Stewart then said he felt a duty to make Bernhardt's psychically based prediction public. This information was given in a paper he co-authored with Bernhardt, "Some Recent Psychic Earthquake Predictions," presented at the January 9-10, 1976, Annual Convention of the Southeastern Regional Parapsychological Association, Davidson College, North Carolina.

According to accounts in newspapers from Chapel Hill, Durham, Wilmington, and Raleigh, N.C., for January and February 1976, Stewart had "privately and quietly"

contacted state government officials about Mrs. Bernhardt's prediction, touting her recent claims to have successfully predicted three earthquakes. At that time, he caused a furor in his academic community. Fourteen of Stewart's colleagues, including his department chairman, signed a statement that analyzed Bernhardt's claimed successful earthquake predictions and concluded that there was "no valid reason to take seriously Ms. Bernhardt's prediction." Stewart subsequently featured Bernhardt at a

*\*\*\* in the mid-1970's,  
Stewart had worked  
with California psychic  
Clarissa Bernhardt to  
predict an  $M=8$   
earthquake \*\*\* in the  
region of Wilmington  
and Southport, N.C.*

Geology Department Colloquium at the University of North Carolina, Chapel Hill. David Dunn, a colleague and former collaborator of Stewart's, said at the time, "I think it is socially irresponsible to make such predictions without being concerned about the adverse consequences of such a position being made public." Victor Zullo, professor of earth sciences at the Wilmington campus of the University of North Carolina, said, "It is irresponsible for a scientific person to alarm people with

such an emotional approach." Stewart subsequently was denied tenure at the University of North Carolina [10-21-90, St. Louis Post-Dispatch; 10-21-90, Dallas Morning News], even though in 1973 he had been voted by geology students as the best teacher of the year [10-21-90, Dallas Morning News; 12-12-90, Greensboro].

Comparing Stewart's backing of the Bernhardt and Browning predictions, Geoffrey Feiss, now chairman of the Geology Department at the University of North Carolina at Chapel Hill and a former colleague of Stewart's reflected, "It surprises me that he didn't learn his lesson 15 years ago." Feiss chalked up Stewart's eagerness to embrace Bernhardt's predictions as the naiveté of a young scholar and went on to say, "I think Dave is a unique fellow \* \* \*. He feels that there are things that operate in the physical world that we can't understand or we don't understand. So he has an open mind to all possibilities, which is good, but the problem in this case is he sacrifices his critical facilities" [12-12-90, Greensboro News and Record]. Similarly, Dunn, who is now dean of the School of Natural Sciences and Mathematics of the University of Texas at Dallas, points out, "His logic seemed identical to that he's using now. He takes a [scientifically] undocumented claim, he says the individual has a track record of success and, therefore, he says, the individual cannot be ignored" [10-21-90, Dallas Morning News]. So, finally, widespread knowledge of Stewart's past track record of endorsing an earthquake prediction without regard to a legitimate scientific process discredited his alliance with Browning's prediction [10-21-90, St. Louis Post-Dispatch; 10-21-90, Dallas Morning News].

By coincidence, in the late summer of 1990, the Federal Emergency Management Agency (FEMA) released its long-awaited report on estimated earthquake losses for St. Louis.<sup>31</sup> This comprehensive report estimated the effects on the City and County of St. Louis of a large ( $M=7.6$ ) and a great ( $M=8.6$ ) earthquake occurring in the New Madrid seismic zone. In early summer, Senator John Danforth, R-Mo, said that this report estimates hundreds of deaths and billions of dollars damage in St. Louis from a severe New Madrid quake and that "we are not as prepared as we should be" [7-14-90]. Studies such as the FEMA report are crucial for emergency preparedness planners, for engineers, and for the development of modern infrastructure. However, the coincidence of this report with a heightening concern about Browning's prediction served to tie the two together [8-6-90] and to further elevate the public's concern.

By mid-September, the St. Louis County emergency management office was averaging more than

100 calls a day about the Browning prediction, and the St. Louis City emergency management office was getting over 60 calls per day. Costs for supplying and mailing materials already were straining budgets for these offices. At this time, Fred Williams, director of the St. Louis City office was averaging two speaking appearances a day, to crowds from 20 to 600. He said that people were "taking this thing real seriously" [9-20-90]. Mark Gartland, director of the county office, said that the public reaction is "bordering on the unhealthy" [9-20-90]. Jill Stevens, of Memphis State University, gave over 300 requested talks to organizations, agencies, schools, and private groups in the central U.S. in the year preceding December 3, 1990.<sup>28</sup> She was critical of the Browning prediction, saying "We're not according any credibility whatsoever to his projections" [9-23-90, the News-Leader].

Perhaps this whole episode would have faded away if it were not for the magnitude 4.7, Cape Girardeau earthquake of September 26, 1990—one of nearly 20 earthquakes of about this size in or near the New Madrid zone since the turn of the century. In her June 19 talk to the Mid-America Regulatory Conference, Browning's daughter warned of foreshocks in October, saying that many areas are unprepared for a quake and that a foreshock "would be one of the best things that could happen" [6-20-90]. This widely felt earthquake gave a tangible aura of credibility to Browning's prediction. The public felt a terrible unease, and this small earthquake triggered a full-scale media quake. Articles appeared in Time magazine

[10-8-90], Newsweek magazine [10-22-90], USA Today (numerous stories in October-December), and many national and foreign newspapers. This small earthquake also evoked an immediate cautionary response from the professional community. Douglas Wiens, professor of Earth and Planetary Sciences at Washington University, published a reality-check commentary in the St. Louis Post-Dispatch [9-30-90], saying "The near-hysteria that has developed over [Browning's] groundless prediction is startling to those of us who study earthquakes \* \* \*. The public should disregard all predictions about the specific date that an earthquake will occur. No one can make such predictions." Eventually the panic level soared so high that the editor of the Paducah Sun decided to ban any earthquake-related stories in his paper from about November 25 until the weekend after December 3-4 [11-25-90, the Paducah Sun; 1-91, ASNE Bulletin].

Nearly 5 months after CUSEC's original request for an evaluation of

*Eventually the panic level soared so high that the editor of the Paducah Sun decided to ban any earthquake-related stories in his paper from about November 25 until the weekend after December 3-4.*

Browning's prediction and only 1½ months prior to December 3, the U.S. Geological Survey transmitted to CUSEC the full report of the NEPEC Working Group. Three days later, on October 18, the U.S. Geological Survey, NEPEC, and CUSEC released the report (appendix B) to the media, at a press conference at St. Louis' Airport Hilton. The report was prepared in less than 2 weeks. It showed, point by point, that the Browning prediction was thoroughly invalid. It showed that tidal triggering of earthquakes cannot be substantiated and that Browning's claimed string of successful predictions was unsupportable. The report thoroughly debunked Browning's methodology and claims, and these results were widely reported [10-19-90, Southeast Missourian (Grebling and Hente); 10-19-90, St. Louis Post-Dispatch; 10-21-90, Dallas Morning News; 10-21-90, St. Louis Post-Dispatch; 10-26-90; 10-30-90].

Nevertheless, many citizens would wait until December 3 before they would judge Browning's prediction to have been a failure. Stewart issued a press release (appendix B) the day after release of the NEPEC report, commenting that "Dr. Browning has yet to be properly scrutinized by the scientific community" [11-8-90].

Also after release of the NEPEC report, exceptionally informative earthquake preparedness guides were published in many regional newspapers. These included supplements (see appendix E) in the St. Louis Post-Dispatch on October 28, 1990, the Paducah Sun on November 3, 1990, the Arkansas Gazette (Little Rock) on November 11, 1990, and the Southern Illinoisan (Carbondale) on

November 18, 1990. The St. Louis, Paducah, and Carbondale guides were filled with a remarkable amount of advertising, much relating to earthquake preparedness, whereas the Little Rock guide had no advertising. In addition, hundreds of thousands of pieces of earthquake information literature were distributed through stores, churches, insurance agencies, universities, the Red Cross, the USGS, CUSEC, and State and local emergency preparedness offices. All of these guides gave much useful information on how to prepare for a major earthquake and actions to take when one occurs.

What most of these guides did *not* do was take a stand on the validity of Browning's prediction, or even acknowledge the debate. Some of the newspapers that had published preparedness guides later ran stories and columns about the scientific community's rejection of Browning's prediction [10-19-90, St. Louis Post-Dispatch; 10-30-90; 11-18-90, Paducah Sun; 11-25-90, Paducah Sun], and CUSEC prepared a disclaimer about the prediction (appendix B) but didn't routinely include it in mailings of earthquake preparedness literature. Only Memphis State University systematically included a rebuttal of the prediction with the preparedness literature it distributed. All other distributors of such literature, by their silence on this issue, gave implicit credibility to Browning's prediction.

It is outside the scope of this report to assess the degree to which public attitudes were shaped by local media coverage and by the statements and actions of local scientists and emergency preparedness personnel. A strong, but subjective, impression is that public agitation was lower in the Memphis area than in many other parts of the region. We believe this was because of the major effort Memphis State University made to explain the invalidity of Browning's prediction.

One last event would serve to push a segment of the population towards panic. The NBC mini-series "The Big One: The Great Los Angeles Earthquake (a soon to be true story)" was long scheduled for prime time November 11 and 12. A few days before this broadcast, NBC's "Unsolved Mysteries" put together an earthquake segment [11-8-90], featuring a highly edited interview with Browning and Stewart. Immediately after this interview, in which Browning unequivocally stated that the predicted New Madrid earthquake had a 50-50 chance of occurring and repeated his claims of past successful predictions, there was a cut to advertise the forthcoming mini-series. To achieve some balance, this television segment contained a rebuttal of Browning's prediction by a USGS seismologist. However, the implied association of Browning's

prediction with the effects to be portrayed in the mini-series was disturbingly clear. CUSEC chairman Jerome Hauer requested that NBC delay the airing of this earthquake-disaster movie [11-11-90, St. Louis Post-Dispatch]. Nevertheless, the movie was aired. Although some mainstream scientific thinking on earthquake prediction was represented accurately, this information was imbedded within a choppy story line, diminishing the earthquake preparedness value of the mini-series. The film's main character was based in part on USGS seismologist Lucy Jones, who called the movie plot "completely unrealistic" and said "Some really responsible people were portrayed very badly" [11-13-90]. Columnist Eric Mink termed part 2 of the mini-series "gratuitously violent \* \* \* and one of the most cynically exploitive TV productions that I can recall" [11-11-90, St. Louis Post-Dispatch]. Science writer William Allen called the mini-series "The Big Baloney" and quoted CUSEC chairman Jerome Hauer, that the mood in Missouri, Illinois, and other states "is

*The seeming confirmation of the Browning prediction by regional educational institutions swelled the grass-roots acceptance of the prediction.*

somewhere between a hysteria and a panic. There's no question that people are taking this prediction very seriously. \* \* \* That show made it sound like [earthquake prediction] was something simple and that did the public a considerable disservice. \* \* \* it leads the public to believe that scientists really do have this information but are keeping it from them" [11-13-90]. (The real world of earthquake prediction is in an early stage of hypothesis testing and it may be decades before a reliable method of earthquake prediction is available [11-18-90, Los Angeles Times]). On the day after the mini-series NBC provided a national hookup for affiliate stations to interview a USGS seismologist; most of the responding stations were from the Midwest and most of the questions dealt with Browning's prediction.

After release of the NEPEC denunciation of the Browning prediction, the pace of announced school closings continued to increase. The seeming confirmation of the Browning prediction by regional educational institutions swelled the grass-roots acceptance of the prediction. Many schools in Arkansas, Illinois, Indiana, Missouri, and Tennessee, were closed at least on Monday, December 3, and some were closed for the three days December 3-5 [7-9-90; 9-9-90; 12-2-90, Memphis Commercial Appeal; 12-4-90, Arkansas Gazette]. Other schools remained open but absenteeism was high [12-4-90, St. Louis Post-Dispatch (Uhlenbrock); 12-5-90, Webster-Kirkwood Journal]. One school district prepared a disaster plan for the quake, and then cited community pressures as the main reason for school closures [11-29-90]. Many schools were closed for

monetary reasons, related to the expected high absenteeism. In most states of the region, high absenteeism would cause great reductions in the attendance-based state funding [11–25–90, the Paducah Sun], a burden that financially tight schools could not bear. Such forces helped deprive school programs of a unique opportunity to use the by-then obviously incorrect Browning prediction to engage teachers and students in a critical analysis of the forces that mold public opinion [12–2–90, St. Louis Post-Dispatch (Flemming)].

## THE FINAL DAYS

The months preceding December 3 saw the Midwest engrossed by Browning's prediction. ABC's "Good Morning America" interviewed Browning. The prediction stimulated planned TV segments for the "Today Show," ABC's "World News Tonight," PBS's "Nova," and others [10–12–90]. Coverage by local TV was intense [12–2–90, St. Louis Post-Dispatch (Mink); 12–5–90, Riverfront Times]. Emergency preparedness officials in Missouri, Tennessee, and nearby states dropped everything on their agendas to respond to a deluge of written and telephone requests for information. The requirement to respond to the needs of the public for information led to a major allocation of resources for earthquake preparedness by local agencies.<sup>32</sup> State emergency preparedness agencies spent \$200,000 out of lean budgets in responding to the prediction [12–6–90, USA Today]. Preparedness officials attended earthquake seminars, tested sirens, established emergency shelters equipped with food, water, and medical supplies, designed evacuation procedures, established radio links within communities, gave speeches, and supervised earthquake drills. Thousands of preparedness personnel from counties and municipalities were involved in these activities. In St. Louis, more than 1,000 firefighters, emergency medical technicians, police officers, and others participated in a mock disaster [12–3–90, St. Louis Post-Dispatch (Linsalata and Manor)]. Families were encouraged to practice earthquake drills. Brochures and pamphlets on causes of earthquakes and how to mitigate losses from earthquakes were widely distributed. At least 1,600 members of the Kentucky National Guard were on call [11–28–92]. The National Guards of Missouri and Arkansas performed earthquake preparedness drills during early December [12–2–90, St. Louis Post-Dispatch (Landa); 12–3–90, Courier News]. The Arkansas drill also involved other State and Federal agencies. It used a worst-case scenario of a Richter magnitude 7.6 earthquake, in which the (exaggerated) toll in eastern Arkansas had reached 4,950 dead, 25,097 seriously injured, and 98,020 left homeless [12–3–90, Courier News].

In New Madrid, the annual Christmas parade, scheduled for December 5, was canceled; in Ridgely, Tenn., the

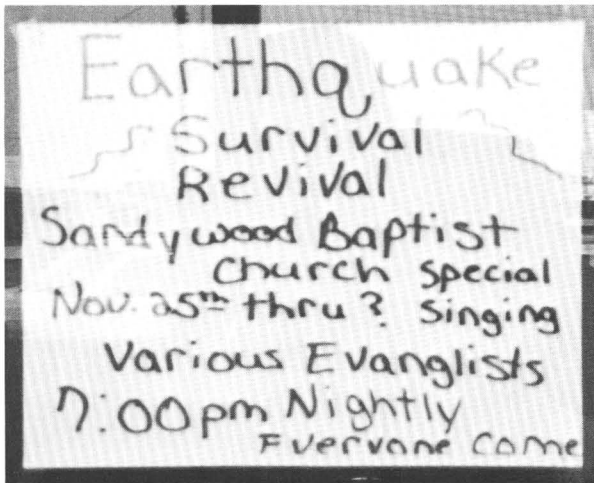
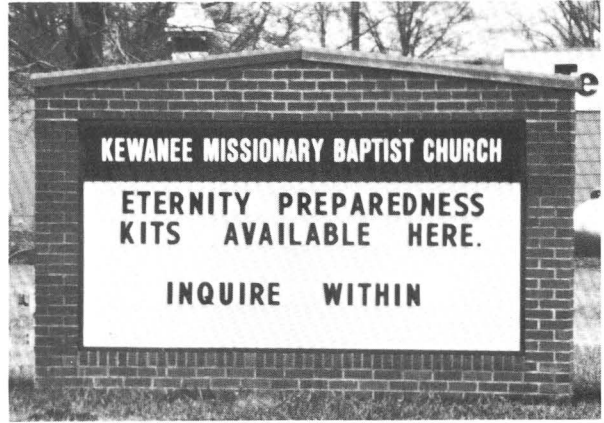
annual Christmas parade was renamed the "Earthquake Parade." In Memphis, Tenn., seasonal concerts and plays, which in past years were traditional moneymakers, were either postponed or canceled due to public concern about the possible earthquake [12–4–90, Commercial Appeal (Smith)]. Occupancy at the Peabody Hotel, Memphis, declined to about 15 percent, whereas full occupancy is typical for the Holidays. Even lower occupancies were seen in other downtown Memphis hotels.

To document the bizarre final days leading into the Browning prediction, the U.S. Geological Survey sent a four-person seismological team to the New Madrid region during December 2–4, 1990. A carnival atmosphere prevailed in New Madrid on December 2 and 3. This small, Missouri Bootheel community of about 3,300 was gorged with story-seeking media members and inquisitive tourists. The mood was one of bewildered anticipation. Downtown, the streets and sidewalks were packed. More than 200 news organizations had reporters on New Madrid's streets [1–91, ASNE Bulletin]. More than 30 television and radio satellite trucks were parked along or adjacent to Main Street. The call letters identified media crews from as far away as New York City and Washington, D.C. on the East Coast, and cities in Kansas, Missouri, Illinois, Oklahoma, Texas, and other parts of the Central States. The international press corps was represented by teams from Japan and Great Britain. On Sunday evening, people knew that the full moon over the Mississippi signaled peaking tidal forces, on which Browning's prediction was based. The maximum force was to be around 5 a.m. on Monday the 3d.

During Sunday, December 2, pulpits rang with words of caution and concern. The bulletin board of the First Baptist Church in Marked Tree read "Give Praise to Our God Who Can Shake the Earth If He Wants To." Other sermon titles in the region included "When Will It Happen?," "Standing on Shaky Ground," "Prepare for the Earthquake," "Earthquake: Fear or Faith," "Preparing for the Big One? Are You Prepared for the Last One?," "The Bible and Browning on Earthquake," and "And the Walls Came Tumbling Down" [12–1–90, Commercial Appeal (Bailey)]. Earthquake "survival revivals" were held in Sikeston, Mo. Such response of religious groups reflected the concerned mood of the heartland.

On Monday, New Madrid streets were alive with activity. A preacher, driving a van equipped with megaphones, spoke about the end of the world. The Chamber of Commerce enjoyed brisk sales of earthquake T-shirts, mugs, and other memorabilia. A skywriting airplane executed aerials over the Mississippi River. A local restaurant, Tom's Grill, was featuring "quakeburgers." A five-piece country band, located near the Mississippi's levee, played earthquake songs. There were rumors of whirlpools in the Mississippi, steaming along the New Madrid fault, bubbling in Reelfoot Lake, fluctuating levels in water





The religious response to Browning's prediction: church bulletin boards in Marked Tree, Ark., and Kewanee, Mo.; sign in a Sikeston, Mo., supermarket advertising a "survival revival"; car driven by Elijah Streicher of Cincinnati, bearing messages for the people of New Madrid; and the van of Rev. Sanford Berry, who dreamed that there would be no earthquake, but nevertheless preached about doomsday through megaphones attached to the van.



wells, blackbirds flying backwards, and an angel hitchhiking in the New Madrid area, warning motorists to stay away from New Madrid. At Hap's Bar, a "Shake, Rattle and Roll" party ran from 6 a.m. Monday until 1:30 a.m. Tuesday (appendix D). Bar patrons jotted the number series 1234567890 on napkins, noting 123 represented

December 3, 456 represented 4:56 o'clock, 78 represented 7.8 on the Richter scale, and 90 the year 1990. There was a persistent rumor that the brilliant Browning had infrared vision in one eye. Another rumor had a St. Louis utility company stockpiling 6,000 body bags in anticipation of the carnage [12-9-90, St. Louis Post-Dispatch (Hernon



"Quake day" in New Madrid. A large banner near downtown calls for help, while the Chamber of Commerce finds some help in the throngs of tourists and journalists drawn to New Madrid by the prediction. Here, Chamber president Shirley Perry sells a T-shirt to the senior author. The Chamber had sold more than \$10,000 worth of T-shirts and sweatshirts by April 1991. (Photo by Todd Wilson of the Standard Democrat, Sikeston, Mo.) On facing page the "Faultline Express Band" puts out some good rhythm in songs about living near the fault zone, and local restaurants advertise special offerings appropriate for the occasion. At lower right, psychologist Dr. Robert Butterworth, seated at the New Madrid Historical Museum, prepares to talk to children about their reactions to the predicted earthquake.



and Allen)]. Missouri Governor John Ashcroft appeared at 3 o'clock on the afternoon of the 3d to assure those present that the predicted earthquake was highly unlikely. Sen. Christopher S. Bond, R-Mo., also was in New Madrid on the 3d and expressed doubt about the predicted earthquake [12-4-90, St. Louis Post-Dispatch (Hernon)]. However, the media quake had been in full swing for weeks and now newsbreaks were taken on the hour, including interviews with other media members.

The New Madrid Historical Museum, at the end of Main Street near the Mississippi's levee, was crammed with people studying David Stewart's excellent exhibits on the earthquakes of 1811-12. Robert Butterworth, a California psychologist, set up shop there, advising children to punch and kick a puppet representing Iben Browning as a means of releasing their fears and anxieties over the prediction [12-4-90, Commercial Appeal (Beifuss, Hernon)]. New Madrid had its entire police

force—6 regular and 15 auxiliary officers—on 24-hour standby. Telephone service technicians installed 40 additional telephone lines for members of the press.

Wherever people congregated throughout the region the main conversation topic was the predicted earthquake. Most people seemed uncertain about the veracity of the prediction but said that they were taking some precautions "just in case." Many of the 1,500 employees at the Noranda Aluminum, Inc. plant—by far New Madrid's largest employer—were expected to stay home on December 3 [12-3-90, St. Louis Post-Dispatch (Hernon)]. Numerous other businesses had high absenteeism; there were reported business closures in the Arkansas towns of Blytheville and Marked Tree. Many people left the region for safer places. Ironically, one Marked Tree family went to Nashville to escape the possible earthquake, only to have their home burn down during their absence [12-4-90, Arkansas Gazette (Gordon)].

By late Monday the 3d, lack of earthquake activity caused people to begin to lose interest in the whole affair. Media trucks began to pack up their gear and lower their satellite dishes. By midday Tuesday, nearly all news teams had departed. One reporter facetiously wrote [12-4-90, Commercial Appeal, Beifuss], "Nevertheless, the hype provided many with an opportunity to have fun, make money, and save souls." He didn't mention that hundreds of thousands of lives had been disrupted, that the economic impact was many tens of millions of dollars, and that the sociological aspects of this event might be studied for years. December 1-5, 1990, had passed and the Earth did not whimper.

## REFLECTIONS

Life has returned towards normal for residents of the central Mississippi Valley region. After the failure of Browning's prediction, Stewart resigned his position as director of the Center for Earthquake Studies at Southeast Missouri State [12-12-90, St. Louis Post-Dispatch; 12-14-90], although he continues as a member of the teaching faculty and gives occasional outside talks on earthquake

preparedness. The dean of Stewart's college said that he believed that due to the efforts of Stewart, "the university and the region are better prepared for an earthquake than they were a year ago" [12-12-90, St. Louis Post-Dispatch]. Browning continued his work and, prior to his death, was persuaded to give another video interview that included comments in regard to the failed New Madrid earthquake prediction (appendix A). On May 3, 1991, a magnitude 4.4 earthquake, centered

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thesis testing \* \* \*.*

about 10 miles west of New Madrid, caused some concern [5-4-91] but was quickly forgotten.

During the Browning episode, regional awareness of earthquake preparedness reached new highs. The public now knows that Browning's prediction was scientifically unfounded and that their agitation was needless. To avoid a backlash of apathy in regard to regional earthquake preparedness, it is important that the public understand the story of how the Browning episode occurred.

Inevitably, some future predictions of major earthquakes will be legitimate. It is also inevitable that amateurs and quasi-scientists will continue to make questionable predictions of earthquakes, volcanic eruptions, landslides, and other natural hazards. How can we use what has been learned from the Browning episode to better serve the public when future predictions of geologic hazards are made? To help answer this, we review the main factors that led to undue visibility for Browning's prediction.

Mainstream science verifies its conclusions through evidence and arguments given to an audience of peer research scientists, through verification of results by independent workers, and through successful predictions based on the new conclusions. In the case of Browning's prediction, there was no history of detailed publication, no replication of results, and no successful prediction. Browning's prediction of a New Madrid earthquake for December 3, 1990, made the leap from hypothesis to prediction without the intervening process of showing verifiable evidence and hypothesis testing that makes mainstream science a viable and successful discipline. Browning never presented the

basis of this specific earthquake prediction for examination by experts in the difficult field of earthquake prediction, yet many persons outside of mainstream science gave him credit for a legitimate earthquake prediction.

Because seismologists early recognized that the Browning prediction was based on faulty arguments, they tended to ignore its existence. Many seismologists did not want to dignify the prediction by addressing it and “hoped it would eventually blow away” [12-3-90, St. Louis Post-Dispatch (Jackson)]. Although regional seismologists countered Browning’s prediction, they generally did so to a limited group of preparedness authorities, while doing a poor job of presenting information to the media [12-4-90, Arkansas Gazette (Reinan)]. Mainstream scientists largely became spot information sources for the media, to add authenticity to a story that really was about the news of the prediction rather than testing the scientific basis for the prediction.

The only person with appropriate scientific credentials who supported consideration of Browning’s prediction was David Stewart, and it was Stewart to whom the media turned to try to authenticate Browning’s prediction. This allowed reporters to portray Browning’s prediction as having merit, being one side of a reasonable debate between two schools of scientific thinking. There was enough regional awareness of earthquake risk and there were enough catchy phrases in Browning’s (and Stewart’s) statements to arouse the attention of some of the media. Scientists were reluctant to publicly attack either the statements or the credibility of Browning or Stewart, possibly due to feelings of collegiality or to considerations of academic freedom.

The uncoordinated renunciations of Browning’s prediction by mainstream scientists were ineffective, partly because saying that there will be no major earthquake is less newsworthy than saying that the earthquake will occur. The media heard from many scientists and emergency preparedness planners that “earthquakes cannot be predicted [interpreted as Browning cannot be right] but there always is a possibility of a damaging earthquake in the New Madrid seismic zone [interpreted as Browning might be right].” This equivocal response failed to emphatically address the great improbability of Browning’s predicted earthquake and left the nonscientific public without sufficient basis for an informed decision.

Seismologists know that a predicted earthquake can be of great public concern and that their audience can

quickly move from professional colleagues to also include a broad segment of the media and the public. Seismologists are learning how to adapt their style of communication to effectively transmit information about a predicted earthquake to the media and to a broad segment of the public. To maintain a science-driven identity for a prediction, a steady flow of general news about a prediction must be matched by a steady flow of material from the scientific community relating to the prediction.

*The media heard from scientists \* \* \* that “earthquakes cannot be predicted [interpreted as Browning cannot be right] but there always is a possibility of a damaging earthquake [interpreted as Browning might be right].”*

Many emergency preparedness officers at all levels openly embraced the possibility that Browning’s predicted earthquake might occur. The great amount of information on what to do in case of an earthquake, disseminated from the media, emergency preparedness groups, churches, stores, insurance agencies, and other sources (appendix E) unwittingly added credibility to the Browning prediction. Many emergency planners did not grasp the authoritative scientists’ rejection

of Browning’s prediction. Because emergency preparedness officers lacked coordinated information upon which to base their responses, most acted autonomously during the Browning episode.

The media and public had an appetite for the success of a non-mainstream and sensational pronouncement. For many members of the media, the value of Browning’s prediction largely was based on its considerable news value, rather than its factual merit. Investigative journalism was present only in several well-developed newspaper articles. Leading science writers tended to ignore Browning’s prediction, and many members of the media who did cover this story were unable to place the prediction in the context of the difficult field of earthquake prediction [11-30-90; Courier-Journal]. For several months prior to December 3, 1990, most regional newspapers carried many stories relating to the prediction, serving to elevate the already high public awareness. The conflicting and sometimes sensational stories coming from TV, radio, and print media were confusing. George Kennedy, a journalism professor at the University of Missouri at Columbia, said, “We were participating in a media feeding frenzy. There was \* \* \* a kind of momentum and a level of fascination that is irrational” [12-9-90, St. Louis Post-Dispatch (Heron and Allen)]. William Booth, science writer for the Washington Post, said “The media got taken for a ride,” elaborating that even major national publications were guilty of treating the earthquake forecast uncritically, thereby giving it undue credibility [11-30-90, Courier-

Journal]. Jim Paxton, editor of the Paducah Sun, wrote "People observing this situation from afar will never fully appreciate the breadth and the reality of the suffering we in the press and other media helped to cause in the Midwest by our mishandling of this story" [1-91, ASNE Bulletin]. What began as an interesting story, but one not given particular credibility, evolved into a contagion that promoted Browning's prediction. Many educated and otherwise sensible people were caught up in believing that perhaps Browning was right. New York's finest ad agency couldn't have done it better.

Ultimately then, Browning's prediction became an example of pseudo-science overwhelming mainstream science. After the public perception became "we don't know what to think about the Browning prediction, but we'd better make preparations just in case," the prediction had a credibility of its own and would not be judged until December 3 had passed. Thus the unequivocal denunciation of the Browning predic-

tion by the National Earthquake Prediction Evaluation Council was too late and generally too little publicized to have much effect in calming the agitated populace of America's heartland. A similar case occurred for Peru in 1980-81, when delayed scientific judgment of a falsely predicted earthquake allowed Peruvian and international media to give that prediction a tumultuous, 1 1/2-year-long life of its own.<sup>33</sup>

What could have been done to encourage more appropriate responses to the Browning prediction? Because the prediction purportedly was scientifically based, its judgment and resolution should have been dominated by evaluations from the scientific community. The New Madrid experience has shown that ignoring an earthquake prediction that has significant media coverage runs the risk of giving the prediction a life of its own. Once media coverage began to accelerate, a strong rebuttal should have followed immediately. These rebuttals should have continued as long as the media gave significant supporting coverage of the prediction. In this case, the process would have been straightforward. The prediction itself was without scientific merit, and Browning lacked qualifications to predict an earthquake. These vital facts should have been explained simply but authoritatively.<sup>34</sup>

Some kind of an "alert" system is needed whereby press officers of agencies alert their leadership to building media coverage of an invalid prediction of a natural hazard. Then, it is essential that this leadership respond in an active way to turn the tide of building media coverage. Evidence that such an approach could be successful is the

lowered level of public agitation in the greater Memphis region, apparently resulting from the repeated rebuttals of Browning's prediction that came from Memphis State University. Based on the "alert" system, a team of 2-4 persons from university and government groups could quickly be assigned to coordinate preparation of clear, focused, and authoritative information on the prediction. This information should be disseminated to appropriate print, television, and radio reporters and to the entire pyramid of emergency preparedness personnel. Doing so would give these persons and their agencies concrete information upon which to base their responses. Preparing a video that summarizes in very plain language the important elements of the situation could be particularly effective. So might a series of radio interviews with mainstream scientists and a series of public service announcements. In the case of Browning's prediction, rebuttals throughout the entire affected region could have done much to counter the continual,

*Thus the unequivocal denunciation of the Browning prediction \* \* \* was too late and generally too little publicized to have much effect.*

but not very informative press coverage. Coordinated with such an "alert" system, a highly authoritative group of experts could be asked to render a rapid judgment. Throughout such a process, according to Showalter and Riebsame,<sup>35</sup> of the University of Colorado's Natural Hazards Information Center, it is important to "anticipate media behavior, understand their information needs, and work with them to temper the worst aspects of reporting: failure to discriminate among sources, sensationalism, and superficial treatment. \* \* \* Professionals must critique unprofessional approaches without being seen as obstructing the public's right to know."<sup>35</sup> Meanwhile, as suggested by Brian Mitchell, occasional workshops that bring together researchers, reporters, and preparedness officers could help establish personal and information networks to facilitate coordinated distribution of scientific information on risk from natural hazards.

When another prediction, whether valid or invalid, of a natural catastrophe attracts an escalating media coverage the Browning experience suggests that society will benefit from rapid and coordinated information from the scientific community. Such reliable and effectively packaged scientific information should be passed continuously to the print, TV, and radio media, and to the extended community of emergency preparedness planners. Persons in these fields are trained to take action and to communicate and thus could be powerful spokespersons for scientifically based conclusions. Such a chain of events would make the public better informed and, perhaps, prevent future incidents similar to the Browning episode.

## SUMMARY

### *Why was Browning's prediction taken seriously?*

- Awareness of the huge 1811–12 New Madrid earthquakes and modern studies in the area.
- Heightening of Midwestern earthquake awareness by the 1989 Loma Prieta (or “World Series”) earthquake.
- Public debate in Memphis and St. Louis concerning need for seismic building codes.
- Browning's image and his claimed successful predictions.
- Independent endorsement of the prediction by a perceived reliable authority.
- Inexperience of regional scientists, media, and public with earthquake pseudo-science.
- Failure of seismologists to actively refute the prediction.
- Media need for a good story.
- Public appetite for success of a non-mainstream pronouncement.
- Summer 1990 release of FEMA report on hypothetical earthquake losses in St. Louis.
- Magnitude 4.7 earthquake near Cape Girardeau, Mo., on September 26, 1990.
- Increasing media coverage on earthquake topics.
- Broadcast, in mid-November 1990, of a television mini-series about an earthquake disaster.
- Tardiness of NEPEC's debunking of prediction.
- Autonomous action by emergency preparedness officers.
- Distribution of much earthquake preparedness information without any disclaimer of Browning's prediction.
- Great number of school closings.

### *Lessons learned:*

- In-house press officers need to alert scientific management to increasing media coverage.
- Scientific management must respond to and have evaluated promptly any earthquake prediction that attracts increasing media coverage.
- Media need reliable and appropriately packaged information. Media need to verify sources and to interview independent experts.
- Entire pyramid of emergency preparedness officers needs reliable and appropriately packaged information.
- Publicity surrounding a predicted earthquake must be actively coordinated.
- Release of emergency preparedness information may unwittingly endorse an unfounded prediction. Preparedness information must include authoritative evaluation of the prediction.

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# APPENDIX A

## WRITINGS AND SPEECHES OF IBEN BROWNING AND DAVID STEWART

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# THE BROWNING NEWSLETTER

THREE CATEGORIES OF ITEMS are treated in the Browning Newsletter:

- 1. World reports covering in particular: A. Climate, B. Behavior, C. Commodities
- 2. Original papers
- 3. Historical perspectives.

Copyright Iben Browning

November 21, 1989

Vol. 13, No. 10

This newsletter contains articles, observations and facts to support our contention that Man is significantly influenced by the climate in which he exists.

Our calculations show the climate, over the next term, will cause dramatic changes in our social and economic patterns.

We feel that the reader, attuned to the changes which are occurring, may develop a competitive edge; and, by understanding his now and future environment, can use the momentum of change to his advantage.

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THE WEATHER OF 1992 - 1993: A CONTINGENCY ARTICLE--A review of the driving forces to be in place in time to produce the weather of 1992 - 1993, and the probable pattern of that weather.....Page 4

NEWSNOTES--.....Page 6

Some people want me to put my travel schedule in the Newsletter, even if the meetings are not public.

- 6 DEC 1989 Executives, Detroit, MI
- 8 DEC 1989 Faultless Starch/Bon Ami, Kansas City, MO
- 12 DEC 1989 Gov. Conf. on Agric., Osage Beach, MO
- 20 DEC 1989 Hold; Amarillo, TX

This is the end of an era. Henceforth, my travels will be very much reduced.

TABLE I in this article is the chart he spoke of. I worked it up for an international tour that I did in December of 1985.

First, note that the most dangerous dates in the first group are all at the New Moon; the most dangerous dates of the second group are all at the Full Moon. Dangerous, here, is defined as the times of highest "vector sum high tidal forces". I was silly putting in decimal fractions of days, because earthquakes and volcanoes are simply not that precise; but that is what the first numbers are. Then the month is listed, then the year. The asterisks are intended to reflect two things: the relative height of the high

### EARTHQUAKES, 1989

There have been earthquakes!

A client and friend of mine called me to say that the chart that I gave him 3 or 4 years ago missed the time of the San Francisco earthquake several hours. (He will permit me to give his name and phone number to people who feel the need to have him verify this statement: He is an executive in an insurance company.)

**THE BROWNING NEWSLETTER**

TABLE I.

DATES OF GEOLOGICAL DANGER (HIGH TIDAL FORCES)

NEW MOON	19.811	SEPT. 1985	*	(MEXICO CITY EARTHQUAKE) (19 SEPT)
	17.381	OCT. 1985	**	(VOLCANO-KILAUEA, HAWAII) (18 OCT)
	13.946	NOV. 1985	***	(VOLCANOS-COLOMBIA, PAIWA NEW GUINEA, USSR) (13 NOV)
	11.501	DEC. 1985	**	
	8.055	JAN. 1986	*	
<hr/>				
NEW MOON	6.391	NOV. 1986	**	
	3.945	DEC. 1986	**	
	31.6	DEC. 1986	***	(30° LAT. SOUTH) (168 YEAR HIGH)
	28.054	JAN. 1987	**	
	24.609	FEB. 1987	*	
<hr/>				
NEW MOON	21.922	DEC. 1987	*	
	18.476	JAN. 1988	**	
	15.031	FEB. 1988	**	
	14.586	MAR. 1988	**	
	11.190	APR. 1988	*	
<hr/>				
NEW MOON	23.334	AUG. 1989	.	
	19.889	SEPT. 1989	*	
	17.443	OCT. 1989	**	
	13.998	NOV. 1989	*	
	11.552	DEC. 1989	.	
<hr/>				
NEW MOON	9.394	OCT. 1990	*	
	5.949	NOV. 1990	**	
	3.5	DEC. 1990	***	(30° N. LAT.) (27 YEAR HIGH)
	31.055	DEC. 1990	**	
	27.609	JAN. 1991	*	
<hr/>				
FULL MOON	25.419	NOV. 1991	*	
	21.974	DEC. 1991	**	
	18.528	JAN. 1992	****	(20° N. LAT.) (18 YEAR HIGH) (ONE OF 3 HIGHEST HIGHS IN OVER 1000 YEARS)
	15.083	FEB. 1992	**	
	13.637	MAR. 1992	*	
<hr/>				
FULL MOON	9.596	JAN. 1993	.	
	6.151	FEB. 1993	*	
	5.706	MAR. 1993	**	

### TABLE 1. TIDAL FORCE AND LENGTH OF TIME SINCE THE TIDAL FORCE WAS THAT HIGH.

tidal force, and the length of time since the tidal force was that high. Each of these factors has to do with the tidal force finding a geological event far enough developed to be triggered.

Second, note that the high tidal force of 31 Dec. 1986 at 30° S. Latitude was the high tidal force that Evelyn referred to in last month's Newsletter, around which, over a 5 year period, 45% of all the world's volcanic activity occurred, even though the Southern Hemisphere has only 1/3 of the world's volcanoes. Note also, that since the 31 Dec. 1986 high tidal force, only 5 out of the 17 volcanoes (listed by Evelyn in the September Newsletter) were in the Southern Hemisphere. We have entered the era of intensive volcanic activity in the Northern Hemisphere.

Third, note that the day listed on the TABLE was 17 Oct. 1989--the very day of the San Francisco earthquake (a 7.1). That was a Tuesday.

Late Saturday, a moderate quake had been reported from Japan, then, in quick succession, there was a small earthquake outside of Rome (18 October), and several moderate quakes in China (19 October), and further small quakes in Japan, Nicaragua, and Java. The Solomon Is. had a 7.2 earthquake on 28 October, Algiers a 6.0 on 30 October, and Japan had a 7.3 on that same day. Once it started, it seemed like the world opened up. Normally, there are 5 or 6 Richter 7s per year. This brought on 3 in 2 weeks.

Santiago, Chile shook on 9 Nov., and there were more Japanese earthquakes, and in Southeast Iran and in Wellington, New Zealand in the first week of November.

Earlier in the year (July) there had been two volcanoes go off in Japan, one in Colombia and one in Guatemala.

There were solar flares at the same time, and a Russian scientific meeting saw some scientists proposing that the earthquakes were caused by solar flares. The readers of this Newsletter will recognize that they were warned long ago that there would be a peak in tidal forces and of sunspots--two causally unrelated matters--occurring simultaneously at about this time.

An Executive of an organization to which I spoke on 10 October 1989 wrote me as follows:

"It is doubtful that anyone that heard you speak will ever forget your forecast of a major earthquake, volcano or both on October 16 plus or minus a day or two. This was a dramatic enough statement but the San Francisco earthquake make it "lifetime memorable."

"Now what is concerning people is that the earthquake forecast was a precursor for being on track for other forecasts about natural disasters and severe weather in the coming years."

Another quote that I will call to your attention is from Robert Prechter's The Elliott Wave Theorist.

#### "ONE WHO PREDICTED THE EARTHQUAKE"

During the second week of October, I took a trip first to San Francisco, and then to western Canada to visit A.J. and Frances Frost. I was mindful of the fact that it would be a good idea to be out of San Francisco by the weekend because for weeks, the 16th on my calendar was marked, "Iben Browning earthquake." On Saturday the 14th, we were all sitting in A.J.'s living room and the entire house shook. "Wow," I said, "that's probably a pre-shock!" (The Frosts live on the same fault line.) We discussed Iben Browning's forecast for awhile. I returned on Sunday. The following Tuesday made history. What bothers me is that no one reported Browning's feat. This man has been accurately projecting volcanic and earthquake activity for years based primarily on the timing of peak tidal forces. What interests me is that he also relates such activity to changes in farming success and cycles of boom and depression. His fascinating "Browning Newsletter" is available from Fraser Publishing, P.O. Box 494, Burlington VT 05402 for \$225 a year. I highly recommend it.

AROUND THE GLOWING  
COALS OF A BRAZIER,  
OLD MEN  
TELL TALES OF EARTHQUAKES.

--KYOROKU"

I'm grateful that Bob noticed.

[Editor's note: The following has been retyped for legibility but is word-for-word identical to the original]

DATE: June 18, 1990

MEMO TO: Harvey Ryland, Central U.S. Earthquake Consortium, Memphis  
Walt Hayes, U.S. Geological Survey, Reston, VA  
R. D. Ross, Missouri Emergency Management Agency, Jefferson City  
Arch Johnston, Center for Earthquake Research & Information, Memphis State University  
Brian Mitchell, Department of Earth & Atmospheric Sciences, St. Louis University  
Iben Browning, Private Consultant, Albuquerque, NM

FROM: David Stewart, Center for Earthquake Studies, Southeast Missouri State University,  
Cape Girardeau

RE: Dr. Iben Browning and the possibility of a damaging earthquake, December 3, 1990, on the  
New Madrid Fault

Since October 17, 1989, following the Loma Prieta earthquake in California, the news media has widely publicized a statement by Dr. Iben Browning, wording it in the form of a prediction of a large earthquake to occur December 3, 1990, on the New Madrid Fault.

I visited with Dr. Browning in Albuquerque, New Mexico, May 18–19, 1990, and have had several phone conversations with him as well, before and since our May meeting. While in Albuquerque I met his wife, Florence, and also his daughter, Evelyn Garriss, who lives nearby and who has been trained in Dr. Browning's methods. Dr. Browning's address is: P.O. Drawer 130, Sandia Park, NM 87047. His phone is (505) 281–2692.

I also have had telephone conversations with six people who have known and/or worked with Dr. Browning for some years. These individuals are familiar with Dr. Browning's past track record of predictions or projections in many areas including earthquakes, volcanoes, climate, crop futures, market trends, and political forecasts. They are as follows: Eric Watson, President, Environmental Engineering Concepts, Inc., Palm Springs, CA, (619) 322–1111; Roger Spencer, First Vice President, Paine-Webber, Inc., Chicago, IL, (312) 580–8215; Judith Seime, Research Assistant, Paine-Webber, Inc., Chicago, IL, (312) 580–8215; Dr. Don Isenberg, Chief Scientist, Microbics, Inc., California, (619) 438–8282; Emmitt Barker, President, Farm & Industrial Equipment Institute, Chicago, (312) 321–1470; Bill Galbraith, Executive Vice President, North American Equipment Dealers Association, St. Louis, (314) 821–7220. I encourage you to call as many of these people as you wish. There are literally hundreds of people who have heard Dr. Browning's predictions before the fact that you can call to verify what follows in this statement.

Mr. Watson has known Dr. Browning for at least the last five years inasmuch as he has been the chairman of the Blanchard Conference, a gathering of 2500–3000 business

leaders, for the last several years and has introduced Dr. Browning as one of the featured and favorite speakers at that conference, which is always in New Orleans each year. Mr. Watson has also had other contacts with Dr. Browning through the years and earlier in 1990 made a 100 minute video tape of Dr. Browning's latest projections and forecasts in many areas, but including commentary on the New Madrid Fault and the December 3, 1990, date. I have a complete copy of this tape, which is available from Mr. Watson. It is copyrighted and proprietary, but Mr. Watson kindly sent me a complimentary copy (it will be retailed for \$99 a copy). I have permission to distribute the excerpts regarding the New Madrid Fault to selected people. Enclosed is a promotional flyer regarding this tape and its commercial availability. For the New Madrid excerpts, just send the Center for Earthquake Studies a blank 1/2 inch VHS tape and we will copy those excerpts for you free of charge.

Mr. Watson's reason for such a long tape stems from the fact that Dr. Browning has not been in good health for the last seven years and can no longer travel to speak. His last appearance at the Fall 1990 [sic] Blanchard Conference was via video in which, I am told, he mentioned the upcoming earthquake in California which did actually occur. (October 17, 1990 [sic].) Dr. Browning's current invitations to speak are now covered by his daughter, Evelyn Garriss. It is possible that this 100 minute tape produced by Mr. Watson could well be Dr. Browning's last major public statement.

Mr. Spencer is an agricultural futures specialist and climatologist and has known Iben Browning for some twenty years and has worked closely with him on behalf of Paine-Webber.

Judith Seime is a research associate in Mr. Spencer's office of Paine-Webber, who, for the past seven years has worked closely with Dr. Browning in processing and distributing his forecasts for Paine-Webber clients. During

the course of Dr. Browning's long consulting association with Paine-Webber, he visited Chicago several times a year and for the last several years worked with Judith Seime.

Dr. Don Isenberg is a biochemist and a friend of Iben Browning's for the past twenty years or so. Dr. Browning was having dinner with Dr. Isenberg and some others on the evening of February 8, 1971, in the Los Angeles area when he remarked to the group, "This is going to be an interesting evening. We are probably going to have an earthquake." Early the next morning the 6.4 San Fernando earthquake occurred.

Emmitt Barker and Bill Galbraith were both at a national meeting in San Francisco, October 10–12, 1989, accompanied by 400–500 other CEO's from companies that comprise the heavy and agricultural equipment industry. They both heard Dr. Browning's forecast of the Loma Prieta Earthquake which occurred October 17, within 24 hours of the October 16 date given by Dr. Browning and within the 48 hour window that Dr. Browning had indicated a week before.

The information I present here is based upon conversations with all of the foregoing people and upon materials provided to me by Eric Watson, Roger Spencer, Judith Seime, and Dr. Browning, himself, who was very generous in what he shared with me.

#### A Summary of Key Points

The central point and summary of all my investigations at this time is this: Dr. Browning is highly respected within the business and investment community. His forecasts have been found highly reliable in many areas. His integrity is said to be beyond reproach. His accuracy is said by various people to be 50% at worst, and 90% or better most of the time. That he was correct in the Loma Prieta event is a verifiable fact. He was also apparently correct within a few days in predicting the eruption of Mt. St. Helens, May 18, 1980. In this latter instance he was speaking before a group of several hundred in Portland, Oregon, on May 13, 1980, when he told them it would go "in about a week." This pronouncement was caught on video tape and used by Paine-Webber in national advertising for their firm as proof of the accuracy of their consultants. His calculations had also picked the dates of September 19, 1985, and November 13, 1985, upon which the Mexico City earthquake and the Novado del Ruiz volcano eruption in Columbia respectively occurred. These, plus his 1971 prediction of the San Fernando earthquake 24 hours ahead of time, indicate that what Dr. Browning is doing cannot be explained merely by chance. Although, his accuracy is not 100%, his methodology does seem to be promising and worthy of serious and thorough consideration.

#### What is Dr. Browning's Methodology?

Browning starts with astronomical calculations of the vector sum of tidal forces from the sun and moon. To my knowledge his exact method has never been tried or published in the conventional scientific journals such as the "Bulletin of the Seismological Society of America," the "Journal of Geophysical Research," etc. Seismologists have attempted to correlate tidal forces with earthquake triggering many times, but none, so far as I can ascertain, have done what he has done.

Most use the vertical components only or use simple moon phases. Dr. Browning's data come from calculations by the U.S. Naval Observatory in cooperation with an associate there (Harrington, with whom he co-authored a paper).

These calculations are latitude-specific. There are many basic and beat frequencies of the solar/lunar tidal forces and these all depend on latitude, the earth's inclination, the nearness of the sun (perihelion), the nearness of the moon (perigee), the alignment of sun and moon, and the ecliptic cycles. There is a basic 78 year period at the equator and a 178 year period in higher latitudes. It is the vector sum maxima at specific latitudes, not vertical components only (which control ocean tides), that seem to correlate with earthquakes and volcanic activity.

To this point, Dr. Browning's methodology is amenable to the scientific method. By obtaining a set of calculations for vector sum tidal forces at a specific latitude, one should be able to do a historical investigation around the world for that latitude (actually a band of latitudes) to see if, in fact, surges of earthquake and/or volcanic activity do occur at those times.

The astronomical calculations, according to Browning, only identify a band of latitudes where maximum tidal forces will occur on given dates. At this point, Browning says he then must rely upon geologic and seismologic information to find those places within the latitudes indicated that will be ready to go next.

For example, last October Dr. Browning was aware of the 1988 forecasts by the U.S. Geological Survey on the San Andreas Fault and was specifically aware of the Santa Cruz portion. His date, "October 17, 1989, at about 10:45 a.m." was first published in 1985 (I have a copy he had sent to Paine-Webber in December, 1985). His public statement last Fall before the event was that the quake would be "October 16 + or - a day or two." October 17, 1989, 5:04 p.m. is when it actually happened. When the October 17 date was first published in 1985, I don't think he had identified which fault would go. Only the date and latitude band (30 degrees – 60 degrees North Latitude) had been identified. This band includes all of California, China, Japan, the Mediterranean Sea, and the New Madrid Fault.

I do not understand entirely how he concluded that of these possibilities, it would be the Santa Cruz portion of the San Andreas to go then. But he did draw that conclusion and was right. I don't know why the Parkfield reach of the San Andreas did not go then, which is the one the U.S. Geological Survey has been predicting will go any time between 1984 and 1992 and still hasn't happened. Why not the New Madrid Fault at that time? Why not Japan, China, or the Mediterranean?

Somehow, he correctly picked the fault just south of San Francisco and claims that he was then using the published forecasts of the U.S.G.S. I am not sure to what extent his methodology is scientific at that point and how much is intuition or a very sophisticated rational judgment on his part. We just have to keep coming back to the fact that he was right.

The identification of a latitude band under periodic tidal forces, vector sum maxima, as they correlate with seismic activity, can be scientifically verified. The selection of which volcanoes and/or faults will become active in those latitude bands is something considerably more difficult, it seems to me. How Dr. Browning really does it, I do not know.

#### What are Dr. Browning's Qualifications?

Iben Browning has a bachelor's degree in mathematics and physics and a Ph.D. in microbiology. He holds 67 patents and has written three books. The last one is entitled, "Past and Future History," co-authored with his daughter, Evelyn Garriss, and is available from Fraser Publishing Company, a division of Fraser Management Associates, Inc., Box 494, Burlington, Vermont 05402. Among other things, this book contains a graph showing the annual release of earthquake energy (Don Anderson's data from Cal Tech) for the past century or two and how that closely corresponds with the ups and downs of tidal forces. Dr. Browning has done work in genetics research, climatology, biophysics, and other fields, and was a test pilot at the Air Force Base in Victorville, California, during World War II.

His friends say he is a "genius," has an I.Q. of 200," and seems to have "total recall." He was confined to the air base in World War II and instead of spending his evenings drinking at the officer's club, he memorized large portions of the Encyclopedia Britannica. After spending hours with him in Albuquerque, I would not have any difficulty in believing in his "genius" or his "200 I.Q." His mental abilities, even now at age 72 and in failing health, are far more acute than mine have ever been. He is, perhaps, the most intelligent person I have ever met.

The fact that I am, at this point, unable to fully comprehend his method is partly due to the fact that what he is doing is not really simple, but very complex, and that it would take an intelligent person some time and effort to

fully grasp what he is doing. Whatever it is he is doing, I hope it will not be lost. His daughter will be carrying on his work into the future.

What it boils down to, as regards Dr. Browning's qualifications, is this. He is not a seismologist. He is not a geologist. He is not formally trained in the fields that would traditionally deal with volcanoes and earthquakes. Furthermore, I see the applicability of the scientific method, as we know it today, only to his vector sum tidal force calculations by latitude. Beyond that, the choosing of which location within a band of latitudes, I do not fully understand, even though he is using available geologic and seismologic information from that point. I cannot take his data, apply it to known tectonic information, and come up with his conclusions.

As Browning pointed out, the scientific community is interested in "qualifications" and "methodology." If the credentials are not there and the methodology is not within that considered to be "scientific," then the scientific community often rejects such. In the business world, however, all that counts is results. What is the track record? They do not care who is the source or what schooling a person may or may not have had. They do not care how the information is obtained if it proves reliable. In the business world, Dr. Browning has a long track record of reliability. At his worst, according to his friends and associates, he is 50% right.

This brings us to consideration of what to do with the December 3, 1990, projection for the New Madrid Fault.

#### How Credible is the December 3, 1990, Date?

The December 3, 1990, date + or - 2 days, represents a vector sum tidal maximum for latitudes 30 degrees to 60 degrees North. This includes a majority of the most seismic zones of the world. Dr. Browning is concerned specifically about Tokyo, Japan, and the New Madrid Fault. After hearing of the recently revised probability on the Hayward Fault (75% chance of a damaging quake in the next 30 years) he is now concerned about that fault, also, on December 3. He told me over the phone, in our last conversation, June 16, 1990, that he would assign a 50% chance of each of these, independent of the other and that in the aggregate, an 87% probability that at least one of these three will go December 3. He is virtually 100% certain that some major quake will occur in that band of latitudes on or about that date.

"I can guarantee that the trigger will be pulled on December 3, 1990," he said. If a fault is not loaded, it will not go off. If it is, then it will release an earthquake and the size will depend on the amount of strain energy stored up." He thinks that the New Madrid zone would produce a magnitude 7.0 or greater.

Dr. Browning points out that the December 3 date is a 27 year maximum for these latitudes and that within the

broader scheme of periods for vector sum tidal forces, it marks the return of a 178 year cycle, the last time of which occurred in 1812. He also said that if the New Madrid fault is ready to go, there may be foreshocks during the 48 hour windows about October 9 and November 6, 1990.

He emphasizes that he does not know for certain. He does seem to have strong feelings about the New Madrid fault on that date and warns that bridges will likely be out along the Mississippi and that the military should have pontoon bridges ready to rapidly put in place. He told Roger Spencer of Paine-Webber that "one third of the buildings in Chicago will be damaged." Roger, and other people who know Browning and with whom I spoke, said, "I have learned not to bet against Browning." Roger said he and his staff plan to take Monday, December 3, off. They don't want to be in a Chicago hi-rise building on that date. "If it doesn't happen," said Mr. Spencer, "we just got a day off. If it does, then we will definitely be better off at home."

#### What is an Appropriate Response?

Browning says, "I fear public panic more than I do an earthquake. However, I want the public to be forewarned if that can be done without panic." He says, I hope that I am wrong and that on December 3 I will look like a fool." Dr. Browning does not personally think he is wrong, however. All of the people I spoke with said he is a very careful man and even though he has not always been right, none could think of an instance when he made a specific forecast concerning an earthquake or volcano when he was wrong. He has been wrong, some said in his short-term climatic forecasts and in some of his political prognostications.

Some seismologists have said, "If you make enough predictions, you're bound to be right on some of them." I disagree. Last October Dr. Browning made a prediction that came true. He picked the correct span of time within 24 hours and estimated the magnitude to be "about 7.0." He picked the location. If you simply had the U.S.G.S. information that the Santa Cruz part of the San Andreas Fault had a 30% probability of a 6.0-7.0 quake in the next thirty years and picked a two day interval of time in those 30 years and were right, as was Dr. Browning, chances of this happening would be from one chance in about 2,500 or, depending on how you consider it, as little as one chance in over 100,000. Unless Dr. Browning has been making thousands of predictions, being wrong in most of them, the idea that "if you make enough predictions, you're bound to be right on some of them" is not valid in relation to Dr. Browning.

The fact is that Dr. Browning has not made large numbers of predictions (or "projections" as he prefers to call them). According to all the sources I checked, he has made very few and most have been correct.

My conclusions are as follows: We believe from the work of Arch Johnston, Memphis State University, as published in the "Journal of Geophysical Research" in 1985 that the New Madrid Fault has, in round figures, a 50% chance of at least a 6.0 or greater by the year 2000. It has, perhaps, a 33% chance of a 7.1 and a 10% chance of a 7.6 event by the same year 2000. These are statistical forecasts based upon history, seismographic measurements, and paleoseismic data. Dr. Browning's prediction is reasonable. Arch Johnston's figures do not favor any specific date during the next ten or fifty years, but do speak to the possibility that December 3 could be the date (+ or - 2 days).

From a seismologist's point of view, we cannot say December 3 is any more likely than today, tomorrow, or ten years from now. Dr. Browning's track record (which is not a scientific way to consider things) would suggest that perhaps there is a higher probability for a destructive earthquake in the New Madrid Fault on December 3, 1990, than most other dates in the next few years. According to Dr. Browning, chances are 50-50 during that span of time (December 1-5, 1990).

The Missouri and Arkansas National Guards are planning earthquake exercises during those dates. Perhaps this is the prudent thing to do. If it doesn't happen (and chances are it won't), then only an exercise took place which would have been scheduled to take place anyhow. If it does happen, then everything would be ready.

#### THE MOST IMPORTANT POINT OF ALL

The important thing to realize is that destructive earthquakes will happen from time to time in the New Madrid Fault. They have happened in the past and they will happen again. Whether or not such an event occurs on or about December 3, 1990, has nothing to do with the necessity for the central United States to prepare for such an eventuality.

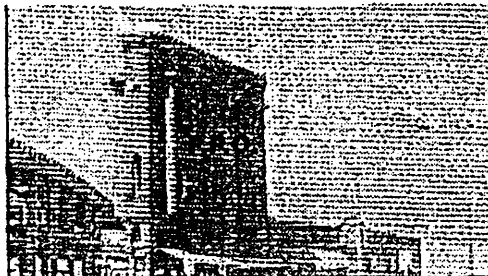
We must guard against preparing for a December 3 earthquake and then if it does not happen (and Dr. Browning repeatedly emphasized that it may or may not) people become apathetic or indifferent about earthquake preparation and do not get ready for what will inevitably come at some time, whether December 3 or not. And even if such an event does occur on December 3, it won't be the last.

The challenge we have at this point is to put to good use whatever Dr. Browning's projection is worth without letting it work against the essential earthquake preparations we must make in the midwest.

It will be a tragedy if what Dr. Browning has forecast comes true on December 3. It could be a worse tragedy if it does not happen and people become cynical and unmotivated in earthquake preparation so that when the destructive quake does come they are not ready.



**At the 1989  
Blanchard New  
Orleans Investment  
Conference the  
audience sat spell-  
bound as Dr. Iben  
Browning predicted a major earthquake  
would strike North America in 10 days time.**



What was once a six-lane freeway through Oakland, is now a mass of twisted metal and broken concrete as Dr. Browning's startling prediction comes true.

**On October 17, 1989 — 10 days later — San Francisco covered  
in fear as Dr. Browning's startling prediction came true.**

*What does all this have to do with making  
hand-over-fist investment profits?*

Dear Friend:

Why was climatologist Dr. Iben Browning making a presentation at an investment conference in the first place?

Well, if you play your cards right, what Dr. Browning has to say about earthquakes, volcanoes and the weather could significantly increase your personal wealth. Without being overly dramatic, I think I can safely say that what he has to say — in addition to making you a lot of money — could very possibly save your life. You'll see why in a minute.

**The color of sky affects the  
green in your pocket**

Dr. Browning is one of this nation's leading climatologists. Simply put, he forecasts long-range weather patterns. On behalf of large corporate clients — such as Faine Webber and Homestake Florida Community Bank (which finances approximately 50% of Florida's citrus growers) — he analyzes the effect this weather will have on a wide range of economic, investment, social and political issues.

You see, weather is one of the least understood but most vital forces impacting each of us.

A drought can devastate farmland, sending price inflation soaring. When it comes to the supply and demand relationship for food, supply is the only fluctuating factor. Demand is constant... everybody has to eat.

A prolonged cold spell can drive gas and heating oil prices out of sight.

A major hurricane or earthquake can wreak havoc with government budgets and threaten insurance companies.

Weather can also be responsible for massive political upheavals. You have no doubt wondered why the Soviets have gotten so chummy lately. A friendly Soviet, according to Browning, is a hungry Soviet: drought has wiped out their grain reserves.

And that's just the beginning: Dr. Browning is now forecasting the onset of the worst weather in the recorded history of the United States.

**One Eye-Opening Video Tape**

I have just previewed a very special video tape, featuring Dr. Browning. It made me do a lot of thinking. In some respects, it is frightening.

But as I watched I couldn't help but furiously scribble notes about ways, with just a little effort, I could make one heck of a lot of money out of the information I was hearing.

For those of you who have heard Dr. Browning speak in the past, you can skip the rest of this letter and head straight for the order form. I know you'll jump at the chance to hear him again.

But if you have not yet heard Dr. Browning speak, then the video I am about to tell you about will be your best way to meet him... to profit from his incredibly accurate predictions... and to hear him say goodbye.

Dr. Browning, now 72 years of age, has just announced his retirement.

**The Lessons Learned In A Brilliant Career**

Dr. Browning won't be one of those Americans short on retirement cash. Over his incredibly prolific career he has been well paid by corporations around the world for his research. He is also the holder of 67 patents — including ones recently granted for high definition large screen television and a voice compression system used in satellite communications.

But his retirement does mean that he'll no longer make his already infrequent public appearances, or write for publication. (Not that you have heard much from him any way. Dr. Browning fervently shuns the media: he doesn't like or trust the press and simply refuses most interview requests.)

In fact, the only reason Dr. Browning agreed to sit through over an hour of probing questions was because he wanted to leave a permanent record for posterity. And because he felt it was essential that Americans prepare now for the challenges just ahead.

**100 minutes of startling (and  
profitable) predictions**

"Climate and the Affairs of Man," a 100 minute long video presentation, is Dr. Browning's farewell to the business and investment world. And your last opportunity to profit from one of America's true geniuses.

Here are just a few of the extraordinary forecasts you'll hear on the video...

- ✓ the specific day and place in the U.S. that an earthquake as much as 32 times stronger than the San Francisco earthquake will strike later this year.
- ✓ Why we'll see the worst weather in the history of the United States between now and 1994. (The weird and destructive weather — floods, tornadoes, hurricanes, late snows, etc — that we've had over the last couple of years are just mild previews of the unprecedented chaos to come.)

why we could be on the verge of an economic catastrophe (and a period of incredible opportunity) such as hasn't been seen in this country since the 1929 depression.

Please note that Dr. Browning is not some sort of "guru" who mystically foretells the future. Far from it. He is a nuts and bolts research scientist of the first order who has developed easy-to-understand ways of pinpointing climatic "triggers."

It is these triggers which set off earthquakes, volcanoes, and create erratic weather. In the video, his methodology is explained in language you can understand... a methodology that has earned him a documented track record of over 90% accuracy.

I can tell you one thing, if only fifty percent of his forecasts come true... we're in for a wild ride these next few years.

### How you can profit

This video tape is truly fascinating. So much so that you'd be happy to pay the \$99 for this limited production video even if it couldn't make you a lot of money. But the fact is, it can. You'll profit in six different ways from your copy of Dr. Browning's revealing tape...

1. You'll learn just how important a role weather plays in the affairs of man... how to forecast weather trends yourself... and how to profit. This video will unlock weather's mysteries for you.
2. You'll learn which crops in the next few years will freeze... or literally dry up and blow away... allowing you to reap mega-profits from futures, options and "forward" markets (don't worry, the comprehensive yet quick reading report that accompanies the video will tell you everything you need to know about how to easily and safely turn Dr. Browning's predictions into profits).
3. You'll learn which industries and specific companies will see their profits soar as markets fall. You'll learn which to sell NOW. The effect Dr. Browning's forecasts will have on real estate and gold are also discussed in depth.
4. You'll learn the real reason behind the last great depression... and when Dr. Browning is forecasting the next depression to hit. (The last depression created more millionaires than any other point in history. We can't promise you millions... but with just a little creativity, and cash... you could add significantly to your net worth.)
5. If you live in the earthquake zones identified on the video, this video could save your life! You'll definitely want to be out of town on the day, later this year, when Dr. Browning is calling for the next big earthquake to strike. You'll also want to buy a lot more insurance. The report that accompanies the video tells you how to make sure you are adequately protected.

(Warning: the target zone is not in California - though some effect may be felt there as well.)

6. You'll gain priceless insights on a wide range of important current topics... the horrifying truth about AIDS (Dr. Browning, also a biologist, has studied the disease and holds a patent on a new AIDS decontamination device)... about environmental threats such as global warming and holes in the ozone layer... the real reason for Soviet peace overtures... and much, much more.

I guarantee - literally, see below - that you won't want to miss this opportunity to secure a copy of Dr. Browning's tape. It will give you something to think about, and talk about, for years. For example, every time one of Dr. Browning's predictions come true.

A caveat. The video, while of a professional studio quality, is no Hollywood production. It is, however, the kind of video you're going to want to roll up your sleeves, grab paper and pen, and watch time and time again. You're going to want to share it with family, friends and associates.

- ✓ And, so you'll be able to act - the video is accompanied by a concise written report that sums up Dr. Browning's investment related forecasts and guides you to action. The advice offered is simple, safe and practical. Nothing exotic.

How much could you make from this video? Would you have been happy with a 4.285% net profit in just six weeks? That's how much you could have made using a limited risk strategy in advance of the year-end 1989 freeze when over 40% of nation's citrus crops were destroyed. Dr. Browning saw it coming months in advance.

### TIME-DATED MATERIAL - ACT FAST

Because much of the information on this video is time-dated - including Dr. Browning's important 1990 earthquake forecast - it is unlikely that this offer will be repeated.

If you fail to act, you could miss one of the most valuable additions you could possibly make to your video library. And one of the most important investment decisions you could make at this critical juncture of time.

Send in your payment today, now. Don't miss out on this incredible opportunity to see into the future. Act today.

Sincerely,

## "Climate And The Affairs Of Man"

A limited edition video and special report

- Yes!** Please rush me      copy(s) of the eye-opening video "Climate and the Affairs of Man" featuring Dr. Iben Browning at \$99 each. I understand that my video also comes with a concise report summarizing Dr. Brownings predictions and analysis and shows me easy ways to profit. 100% MONEY BACK-GUARANTEE. If I am not completely satisfied with my video and report, I may return it within 30 days for a full refund.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_

Send check or money order or charge:

Visa  MasterCard  AMEX TOTAL: \$ \_\_\_\_\_

Card # \_\_\_\_\_ Exp. \_\_\_\_\_

Signature: \_\_\_\_\_



# THE COMING TWO YEARS—1990—1992

Dr. Iben Browning speaking in Chicago, October 31, 1989

Dr. Iben Browning is the executive Director of the Thomas Bede Foundation, a non-profit contract research corporation. Dr. Browning consults in over twenty fields ranging from electronics and computers to microbics and space navigation. He holds 66 patents, has written more than three dozen scientific papers and is the author of several books. He shares his knowledge and insights through the Browning Newsletter of which he is the author and publisher. Dr. Browning received his BA in Math and Physics from South West Texas State Teachers College, his Masters and Doctoral degrees in Zoology and Physiology from the University of Texas, Austin.

For many years, Dr. Browning has periodically talked with PaineWebber clients about the weather and the political and social implications of climatic change. On October 31, 1989, he met with a small group in Chicago. Those of us who have been privileged to listen to Dr. Browning, and many others who have kept up with his thoughts through the printed pieces, have appreciated the opportunity to be informed, as well as entertained. The following is a summary of Dr. Browning's recent speech, together with explanations of the phenomena which, according to Iben control man's destiny.

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Albuquerque had 41 black bears move into the city this fall and try to become neighbors. Now, a 600 lb. black bear as a neighbor is thought provoking. Montana also had an invasion of grizzly bears. As you can imagine, it can really begin to feel crowded with several grizzly bears in your back yard, because they are not intellectual giants - they eat whatever is nearby. As it turned out, bears came down to the foot of the mountains, all the way from Canada to the Mexican border. There was some puzzlement about this at first, but after some investigation, it was found that the late frost last spring killed all the acorns and berries, and killed the fruit crops at 7,000 feet. So when fall arrived, the bears, who like to get fat before they go find themselves a place to sleep, ranged further down the mountains, creating somewhat of a furor. This is only the second time that this has happened in living memory, the previous time was 1976.

Since I happen to believe that the past can help project future conditions, let me remind you of a series of events. In 1975 and 1988 we had severe droughts. In the spring of 1976 and the spring of 1989, there was a late frost which killed all the acorns and berries. The fall of 1976 and the fall of 1989, the bears came down to the towns around the mountains, all the way from Canada to Mexico. The fall of 1976 was followed by the winter of 1976-77, which was memorable to say the least. In 1976-77 the area east of the Mississippi experienced some of the coldest temperatures in 200 years of records. So to whatever degree that three checkpoints enforced by the presence of countless bears (if that is a statistic), and if the future resembles the past, then this winter should compete with the coldest winter in 200 years east of the Mississippi. This will mean that more than the average amount of fuel will be used, for whatever that is worth.

Overall, global weather is becoming colder, less predictable, and more volatile. For example, the snowstorm which dumped 8 inches of snow in Indianapolis in the middle of October this year was the earliest storm of that size in 100 years. 1990 is going to be a pivotal period as all the major components which act together to determine global weather become more variable. Sunspots and tidal forces, two primary determinants, will intensify during 1990-1992, with maximum gravitational impact north of the equator. Since only about 5% to 7% of the world's arable land is south of 20 degrees south, these changes will greatly affect the majority of the world's population. Sunspot activity will reach a peak in early 1990. High tidal forces will maximize on December 3, 1990 at 30 degrees north latitude and 45 degrees north; and again in January, 1992 at 20 degrees north latitude. This will create conditions which will produce some of the stormiest weather in our history, since 1760.

As sunspot activity reaches a maximum, the tropical air mass will be warmed to its maximum. Tidal force maximums will trigger volcanoes which in turn produce conditions which create clouds. As clouds reflect the sunlight away from the earth, the air inside the polar vortex will become cooler. Where the edge of the polar vortex converges with the tropical air, a storm track called the jet stream is generated. The greater the temperature differential between the polar air and the tropical air, the greater the velocity of the jet stream, and the more convoluted (lobed) it becomes. During the next few years, 1990-1992, this highly lobed jet stream will bring severe storms sweeping across from the west to the east in a saw-tooth pattern, down along the Mexican border, up into Canada, down to the Gulf of Mexico and back up into Canada.

But remember, we live on a very large landmasses. So large in fact, that what I experience in New Mexico may be much different from what you experience in Chicago, or your friends experience on the East Coast. So as I say it is getting colder, and there will be intensive storms, I am speaking of a global trend, not what happens daily in each individual state or country. In various regions and during different seasons there will be tornadoes, hail storms, very high winds, dust storms, flooding, heavy snows in some areas and areas where droughts and Chinooks leave out snow completely.

Another result of the high tidal force maximum will be an increase in earthquake and volcanic activity. In November, 1985 and December, 1986 there were high tidal peaks with maximum gravitational impact south of the equator. In September, 1985 there was a Richter 8 earthquake in Mexico City and in November another earthquake in Columbia which killed several thousand people. There were also volcanoes in Hawaii, Columbia, Papua New Guinea and the USSR between September and December, 1985. Some people don't seem to think much of the theory that high tidal forces trigger earthquakes and volcanoes, but the earthquakes and volcanoes seem to comply, so I don't ask for approbation.

This year, on the 12th of October, I found myself in San Francisco, talking to a group of CEO's from a farm equipment group. I mentioned that I had worked out a chart back in 1985 which projected the dates and times of high tidal forces. It seemed that since many of them planned to stay over for the baseball games, I should mention that there was going to be a high tidal force centering around October 16, and that there would probably be an

earthquake. I told them that we knew that it could not be larger than a Richter 7 because it takes at least thirty years for a Richter 8 to get ready, and there had been a survey seven years ago monitoring the accumulated strain along the fault. I did, however, miss my calculations by a few hours since I expected the quake to occur about 10:45 a.m., but it was close enough for a government worker.

The last two major high tidal peaks were in 1972 and 1982. In the past, each time we approached the time of the high tidal forces, there were a couple thousand earthquakes in the month preceeding and following the tidal force. The next time it is going to be very dicey is December 3, 1990. According to my calculations, there will be a high tidal peak on December 3, 1990, at 30 degrees north latitude, which will be a 27 year high, and also at 45 degrees north. Again, on January, 18, 1992 at 20 degrees north latitude an even higher tidal force will occur, one of three highest highs in over 1,000 years. California will be at risk for quakes during this time, as well as the Phillipines. Another area which will be at risk during this period is the New Madrid Fault. By December, 1990 it will have been 179 years, which is a full tidal cycle, since the last earthquakes in this area in December, 1811 and January-February, 1812. During that winter there were three earthquakes, all above 8 on the Richter scale. I don't know if this brings anything to mind, but I will plan to be in New Mexico at the time.

During warm periods, such as we have been living through, man tends to get the impression that he is in control. However, all of these natural phenomena combine to affect us in rather considerable detail. During the last half century we have lost sight of the fact that these forces control, we respond. There is a long history of these events which makes me extremely confident in projecting the future. By taking a simple multiple of tidal forces times inverse sunspots, you get an index of cooling. When plotted, there is a cyclical pattern. My calculations, starting in 1760, show that there have been four cycles. There was warm weather until the late 1770's and then it got cold again. In 1772-75 there was a depression; 1775-83 there was a revolution; 1784-88 there was aggression during which time we annexed everything east of the Mississippi except Florida. Another period, beginning in 1837, was our longest depression; it bottomed out in 1843, and 1846-48 during the period of recovery we had a war with Mexico, during which we took the states west of the Mississippi. Again, a depression bottomed out in 1893 and during the period of recovery we fought the Spanish American War, followed in 1899-1906 by the Phillipine insurrection. This was the third longest war we ever had, and we increased our territory a great deal, taking the Spanish empire. The next period was the 1930's, some of you may remember that.

Now some will dispute this correlation, saying that we aren't aggressive. I disagree, at no time in our history have we shown the level of aggression that we are now showing (we are just calling it something different). As early as 1979 we established human rights as the behavior which governments must have towards their people, and we have attempted to enforce that relationship. We have invaded Grenada, bombed Libya, and we have talked about authorizing the CIA to assassinate heads of state. We have just authorized the FBI to enter any country in the world, arrest anyone who has violated U.S. laws, and bring them home for punishment. And, we are in the process of attempting to establish homogamy over the Communist Empire. That is pretty aggressive.

Every great period of depression and war in our history - 1780, 1840, 1890 and 1930 have been at times exactly like this. It will be a period for maximum alertness. As we enter the 1990-1991 period, I expect us to enter another round of depression, war and aggression. A great many opportunities will come into existence, but the opportunities will have two forms - you can win or lose.

These are projections, not predictions. Projections are made on the basis of calculations; e.g. if the situation was thus and so under certain conditions, then, if those conditions exist again, a projection of like circumstances can be made. So, if the future is like the past, I project that the next two years will be punctuated with increased volcanic and earthquake activity, high winds, storms, colder weather, and social change. The coming decade is likely to be one to remember.

November 9, 1989

Edited by: C. Judith Seime

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Talk by Iben Browning to Faultless Starch/Bon Ami  
 Company & Guests  
 Kansas City Club  
 Kansas City, Missouri

[Editor's note: The following has been retyped for legibility. Lengthy sections not relevant to the New Madrid prediction have been omitted, but it is otherwise word-for-word identical to the original.]

Dr. Iben Browning's Breakfast Talk  
 December 8, 1989

When I was on an international tour, September 19, 1985, there was an earthquake that hit Mexico City a Richter 8. There was a new moon and high tidal force and then other volcanoes and so. So I distributed this in 1985 and I had down October 17, 1989 as the point of high danger, and that was the day of the earthquake in San Francisco.

This was 30° north latitude for the high tidal force. And then again on the 3rd of December, 1990 there will be a 27 year high, 30° north latitude. There's another unique thing about that, the tidal force occurs in 179 year cycle, the average length of a tidal cycle is 179 years, so we'll be back in exactly the same position as we were 179 years ago which was the time of the new Madrid Earthquakes. It will be back with the same configuration as we were when the New Madrid Earthquake occurred December, 1811 and we'll have a 27 year high tidal force. So I attach a much higher than usual probability of the New Madrid Quake of some magnitude, which should be of interest here. Since the one then cracked streets in Washington, DC and rang churchbells and broke windows in New England.

This is merely a triggering force, it is not an earthquake force. The earthquake energy is provided by the local terrain. Well, in San Francisco, what that was was a strike slip, the San Andreas Fault, the west side is sliding north, the east side is fairly stationary. But in the New Madrid area it is a diaphragm. It will snap up instead of sliding, it just snaps up. It's a process known in geology as Isosticy, everything attempts to come to its own level. Well there has been an accumulation of some energy in the New Madrid Fault, the Mississippi Delta has grown several hundred thousand cubic miles in volume, that is to say, soil has been eroded away on the central shield. So this is unloaded, the central part of the country, so the process of Isosticy has been a process of loading of that Fault, so it has a good chance of, so I would say have your dishes down flat, and try not to be on top of a tall building on December 3 next year.

The following time there's a high tidal force that will be the 18th of January, 1992, that will be a 20° north latitude at 20 plus or minus a few degrees, there is an enormous number of huge volcanoes. So there's a high

probability of a very high tidal force, it's the highest tidal force in 54 years, and a high probability of triggering volcanoes at that latitude. The last time we had a volcano at 20° north, actually 17.3 was El Chichone in 1982, and El Chichone caused, well it was immediately followed by the El Nino current—El Chichone put up so much debris into the atmosphere that the net sunlight falling on Hawaii over \* \* \* [illegible].

Ninety to 95% of all the anchovies disappeared following the 1982 El Chichone and 60% of salmon and 60% of the king crab disappeared. The temperature along the west coast of the Americas went up 6° centigrade, fish don't spawn when the temperature changes more than 1° centigrade, so that's why so many fish disappeared. In the North Atlantic following that volcano at that latitude, 20% of all the fish in the North Atlantic disappeared in the following winter. Earthquakes are important only if you're there, but volcanoes are important wherever you are, so that could be expected to produce major climatic changes following January, 1992.

Let me show you the plot of the tidal forces now. (Charts provided for audience). October 17, '89, December 3, '90, January 18, '92. These are separated by 413 days and these separated by 413 days, this is the plot of the actual tidal forces, this is the high tidal force at December 3, 1990, this was the 17th of October, 1989, this will be the 18th of January, 1992. These calculations were done for me by the Navy Observatory. So then the excitement is over until 2008. A little bit of excitement here in 1999. But enormous excitement in 2008. This will be the highest tidal force in 96 years. So at that point in time the sky will become red, you'll be unable to see the sun until it's about 15° above the horizon because of the dry fog and it will be very very cold indeed.

So that's sort of the rundown of current events.

We have excitement continuing on out into the middle of 1992, so far as, earthquakes and volcanoes are concerned, and the consequences of that for that year and the following year.

Now I should speak a little bit about the greenhouse effect. You've heard a lot about greenhouse effect. The first thing let me say about it is it's hogwash. It's getting colder not warmer. I don't want to equivocate about this, it's just a pack of lies. Glaciers are growing in the northern hemisphere. For example, this is a glacier, all of these bars here (showing on the chart) are glaciers growing and is all around the northern hemisphere. Each time the volcanic activity is high, glaciers grow. They did not grow in the period from 1920 to 1950 because there was no time when the volcanic activity was high, and they started growing again when the volcanic activity got high. Now glaciers are now growing very rapidly in the northern hemisphere. And glaciers seldom grow in warmer weather.

The second observation is that if you take a 12 month running average of ice and snow cover, it's increasing.

This is a composite of photographs from space as calculated by N.A.S.A. until 1972 through 1971 we had about 21 million square kilometers of ice and snow cover in the northern hemisphere. 1972 jumped about 2 million square kilometers and then since 1972 we've been running about 25 million square kilometers. We've increased our ice and snow cover in the northern hemisphere about 4 million square kilometers, which since that time the Russians have not made but one good crop. They are planners. And Communist planners, their plan always is, if we succeeded last year, let's do the same thing. Well they establish their habits in the warm weather. See, Communist came into power in 1918 after the weather got warm, and it's going out of power and as a consequence the weather is getting cold, because plans work—agricultural plans in particular—only in warm weather. Russia doesn't have that anymore and I have some bad news for them, it's not going to get warm again until about 2070, so it's going to take a lot of breath holding to hold out.

In the meantime the Russians had one good crop since this happened and that was this year, and all other years they've had crop failures. This year their crop failure was especially bad—they planned on 245 million tons, they claim they made 207 million tons. If you have a decrease of production of 10% below the plans, that's called a disaster, if it's 20% below plans, that's called a catastrophe. In 1975, instead of producing 222 million tons, produced 138. They didn't have a name for it.

Then, forests are advancing in the south and retreating in the north. As it gets cooler, the polar vortex expands and the storm-track goes south. You'll notice today, for example, that the snow is south of here. There is no snow here and no snow north of here. The storm-track has retreated toward the south and with it, of course, the moisture. Next spring people who enjoy driving around on dry streets this winter are going to hate it next spring when they have nothing but dust to plant grain in.

If you go to New Mexico or Arizona you'll find that out from the forests there are little trees growing for 100–150 feet. So the forests are advancing in the south. On the other hand, if you'll recall the fires in Yellowstone and in Idaho and so on, those were not little trees that were burning, those were big trees. So when the big trees are burning in the north and the little trees are out in front of the forests in the south, the forests in general are advancing south. There's another way of checking that.

If you don't happen to have a forest or a glacier maybe you've got bats. We have bats in New Mexico. We have Carlsbad Cavern, and 10 years ago, every night an eighth of a million bats would come out every night. I'm not sure who counted them but they said that's how many there were, and that was 10 years ago. Now one and an eighth million bats. Nine times as many bats come out every night. What that means is conservatively speaking that

there's nine times as much bat food, but you can't have nine times as much bat food unless that desert is getting some rain. So what's happening is that the storm-track has swung far enough south that the rain is maximizing down there instead of over Kansas where you'd like to have it for wheat. We have room for wheat growers down there.

Canadian government reports that the North Atlantic is cooling. The weight of North Atlantic fish is getting less. For example, the fish off of Iceland. Ten years ago the fish ranged 10–12 lbs. each. Now they are 8–10 lbs. each. There is less fish food, the water is colder. There's many lines of evidence that it's getting colder not warmer. Only theory says that it is getting warmer. All the data is in the opposite direction.

Now there's a very slow thing that I have wanted to show you that I'm going to relate terribly close to everything else, but this is the magnetic field inclination in the northern hemisphere. Now the fact that the North Magnetic Pole is just northwest of Hudson Bay is not news, but the fact that it's just passing by may be. It is proceeding west.

Now 400 years ago the Magnetic North Pole was over this direction from the north geographic pole. It was pointed toward England, in England there are records from tree rings of temperature. And in France straight south of England, people were building campfires on wet clay.

You can go to an old fossil campfire site and find the orientation of the magnetic field at the time the campfire baked the magnetic field orientation into the clay. If you go back through history we can find out where the magnetic field was because bricks of ancient cities have the magnetic field baked into them. Sun baked bricks. Anyway, here are three campfires in the 800 A.D. period, and then the earth's magnetic field varied like which is a record of the magnetic field passing by England and there was a corresponding 1° change in temperature in England at the time this magnetic field was passing by in France. This is an 800 year cycle, it's a 1° change. Now 1° doesn't sound like much, but 1° cooling moves crops 300 miles south. So that is one source of 1° cooling. The magnetic field has swept passed us now, it entered the United States in 1880, it's now pointing toward Bismarck, North Dakota and it will exit the western part of the United States in about 2060. It moves across the United States in 180 years.

Switching away from that, let's look at the record of volcanoes. There are various kinds of records of volcanoes but this is one of the better ones. In Greenland ice and in Antarctic ice the sulphuric acid record shows every volcano that has existed, which the records go back 10,000 years or so, this is the last history of the United States. Now this is tidal forces in the northern hemisphere, tidal forces in the southern hemisphere which you'll notice are reciprocal. When the northern hemisphere has low tides the southern hemisphere has high tides and vice

versa—the northern hemisphere high tides, southern hemisphere low tides. When there are high tidal forces in the southern hemisphere, it triggers great volcanoes in the southern hemisphere. When our high tidal forces in the northern hemisphere, it triggers great volcanoes in the northern hemisphere. Now when volcanoes occur and there's a lot of sulphuric acid, then that is the time it is cold. Thus, for example, this was 1796 that the tidal forces were low in the northern hemisphere. As the tidal forces went up in the northern hemisphere and were high in the southern hemisphere, 50 years of severe volcanic activity occurred in the northern hemisphere and it was very cold. What is going to happen next? Exactly the same thing, because we are now in a period of rising tidal forces in the northern hemisphere, high tidal forces in the southern hemisphere, so we will have 50 years of high volcanic activity here as we did here. So that will make the weather very cold in the ensuing 50 years.

The literature will continue to reflect the greenhouse effect as long as the grants hold out.

What's the effect of the volcanic activity? Let's concern ourselves with that. What effect does it have on people, or is that a completely abstract piece of knowledge? Here is the history of the United States as reflected by volcanic activity recorded in Greenland ice. Everything on the left side here is periods when it's warm. Everything on the right side is high sulphuric acid times when it is cold. How's it make it cold? Volcano goes off—shoots a large amount of sulphuric oxide in the stratosphere. El Chichone, for example, in 1982 shot 40 million tons of sulphuric oxide into the stratosphere. The sulphuric oxide combines with ozone—you've heard of the ozone hole—that's how it gets there. Sulphuric oxide combines with ozone to make sulphur trioxide and that combines then with water to make sulphuric acid, and the consequence of the sulphuric acid is, "the droplets trickle down from the stratosphere down into the troposphere nuclear clouds and clouds then reflect sunlight which leaves it cooler below. That's the mechanism. So when there's very little sulphuric acid, it's warmer below because more sunlight gets through—less clouds. Here is a period from up until about 1757 or something like that—56, when it was nice and warm in the colonies, then it got cold and we triggered the french and indian war which spread to Europe as the seven years war. It's the first time we amounted to a historic group of people because we managed to trigger a war in Europe.

[Eight transcript pages of this talk are omitted here. In this omitted section, Browning continues to argue for a relationship between cycles of crop failures and weather variations caused by cycles of volcanic eruptions which, in turn, were caused by cycles of tidal loading. For the period from 1992 until about 2070, he predicts an increased

rate of volcanic eruptions and earthquakes due to increased tidal forces. The following is a short excerpt from a question and answer session that followed this talk.]

- A. \* \* \* Meantime our food reserve has declined each of the last three years, both in the United States and in the world. The world's food reserve now is 60 day reserve, only 60 days. The next two years, if I'm correct, we will have drought and our crops will be much less than we need, so we will use up our reserve, which is already small. We'll use up our reserve next year.

In the meanwhile the U.S. government shows a total insensitivity to this. They're attempting to buy the loyalty of the defecting Communists with American food reserves. We are using out of last year's reserve. So next year I expect our food reserve to be completely exhausted and then the crop failure the following year will put pockets of famine in the USA. So I think Americans will take poorly to hunger, especially starvation and I expect there's at least a 50/50 probability that the federal government of the U.S. will fall in 1992. It's not a recommendation it's just a probability.

You can see how people who are accustomed to eating are going to have a helluva time breaking the habit.

- Q. This gets back to some people that used to tell us to put in food reserves at home.
- A. Well don't bother unless you also put in munitions reserve. I ran across the fact that in Oakland, maps were being sold on the streets with all Mormons' homes marked on them. I called this to the attention of Mormons and they seemed a little uneasy about it.
- Q. In 1992 if things are this way in the northern hemisphere, should I move to Buenos Aires?
- A. Well there's a problem there, you see there's so many Argentines already there.
- Q. Right, but you see they'll be happy and fat and they'll love to have me.
- A. Well, I recall the story of the lady who searched all over the globe and finally found the ultimately peaceful spot and went there, it was the Falklands?
- Q. Okay, but that was when the weather was bad down there.
- A. Well that made it even more attractive because she wanted a place that was peaceful. But even the Argentines went in despite the bad weather.

**In a 1990 video interview, Dr. Iben Browning warned that a devastating earthquake could strike America...**

**His words of caution triggered a media frenzy...**

**Yet, the December 3, 1990 earthquake never occurred. So why should you pay close attention to what he has to say now?**

Unfortunately, the media got it wrong... dead wrong... and in the process overlooked Dr. Browning's critical messages on volcanoes, the weather, the economy and on the future of man.

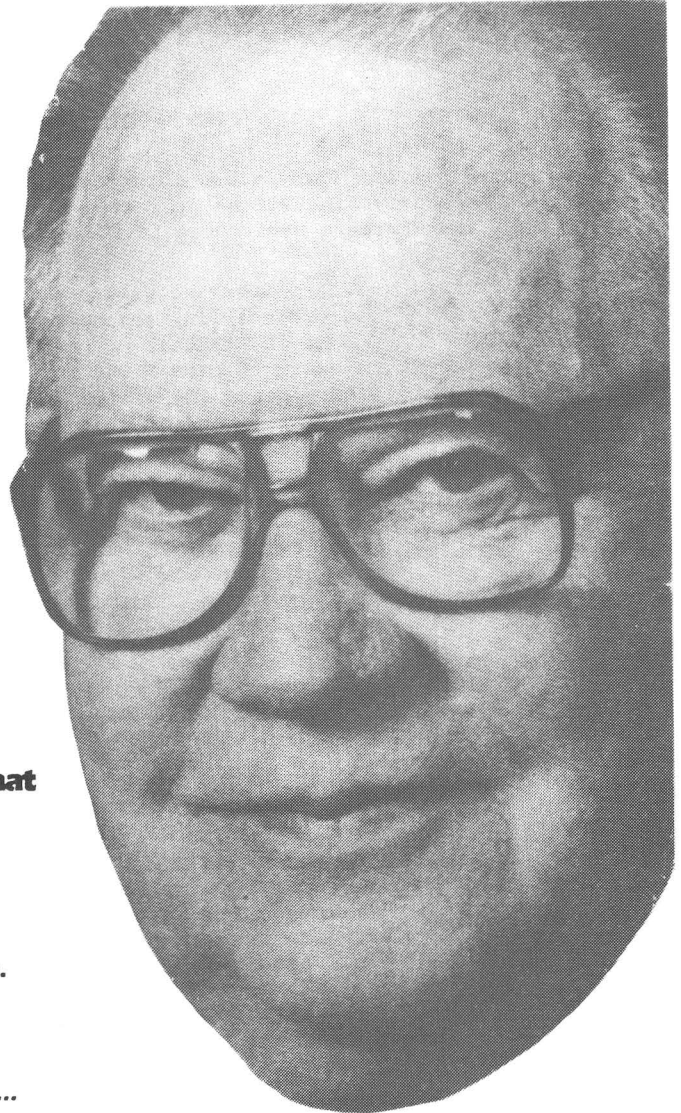
*Recently, Dr. Browning agreed to sit for a new exclusive video interview. Read on for details on a risk-free opportunity to spend time with Dr. Browning... and to prepare for the incredible events just ahead.*

Dear Friend:

Dr. Iben Browning entered the first grade of school at two and a half years old. Since that auspicious start, he has enjoyed a career of almost unimaginable diversity and success... academically (graduating from university at age 19), in the military (test pilot, inventor of sophisticated aircraft guidance and weapons systems) and professionally (with some 68 patents to his name).

Rancher, farmer, engineer, physicist, biologist, test pilot and teacher... Dr. Browning is a true American original whose I.Q. literally tops the chart. Yet of all the things which Dr. Browning has done in his incredible career, it is the study of the climate and its effect on mankind that has most captivated his attention.

Which is good news for you. What Dr. Browning has to say about today's weather is both fascinating and of critical importance to you. What he has to say is not just of passing interest.



**Dr. Iben Browning** — what he has to say will help you make crucially important decisions on how you invest, where you live and how to best prepare for the next 5 critical years. Risk-Free Offer.

(over, please...)



## **APPENDIX B**

# **OFFICIAL STATEMENTS ON THE DECEMBER 2-3, 1990, EARTHQUAKE PREDICTION AND DAVID STEWART'S RESPONSE**

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A number of "predictions" of earthquakes based on correlations with tidal potentials have gained wide attention in the news media in recent months. One of these, by Dr. Iben Browning, a consultant in Albuquerque, New Mexico is for the high likelihood of a large earthquake in the New Madrid region for December 3, 1990. Because of the media attention and public concern attached to this prediction, we feel that it is important to show that Dr. Browning's methodology is ineffective for predicting earthquakes; thus an earthquake in the New Madrid region on December 3, 1990 is no more likely than at any other time.

Several questions can be asked concerning Dr. Browning's methods and his application of them to the New Madrid region:

Is Dr. Browning's methodology new?

No. Attempts to correlate earthquake occurrence with earth tides were made at least as early as 1936 and many papers on that topic have been published since then. Moreover, Dr. Browning is not the first to consider the vector sum of tidal forces at specific latitudes. Earth scientists have been able to make such calculations for many years and standard programs have been available since at least 1969.

Do past earthquakes consistently correlate with tidal effects?

Several seismologists have considered this problem. A few have concluded that earthquakes are triggered during tidal maxima; others have concluded that they are triggered when tidal amplitudes change most rapidly. Other studies find no correlation between earthquakes and tides at all. This includes a recent study in 1985 by an author who found an earlier correlation, but later concluded that his statistics had been faulty.

Will there be a tidal maximum on December 3, 1990?

Yes, but tidal maxima also occur at many other times, some of them similar in magnitude to that on December 3rd. Gravity values on December 3rd are only slightly higher than values at peaks in late May and June. Why were there no earthquakes then?

Did other New Madrid earthquakes occur at times of tidal maxima?

In 1811-12 there were a series of three earthquakes greater than magnitude 8.0. The first earthquake, on December 16, 1811, occurred on a maximum, but it is a typical maximum, no larger than others which occur about every two weeks. The earthquakes of January 23 and February 7, 1812 occurred close to tidal minima.

Other damaging earthquakes in the New Madrid region occurred on January 4, 1843 (Magnitude 6.0) and October 31, 1895 (magnitude 6.2). Both occurred closer to the tidal minimum than to the tidal maximum.

Are the tidal force effects on earthquake faults unique?

No. Simple calculations show that under the most generous assumptions, tidal effects can add at most several hundredths of a bar (or several hundredths of standard atmospheric pressure) to the stresses promoting failure on a fault. Several other natural processes can do this as well (or better), including weather fronts, heavy rainfall or a high river stage. Why, then, pick on tidal forces?

Conclusion

The above discussion indicates that there is no reason to believe that an earthquake will be triggered by tidal forces on December 3, 1990. Dr. Browning's prediction therefore should not be considered seriously. We do, however, live in a region that is at risk from a damaging earthquake. The likelihood of a magnitude 6 or greater earthquake occurring in the New Madrid region in the next few decades is fairly high. Just because Dr. Browning's prediction is invalid is no reason to be complacent.

This information was compiled in cooperation with the Department of Earth and Atmospheric Sciences, Saint Louis University. For more information about earthquakes and earthquake preparedness contact:

Center for Earthquake Research & Information  
Memphis State University  
Memphis, TN 38152  
(901) 678-2007



NEW MADRID FACT SHEET

How do we know the Mid-South is at risk from an earthquake?

In the winter of 1811-1812, three of the largest earthquakes in North America occurred in this region. All had magnitudes greater than 8.0 on the Richter Scale and altered the landscape drastically.

Since that time two major-damage level earthquakes have occurred—a magnitude 6.0 near Marked Tree, Arkansas in 1843 and a magnitude 6.2 near Charleston, Missouri in 1895.

In addition, earthquakes of smaller magnitudes were felt in the past and continue to be felt periodically today. Since the installation of seismic instruments throughout the Mid-South, it is known that earthquakes happen all the time (about 150 per year) in the New Madrid seismic zone, but most are too small to be felt by people.

The largest earthquakes felt in this region in recent times occurred in 1976 (magnitude 5.0 with a 4.5 aftershock) and on April 27, 1989 (magnitude 4.5).

Do we know when the next damaging earthquake will occur?

Scientists at the Earthquake Center have computed a set of probabilities that estimates the potential for different magnitude earthquakes to occur:

Magnitude	Avg. Repeat Time	Probability within the next 15 years	Probability within the next 50 years
6.3	70 ± 15 years	40 - 63%	86 - 97%
7.6	254 ± 60 years	5.4 - 8.7%	19 - 29%
8.3	550 ± 125 years	0.3 - 1.0%	2.7 - 4.0%

At this time no responsible scientist is able to predict the exact date an earthquake is likely to occur.

What should I know about earthquakes?

Earthquakes are very common in many regions of the United States and the world. Very large earthquakes are relatively rare.

The ground does not open up and swallow people, houses, etc.

The New Madrid fault system does not run under Memphis or Shelby County. The closest point is 35 miles northwest of Memphis at Marked Tree, Arkansas.

Many small earthquakes do not act as a safety valve for a large earthquake.

You can prevent a lot of earthquake damage by knowing what to do when an earthquake occurs and by preparing ahead of time. This knowledge can help prevent injuries, save lives and dollar losses. Experience has shown that individual action is effective.

More information about earthquakes and what can be done to prepare for them is available from Memphis State University's Earthquake Center at (901) 678-2007. 3890 Central Avenue/Memphis, Tennessee 38152

Additional Statement: Earthquake Probability on Dec. 2-3, 1990

The 2-day probability of an M = 7 earthquake in the New Madrid seismic zone is about

P(2 day) ≈ 1.7 x 10<sup>-5</sup>

Iben Browning projects an increase of this miniscule probability (1 chance in 60,000) to P(2 day) ≈ 0.5 (1 chance in 2) on Dec. 2-3, 1990, on the basis of an extremely small variation in the gravitational force imposed on the earth's crust by the moon and sun, resulting in a stress or pressure difference on crustal faults on the order of 0.005 bar or five one-thousandths of one standard atmospheric pressure. That such a minor stress perturbation could appreciably alter the internal processes of the earth so as to increase the 2-day probability of an earthquake by a factor of 30,000 is outside the range of responsible, supportable science and in the realm of pseudo-science and personal conjecture.

APPENDIX B—OFFICIAL STATEMENTS ON THE PREDICTION

## RESPONSES TO PREDICTION OF A 1990 NEW MADRID, MO, EARTHQUAKE

## CUSEC EARTHQUAKE PREDICTION POLICY

1. We are aware of the News Media reports concerning the possibility of an Earthquake in the Central U.S. on (or about) December 3, 1990.
2. CUSEC's mission is Earthquake Mitigation and Preparedness --not prediction. (Thus), we are not in the position to evaluate the so-called "December 3, 1990, prediction", but accept the opinions of Earthquake Scientists (such as those at the Center for Earthquake Research and Information at Memphis State University) who state that an Earthquake in the Central U.S. is no more likely to occur on that day as any other date.
3. CUSEC's position is that in the Central U.S. Earthquakes could occur at any time, and every day that passes brings us one day closer to that event. The Earthquake Seismologists have informed us that there is a 50% chance of an Earthquake in the 6-7 range (on the Richter Scale) in the next 10-15 years and a 90% chance of it occurring within 50 years.
4. Therefore, it is important to prepare for such an Earthquake as rapidly as possible. This preparation should include:
  - a. Public Awareness and Education
  - b. Mitigation - Structural and non-Structural
  - c. Planning for Response and Recovery
  - d. Training
  - e. Conducting Exercises
5. In Summary, CUSEC strongly urges all public and private organizations and residents of the Central U.S. to prepare for an Earthquake.....not because of the December 3, 1990 reports, but because a damaging Earthquake could occur at any time.

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By

## The *Ad Hoc* Working Group on the December 2-3, 1990, Earthquake Prediction

October 18, 1990

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Although Iben Browning has not prepared a thorough written statement of his December 2-3, 1990, prediction which presents the elements needed for scientific and systematic review, he has made a succession of public statements from which the *Ad Hoc* Working Group has framed the elements of his prediction. These are consistent with information presented by I. Browning in a September 27, 1990, telephone conversation with R. Wesson, Vice-Chairman of the National Earthquake Prediction Evaluation Council (NEPEC).

I. Browning has proposed that there is a 50 percent probability that a tidally triggered, magnitude 6.5 to 7.5 earthquake will occur in the New Madrid region of the Central United States on December 2-3, 1990, plus or minus 2 days (December 1-5, 1990). I. Browning also believes that the maxima of a 179-year tide cycle triggered the late 1811 and early 1812 New Madrid earthquakes and will again affect the region on December 2-3, 1990. I. Browning also predicts a greater than 50 percent probability of a magnitude 8.2 earthquake in Tokyo, Japan, and a slightly less than 50 percent probability of a magnitude 6.5 - 7.5 earthquake on the Hayward fault in California, but the *Ad Hoc* Working Group was not charged with evaluating the predictions for those regions.

**Testing of the I. Browning Prediction**

To be scientifically and systematically evaluated, an earthquake prediction must specify:

- Geographic location;
- Size (magnitude);
- Timeframe of occurrence--hours, days, months;

- Confidence limits on location and size and a probability statement of the likelihood of its occurrence during a stated time span; and

- The scientific basis for proposing the above.

The *Ad Hoc* Working Group has evaluated the December 2-3 New Madrid prediction using four tests:

- The validity of the general concept that tides trigger earthquakes;
- The plausibility of a magnitude 6.5 to 7.5 earthquake associated with the New Madrid seismic zone;
- The plausibility of such an earthquake being triggered by the tidal maximum of December 2-3, 1990;
- The significance of the correlation of tidal maxima with earthquakes and volcanic eruptions using the I. Browning data set and the success of I. Browning's earlier predictions.

#### The General Correlation between Tidal Maxima and Earthquakes

Although there are theoretical physical reasons for supposing that tidal maxima can trigger earthquakes in fault zones where failure is imminent, extensive exploration of the statistical correlation between earthquakes and tidal maxima leaves the existence of tidal triggering unproven. This demonstrates that Earth physics is more complex than intuitively perceived. It is presently impossible to develop a rigorous conclusion that there exists any correlation between the imminence of the failure of a specific fault zone and the capability of a specific tidal maximum to trigger an earthquake.

#### The Plausibility of a Magnitude 6.5 to 7.5 New Madrid Event Being Triggered by the Tidal Maximum of December 2-3, 1990

The *Ad Hoc* Working Group states with confidence that, although a long-term large earthquake potential does indeed exist for the New Madrid zone, there is absolutely no scientific basis for selecting New Madrid from among the other seismic zones as the site of a major earthquake on December 2-3, 1990. Such a projection, especially at the predicted 50-50 chance level, implies a level of detailed knowledge of fault loading and fault dynamics that simply does not exist for New Madrid. Further, I. Browning has proposed a correlation of the late 1811 early 1812 earthquake sequence with the December 2-3, 1990, tidal cycle as part of a 179-year tidal cycle. This correlation is also rejected by the *Ad Hoc* Working Group.

Tidal maxima similar to the December 2-3 tidal peak have been experienced in the New Madrid area in the recent past, posing the question as to why the predicted event did not occur during these earlier highs.

#### Correlation of Past Tidal Maxima with Recent Earthquake and Volcanic Eruptions Using the I. Browning Data Sets

The *Ad Hoc* Working Group evaluated dates of "high geological risk" for the years beginning in 1985 which have been presented by I. Browning in two of his tables and are included in this report. The correlation of his selected dates with volcanic and earthquake events is random.

Examination of his claimed predictions does not produce rigorous evidence that his pre-event statements contained all of the previously enumerated elements of earthquake prediction which are required in order for predictions to be critically analyzed. The *Ad Hoc* Working Group specifically rejects the claim of a successful prediction of the Loma Prieta earthquake based upon the best available evidence. His predictions could not have been considered for public policy at the time they were made. His claimed success rate should not, in our opinion, be used to underscore the need for public response to his December 2-3, 1990, New Madrid prediction.

### Conclusion

The Ad Hoc Working Group has reviewed all available public statements and written materials by Iben Browning regarding the prediction for a magnitude 6.5 to 7.5 in the New Madrid region on December 2-3, 1990. The Working Group concludes that the prediction does not have scientific validity.

### Public Policy Implications

To be considered for public policy, a prediction must contain all of the elements necessary for it to be scientifically and systematically evaluated. The I. Browning prediction as interpreted by the *Ad Hoc* Working Group contains sufficient specificity for evaluation.

To be used in public policy, a short-term earthquake prediction must present credible evidence that during a specific period of time (hours, days, months), the probability of a damaging earthquake occurrence will significantly exceed the scientifically accepted, longer term base level of probability for the specified region. In such cases a rationale exists for conducting public and private affairs in a fashion which departs materially from the norm in order to protect lives and property. The I. Browning prediction of a magnitude 6.5 to 7.5 earthquake associated with the New Madrid seismic zone does not meet such a standard in the opinion of the *Ad Hoc* Working Group.

The inhabitants of the Central United States should recognize, however, that a significant long-term probability does exist for a magnitude 6.5 to 7 earthquake in the New Madrid seismic zone and that such an event can occur at any time, although the likelihood of its occurrence on December 2-3, 1990, will neither be greater nor less than any other 2-day period, as far as we are able to scientifically determine. Therefore, since the prospect of a damaging earthquake is very real in the region, the norm for conducting public and private affairs must, in our opinion, take this circumstance into account. We see no reason why the dates of December 2-3 should be

particularly singled out for earthquake preparedness. However, some general level of earthquake preparedness is appropriate at all times.



# Ad Hoc Working Group on the December 2-3, 1990, Earthquake Prediction

## EVALUATION OF THE DECEMBER 2-3, 1990, NEW MADRID SEISMIC ZONE PREDICTION

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### INTRODUCTION

The Central United States Earthquake Consortium (CUSEC), composed of State emergency operations officials, has requested the U.S. Geological Survey to advise them about the validity of Iben Browning's prediction that a damaging earthquake will strike the New Madrid region on or about December 3, 1990. This report by the *Ad Hoc* Working Group on the December 2-3, 1990, prediction fulfills a charge made to the group by the Chairman and Vice-Chairman of the National Earthquake Prediction Evaluation Council (NEPEC) to investigate the matter.

The *Ad Hoc* Working Group includes individuals with experience in the geology and the seismicity of the New Madrid seismic zone, evaluation of earthquake predictions and correlations between Earth tides and earthquakes and volcanic eruptions. The group developed a consensus after a review of pertinent information.

Information regarding I. Browning's conclusions has included available records of his public statements, his September 27, 1990, letter responding to R. Wesson's (Vice-Chairman of the National Earthquake Prediction Evaluation Council) request for background on his prediction and R. Wesson's written summary of his September 27, 1990, telephone conversation with Dr. I. Browning.

This report of the *Ad Hoc* Working Group has been composed through the synthesis of the written contributions provided by the membership.

## BACKGROUND ON EARTHQUAKE PREDICTIONS

### Types of Information Comprising Earthquake Predictions

Earthquake predictions that can be scientifically and systematically evaluated must contain certain basic information:

- (1) The geographic location of the anticipated event.
- (2) A clearly defined time for the event, e.g. day, range of days, months, etc.
- (3) An estimate of the magnitude, or range of magnitudes, of the anticipated event.
- (4) Some measure of the confidence or reliability which the predictor attaches his statement, e.g. plus/minus factor on the time, and a probability value for the occurrence of the earthquake.
- (5) A rationale for the conclusions described above which provides a scientific basis for the prediction conclusion.

In addition, the prediction statement must be issued in advance of the predicted event. This may seem obvious, however, most commonly predictors claim success in retrospect. The argument generally follows a logic that (1) a theory is proposed or a pattern recognized, (2) a model is designed and past events are analyzed using the proposed model, (3) a number of past events are tested on the model resulting in certain events being retrospectively "predicted" by the model, (4) the predictor claims success for these past events. This methodology is limited because independent reviewers of the prediction have difficulty determining the extent to which selection of the data influenced the outcome. Further, reviewers are often not provided with a comprehensive list of successes and failures of the method, i.e. there is a tendency for bias toward reporting retrospective successes and discounting failures.

## Standards for Use of Predictions in Public Policy

During the last 15 years, investigations have yielded probability estimations for anticipated earthquakes of specified size in many parts of the country. These conclusions are usually stated as probabilities of the event occurring during an identified timeframe. Both time-dependent and time-independent estimates presently exist for many areas, including the New Madrid seismic zone. Although no single probability value may be universally accepted, the scientific community generally considers a certain range of estimates to be plausible. To be used in public policy, a short-term earthquake prediction must present at least equally plausible evidence that during a specified narrow time (months, days, hours) the probability that a damaging event will occur significantly exceeds the generally accepted probability base level. In such cases, a rationale exists for conducting public and private affairs in a fashion which departs materially from the norm in order to protect lives and property.

The Seismological Society of America, the leading professional body of seismologists in the Nation, has an established set of guidelines for earthquake predictors (Seismological Society of America, 1983). This informal set of principles serves as a basis for acceptance of a prediction and for use in public policy, but more importantly, it establishes what is expected from the scientist making the prediction in terms of conduct as a scientist, and conduct with respect to fellow scientists, government officials, the public, and foreign countries. The principles embodied in these guidelines were employed by the *Ad Hoc Working Group* in its evaluation of I. Browning's prediction.

### SUMMARY OF THE IBEN BROWNING PREDICTION

Table 1 enumerates the pronouncements which I. Browning has made regarding earthquake potential associated with the December 1990 timeframe. The earliest available evidence identifying the December 3, 1990, timeframe occurs in a handwritten table which he apparently prepared and distributed in December 1985. That table, which is further

discussed as Table 2 elsewhere in this report, lists 35 days between September 19, 1985, and March 3, 1993, which I. Browning considers to be dates of increased danger based upon tidal conditions. The December 3, 1990, date is highlighted with three asterisks (four is the highest assigned) which implies a significantly higher danger than tidal peaks in prior or subsequent months. This date also has an annotation of "30° N latitude, 27 year high" but no mention of New Madrid or any other seismic zone is made. I. Browning is reported to have told a business seminar in Atlanta, Georgia, in February 1988, that a damaging earthquake could occur in the Memphis area in early December 1990. We do not find any additional comments from I. Browning regarding a December 3, 1990, prediction until October 21, 1989. From this time on his public comments show a gradual increase in specificity.

The Table 1 listing of public statements may not be complete, but it does demonstrate the evolution of I. Browning's pronouncement over the past year. Although Memphis appears to have been mentioned in February 1988, the first evidence we find of the New Madrid region specifically by name being associated with the December 3, 1990, date is in November 1989. Since then, the date has remained fixed at December 2 or 3. He has subsequently attached a plus or minus factor on the date. This ranges from 24 to 72 hours each side of the December 2-3 window, so in the extreme case, the prediction could be construed to cover November 30 to December 6. In recent months, he has usually used the interval of 2 days. Magnitude has generally been stated as 7 or above, but most recently he has restricted this to 6 1/2 to 7 1/2. He has often stated a 50-50 chance or 50 percent probability of occurrence although there is no indication of how this probability has been calculated or tested. In his September 27, 1990, conversation with R. Wesson, he stated that his probability statement is "an estimate from observation."

The scientific rationale for selection of the New Madrid area is at least in part dependent upon I. Browning's conclusion that the maxima of a 179-year tide cycle triggered the late 1811 and early 1812 New Madrid earthquakes and will again affect the region on December 2-3, 1990.

TABLE 1 CHRONOLOGY OF THE I. BROWNING PREDICTION

DATE	FORUM	GEOGRAPHIC AREA	DATE	+/-	MAGNITUDE
10/21/89	Browning Newsletter	Northern Hemisphere (2/3 of volcanoes but no mention of earthquakes)	12/3	n.a.	n.a.
10/31/89	Paine-Webber speech	30°N and 45°N	12/3	n.a.	n.a.
11/21/89	Browning Newsletter	Around 30°N	12/3	a few days	n.a.
12/8/89	Speech, Kansas City	30°N and 45°N, New Madrid, Calif. & Philippines	12/3	n.a.	n.a.
12/21/89	Browning Newsletter	New Madrid	12/3	n.a.	n.a.
2/19/90	Video tape interview w E. Watson	30°N to 60°N (EQ's & volcanoes)	12/2-12/3	n.a.	n.a.
		New Madrid (50-50 chance)	12/2-12/3	n.a.	7.0+
6/18/90	D. Stewart memo	30°N to 60°N (100% probability)	12/3	2 days	n.a.
		New Madrid (50% probability)	12/3	2 days	>7.0
		Tokyo, Japan (50% probability)	12/3	2 days	n.a.
		Hayward, Calif. (50% probability)	12/3	2 days	n.a.
7/25/90	San Francisco Chronicle interview	New Madrid	12/3	n.a.	7.0+
		Hayward fault, Ca	12/3	n.a.	n.a.
		Tokyo, Japan	12/3	n.a.	n.a.
Summer 1990	Revision of 1985 chart	30°N. latitude (all events within 72 hrs., + or -)	12/3	n.a.	n.a.
8/26/90	St. Louis Post-Dispatch interview	New Madrid (50-50 chance)	12/3	2 days (10/9 & 11/6 precursors)	>7.0
9/17/90	Wall Street Journal interview	New Madrid (50-50 chance)	12/3	2 days	>7.0
9/90	Newspaper advertise.	New Madrid	12/3	1 day	n.a.
9/27/90	R. Wesson interview by telephone	New Madrid (50% probability)	12/2	2 days	6.5-7.5
		Hayward, Calif. (<50% probability)	12/2	2 days	6.5-7.5
		Tokyo, Japan (>50% probability)	12/2	2 days	8.2

**Table 2. A complete list of the "Dates of Geological High Risk" as provided by I. Browning to R. Wesson, September 27, 1990, for the period September 19, 1985, to December 3, 1990. Requests for the complete table should be directed to the author. (Note: Browning has used asterisks to indicate "increasing danger.")**

19 Sep 1985\*  
 17 Oct 1985\*\*  
 13 Nov 1985\*\*\*  
 11 Dec 1985\*\*  
 8 Jan 1986\*  
  
 6 Nov 1986\*\*  
 3 Dec 1986\*\*\*  
 31 Dec 1986\*\*\*\*  
 28 Jan 1987\*\*\*  
 24 Feb 1987\*\*  
  
 21 Dec 1987\*  
 18 Jan 1988\*\*  
 15 Feb 1988\*\*\*  
 14 Mar 1988\*\*  
 11 Apr 1988\*  
  
 23 Aug 1989  
 19 Sep 1989\*  
 17 Oct 1989\*\*  
 13 Nov 1989\*  
 11 Dec 1989  
  
 9 Oct 1990\*  
 5 Nov 1990\*\*  
 3 Dec 1990\*\*\*

**Conclusion**

The *Ad Hoc* Working Group concludes that the most current statement of his prediction is:

A 50 percent probability of a magnitude 6 1/2 to 7 1/2 earthquake in the New Madrid region on December 2 to December 3, within plus or minus 2 days (December 1 to December 5, 1990). The predicted event will be tidally triggered.

**TESTING OF THE I. BROWNING PREDICTION**

I. Browning has chosen December 2-3, 1990, as his prediction timeframe because relatively large tidal accelerations will occur in northern latitudes on that date (there will be a near coincidence of lunar perigee and full Moon and maximum northern declination: the full Moon syzygy occurs on December 1, perigee is reached on December 2, and maximum northern declination is reached on December 3). In order to verify I. Browning's prediction, three criteria should be met: (1) The correlation of earthquakes and "large tides" must be established in order to conclude that the phenomenon of tidal triggering of earthquakes exists; (2) The seismic potential must exist for the predicted earthquake to occur at the specified location (New Madrid); (3) "Large tides" will occur at the stated locality on December 2-3, 1990. The existing seismic potential and the prospect of "large tides" on December 2-3, 1990 is discussed at length later in the report. In this section, we examine the correlation between "large tides" and earthquakes in general.

There is a long history of studies of the possible correlation between earthquakes and Earth tides. Although it is beyond the scope of this report to comment on each of these studies, some general observations can be made. Despite years of study, the question of tidal triggering does not yet have a definitive answer. There are numerous studies that report positive correlations between tides and earthquakes (M. Allen, 1936; G. Tamrazyan, 1968; T. Heaton, 1975; F. Klein, 1976; S. Kilston and L. Knopoff, 1983;

Shirley, 1988; Weems and Perry, 1989), and there are many studies that were unable to find such correlations (L. Knopoff, 1964; L. Knopoff, 1970; T. Heaton, 1982; M. McNutt and T. Heaton, 1981; S. Hartzell and T. Heaton; 1989). In several instances, methodologies for correlating earthquakes and tides that apparently yielded positive correlations were later tested with other data sets and were shown not to work (e.g., Heaton, 1982; McNutt and Heaton, 1981). In one case, a positive correlation (G. Tamrazyan, 1968) was shown to be the result of a mathematics error (L. Knopoff, 1970). Perhaps the most common problem with published studies of the correlation between earthquakes and tides is a misuse of statistical methods. Having well defined rules is essential if statistics are to have meaning. The statistics are invalid if results are examined before deciding whether or not to play the game. Although this mistake is commonly made in tidal triggering studies (and earthquake prediction studies in general), it is clear that professional casinos do not allow their patrons to make this same mistake.

There are two approaches that can be used to examine I. Browning's hypothesis that a large earthquake (or earthquakes) will occur in the mid-latitudes of the Northern Hemisphere as a result of the high tides on December 2, 1990. Well established physical principles can be logically combined to make a deterministic prediction, or a compelling empirical relationship can be established even though the physical principles may not be well understood.

What is the theoretical basis for I. Browning's December 3, 1990, prediction? I. Browning chooses to parameterize Earth tides as the amplitude of the tidal "force vector" as a function of observer latitude and the positions of the Moon and the Sun relative to the Earth (see Chapter 3 of Stacy's book (1969) for a clear explanation). Although this vector is also a function of the observer's longitude (giving rise to semidiurnal tides), I. Browning assumes that the observer is located at a longitude such that the moon is at its zenith. He asserts that earthquakes are likely when this tidal force vector reaches its absolute maximum amplitude, which generally occurs when a full or new moon coincides with perigee (closest approach of the moon). However, there are major conceptual difficulties with this

conjecture. It is important to recognize that there is no theoretical justification for a direct response of earthquakes to the tidal "force vector" (which in fact is an acceleration vector and not a force). In order to understand the response of the solid Earth to tides, it is necessary to consider the strains (or stresses) induced in the Earth from the integrated effect of differential accelerations on the entire Earth, which is considered as an elastic continuum. Although the calculation of the distribution of strain within the Earth is far more complex than the calculation used by I. Browning, there are well established numerical techniques for doing so (C. Beaumont and J. Berger, 1975). The effect of using stress (a physically meaningful parameterization) as opposed to "force vector" (not very physically meaningful) is somewhat unclear. In general, if the "force vector" becomes large because of syzygy of the Moon and Sun, then relatively large global tidal stresses can generally be expected. However, the particular latitudes in which stresses become large does depend upon the response of the solid Earth as well as the component of stress that is being investigated. As is demonstrated later, the peak tidal right-lateral shear strain on a vertically dipping plane striking N45°E at the location of New Madrid, Missouri, is  $1.186 \times 10^{-8}$  (about 0.03 bars of stress) on December 2-3, 1990, (excluding effects of ocean tidal loading). Although this is the largest tidal strain for this location that was calculated for the period from 1988 through 1990, a previous shear strain peak of  $1.177 \times 10^{-8}$  is calculated for January 17, 1988. In addition, there are numerous examples of peak tidal shear strain in excess of  $1.10 \times 10^{-8}$  for this time period of 1988 through 1990.

Is there a theoretical basis for concluding that a tidal shear strain peak of  $1.186 \times 10^{-8}$  will trigger an earthquake in the locations mentioned by I. Browning? Although tidal stresses are small (tens of millibars), they are generally responsible for the largest daily variation observed in the Earth. For instance, long-term shear stress accumulation rates on the San Andreas fault are about 0.07 millibars per 6 hours. Furthermore, even larger tidal stress variations occur in some coastal regions where oceanic tides have a complex and significant effect on tidal stresses. Because the tidal stress variations are much larger than those generated by average long-term tectonic strain rates over equivalent time periods, one could

conclude that it is reasonable to expect a correlation between tides and earthquakes. To the contrary, conclusive evidence of such a correlation has not been found. If the earthquake failure process simply consists of slowly increasing strain until a critical value is reached, whereupon a large earthquake occurs, then we would expect to see tidal triggering. If this model is true, then we expect earthquakes to occur when the appropriate tidal shear stress increases the overall shear stress on the fault. However, evidently this simple model doesn't adequately approximate Earth physics, since no such correlation could be established (T. Heaton, 1982). In fact, there are other reasons to suspect that a simple failure model for faults is inappropriate; there are reasons to expect accelerating unstable slip on faults prior to earthquakes (J Rice and S. Tse, 1986), and there are strong reasons to expect that stress variations immediately after the initiation of rupture far exceed any tidal stress variation (T. Heaton, 1990). It is difficult to construct a simple failure model in which large earthquakes are tidally triggered, but small ones are not.

Although simple models of earthquake failure lead to the expectation of tidal triggering, the assertion by I. Browning that a particular high tide can be identified that will trigger earthquakes is difficult to justify. In particular, S. Hartzell and T. Heaton (1989) studies the relationship between fortnightly tides and catalogs of earthquakes for both the southern California region and the entire Earth. They found no correlation for the southern California catalog and they found a weak (and perhaps misleading) correlation for the global catalog. Their reported correlation could be accounted for by one earthquake in 80 being in phase with the fortnightly tides. If 79 of every 80 earthquakes occur randomly with respect to full and new moon, then it is difficult to understand why the earthquakes that will eventually hit the places mentioned by I. Browning will occur at one particular full Moon. According to the calculations presented later in this report, the shear stress at New Madrid on December 2-3, 1990, will be about 0.3 millibars larger than those on January 17, 1988. This is a very small stress, even when compared against other small stresses, such as those induced by atmospheric pressure changes.

To summarize, based on current theoretical understanding, we conclude that tides do not provide a significant trigger for earthquakes. Furthermore, even if tides do trigger earthquakes, it seems difficult to concoct a model that would choose the tidal peak on December 2-3, 1990, when there are so many other tidal peaks of nearly comparable amplitude. Thus, there does not appear to be a theoretical basis for Browning's prediction, and in fact, it appears theoretically implausible.

A second possibility remains. We may not understand the physical basis for I. Browning's prediction, but perhaps there could be compelling statistical proof of its existence. Unfortunately, there is no well defined set of written I. Browning predictions that were collected together so that we can objectively test the method. It is important to recognize that statistical tests formulated after the inspection of data are at best misleading. For this reason, it does not seem possible to rigorously test I. Browning's predictions against reality. We can attempt to reproduce his method and test it against historical catalogs. As will be shown later, such tests do not support Browning's prediction of a large earthquake on December 2-3, 1990. The *Ad Hoc* Working Group concludes that although there is divergence in the conclusions of published studies of tidal triggering, at the time of this report, there does not seem to be a study which defines a methodology that can consistently predict the times of earthquakes in different earthquake catalogs. Furthermore, most studies suggest that even if tidal triggering exists, the effect is not large enough to allow specific predictions for one particular tidal peak. These observations provide a background for further consideration of the I. Browning December 2-3, 1990 prediction.

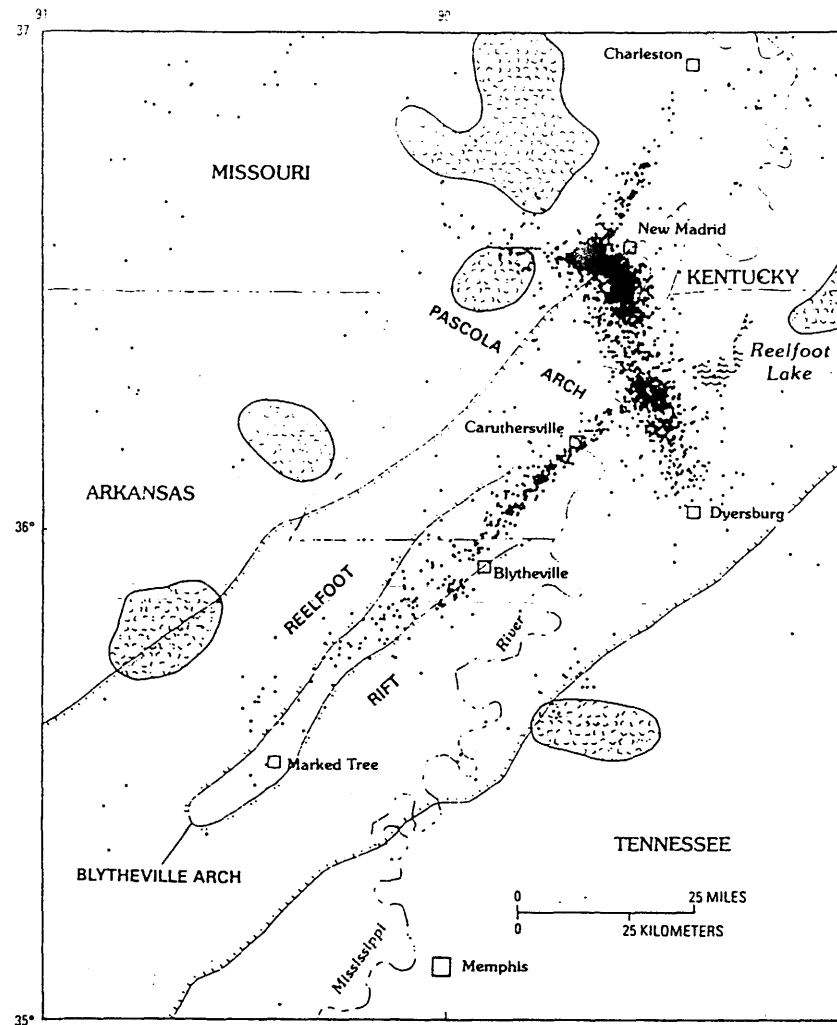
#### **IS THERE A SCIENTIFIC BASIS FOR SELECTING THE NEW MADRID ZONE AS THE LOCATION OF A DAMAGING TIDALLY TRIGGERED EARTHQUAKE ON DECEMBER 2-3, 1990?**

In his videotape interview of February 19, 1990, and his telephone conversation (September 27, 1990) with R. Wesson, I. Browning explained how, within the band of latitude in which he expects tidal triggering to operate, he predicts where specific damaging earthquakes will occur. He

stated that he reviews the scientific literature to determine the locations within the range of latitudes where: sufficient strain has accumulated; where the recurrence time is being approached; or where there are other signs of unrest. In the discussion of the testing of the I. Browning prediction in the preceding sections of this report, it was noted that a potential must exist for the predicted earthquake to occur at some time in the future at a specific location. In this section, we review the earthquake potential of the New Madrid seismic zone and examine the evidence that sufficient strain has accumulated for the December 2-3, 1990, Earth tide peak to trigger an event of the size that I. Browning proposes will occur.

### Why Earthquakes Occur in the New Madrid Area

The New Madrid area of southeastern Missouri, northeastern Arkansas, western Kentucky and Tennessee, and southern Illinois and Indiana is over 1,500 km from the nearest tectonic plate boundary. About 95 percent of all earthquakes occur along plate boundaries. In the mid-70's, studies showed that many of the New Madrid area earthquakes occur along a northeasterly trending line centered between prominent geophysical anomaly patterns and that the earthquake mechanisms were mostly strike-slip. Geophysical and geological studies since the 1970's have shown that the New Madrid area is the site of a failed arm of a crustal rift associated with a late Pre-Cambrian rifting event along the southern margin of the North American continent. The main rift segment--the Reelfoot rift--extends for over 250 km in a northeasterly direction near the northern end of the Mississippi Embayment. These features are shown on Figure 1. The major epicentral trend of right-lateral strike-slip earthquakes that delineate the New Madrid seismic zone is bounded by the inferred boundaries of the buried Reelfoot rift. To the north, the spatial pattern of seismicity becomes more complex and the association of earthquakes with rift-related faults is a matter of current investigation. In the presence of the contemporary regional compressive stress field (nearly horizontal, E-W maximum compressional stress direction) for the Central United States, earthquakes primarily occur within this upper crust weakened by ancient rifting.



**Figure 1. Seismicity and major geologic structures in the most active part of the New Madrid seismic zone.** The boundaries of the Reelfoot rift are shown by the single hachured lines. The boundary of the Blytheville arch is shown in the center of the Reelfoot rift. The dots represent the location of earthquake epicenters. (Figure originally prepared by F. McKeown, USGS, for publication in USGS Circular 1066)

Although paleoseismic investigations are beginning to uncover evidence of prehistoric earthquakes, the first well documented events in the New Madrid region were the three great earthquakes of December 16, 1811, January 23, 1812, and February 7, 1812. Each had an extensive aftershock sequence. Since that time, only two New Madrid events have exceeded magnitude 6--an M 6.0 in 1843 in the southern portion of the zone and an M 6.2 in 1895 in the northern portion. The zone has been monitored by seismic instrument networks since 1974. Several hundred earthquakes are recorded each year, a rate that shows the zone is still active, but which is too low to significantly relieve any strain accumulation that may be occurring.

#### Long-Term Probability of a Significant Earthquake

Written and geologic history allow us to conclude that there has been persistent seismic activity in the New Madrid area, and it is therefore reasonable to conclude that future significant earthquakes will occur. Several competing methodologies can be formulated to calculate long-term probabilities, but there is inadequate information to judge scientifically which is the more adequate. One reasonable estimate is from Johnston and Nava (1985) of a 40 to 63 percent probability of a magnitude 6 or greater New Madrid event in a 15-year time period. The same technique yields an estimate of less than a 1 percent chance of a repeat of a magnitude 8, 1811-sized event in a 15-year time period. A recent random earthquake model by Nishenko and Bollinger (1990) would lower the estimate of the probability of a magnitude 6 by a factor of 2 to 3, but it approximately doubles the magnitude 8 estimate. These differences reflect true uncertainties about the long-term behavior of a midplate earthquake zone, such as the New Madrid, but nevertheless they are in agreement as to the current existence of a significant hazard in the magnitude 6 to 7 range.

#### Imminence of Failure

I. Browning's selection of the New Madrid zone as the site for a major earthquake on December 2-3, 1990, appears to be based on two factors: a reliance on the existence of a 179-year periodicity in tidal accelerations and

a reliance on the work of Nuttli (1983), who estimated that strain has accumulated since 1811-1812 to produce an Ms 7.6 earthquake. The reality and applicability of the 179-year cycle is addressed in the next section. In relying on Nuttli (1983), I. Browning has assumed that "significant strain accumulation" equates with "imminent failure." Moreover, he has relied on a strain estimate that is now considered by knowledgeable seismologists to be too large.

The 1983 Nuttli strain estimate assumed a slip accumulation rate of 1 cm/yr, a value that implies an unreasonably high strain rate for a midplate seismic zone. The actual New Madrid strain rate is unknown, but a more realistic rate coupled with more up-to-date conversions from seismic moment to earthquake magnitude yield an upper bound of about magnitude (Mw or Ms) 7.0 rather than Ms 7.6 as the maximum possible New Madrid earthquake at this time.

The rationale for selection of the New Madrid zone from among the numerous seismic zones within the 30°-60° north latitude band specified by I. Browning is not apparent. There are other zones within the latitude band which probably have accumulated as much and more elastic strain energy. This latitude band takes in some of the major active plate boundaries of the Earth, including the Aleutians, the Kurils, Kamchatka, Japan, California, and the Alpine-Himalaya belt as well as New Madrid. I. Browning, as Table 1 indicates, believes that the December 2-3, 1990, tidal conditions could also trigger an event in California or Japan. The fact is that no earth scientist can project which fault(s) within these zones is so imminently close to failure that an increment of only 0.3 millibars larger than the tidal peak on January 17, 1988, will trigger it.

#### Conclusions

The *Ad Hoc* Working Group states with confidence that the New Madrid zone is not known to be any closer to a major earthquake failure mode than the other faults within the ensemble of plate boundaries cited above.



The *Ad Hoc* Working Group further concludes that, although a long-term large earthquake potential does indeed exist for New Madrid, there is absolutely no scientific basis for selecting New Madrid from among other seismic zones as the site of a major earthquake on December 2-3, 1990. Such a projection, especially at the predicted 50-50 chance level, implies a level of detailed knowledge of fault loading and fault dynamics that simply does not exist for New Madrid or any other fault zone in the world. Therefore, the Working Group's observation is that the selection of New Madrid zone for failure due to tidal effects on December 2-3, 1990, is not scientifically supportable.

## ANALYSIS OF THE TIDE DATA EMPLOYED IN THE I. BROWNING PREDICTION

### Methodology

In this section we discuss the methodology used by I. Browning to arrive at the date of December 2-3, 1990, for a repeat of the New Madrid earthquake. Since these methods have not been set down in one place, some of this is a reconstruction of the procedures from what evidence is available. We have included comments on these procedures when this seemed appropriate.

As noted previously, the basic quantity used by I. Browning in his prediction is the total tidal force at a particular latitude. At any location the tide-generating force has both horizontal and vertical components. I. Browning uses the magnitude of the vector sum of both components as the number of interest, computing this as a function of time for a particular latitude. We have also noted earlier that there is no apparent physical reason why this force should be relevant to earthquake triggering; the body force on the region around a fault is much smaller than the tractions exerted on it by the surrounding material which are expressed by the strain tides rather than the tidal force.

To compute the tidal force, I. Browning uses a program provided by R. S. Harrington of the U.S. Naval Observatory. This program should give results of accuracy similar to Longman (1958). The program as actually written computes the tidal force at a point with the specified latitude and a longitude such that the Moon is on the meridian. This will in general not coincide with the point of maximum diurnal tide except at new and full moon when the Sun and Moon are in nearly the same (or opposite) directions. The curves in the following figures show only the peak values for each month, for which such conditions apply.

Figures 2a, 2b, and 2c show the monthly peaks of tidal force computed for three different latitudes using Harrington's program. The units are arbitrary (set to a value of 1 for the solar tide at perihelion). Figure 2a shows the peak values at 30° N, and illustrates a long-term cycle in the annual peak values. As stated by I. Browning, an especially large peak occurs on December 2-3, 1990. In comparing tide values, the next closest peak just below the December 2-3, 1990, value was on December 30, 1982, and was 0.06 percent smaller. The previous closest larger peak was on December 19, 1964, and was 0.07 percent larger. Figures 2b and 2c show similar computations for the latitudes of the Equator and 30° S. Figure 2d shows times of "Geologic Danger" from the list of "Dates of Geological Danger High Tidal Forces" distributed in December 1985 by I. Browning, (Table 2 of this report). The table gives different numbers of asterisks to specific dates, which we have converted to numerical rankings (Figure 2d).

Comparing the Figures 2a, 2b, and 2c with Figures 2d, it is apparent that I. Browning's 1986, 1987, and 1988 dates correspond to the highest peaks in the Southern Hemisphere and the 1990 and 1991 dates correspond to the highest peaks in the Northern Hemisphere. Apparently I. Browning does not consider peaks in the equatorial regions to be able to trigger events. However, the details do not completely agree with this premise. For example, in late 1989 the largest peak tide is in November (Figure 2a) but the highest I. Browning "danger date" (Table 2) is listed in October, while in 1990 the highest "danger date" does correspond to the highest peak. The rationale for this departure from the use of peak tides is not explained by I. Browning.

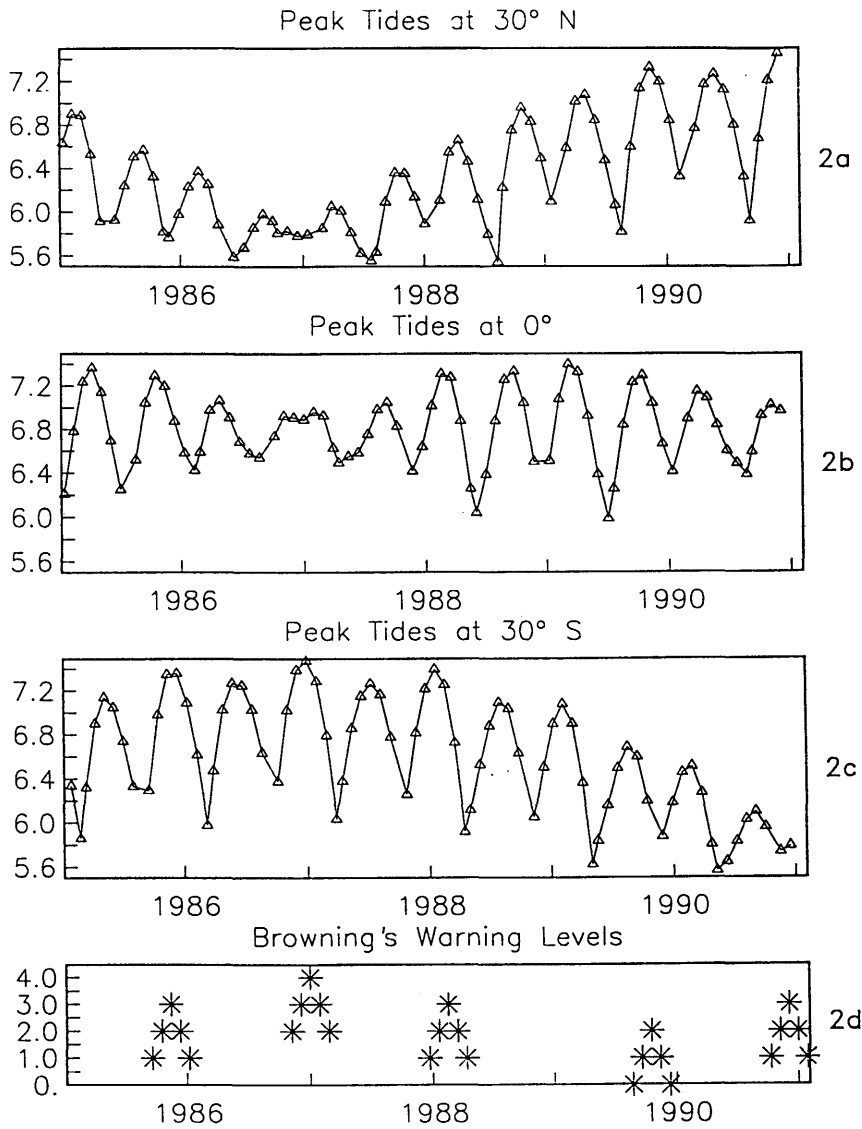


Figure 2

I. Browning also prepared a table in late 1989 which shows the correlations he has made between "Dates of Geological Danger" and volcanic eruptions and earthquakes (Table 3 of this report). As noted previously, it is not clear why the particular latitudes of  $\pm 30^\circ$  are chosen, or how this choice limits the area of predictions, since a number of the confirmations claimed on I. Browning's list are from very different latitudes than the tidal peaks. For example, Browning correlates the peak of November 1985 (see Table 2) with volcanic eruptions in Papua New Guinea (on the Equator), Colombia (slightly north of the Equator) and the USSR (high northern latitudes); but as the Figures 2a and 2c make clear, the peak tides at this time were in the Southern Hemisphere. We were not able to resolve this contradiction.

As also indicated in the preceding section of this report, I. Browning indicates that he selects, out of many possible trigger points, those that are most nearly loaded; the grounds on which this choice is made are unclear. The *Ad Hoc* Working Group knows of no procedure, whether accepted or even proposed, for making more than the most general of statements about the proximity of a fault to rupture or of a volcano to eruption. The only justification for the choice of the New Madrid area that we are aware of is that I. Browning claims that 1990 falls 179 years after the start of the earthquake sequence of 1811-1812, and that the tides exhibit a cycle of this period so that the tidal situation on December 2-3, 1990, is a repeat of the events in late 1811 and early 1812. While the 179 year difference in dates is incontrovertible, there is room for doubt about the existence of such a tidal cycle. I. Browning's basis for it is presumably the analysis by R. Roosen, R. Harrington, J. Giles, and I. Browning (1976) of a long record of synthetic tides; unfortunately, this analysis appears to have created an average period that does not show up in recent times. As evidence of this, Figures 3a and 3b show monthly tidal peaks calculated from Harrington's program for the two periods of interest, and at the  $30^\circ$  N latitude. It is at once apparent that the peak that corresponds to that in 1990 occurred at the end of 1813 and well after the start of the New Madrid sequence (late 1811 and early 1812); the parallel peak to that of late 1811 was in late 1888. The cycle length of the tidepeak cycle thus appears to be not 179, but 177 years.

## Conclusions

The *Ad Hoc* Working Group believes that the tidal cycle provides no basis for the selection of a repetition of the New Madrid earthquake as a likely event for the end of 1990. The *Ad Hoc* Working Group further finds that the intensity of the December 1990 tidal peak is not materially above the level already experienced in 1888, posing the question as to why the earlier condition did not trigger the earthquake that I. Browning expects in December. Finally, in considering the feasibility of the tidal triggering phenomenon, the tidal force cited by I. Browning is much smaller than the tractions exerted by surrounding material (strain tides), so that the group questions his choice of the vector sum dimension. The *Ad Hoc* Working Group can identify no reason why the probability of a magnitude 6 1/2 to 7 1/2 event occurring in December 2-3, 1990, timeframe would exceed the generally accepted base level of probability of events of that size associated with the New Madrid seismic zone. I. Browning has proposed the correlation of the late 1811 and early 1812 earthquake sequence with the December 2-3, 1990, tidal peak as part of a 179-year tidal cycle. This correlation is also rejected by the *Ad Hoc* Working Group.

### ANALYSIS OF THE GENERAL SUCCESS OF THE I. BROWNING METHOD-VOLCANIC ERUPTIONS

I. Browning asserts that (1) Earth tide maxima can trigger volcanic eruptions and (2) that volcanic eruptions are likely during periods of maximum tidal stress. Because the credibility of I. Browning's earthquake prediction depends in part on his assertions about volcanic activity, we examine those assertions here. Discussion is divided into five sections: eruptions; comparison of eruption frequencies in the northern and southern hemispheres, and a possible 180-year periodicity in eruptive activity.

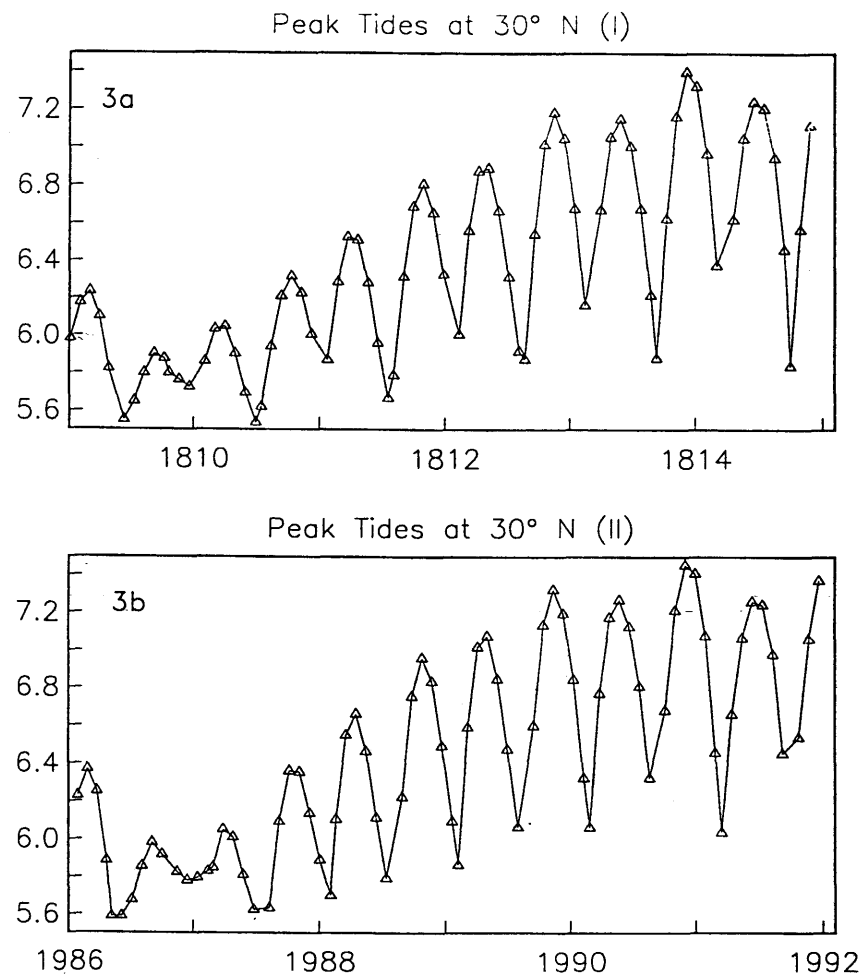


Figure 3

The course of a volcanic eruption is highly variable. Some eruptions start and stop within a period of hours, but most last for weeks to years and sometimes even decades. Some are continuous from start to finish; most exhibit intermittent or fluctuating levels of activity. i.e., multiple phases. Most eruptions start as phreatic (steam) explosions; many, though not all, evolve from phreatic into magmatic eruptions as magma rises above the water table to the surface. Accordingly, a discussion of possible correlations between volcanic eruptions and Earth tides must begin with definitions of eruptions and eruption phases. Interpretation of any correlation must also recognize that processes which might trigger different phases of an eruption vary according to the type and stage of eruption.

For consistency, the Smithsonian's "Volcanoes of the World" (T. Simkin and others, 1981) counts a new eruption each time a volcano ejects solid or molten rock after a quiescence of at least 3 months. Ejections separated by periods less than 3 months are considered phases of one eruption. The catalog of eruption starts in the 1980's is reasonably complete, thanks to an extensive network of Smithsonian correspondents and information from satellites. The catalog of eruption phases during the 1980's, however, is still seriously incomplete. Phases are reported by some eruptions, but are unknown for many others. Because I. Browning's projections are for infrequent events to occur at infrequent tidal maxima (each separated by much longer than 3 months), we consider a set consisting only of the starting dates of eruptions as listed in the Smithsonian catalog. Because I. Browning claims to have predicted several events that were second or later phases of an eruption, we consider another set consisting of both initial and later phases. Both sets exclude eruptions that are continuous for months to decades, and thus whose eruption on a specific I. Browning "danger date" is insignificant.

F. Mauk and M. Johnston (1973) found that approximately 14 percent of the world's subaerial eruptions start on the day of fortnightly tidal maximum; about 10 percent start on the fortnightly minimum. Both values are higher than the 7.1 percent per day that would be expected in a random distribution, but low enough to suggest that fortnightly Earth tides are only one of several factors that determine when an eruption will begin. Several other studies confirm a weak, but statistically significant fortnightly influence in triggering eruptions or eruption phases, especially at volcanoes where magma is already close to the Earth's surface (for example, M. Johnston and S. Mauk, 1972, W. Hamilton, 1973; M. Michael and D. Christoffel, 1975; M. Golombek and M. Carr, 1978; D. Dzurisin, 1980; D. Swanson and others, 1987). At many volcanoes, eruptions show no relation to fortnightly Earth tides.

Correlation of eruptions with longer periods of tides--of primary importance to I. Browning's earthquake prediction--is doubtful at best. Hamilton (1973) speculated about annual and 18.6 year cycles in eruptions but the data he presented are not compelling. P. R. Bell (pers. comm. to C. Newhall, January 1984) found what appeared to be a correlation between eruptions and the same 413-day periodicity cited by I. Browning (periodic coincidence of new moon and perigee); however, P. R. Bell subsequently retracted his conclusion after discovering that it was an artifact of rapid variation in the time of lunar perigee twice each perigean spring tide cycle (P. R. Bell, pers. comm., June 14, 1984). Other supposed patterns have disappeared after new data are considered. For example, an inference of seasonal eruption frequency peaking in the early spring (A. Eggers and R. Decker, 1969) disappeared in examination of the more complete catalog of T. Simkin and others (1981) by R. Stothers (unpublished).

Stress changes induced by fortnightly Earth tides are small (maximum  $10^{-2}$  bar) compared with stresses needed to fracture rock ( $10^1$  to  $10^3$  bar). Therefore, we do not think that tides can trigger eruptions by fracturing a pathway for that magma to the surface. However, rates of stress accumulation during fortnightly Earth tides can be up to  $10^{-5}$  bar/s. Rates

of stress accumulation in and around magma before eruptions are known to range from  $10^{-7}$  bar/s to  $10^{-4}$  bar/s (R. Sparks, 1981) and probably span an even wider range than that. In concept, but without rigorous testing, we expect that if the fortnightly Earth tides are to have an effect on eruptions, they are most likely to trigger eruptions from magma at or near the surface, within which stress has been accumulating at a rate slower than that which would be induced by tides.

### Correlation Between I. Browning's "Danger Days" and Eruptions

Is the number of eruptions starting within  $\pm 2$  days of I. Browning's "dates of maximum danger" (Browning Newsletter, November 1989, p. 2) greater than the number of eruptions that would have occurred on the same number of days if eruptions occur randomly in time?

I. Browning has 20 days of "high geologic danger" in the period 1985-1989 (Table 2). Allowing a 2-day window on either side of each "danger day," there have been 100 inferred "danger days" in a period of 1,826 days. One hundred forty-six (146) eruptions started during the period 1985-1989 ( $29.2 \pm 5.4$ /year). In a random distribution of eruptions through time, the expected number of starts in 100 days is 7.9; the number of starts during I. Browning's 100 days of "danger" was 4. There was no anomalous concentration of eruptions around I. Browning's "danger days" in the period 1985-1989. If we consider the set of both initial and later phases of eruptions, i.e., eruption starts and starts of later phases, we find a similar result. A total of 277 events occurred during the period 1985-1989 ( $55.4 \pm 13.8$ /year). In a random distribution of eruption and phase starts through time, the expected number of starts in 100 days is 15.2; the number of eruption and phase starts during I. Browning's 100 days of "danger" was 9.

If we accept that there is no statistical evidence for enhanced danger of eruptions, how can we explain supposedly "successful" projections by I. Browning?

I. Browning is reported to have told an audience in Portland, Oregon, on May 12, 1980, that an outburst from Mount St. Helens was likely "within about a week." The climatic eruption occurred on May 18, 1980. However, I. Browning's statement was less prescient than it might seem. The volcano had been erupting frequently since March 27 and its north flank was widely reported to be bulging at about 2 meters per day, an astounding and worrisome rate. The newspapers in Portland were full of warnings from geologists that a major eruption was imminent and, acting on advice from geologists, the U.S. Forest Service and the State of Washington had evacuated and closed a large area around the volcano.

Furthermore, the closest fortnightly tidal maximum (May 14) was not an exceptionally high maximum; 31 tidal maxima during the 1970's and 36 more during the 1980's were stronger than that of May 14, 1980, and we have not seen evidence that I. Browning identified May 14 as a "danger day" until his speech in Portland--where it could not fail to be influenced by highly publicized, unmistakable evidence of danger at Mount St. Helens.

Browning has cited other eruptions which claims began on his "danger days" with the implication that these were anticipated. We have no indication of any but the most general anticipation--e.g., that "frequent eruptions" were to be expected in the Southern Hemisphere in the period bracketing December 1986, and in the Northern Hemisphere after early 1987 (Browning Newsletter, September 1989, p. 3, and November 1989, p. 2). One eruption phase in particular--that of Nevado del Ruiz on November 13, 1985--was cited by I. Browning in his conversation with Wesson (September 27, 1990). As at Mount St. Helens, the eruption of Nevado del Ruiz had already begun (in September 1985), attended locally by considerable publicity and public warning. The second, deadly phase of this eruption did occur on an I. Browning "danger day," but nowhere in the considerable volume of postmortem inquiry about this eruption is there any indication that I. Browning or anyone else had forecast an eruption of Nevado del Ruiz on this particular date. The issues of foresight and specificity are important; any claim to have foreseen a specific event must be backed by a documented, public prediction of that event before the event occurred; anything less is wishful thinking.

### Comparison of Eruption Frequencies in the Northern and Southern Hemispheres

I. Browning asserts that an anomalously high number of eruptions occurred in the Southern Hemisphere during the 2 years surrounding December 1986, and that a similar anomaly should occur in the northern hemisphere in 1989-1991. Of 1,343 volcanoes listed in T. Simkin et al., 1981, 437 (32.5 percent) are in the southern hemisphere. Of 118 volcanoes known to be active in 1986 and 1987, 45 (38 percent) were in the Southern Hemisphere. Of the 54 volcanoes known to be active in 1989, 20 (37 percent) were in the southern hemisphere. This is not a significant difference.

#### Is there a 180-Year Periodicity in Eruptive Activity?

R. Roosen and others (1976) inferred a 180-year periodicity in volcanic activity from  $^{18}O/^{16}O$  temperatures in a Greenland ice core, attributed it to episodic volcanic eruptions triggered by a 179.3-year period in Earth tides and hypothesized that a similar 180-year pattern should be duplicated, 180° out of phase, in Antarctic ice cores. Work by S. Johnsen and others (1972) and C. Lorius and others (1985) fails to show any such pattern, although with slower accumulation rates for Antarctic ice cores, we are not sure that a 179-year periodicity would be resolvable.

### ANALYSIS OF THE GENERAL SUCCESS OF THE BROWNING METHOD-EARTHQUAKES

I. Browning has based the credibility of his prediction of the December 3, 1990, New Madrid earthquake, in part, on his past successes at correlating earthquakes and high tidal vectors. There are two aspects to this asserted success: (1) he states that there is statistical increase in earthquake activity worldwide on or about his "dangerous dates" and (2) he points to specific historic earthquakes that occurred on his high tidal vector ("dangerous") dates, which he claims to be successes.

A primary difficulty we have had in evaluating his success lies in defining precisely what he has predicted. For a given tidal high, we have not been able to determine from his lists what areas of the Earth he is predicting to be in high danger. His table seems to carry implications that regions at risk are different on various of these dates, but there seems to be no consistency. Furthermore, there is no indication as to a range of earthquake magnitudes that he is predicting for any given tidal high. Therefore, in his lists, he seems to name as successes earthquakes that fall on one of his tidal high dates irrespective of geographic location or magnitude.

We found there to be no apparent way to judge either from his table or from R. Wesson's or conversations with I. Browning how he assigns a confidence level to his predictions. He refers to "enhanced probability" in his September 27 letter and to "an estimate from observation" in his telephone conversation with R. Wesson, but there is no evidence to suggest that his 50 percent probability statements for December 3, 1990, have any formal basis.

#### Correlation of the Global Seismicity Catalog with I. Browning's "Dates of Geological Danger"

In the table of 35 dates which I. Browning prepared in 1985, he considered "dangerous dates" for both earthquakes and volcanoes, with some

annotations made this summer. He still bases his future predictions on that table. We do not know when the table was first prepared, but we do know that it was in the hands of a third party by December of 1985. In order to compare the level of seismicity on the "dangerous dates" with the level throughout the rest of the year, we requested that the National Earthquake Information Center (NEIC), Golden, Colorado, assemble a catalog of earthquakes occurring between September 19, 1985, and September 28, 1990. We requested that the catalog contain all earthquakes with magnitudes equal to or greater than 6.5, which is the threshold range I. Browning is currently predicting for New Madrid. The catalog cites events by date, latitude, longitude, and magnitude.

Three separate correlation runs were made. In each case we allowed the "danger dates" an expanded window extending from 3 days before to 3 days after the given date in I. Browning's table. The first run considered only the period from January 1, 1986, through September 28, 1990, because it was not clear whether the September to December 1985 period on his table was prospectively identified. This run considered earthquakes worldwide. During this period, the NEIC reported 164 earthquakes with magnitudes of 6.5 or greater. I. Browning cites 16 danger days within this period and, by allowing him a 7-day interval about each danger day, we have a total of 112 days included in the Browning windows. There is a total of 1,732 days in the time period. If the earthquakes were random with a uniform distribution, we would expect  $(112/1732) \times 164$ , or 10.6 earthquakes to occur during the Browning windows. Counting up the actual number of earthquakes that occurred during these windows, we find 12. Thus, this correlation concludes that Browning "predictions" are not significantly different than random.

The second run adds the time interval from September 1, 1985, to December 31, 1985, to the previous run. The total number of earthquakes increases to 182, the number of earthquakes during the Browning 7-day windows increases to 14, the total number of Browning window days increases to 140, and the total number of days increases to 1,854. The expected number of earthquakes under random, uniform distribution conditions during the

Browning windows is  $(140/1854) \times 182$ , or 13.7 events. Again, the results show that Browning's "predictions" are equivalent to random.

The third run considers only the earthquakes that occurred in the range of latitudes from 30 to 60 degrees north and south. These latitudes were selected because on the video tape marketed by I. Browning and in other documents, these latitudes are specifically mentioned. During the time window of September 1, 1985, to September 28, 1990, a total of 55 earthquakes occurred; three of these occurred within the Browning windows. The expected number, by random chance, would be  $(140/1854) \times 55$ , or 4.2 earthquakes during the Browning windows. Again, comparing three actual earthquakes with 4.2 projected randomly, we can only conclude that I. Browning's method is no better than random.

### Review of Specific I. Browning Predictions

On the video tape of Browning of September 16, 1989, and February 19, 1990, as well as in various newspaper articles and Browning's newsletters, there are specific statements made that he had predicted the San Fernando, California, earthquake (February 9, 1971), the Managua, Nicaragua, earthquake (December 23, 1972), and the Loma Prieta, California, earthquake (October 17, 1989). We will review what we know of each of these "successes." The Ad Hoc Working Group examined tidal fluctuations calculated for these regions for several months preceding and following each earthquake, to evaluate possible correlations.

- San Fernando, California

This earthquake had a moderately large magnitude of 6.6 and attracted great public attention because of its affect on the Los Angeles basin. The event occurred over 19 years ago, and we could find no evidence to document whether I. Browning had predicted it prospectively, or had merely retrospectively noted its occurrence. Nevertheless, the San Fernando earthquake occurred on a fortnightly tidal maximum. It should be added, however, that this maximum was significantly smaller than at least ten maxima which had occurred over the prior 7 months.

- Managua, Nicaragua

The Managua earthquake was of moderate magnitude, 6.2, but had substantial media coverage and study because it occurred directly beneath the city, resulting in major damage. This event occurred in December 1972, and we can find no evidence to indicate that this earthquake was predicted by Browning in advance of its occurrence. From our calculations, we conclude that the earthquake occurred a few days after the fortnightly tidal maximum. Moreover, that maximum was not particularly large and was preceded by three larger maxima between late September and late November of 1972.

- Loma Prieta, California

This earthquake (M-7.1) was the largest to occur on the San Andreas fault since the San Francisco earthquake of 1906. In reviewing the video tape of I. Browning made on September 16, 1989, he states that there will be a tidal maximum on October 16 and "earthquakes will go off and also a volcano or two." There was no specific mention of California, the San Andreas fault, or of any specific geographic region. He claims to have made a specific prediction of Loma Prieta a few days before the earthquake while giving a talk in San Francisco on October 10, 1990. We have been provided a transcript of his exact words at that conference. His statement was "there will probably be several earthquakes around the world, Richter 6+, and there may be a volcano or two." No mention is made of an earthquake occurring in the San Francisco area or even California.

Because I. Browning did not specify any location or a magnitude, he can hardly be given credit for a successful prediction. Over the past 10 years, there has been an average of about 110 earthquakes per year of magnitude 6.0 and greater throughout the world. The likelihood of such an earthquake occurring within a 3-day window is therefore very high. Earthquakes of magnitude 7.0 and larger have occurred at a rate of about 11 per year over the past 10 years. The likelihood of an earthquake of that magnitude occurring over the 3-day period would be about 1 in 11.

## Conclusion

In summary, I. Browning's correlations of earthquake activity with danger periods at times of highs in tidal forces does no better at predicting earthquakes of magnitudes greater than 6.5 than does random guessing. Successes claimed for predictions of specific earthquakes, in almost all cases, are not very compelling. Since there is no record of publically stated specific earthquake predictions that he made prior to 1989, we can only infer that successes claimed before that time were retrospective, that is, that he found, after the fact, that certain earthquakes occurred during times of his "danger periods." He did not specify the San Francisco Bay area in his October 10, 1989 prediction. Thus, the *Ad Hoc* Working Group rejects the claim that he predicted the Loma Prieta October 17, 1989, earthquake.



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**STATEMENT FROM THE CENTER FOR EARTHQUAKE STUDIES  
DR. DAVID STEWART, DIRECTOR  
SOUTHEAST MISSOURI STATE UNIVERSITY  
OCTOBER 19, 1990**

I have been asked by the news media to respond to a report issued Oct. 18 by the Ad-Hoc Working Group on the Dec. 2-3, 1990 Earthquake Prediction. I am issuing this statement as my response.

Although I have not yet had the opportunity to carefully study the 57-page document, my preliminary review of the report leads me to conclude that Dr. Iben Browning's methodology has been neither verified nor disproven by the scientific method at this time.

The scientific probability forecasts for this decade imply the possibility of damaging earthquakes 6.3 to 7.6 in size at any time. However, such forecasts are not able to assign a higher probability to the Dec. 3, 1990, date nor to any other date during the 1990s. By the present level of scientific methodology all dates between 1990 and 2000 are equally likely to have a damaging earthquake along the New Madrid Fault System.

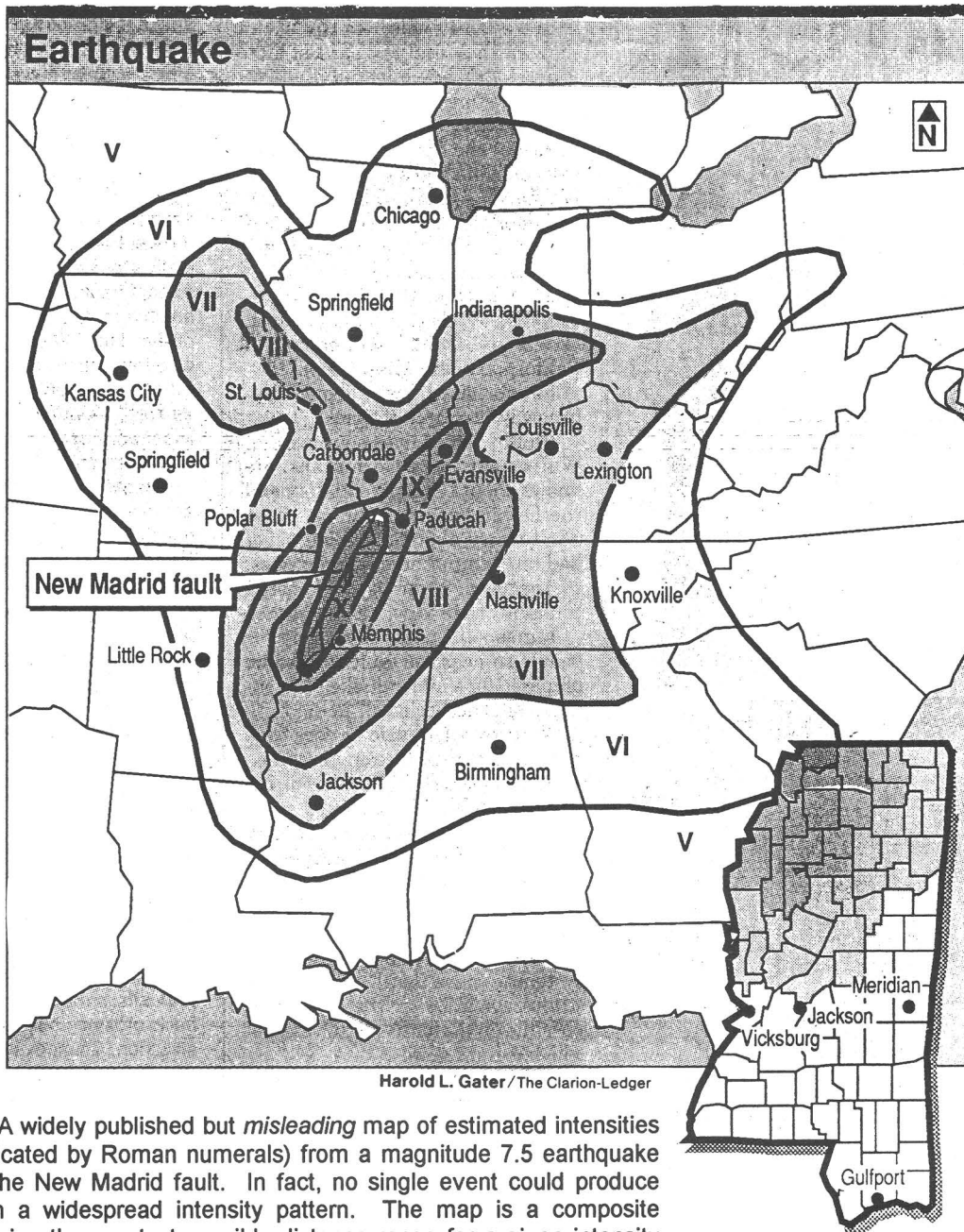
With or without an earthquake on Dec. 3, this region remains much better prepared for an earthquake than we were six months ago, but there is much work yet to be done. I encourage everyone living within 200 miles of the New Madrid Fault Zone to take appropriate safety and preparation measures to be ready for an earthquake that could happen on any day.



# APPENDIX C

## THE PREDICTION IN THE PRESS

A chronological set of press clippings relating to Browning's prediction. Each article is identified by its publication date (month-day-year) and the name of the publication in which it appeared.



Harold L. Gater / The Clarion-Ledger

A widely published but *misleading* map of estimated intensities (indicated by Roman numerals) from a magnitude 7.5 earthquake on the New Madrid fault. In fact, no single event could produce such a widespread intensity pattern. The map is a composite showing the greatest possible distance range for a given intensity arising from magnitude 7.5 earthquakes anywhere along the fault. (From the 7-15-90 Jackson, Miss., Clarion-Ledger.)

10-22-89

**St. Louis Sun**Reprinted by permission  
of the Associated PressMoney woes**Seismic system may close**

EVANSVILLE, Ind. (AP) — Funding cutbacks could lead to the dismantling of an 81-station seismic network in the New Madrid Fault region that runs from Missouri to southeastern Indiana.

Walter Hays, deputy chief for research applications with the U.S. Geological Survey, said the national agency responsible for monitoring earthquakes doesn't have the funding to provide both a national network and support for the regional system.

St. Louis University and Memphis State University operate a "regional network" of 81 seismographs throughout the Midwest, most along the system of underground faults associated with the New Madrid Fault. The seis-

mographs relay information into the two universities.

"Our network is in jeopardy because I don't know how we are going to get funding the next few years," geophysics professor Robert Herrmann of St. Louis University told *The Evansville Courier*. "Our monitoring in the Wabash Valley may be coming to an end."

The system has recorded 3,500 mostly small quakes in the Midwest since 1975.

The Wabash Valley area, especially southern Illinois, has been the most active of the New Madrid Fault system, Herrmann said. He said the largest earthquake of the past 20 years, a 5 on the Richter scale, was centered near Lawrenceville, Ill., in 1987.

10-23-89

**St. Louis Sun**Reprinted by permission  
of the Associated Press**Missouri team to study S.F. in quake aftermath**

JEFFERSON CITY (AP) — The State Emergency Management Agency will send a team to San Francisco to see what they can learn from the disaster, but they won't go until the situation is less hectic, officials said.

"We plan to send some people, but we're going to do it at a time when we won't be interfering with their rescue and recovery efforts," said SEMA spokesman Dennis Mabrice.

The New Madrid Fault is centered about 150 south of St. Louis, running from Marked Tree, Ark., to southern Illinois.

10-24-89

**St. Louis Sun****Geological convention will have a fresh topic**By JENNIFER FEEHAN  
St. Louis Sun staff

ST. LOUIS — The recent earthquake in San Francisco has prompted the Geological Society of America to add a special session on the quake at an upcoming meeting here.

The Geological Society of America will hold its 101st annual meeting at Cervantes Convention Center Nov. 5-9.

On Nov. 7, earthquake spe-

cialists Walter Mooney of the U.S. Geological Survey and Walter Alvarez of the Department of Geology and Geophysics at the University of California at Berkeley will discuss last week's quake in California as well as the New Madrid fault in Missouri.

Local elementary science teachers have been invited to attend a session on teaching about earthquakes, based on a pilot program that has been

used at schools in the San Francisco Bay area.

More than 4,800 earth scientists from across the country are expected to attend the conference, which will address a variety of geological issues. Of particular local interest, researchers will discuss the negative effects that alteration to the Mississippi River has had over the past 12,000 years, beginning when ancient cultures diverted the water for agriculture.

## Prepare now for quake

The *Sun's* coverage of the San Francisco-Oakland earthquake has been very good. However, I agree that St. Louis is not prepared to even handle an earthquake of the magnitude the Bay Area saw.

Watching what happened on the Cypress Street Viaduct, a 1.5 mile stretch of Interstate 880 reminds me of the elevated highways in downtown St. Louis, particularly I-64, U.S. 40 from Vandeventer Ave. east to the I-55-70-64 split in Fairview Heights, IL.

St. Louis is unprepared. I was happy to hear that the eastbound span of the Blanche Memorial Bridge can withstand an earthquake, but what about the westbound span, which was built in 1956?

They are working on the Daniel Boone Bridge in Chesterfield. Surely the new eastbound span can withstand the stress, but what about the westbound span? That one was built in 1936.

Experts have been saying that a major earthquake can happen in the New Madrid Fault region any day between now and the year 2027. The last big quake here was in 1811. The last tremor in the St. Louis region was a 3.5 in 1988.

I hope that the Bay Area quake of the past week will be a lesson for St. Louis agencies to get prepared — quickly.

LOUIS J. LAUNER  
St. Charles

□□□

Picture this scenario: The New Madrid Fault triggers an earthquake and causes terrible and devastating damage over several states.

Where will law enforcement priorities be distributed? To apprehend loosened heinous murderers who will prey on disoriented and terrified earthquake victims; or to help find medical care, find lost loved ones, and restore some semblance of order?

Capital punishment for heinous criminals does pro-

hibit their ever committing another crime, and, thereby, is a deterrent to crime. When "what if" becomes reality, it's too late to right a wrong.

HERBERT A. HANSEN  
Sappington

□□□

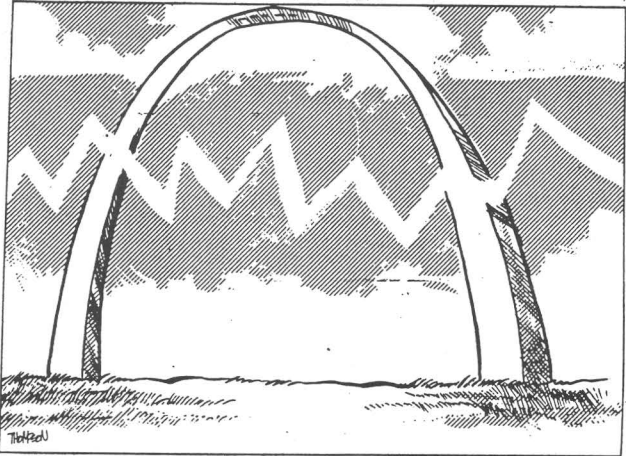
The front page of the *St. Louis Sun* alludes to the problem of a possible \$10,000,000,000 price tag for the recent earthquake in California. Not a problem!

Simply have any and all loans made through our well-managed and well-regulated Savings and Loan Associations. That way it won't cost us (the private citizens) any money.

And please don't tell me this won't work. I believe it has been done before and done before and done before...

JOHN F. BERNOSKY JR.  
Maryland Heights

10-25-89  
*St. Louis Sun*



10-27-89  
*St. Louis Sun*  
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of the Associated Press

# More jolts in store

## Odds favor future quakes, experts say

By LEE SIEGEL  
Associated Press

LOS ANGELES — A repeat of the great San Francisco earthquake—of 1906 is unlikely for decades, scientists say.

But there is a 50 percent chance within 30 years of another quake as strong as last week's — only closer to the city and much more deadly.

Chances are even better — 60 percent — that the next catastrophic quake, a big one measuring 7.5 to 8.3, will occur by 2018 on the San Andreas fault in Southern California.

"Everybody who lives in California should be ready for an earthquake at any time, and that means tomorrow," said Don Anderson, director of the California Institute of Technology's seismological laboratory. "Just because someone says there is a 30 percent probability of a big earthquake in the next 30 years doesn't mean it won't happen tomorrow."

Probabilities for quakes that could kill thousands of people in California were listed in a 1988 U.S. Geological Survey report and remain unchanged by the Oct. 17 quake that claimed at least 63 lives in the San Francisco Bay area, said USGS geophysicist Jim Dieterich.

### Quake readiness bill approved

WASHINGTON (States) — The Senate on Wednesday passed legislation proposed by Sens. John Danforth, R-Mo., and Albert Gore, D-Tenn., to authorize spending \$20 million on research and planning for earthquakes.

The bill was introduced in May after the disastrous earthquake in Soviet Armenia piqued the senators' interest in promoting preparedness along the New Madrid fault in southern Missouri.

"The terrible situation in California brings home the

importance of being as prepared as possible for a major earthquake," Danforth said.

Under the bill, various federal disaster agencies would develop programs to reduce earthquake damage, including model building codes and construction guidelines, and would estimate the costs of shoring up existing buildings.

The agencies would develop a variety of regional preparedness and educational programs and examine and improve regional earthquake response strategies.

Dieterich is the lead author of the study, which represented a consensus of leading scientists.

The report predicted a 30 percent chance by 2018 for a magnitude-6.5 quake on the segment of the San Andreas that caused last week's quake. The jolt measured 7.1, suggesting the forecast was conservative.

"The chance of another destructive or more destructive earthquake in the Bay area is still high, and the chances in Southern California are even higher," said Cal Tech geologist

Kerry Sieh.

A repeat of the 1906 San Andreas Fault quake — which measured 8.3 and killed at least 2,500 people, according to recent studies — is unlikely for another 100 to 200 years, Dieterich said. But the report forecast 50-50 odds for a magnitude-7 major quake in the Bay area by 2018.

In Washington, President Bush signed legislation Thursday to provide quake-stricken areas of Northern California \$2.85 billion in emergency relief assistance.

10-31-89

Los Angeles Times

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# S.F. Disaster Jolts Officials in Memphis Into Preparing for Their Own Big One

■ **Earthquakes:** Experts warn that a major temblor is on the way. But a fight looms over new building code requirements.

By JAMES RISEN  
TIMES STAFF WRITER

MEMPHIS, Tenn.—If The King ever does show up back here in his hometown, he'd better be careful. Graceland hasn't been earthquake-proofed.

But Elvis Presley's old mansion—the biggest tourist attraction in this city along the Mississippi River—is hardly alone.

Nothing else in Memphis is ready for the Big One either, even though this city lies close to the site of the most powerful earthquake in American history and sits almost directly atop one of the biggest earthquake fault lines in the United States.

Memphis—like most cities in the central United States—has no building code requirements to guard against earthquakes. Developers in Memphis have been successfully fighting such "seismic" building code requirements for years, arguing that they would add huge costs to new construction while protecting against a threat of which most here are only dimly aware.

Only now, in the wake of the World Series quake in San Francisco, has the seismic code issue been revived. After inspecting the damage to the Bay Area, Memphis Mayor Richard Hackett returned home and announced he would push a long-delayed seismic code into law by the end of the year.

"It'll be a tough one to sell, it won't be politically popular," Hackett spokesman Ray Pohlman admitted.

"It's never been a hot issue before. But the San Francisco quake is forcing it to be a big issue now."

"The new code may come just in time, earthquake experts here say.

A serious earthquake in Memphis is on the way—and soon—seismologists warn.

In fact, Memphis is at greater risk of suffering a major earthquake sometime in the next few years than any other urban area in the eastern half of the United States. There is a 40% to 63% probability that a quake of at least 6.0 magnitude will hit Memphis within the next 15 years, according to Arch Johnston, director of the



Los Angeles Times

Center for Earthquake Research at Memphis State University.

Yet, today, the city is almost completely unprepared for it. "Our risk to people and buildings from an earthquake is high because we've taken virtually no precautions here," Johnston warned. He added that most public schools in the city are built of "old, unreinforced masonry, which engineers will tell you is the worst possible construction in the event of an earthquake. If we had a quake during the school day, many of our casualties would be children."

The complacency about earthquakes in Memphis reflects a broader sense among most Americans that only Californians need worry about quakes. But, although California rightly grabs the headlines as America's earthquake capital, other regions of the nation are hardly immune.

"If you asked people in Memphis where earthquakes occur, they would say California," noted Harvey Ryland, executive director of the Memphis-based Central States Earthquake Consortium, which was formed in 1983 to increase awareness among builders and residents in seven central states of the threat from earthquakes. "Most of them don't know [earthquakes] can happen right here in their own back yards."

Indeed, the most powerful earthquakes ever to hit the continental United States happened here in the Mississippi River Valley, along what seismologists have dubbed the New Madrid Fault.

Three quakes, with an epicenter near the small farming town of New Madrid, Mo., about 70 miles north of Memphis on the Mississippi River, hit in rapid succession during the winter of 1811-1812 with more fury than the 1906 quake that devastated San Francisco.

The quakes—estimated to have been between 8.6 and 8.9 magnitude—packed such force that they briefly reversed the course of the Mississippi, created a major new lake that still exists, rang church bells in Boston and knocked down construction scaffolding around the Capitol in Washington. The tremors could be felt over 1 million square miles.

"All nature seemed running into chaos," recalled one Frenchman who was traveling down the Mississippi when the first earthquake hit in December, 1811. Throughout the winter in New Madrid, the ground shook incessantly, "like the flesh of a beef just killed," wrote one resident.

But the area was so sparsely populated then that only a few people were killed—mostly passengers on small boats swallowed up by the raging river—and the region hasn't been hit by a comparable quake since.

So, although less severe quakes, at 5.0 or below, occur regularly—about 200 barely detectable quakes hit along the New Madrid Fault each year—few people in the Memphis area take the threat of a major quake seriously.

"There's no memory of a big quake here, that's the problem," said Jeff Crenshaw, director of the Memphis-Shelby County Emergency Management Agency. "Our problem is that we don't have them often enough for people to know what to do."

As a result, a quake in Memphis like the one that recently hit the Bay Area could lead to a greater loss of life, because people don't know what to do and buildings haven't been reinforced. In addition, the damage here would extend over a larger region, because of the Mississippi River Valley's soft soil, which transmits seismic energy more easily than does the thick rock just below the surface in California.

The San Francisco quake has led political leaders here to start taking earthquake warnings seriously. Earlier this week, Rep. Harold E. Ford (D-Tenn.) wrote a letter to Mayor Hackett calling for a halt in the construction of the "Great American Pyramid," Memphis' huge new pyramid-shaped sports complex, until it can be earthquake-proofed.

"It's tragic, but the San Francisco quake has done more to make people aware of the threat than anything else," Crenshaw observed. "Now, I'm getting calls from the City Council members saying they want to support us" in earthquake preparations.



11-27-89

## Associated Press Wire Service

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of the Associated Press

COLUMBIA, Mo. (AP)—A New Mexico climatologist said earthquakes will rattle the New Madrid Fault in December 1990.

A University of Missouri Professor was skeptical about the prediction given by Iben Browning in a telephone interview with the Columbia (Mo.) Daily Tribune on Saturday.

Browning, of the commodities firm Paine Webber Inc., said in the interview from Albuquerque, N.M., that Dec. 3, 1990, is the day the New Madrid Fault, which runs through part of southeast Missouri, will be hit by the quakes. He based the projection on a 179-year cycle of "tidal forces."

Browning said that in 1985 he forecast the earthquake that hit San Francisco last Oct. 17, and missed it by only one day.

The last series of major earthquakes on the New Madrid Fault occurred in 1811-12, which Browning said was the last "high cycle" of tidal forces in that area. Tidal forces are related to alignments of the sun and moon, he said.

Ernest Kung, a University of Missouri-Columbia professor of atmospheric science, was skeptical of Browning's assertions, saying the tidal-force theory has not been proven in scientific studies.

It's not unusual for organizations such as stock brokers and insurance companies to focus research on such "exotic things," Kung said.

## Tidal forces may trigger 1990 quake

By Michael Kelley  
The Commercial Appeal

Mark the date on your calendar, but don't panic, says a scientist who correctly predicted October's San Francisco earthquake: the New Madrid fault could be hit by a serious swarm of tremors on Dec. 3, 1990.

Dr. Iben Browning, a New Mexico climatologist, said in a telephone interview Monday he's not flatly predicting a major New Madrid earthquake.

If the geological conditions are right, though, he said, tidal forces created by the positions of the sun and moon could be a "triggering force" for a major series of earthquakes in the New Madrid zone, which is along a line that runs from a point south of St. Louis to a point about 35 miles northwest of Memphis.

The last time major earthquakes occurred along the New Madrid fault, in 1811 and 1812, the Mississippi River changed its course.

Experts say a 20th Century disturbance in the New Madrid zone could cause catastrophic damage from the Missouri Bootheel to Memphis.

"A triggering force is not an earthquake force any more than pulling the trigger on a gun makes the gun go off," he said. "The gun goes off only if it's loaded. I don't know whether (the New Madrid Fault) is loaded or not, but the trigger will be pulled."

Browning warns of upcoming earthquakes, volcanoes and other phenomena as a sort of sideline to his primary business of developing long-range weather forecasts for farm equipment manufacturers, a brokerage firm and other clients.

Dr. Arch Johnston, director of the Center for Earthquake Research and Information at Memphis State University, said there is some scientific research that supports the tidal forces theory but just as much research that disproves it.

"The normal tidal forces of the sun and moon induce periodic low-level stresses in the earth," he said.

"A lot of people have looked at this to determine... if the fault is sitting there ready to go and gets a little nudge (from tidal forces) that actually triggers the

earthquake."

The research, though, is "not very satisfying," he said. "For every paper that says 'Yes, there is a statistical correlation,' there's a paper that's found no correlation."

The chairman of a panel of geologists established to evaluate earthquake predictions was less generous. "I wouldn't worry too much about it, or put any stock in it," said Dr. Thomas McVilly at the University of California-Berkeley.

"The tides happen twice a day, and they get big every month and every spring and fall. They go on for years and years. There's no correlation," he said.

Neither Johnston nor McVilly had heard of Browning before, although some publicity followed his San Francisco prediction.

The prediction was made during a meeting before about 450 corporate executives Oct. 9 at the St. Francis Hotel in San Francisco, just eight days before the earthquake, according to Richard Howell, a spokesman for the

Farm and Industrial Equipment Institute in Chicago.

Howell said he was present when Dr. Browning surprised his audience by saying there would be a major quake in Northern California within three days of Oct. 16. The earthquake occurred on Oct. 17.

His projections on the New Madrid Fault, he said, were based on a 179-year cycle of "tidal forces" last felt by the fault in 1811. On Dec. 3 of next year, he said, the "highest vector sum high tidal force in 27 years" will occur.

"The configuration will be the same as it was the year the original (1811) earthquake went off."

Browning said he holds a doctorate in physiology from the University of Texas, where he received his bachelor's degree 52 years ago in physics and math.

Although "I really don't want to make public statements," the 71-year-old scientist said, "I was one of those people who wouldn't go near Mt. St. Helens before it erupted."

12-12-89

## Blytheville (Ark.) Courier News

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## Climatologist says New Madrid quake could happen next year

OSAGE BEACH, Mo. (AP)

— A scientist says history and a little math show that the New Madrid Zone, where 19th-century earthquakes made the Mississippi River flow backwards, could be the center of a major quake in less than a year.

Iben Browning delivered his prediction during a meeting of farm leaders Tuesday, a day after public-safety officials from seven states discussed earthquake preparedness in Memphis, Tenn. On Wednesday, the Missouri Legislature begins hearings at Cape Girardeau, Mo., on proposals to curb earthquake damage.

Researchers have predicted that a major earthquake — rivaling the Oct. 17 tremors in northern California — has a 1-in-3 chance of happening along the New Madrid Zone during the next decade. The probabilities soar above 90 percent

during the next half-century.

Browning, a climatologist from Albuquerque, N.M., offers a specific date for the intense seismic activity if conditions are right: Dec. 3, 1990.

The correct conditions, which Browning told the Missouri Governor's Conference on Agriculture are like a "loaded gun," would be a massive amount of pent-up energy beneath the earth's surface.

"Will it go off? Who knows? If you pull the trigger on a gun it goes off only if it's loaded. I don't know if it's loaded. Certainly the opportunity exists if it's loaded," Browning said.

"There has to be energy there for it. You can't get energy from the triggering forces. You get energy from geological forces" he said.

Other factors are tidal forces, which Browning says move in 179-year cycles — meaning

12-12-89  
Blytheville (Ark.)  
Courier News  
(Continued)

earthquakes which rattled the New Madrid Zone starting in December 1811 could shake again in December 1990.

"We're back in the same triggering force configuration as of Dec. 3 of next year as we were when the great New Madrid quake went off," Browning said of the tidal forces.

While Browning says his target date for the next New Madrid earthquake is tentative, he claims to have missed by one day predicting the recent California quake by using the same computations. Browning, a climatologist for 15 years who has written three books and issues a newsletter said he first published his predictions in 1985.

The October earthquake, measuring 7.1 on the Richter scale, caused 67 deaths and more than \$7 billion in damage. Several of the 1811-1812 New Madrid quakes — occurring a century before development of the Richter scale — would have surpassed an 8.8 measurement of intensity, researchers contend.

Several major cities lie along the New Madrid Zone from Cairo, Ill., to Marked Tree, Ark., encompassing parts of the states of Arkansas, Illinois, Indiana, Kentucky, Mississippi, Missouri and Tennessee. At Memphis, the Central United States Earthquake Consortium was told that those states are ill-prepared to deal with the devastation of strong earthquakes.

The state legislative hearing was called after lawmakers expressed concern that safety codes for buildings, bridges and highways were not adequate in case of an earthquake. One geophysicist at the Memphis meeting compared existing knowledge about the New Madrid Zone to what was known about the San Andreas Fault in California in 1906.

There were thousands of earthquakes in the 19th-century New Madrid quake, tremors from which reportedly knocked down townspeople in Cincinnati and Nashville, Tenn.; and rang church bells in Boston and Baltimore.

1-27-90  
St. Louis Sun

## Experts: Quake not a threat

By PEGGY FORD  
St. Louis Sun correspondent

ST. LOUIS — An earthquake in the St. Louis area that collapses houses or destroys buildings is unlikely within the next 20 years, and the violent New Madrid earthquakes of 1811-12 likely won't recur for hundreds of years, seismology experts said Friday.

"(St. Louis) is not in imminent danger," said Paul C. Thenhaus, a research geologist with the U.S.-Geological Survey. "Considering the average recurrence (of an earthquake) is 800 to 1,000 years, the probability is quite small."

In front of an audience of 170 at the Sheraton St. Louis Hotel, experts from the central United States gathered to present data on regional quakes and to discuss precautions.

"I'm not an alarmist and am opposed to the alarmist rhetoric," said Dr. Robert Herrmann, St. Louis University's professor of geophysics. "(A serious earthquake) is not going

to occur tomorrow. It's not going to destroy the city and every house in it."

Herrmann called a recent prediction by a New Mexico meteorologist that a major earthquake would hit the area on Dec. 3 "alarmist and irresponsible."

He guessed that tornadoes pose a greater threat to St. Louis residents than a quake.

However, Herrmann said, tremors that shake the metropolitan area are likely.

"There is a quake problem, so let's do something to guarantee that structures going up can withstand the earthquake that is expected during the life of the building," Herrmann said.

In the St. Louis area, earthquakes pose the greatest danger to occupants of older, multi-story, brick office and apartment buildings. The damage to most homes in the area will be from falling objects.

"Consider what would fall over if the house moved horizontally," Herrmann said.

He did not recommend blindly buying earthquake insurance.

1-30-90  
Paducah (Ky.) Sun

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## Mark your calendar

New Mexico climatologist sets New Madrid quake for Dec. 3

By BILL BARTLEMAN  
Sun Staff Writer

If the New Madrid Fault is loaded for a major earthquake, it will erupt on Dec. 3, according to climatologist Iben Browning.

The Albuquerque, N.M., scientist said his prediction is based on history and "a little math."

He said he is using the same information he used to predict — within one day — the earthquake that rocked northern California on Oct. 17.

Scientists believe one of the triggering forces of an earthquake is the tidal force that causes high and low tides in the ocean.

The strength of tidal forces — determined by the alignment of the earth, moon and sun — causes a "pull" on the land the same as the pull on the seas.

Browning said that on Dec. 3, 1990, the tidal forces that affect the New Madrid Fault will be at their highest level since 1964 and equal to the tidal forces that existed in 1811 when a series of enormous earthquakes caused the Mississippi River to flow backward.

An earthquake is caused when pressure is released between two faults in the earth.

Browning said that if sufficient pressure is built up in the New Madrid Fault, the strength of the tidal forces on Dec. 3 could "pull" enough to cause the pressure to be released.

"It's like a gun," Browning said. "If it's

loaded and you pull the trigger, it'll go off.

"If it's not loaded, it won't go off."

Browning said he has made no calculations to determine how much pressure is built up in the New Madrid Fault, which runs from Cairo in southern Illinois to Marked Tree, Ark.

Scientists have predicted that pressure is building, and a 1-in-3 chance exists for a major earthquake by the end of the century, and a 90 percent chance of a major earthquake during the first half of the 21st century.

The earthquakes of 1811-12 on the New Madrid Fault are believed to be the strongest on record. Although no measurement existed then, the quakes are believed to have surpassed a measurement of 8.8 on the modern Richter scale.

The California earthquake last October measured 7.1 and caused more than \$7 billion in damage.

Browning said he predicted the earthquake within a day, using tidal data.

Browning was a featured speaker at last month's meeting of public safety officials from the seven states which would be affected by a New Madrid earthquake.

It was at that meeting that he first discussed the possibility of a Dec. 3 earthquake.

States directly affected are parts of Kentucky, Illinois, Tennessee, Indiana, Missouri, Arkansas and Mississippi.

2-4-90  
St. Louis Sun

## Earthquake preparedness sorely lacking

An article titled "Experts: Quake not a threat" appeared Jan. 27 in the *Sun*. I would like to clarify what appears to be a terrible misunderstanding.

The article begins by stating that an earthquake causing severe architectural damage is "unlikely within the next 20 years."

It is widely accepted by the scientific community that chances of a 7.1 magnitude quake are 33 percent within that time frame. This is the same "body wave magnitude" that swept through California on Oct. 17, 1989.

What most readers don't understand is that the geologic makeup of the Mississippi Valley is closer to that of Mexico City and Armenia, which recently experienced devastating earthquakes of similar "magnitude."

Because of the subsoil conditions in these areas, and in southeastern Missouri, an earthquake wave is capable of moving hundreds of miles without losing much energy.

However, severe damage that occurred in these areas was due not only to geologic conditions, but lack of preparedness, far unlike that exhibited in California.

St. Louis and surrounding communities are decades behind in earthquake preparedness. If you combine the lack of seismic integrity in most of the area's buildings with the public's complacency toward preparedness, you have a situation that doesn't jibe with your article's headline.

TIM WAGNER  
St. Louis County

2-5-90  
St. Louis Sun

### GUEST COLUMN

## A major earthquake would render city, state helpless

Missouri or the City of St. Louis can take no comfort that the Oct. 17 Bay area earthquake casualties were only 66 and only \$10 billion in damages. The earthquake affected only seven counties. But scientists tell us that an earthquake will occur in Missouri.



FRED  
WILLIAMS

I think an earthquake of the same magnitude (7.1) or greater along the New Madrid Fault will be far more devastating than the Bay Area quake.

It has been 177 years since Missouri has had a major earthquake. Therefore, the intensity of the next will be greater.

A great Missouri earthquake will affect 21 states and some 15 million people, according to federal studies. There are 180,000 highly vulnerable residential structures in St. Louis city and county classed as unreinforced masonry buildings.

Life-lines such as gas, water, electric and telephone will be severely damaged.

The fire department will not be able to respond to all the fires.

Tough decisions will have to be made by fire personnel about whether to respond to a single-family fire or to a hotel fire that has 400 or 500 people

trapped. Looting will be widespread.

If a large number of casualties occur, the city may have to initiate temporary mass burials.

The city could be isolated for several days before outside help arrives if the earthquake is a magnitude of 7.1 to 8.3.

In all probability, the bridges to the east and west will be in the Missouri and Mississippi Rivers.

A substantial number of people will be left homeless. The present shelter

“  
*A great Missouri earthquake will affect 21 states and some 15 million people, according to federal studies.*  
”

system cannot accommodate the need. Tent cities will have to be established.

There will be shortages of drugs, food and water.

Law enforcement personnel will be taxed to a point of pain. The city will lack the necessary number of engineers needed to inspect all residential and commercial buildings to determine which are safe for habitation.

*Fred Williams is director of the city Emergency Management Agency.*

2-9-90

St. Louis Sun

## Quake column lacking

Fred Williams, head of the St. Louis Emergency Management Agency, really knows his earthquakes. His guest column on Feb. 5 listed all known effects. I just have a couple of questions.

Fred, what are you going to do when the New Madrid fault unwinds under us? Your column didn't give us any clues. Do you have any?

Would you share them with us?

BOB WELCH  
-St. Louis

*Editor's note: The column was excerpted from a detailed report including safety measures to take. The Sun has printed them. You can contact Williams at the City Emergency Management Agency, 1315 Chestnut St., St. Louis, Mo. 63103. Or call 622-3501.*

6-20-90, Jonesboro (Ark.) Sun

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## Earthquake forecasts getting more reliable

By R.B. FALLSTROM  
Associated Press

ST. LOUIS (AP) — A member of a team that is projecting a major earthquake in the Midwest Dec. 2 or 3 says that forecasts of this sort are getting more and more reliable.

"I would not be surprised if in 20 years or so we can get to a point where we can treat earthquake warnings like hurricane warnings," Evelyn Browning Garriss of Sandia Park, N.M., said Tuesday. "These are projections, not predictions."

"If you want to make a prediction, you use tea leaves."

Garriss' father, climatologist Iben Browning, used U.S. Naval Observatory calculations to determine that an earthquake was likely on the New Madrid Fault this December.

2-14-90

St. Louis Sun

## Quake stories misleading; we'd better get prepared

The Jan. 27 *Sun* headline ("Experts: Quake not a threat") and subsequent article on the recent earthquake hazard reduction workshop in St. Louis were misleading.

The New Madrid earthquakes of 1811-1812, estimated to have magnitudes of 8.1 to 8.3, were the greatest recorded on the North America continent.

A quake of similar magnitude today would result in almost total destruction along this fault and would be a catastrophe unparalleled in American history.

The seismology experts at the workshop stated that a quake like those of 1811-1812 could be expected to recur every 800 to

1,000 years.

Readers of the *Sun* article could very well be left with the mistaken impression that any serious earthquake was not likely to happen along the New Madrid fault for several hundred years.

The predicted probability of an earthquake of 6.3 magnitude along the New Madrid fault during the next 15 years runs from 40 percent to 60 percent and 86 percent to 97 percent during the next 50 years.

A 6.3 earthquake would not level St. Louis but would likely cause damage to masonry structures, roads and bridges, and possibly result in injuries or deaths.

In this century, Missouri has been fortunate to have been spared earthquakes such as the 1895 quake of 6.3 magnitude near Charleston, Mo.

But we cannot allow this period of relative seismic calm to lull us into believing that destructive earthquakes can't happen here within the next few years.

Preparedness kept the damage of the recent California earthquake from being any worse than it was. Missouri and other states along the New Madrid fault can learn from that experience.

JAMES H.  
WILLIAMS, Ph.D.  
Director, State Geologist

in the bay area, killing 67 people.

He also projected an earthquake along the New Madrid fault. "People haven't been paying attention." Browning said of communities in California's San Fernando Valley in 1971 that measured 6.5 on the Richter scale and killed 75 people, a 1972 killer earthquake in Nicaragua, and the Mt. St. Helens volcanic eruption.

The city of Carbondale, Ill., located along the New Madrid fault, is taking the December projection seriously. Vacations have been postponed for some employees that week.

Browning, 72, is too ill to travel, so his daughter has spread words of his work at speaking engagements. At an appearance at the Mid-America Regulatory Conference Tuesday, she wore a T-shirt emblazoned on the back with the words, "Are You Ready For The Next One?" She received the shirt from the Center For Earthquake Studies at Southeast Missouri State University in Cape Girardeau.

But Illinois as a whole is unprepared for a quake and other areas along the fault aren't really ready either, she said.

"If California is a 10 on a scale of preparedness and Armenia a zero, most of the New Madrid fault would have a 3," Garriss said. "Memphis is zero."

Her father agreed in a telephone interview Tuesday.

"They're absolutely not ready,"

Garriss said there may be warning quivers in October, which would help communities realize that the danger is serious.

"It would be one of the best things that could happen," Garriss said.

Browning and Garriss publish a monthly newsletter, "The Brown-ing Newsletter," that deals with climate, geological events and their impact on society, Garriss said.

Earlier in the year they projected flooding for the Mississippi River basin. They've also projected three hurricanes to occur in the Gulf of Mexico this year and, here's an easy one, a 70 percent chance of a heat wave in the Midwest in July and August.

The earthquake danger is not just on the New Madrid fault, according to Browning and Garriss. Other areas at risk are Utah and Montana, and California.

Earthquake experts in the Midwest have said there is a 50-50 chance of a quake measuring 6.3 on the Richter scale in the next 10 years, and a 10 percent chance of a quake measuring 7.6. It may escape a quake this December, but the clock is running down.

"It's like living on a bowl of Jell-O," Garriss said. "I would at least lie the china flat."

## Quake is taken very seriously

INDIANAPOLIS (AP) — The State Emergency Management Agency is taking seriously one expert's projection that a major earthquake will hit the New Madrid Fault in December even though it probably won't happen, the agency's director said Thursday.

Climatologist Iben Browning said a major quake will hit the Midwestern fault on Dec. 2 or 3, a projection that has caused officials in Carbondale, Ill., to cancel vacations that week. Browning earlier had projected the Loma Prieta quake that devastated San Francisco last October, a 1972 killer earthquake in Nicaragua and the volcanic eruption of Mt. St. Helens.

An earthquake Thursday in northern Iran killed more than 25,000 people and injured thousands, Iran's government announced. Scores of villages and towns were demolished.

"I basically have taken the position we are not going to ignore this prediction," said Hauer, chairman of the Central United States Earthquake Consortium, which includes emergency management directors from Illinois, Kentucky, Missouri, Arkansas, Tennessee and Mississippi.

Hauer said that a major quake likely will not occur along the New Madrid fault those days and that he did not want to cause any panic. SEMA will not cancel vacation plans for the first week of December, but he said there are practical steps that might be taken.

"If we have to schedule National Guard drills during the month of December, why not schedule them during that week?" Hauer said.

Hauer also said the state must continue earthquake education programs and preparation of response plans so that when an earth-

quake hits, people are ready to react correctly.

"There's a possibility of a New Madrid earthquake. Most people accept it will happen. They just don't know when it will happen. I need to be as prepared tomorrow as I will be December 3rd this year and December 3rd next year," Hauer said.

The New Madrid fault extends about 120 miles from near Cairo, Ill., through New Madrid, Mo., to Marked Tree, Ark. A series of major quakes that occurred along the fault in 1811-12 were among the most powerful in U.S. history, scientists have said.

John Hill of the Indiana Geological Survey in Bloomington said Browning's projection for the New Madrid fault has been known for years and said the scientific com-

munity, while skeptical of earthquake predictions, feels he may have come up with insights on determining when earthquakes will occur.

"They are not illogical. They are certainly based on common sense," he said.

Unlike the California faults, the Midwest framework in which earthquakes occur is not well understood, Hill said.

What is known is that a zone of weakness extends northward from New Madrid into the Wabash Valley, he said.

Evansville and southwest Indiana would face the greatest damage in this state from a quake centered at New Madrid, Hill said. That area not only is closest to New Madrid, but structures there are built upon unconsolidated sedi-

ment, rather than bedrock. The latter factor would amplify the energy of a quake as it shook a structure, he explained.

Browning charts tidal patterns to project when earthquakes will occur along major faults. The added stress of tidal force along a fault may be the "last straw on the camel's back" when it comes to triggering a quake, said Hill, head of the publications and education section of the survey.

Other, unknown forces may play more important roles, however, he added.

Browning's projection of the Loma Prieta earthquake caused interest among earthquake scientists, Hill said. "He may have hit on something of scientific significance, or it may have been coincidental," he cautioned.

6-22-90

St. Louis Post-Dispatch

Reprinted by permission

## Dec. 3 Called Day To Lay Dishes Flat

By William Allen  
Of the Post-Dispatch Staff

For anyone in the St. Louis region wondering whether to take an early Christmas vacation in 1990, consider this:

Gravitational forces coming to a head toward the end of this year will increase the chances of a major earthquake in the nearby New Madrid fault, a climate forecasting consultant from New Mexico said Tuesday.

The alignment of the Earth, moon and sun will create an unusually strong tidal pull that could trigger a quake in the fault on Dec. 3, said Evelyn Browning Garriss.

"We're not saying there's definitely going to be an earthquake on Dec. 3, but if the fault is ready to go, this will trigger it," Garriss said. "I would at least lay the china down flat."

But before you pack the bags and put the dishes on the floor, consider that many scientists don't think there's any basis for predicting a Dec. 3 quake.

Brian Mitchell, chairman of earth

and atmospheric sciences at St. Louis University, said the many scientific studies of how tidal forces may influence earthquakes have failed to show a link.

"I don't think it [the prediction] is something we should pay any attention to," Mitchell said in a telephone interview.

Garriss spoke this week at the Mid-America Regulatory Conference at the Marriott Pavilion Hotel downtown. She reported on quake projections made by her father, Iben Browning, a scientist in Sandia Park, N.M.

Garriss and Browning produce a newsletter for business clients on climate and geological events and their impact on the economy. In 1985, Browning predicted an earthquake on Oct. 17, 1989, in the general area where the one actually occurred on that date in the San Francisco area, Garriss said.

Browning now estimates that the pull of the moon and sun will peak in northern latitudes of the globe in December, possibly triggering quakes in

several countries, including the United States and Japan.

The New Madrid fault is one of several faults believed to be primed for a quake.

The fault runs for about 120 miles through part of southeastern Missouri and southern Illinois. Scientists rate the chances of a damaging quake of 6.0 or better on the Richter scale at about 50 percent by the end of the decade.

Garriss did not say how much the impending tidal forces raised the chances of a quake.

"We are now starting to have more high tides, and one of the highest will be on Dec. 3, 1990," Garriss said. Several "precursor earthquakes" could rumble in advance of the Dec. 3 event.

Gravitational forces affect not only the tides at sea but also so-called Earth tides, which are slight rises and falls of the land.

"High tides are a triggering mechanism," Garriss said. "They can pull the trigger 100 times, and if the gun isn't loaded, it doesn't go off."

6-24-90

**Memphis Commercial Appeal**

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**City, state to participate  
in nationwide quake drill**

By **Karanja A. Ajanaku**  
The Commercial Appeal  
Nashville Bureau

NASHVILLE — At 10:15 a.m. on Oct. 10, a simulated earthquake measuring 6.8 on the Richter scale will trigger the first-ever nationwide test of the federal government's National Disaster Medical System.

Don't panic. This will be only a test.

But some states have been encouraged to participate by one scientist's suggestion that Dec. 3 may be the day the New Madrid fault could be hit by a serious swarm of tremors.

Dr. Iben Browning, a New Mexico climatologist, told The Commercial Appeal back in November that Dec. 3, 1990 was the day when tidal forces created by the positions of the sun and moon could be a "triggering force" for a major series of earthquakes in the New Madrid zone. The zone is along a line that runs from a point south of St. Louis to a point about 35 miles northwest of Memphis.

The notoriety that Browning and his "tidal force projections" are garnering has become a source of some uneasiness among those who prepare for earthquakes for a living.

Said Tom Durham of the Tennessee Emergency Management Agency, "It is the first time we've had to deal with something like this . . . You can imagine if there was an official prediction, just the complication of when to make the prediction public."

As Browning put it, "A triggering force is not an earthquake force any more than pulling the trigger on a gun makes the gun go off. The gun goes off only if it's loaded. I don't know whether (the New Madrid Fault) is loaded or not, but the trigger will be pulled."

Dr. Arch Johnston, director of the Center for Earthquake Research and Information at Memphis State University, said there is some research that supports the tidal forces theory but just as much research that disproves it.

Either way, Pete Darmohray, area manager for the National Disaster Medical System (NDMS), said Browning's projections about tidal-forces triggering earthquakes actually has encouraged some states to participate in the October drill.

"A real big New Madrid fault exercise historically has not been conducted. A medical exercise of this volume has never been conducted in this country before. You are looking at two firsts," Darmohray said.

The staged earthquake's epicenter will be Marked Tree, Ark., about 35 miles northwest of Memphis. The fake disaster will include 2,200 mock fatalities and 32,000 other injuries.

During the four-day drill, the Memphis and Shelby County Emergency Management Agency will unveil its new \$200,000 mobile emergency center, a specially equipped tractor-trailer. The exercise also will be the first trial run of a new agency system designed to track patients as efficiently as Federal Express tracks packages.

Earthquake preparation along the New Madrid Faultline is reaching a new level of intensity. Local, state and national officials are busy refining — and in some cases creating — different

aspects of their own preparedness plans. While many of the earthquake preparation efforts were underway before the Loma Prieta earthquake shocked Northern California last October, it's clear that the enormity of that catastrophe is helping quicken the pace.

NDMS is the United States government's nationwide medical mutual aid system. It is supposed to provide for treating large numbers of patients who are injured in a major domestic disaster within the continental United States or treat casualties from a conventional military conflict overseas.

To get that job done, the U.S. departments of Health and Human Services, Defense, Veterans Affairs and the Federal Emergency Management Agency are cooperating. The NDMS program includes 75 federal coordinating centers and 1,563 private-sector hospital members with about 105,000 beds.

NDMS, which was set up during the administration of former president Ronald Reagan, has been planning the New Madrid exercise since April 1989.

Memphis and Walnut Ridge, Ark., have been designated as regional evacuation centers, where NDMS will test its ability to gather and treat the injured and then send them off to hospitals aboard C130 transport planes. For the exercise, about 1,300 people actually will be flown to 24 different cities.

Darmohray said the NDMS program is supposed to supplement local and state efforts.

Jeff Crenshaw, director of the Memphis and Shelby County Emergency Management Agency, said, "We had the choice. We could play or not play. We decided to play and test some particular things that really need it."

For example, there will be the first test of a patient tracking system that uses bar-code technology. "It (the concept) is simi-

lar to Federal Express. If you can track a package around the country, why not a person?"

The patient-tracking system was developed, in part, by what Crenshaw calls an individual mobilization augmentee (IMA). Basically, that's a person paid to help in some aspect of the local disaster plan. Other IMAs are helping convert a tractor-trailer into one of the most sophisticated mobile emergency centers in the country. The mobile center is designed to replace the center in City Hall. It is being paid for with about equal parts of private and public money.

Crenshaw said Memphis and Shelby County also will test a family notification plan with the Chattanooga Emergency Management Agency. The plan is a lesson learned from California. That earthquake experience showed that people couldn't call within an area code but could call outside.

The NDMS earthquake drill comes as the state works to complete "a statewide, coordinated response and recovery plan" by next year. Durham said the state will have some limited participation in the NDMS exercise.

Durham said state officials are about midway in developing their new plan. Sixteen teams involving various state departments and agencies are working on portions of the plan.

A recently completed component of the plan is a building rating system to designate the condition of a building after an earthquake hits.

The state already has the Tennessee Emergency Management Plan that provides a basic framework to help deal with disasters.

But, Durham said, "Hurricane Hugo and the California earthquake has made planning for a catastrophic disaster the top priority."

Staff reporter Michael Kelley contributed to this story.

7-1-90

Central West End Journal (St. Louis)

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## Study: Earthquake would hurt city most

By Tracy Corrington  
States News Service

St. Louis County residents are better protected than city residents from the effects of a catastrophic earthquake, a new earthquake preparedness study shows.

Still, the study said the entire St. Louis region would suffer devastation and is not prepared to cope with such a disaster.

The soon-to-be-released study was conducted by the Federal Emergency Management Agency. It said that casualties from an earthquake registering 7.1 on the Richter scale — the magnitude of last October's quake in San Francisco — would be more than three times as high in the city than in the county.

"County residences are predominantly of wood frame construction which typically, is not associated with damages severe enough to produce large numbers of deaths and serious injuries," the report said.

By comparison, the report noted that about 80 percent of structures in the city "are of unreinforced masonry construction," such as brick.

FEMA's study is the first comprehensive look at the potential consequences of an earthquake in St. Louis, which is located over the New Madrid Fault.

The study assesses the damage of a hypothetical earthquake centered near Cape Girardeau, Mo. The report said such an event will probably happen with-

in the next century.

Deaths from such a quake could range from 260 to 1,020 in the county and 1,200 to 4,300 in the city, depending on whether the quake hit in the day or evening. The estimate does not include casualties from resulting floods or fires.

The FEMA report will help in planning future construction and in urging local officials, businesses and schools to create earthquake response plans, said Fred Williams, director of the city's Emergency Management office.

"It's pretty hard to tell people to get ready (since) it's been 179 years since the last big quake," Williams said. "But we're going under the assumption of many scientists that we will have another quake by the year 2000."

Williams was referring to a series of earthquakes along the New Madrid Fault in late 1811 and early 1812. The most severe of the earthquakes, on Feb. 7, 1812, caused the ground to move 15 to 20 feet vertically and horizontally, caused the Mississippi River to flow backward and created Reelfoot Lake in northwest Tennessee.

FEMA officials would not comment on the study until it was officially released, which they said would occur "soon."

Existing emergency response resources — police and fire departments, hospitals and power companies — cannot adequately provide for the needs of quake victims, the study said.

7-9-90

San Jose Mercury News

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## No school Dec. 3-4: Quake is predicted

WILSON, Ark. (AP) — A northeast Arkansas school district is taking a forecaster's prediction to heart and has tentatively planned an early December earthquake break.

The South Mississippi County School District No. 57 won't hold classes Dec. 3-4, if the school board approves, in deference to climatologist Iben Browning's prediction of a major earthquake along the New Madrid Fault during that time.

Browning claims to have accurately predicted last fall's Northern California earthquake within one day. He also says he correctly predicted the 1971 earthquake in California's San Fernando Valley, a deadly earthquake in Nicaragua in 1972 and eruption of Mount St. Helens volcano in 1980.

South Mississippi County Superintendent Harvey Barton said he is taking Browning seriously. Browning has predicted a quake for Dec. 2 or 3, a Sunday and Monday. The district, north of Memphis, Tenn., has canceled classes on Dec. 3 and 4. It will use that time for staff development days mandated by the state Department of Education, Barton said.

"Because we are a large rural

## Climatologist Iben Browning has forecast a major earthquake along the New Madrid Fault.

area covering approximately 400 square miles, transporting students would be a hardship if we should have an earthquake," Barton said.

The New Madrid seismic zone stretches roughly from northeast Arkansas northward to southern Illinois.

Communities that make up the South Mississippi County School District are within 30 miles of Marked Tree, the center of a series of great earthquakes measuring as high as 8.5 on the Richter scale that rocked the area during the winter of 1811-12. U.S. Geological Survey scientists consider those the strongest series of quakes in the nation's recorded history.

7-11-90

Memphis Commercial Appeal

Reprinted by permission of the Associated Press

## Arkansans, Guard prepare for quake

The Associated Press

The Arkansas National Guard has scheduled earthquake exercises for northeast Arkansas during the time period that a major earthquake is projected along the New Madrid fault.

The projection by climatologist Iben Browning, who predicted last fall's San Francisco earthquake within a day, also has resulted in a planned closing of a school district and a flurry of sales of earthquake insurance.

Browning, who declined a telephone interview Tuesday,

has gathered data that indicate a high likelihood of an earthquake on Dec. 2 or Dec. 3 along the fault line, which extends roughly from Marked Tree, Ark., through New Madrid, Mo., to Cairo, Ill.

Officials of the South Mississippi County School District won't hold classes on Dec. 3-4, if the school board approves, in deference to Browning's projection.

"The publicity has definitely made an impact," said Bill Geeslin of Pollard-Geeslin Insurance Agency in Blytheville. He said inquiries are up 10 percent to 20

percent over last year. At least half of his customers have the coverage. "People are definitely asking about it," he said.

Agent Bill Kenner of Blytheville said publicity about the projection and the vulnerability of Northeast Arkansas have made selling easy. He said about 90 percent of his customers buy earthquake coverage after he mentions it.

A National Guard spokesman said the drill was planned before Browning's projection. Maj. Cissy Lashbrook said Monday that the earthquake exercises are not the result of the projection. However, they were sched-

uled for Dec. 1-5 "because of the increased public awareness" resulting from the projection of the quake in Northeast Arkansas.

She said the exercises will give the Arkansas Guard an opportunity to test its earthquake contingency plan.

Seismologists have warned that a major quake will occur along the New Madrid fault sometime in the next few years. Scientists say there is a 60 percent chance of a major earthquake along the New Madrid fault by the year 2000, and a 95 percent chance by 2035.

7-12-90

Memphis Flyer

Reprinted by permission

# Quake Prediction Sparks Reaction, Debate

By Lucia Loeb

December 3rd might seem like a long way down the road, but many area residents have already chosen that date for their winter vacation. Destination—anywhere outside of the city.

Reactions are stemming from a projection made by New Mexico climatologist Dr. Iben Browning, who says that on December 3, 1990, tidal forces created by the positions of the sun and moon could be a triggering force for a major earthquake in the New Madrid fault zone, an area which includes Memphis.

Browning's high tidal forces theory is based on earth tides, a phenomenon where stresses are generated by gravity within the earth, causing the earth to literally rise and fall. He contends that the maximum point of these earth tides triggers stress which is stored in a fault system, thus creating the possibility of an earthquake.

In a recent phone interview, Browning emphasized that he was not actually predicting an earthquake for that date, rather he was projecting the triggering force. Comparing the New Madrid zone to a gun, Browning said that on December 3, 1990 the trigger of the gun would be pulled. "But it is not up to me to say whether the gun is loaded," he said. "That is up to local geologists." Browning then added, "I have, however, been told by Dr. Arch Johnston of the Center for Earthquake Research and Information (CERI) at Memphis State University and Dr. David Stewart of the Earthquake Studies Center at the University of Missouri that the gun is loaded."

Browning said his earth tides theory has allowed him to correctly project triggering forces in several other catastrophic natural disasters, including the October 17, 1989 earthquake in Northern California which measured 6.9 on the Richter scale and caused an estimated \$7 billion in damages; the February 9, 1971 San Fernando Valley earthquake which measured 6.6 on the Richter scale and caused an estimated \$1 billion in damages; and the November 14, 1985 eruption of the volcano Nevada del Ruiz in northern Colombia, which killed as many as 20,000 people.

Asked if he lived in the Memphis area would he evacuate by December 3rd, Browning replied that he would definitely prepare himself. "My first principle is to avoid panic, because panic can kill more people than earthquakes can," he said. "The question here is not *if* you're going to have an earthquake, because you *will* have one. The question is *when* you will have it. The trigger is going to be pulled on December 3rd, and though it does not unquestionably follow that you will have an earthquake, I would certainly prepare myself in all ways."

Although Browning contends that his theory is a proven one, some don't give it much credibility. "There is no conclusive evidence to suggest there is a correlation between earth tides and earthquakes," says Jill Stevens, manager of public education and information at CERI. "There have been some studies done that suggest that earth tides do trigger earthquakes, but there have been roughly an equivalent number of studies that have refuted the notion."

Stevens notes studies conducted by scientists at St. Louis University which showed that Browning's theory was

incorrect. "These scientists ran back through and looked at these tidal cycles in relation to past earthquakes in the New Madrid zone," she says. "They found that in the earthquakes of 1811 and 1812, only one occurred at the earth tide maximum. In fact, the other three occurred at or close to the earth tide minimum. Furthermore, two other significant earthquakes, one in 1843 and another in 1895, also occurred very close to the earth tide minimum."

Stevens says that none of Browning's theories regarding earthquakes and tidal forces have ever been noted in any reputable scientific publication. "He has made his livelihood from traveling around and talking to various business and corporate people, not the scientific community," she says. "No responsible scientist can make a prediction as to the date of an earthquake, and whether you use another name or not, essentially what he's saying is that there's going to be an earthquake here on December 3rd."

As for a CERI forecast on a New Madrid zone earthquake, Stevens said they can only hypothesize. "What we believe is that there is the possibility that a magnitude 6.0 to 6.5 earthquake can be predicted," she said. "Based on what we know about recurrence rates, we feel there is a 40 to 63 percent chance of that earthquake happening in the next 15 years, but that does not mean that this trigger is going to pop it off. There is no greater chance of an earthquake occurring on December 3rd than on any other day."

■



**7-14-90**  
**St. Louis**  
**Post-Dispatch**  
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Wes Paz/Post-Dispatch

Sen. John Danforth (right), talking with Brian J. Mitchell (left), chairman of earth and atmospheric sciences at St. Louis University,

and Sean-Thomas Morrissey of the university's Geophysical Observatory. Danforth toured the center Friday.

## Prediction For Big Quake Attacked

By William Allen  
 Of the Post-Dispatch Staff

Earthquake experts in St. Louis and Memphis debunked on Friday a prediction that there's an unusually good chance of a severe earthquake in the New Madrid Fault in December.

The prediction was made months ago by Iben Browning, a scientist in Sandia Park, N.M. Browning said that gravitational forces coming to a head on Dec. 3 would cause an unusually strong tidal pull that could trigger a quake.

Since the prediction, at least one city, Carbondale, Ill., has canceled vacations by city employees for Dec. 3, a school district in Arkansas has canceled school for Dec. 3 and 4, and the Missouri and Arkansas National Guards have scheduled quake-preparedness exercises from Dec. 1-5.

But Browning's prediction method was criticized in a memo released Friday by Brian J. Mitchell, chairman of earth and atmospheric sciences at St. Louis University, and

Arch C. Johnston, director of the Center for Earthquake Research and Information at Memphis State University.

Because of "media attention and public concern" about the prediction, "we feel it is important to show that [Browning's method] is ineffective for predicting earthquakes," Mitchell and Johnston wrote.

They said that a quake on Dec. 3 was "no more likely than at any other time" and that the prediction "should not be considered seriously."

But that "is no reason to be complacent" about improving the region's readiness for a major earthquake, they said.

The New Madrid Fault runs for about 120 miles through part of southeastern Missouri, Southern Illinois, Tennessee and Arkansas. Scientists rate the chances of a damaging quake of 6.0 or better on the Richter scale at about 50 percent by the end of the decade.

Scientists have studied the relationship between earthquakes and

tidal forces since 1936, with few finding any correlation, Mitchell and Johnston wrote. Tidal forces similar to those expected on Dec. 3 have occurred many other times without triggering a quake, they said.

The memo, dated June 29, was addressed to several state and federal emergency management officials and scientists.

The scientists released the memo to reporters while Sen. John Danforth, R-Mo., toured the university's seismic data center Friday afternoon. Although not specifically referring to the prediction for Dec. 3, Danforth said: "It's important not to push the panic button, to be an alarmist. But I also think we should not be cavalier."

He said a recent federal report that estimates hundreds of deaths and billions of dollars in damage in St. Louis from a severe New Madrid quake "indicates we are not as prepared as we should be." He recommended "a businesslike approach" to preparing for a quake.

7-15-90

**Jackson (Miss.) Clarion-Ledger**

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# QUAKE?

■ An expert predicts major damage in Mississippi Dec. 2 or 3.

**By Leslie R. Myers**  
Clarion-Ledger Staff Writer

Set your earthquake alarm for December 2 or 3, 1990.

When time runs out, the New Madrid fault — mid-America's sleeping giant — apparently will awaken and introduce itself.

The fault's wintertime yawn is predicted to become a major earthquake, between magnitudes 6.3 and 8.6 on the Richter scale.

The timing is based on research by U.S. scientist Iben Browning, the same man whose work helped predict the volcanic eruption of Mount St. Helens in 1980 and — within a day — last October's devastating 7.1 quake in San Francisco.

A major New Madrid quake would throttle northwestern Mississippi, shake up Jackson and rumble south to the coast. Twenty-one states are in this erratic, destructive path.

Almost nobody is prepared.

That's a challenge for Mississippi Emergency Management Agency (MEMA) Director Jim Maher. His agency must educate Mississippians, utility services and emergency personnel about the New Madrid threat. MEMA is encouraging us to prepare for a 7.6 quake.

"Some people don't believe it," Maher said of the December prediction. "But you can't ignore it. You can't be complacent about it."

The fault has kept rather quiet in our lifetimes. It has quakes almost daily, but seldom are they felt.

But the fault once was famous.

In the winter of 1811 and 1812, the New Madrid fault unleashed three major shocks. Its third jolt, an 8.7, is the third largest quake in recorded world history. (San Francisco's 1906 quake registered 8.3.)

Iben Browning works with his daughter, climatologist Evelyn Browning Garriss, in New Mexico. "They're planning for the worst," said Garriss, who often attends U.S. and regional New Madrid quake preparedness meetings. "Your quake usually goes off in winter."

The 1811-12 quakes began in December. *The Next New Madrid Quake: A Survival Guide for the Midwest* describes that first shock, an 8.6, in Missouri: "Flashes of light suddenly burst from the earth, which shook violently, both horizontally and (15 to 20 feet high) vertically. In places, it rolled and undulated in waves . . . the earth burst open and spewed forth water, sand, rock and coal, often as high as the treetops . . . black liquid oozed from the earth . . . to a depth of three feet. Large fissures opened, splitting the ground into hundreds of deep chasms, (some) seven feet wide and of untold depth."

"It's not going to be the end of the world," Garriss said, "but its going to be pretty bad for Memphis."

There is no way to predict the death toll of a 7.6 New Madrid quake. But one study, which covered six cities in the damage zone, said more than 3,000 people would die in those places alone.

The main fault runs in a jagged line from Marked Tree, Ark., to New Madrid, Mo., to Cairo, Ill.

Wendy Jordan works in a grocery store in Walls, a northwest Mississippi farming community 55 miles from the fault's southern tip. It's in the zone that would be hardest hit.

She said they have no plans to close the store on Dec. 2 and 3.

"But I'm already planning my vacation for the first few weeks of December. This had a lot to do with it. It's scary," Jordan, 35. She isn't prepared for an earthquake — nor does she know how to become prepared, she said. Jordan takes the fault

"very seriously." But she said most people in Walls don't talk about it. "We always think it will happen in California, not in Mississippi."

Jordan has thought about moving away "a couple of times."

Jimmy James lives southwest of Walls near Lake Cormorant. He knows about the fault's history and the December prediction. "I just don't worry about it. We've never had one around here," said James, 49, the town's postmaster. "When it comes my time to go, I'm gonna go."

James said there is no way for people so near the fault zone to be prepared for a major quake. "It's going to be strictly chaos," he said.

Worry or not, he said he does have earthquake insurance on his home.

In October, the Mississippi Insurance Department issued news releases encouraging all to buy earthquake insurance, which is not standard in a homeowners policy.

Maher said MEMA is preparing for a 7.6 quake "because everyone says there's sufficient strain on the system to cause that." A mid-1980s study says a 7.6 is "the maximum possible quake for five to 10 years — which is right now."

"The worst case scenario is an 8.6," Maher said. "I think if we had just a 6.3, we'd be fortunate," he said.

"If — I mean when — we have a (major) earthquake, it's not just going to cause damage to our homes and our buildings," Maher warned. "We're going to lose our infrastructure — pipes that bring us gas, our water, maybe our communications system, our utilities system, emergency facilities and bridges and highways — especially in the Delta."

Dams and levees also could cave in, causing huge floods, studies say.

"A 7.6 . . . could make damage visible as far south as right here in Jackson," he said. "As you go north and west, damage would get worse."

"In northwest Mississippi . . . we're going to see major destruction."

"The economics?" he pondered. "I wouldn't hazard a guess. Astronomical — not only in Mississippi. It would have an effect nationwide."

7-16-90

Blytheville (Ark.) Courier News

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# Quake prediction shakes up residents along New Madrid fault

By MITCHELL LANDSBERG  
Associated Press Writer

A scientist's prediction that a quake might strike Missouri and neighboring states Dec. 2 appears to have shaken loose the seismic fears of people in the nation's heartland.

The prediction by climatologist Iben Browning — who claims to have forecast the Oct. 17 Bay area quake but whose theories are disputed by most seismologists — has not created a panic.

But along the New Madrid fault, the example of the Northern California quake, coupled with Browning's forecast, has raised awareness of earthquakes and earthquake safety.

Insurance sales are up, a school district has tentatively canceled classes and two states' National Guards have scheduled drills that week.

The fault, which roughly follows the Mississippi River from Mississippi to Illinois, may not be as well known as the San Andreas fault in California, but it commands respect among earthquake experts.

The last sizable quake on the fault was in 1895, but that's not the one people talk about. The Big One — actually, the Big Three or Four — occurred in 1811 and 1812, when a series of quakes centered in New Madrid, Mo., rocked much of the eastern half of the nation.

The quakes rang church bells in Washington, D.C., and are said to have made the Mississippi River run backward. They have been estimated at around 8 on the Richter scale.

The quakes have become part of the folklore of the region — "It's Our Fault," a T-shirt proclaims. But until recently, that was about as far as it went.

"We talked about it for years," said Sheriff Jake Rone of New Madrid County, "but we never really got serious about it until this thing happened."

The thing that has people talking up and down the New Madrid fault is a projection by Browning, a scientist from Tijeras, N.M., that there could be a major quake in the region Dec. 2 or 3.

Browning, 72, an inventor and climate consultant, bases his projection on a convergence of tidal forces, which he believes can put stress on earthquake faults. But he stresses it's a possibility, not a certainty, that such a quake will happen.

Still, he claims to have predicted last October's California quake using the same method — he says he warned a group of executives in San Francisco seven days before the quake.

Despite the disdain of seismologists, a school district in Mississippi County, Ark., has tentatively canceled classes Dec. 3-4.

Insurance agents in Arkansas say their business in quake insurance policies picked up noticeably after the California temblor and dramatically after word of Browning's projection became public in March.

The director of Indiana's Emergency Management Agency doesn't necessarily believe the forecast, but he doesn't disbelieve it either.

"I basically have taken the position we are not going to ignore this prediction," Jerry Hauer said.

Hauer also is chairman of the Central United States Earthquake Consortium, which includes emergency management directors from the states that would be

hardest hit by a New Madrid quake — Arkansas, Illinois, Indiana, Kentucky, Mississippi, Missouri and Tennessee.

The consortium has taken no action to prepare for a December quake, and Hauer said Browning probably will be proved wrong.

But just in case he isn't, Hauer said, "If we have to schedule National Guard drills during the month of December, why not schedule them that week?"

Officials in Missouri and Arkansas have already done just that, both planning earthquake drills for guardsmen in the first few days of December.

"If something does happen, we'll be there," said Arkansas Guard spokeswoman Maj. Cissy Lashbrook. "If nothing happens, people will see we're prepared for this type of emergency."

Seismologists have mixed feelings about Browning's forecast. It's not that they don't believe there will be a quake; they just don't believe it can be forecast as specifically as Browning suggests.

As close as seismologists can pinpoint it, there's a 40 percent to 63 percent chance of a severe quake — one that is magnitude 6 on the Richter scale — on the New Madrid fault in the next 15 years.

"Yes, people ought to be prepared," said Klaus Jacob, a senior research scientist at Columbia University's Lamont-Doherty Geological Observatory in Palisades, N.Y. "They should be prepared on Dec. 3 and 4. But they should also be prepared today and tomorrow, and Dec. 1 and next year."

"Earthquakes don't care about predictions," he said. "And people shouldn't worry about predictions; they should worry about earthquakes."

7-16-90

## Blytheville (Ark.) Courier News

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## Officials urge residents to prepare for earthquake

By The Associated Press

Residents of the New Madrid Fault region should prepare to follow the 72-hour rule if a major earthquake hits the region, officials say.

That means they should plan to be on their own for at least three days should an earthquake rumble through the region.

"The 72-hour rule is very realistic," said Jeff Crenshaw, director of the Memphis-Shelby County Emergency Management Agency.

"It's unproven what's going to happen in this area," he said. "You can't compare the 1811 earthquake because no one was living here in 1811. You've got to think the worst."

A series of major earthquakes struck the region in 1811-12. A New Mexico climatologist has projected an earthquake for Dec. 2 or 3 along the fault that runs from Marked Tree, Ark., to New Madrid, Mo., on to Cairo, Ill. Iben Browning correctly predicted last October's San Francisco earthquake.

One concern is that collapsed bridges and overpasses would trap people in the area and block help from the outside. That's one

reason why families, communities and cities should store enough food and water for three days, plus medical supplies, blankets and other items that would be needed in a disaster, civil defense planners say.

The new I-40 bridge across the Mississippi River was built with a seismic resistance design, Crenshaw said. But the on- and off-ramps weren't, he noted.

It's possible that Craighead County would be divided by the St. Francis River, said Glen Bradley, county emergency services coordinator.

Blytheville schools have food and medical supplies on hand, thanks to a student project last spring, said Joe Musick, Mississippi County emergency services coordinator.

The city of Jonesboro added a seismic resistance provision to its building code last April. The committee that helped develop the provision is working on coordinating various rescue efforts and increasing public awareness, committee chairman Charlie Smith said.

The committee supports the 72-hour self-sufficiency rule,

Smith said. But the group also is trying to designate "casualty management areas," where medical supplies, treatment and food would be stored.

West Memphis is "500 percent better prepared" for disaster than it was in December 1987, when a tornado tore through the city, fire chief Mac Holmes said.

Two weeks later, the community was flooded. Holmes said the community now is better prepared for disasters.

Browning's prediction has heightened public awareness, Holmes said. People are stocking up on canned food, water and fuel. His department has equipment designed to dig through rubble and collapsed buildings, Holmes said.

He's considered parking city fire trucks outside the station on Dec. 3, Holmes said. But, "you hate to scare people," he said.

West Memphis, which has just two seismically resistance buildings, can look across the river to Memphis for help, Holmes said.

"We don't like to come off as Big Brother, but this is a mid-South area," Crenshaw said. "Those people are our friends and neighbors. I don't know that they might be bigger help to us."

7-21-90

## St. Louis Post-Dispatch

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## Quake Prediction Taken Seriously

By William Allen

Of the Post-Dispatch Staff

**D**ESPITE CRITICISM by some scientists, a prediction of a New Madrid Fault earthquake on Dec. 3 should be taken seriously and not dismissed as unscientific, an earthquake expert said Friday.

"From a scientific viewpoint, we can neither verify nor discredit this projection," said the expert, David Stewart. He is the director of the Center for Earthquake Studies at Southeast Missouri State University, in Cape Girardeau.

Stewart made the comment in a telephone interview after releasing a detailed memo assessing an earthquake forecast by Iben Browning, a scientist in Sandia Park, N.M. Stewart sent the memo June 18 to federal and state emergency management officials and scientists.

Browning has predicted that unusually strong gravitational forces coming to a head on Dec. 3 will increase the chances of a destructive earthquake in the New Madrid Fault. The prediction has caused some officials in regions near the fault to cancel

**"What Dr. Browning is doing cannot be explained merely by chance. Although his accuracy is not 100 percent, his methodology does seem to be promising and worthy of serious and thorough consideration."**

DAVID STEWART, director of the Center for Earthquake Studies at Southeast Missouri State University

vacations and school around that date and to plan earthquake-preparedness exercises.

The New Madrid Fault runs for about 120 miles through part of southeastern Missouri, Southern Illinois, Tennessee and Arkansas. Seismologists rate the chances of a damaging earthquake of 6.0 or better on the Richter scale at about 50 percent at some time by the end of the decade.

Browning expects a major earthquake on Dec. 3 in either the New Madrid Fault, the Hayward Fault in northern California or a fault near Tokyo, Japan. There is an 87 percent

chance that one of the three will erupt on that date, he said.

Browning's prediction for the New Madrid Fault area has been criticized by earthquake specialists at St. Louis University and Memphis State University. They said it should not be taken seriously because scientific studies have found no significant link between gravitational forces and earthquakes.

Stewart, a seismologist, went to New Mexico to interview Browning at length. He discussed Browning's work with several clients who subscribe to Browning's newsletter on climate and

geological events and their impact on the economy.

Although not "formally trained" in fields dealing with earthquakes and volcanoes, Browning is highly respected among businesspeople and investors, Stewart said in the memo. His accuracy on natural disaster predictions "is said by various people to be 50 percent at worst and 90 percent or better most of the time," the memo says.

Browning predicted the earthquake on Oct. 17 in Loma Prieta, Calif., and the eruption of Mount St. Helens in May 1980. He also accurately predicted the earthquake in September 1985 in Mexico City, Mexico; the volcanic eruption in November 1985 in Colombia and the earthquake in 1971 in San Fernando, Calif.

"What Dr. Browning is doing cannot be explained merely by chance," Stewart said. "Although his accuracy is not 100 percent, his methodology does seem to be promising and worthy of serious and thorough consideration."

Browning has said that if the fault is "loaded," the gravitational forces would simply act to "pull the trigger."

# Quake warning rattles residents

## New Madrid area prepares; some are unconvinced

By Lee Hancock

Staff Writer of The Dallas Morning News

BLYTHEVILLE, Ark. — Many experts deride Iben Browning's warning that a powerful earthquake could rattle Middle America on Dec. 3.

But some worried residents of the region are bracing for the Big One:

■ Two weeks ago, banker Steve Bell's customers began asking how to make withdrawals when the earthquake topples the bank building.

■ In neighboring Wardell, Mo., one quarter of the town packed a schoolhouse Monday to hear Red Cross instructor Bob Edwards teach earthquake survival skills.

"My honest opinion: I'm afraid it's going to happen," he said. Pointing at a concrete support behind his desk, he added, "I'm not sure I'll want to be here, either."

The northeast Arkansas town of 25,000 — a county seat with an Air Force base and several small industries — is perched directly over the fault. Despite local jokes about the prediction, knowing what lies beneath the flat delta farmland clearly makes some uneasy.

"Our fire chief told our firemen they can't take vacation. Some already asked," said Mr. Edwards, a fire department lieutenant. "He said we could ship our families out, but we're staying. It was said kind of in jest, but I think that everyone is actually pretty serious about this."

In neighboring Half Moon, Barry Bivens' family won't wait to see what December brings.

"We're going to Sardis, Miss., a week before and we'll stay there until a week after it's supposed to happen," he said. "We're worried that it'll suck our houses plumb under. Why wait around and wonder?"

One geophysicist studying Dr. Browning's methods says the projection can't be ignored because he has predicted other earthquakes — including last October's California temblor.

"Here's a man who verifiably has hit several home runs, and he's up to bat," said David Stewart, director of the Earthquake Information Center at Southeast Missouri State University in Cape Girardeau. "Is he going to hit another one? You don't know, but you can't ignore the batting record."

But most experts dismiss the warning. They acknowledge that there is a 50-50 chance that a destructive quake will hit the fault by decade's end, but they say the projection lacks scientific validity.

"It seems like people are becom-

ing worried about it for no reason at all," said Dr. Brian Mitchell, chairman of the department of Earth and Atmospheric Sciences at St. Louis University.

At the center of the furor is an ailing 72-year-old inventor from Tijeras, N.M., who has spent much of the last 20 years offering clients advice on the esoteric topic of future world climates.

Dr. Browning declined to be interviewed. But his daughter, Evelyn Browning Garriss, said her father began forming his wide-ranging theories while working at Sandia Laboratories in Albuquerque.

Dr. Browning has a doctorate in biology from the University of Texas, and Ms. Garriss said his interests range across many fields. She said he has been a test pilot and developed weaponry and TV technology.

In 1973, he became an adviser on everything from weather to politics for the investment company now known as PaineWebber, said Roger Spencer, a first vice president.

Dr. Browning's weather theories have prompted national media coverage. After predicting the 1980 eruption of Mount St. Helens, he was featured in a PaineWebber commercial.

"He's been dismissed as a nut," Mr. Spencer said, "but all I know is that he's laid out these theories for years, and bad things happen on these days when he says they will."

Ms. Garriss said the ideas that spawned her father's latest projection arose from research for the U.S. government on peaceful uses for atomic bombs. While studying how explosions affect the atmosphere, she said, he became fascinated with volcanoes.

He found that volcanoes are triggered by the same gravitational pulls that cause ocean tides, and "discovered that the same forces that trigger volcanoes also trigger earthquakes," she said.

### ■ 50-50 chance of big quake by 2000. 28A

■ In Wilson, Ark., Doug Jackson has sold 100 earthquake insurance policies in two weeks, and schools have canceled classes Dec. 3 and 4.

Across the region, people are paying heed to the self-styled climatologist's claim that the New Madrid fault will set off a devastating quake within 48 hours of Dec. 3.

"There's people that think that . . . half of the population of this town won't be here because they're planning to leave," said Mr. Bell, a Blytheville alderman and vice president of the Merchants & Farmers Bank.

Using calculations called "vector sum high tides" — sums combining gravitational pulls of the moon, the sun and the planets — he pinpointed dates and areas of potential seismic and volcanic activity.

That theory produced his projection of an earthquake on the New Madrid fault.

Dr. Stewart, a Missouri geophysicist, began researching Dr. Browning's methods after his projection was made public in November. His initial conclusion: Dr. Browning's work can't be discounted.

He said he does not fully understand Dr. Browning's methods but has confirmed the inventor's predictions of the Mexico City earthquake a deadly volcanic eruption in Colombia, both in 1985 and last year's California quake.

"If you just take California last year all by itself, the chances of being correct on that, at the most conservative, would be at least one in 2,500, and probably it's a one in 100,000 chance," he said. "It's almost impossible to pick a date, time and place correctly. But he did it."

Dr. Stewart said he isn't convinced that Dr. Browning's latest projection is right. "But I certainly can't say it won't happen for sure. His methodology has not been put to the scientific test. That doesn't mean it's wrong."

Other scientists strongly disagree. They say Dr. Browning's theories have been disproved by seismologic studies.

"I think as far as the prediction goes, he's completely wrong," said Dr. Mitchell.

The tidal forces that Dr. Browning says might trigger a December quake won't be abnormally strong, "and in past earthquakes, there just hasn't been a correlation between tidal pull and seismic activity," he said.

Dr. Mitchell and others also contend that Dr. Browning's past pre-



Iben Browning . . . the Mount St. Helens eruption and last year's California quake are among his correct predictions.

dictions are suspect because they weren't presented to unbiased observers.

"They have been made to friends, business associates or in talks in front of business groups. It's kind of hard to know what went on in those settings, how many he's made and how many are correct," he said.

Dr. Browning's daughter said he has made only seven projections since 1971 and all have been correct. "He's very careful," said Ms. Garriss, who edits her father's monthly newsletter on the effects of global climate changes.

He hasn't publicized predictions because "he's a private person," she said. "He's trying to give business clients information to make policy with. He's not talking with the scientific community."

Although rejected by most scientists, Dr. Browning's new warning has gained attention from many in a region already worried about the New Madrid fault's potential for destruction.

Some earthquake-preparedness efforts have been under way for six years because seismologists warned in the early 1980s that a temblor measuring 6.0 on the Richter scale had a 50-50 chance of occurring before 2000.

Indiana, Kentucky, Missouri and the cities of Carbondale, Ill., Memphis, Tenn., and St. Louis have approved seismic building codes in the past two years.

7-22-90

Dallas Morning News  
(Continued)

Since 1984, seven states and the Federal Emergency Management Agency have developed a regional emergency response system through the Central U.S. Earthquake Consortium in Memphis.

"Especially with the earthquake in California last fall, the central U.S. woke up," said Jeff Crenshaw, director of Memphis-Shelby County emergency operations. "But this prediction has really gotten people's attention."

Since the prediction gained regional publicity in June, emergency officials have been swamped with queries from local officials and an unprecedented number of requests for earthquake preparedness classes.

In the past three weeks, Memphis State University's Center for Earthquake Information and Research also has "has been inundated with calls," said Jill Stevens, information and education director.

The center is trying to play down the projection, she said, but "some people are panicking. There are quite a few people who are apparently considering very seriously the prospect of leaving. We haven't had experience with this before. I think we are kind of naive as a region, and we've been taken in."

Most state officials place little stock in the prediction, but they hesitate to reject it for fear of encouraging complacency about real threats posed by the fault.

As a result, officials in Indiana, Arkansas and Missouri have planned emergency drills for National Guard units and state agencies in late November or early December.

Mississippi officials are accelerating preparedness planning. And in Illinois, officials are forming a "covert plan" to address panic that might result if any detectable tremors hit the region near the predicted date, said Tom Zimmerman, the state's emergency planning director.

To further soothe regional concerns, state emergency officials want scientific experts to formally evaluate the prediction. Several state officials said they have asked the National Earthquake Prediction Council, based in California, to address the issue.

The council of pre-eminent Earth scientists has turned down the request.

"They don't want to glorify the prediction," Dr. Mitchell said.

Said Mr. Zimmerman, "If his forecast is correct, he'll really put the world of earthquake prediction on its ear."

# Chance of major quake by decade's end is 50-50

By Lee Hancock

Staff Writer of The Dallas Morning News

**BLYTHEVILLE, ARK.** — The upper Mississippi River delta appears languid and immovable, its landscape of cotton and soybean fields disturbed only by scattered farm communities.

But scientists say the region, which includes parts of seven lower Midwest and Southern states, rests uneasily atop a sleeping giant.

The area lies along the New Madrid fault, a subterranean fracture blamed for the country's biggest earthquakes, which shook North America in 1811 and 1812.

Seismologists say there is a 50-50 chance that the fault will produce a destructive earthquake measuring at least 6.0 on the Richter scale by decade's end.

And if it is large enough and close enough to the region's cities, emergency planners say, the next temblor could cause widespread destruction and kill thousands of people.

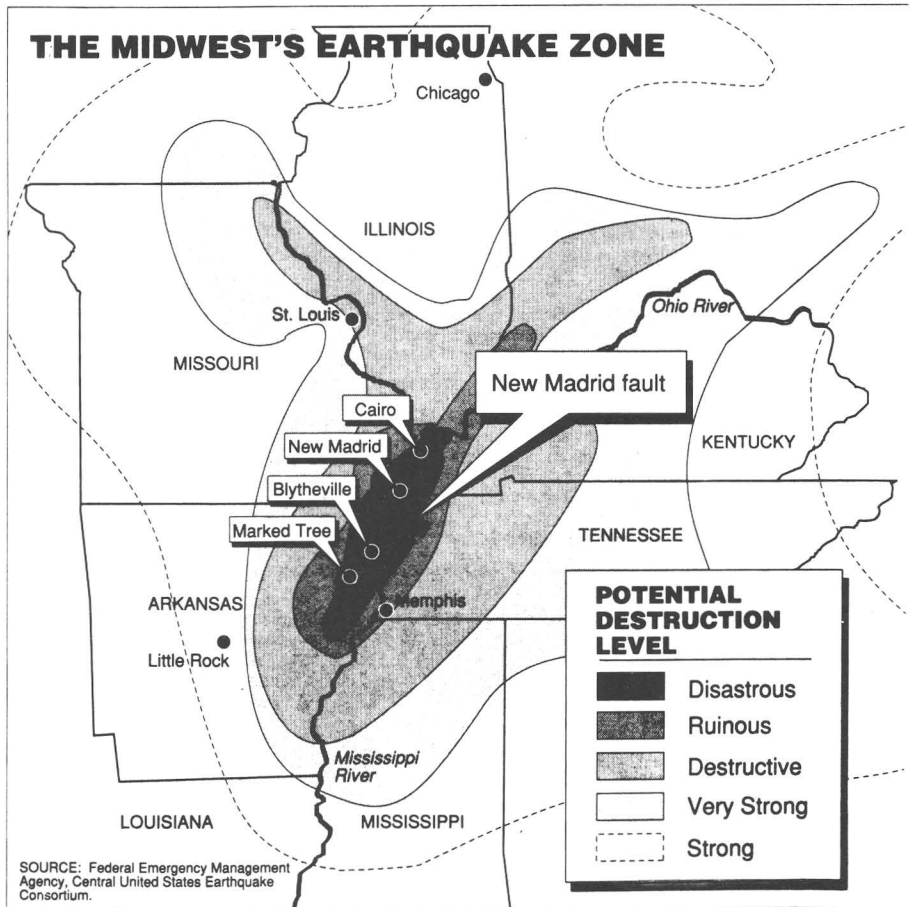
"The New Madrid fault generally will put out a destructive earthquake every third generation," said David Stewart, director of the Center for Earthquake Studies in Cape Girardeau, Mo. "We're now into

that third generation, so it's only a question of time."

Scientists believe that the fault was formed 600 million years ago and stretches more than 120 miles from Marked Tree, Ark., into southwest Illinois, along the way branching into the Missouri boot heel and western Tennessee.

Experts in Earth science say the system is not as well understood as California's San Andreas fault, a much newer formation.

"Right now, we think it's just an old weak place in the Earth's crust where strain is built up," said Dr. Brian Mitchell, chairman of the de-



7-22-90

## Dallas Morning News (Continued)

partment of Earth and Atmospheric Sciences at St. Louis University.

The Earth's crust there is much older and colder than in California, so it conducts seismic waves much more efficiently; scientists say. Therefore, they say, an earthquake as powerful as October's California quake, which registered 7.1 on the Richter scale, would cause more damage in the central United States than California incurred in last fall's temblor. The California quake killed 67 people, injured more than 2,800, left more than 14,000 homeless and destroyed billions of dollars worth of property.

The New Madrid fault rumbles almost daily, releasing temblors from depths as shallow as one mile to as deep as 10 miles beneath the Earth's surface, said Dr. Mitchell, a seismologist who has studied the fault for 15 years.

Most of those quakes are too weak for people to detect, he said. The last palpable shaker, which measured slightly more than 4 on the Richter scale, rattled northeast Arkansas in April 1989.

But the fault has not always been benign.

In the early 1800s, it unleashed forces powerful enough to ring church bells in Boston, set off landslides in the mountains of North Carolina and buckle sidewalks in Baltimore. Tremors were felt as far away as South Florida and what is now Wyoming.

In December 1811, a quake estimated at magnitude 8.6 occurred near New Madrid, Mo., then a town of 1,000 that was the largest settlement between St. Louis and New Orleans.

Two more quakes measuring more than 8 on the Richter scale hit the region in January and February 1812, and they were followed by more than 2,000 massive aftershocks, Dr. Stewart said.

The shakes obliterated New Madrid and two nearby river towns, temporarily forced the Mississippi River to run backward and permanently changed its course.

In northwest Tennessee, sand spouts, sinking land and other seis-

mic action formed what is now Reelfoot Lake from dry land in January 1812.

Settlers described violent upheavals that caused land to ripple like ocean waves, shot sand as much as 40 feet into the air and opened gaping fissures that spouted dark water and noxious gases.

"You have to consider that today, the same area that was sparsely populated, with a total of about 5,000 people, now has 1.5 million people," and that doesn't include Memphis, Tenn., Paducah, Ky. or Cape Girardeau, Dr. Stewart said.

The area has as many as 12 million people, he said, "so the potential for destruction is significant."

A study completed in 1985 for the Federal Emergency Management Agency predicted that an earthquake of magnitude 7.6 would cause more than 3,000 deaths and \$38 billion in damage in area cities alone.

Such a quake could devastate Memphis, the region's largest city. There, almost all highways and other transportation, much of the downtown area and many residential areas could be severely damaged, the report says.

"Depending on the time of day and the time of year, it could do a lot of damage," said Jeff Crenshaw, director of the Memphis-Shelby County Emergency Management Office. "We have a lot of buildings with unreinforced masonry that could be hit hard."

Although several states and cities in the region have recently enacted seismic building codes, they apply only to new construction, and do not correct deficiencies in the region's existing buildings.

A large quake also could devastate highways and buildings in other parts of the region. Many rural areas could be isolated. Emergency management officials say residents should be prepared to fend for themselves for up to 72 hours after a large quake.

Earthquakes of a destructive nature are inevitable along the New Madrid fault," Dr. Stewart said. "The point people need to realize: We need to prepare now."

7-22-90

## Indianapolis Star Reprinted by permission of the Associated Press

# Expert takes New Madrid quake prediction seriously

ASSOCIATED PRESS

St. Louis — Despite criticism by some scientists, a prediction of a New Madrid Fault earthquake on Dec. 3 should be taken seriously and not dismissed as unscientific, says one earthquake expert.

"From a scientific viewpoint, we can neither verify nor discredit this projection," David Stewart said Friday. Stewart is director of the Center for Earthquake Studies at Southeast Missouri State University in Cape Girardeau, Mo.

Stewart made the comment after releasing a detailed memo assessing an earthquake forecast by Iben Browning, an inventor from Sandia Park, N.M. Stewart sent the memo June 18 to federal and state emergency management officials and scientists.

Browning has predicted that unusually strong gravitational forces coming to a head on Dec. 3 will increase the chances of a destructive earthquake in the New Madrid Fault. The prediction has caused some officials in regions near the fault to cancel vacations and school around that date and to plan earthquake-preparedness exercises.

The New Madrid Fault runs for about 120 miles through part of southeastern Missouri, Southern Illinois, Tennessee and Arkansas. Seismologists rate the chances of a damaging earthquake of 6.0 or better on the Richter scale at about 50 percent at some time by the end of the decade.

(Such an earthquake could cause major damage to nearby Evansville and lesser damage as far north as central Indiana, experts believe.)

Browning expects a major earthquake on Dec. 3 in either the New Madrid Fault, the Hayward Fault in northern California or a fault near Tokyo.

Browning's prediction for the New Madrid Fault area has been criticized by earthquake specialists at St. Louis University and Memphis State University. They said it should not be taken seriously because scientific studies have found no significant link between gravitational forces and earthquakes.

Stewart, a seismologist, went to New Mexico to interview Browning at length. He discussed Browning's work with several clients who subscribe to Browning's newsletter on climate and geological events and their impact on the economy.

Although not "formally trained" in fields dealing with earthquakes and volcanoes, Browning is highly respected among businesspeople and investors, Stewart said in the memo. His accuracy on natural disaster predictions "is said by various people to be 50 percent at worst and 90 percent or better most of the time," the memo says.

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"What Dr. Browning is doing cannot be explained merely by chance," Stewart said. "Although his accuracy is not 100 percent, his methodology does seem to be promising and worthy of serious and thorough consideration."

Browning has said that if the fault is "loaded," the gravitational forces would simply act to "pull the trigger."

7-25-90

## St. Louis Post-Dispatch Editorial

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## It Can Happen Here

Laugh if you want, but if Iben Browning is right in predicting an earthquake — even a few faint tremors — along the New Madrid Fault, he will have done more than anyone around to help prepare this area for a disaster-in-the-making. Mr. Browning, a scientist based in Sandia Park, N.M., believes that a major shock will occur Dec. 3 in one of three places: the New Madrid Fault south of St. Louis, the Hayward Fault in northern California or a fault in Japan. Because he is not a seismologist and does not use orthodox methods of prediction, some people will not take Mr. Browning's warning seriously. Others in Missouri and elsewhere in the Midwest will pooh-pooh his warning because they refuse to believe that a severe quake can occur here. The last big ones were in 1811-12, but another big one has a one-in-two chance of occurring before 2000.

Mr. Browning has a good record of accurate predictions — good enough to be taken with a great

deal of caution. That means he should be heeded; if it takes a prophet to wake Missourians up, so be it.

Being prepared for an earthquake isn't easy, especially in an area where there have been so few. The Missouri General Assembly faced up to some of the problems this year by passing a bill requiring public buildings to meet higher standards in order to be more earthquake-resistant. That won't do anything, however, for the buildings now standing. Civil defense officials have held disaster drills to hone their response times. The state has made some efforts to prepare for a major quake.

What's left? More drills and more reviews of procedures by officials. The most important factor now may be for families and individuals to review what they need to do to be ready when an earthquake strikes. Better to be prepared than mourning the deaths of loved ones. Now's the time to think about Dec. 3 — or whenever a quake might strike.

7-26-90

## Dallas Morning News

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# Experts to study quake prediction

## Geological agency to convene panel of scientists 'to set people at ease'

By Lee Hancock

Staff Writer of The Dallas Morning News

The U.S. Geological Survey will officially evaluate a New Mexico man's warning that an earthquake may rock the central United States on Dec. 3, 1990, an agency official said Wednesday.

Walter Hays, an official with the Geological Survey in Washington, said the agency would convene a panel of geologists and seismologists from throughout the central United States to study the prediction.

"We're not at all impressed with this forecast," he said. "On the surface we would not expect there is any basis for concern. But we do want to set people at ease and be satisfied in our own minds that we haven't overlooked something."

The location of the predicted earthquake is along the New Madrid fault, which runs between Marked Tree, Ark., and Cairo, Ill., and has branches in West Tennessee and the Missouri boot heel.

Scientists say it is impossible to predict exactly when an earthquake

will occur. However, they say they are trying to estimate the probability of an earthquake along several highly active faults in the United States.

The decision to evaluate the prediction follows a plea for help by the region's seven-state earthquake response coalition, an agency that has been struggling for more than a month to address growing regional fears about the prediction by Iben Browning, a self-styled climatologist from Tijeras, N.M.

Dr. Hays said U.S. Geological Survey scientists have considered about 300 predictions since 1977 that ranged from the scientific to the ridiculous. But he said that the widespread public concern makes Dr. Browning's prediction unique and that it was the primary reason for the evaluation.

Dr. Hays said the study probably would be completed by the end of September.

Indiana, Arkansas and Missouri recently began planning emergency exercises for their National Guard units and other state agen-

cies to take place in late November or early December because of public concern about the prediction.

In some areas, insurance agents have reported skyrocketing demand for earthquake policies, and some local officials fear that some residents are considering leaving the area just before the predicted date. One school district in Northeast Arkansas is canceling classes on Dec. 3 and 4 because of the prediction, and state emergency management officials in Arkansas and Missouri have said that other school districts in their states may consider closing.

In Atlanta, the regional federal office of the General Service Administration — which manages federal properties in several southeastern states along the fault — is informally evaluating the prediction, Dr. Hays said.

"They are obviously concerned," he said. "They want to see if there is credence so they can take action if appropriate."

State officials say a formal evaluation of the prediction should significantly ease the concern.

"I think obviously the quicker that we get a critical scientific analysis, the better off we'll be," said Jerome Hauer, chairman of the Central U.S. Earthquake Consortium and director of Indiana's emergency management office.

"If in fact this group of scientists feels the risk is no greater on Dec. 3 than at any other point in time, it will help allay people's fears," Mr. Hauer said.

Dr. Browning, a retired inventor with a doctorate in biology, con-

tends that the same gravitational forces from the sun, moon and other planets that cause ocean tides also tug at the Earth's crust. The forces ebb and flow in cycles as long as 179 years and when strong enough, trigger seismic activity, according to Dr. Browning's theory.

He claims to have used his theory to predict that a New Madrid earthquake higher than 7 on the Richter scale probably will occur within 48 hours of Dec. 3.

Dr. Browning says he predicted last October's San Francisco earthquake, the 1985 Mexico City earthquake, the 1980 eruption of Mount St. Helens and several other natural disasters.

Several prominent earth scientists from the mid-South and Midwest have rejected Dr. Browning's theory, saying it has been disproved by existing studies. But one geophysicist, David Stewart of Southeast Missouri State University, has investigated Dr. Browning's past predictions and contends that the theory can't be discounted until it is thoroughly studied.

The National Earthquake Prediction Council, an advisory board of earth science experts set up by the U.S. Geological Survey, last month refused to evaluate the Dr. Browning's prediction. "They didn't want to glorify it," one mid-south seismologist said.

Dr. Hays said the 13-member council would evaluate the findings of the regional scientists' group at the request of the federal geological agency.



8-5-90

Springfield (Mo.) News-Leader

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# Officials heed quake warning

## Springfield could expect wave of tremor's refugees

By J. Lee Howard

The News-Leader

A prediction of a December earthquake along the New Madrid fault is being taken seriously by state and local officials who are planning for the worst.

Iben Browning, a 72-year-old New Mexico climatologist, projects a 50-50 chance the quake will hit Dec. 3, give or take a day. But he said the quake also could strike in the Hayward fault in the East Bay in San Francisco or in Tokyo.

Browning is no star gazer, palm reader or swami. But the accuracy of his "mathematical projections" — he eschews the word "predictions" — has astounded and baffled geologists and seismologists, many of whom question his techniques.

Browning has predicted seven major earthquakes, including the Oct. 17, 1989, Loma Prieta earthquake that ravaged San Francisco.

"He's been correct on so many other things," said Candace Adams of the Springfield-Greene County Emergency Management Office. "I think everybody ought to take him seriously."

Springfield probably wouldn't get the bulk of the shock from a New Madrid quake, however. What Springfield may get, Adams said, is about 200,000 refugees from eastern Missouri.

The New Madrid fault runs about 120 miles through southeastern Missouri, southern Illinois, western Tennessee and Arkansas. In 1812, the New Madrid fault unleashed an earthquake believed to be the worst in U.S. history.

Seismologists have predicted about a 50 percent chance for an earthquake of 6.0 on the Richter scale to strike the fault sometime before the turn of this century.

Browning, however, is the only one with a date in mind.

He makes his projections by calculating tidal activity and the pressures the sun and moon exert on the Earth. Mysticism doesn't play a role in his projections, he said.

"I don't predict anything," Browning said from his home in Sandia Park, N.M., Friday. "That's a lot of garbage."

Browning referred to a scientific paper recently brought to his attention. The paper was published in 1967 in the journal "Icarus," and was authored by Gene P. Tamrazyan, a scientist at The Institute of Geology at the U.S.S.R. Academy of Sciences in Baku, Azerbaidzhan.

Browning said Tamrazyan's paper, which points to the influences tidal waves have on earthquakes, supports the theories he uses in making his projections.



Iben Browning  
Predicting Dec. 3 earthquake

8-6-90

Taylorville (Ill.) Breeze-Courier

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# Study indicates death probabilities if earthquake hits

Federal officials are taking a second look at a study on the possible effects of an earthquake along the New Madrid fault, including the potential impact on Carbondale, Ill.

The 1985 study presents a picture of death, injury, flooding and wide-scale economic disruption throughout the region, and one official says the numbers are now probably too low.

The study lists death probabilities for six cities — from Little Rock, Ark., to Paducah, Ky., — in the event of an earthquake of either 7.6 on the Richter scale or 8.6 on the scale. The study looks at a number of variables in each instance, including points of epicenter and whether the earthquake occurs during working hours or at night when fewer people occupy office buildings.

The Federal Emergency Management Agency study is called the "Central United States Earthquake Preparedness Project." The New Madrid seismic zone extends from Marked Tree in northeastern Arkansas through New Madrid, Mo., to Cairo, Ill.

Other cities in the study include Evansville, Ind., Poplar Bluff, Mo.,

and Memphis, Tenn.

The study would still be accurate in many respects but would need updating in others, including projections of casualty figures, according to James Lee Witt, director of the Arkansas Office of Emergency Services.

"I'm sure the statistics would change," he said in a telephone interview. He said they probably would have to be revised upward because of population increases in the region since 1985.

Poplar Bluff had the lowest projected number of deaths, according to the study, while Memphis had the most.

The night and day death predictions for the 7.6 and 8.6 tremors, in that order, were:

Memphis — 211, 253; 435, 3,786.

Evansville — 23, 277; 58, 492.

Little Rock — 3, 64; 9, 216.

Paducah — 47, 116; 101, 201.

Carbondale — 29, 74; 69, 160.

Poplar Bluff — 1, 17; 4, 52.

The projections are based on 1985 populations.

Iben Browning, a 72-year-old climatologist from Tijeras, N.M., has said a major earthquake could occur

in the New Madrid zone Dec. 2 or Dec. 3.

Browning forecasted last fall's San Francisco-area earthquake, as well as the 1971 earthquake in California's San Fernando Valley that killed 75 people, the deadly earthquake in Nicaragua in 1972 and the Mount St. Helens volcanic eruption in 1980.

Browning is a consultant on climatology for various businesses. He said his projections, a term he prefers over predictions, are based on vector sum high-tidal forces. But he acknowledged the theory is controversial among seismologists.

Seismologists have said conditions are favorable for a major earthquake along the fault.

The latest quake in the New Madrid seismic zone hit near New Madrid, Mo., on April 26, 1989. It measured 4.7 on the Richter scale and was felt in Arkansas, Missouri, Kentucky and Tennessee.

"Due to the different soil conditions and overall lack of adequate seismic design in structures in the Mississippi Valley region, a New Madrid quake could be expected to cause much more extensive and widespread damage than resulted

from an event of similar magnitude in California," the FEMA study said.

The FEMA study said that in all cities, "a substantial proportion of the daytime casualties would occur among school children."

Officials of the South Mississippi County School District in northeastern Arkansas want an extra two-day holiday for students Dec. 3-4 due to Browning's prediction. The school board is expected to consider the administration's holiday recommendation at this month's meeting.

The school district is within 30 miles of Marked Tree, the center of a series of great earthquakes measuring as high as 8.5 on the Richter scale that rocked the area during the winter of 1811-12. U.S. Geological Survey scientists consider those the strongest series of quakes in the nation's history.

The study says utilities will be a problem following a major earthquake.

The National Disaster Medical System has scheduled a nationwide medical response drill for Oct. 10-13 to deal with a simulated earthquake measuring 6.8 with the epicenter at Marked Tree.

8-20-90, New York Times

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# Midwest Quake Is Predicted; Talk Is Real

By WILLIAM ROBBINS

Special to The New York Times

NEW MADRID, Mo., Aug. 15 — Life on the fault line is always interesting, as people in this trembly old Mississippi River town often say, but a prediction by a man named Iben Browning is making life hereabouts downright exciting.

Dr. Browning, a climatological consultant from New Mexico, has calculated that on Dec. 3, give or take 48 hours, this area could once again be the center of a destructive earthquake. People in Missouri and neighboring states are taking him seriously enough to plan events like National Guard drills and informational town meetings, to store food and to consider closing schools on the appointed day.

There is considerable skepticism among experts and residents of this area about Dr. Browning's prediction, which involves calculations of tidal forces resulting from the gravitational effects of the Earth, the Moon and the Sun. But New Madrid is conditioned by its history to take a sober view of such warnings.

## A Devastating History

This town is near the epicenter of one of the most devastating earthquakes ever recorded in North America. A series of quakes, beginning with a colossal shock, struck at 2 a.m. on Dec. 16, 1811, while settlers and Indians in the Mississippi River frontier slept. Tremors shook the earth almost continuously for months, and two even greater shocks struck on Jan. 23 and Feb. 7, 1812.

The shocks have been estimated at well over 8 on the Richter scale of ground motion in a reading that would make them about 30 times the force of the 7.1-magnitude quake that rocked San Francisco last Oct. 17, seismologists say.

The earth rolled like tidal waves and burst open to spew geysers of sand, black rocks and water into the air. Witnesses also said that for a time the Mississippi River flowed upstream.

Shocks were felt as far away as Boston and the South Carolina coast. Large tracts of land sank, in one area of Tennessee forming what is now Reelfoot Lake.

The New Madrid (pronounced MAD-red) fault, a broad zone of weakened rock reaching far below the earth's surface, stretches about 120 miles, from Marked Tree, Ark., to Cairo, Ill. And every now and then the earth twitches, a reminder of the trouble that awaits below.

## Debate on Predictability

Seismologists say it is impossible to predict when another big earthquake might strike. But based on what they know of the geologic conditions, they calculate that there is a 50 percent chance for a 6.3-magnitude quake by the end of this decade and a 90 percent chance for such a quake by 2040.

Most scientists doubt the ability to



The New York Times

A huge earthquake was centered in New Madrid, Mo., in 1811

## Most on the fault aren't panicking, but they're taking precautions.

pinpoint the date of an earthquake. But at least one, David Stewart, director of the Earthquake Information Center at Southeast Missouri State University in nearby Cape Girardeau, says he has looked into Dr. Browning's previous predictions and accords him respect.

Dr. Browning's previous warnings have been widely reported in another quake-skittish locale, San Francisco. He is known to have predicted the 1989 San Francisco earthquake a week in advance in an appearance before about 500 business executives and their wives at a convention. He is also said to have predicted the eruption of Mount St. Helens in 1980.

Like the experts, the people with the biggest stake in the debate, those who live here, are also divided on Dr. Browning's prediction.

Don Lloyd, the city administrator, typified the most optimistic stance. "We know it's coming sometime, but it's just as likely to happen tomorrow as next Dec. 3," he said the other day.

Most people are like the police chief, Jimmy Helmes, or officials of the National Guards of Missouri and Arkansas. While they are not panicking, they see nothing wrong with taking precautions, either.

Missouri's Army National Guard is planning earthquake exercises Oct. 13 to 14, and the Arkansas National Guard is planning a similar drill Dec. 1 to 5.

"We were planning an exercise anyway," said Maj. Cissy Lashbrook, the Arkansas Guard's public information officer. "But Browning has attracted so much attention, this looked like a good time to let people know we do have a plan."

Mr. Helmes has planned to store food and water supplies in a warehouse and to station school buses nearby for emergency transportation. Mayor Dick Phillips and Mr. Lloyd are planning a town meeting at which Dr. Stewart will discuss precautions.

In addition, officials of a few schools in nearby towns are considering closing them for the day; Gerald Murphy, a high school coach, wants his wife, Beth, to take their baby and get out of town, and James and Gloria Taylor of nearby Lilbourn are planning to take their daughter and son-in-law, Kim and Henry Dentley, on a trip on the first weekend in December.

The talk has naturally focused attention on the man who made the prediction.

Dr. Browning's academic background is in mathematics, physics and microbiology, and his doctorate, in biology, is from the University of Texas. He is also a self-taught climatologist and serves as a consultant on the subject to many businesses and executives.

## 'No Public Pronouncements'

"I make no public pronouncements," the 72-year-old scientist said in a telephone interview from his home in Sandia Park, N.M. "What I say is for my clients." He said predictions that have surfaced publicly have been recounted by members of private audiences.

It was at a convention of the Equipment Manufacturers Institute in San Francisco that he said his calculations indicated an earthquake there about Oct. 16, the day before it occurred, and one on Dec. 3 in the New Madrid area.

Emmitt Barker, president of the institute, was present and says he heard the predictions.

Regarding Dr. Browning's method, Brian Mitchell, chairman of the department of earth and atmospheric sciences at St. Louis University, said, "Recent studies with the best available data show no correlation between tidal forces and earthquakes."

And Pat Jorgenson, a spokesman for the United States Geological Survey in Menlo Park, Calif., said scientists there "are not at this time doing any research into earth tides and any possible relation to seismic activity," although they are aware "that this is a much-discussed proposition." She said that the agency's scientists had conducted studies on the claims but that these "proved inconclusive."

Still, Dr. Stewart, of Southeast Missouri State, said he thinks Dr. Browning's method should not be summarily rejected. "Here's a man who has hit several home runs," he said. "Will he hit another on Dec. 3? We don't know, but that's no excuse for not being prepared."

8-21-90

Jackson (Miss.) Clarion-Ledger

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# Mabus seeking strategy for earthquake response

■ A scientist has projected a quake to strike by the end of 1990.

**By Jay Eubank**  
Clarion-Ledger Staff Writer

Gov. Ray Mabus is trying to learn what Mississippi must do to get ready for an earthquake forecast to strike before the year ends.

Mabus last week convened a meeting of leaders of about a half-dozen state agencies to see where preparedness stands and is waiting on a step-by-step strategy to show how the state would respond.

"You have to be prepared as you can," said Mike Goff, Mabus' natural resources adviser.

"Every agency will play a role in the event something of that magnitude happens. That's why (Mabus) got everybody together."

New Mexico scientist Iben Browning has rattled mid-America with his projection of a major quake along the New Madrid fault Dec. 2 or Dec. 3.

Browning gained fame for helping forecast the 1980 Mount St. Helens volcanic eruption in Washington state and the San Francisco earthquake on Oct. 17.

Goff said Mississippi Emergency Management Agency Director Jim Maher is helping prepare an executive order for Mabus that will outline an in-depth plan for the state to react to an earthquake.

It should be ready in the next several weeks, Goff said.

"We are busy briefing state agencies on the earthquake threat — its potential" Maher said. "The projection has heightened our awareness."

Officials with MEMA and the Department of Public Safety discussed Monday how to keep communication active in event of an earthquake.

Maher is also keeping in touch with officials in other states that would be directly affected by a New Madrid earthquake.

The New Madrid fault snakes north from Marked Tree, Ark., through New Madrid, Mo., to Cairo, Ill. In Mississippi, a major earthquake could bring widespread destruction in the Delta and northern counties, cause damage in Jackson and be felt on the coast.

"It's almost impossible to prepare economically for something of that magnitude," Goff said.

"This is something we haven't had a lot of training in — that's why we're taking this quite seriously," said Maj. Bruce Breland of the Mississippi Highway Patrol, who is working with MEMA in developing the earthquake plan.

The plan would be for a quake measuring 7.6 on the Richter scale — about five times more powerful than the one that struck San Francisco in October.

The Richter scale is a measure of ground motion as recorded on seismographs. A magnitude of 7 signifies a major earthquake capable of causing widespread, heavy damage.

The Department of Corrections "in the very near future" will have a strategy on how the State Penitentiary at Parchman in the Delta would react, spokesman Ken Jones said. "We have begun a series of meetings. . . . We will have a specific preparedness plan."

Twenty-one buildings at Parch-

man hold about 4,600 inmates, but none of the buildings is designed to withstand a major earthquake's jolt.

Parchman's 16,000 acres also have 150 houses for many guards and others on the staff of 1,358.

"Parchman compares with a small town in Mississippi. An earthquake could have a devastating effect," Jones said. "You're talking about losing power and other utilities that are used at an operation like a prison. We're looking at what we can do to combat that."

The New Madrid fault is known for three jolts in the winter of 1811-12. One of those registered an estimated 8.7 on the Richter scale, the third-most severe jolt in recorded world history.

"There is a great deal of controversy about (Browning's) approach at arriving at these projections," Maher said. "But the fact that he had other projections on the money, you can't discount that."

Maher said the last major quake to be felt in much of Mississippi was the 1895 earthquake centered in Charleston, Mo., that registered 6.3 on the Richter scale.

As December draws closer, Goff said, emergency officials may hold mock drills.

Maher said the state isn't stockpiling materials that would be needed in the event of an earthquake. "That's a very costly thing," he said. "We're locating those materials and resources we need, and we'll know how to obtain them. In an emergency, we have priority."

The state Board of Education on Thursday urged all 151 public school districts to begin work on earthquake safety. The board members said schools should teach students how to protect themselves against injury in an earthquake.

8-26-90

St. Louis Post-Dispatch

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# Quake: Prediction For Dec. 3 Stirs Debate

By William Allen  
Of the Post-Dispatch Staff

ALBUQUERQUE, N.M. — Iben Browning doesn't care that earthquake experts have denounced his forecast for an increased chance of an earthquake in early December in the New Madrid Fault.

"I did not come up with this information for seismologists," Browning said in a recent interview. "I didn't do it for the public. I did it for my clients."

Browning, a scientist and business consultant from Sandia Park, N.M., has said that tidal forces coming to a head on or about Dec. 3 could unleash various kinds of geological violence in a strip around the globe.

His forecast of geological danger has been reported widely over the past several months, and scientists have almost unanimously condemned it and the method behind it.

Even so, the reports have caused a rare kind of public anxiety in the central United States, where the New Madrid Fault runs.

School has been canceled for Dec. 3 in at least one district in Arkansas. Vacations by city em-



■ Iben Browning is profiled .....Page 9A

**"I hope people will take it seriously enough that they will be prepared."**

**IBEN BROWNING, forecaster of earthquakes**

ployees in Carbondale, Ill., have been canceled for that week. The Missouri and Arkansas National Guards plan quake-response drills around the date.

Thursday night, about 500 people packed a school auditorium in Sikeston, Mo., to learn how

to prepare for a quake. Earthquake experts throughout the Midwest are being flooded with letters and phone calls.

So what exactly was it that Browning said will happen? How did he come up with his forecasts? And why are earthquake scientists so sure Browning's technique is flawed?

## Browning's Forecast

Here is Browning's forecast:

Within 48 hours on either side of Dec. 3, an earthquake measuring 7.0 or greater on the Richter scale has a 50-50 chance of erupting somewhere in the New Madrid Fault, he said. That means it could happen any time from Dec. 1, a Saturday, through Dec. 5, a Wednesday.

The odds, Browning said, mean the same as when a weather forecaster says there's a 50-50 chance of rain. "In English, that means, 'Maybe, but maybe not,'" Browning said.

He said precursor quakes may occur on or about Oct. 9 and Nov. 6, but the chances of that happening are less than around Dec. 3. If the Dec.

See **QUAKE**, Page 9

# Iben Browning Called 'A Man Of Great Honesty'

By William Allen  
Of the Post-Dispatch Staff

ALBUQUERQUE, N.M. — Standing on the banks of the Rio Grande, Iben Browning reflected on whether an ancient earthquake fault several thousand feet below helped him shape his method for forecasting earthquakes.

"It didn't help me acquire information, but it made me seek it," Browning said, with the Sandia Mountains towering behind him. New Mexico has been "a very stimulating place to live."

Iben (pronounced "Eye-Ben") Browning, 72, has been described as a genius, a renaissance man and a charlatan. He bristles at the notoriety brought by his forecast of possible earthquakes and volcanic eruptions around Dec. 3.

Browning's health is frail. He suffers from complications of diabetes. He recently had leg surgery to correct circulatory problems. Without the surgery, he faced probable amputation of

his foot because of gangrene.

Browning suffers constant pain and often suggests that he may not live to see whether his projections come true. He walked with slow, minute steps in padded slippers.

He stood on the banks of the Rio Grande recently at the request of an Australian television crew filming a show on earthquakes. Browning confesses to a distaste for American journalists.

He has been "almost universally misquoted" by the U.S. news media, he said.

He wore glasses, black slacks, a white shirt, and navy blue tie with a tie pin in the form of a bear paw — the symbol of an Indian tribe. He has short, sandy hair.

Browning is a biophysicist, climatologist and inventor. Born in Texas, he holds a doctorate in physiology, genetics and bacteriology from the University of Texas at Austin.

Based in Sandia Park, near Albuquerque, he is a consultant to busi-

nesses on climate and geological events and their impact on economics and politics. With his daughter, Evelyn Browning Gariss, he publishes a newsletter for clients that include PaineWebber Inc.

Browning holds 67 patents and has written four books, including works on AIDS, robots and the relationship between climate and history.

Asked how he felt about his forecast of October's quake in the San Francisco area, Browning said: "Terrible. There is no scientific attitude toward disaster. I just felt terrible. I cried."

He said he never intended to make public his forecast for December. He assumes some of his business clients did so.

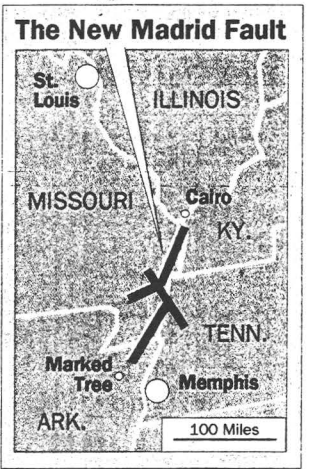
"I've been asked, 'Why do you tell me about something I can't control?'" Browning said. "And I say, 'Suppose you lived at the bottom of a cliff and I knew about a rock slide. Would you want to know?'"

Said David Stewart, a seismologist from Missouri who has met at length with Browning: "He is a man of great honesty, and he is convinced of his method. He seems to be on to something. He's definitely not a crank. He's a man of science."

Browning said he has given all of his data to Stewart.

He said he had worked hard to compile the information as a way of making his living and was only releasing it as a gesture of goodwill.

Browning said he is not a seismologist but knows how to use information gathered by earthquake experts. What



Post-Dispatch map

distinguishes his methods from those of other scientists who want to predict earthquakes is the larger number of facets he examines.

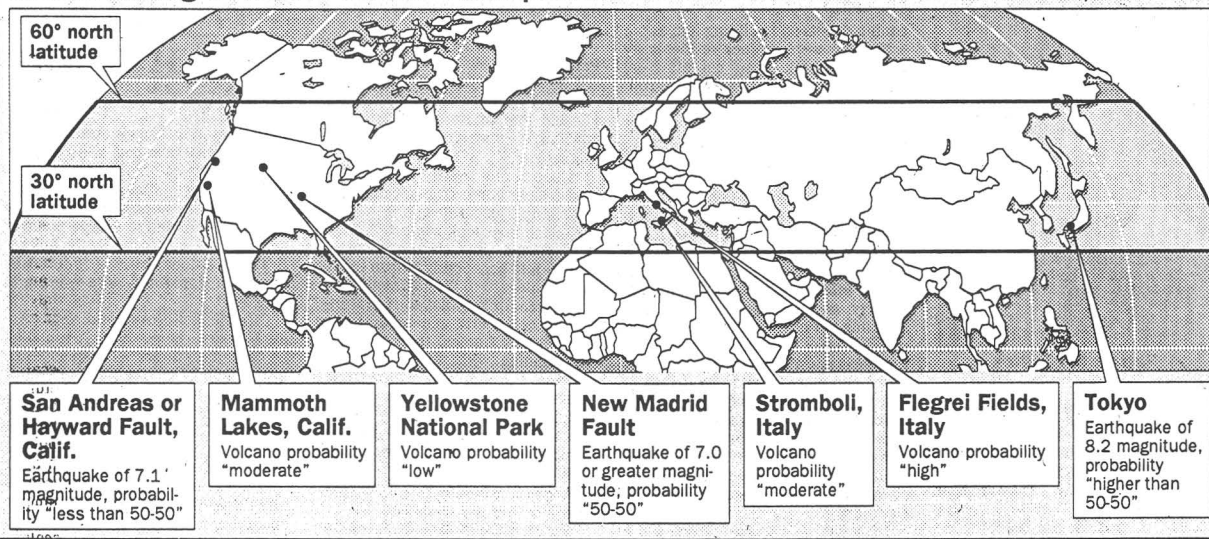
"Science has been the art of understanding the simple and thus has forfeited the understanding of the complex," he said.

Browning said he'd be "surprised" to be alive in December, but if he is, he will not go near the areas listed in his forecast.

8-26-90

St. Louis Post-Dispatch (Continued)

## Iben Browning's List Of Possible Earthquakes And Volcanoes Around December 3, 1990



Tom Borgman/Post-Dispatch

# Quake

From page one

3 quake occurs, Dec. 31 and Jan. 28 are likely aftershock dates, Browning said.

How much greater are those odds than the scientifically accepted line?

Seismologists say the chances of a 7.0 earthquake erupting somewhere in the New Madrid Fault within a decade are about 33 percent, said David Stewart, director of the Center for Earthquake Studies. The center is located at Southeast Missouri State University, in Cape Girardeau.

Thirty-three percent over a decade boils down to about one chance in 10,000 for any specific day, Stewart said. So Browning's 50-50 odds are about 5,000 times greater for Dec. 3.

Depending on where in the fault the earthquake occurs, a quake with a magnitude of 7.6 could kill thousands of people and cause \$25 billion in damage over 15 to 20 states, Stewart said.

"It is potentially the greatest disaster in American history," he said.

Browning also has forecast geological danger for other parts of the world for the same time frame.

He rates the chances for an 8.2 earthquake in Tokyo "higher than 50-50." The odds for a quake of 7.1 in either the San Andreas or Hayward faults in California are "less than 50-50."

Volcanoes may erupt in the Flegrei Fields, west of Naples, Italy. They also may occur in Mammoth Lakes, Calif.; Stromboli, Italy; and Yellowstone National Park.

## Browning's Method

Here, put simply, is Browning's method for forecasting earthquakes and volcanoes.

He has identified a band of latitude

around the globe where the tidal forces will peak. Within that band, he has identified points of earthquake and volcanic activity that may be ready to release their subterranean energy.

For each of these active points, he has estimated the chances that the tidal forces will trigger an eruption.

"The triggering force will happen," Browning said. "Whether or not it goes off depends on whether the gun is loaded."

The band of latitude runs from 30 degrees north to 60 degrees north. It spans most of the United States, the Soviet Union, China and Europe.

That band is where the tidal pull of the sun and moon will be concentrated on Dec. 3 at their highest level in 27 years, Browning said. That's because the moon will be at its closest point to Earth in its orbit around the planet, and the Earth will be only one month away from its closest approach to the sun.

Browning calculates what are called the "vector sum tidal forces" to determine which date is most likely to have the triggering effect.

"This triggering force is very slightly higher than previous forces," he said. "It will cause earthquakes and volcanoes to go off around the world in this latitude."

Browning said he determines which faults and volcanoes are ripe for release by studying information gathered by scientists at each location. The information has to do with how long it has been since the fault erupted and the rate at which energy released by small quakes travels through cracks that constantly develop in the fault.

Browning also believes that one period of high tidal forces can push a fault to near failure and the next period years later can push it over the edge.

Of his method, Browning said a friend once told him that he "connects

the dots" — brings together information that individual researchers have long worked with.

"I don't know why it took so long to figure it out," Browning said. "It's really very simple."

## Seismologists' Comments

Here's what seismologists are saying about Browning's forecast and the method he used to make it.

"Invalid" and "ineffective," said Brian J. Mitchell of St. Louis University and Arch C. Johnston of Memphis State University, two leading experts on the New Madrid Fault.

When asked about the prediction, Randall Urdike, an official with the U.S. Geological Survey, in Reston, Va., said: "I'd be happy to sit and have a drink with you Dec. 3 atop the highest hotel in St. Louis."

The scientists said previous studies of the same effects Browning based his forecast on have not shown a correlation between tidal forces and earthquakes. Such research "just hasn't paid off," Urdike said. Browning disagrees.

Mitchell and Johnston said previous New Madrid quakes had come at times of both low and high tidal forces. Moreover, tidal forces produce a relatively small amount of stress on the fault, they said.

"Several other natural processes can do this as well or better, including weather fronts, heavy rainfall or high river stage," Mitchell and Johnston wrote June 29 in a memo criticizing Browning's method.

Browning said about attempts by scientists to discredit him, "All I have is a track record."

That record includes what appears to be a high percentage of successful predictions:

- The quake in October near San Francisco.
- The Mexico City quake in 1986.
- The Mount St. Helens volcanic

eruption in 1980.

■ California's San Fernando quake in 1971.

In some cases, documents show and witnesses say they heard Browning make predictions with specific times and locations.

One seismologist who has taken Browning more seriously is Stewart, of Southeast Missouri State. Stewart said he had gone to New Mexico and spent hours with Browning to get "more understanding of what he is doing."

It's still possible "that the whole thing could be discredited," Stewart said. "But it needs to be addressed."

If Browning's method proves to be nothing more than a way to identify a latitude with a high geological risk during a certain period, "that in itself would be an invaluable contribution," Stewart said. But it "needs to be thoroughly checked out by many scientists."

Many in the business community have put stock in Browning's forecasts for years. They include officials at PaineWebber Inc., for whom Browning has been a consultant since 1975.

Roger Spencer, first vice president at PaineWebber, said he will not be in his 50th-floor office in downtown Chicago on Dec. 3.

"I'm going to be on the ground, at home," Spencer said.

In St. Louis, William Galbraith, executive vice president of the North American Equipment Dealers Association, says, "This is not some soothsayer who's come out with some wild prediction."

Galbraith invited Browning to speak at a governor's conference on agriculture last December in Osage Beach, Mo. That's where Browning's forecast first made waves in the Midwest.

"I sure hope [the Dec. 3 forecast] is wrong, but the guy has been incredibly close to being right so many times," Galbraith said.

9-9-90

St. Louis Post-Dispatch

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# New Madrid Fault

## In Many Communities, Preparations For Earthquake Are Now A Priority

By William Allen

Of the Post-Dispatch Staff

NEW MADRID, Mo. — A forecast that a major earthquake may strike in December has Lori Krebs thinking a lot these days about the New Madrid residents who experienced the great quakes of 1811-12.

"If they had known about it ahead of time, a lot of them probably would have stayed, like a lot of us are," said Krebs, who works at the Show Biz Video store in New Madrid.

"We're staying because it's home," she said.

People are abuzz with quake talk and preparedness plans from Cairo, Ill., to Marked Tree, Ark. — the end-points of the New Madrid Fault.

The reason: a forecast by New Mexico scientist and business consultant Iben Browning. Browning has said that within 48 hours on either side of Dec. 3, an earthquake measuring 7.0 or greater on the Richter scale has a 50-50 chance of erupting somewhere in the fault.

The fault erupted with a series of major quakes in 1811-12, including at

least three measuring more than 8.0, scientists say.

Most earthquake specialists have rejected Browning's forecast as ridiculous. But most people on the fault line are less certain, officials and residents in southeastern Missouri and northeastern Arkansas said in interviews last week.

Many are reacting like Doyle Tarlton, who owns an auto parts store in Marked Tree.

"I don't necessarily go along with the dates," Tarlton said. "But when there is a quake, and it will happen someday, we need to be prepared."

Tarlton admitted to "an uneasy-feeling" about Browning's forecast. A tremor in western Tennessee on Aug. 29 that measured 3.4 on the Richter scale didn't help much. Many people are taking the forecast "very seriously," he said.

Lifelong residents of New Madrid are for the first time actively preparing for a major quake.

Some have put sleeping bags in their cars and valuables in safe de-

posit vaults. Some have bought wrenches to put near natural gas valves in case they have to turn them off after a quake.

"The forecast is 'bringing some things home to people who never really thought about these problems,'" said New Madrid Mayor Dick Phillips. "The majority of people are taking it seriously, but only about 5 percent are bringing in groceries, water and actually preparing themselves."

But residents of New Madrid are not panicking, Phillips said.

"We've lived here all our lives," he said. "We're aware of the fault and that eventually we'll have an earthquake. It may be tomorrow, it may be next week, it may be 50 years from now."

Phillips said he respected Browning's forecast.

"I'm well aware that other people don't," he said. "But it's been right a few times, so you can't disregard the prediction."

At the New Madrid Historical Museum, the mood among a flood of visitors from states around the fault ranges from denial to hysteria, said Virginia Carlson, museum coordinator.

Some visitors say they're leaving the area, come December.

"They're worried that they can't cope with the aftermath," Carlson said.

The fault was named after New Madrid, even though none of the great quakes of 1811-12 were centered there. The town of that day, however, now rests at the bottom of the Mississippi River. It became submerged when the river's banks shifted during the quakes.

Many of the stores around New Madrid these days have a sign in the window announcing a town meeting Thursday where residents can learn how to prepare for an earthquake.

After the meeting, officials plan to begin storing food, medical supplies, water, cots, radios and other items in a steel-reinforced building.

"Then, if the need arises, we'll have a place for people to go," Phillips said.

New Madrid officials aren't too worried about damage to buildings when a quake strikes. But they are concerned about the 20-foot-high dike that protects New Madrid from the river.

"If you had high water at that particular time, then the pressure on it would..." Phillips paused and did not complete the sentence. He said he doubted whether the river would be high in December.

Some New Madrid residents said others among them have the mistaken notion that Browning said a quake is certain to strike in December.

That anticipation is useful anyway, "because a lot of people are talking about it and getting prepared," said Lynn N. Bock, a lawyer in New Madrid. "I hope people in St. Louis and Memphis are paying as much attention as we are."

New Madrid residents have begun storing supplies because they realize that "if we have an earthquake, most of the attention will be focused on the metro areas, and the people in the country will be left on our own," Bock said.

In Sikeston, officials are in the midst of a series of mass public education seminars on earthquake preparedness. They expect to train at least 10 percent of the city's 30,000 residents.

Michael Phelan, director of public safety and a long-time advocate of quake preparedness, is grateful to Browning.

"Even if he isn't correct, he's doing a great service for emergency preparedness because people are finally listening," Phelan said. "We've made some progress."

City officials have begun a program to organize neigh-

borhoods into emergency cooperatives.

The local all-volunteer chapter of the American Red Cross has arranged with Sikeston's schools and churches to serve as emergency shelters, said LaDona DeKriek, chapter chairman.

"As much as we want people to be self-sufficient, a lot of people are not going to come through this well," DeKriek said.

Sikeston officials are worried about major natural gas pipelines that pass south of town.

"They could get real cold in Chicago and New York if this thing hits in December," Phelan said.

In Malden, Mo., officials will move from City Hall to a former fire station outside town. There, they will conduct business as usual and run eight days of preparedness drills, said Mayor W.M. Johnson.

City Hall, an old, two-story brick building, is "the kind that's predicated to going first" in a major quake, Johnson said.

Police and emergency vehicles will be parked away from buildings, in case a quake hits and the structures collapse.

"Most of the people here are used to destructive tornadoes," Johnson said. "They say that if an earthquake comes, it'll come. At the same time, they think the drill is a good idea."

Talk of Browning's forecast has become commonplace. On a radio talk show recently in Malden, a high school football coach scoffed at a preseason poll that ranked his team high.

"That's about as believable as that earthquake prediction," the coach said, chuckling.

Contrary to a news report by the Associated Press late last month, motels in New Madrid have not been booked completely by out-of-town thrill-seekers.

Plenty of rooms are available for Dec. 1-5, said managers at the Cabana Motel — the only motel in New Madrid — and the Cottonboll Inn, in Marston. Marston is the town nearest to New Madrid.



Post-Dispatch Map

9-9-90

St. Louis Post-Dispatch  
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## Officials Ponder Closing Schools

NEW MADRID, Mo. — School officials here wonder whether they should cancel classes the first few days of December because of a scientist's prediction that an earthquake may occur then.

Ultimately, parents may make the decision for them.

Scientists are skeptical about Iben Browning's forecast of a 50-50 chance for a quake in the New Madrid fault between Dec. 1 and Dec. 5.

But many parents say they are planning to keep their children out of school and maybe even leave town.

"As a board and administration, we do not place much credence in the prediction," said Robert B. Payne, superintendent of the New Madrid County Central School District. "The problem with schools is, it's not what's true so much as it is what's perceived to be true."

The first two days of that period are a weekend, but the final three are a Monday-Wednesday. Some districts in southeast Missouri and northeastern Arkansas have already decided to close on those days.

If a major quake strikes during school hours, a large fraction of the casualties would be schoolchildren, federal studies of the region show.

Payne said district officials will have to be practical in deciding whether to close schools.

If most children will be away, "I'm not sure what we'd gain by having school," he said.

Officials have decided to close public schools in East Prairie, which sits atop the fault northeast of New Madrid.

The East Prairie R-2 School District board took the action as a precaution because "our buildings are hazardous for earthquakes," said Judy Lewis, a secretary in the district office. The district has about 1,400 students.

In Sikeston, Mo., public schools are scheduled to be open, but St. Francis Xavier Catholic School will be closed,

city officials said.

School officials in Wilson and Earle, Ark., also have decided to close school.

Teachers in the South Mississippi County School District 57 will report to school Dec. 3-5, but the district's 2,000 students will not, said Frances Little. She is a secretary in the superintendent's office in Wilson, Ark.

Teacher staff development days normally held at other times of year have been rescheduled for those days.

District officials canceled classes because "a lot of our parents are concerned," Little said.

In New Madrid, district officials are more worried about the fact that a quake could occur at any time than they are about the Dec. 3 prediction, Payne said.

The district has been preparing itself for an earthquake ever since last October's quake in northern California brought public attention to the threat.

"When a neighbor's house burns, everyone starts reading their fire insurance," he said.

The district's 2,300 students attend buildings ranging in age from 4 to 50 years old. The buildings were not designed with earthquakes in mind.

District officials have attended quake seminars and issued a preparedness manual to the staff. A radio system has been installed in each building so they can communicate if a quake knocks out phone service.

They are about to begin stocking school buildings with blankets, first aid kits and other supplies. Maintenance crews will attach bookcases to walls and may put plastic film on windows to prevent shattering.

And the New Madrid schools will soon have the first of four annual earthquake drills mandated by the Missouri Legislature in its last session.

— William Allen

9-10-90

St. Louis Post-Dispatch  
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## Residents Told To Prepare For Days After Quake

By Shari L. Gaddy  
Post-Dispatch Special Correspondent

People must be prepared to fend for themselves for three to five days if a major earthquake disrupts the area, residents of Jefferson County were told Thursday at a seminar in Arnold.

The advice came from State Rep. William McKenna, D-House Springs, who helped organize the event. He said local governments would take that long to respond to the disaster.

The seminar held at Rickman Auditorium drew more than 2,000 people — far more than the capacity of the facility at Fox High School. Arnold police turned away about 500 people because the auditorium was filled.

"Our purpose tonight is to calm people's fears and present a world of facts and information to help get prepared," McKenna told participants.

Assisting McKenna was a panel of 14 experts from organizations such as utilities, civil defense, medical, university and government.

People were advised to stay put if an earthquake hits. If at home, they should go to a hallway and avoid the

**"Browning's theory does not specifically mention the New Madrid fault."**

DAVID STEWART, director for the Center for Earthquake Studies at Southeast Missouri State University

kitchen, experts said. If in an office, they should get into a hallway or under a desk.

Children in school should get under their desks, the experts said. If in cars, people should pull to the side of the road and avoid parking under bridges and viaducts, experts said.

After a quake, people should try to listen to a radio to find out how serious the situation is, experts said. People should have available three to five days of food, drinking water and emergency supplies, the experts said.

People who leave their homes should leave notes saying when they left and where they are going, the experts said.

Don't forget to take care of pets, experts said.

Participants watched a video from

Los Angeles which discussed preparations for an earthquake. It dealt with:

- Preparing houses and mobile homes.
- Collecting emergency supplies.
- Dealing with the psychological shock of the disaster and the disruption of daily life.

"The video's best feature is that it made people realize that their family might not all be together at home when an earthquake hits. Contingency plans are important," said Carol Stallman, Jefferson County's first district commissioner.

David Stewart, director for the Center for Earthquake Studies at Southeast Missouri State University, discussed the widely publicized prediction of a major earthquake on the New Madrid fault on Dec. 3. The

prediction is derived from a theory of Iben Browning of the University of New Mexico.

Stewart said, "Browning's theory is based on the gravitational force caused by the movement of the sun and moon. These tidal forces will be the greatest on Dec. 3 when the sun and moon are pulling in the same direction."

He said Browning predicted a 50-50 chance that these tidal forces will trigger a volcanic eruption or an earthquake of at least 6.0 on the Richter Scale in territory in the 30 to 60 degree north latitudes.

"Browning's theory does not specifically mention the New Madrid fault. In narrowing down the volcanos and fault lines, the New Madrid fault is on the verge of erupting," Stewart said.

An earthquake is inevitable in this area, Stewart said. Experts predict a quake of about 6.3 based on archeological, historical and geologic data, Stewart said.

Two additional earthquake seminars will be held in Jefferson County: 7:30 p.m. Oct. 15 at Rickman Auditorium in Arnold and 7:30 p.m. Oct. 30 at Jefferson College in Hillsboro.

9-11-90

St. Louis Post-Dispatch

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## Quaker State: Insurers Face Demand For Coverage

By John Curley  
Of the Post-Dispatch Staff

The prediction of an earthquake Dec. 3 along the New Madrid Fault in southeastern Missouri is triggering tremors across the insurance industry here.

Many insurance companies say demand for earthquake insurance has jumped more than 50 percent in recent months as homeowners and businesses rush to protect against losses from a major upheaval.

One insurer is warning that insurance will get scarce as Dec. 3 approaches. But most underwriters say they will have no problem meeting the booming demand.

"We have no plans to restrict earthquake coverage," said Dave Hurst, a spokesman for State Farm Insurance Cos., the nation's largest provider of homeowners insurance. "We aren't telling people to hurry up and buy insurance before it's gone."

Demand for earthquake insurance rose sharply after Oct. 17, when a severe tremor shook the San Francisco Bay area. Two other major quakes — a June 21 quake in Iran that killed at least 40,000 people, and a temblor July 16 in the Philippines that killed more than 100 people — have helped keep demand high.

In the St. Louis area, the rush to insure also has been spurred by Iben Browning's prediction of a major upheaval along the New Madrid Fault, which runs from northeastern Arkansas through southeastern Missouri to the southern tip of Illinois. Browning, a scientist and business consultant from New Mexico, has said that an earthquake measuring 7.0 or greater on the Richter scale has a 50-50 chance of erupting somewhere in the New Madrid Fault within 48 hours before or after Dec. 3.

A New Madrid quake measuring 7.6 on the Richter scale could kill thousands of people and cause \$25 billion in damage in 15 to 20 states, according to the Center for Earthquake Studies in Cape Girardeau, Mo. The earthquake in San Francisco last year measured 7.1 on the Richter scale.

Carol J. Robben, an account executive at Daniel & Henry Insurance Co. in St. Louis, said she has been getting three or four calls a day from homeowners asking for earthquake insurance. A year ago, she didn't get that many calls in a month.

Michael Bennett, a branch underwriting manager at American Family Insurance, said there has been "a fairly sizable increase in demand for earthquake insurance from St. Louis and other places in the Midwest."

Corroon and Black of Missouri Inc., a commercial insurance specialist, has sent letters to clients reminding them of the Dec. 3 prediction and urging them to get in line for earthquake insurance right away. If they wait, the company warns, they may be able to get only partial coverage — or no coverage.

"We aren't having any trouble now getting quotes, but in early November it will become more difficult," said Judy E. Lemond, senior vice president.

Others disagree. They say their companies can supply as much earthquake insurance as needed.

"The insurance companies haven't given us any indication that they will raise rates or that they won't provide coverage based on predictions in the New Madrid zone," said Scott Sapot, executive vice president at Berry-Lander Insurance Services Inc. in St. Louis.

Hank Johnson, vice president at Daniel & Henry, said, "We haven't seen a restriction on either personal or commercial insurance."

## Fire Department Takes Precautions In Event Tremor Does Strike Area

By Bill Bryan  
Of the Post-Dispatch Staff

The St. Louis Fire Department is gearing up for the possibility of an earthquake shaking the city in early December.

"We're not saying there will be an earthquake, but if something does happen and we've taken no precautions, we'd be kicking ourselves," Fire Chief Neil J. Svetanics said Monday in an interview.

Iben Browning, a scientist and business consultant from New Mexico, has said that a significant quake has a 50-50 chance of erupting somewhere in the New Madrid Fault on or about Dec. 3. The quake could result in much damage in the St. Louis area. Many other scientists have denounced the prediction, which has caused some anxiety throughout the region.

"We're taking advantage of the timing of Mr. Browning's predictions to update our training and plans for all emergencies,"



Svetanics

said.

"We've been going over basic things for dealing not just with earthquakes, but also tornados, major storms and blizzards. We're trying to educate our employees and beef up training."

One earthquake-related precaution the fire department will take will be to move 10 reserve pumpers to open areas in mid-November, Svetanics said. "We wouldn't want to get caught with our pants down," he said.

If there is no earthquake, the pumpers would go back indoors about the second week of December, he added.

In the event of a serious earthquake, all firefighters would be called to duty, Svetanics said. A third of the city's 630 firefighters are working at any one time.

Also, the chief said, firefighters are learning how to draft water from non-pressurized sources, such as swimming pools and ponds.

"Fires follow earthquakes like night follows day," Svetanics said.

The fire department is not the only agency facing the possibility of an earthquake. "A lot of important people in the emergency field are getting ready," Svetanics said.

9-20-90

St. Louis Post-Dispatch

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## Information, Please

### Area Disaster Officials Are Being Swamped With Calls On Preparing For An Earthquake

By William Allen  
Of the Post-Dispatch Staff

Just a year ago, St. Louis County emergency preparedness officials gave a seminar on how to prepare for an earthquake. It was sparsely attended.

Now those officials are getting hundreds of calls each day from people demanding the same information. And officials do not have to hold an event. They are getting invited everywhere — to schools, businesses, government offices and public meetings.

Their popularity is the result of a forecast by Iben Browning, a private climatologist in New Mexico, who predicts that a major earthquake may occur in the New Madrid Fault in December.

Browning has said that within 48 hours on either side of Dec. 3, an earthquake measuring 7.0 or greater on the Richter scale has a 50-50 chance of erupting somewhere in the fault.

Earthquake experts almost unanimously have dismissed the forecast as quackery. But the telephone calls indicate many non-scientists feel otherwise, officials said.

County workers have other disasters to prepare for, but Dan Freet, deputy director of the county's Office of Emergency Management, says, "Most of our time now is consumed with getting material [on earthquakes] out to people."

"We're just overwhelmed," said Fred Williams, director of the city's emergency management office. In Monroe County, emergency services coordinator George Riebeling said his office was "quite busy" responding to requests.

Freet estimated the earthquake calls at his office were averaging more than 100 a day. The city emergency management office is getting more than 60 a day, Williams said. The Monroe County office is getting far fewer.

The callers ask for information about how to prepare their homes and families for an earthquake and what to do during and after one.

In some instances, callers will ask for information, give their names and home addresses and pass the telephone around to several office co-workers.

Mark Gartland, director of the county's emergency management office, urged employers in St. Louis County to send for a single copy of the office's information packet and mass produce it for their employees.

Costs for copying, postage and materials have put a strain on the office's budget, he said.

The St. Louis County office has fielded calls from residents in other counties in Missouri and fire protection districts. Schools and major corporations have asked for help in preparing contingency plans for an earthquake.

Some callers ask about earthquake

insurance and soil conditions in specific areas, Freet said.

At least one local business passed out newspaper clippings on the earthquake forecast with employees' paychecks. Some schools are sending earthquake information home with students.

The city soon may send earthquake information widely to city residents, Williams said. It could be enclosed with water bills or statements from the assessor's office.

Officials believe the information, if acted on, will reduce injuries in an earthquake and help prevent panic afterward — whenever an earthquake occurs.

"We don't take a position that an earthquake will or will not happen" on Dec. 3, Williams said. "We're here to educate people about how to prepare, because scientists say one will eventually happen, whether it's Dec. 3 or nine years from now."

The city and county sent a fact-finding group to the San Francisco area following the earthquake there last October. After studying California's readiness for an earthquake, officials concluded that the St. Louis area is ahead in its earthquake emergency plans and staff but behind in seismic building codes and public awareness.

Williams, who has been averaging about two speaking appearances a day, said crowds range in size from 20 to 600.

"They're taking this thing real seriously," he said.

Beside the local offices, those concerned about earthquakes can call:

- Center for Earthquake Studies at Southeast Missouri State University in Cape Girardeau, (314) 651-2019.

- Missouri Emergency Management Agency in Jefferson City, (314) 751-9571.

- Illinois Emergency Services and Disaster Agency in Springfield, (217) 782-4448.

## City Officials Plan Training For Quake

Department heads of St. Louis city government will get special earthquake training next month, a city official says.

Mayor Vincent Schoemehl Jr. has ordered all department heads to get training in October in what to do during and after an earthquake, said Fred Williams, the director of emergency management.

The training will include sessions on first aid and search and rescue techniques, Williams said.

"The idea is to have all city employees trained in first aid, how to survive a quake and be helpful to us in search and rescue," Williams said.

City officials have been meeting regularly in recent weeks to discuss how to cope with a possible earth-

quake.



9-23-90

Springfield (Mo.) News-Leader  
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# Springfieldians curious about earthquake insurance

By Mike Penprase  
The News-Leader

Prompted by the 1989 San Francisco earthquake and predictions of a quake along the New Madrid zone, growing numbers of people in the Springfield area are asking about earthquake insurance, insurance representatives say.

Insurance companies are giving the same advice they give for any other type of insurance: Shop around and read the policy, an official with the state agency that supervises insurance companies said.

Compared with the potential damage an earthquake might cause,

adding earthquake coverage to existing insurance is a relatively minor investment, said Richard Jackson, president of Barker Phillips Jackson Insurance Co.

A rate sheet issued by the Insurance Service Office sets earthquake insurance rates for homes in Springfield at 27 cents per \$1,000 value, and at 86 cents per \$1,000 for masonry homes, he said.

Using ISO rate estimates, earthquake insurance for a frame home valued at \$50,000 would be \$13.50, while the rate for a masonry home of equal value would be \$48.

The price difference is based on

experience showing frame homes sustain less damage than masonry homes in earthquakes, he said.

Jackson said his firm has received 10 to 15 inquiries a day lately about earthquake insurance. That interest has prompted the firm to send out a mailing to current customers informing them of the availability of earthquake insurance, he said.

People thinking about getting earthquake insurance shouldn't wait for a warning tremor to sign up, Jackson said. Insurance companies will not issue policies for 30 days after a quake hits, he said.

Ollis and Company has been get-

ting more inquiries about insurance coverage, said Shirley Harman, company personal life manager.

Potential customers aren't making panic calls, however, she said. "I think they're just more interested in information," she said.

Statewide, there have been fewer inquiries to the Division of Insurance than expected, said Myrta Holtcamp, division consumer protection supervisor.

The division got a flurry of inquiries after the San Francisco quake, but few inquiries related to predictions the New Madrid fault might snap in December, she said.

## Residents field quake queries

By Mike Penprase  
The News-Leader

Salina Patel has no idea where the story originated — that New Madrid's one and only motel was already booked for Dec. 3, mostly by news reporters who want to see if the predicted earthquake will take place there.

Plenty of rooms still are available, said Patel, who works at the 47-room Cabana Motel on U.S. 61.

Patel and many residents along the seismic zone running 120 miles from Marked Tree, Ark., to Cairo, Ill., have turned dealing with outsiders' curiosity into daily routine.

At the Missouri Department of Tourism information center on Interstate 55 five miles south of town, more than half the people who stop ask about the earthquake fault, manager Jan Farrenburg said. "The last person who was in the building was wondering where the fault line was," she said of a Texas motorist.

Curious travelers are told there are no easily seen signs of the fault zone and are directed to the local museum to view its earthquake exhibit, Farrenburg said.

But for local people, the prediction by New Mexico climatologist and business consultant Iben Browning that a fault line might snap in early December is more a topic of conversation than preparation, she said. Many living along the zone take its existence matter-of-factly, the New Madrid County resident said. Because major tremors exemplified by the legendary earthquakes of 1811, 1812 and 1895 were so long ago, few people have had personal experience with them.

"The small ones we have here every day, we don't feel them," Far-

renburg said of quakes undetected by sensitive seismographs. "I've lived in southeast Missouri all my life, and people are used to the little quakes."

That attitude may have changed after 300 residents in the town of 3,200 crowded into the local theater recently to hear about earthquake planning.

New Madrid Historical Museum director Virginia Carlson said the meeting was an eye-opener.

Carlson, who contends New Madrid residents should prepare for an earthquake whether or not Browning's prediction is correct, said the meeting may prompt residents to prepare.

"I think they're frightened," she said.

At the same time, some are frustrated at the lack of coordinated effort for disaster preparation, she said.

Residents have been warned but haven't been told how sanitation, medical care and emergency transportation needs might be met in the event of an earthquake, she said.

"I think we're sticking our heads in the sand," she said.

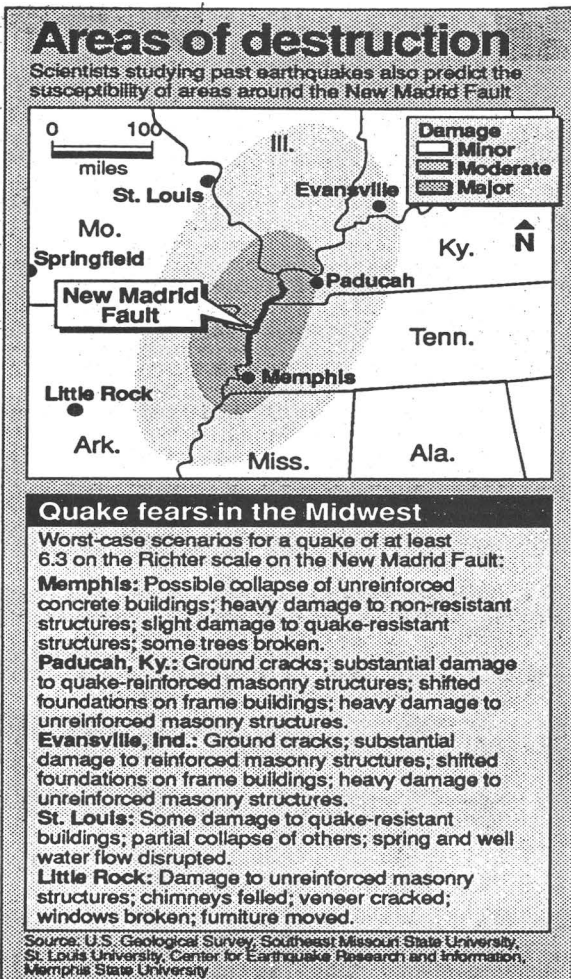
Mayor Dick Phillips believes local people will have to rely upon themselves for days if a major quake hits.

"This is the thing we've got to get across to them — they've got to be self-sufficient," he said.

Residents were told at the meeting not to expect help from city, county or state agencies, Phillips said.

That will go to St. Louis and Memphis, with little towns such as New Madrid left to fend for themselves, he said.

The city is storing emergency supplies in a steel building that should



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withstand an earthquake, the mayor said.

Fifty miles further south on I-55 at Blytheville, anxiety over the earthquake prediction has been so intense at least one factory will shut down.

Enough employees signed up for vacation — or said they would call in sick — that it wasn't worth making automotive underhood tubing and heating and air conditioning ductwork at the Flexible Technologies plant on Dec. 3 and 4, plant superintendent Jimmy Connell said.

"They're getting away from here," he said of many of the plant's 55 employees who plan to journey everywhere from Florida to Fort Smith.

The plant also is planning for the future, even if Browning's prediction doesn't come to pass, Connell said.

A local firefighter who is conducting earthquake seminars talked to plant employees about safety precautions at work and at home, and employees have created earthquake survival kits at work, he said.

At Eaker Air Force Base at the edge of town, base officials are keeping quiet about any plans to protect the base's B-52 bombers.

"Suffice it to say we have a contingency plan," base spokesman Capt. Lane Johnson said.

Rather than being concerned about having nuclear-armed bombers wrecked by an earthquake, local residents seem more concerned about the chance a jet fuel pipeline running to the base might crack, Flexible Technologies superintendent Connell said.

"I would venture to guess the planes that are capable will be in the air or assigned to different bases," he said.

New Madrid museum director Carlson said she didn't even know about the New Madrid seismic zone until she started working at the little museum sitting on the banks of the Mississippi River.

She said people tend to be lulled into complacency because there are no readily-apparent signs of past earthquakes.

"It's peaceful looking, and you really have to tell people there's some real bad things going on underground," she said.

Carlson, who hands out disaster preparation information at the museum, also sells T-shirts taking a humorous view of having a major fault zone as a neighbor.

One T-shirt states "It's Our Fault."

Another — a reference to the fact that in the 1811 and 1812 quakes the original town slid into the Mississippi River — advises "Visit New Madrid (While It's Still There)."

## Predictions of quake keep Missouri ready, waiting for trouble

By J. Lee Howard

The News-Leader

Experts in seismology have approached Iben Browning's projections cautiously.

Browning, a 72-year-old New Mexico climatologist, says there is a 50-50 chance an earthquake will hit Dec. 3 along the New Madrid Fault. David Stewart, director of the Center for Earthquake Studies at Southeast Missouri State University in Cape Girardeau, has said he can neither refute nor confirm whether the New Madrid fault will reawaken this December.

"It boils down to his methodology," Stewart said of Browning. "It's not fully understood by any member of the scientific community, myself included. What he's doing is not simple."

"But in a recent memorandum to the state Emergency Management Office, Stewart said Browning should nonetheless be taken seriously.

"He's been correct on not just one but several occasions in the past," Stewart said. "We have a verifiable homerun hitter here with a track record, and now he's up to bat.

"The question is," Stewart said, "is he going to hit or strike out?"

Art Wallhausen, an associate to the president of Southeast Missouri State, said the school developed an earthquake plan several years ago and has been updating it each year since.

Wallhausen said Browning's projections for the New Madrid fault have clearly heightened interest in earthquake preparedness, but that other experts have for some time been predicting a quake at the New Madrid fault.

"It's generally accepted that there's a 50 percent chance for an earthquake of a 6.3 (Richter) magnitude by the year 2000," Wallhausen said. Chances of an even stronger earthquake also are relatively high, he added.

"With those probabilities," Wallhausen said, "we have to be ready regardless of a specific date projected."

But at least two northeast Arkansas school districts aren't taking any chances.

Mississippi County School District No. 57 is closing its doors Dec. 3-4. So is a school district in neighboring Poinsett County.

Harvey Barton, school district No. 57 superintendent, said several principals from the district went to an earthquake seminar in June at Arkansas State University in Jonesboro. The principals heard about Browning's predictions at the seminar.

The school district decided to cancel classes Dec. 3 and 4 and hold teacher workshops instead.

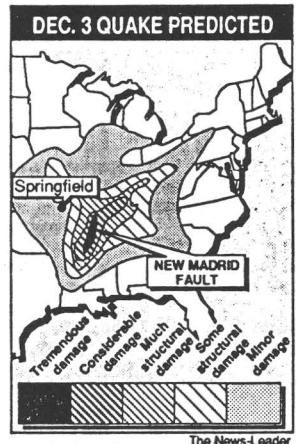
"A lot of students and parents have a lot of anxiety about this," Barton said. "We've decided to do this as a precautionary measure, because of all the anxiety that's built up in the community."

The Missouri National Guard and state and local emergency management officials also are looking toward Dec. 3 with some degree of anxiety.

Civil defense and military authorities point to other experts who say an earthquake at the New Madrid Fault is imminent. Those interviewed not only were familiar with Browning's predictions, they also found them a little frightening.

The Springfield-Greene County Emergency Management Office is helping to coordinate host shelters in the event the quake causes major damage to homes in the New Madrid region. Emergency teams, including doctors with the Greene County Medical Society, would be dispatched to the area to help the victims of the quake.

"If it doesn't happen, fine," said Candace Adams, an emergency management specialist in the Springfield office. "But if it does,



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we'll be ready for it."

The Missouri National Guard is taking a similar posture.

The Guard plans to conduct a statewide earthquake emergency drill during the first two weeks of December.

The exercise will involve the cooperative efforts of the state Department of Transportation, the Department of Conservation, the Department of Public Safety and state Emergency Management Office authorities.

Col. Jerry Uhlmann, planning operations and military support officer with the National Guard in Jefferson City, said the drills aren't necessarily timed to coincide with Browning's predictions. However, he said, other experts also are saying an earthquake will hit this decade, making it incumbent on the military to be prepared at all times.

"Every year the threat is greater," Uhlmann said. The Loma Prieta quake boosted the Guard's interest in developing an earthquake disaster strategy, he said.

But, like Adams, Uhlmann said Browning's predictions shouldn't be discounted.

"Dr. Browning's projections have definitely stirred up a lot of interest," Uhlmann said. "I don't agree or disagree with his projections. We're not in that business."

"But he's saying indications are that there will be a peak at that time (Dec. 3). We're certainly not going to discount those projections."

9-23-90

Springfield (Mo.) News-Leader

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# Quake prediction hits wall of doubt

By Mike Penprase  
The News-Leader

Scientist Iben Browning, who predicts that a major earthquake could hit Dec. 3 along the New Madrid fault, apparently has a lot of believers.

At one St. Louis area meeting to discuss the possible quake, 2,000 people attended and 500 had to be turned away.

In New Madrid, 300 people crammed a theater to hear emergency management officials and David Stewart, director of the Center for Earthquake Studies at Southeast Missouri State University.

However, few scientists are buying Browning's theories.

"It could happen tomorrow, it could happen in a couple of decades," Brian Mitchell said of the potential for an earthquake.

Mitchell is chairman of the St. Louis University Department of Earth and Atmospheric Sciences.

Seismologists have warned for years the New Madrid fault, running from Marked Tree, Ark., to Cairo, Ill., needs attention.

But Browning, who lives in New Mexico, has caught the public's attention.

Browning, 72, has a doctorate in physiology, genetics and bacteriology. He projects a 50-50 chance the quake will hit Dec. 3, give or take a day.

Springfield probably wouldn't get the bulk of the shock from a New Madrid quake, but emergency management officials say it would get about 200,000 refugees from eastern Missouri.

Interest in Browning's prediction began after it was reported he predicted last October's San Francisco area quake.

Stewart recently spent two days with Browning in New Mexico, which gave him more insight into Browning's methods, he said. But Stewart, who has been criticized by some for backing Browning's theories, said he wants to see more research done.

"All I'm saying is until we have his complete set of formulae and

methodology, I'm holding on it," he said. "We just can't write him off summarily."

Counterparts who contend he's been won over to Browning's views are wrong, Stewart said.

"I'm not saying I agree with Dr. Browning," he said. "I'm saying let's find out what he's doing and draw our conclusions."

## Gathering data

Browning makes his projections by calculating tidal activity and the pressures the sun and moon exert on the earth in a band of latitude taking in not only the New Madrid Fault Zone but also fault zones in California, Japan and other areas.

Because that band of latitude north extends around the earth, Browning's prediction also holds for earthquake zones in Iran and Iraq, for instance, Stewart said.

Stewart is the only person with a background in earthquake studies who supports Browning, said officials with organizations such as the United States Geological Survey, other earthquake centers and the Missouri Division of Geology.

People need to be aware of and prepare for hazards the New Madrid seismic zone presents, but shouldn't rely on unprovable predictions, said Randy Urdike, associate chief of earthquakes, volcanoes and engineering at the Geological Survey's headquarters in Reston, Va.

"It would be helpful if they would not rely so much on a soothsayer, rather than the people who do this kind of work," he said.

But Browning has said mysticism doesn't play a role in his projections. "I don't predict anything," he said in an earlier interview. "That's a lot of garbage."

Urdike said the Geological Survey's National Earthquake Prediction Evaluation Council — made up of 15 people from universities, state geological surveys and Geological Survey — will study Browning's methodology along with other prediction methods in two weeks.

Browning's methods were includ-

**'All I'm saying is until we have his complete set of formulae and methodology, I'm holding on it. We just can't write him off summarily.'**

— David Stewart  
Center for Earthquake Studies

ed in the study not so much for their interest among researchers, but because of public interest, he said.

People who believe they can't predict earthquakes aren't that rare, Urdike said.

He often gets telephone calls from people who insist they can predict quakes with their sore feet or by interpreting cloud patterns crossing the sun, Urdike said.

"There are a lot of kooks out there," he said. "NEPEC could spend their whole year looking at bizarre stuff."

Harsher assessments came from other quarters.

"We're not according any credibility whatsoever to his projections," said Jill Stevens of the Center for Earthquake Research and Information at Memphis State University.

Browning relies on methods seismologists have studied since the 1930s, and have found wanting, Stevens said.

As for the New Madrid zone, rises and falls in the level of the Mississippi River put more stress on the faults in the zone than do tidal changes, she said.

## Prepare, experts warn

Although the center rejects Browning's projection, it stands by warnings the fault area could move at any time and that people should be prepared, Stevens said.

The center supports the estimate there is a 40 percent to 60 percent chance the fault line could produce a damaging quake of between 6.0 and 6.5 magnitude on the Richter scale in the next 15 years, she said.

An earthquake of 6.5 magnitude could cause \$3.6 billion in damage to housing alone. An earthquake of over 8.0 in magnitude — similar to the quakes of 1811-12 and 100 times more powerful than a 6.0 quake — would cause more than \$50 billion in damage and thousands of casualties in jolts felt from the Rockies to the Atlantic Ocean, the Geological Survey has estimated.

## Protecting reputation

If there is no earthquake in December, efforts to get people to pay attention to reducing an earthquake's effect could be hampered in the future, Mitchell of St. Louis University said.

"If it doesn't happen, people will think science doesn't have anything to tell us," he said.

Stewart responds to criticism aimed at Browning by the St. Louis and Memphis researchers by saying their own research into tidal influences on earthquakes is flawed.

Missouri Division of Geology director James Williams said he is aware some scientists aren't pleased with Stewart's support of Browning, but said the division won't take sides.

"We haven't expressed any strong opinion that Browning is right on target, or that he is a crazy loony," he said.

One difficulty in checking any theories about the New Madrid zone is that it is difficult to study, Williams said.

The intersecting faults, rifts and arches making up the New Madrid zone lie under hundreds of feet of Mississippi River Valley dirt and sand, and there's no reliable way to measure stress as it builds, he said.

Scientists only can measure jolts as they take place, he said.

While plenty of non-scientific people have heard Stewart, he said he thinks he isn't getting a hearing on behalf of Browning because Browning isn't a seismologist.

"Here's a non-scientist who has done what they (seismologists) have tried to do, and failed," he said.

9-23-90

**St. Louis Post-Dispatch**

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# Panicky Reaction To Quake Forecast Causing Concern

By William Allen

Of the Post-Dispatch Staff

**A** CONTROVERSIAL earthquake forecast has been a boon to quake preparedness efforts. But public reaction to it is approaching panic in Missouri and Illinois, experts say.

They are urging people in both states to prepare for a quake not because of the December forecast but because a severe quake could occur at any time in the next several decades.

The public reaction is "bordering on the unhealthy," said Mark Gartland, director of the St. Louis County Office of Emergency Management.

"It concerns me that it's not going to take too much more before people are going to be afraid to step out the door from Dec. 1 through 5," Gartland said.

New Mexico scientist Iben-Browning predicts on those days a 50-50 chance of an earthquake measuring 7.0 or greater on the Richter scale in the New Madrid Fault. The forecast covers 48 hours on either side of Dec. 3.

Scientists who specialize in earthquakes — Browning is not one of them — almost unanimously have dismissed the forecast as quackery. They stand by their predictions that a severe quake in the fault has a 50-50 chance of occurring sometime in the next decade.

The Federal Emergency Management Agency estimates that a 7.6 quake at the northern end of the New Madrid Fault would kill 265 people in St. Louis city and county and seriously injure more than 1,000. It would leave 200,000 people homeless and cause more than \$2 billion in damage to buildings if it struck during the day.

Slightly fewer casualties could be expected if the temblor struck at night, when more people are in generally safer buildings. About one-fifth of the daytime dead and injured would be schoolchildren.

A more powerful but less likely quake — 8.6 on the Richter scale — would kill 1,400 people and seriously injure more than 4,300 in the city and county if it hit in daytime.

Meanwhile, disaster preparedness officials have been swamped with phone calls from people wanting to know how to prepare themselves.

Browning's forecast has aroused "an unparalleled level of interest" in earthquake preparedness, said Thomas Zimmerman, an official with the Illinois Emergency Services and Disaster Agency.

"We're taking the prediction very seriously only because of the near-panic and chaos that could ensue or the business interruptions that could ensue if schools and businesses shut down" around Dec. 3, Zimmerman said.

Gartland said that if anxiety about an earthquake continues to increase, it could create a "crisis that in itself could cause an emergency," Gartland said.

But an equally important concern of many disaster preparedness officials is that interest will wane dramatically if December passes without a tremor.

Said Illinois' Zimmerman: "If people believe that earthquakes can be predicted with that level of accuracy, then when the earthquake doesn't happen, they will think, 'All this for nothing?'"

But a more "healthy mindset" comes from accepting insistence by earthquake scientists that specific predictions cannot be made. That sets the stage for a more rational approach to preparedness, in which people can begin to take simple steps to prepare themselves and their homes, schools and workplaces, he said.

But if they panic before a quake happens, they may decide to do nothing.

"The mindset is everything," Zimmerman said. "It determines whether the public will take an active approach to earthquake preparedness or a panic approach."

Fred Williams, director of the St. Louis city emergency management office, said he fears that people won't be prepared for a quake when it finally does happen if they let their guard down after a quakeless December.

Williams doesn't talk about Browning's forecast in his public presentations, although it invariably comes up in questions by the audience.

Said St. Louis County's Gartland: "It's that letdown that I don't think we can afford as a community. Everything we did even before the San Francisco quake would be gone, and we'll have to wait till the next shake."

Few people in this area paid serious attention to earthquakes until recently. One year ago last week, St. Louis County marked earthquake awareness week with news conferences, public seminars and

disaster drills. The activity generated little interest, officials said.

People began to tune in after the Oct. 17 earthquake in the San Francisco Bay area. The Browning prediction has triggered unprecedented interest.

The deputy director of the county's emergency management office, Dan Freet, said information requests were not only more numerous, but callers expressed more concern.

"People are saying, 'I'm really worried about what the school is going to do with my child,'" Freet said. "It's beginning to dawn on them that there is a risk."

Officials don't hide the fact that they're capitalizing on public interest in quake preparedness.

Illinois has rescheduled its earthquake awareness week to the first week of November. It had been scheduled for February 1991.

"Our approach is, let's look at this as an occasion for getting prepared, whether an earthquake happens tomorrow, in December or anytime thereafter," Zimmerman said.

Missouri officials expect more than 100 communities to take part in a quake preparedness drill on Dec. 1 and 2 run by the Missouri Department of Public Safety.

R.D. Ross, director of the Missouri Emergency Management Agency, said his agency has been "taking full advantage" of the growing concern.

"The fact is that seismologists for a number of years have said that the probabilities of a medium to major earthquake in the next 10 to 20 years was considerable," Ross said. "But we are concerned that preparation and not panic be the theme of the rest of 1990."

Gartland said his office was "trying not to blow it out of proportion. It's a very touchy situation."

Business people have called Gartland and asked if they should close down on Dec. 3, a Monday. He tells them that if they're going to do that, they should also close on Dec. 4 and 5, the last two days encompassed by Browning's forecast.

"When they're told that, they become leery about closing their operations for three days," he said. "Then they realize that there's no telling when an earthquake can happen."

9-23-90

St. Louis Post-Dispatch

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# New Odds:

## Chance Of New Madrid Quake Lowered

By William Allen  
Of the Post-Dispatch Staff

**T**HE CHANCES for earthquakes in the New Madrid Fault may be less than previously believed, scientists reported Friday in Science magazine.

But the researchers stressed that those chances are still significant and simply provide more evidence that the central United States should prepare for an eventual quake.

In most cases, the new estimates are less than half of the widely cited standard probabilities for earthquakes in the range of 6 and 7 on the Richter scale.

The lower figures should reduce concern about quakes "not at all," said Gilbert Bollinger of the U.S. Geological Survey and the Seismological Observatory at Virginia Tech, in Blacksburg, Va. He co-authored the paper on earthquakes in the eastern United States with S.P. Nishenko of the National Earthquake Information Center, in Denver.

**Nishenko and Bollinger** rate the chances for a quake 6.0 or greater at 13 percent by the year 2000 and 50 percent by 2040. Chances for a 7.0 quake are 2 percent by 2000 and 8 percent by 2040, they said.

The most widely cited probabilities so far were published in 1985 in the Journal of Geophysical Research by Arch Johnston, director of the Center for Earthquake Research and Information at Memphis State University, and Susan Nava, now at the University of Utah.

Johnston and Nava estimated the chances for a 6.0 or greater quake by the year 2000 at between 40 to 60 percent. That estimate has been boiled down to 50 percent by some scientists. The chance for a 6.0 quake by 2040 is 90 percent, they said.

For a quake of 7.5 or greater, they rate the chances at roughly 10 percent by 2000 and 25 percent by 2040.

The different figures resulted from the different methods used by each group to make the estimates.

The main difference is that the Johnson-Nava method assumes that stress building in the fault since the last earthquake can influence the timing of the next one and the Nishenko-Bollinger method doesn't.

**Although the groups** disagree on the best method, they agree that more research is needed to better understand the New Madrid Fault.

"In one sense, you could see the two sets as an upper and lower range of probabilities," Johnston said in a telephone interview. "Either one you take, the probabilities are significant." Bollinger agreed.

Scientists are unsure which set of probabilities they'll use when talking to the public about earthquake risk.

David Stewart, director of the Center for Earth-

quake Studies at Southeast Missouri State University, in Cape Girardeau, said he will have to study the new estimates before making a decision.

"The latest paper is not necessarily the best," Stewart said. "Unless I can see a compelling reason to buy their assumptions, I'm going to go with Johnston."

## Quake Concern Worries Residents Of Tiny Town

By William Allen  
Of the Post-Dispatch Staff

TYRONZA, Ark.

**C**ONCERN ABOUT the possibility of an earthquake in December has risen to the level of panic among some residents here, says Mayor Ray Brewington.

"There's talk around here that some people are going to take their money out of the bank," Brewington said.

The reason: Iben Browning's forecast of a 50-50 chance for an earthquake in the New Madrid Fault around Dec. 3.

Tyrnza is a farming town of about 800 in northeastern Arkansas near the southern tip of the New Madrid Fault.

Brewington said he was urging people who are considering a withdrawal not to do so because they could be easy prey for thieves poised to take advantage of the panic.

Whether they withdraw from the bank or not, "the majority of people I've talked to say they're going to leave," Brewington said.

"**We have** 200 tremors a year, but before this people never did think about it," Brewington said.

The president of the Tyrnza Bank, Charles F. Luter, said no such withdrawals have been made.

"I don't expect much of that to take place," Luter said.

Residents are more concerned about tornadoes than earthquakes, he said. In any case, the bank's vault, with two-foot-thick steel and concrete walls, is the safest place around. The money also is insured by the federal government.

Mayor Brewington is appealing to residents to "use common sense and prepare for an earthquake, whenever it



comes. There's no need to panic."

But quakes like a minor tremor centered in western Tennessee Aug. 29 seem to be making believers out of people in Tyrnza.

"The general public talk is, if we keep having these tremors, the man [Browning] knows what he's talking about," Brewington said.

**Some people** are taking their families out of town for first week of December, Brewington said.

Like many towns along the fault, Tyrnza is buying electrical generators and storing medical and other supplies.

"We're eventually going to have a quake, so it's money that won't be wasted," Brewington said.

9-27-90

St. Louis Post-Dispatch

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# Quake Rattles Region

## Temblor Leaves Behind Little Damage, No Injuries, But Brings On New Jitters

By William Allen

Of the Post-Dispatch Staff

Somewhere beneath southeastern Missouri, the Earth shrugged its shoulders Wednesday. The result: an earthquake measuring 4.6 on the Richter scale.

As quakes go, this one went quickly and with little fuss. It was brief, and caused no injuries and little damage, officials said.

But it sent jitters through a region already made jumpy by predictions of a big quake along the New Madrid

- HAZELWOOD DRILL is a dress rehearsal..... Page 12A
- INSURANCE AGENTS are kept busy..... Page 12A
- DUTCHTOWN, MO., recovers from the shake..... Page 13A

Fault in December.

The quake struck at 8:19 a.m., said St. Louis University's Sean-Thomas Morrissey, who pegged the scale at 4.6.

The quake's epicenter — about 10

miles southwest of Cape Girardeau — was not on the New Madrid Fault but was a few miles west, said Morrissey, a geophysicist.

Another tremor shook the Cape Girardeau area about 12 hours later, registering about 3 on the Richter scale, according to officials in Cape Girardeau.

The earthquake's rumblings traveled through seven states — Missouri, Illinois, Arkansas, Indiana, Kentucky, Ohio and Tennessee.

The quake caused minor damage in

small towns around the epicenter, breaking dishes, knocking pictures off walls and pitching contents from cabinets and shelves.

Near Keiso, Mo., the quake broke several pieces of one woman's collection of 300 ceramic pigs.

"There was a rumbling noise like a heavy truck," said David Stewart, director of the Center for Earthquake Studies at Southeast Missouri State University, in Cape Girardeau.

Stewart, who was in a classroom at the time, said, "I shouted, 'It's an earthquake,' and everybody ducked under their desks."

Scientists agreed that Wednesday's tremor had nothing to do with the December prediction, made by Iben Browning of New Mexico.

Browning has forecast a 50-50 chance of an earthquake measuring at least 7.0 along the New Madrid Fault between Dec. 1 and Dec. 5.

Most scientists who specialize in earthquakes have dismissed Browning's forecast as ridiculous. They put the chance of a quake measuring at least 6.0 at 50-50 sometime in the next decade.

See QUAKE



Post-Dispatch map



Karen Elshout/Post-Dispatch  
**Scott Michell, a St. Louis University geophysics graduate student, holding a reading of Wednesday morning's quake.**

## Quake

From page one

If Wednesday's quake fell far short, it had its moments. In Perry County, Mo., sheriff's dispatcher Ryan Worthington had a report that the second floor in one house had pulled away from the wall about a foot.

Elsewhere, the quake spilled coffee, rattled windows and gently shook couches and chairs.

Zanda Cepicky of south St. Louis County said she knew right away what the rattling window in her dining room meant.

"I had just made a fresh cup of coffee and had sat down at the kitchen table," said Cepicky, who lives off Matjis Road. "My dishes rattled, my kitchen table vibrated and my chair vibrated. It was just enough shake in my cup that it spilled my coffee."

Others felt little or nothing. Gladys Reams, 50, who lives at 5225 Lotus Avenue in north St. Louis, said that only when her daughter called did she realize that she had sat through an earthquake.

More than anything, the quake seemed to rattle nerves. New Mexico's Browning had said some quakes might occur on Oct. 9 or Nov. 6, in advance of the big one he's saying might happen in December.

But Wednesday's tremor "was just another earthquake," said William Schmieder, a geophysicist with the National Earthquake Information

Center in Golden, Colo.

And St. Louis University's Morrissey said: "We love the fact that everybody is paying attention to earthquake preparation — but this Chicken Little stuff has got to stop."

Although Wednesday's quake was off the New Madrid Fault proper, it fell within the fault zone. Each year, about 200 measurable quakes occur in that zone, Cape Girardeau's Stewart said. But only about three a year pack enough power to be felt.

In fact, before Wednesday, three were felt this year: a 2.8 quake on Jan. 9, a 3.1 on Aug. 7, and a 3.4 on Aug. 29.

Said Stewart: "We expect them every now and then. When they happen, they normally mean nothing."

Paul Kesterson, assistant chief of the Cape Girardeau Fire Department, said the tremor Wednesday night lasted only a few seconds. There were no reports of damage.

"It was just another tremor," he said. "It made us more aware of what we are sitting on."

Although the morning quake was relatively minor, it was the second largest in the New Madrid Fault zone this century, said Stewart. The largest — 5.0 — hit in 1976 and was centered near Marked Tree, Ark.

Wednesday's quake — Stewart called it a "little old earthquake" — did nothing to relieve any stress in the New Madrid Fault zone, he said.

A quake of magnitude 7.1 — in line with Browning's projection — would be about 3,000 times more powerful than a quake of 4.6.

9-27-90

St. Louis Post-Dispatch

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## EARTHQUAKE SHAKES SEVEN STATES

# Rattled: Nerves And Buildings Are Shaken At Epicenter

By Paula M. Davenport

Post-Dispatch Special Correspondent

DUTCHTOWN, Mo. — It lasted only seconds, but it took hours for 61-year-old Postmaster Mary Amos to recover. Amos was quietly sorting mail for Dutchtown's 75 residents Wednesday morning when time stood still — and everything else began shaking.

"I looked at my watch, because we usually have to file a report when we have an earthquake," Amos said from Dutchtown's post office, located near Whitewater, the village that scientists at Southern Illinois University at Carbondale think was the earthquake's epicenter. Both communities are just south of Cape Girardeau.

"The windows shook, the mailboxes shook and my scales shook," Amos said. "I thought it was never going to quit. I was really frightened. It took me until noon for my nerves to settle down a little bit."

Charlie Schwartz, a Scott County farmer, said he had been out surveying property near Cape Girardeau when the ground started to sway. He glanced up at a Christmas star atop a nearby 90-foot grain silo.

"The star was shaking about a foot. We couldn't see the silos shaking," Schwartz said. "I know one thing: The cattle ran out of the barn as soon as the ground started shaking."

At Dutchtown's Smith Shop — a combination bait shop, gas station, liquor store and deli — the earthquake was the main topic of conversation among Wednesday's shoppers, said owner Voyann Smith.

"My mom just gave me two checks yesterday to get earthquake insurance on the store and the house," Smith said with a laugh. "With this today, I'm sure I'll get insurance."

The quake "rocked" Dutchtown resident Fred Coleman's house trailer, jarring loose a heavy antique lumber saw that was hanging on the living room wall.

"It pulled the nails right off," he said. "I'm never going to hang it again. I've got two little girls, and it's a little dangerous."

But in nearby Whitewater, Dave Lewis, manager of Buchheit Grain Facility, downplayed the temblor.

"If I had one of these grain bins fall over and had 300,000 bushels of wheat out in the street, then I'd have something to talk about," he said.

That kind of talk won't pacify Dutchtown's Lis Kraemer, who fears a prediction that an earthquake will rattle the region in December.

"I'm going to Milwaukee for two weeks [in December]. I'm not staying here," Kraemer said.



Post-Dispatch Map

9-29-90

St. Louis Post-Dispatch

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## Quake Videotape On Shaky Ground

By Bill Smith

Of the Post-Dispatch Staff

The director of the Missouri Department of Natural Resources cautioned the public on Friday to be wary of buying a videotape that he says capitalizes on the projection of a major earthquake in early December in the New Madrid Fault.

"Consumers who might consider purchasing this videotape should be aware that fixating on one day cannot substitute for constant, rational earthquake preparedness," said G. Tracy Mehan, director of the department.

Mehan said the tape consists of an interview with Iben Browning, a New Mexico scientist and business consultant. Browning discusses the possibility of a strong quake occurring in the fault about Dec. 3.

Browning said he gets a share of the profits from the tape's sale. Profits will go into a trust fund set up for two handicapped grandchildren, he said.

An advertisement marketing the videotape ran Wednesday in the Post-Dispatch and in the Memphis Com-

**"The probability of a significant quake occurring on or about Dec. 3 is not greater than any other day"**

G. TRACY MEHAN  
Natural Resources director

mercial-Appeal.

"Dr. Browning's theory and methodology are considered unproven by the U. S. Geological Survey; Dr. James H. Williams, the state geologist and director of the Department of Natural Resources' Division of Geology and Land Survey, and by several noted seismologists," Mehan said.

In a telephone interview from his office in Sandia Park, N.M., on Friday, Browning said he was unaware that the tape was being marketed through

newspaper ads to the public.

"I am completely divided, in my mind, about the virtues of the advertisement," Browning said. He said he had been aware the tape was being sold to business leaders.

Browning said he has been a "little distressed" about the publicity surrounding his projection. But, he said, "I'm hoping it will do the state of Missouri some good."

The tape, a 30-minute version for \$39 and a 100-minute version for \$99, is being sold by a company in Palm Springs, Calif., called Tanstaaf! Communications.

Tanstaaf! stands for There Ain't No Such Thing as a Free Lunch, said Tanstaaf! spokesman Eric Watson. Watson, president of an environmental equipment company, said the tape "is not a ripoff."

"I could show you a stack of letters on my desk saying 'thank you for warning us and our families.'"

Watson said the tape is an interview he conducted with Browning in February. "The tape is being offered so that

people can see the man and judge for themselves whether the man is credible."

Browning and Watson said the tape was made for distribution to the world's business community. Browning said he made the tape at a time when he thought he would be dead within a month because of a serious illness.

Browning said the tape provides no information on how families should prepare for an earthquake.

The newspaper advertisement quotes David Stewart, director of the Center for Earthquake Studies at Southeast Missouri State University in Cape Girardeau, as calling Browning "perhaps the most intelligent person I've ever met."

Stewart, Watson said, "is far more knowledgeable about Dr. Browning, earthquakes and the risks than this Tracy fellow."

Stewart could not be reached for comment Friday.

"The probability of a significant quake occurring on or about Dec. 3 is not greater than any other day," Mehan said.

9-30-90

St. Louis Post-Dispatch

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# COMMENTARY

## A Quake On Dec. 3? Don't Bet The Farm

*Prediction By So-Called Expert Stirs Unnecessary Fears*

By Douglas A. Wiens

**T**here was an undercurrent of fear in the elderly voice on the phone: "Do you think I should leave town because of the earthquake that is coming on Dec. 3?" As stories about an earthquake appear on the front pages of newspapers across the Midwest and reports circulate about schools and businesses closing on that date, the number of those phone calls increases.

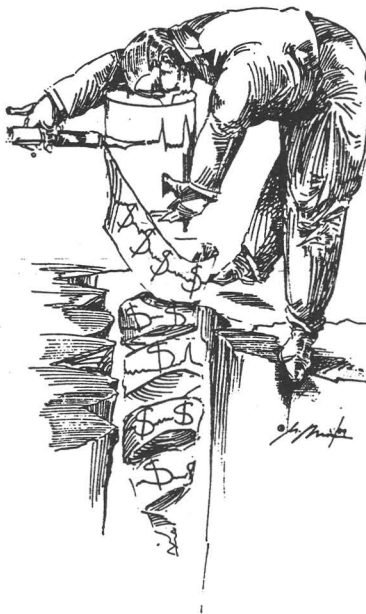
Earthquake experts across the country consider this "prediction" ridiculous and unscientific, but our message is obviously not getting through to the public.

Iben Browning, a business consultant with no prior experience in earthquake studies, started the uproar. He claims that on Dec. 3, there is a 50 percent chance that tidal forces resulting from the pull of the sun and the moon will trigger an earthquake, measuring 7.0 on the Richter scale, along the New Madrid Fault near the southeastern border of Missouri. Such an earthquake would damage large portions of Missouri, Arkansas, Tennessee and Illinois, including the cities of Memphis and St. Louis.

Years of research by earthquake experts show that Browning's prediction is unfounded. These studies conclude that earthquakes occur just as often when tidal forces are low as when they are high. This is not surprising, since tidal forces are very small compared to other forces that can affect faults. For example, a change in the water table from a rainstorm will exert much more force on the fault than tidal forces.

Periods of unusually large tidal force occur frequently, including several times earlier this year, without the dire consequences that Browning foresees. The earthquake near Cape Girardeau on Wednesday, far from supporting Browning's prediction, actually provides evidence against it, since it occurred when tidal forces were small.

Although Browning claims his prediction is based on science, he provides no reason for singling out the New Madrid zone rather than other fault zones. Tidal forces will be at a maximum on Dec. 3 throughout most of the northern hemi-



sphere, and many other fault systems have a much higher likelihood of an earthquake. Why choose New Madrid?

Browning's alleged record of predicting earthquakes and his reputation in the financial community are given as evidence to support his forecast. But most of the so-called evidence for his success consists of offhand remarks by Browning, and friends' hearsay reports. No one knows how many times he may have been wrong. In most cases there is little hard evidence that his predictions actually were made prior to the earthquakes. This kind of evidence, often used to support the predictive powers of astrologers and charlatans, is hardly enough to warrant closing schools and businesses.

The public should disregard all predictions about the specific date that an earthquake will occur. No one can make such predictions. Though scientists have investigated many different factors that could signal an impending quake, none has proved reliable. Research is still be-

ing done, but no detectable forewarning has yet been identified. We may never be able to pin down the time, place and size of earthquakes accurately enough to permit emergency measures to be taken.

On the other hand, progress has been made in long-term earthquake predictions. The Loma Prieta earthquake which caused considerable damage in the San Francisco Bay area last fall is a prime example. During the mid-1980s, several research groups identified this fault segment as particularly likely to cause a large earthquake within the next 20 to 30 years.

For the New Madrid zone, there is less data to constrain such estimates because there are fewer earthquakes and the fault is deeply buried. Various estimates suggest a 13 percent to 63 percent chance of an earthquake measuring 6.0 within the next 10 years. Such a quake would cause moderate damage near the earthquake location but would be much smaller than the catastrophic New Madrid earthquakes of 1811 and 1812.

The near-hysteria that has developed over such a groundless prediction is startling to those of us who study earthquakes daily. Apparently, wide news coverage has validated Browning's prediction in the minds of the public, despite what scientists are saying. The true motives for Browning's prediction may have been revealed recently when ads began appearing asking people to pay \$100 for a tape describing Browning's prediction. The tragedy is that innocent people have been needlessly scared in the process.

The one good effect of Browning's prediction is increased concern for earthquake safety. But the danger is that when Dec. 3 passes without an earthquake, the danger will be forgotten. One can only hope that when ill-conceived but well-publicized predictions such as Browning's fail to come true, the public will still believe that planning for an earthquake is necessary.

*Douglas A. Wiens, professor of earth and planetary sciences at Washington University in St. Louis, has studied earthquakes worldwide.*



10-1-90  
**St. Louis Post-Dispatch**  
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# Shake Treatment: Quake Simulator Draws Many To Science Center

By Phil Linsalata  
 Of the Post-Dispatch Staff

The earthquake simulator at the St. Louis Science Center in Forest Park got a workout Sunday afternoon as visitors searched for an answer to a question posted nearby:

"The New Madrid Earthquakes — 1811, 1812 — *Could it happen again?*"

After Wednesday's earthquake, centered about 10 miles from Cape Girardeau, the question weighed on the minds of those at the exhibit Sunday. The real earthquake apparently served to whet the appetites of people like Gary and Lisa Rich, who felt the tremor clearly while at jobs near their home in West Frankfort, Ill.

"I'm very worried about an earthquake, because we know now how fast they happen — you don't have time to plan," said Lisa Rich.

Her husband said Sunday's simulated earthquake "is just what the earthquake felt like on Wednesday — I was amazed."

Part of a standing exhibit on earthquake science, the simulator duplicates ground movement during moderate to heavy quakes. A video representation of possible destruction accompanies the movement of the platform, which measures about 18 inches in diameter.

Lynne Nelson, assistant manager for services at the Science Center, said attendance has been up sharply since the earthquake last week. Janet Iggulden, community relations director at the center, said inquiries from schools and teachers also increased after the quake, which registered 4.6 on the Richter scale.

On Sunday, a steady stream of people tried out the simulator to get a feeling for the disaster.

Lisa Anzalone, 13, was there hoping to convince her family that Iben Browning's controversial prediction that a major earthquake may occur along the New Madrid fault on or about Dec. 3 is a matter of serious concern.

She thinks she should stay home in Maryland Heights with her parents, her brother and sister on Dec. 3.

"I would like to know my family's OK," she said.

Her mother, Sandy Anzalone, is a speech pathologist in the Ladue School District. Her mailbox at work seems to carry a daily bulletin on earthquake readiness, she said.

"The students are concerned," she said.

Her husband, Jerry, is also concerned. But he is more worried about public hysteria. He thinks educators and the media have unnecessarily frightened his family.

"I'm sure we'll have an earthquake," he said. "But as far as predicting when — that's absurd."

"This is just terrifying the children, that's all," he said.

But it is not just the children who are frightened.

Adam Collins of Creve Coeur said he was drawn to the Science Center exhibit after "hearing so much" about the threat of an earthquake. He said he is particularly worried about being away on business and finding himself cut off from his wife, Mary.

"Suppose I'm out of town, and the bridges are knocked out. How am I going to get home?"

Mary Collins, a veteran of previous earthquakes, remains more cool than her husband. "Earthquakes don't bother me," she said. "I'm more worried about a tornado."



## Science

# Wake Up, East And Midwest

*The next Big One may not  
 hit California after all*

The sleepy cotton fields around New Madrid, Mo. (pop. 3,400), convey no sense of seismic menace. Yet scientists say the area is potentially one of the most dangerous earthquake zones in the world. Early in the past century an unseen fault, obscured by tons of sediment, unleashed a fearsome trio of tremors—each as powerful, some say, as the earthquake that virtually destroyed San Francisco in 1906. The eyewitness accounts read like the tall tales of Baron Munchhausen. The ground rippled with waves as though it were an ocean. The Mississippi River raged with waterfalls and rapids. Fountains of sand erupted in gritty geysers. Shock waves, pulsing outward for hundreds of miles, wrecked boats in the Charleston, S.C., harbor, cracked masonry in Cincinnati, and caused church bells to peal and buildings to shake as far away as New York City and Boston.

Today the fault at New Madrid remains active, regularly generating small, unnoticeable earthquakes and, from time to time, palpable jolts. Such quakes usually do not stir more than passing interest. But last week residents of southeastern Missouri snapped to attention when a moderate earthquake, rated 4.6 on the Richter scale, rattled windows, spilled coffee and broke ceramic figurines. Reason: the earthquake followed a much publicized prediction that the fault is likely to produce a major shock come Dec. 3, and many people feared last week's tremor could be a precursor. The prediction, which has made its way into several newspapers, was the work of Iben Browning, a New Mexico climate consultant, who based his forecast on an analysis of the gravitational pull of the sun and moon. Many seismologists, wor-

ried that public concern could degenerate into panic, have denounced it as unscientific hocus-pocus. At the same time, they agree that the New Madrid fault, which stretches over 225 km (140 miles), poses serious long-term risks, especially to the nearby cities of Memphis and St. Louis.

California has adopted strict building codes to limit earthquake damage, but no other area is so well prepared. If hit by large shocks, the unreinforced highways and bridges of the Midwest and East could collapse. Solid houses of brick and stone might as well be made of playing cards. "The infrastructure in this part of the country has never been tested by a major quake," says Arch Johnston of the Center for Earthquake Research and Information at Memphis State University. Fortunately, when the earthquakes of 1811 and 1812 occurred, the New Madrid region was too sparsely populated to suffer significant damage or injuries. A modern-day replay, however, would make the quake that shook San Francisco last year seem tame. That tremor measured 7.1 on the Richter scale. In contrast, the big quakes that rumbled forth from New Madrid may have exceeded 8.0, or about 10 times that strong.

Earthquakes frequently occur along the boundaries of continental plates, huge sections of the earth's crust that "float" on a mass of superheated rock. California's San Andreas Fault, for instance, marks the dividing line between the North American and Pacific plates, which are slowly slipping past each other. But the New Madrid fault lies in the middle of the North American plate, seemingly far from harm's way. Why do earthquakes occur in such an out-of-the-way spot? By analyzing seismic data, scientists have concluded that the New Madrid fault is a failed rift, or break, in the North American plate. Had it progressed further, the embryonic gap might have created a body of water like the Red Sea, which is slowly widening into an ocean. But hundreds of millions of years ago, the Midwestern rift stopped growing. The New Madrid fault today simply marks a weak spot in the thick midcontinental crust, which periodically ruptures under the pressure exerted by the migrating North American plate. It could take 500 to 1,000 years for enough force to accumulate to trigger a really big quake.

The area around the New Madrid fault is one of several known earthquake zones east of the Rockies. In 1755 Boston experienced a severe jolt, as did Charleston in 1886. Sooner or later a major quake is going to hit these areas again. And unlike the Western U.S., where hot rock close to the surface provides a squishy, shock-absorbing cushion, the middle of the continental plate is cold, hard and thick. Like their precursors in the past century, the next large quakes to strike in the Midwest or East are likely to resonate far and wide, like giant hammers hitting a huge block of steel.

—By J. Madeleine Nash/Chicago

10-8-90  
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10-12-90

**Memphis Commercial Appeal**Reprinted by permission  
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# Quake drill, fears crack into bigtime network TV news

By Michael Lollar  
The Commercial Appeal

The national airwaves are vibrating with news of a predicted earthquake along the New Madrid fault, including a live NBC *Today* show interview Thursday and network reports on the earthquake drill that ends in Memphis this afternoon.

Dr. Arch Johnston, head of the

Center for Earthquake Research and Information at Memphis State University, was interviewed by Deborah Norville Thursday for the *Today* segment.

And Don Wood, planning officer for the Memphis and Shelby County Emergency Management Agency, said ABC's *Good Morning America* began interviews Wednesday night for a future segment.

"I had a little problem with *Good Morning America*," said Wood. "While conducting an interview with Jeff Crenshaw, the head of this agency, they kept stopping him and telling him his responses weren't what they wanted."

Wood said an ABC producer seemed to focus on the drill as a response to New Mexico climatologist Iben Browning's Dec. 3 earthquake prediction. But planning for the drill began 18 months ago — prior to Browning's prediction — and Wood said Crenshaw repeatedly emphasized the drill is not a knee-jerk reaction.

The *Today* segment focused on anxiety about earthquakes in middle America. Jill Stevens, manager of public education and information for the MSU center, said Johnston described

Browning's predictions as "post-dictions," capitalizing on after-the-fact publicity for broad statements made prior to disasters.

Ms. Stevens said ABC's *World News Tonight* is planning a later segment to include an interview with Johnston, and the PBS series *NOVA* will air a segment this winter on risks along the New Madrid fault zone.

Wood said *Good Morning America's* segment will air next week as part of a series on the anniversary of last year's San Francisco earthquake.

He said a Cable News Network crew was supposed to arrive Thursday to do a segment on the quake zone, including Memphis. And CONUS, a satellite news network with 100 affiliates, sent a news team from an Oklahoma affiliate to cover the drill.

10-14-90

**Southeast Missourian  
(Cape Girardeau, Mo.)**

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# Quakes pack power of planet

By David Hente  
Staff Writer

*First in a series*  
CAPE GIRARDEAU — When it comes to natural occurrences, earthquakes bring with them all the power of the planet.

Earthquakes are caused by the abrupt release of stored energy within the earth's crust. They occur with the sudden release of that energy, just as the energy of a stretched rubber band is released when the band breaks.

Seismologists, scientists who study earthquakes, point out the earth is not solid, but made up of eight major plates and numerous smaller ones that float on a core of molten liquid deep beneath the surface of the planet.

Where one of these plates collides, or rubs against another, or where they slide past each other, there is either volcanic activity and



earthquakes, or in some cases, such as the Mt. Helen's eruption, both.

Scientists say this is a natural process of the earth renewing itself. As new crust is formed, the old crust is thrust back into the molten mantle and remelted. This cycle takes place

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over a long time span.

For example, in California, the Pacific Plate is sliding ever so slowly past the North American Plate. Where the two plates slide past each other is the San Andreas Fault.

Other active fault or seismic zones are located along the Japanese islands, the Southwest Pacific island chain, north of Australia, and the eastern Mediterranean area, including Greece, Turkey, and Afghanistan.

Some earthquakes occur where the earth's plates are spreading apart, or rifting. That allows molten magma to create new surfaces on undersea mountain ranges.

For many years, scientists were puzzled as to origin of seismic activity in the New Madrid Seismic Zone, since it is located far from any colliding or abrasive plates.

See QUAKE

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## Southeast Missourian (Continued)

# Quake

From Page 1

The most powerful series of earthquakes ever recorded on the North American continent occurred during the winter of 1811-12 in the vicinity of the tiny Missouri community of New Madrid.

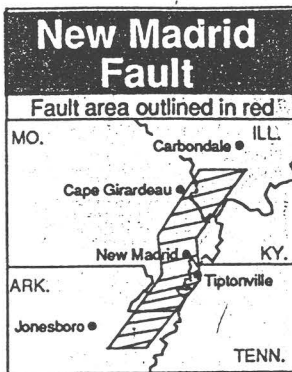
Since that time, a large area of the middle United States, stretching from southern Arkansas and Mississippi to the Great Lakes and eastward to the Appalachian Mountains, has been rocked on occasion by earthquakes originating from the New Madrid Seismic Zone.

Today, seismologists believe they have their answer. The New Madrid Fault Zone is directly over an ancient rift that began to form in the earth's crust. But the rift failed to split, reversed direction, and partially closed.

As time passed, the failed rift filled with sedimentary rock and soil so that the rift and the associated faults are buried deep below the earth's surface.

Today, the rift, which is located above the earth's lower crust, is under great stress as it is being pushed together both from the east and west. Earthquakes that originate about 25 miles beneath the earth's surface, in Southeast Missouri and Northeast Arkansas, are adjustments to these stresses.

According to Dr. David Stewart, director of the Southeast Missouri State University Center for Earthquake Studies, the New Madrid Seismic Zone extends 120 miles southward from the area of Charleston, Mo., and Cairo, Ill., through New Madrid and



Caruthersville, following Interstate 55 to Blytheville, and on down to Marked Tree, Ark. It is about 70 miles wide, and crosses five state lines. It cuts across the Mississippi River in three places, and the Ohio River in two places.

More than 200 earthquakes are measured each year along and near the fault zone, or about 20 a month. Only a few reach the level that can be felt.

However, seismologists have warned for the past decade that there is now a 50 percent chance of a 6.3 magnitude earthquake occurring along the New Madrid Seismic Zone before the end of this century.

This warning was made long before Dr. Iben Browning said there was a 50 percent probability of a 7.0 or greater magnitude somewhere in the New Madrid Seismic Zone this December.

The energy released from a 6.3

New Madrid earthquake would equal to two Hiroshima-type atomic bombs, while the energy released from a 7.0 magnitude quake would equal a one mega-ton hydrogen bomb, according to Dr. Stewart.

Because of different geologic characteristics, seismologists say earthquakes originating in the New Madrid Seismic Zone can inflict much more damage over a greater area than earthquakes of the same magnitude that occur on the West Coast.

For example, a 6.7 magnitude quake in the Los Angeles area would be felt only in the Southern California area. If that same quake occurred in the New Madrid Seismic Zone, its effects would be felt through much of the Lower and Upper Mississippi River Valley, and the entire Ohio River Valley.

Scientists say the reason for the differences in intensities is that the complex and fractured rock of the west coast tends to dampen the seismic shock waves as they travel from the epicenter. That reduces the area of damage for an earthquake of a given magnitude.

But in the New Madrid Seismic Zone, the uniform crust of the mid-continent and the texture of soil in the Ohio and Mississippi River valleys, allows the shock waves of even moderate earthquakes to travel far from epicenter.

The San Andreas Fault is located much closer to the earth's surface, and can actually be seen on the surface in some locations. But the New Madrid Fault is buried under billions of tons of rock and soil. Energy from a New Madrid quake travels much farther as a result.

There is another reason why New

Madrid Seismic Zone earthquakes are much more dangerous than those on the west coast. Stewart, and other scientists explain that much of the Missouri Bootheel, and that of Northeast Arkansas, and parts of Southern Illinois, West Kentucky and Tennessee, have wet, sandy soils.

During an earthquake, this type of loose soil and water would combine during the process of liquefaction. Instead of remaining in solid form, the soil takes on the consistency of quicksand, unable to support major buildings or structures.

Large sand blows that came from the 1811-12 earthquakes can still be seen on the surface in many parts of the Bootheel.

The sandy soil in the New Madrid Seismic Zone is also prone to ground subsidence during a major earthquake. The effect is much like cereal in a box when it is shaken.

Because of the potential for widespread damage and disruption of everyday life in the event of a 6.5 magnitude, or greater, earthquake in the New Madrid Seismic Zone, scientists urge that preparations be made. These include:

- Public awareness and education.
- Mitigation efforts to reduce the extent of physical damage and casualties.
- Planning for response and recovery following a major earthquake.
- And, training and exercises to prepare for an earthquake; or other major disaster.

In Monday's edition: A look at the earthquake prediction that got the region concerned.

## Getting prepared: Store 72 hours worth of food

By Dr. David Stewart

Some common questions and concerns directed to the Center for Earthquake Studies at Southeast Missouri State University involve a basic element needed for survival following a disaster, food.

I recommend putting together a 72-hour food supply for you and your family. You will need to stock two servings of meat, two servings of milk, two servings of fruit and vegetables and four servings of breads and cereals per family member per day. For each teenager, add eight extra servings of milk foods for the time period and four extra milk servings for each child.

You should plan on preparing at least the first two meals without using heat and select foods requiring little or no water. Select foods with high nutritional value that are easy to store. Foods that will keep for six months or

more are best.

Be sure to include a selection of foods that you will enjoy eating cold, because it may not be possible to cook for several days. In addition, don't load up on salty foods which will increase your thirst, because water might be in short supply.

Some examples of foods suitable for storing include canned fruits and vegetables, powdered milk, beef jerky, crackers, canned meats and fish, dried fruits, peanut butter, instant oatmeal, pasta, dry beans and instant orange drink.

Foods that will store for up to two years include pasta, rice, uncooked cereal, sugar and salt. Examples of foods suitable for storing up to a year include canned meat, fish and condensed soups, canned fruits, instant potatoes, dry beans, instant coffee and tea, flour, pudding mixes and hard candy. Those foods that need to be replaced after six months include

evaporated and dry milk; instant breakfast drinks and bars, pancake mix and rice mixes.

Non-food items that should be stored with your food supply include a method of cooking such as a Sterno stove, a large empty coffee can for use as a cooking container, a smaller can for mixing foods, a spoon and matches in a water proof container. You should also store a manual can opener, sharp knife, aluminum foil, pre-moistened towelettes, paper plates and cups, plastic flatware, liquid soap and vitamins.

Dr. David Stewart is the director of the Center of Earthquake Studies at Southeast Missouri State University. This column is one in a series dealing with specific concerns in preparing for a major earthquake in this region.

10-15-90

**Memphis Commercial Appeal--Editorial**

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# Quake date/

## Prediction may serve good purpose

SOME may disagree, but Dr. Iben Browning appears to have done a lot of people a lot of good.

OK, so the controversial climatologist may have shaken a few folks a little too hard with his prediction of a major earthquake in the New Madrid fault zone on or within a couple of days of Dec. 3.

There has been some overreaction, but no one has been hurt, really, and many may benefit in the long run.

What has been called a senseless scare at least seems to have stimulated residents in and near the fault area — including Memphians — to prepare for a major quake, whenever it comes.

"I don't care what motivates them, as long as they stay prepared," Jeff Crenshaw, director of the Emergency Management Agency at Memphis, told The Commercial Appeal during preparation of a recent series on the quake date issue.

And earthquake experts who roll their eyes in exasperation at

Dr. Browning's attempt to pinpoint an exact date agree that a major New Madrid temblor is possible in the lifetime of many who read these words.

Dr. Arch Johnston, director of the Center for Earthquake Research and Information at Memphis State University, has forecast a 40-63 percent chance of a quake measuring 6 or greater on the Richter scale in the New Madrid fault zone in the next 15 years, and an 86-97 percent chance within 50 years.

The odds of a Richter plus-7 on Dec. 3? Fifty-fifty, says Browning. One in 60,000, counters Johnston.

Folks who don't need much excuse for a party anyway certainly are having a ball with the prediction. Earthquake events are the rage, and people are plunking down cold cash for T-shirts declaring whether they're leaving or staying on Dec. 3.

Other businesses are booming, including those that sell camping and emergency supplies — which

merely shows that Browning has influenced people to do what they should have been doing in the first place — making sensible preparations for a possible emergency.

One may reasonably question why some school boards felt obliged to suspend classes on Dec. 3, or why nervous nellys actually plan to take off for distant parts prior to the shake date.

Clear-thinkers, meanwhile, are turning the prediction into something positive. School teachers, taking advantage of the sudden interest in earthquakes, are showing pupils what causes quakes and how to prepare for them without panic. Homeowners are learning how to cut off utilities in an emergency, and public officials are dusting off and testing emergency plans.

BROWNING bases his prediction on high tidal forces, which he says will be much greater than usual around Dec. 3 because a full moon will occur shortly after that orb makes its closest pass to Earth, and because this will occur only a month after Earth's closest pass to the sun, and two months after an eclipse alignment.

Many scientists remain unconvinced that tidal forces are a significant factor in the occurrence of earthquakes. They also worry that if nothing happens Dec. 3, the public won't take future warnings seriously.

"Scientific credibility is a very fragile thing," Johnston said.

Let us hope that neither Johnston's fears, nor Browning's New Madrid predictions, come to pass.

10-15-90

**Southeast Missourian  
(Cape Girardeau, Mo.)**

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# Forecast stirs doubts

*The Southeast Missourian continues publication today of a series of articles about earthquakes and efforts being made to prepare for the effects of a quake in this region. This series is intended to be a factual accounting of what is known about earthquakes and the New Madrid Fault, which runs through the region and holds the potential for a major quake. It is also intended to offer readers tips on quake preparation.*

By Jay Eastlick  
Staff Writer

*Second in a series*

CAPE GIRARDEAU — Joe was stepping out of the shower when his house began to shake. It started as a mild rattling, but within seconds the shaking grew violent.

As he stepped beneath the frame of the bathroom doorway, Joe hoped his wife and two small children, who were downstairs eating pancakes and sweet rolls, were alright.

After about 35 seconds, the shaking stopped, but Joe's heart was still pounding as he called to his wife. He rushed downstairs to find his family frightened but safe.

They had crawled under the heavy kitchen table, which was littered with several porcelain nick-knacks that fell from a shelf on the wall. Several books also had fallen to the living room



floor, but the heavy oak bookcase remained upright. The metal bracing Joe used to secure the bookcase to the wall had withstood the shaking.

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## Southeast Missourian (Continued)

## Quake

From Page 1

The electricity wasn't working, but Joe tested the faucet to find there was running water. There were plenty of batteries and flashlights in the survival kit he packed only weeks earlier.

The house was a bit of a mess, but his family had survived the earthquake they had anticipated fearfully for months.

Earthquake scientists along the New Madrid seismic zone are hoping that hypothetical scenario is closer to reality than the distress created since a nationally acclaimed climatologist projected that a large earthquake would strike the New Madrid Fault Dec. 3.

Climatologist Iben Browning, 72, of Sandia Park, N.M., also is a consultant to businesses and the military. He achieved national recognition last October when he accurately predicted last year's San Francisco-area earthquake.

At the time he predicted the California quake, Browning said a major quake along the New Madrid Fault was possible during the first week in December. He said there is a 50-percent probability of a quake measuring 7.0 or greater on the Richter Scale occurring along the fault.

But scientists and earthquake researchers have downplayed the prediction, saying Browning's prediction methods are unscientific at best.

Harvey Ryland, the executive director of the Central U.S. Earthquake Consortium in Memphis, Tenn., said residents along the New Madrid Fault should be prepared for the possibility of an earthquake at any time, without regard to the Dec. 3 forecast by Browning.

"We do not support his prediction," Ryland said. "We accept the opinions of the earthquake scientists that say an earthquake won't occur on that day any more than it would on any other day."

"People should get ready as rapidly as possible; not because of the prediction, but because we should be ready for one every day."

Dr. David Stewart, director of the Center for Earthquake Studies at Southeast Missouri State University, last month explained Browning's methods for predicting quakes at a Geo-Science Society symposium at the university.

Stewart said Browning's method cannot be proved through scientific methods, but the methods can't be disproved either.

Stewart said Browning based his projection on the alignment of the sun, Earth and moon on Dec. 3, which will produce an unusually strong gravitational pull on Earth's crust.

According to Browning's theory, when such conditions are present, there is a greater probability that an earthquake will be triggered on existing faults.

Browning has said the greatest likelihood for an earthquake Dec. 3 is along the New Madrid Fault or a fault system in Tokyo, Japan.

But Klaus Jacob, senior research scientist at Lamont-Doherty Geological Observatory of Columbia University in Palisades, N.Y., said Browning's methods are flawed. He called Browning's prediction of last year's California quake "lucky."

Arch Johnston, director of the Center for Earthquake Research and Information at Memphis State University in Tennessee, has said Browning's predictions aren't "scientifically justified."

## During an Earthquake

- If you are indoors:** Stay there. Get under a sturdy table or desk or brace yourself in a doorway or corner. Move to an inside hallway when possible. Stay clear of windows, bookcases, china cabinets, heavy mirrors, hanging plants and other heavy objects.
- If you are outside:** Move to an open area away from power lines, power poles, trees, walls and chimneys.
- On a sidewalk near a building:** Duck into a doorway to protect yourself from falling bricks, glass, plaster and other debris.
- In a crowded store:** or other public place, do not rush for exits. Move away from display shelves containing objects that may fall.
- In your car:** Pull to the side of the road and stop. Do not park under bridges or overpasses or overhead wires. Stay in your car until the shaking stops. Stay in your car if electrical wires have fallen across your vehicle. Do not attempt to cross bridges or overpasses that may have been damaged.

Johnston said the tidal forces Browning bases his methodology on have been examined thoroughly by seismologists and that there's no evidence the tidal forces can trigger earthquakes.

Douglas Wiens, a professor of earth and planetary sciences at Washington University in St. Louis, has studied earthquakes worldwide. He called Browning's prediction "ridiculous and unscientific."

Wiens said years of research by earthquake experts show that quakes occur just as often when tidal forces are low as when they are high. He said tidal forces exert much less force on faults than do other forces like changes in the water table following heavy rainfall.

Wiens also said there is very little documented evidence of Browning's accuracy in past predictions.

"The near-hysteria that has developed over such a groundless prediction is startling to those of us who study earthquakes daily," Wiens wrote in a recent newspaper column.

Ryland said that earthquake experts do expect a major earthquake along the New Madrid fault within the next 50 years. He said scientists at Memphis State University have said there's a 50-percent chance of a 6.0-7.0-magnitude earthquake on the fault within 10-15 years, and a 90-percent chance of such a quake within 50 years.

But Ryland said it's impossible to determine a specific day such a quake likely will occur.

Despite the skepticism, Stewart — perhaps the only national earthquake expert to actually interview Browning about his predictions — said the climatologist's track record speaks for itself.

"His forecasts have been found highly reliable in many areas," Stewart said.

He said Browning apparently has accurately predicted not only last year's San Francisco quake, but also the 1980 Mount St. Helens eruption. He also reportedly picked the dates in 1985 when the Mexico City earthquake and the Novado del Ruiz volcano eruption in Colombia occurred, Stewart said.

"These, plus his 1971 prediction of the San Fernando earthquake 24 hours ahead of time, indicate that what Dr. Browning is doing cannot be explained merely by chance," said Stewart. "Although his accuracy is not 100 percent, his methodology does seem to be promising and worthy of serious consideration."

But Stewart said residents along the New Madrid Fault shouldn't prepare for a Dec. 3 earthquake only to become apathetic if the date passes without event.

"The important thing is to realize that destructive earthquakes will happen from time to time in the New Madrid fault," Stewart said. "Whether or not such an event occurs on or about Dec. 3, 1990, has nothing to do with the necessity for the central U.S. to prepare for such an eventuality."

(Some information for this story was provided by the Associated Press.)

10-15-90

## Southeast Missourian (Cape Girardeau, Mo.)

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### *Prediction leads to preparedness, great discomfort*

By Jay Eastlick  
Staff Writer

CAPE GIRARDEAU — Earthquake experts say a New Mexico climatologist's prediction that a major earthquake will occur along the New Madrid fault in early December presents an interesting paradox.

On one hand, the prediction has piqued interest in earthquake preparedness, but it also has resulted in growing discomfort as school districts, government offices and businesses plan to shut down on the day of the supposed quake.

Iben Browning's prediction of a 50-percent probability for an earthquake measuring 7.0 or greater Dec. 3 along the fault has been discounted by experts, but people living near the fault aren't taking any chances.

Residents are stocking up on survival items such as bottled water, canned goods, and first-aid kits to prepare for the quake. But earthquake experts say they fear interest in earthquake preparedness will wane if the Dec. 3 date passes without an event.

Harvey Ryland, executive director of the Central U.S. Earthquake Consortium in Memphis, Tenn., said earthquake prepared-

ness must not hinge on whether Browning turns out to be prophetic.

"We stress public awareness, education and preparation for responding to an earthquake," Ryland said. "We do not encourage any kind of panic or stress over this situation.

"While we cannot predict when and where and how large an earthquake can be, the good news is, the individual can make a very large impact on protecting his home and family against losses from such an event."

Ryland said earthquake experts at Memphis State have said there's a 50-percent chance of a 6.0-7.0-magnitude earthquake on the New Madrid Fault within the next 10-15 years, and a 90-percent chance of such a quake in the next 50 years.

But Ryland said it's impossible to determine a specific day such a quake likely will occur.

The most severe sequence of earthquakes in the history of the U.S. occurred along the New Madrid Fault during the winter of 1811-12. The area has continued to have earthquakes since then, but none have been as strong as the three main 1811-12 shocks, which were followed by aftershocks for several years.

The last earthquake large enough to cause extensive building damage and ground liquefactions along the fault was in Charleston in 1895, with an estimated magnitude of 6.2.

Scientists say earthquakes with magnitudes of the one in 1895 occur every 90-100 years in the New Madrid seismic zone.

If a 6.0 or greater magnitude earthquake were to occur now, scientists predict there

would be moderate building damage, injuries, cracked oil and gas pipelines and downed power lines.

The quake also could cause geologic effects, such as widespread ground liquefaction and cracking, minor flooding, debris flows and landslides.

Ryland said several easy and inexpensive measures can be taken to help prevent injuries and property damage in the event of a quake. He said people should:

— Educate themselves about earthquakes and how to respond during a quake.

— Take mitigation measures in their homes to help prevent injuries and property damage, particularly from falling items.

He said securely attaching heavy bookcases and furniture to walls, securing hanging plants and lamps so they're unable to swing free of hooks, moving beds away from windows, and latching cabinets so that doors won't swing open, will help minimize possible injuries and property damage in an earthquake.

— Develop emergency plans for their families so that everyone knows what to do during and after a quake. Also, families should conduct home earthquake drills to assure that everyone knows the emergency plan.

— Prepare a survival kit to include food, water, first-aid supplies, flashlights, batteries, a portable radio and tools.

"If people do these things they can really have an impact on reducing losses," Ryland said.

**In Tuesday's edition: Public utilities get ready for a potential earthquake.**

10-17-90

## Southeast Missourian

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# Schools get prepared

*The Southeast Missourian continues publication today of a series of articles about earthquakes and efforts being made to prepare for the effects of a quake in this region. This series is intended to be a factual accounting of what is known about earthquakes and the New Madrid Fault, which runs through the region and holds the potential for a major quake. It is also intended to offer readers tips on quake preparation.*

By Mark Bliss  
Staff Writer

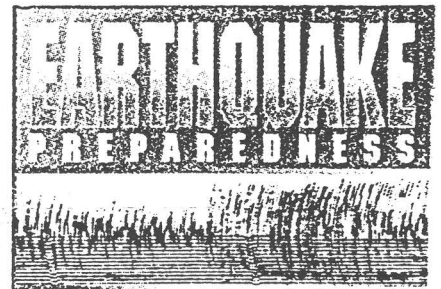
### *Fourth in a series*

CAPE GIRARDEAU — Earthquake drills and evacuation plans have taken hold at area schools as teachers, staff and students prepare for the possibility of a major quake.

Schools not only are spending countless hours planning for such a disaster; they're spending money on emergency supplies such as first-aid kits.

"Right now we want to teach people to duck, cover and hold on," said Dr. Arthur Turner, Cape Girardeau public schools superintendent.

Students in public schools here and in other area schools are being taught to duck under a desk or other sturdy object in the event of an earthquake. Once the shaking has stopped, students would be evacuated to open areas.



Fred Jones, administrative assistant for the Jackson R-2 School District, said, "All of our buildings have designated assembly areas,

See **SCHOOLS**

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## Southeast Missourian (Continued)

## Schools

From Page 1

which are away from overhead transmission lines, utility poles and things of this sort."

In early October the Jackson school district held earthquake drills. Additional drills are planned for the week of Nov. 26-30.

In the recent exercise, the five buildings that comprise the Jackson High School complex were evacuated within one minute and 21 seconds, said Jackson Fire Chief Gary Niswonger.

"Every school we have in Jackson was evacuated in less than a minute and a half," he said.

Notre Dame High School in Cape Girardeau has also held earthquake drills.

"We have had earthquake drills and we will continue to have them on a periodic basis throughout the school year," said Sister Mary Ann Fischer, principal of the Catholic high school.

At Southeast Missouri State University, Public Safety Director Doug Richards and a safety committee have put together an emergency plan that calls for spending about \$45,000 this fall on a variety of items from portable generators and walkie-talkies to flashlights and first-aid kits.

Emergency preparedness activities have been spurred by a prediction by climatologist Iben Browning that there is a 50-percent probability of a quake measuring 7.0 or greater on the Richter Scale occurring along the New Madrid Fault Zone Dec. 3. In addition, a 4.6-magnitude quake on Sept. 26, which shook the entire region, has put an increased emphasis on emergency planning efforts.

At the university, the shopping list for emergency supplies includes: two portable generators, 2,000 copies of the university's emergency plan, 24 walkie-talkies, three portable base radios, six emergency stand-up lights, 80 flashlights, 400 batteries, 10 portable public address systems, four cellular telephones, 30 first-aid kits, and a portable communications tower.

In the event of a major earthquake, an emergency operations center (EOC) would be set up at the public safety office, Richards said.

The university's EOC would serve as a primary communications link with Dr. David Stewart, director of the Center for Earthquake Studies at Southeast Missouri State. It would also provide a means of communicating to other agencies through the Missouri law enforcement and national law enforcement computer systems, Richards said.

"One of our first concerns would be the ongoing safety of people on campus," he said.

Plans are being made to hold emergency evacuation drills at campus buildings within the next few weeks.

If an earthquake occurs, and buildings are subsequently evacuated, Physical Plant Director Vince Seyer and his crews will then evaluate buildings to determine if the structures are safe to re-enter.

If a dormitory were damaged and had to be

temporarily closed, students could be housed in the Show Me Center, Richards said. He said the Show Me Center is one of several campus buildings that are seismically designed to prevent them from collapsing in the event of an earthquake. The others are the Towers dormitory complex and the Rhodes Hall of Science.

At the city's public schools, students would be evacuated under the direction of teachers or other staff members, Turner said. The students would be evacuated to such open areas as playgrounds, and in the case of the high school, the football field.

Groups of students will be assigned to specific areas at evacuation sites. "They've got to go to an assigned place so we know where to locate them," explained Turner.

Immediately after a quake, it would be up to building principals to determine if it is safe to go back inside the schools, he said. "The most likely thing is, we will go back into school," said Turner.

He said: "One of the things we are doing is trying to work out effective alternative communication. We already have radio contact with each of our elementary schools." Plans are being made to expand the radio communication system to the high school.

The Cape Girardeau and Jackson public schools and Notre Dame High School have undertaken a number of activities designed to make the schools safer in the event of an earthquake.

Primarily, those activities have involved anchoring such things as book shelves, file cabinets and water heaters, and securely storing chemicals.

City public school officials have ordered a protective film that will be installed on the inside of school windows in an effort to prevent injuries from shattered glass during an earthquake.

"We're going to start with places where we have big window walls," said Turner. Such schools include Alma Schrader and Jefferson.

"We're also buying some emergency supplies to store such as food, water, first-aid materials and protective blankets."

Turner estimated the district will spend from \$35,000 to \$50,000 to prepare for an earthquake disaster.

First-aid and CPR training will be offered to teachers and district staff members early next month. "We anticipate that we will have individuals in every school who will be capable of doing first-aid kinds of activities."

In the case of a disastrous earthquake, Turner said, the school district would make use of vocational-technical school personnel who have training in practical nursing and respiratory therapy.

Within the next five to seven years, the superintendent said, the school district needs to look

at new school buildings or making modifications to existing schools to make them more earthquake-proof.

The bottom line in any emergency preparedness plan is to react calmly. "We will all be better off if we face things calmly and rationally," said Turner.

Of the Jackson schools, Jones said, "Each one of our buildings has been assessed for seismic hazards by a building committee and each room has been checked by individual teachers."

Steps have been taken to anchor items.

The school district has developed an earthquake response plan, which outlines the emergency actions that would be taken by all school district employees.

"You never can be complacent about safety of students, and you try to plan for as many possible emergency situations as possible," said Jones. "Sometimes it boils down to common sense and dealing with what happens instead of worrying about everything that could possibly happen."

Cape Girardeau public schools and many other area schools have canceled classes for Dec. 3 and 4 as a safety precaution against the possibility of a major earthquake at that time. Other schools, including Notre Dame and Jackson, have yet to make a decision about whether to cancel classes.

Fischer, the Notre Dame principal, said the high school staff would like to see classes held as usual those days. Fischer said it would be better for the students to be at school and under adult supervision in the event an earthquake would occur.

She said the high school staff has been instructed on how to evacuate the building and first-aid kits have been installed in strategic places throughout the Catholic high school and in the garage of the nearby convent. She said Notre Dame students have been taught about earthquakes and how to react in the event of one.

Fischer said it's important to hold earthquake drills throughout the school year and not just gear such exercises to the possibility of a quake on Dec. 3. "We know that scientifically we could have a major earthquake at any time and that we have 200 quakes every year that we don't even feel," she said.

Said Fischer, "Our thinking here is if we conduct these earthquake drills on a periodic basis, this will have a calming influence on our students when and if a major quake occurs."

She said, "We're dealing with high school students who have the capability of understanding the scientific facts surrounding earthquakes, and I think that minimizes some of the trauma."

**In Thursday's edition: Emergency agencies have response plans in place in the event of a major earthquake.**

10-17-90

## Southeast Missourian (Cape Girardeau, Mo.)

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# Rescue training, quake drills help in preparedness

By Mark Bliss  
Staff Writer

CAPE GIRARDEAU — Jim Lawrence expects to be dealing with some 200 "victims" on Nov. 20.

Lawrence is a training specialist with the Missouri Department of Health, Bureau of Emergency Medical Services office in Jackson.

The mock victims will be part of a "multiple casualty" field exercise for emergency medical technicians, nursing and public health personnel, firefighters, coroners and medical examiners from a six-state area.

With rescue training and mock disaster drills this fall, area firefighters, hospital employees and other emergency personnel are preparing for the possibility of a major earthquake occurring along the New Madrid Fault.

Lawrence said about 500 participants are expected to attend the two-day training session, which will be held at Southeast Missouri State University Nov. 19-20.

The emergency medical services bureau is helping to sponsor the training session.

The first day will involve lectures, with the mock disaster to follow on the second day at the university's intramural and soccer field at Sprigg and Bertling, Lawrence said.

Treatment of the "injured" will involve setting up a field hospital. "We're looking at a real large exercise," said Lawrence.

More than 100 firefighters have registered for a regional fire school which will be held Oct. 27-28 in Jackson. Some of the firefighters will be participating in a field exercise designed to show them how to rescue people from collapsed buildings, said Jackson Fire Chief Gary Niswonger.

In addition, he said, an earthquake preparedness seminar for firefighters is scheduled for Nov. 16-18 at the Drury Lodge in Cape Girardeau.

That seminar will feature fire chiefs from a number of California communities that experienced a major earthquake last October.

Both the cities of Cape Girardeau and Jackson, Southeast Missouri Hospital and St. Francis Medical Center have disaster plans.

In the event of an earthquake, command posts would be set up at the No. 1 fire station in Cape Girardeau and at the police and fire complex in Jackson.

### Car Mini-Survival Kit

- Non-perishable food: Store in clean coffee cans
- Bottled water
- First aid kit and book
- Flares
- Fire extinguisher - A-B-C type
- Blanket or sleeping bags
- Sealable plastic bags
- Flashlight - Spare batteries and bulb
- Essential medication
- Tools - screwdriver, pliers
- Short rubber hose for siphoning
- Small package of tissues
- Pre-moistened towelettes
- Local maps
- Extra clothes, jeans, sweater
- Sturdy shoes or boots

SOURCE: American Red Cross

Jackson's police and fire complex has an emergency generator, which would be critical for powering lights and communication equipment in the event of a power outage, said Niswonger. The fire chief serves as Jackson's emergency preparedness director.

In Cape Girardeau, both the main fire station and the police station have generators for emergency power and the other fire stations and other city buildings could utilize portable generators.

The city now has three portable generators, said Mark Hasheider, of the Cape Girardeau Fire Department. Hasheider is the emergency operations coordinator for the city.

St. Francis and Southeast both have emergency generators so they could continue to function if Union Electric utilities were shut down.

"We are an island unto ourself," said Southeast Hospital Administrator O.D. Niswonger. "We have our own emergency power, about a week of medical supplies, and about a week's food supply generally.

"And so we can hold things together pretty well without any outside assistance for about a week perhaps," said Niswonger.

St. Francis has a diesel-fuel-powered emergency generator system. The hospital keeps about 25,000 gallons of fuel on hand, enough to keep the hospital operating for about a week, said Rick Essner, director of environmental engineering for the medical center and chairman of its fire safety and disaster committee.

Essner said St. Francis routinely tests its backup power system.

Unlike schools, Cape's hospitals would not evacuate patients and staff unless the facilities were seriously damaged.

"It's a lot easier to evacuate schools than patients," said Jeannie Fadler, patient care department director at St. Francis and head of its disaster subcommittee.

Both hospitals hold disaster drills on a regular basis.

Southeast went through an earthquake drill last spring, with hospital personnel treating mock patients.

St. Francis is planning to hold an earthquake drill next month. Normally, such drills are not announced in advance to hospital employees.

But this time, because of all the public concern about a possible earthquake, advance notice will be given of the drill, Fadler said.

If a major earthquake occurs, both hospitals would determine which patients they could discharge to make room for quake victims.

If necessary, some patients would be sent to hospitals in St. Louis and Memphis, local hospital officials said.

Local emergency operations centers, as well as the county EOC, headquartered in Jackson, and the state's Emergency Management Agency would be involved in coordinating emergency responses.

"Missouri has an earthquake preparedness and safety program," said Dennis Mobrce, of the Emergency Management Agency in Jefferson City.

He said the program's cornerstones are earthquake response training, reducing possible hazards, public awareness and education.

Mobrce said there is a state earthquake response plan, which involves a number of state agencies, such as the Highway Patrol and the Missouri Highway and Transportation Department.

But, he said, it could take up to three days after a major earthquake before outside help might be available to communities.

"Depending on the condition of the roads, airports and so on," said Mobrce, "there is a thumbnail rule that communities should expect to be on their own for up to 72 hours."

The cities of Cape Girardeau and Jackson both have plans to assess damage to municipal buildings in the event of a major earthquake.

In Jackson, the assessment would be done by a team of city officials, while in Cape Girardeau the task would fall mainly on the shoulders of the building inspectors.

In the event of a major earthquake, city water lines might be damaged and unusable for fighting fires.

In that case, Niswonger said, the fire department could pump water from two creeks which run through Jackson.



10-19-90

St. Louis Post-Dispatch

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## Scientists Rip Record Of Earthquake Predictor

By William Allen  
Of the Post-Dispatch Staff

A national panel of earthquake experts ripped on Thursday the track record of Iben Browning, the New Mexico climatologist who predicted a greatly increased chance of a quake around Dec. 3 in the New Madrid fault.

The National Earthquake Prediction Evaluation Council found no evidence that Browning actually predicted last October's Loma Prieta earthquake in the San Francisco area, as he and his backers have claimed. Nor has he successfully predicted other earthquakes and volcanic eruptions, the panel said.

Those conclusions were among several that cast doubt on Browning's credibility. He has forecast a 50-50 chance of a quake in the New Madrid fault within 48 hours of Dec. 3.

Browning's method of predicting what he calls "dates of maximum danger" due to high tidal forces is no more effective than random guessing, the panel concluded.

"You could select the dates by throwing darts at a calendar, and you would do as well as Doctor Browning has done," said panel member Duncan Agnew. Agnew is a professor of geophysics at the University of California at San Diego.

The scientists released their report at a news conference at the Airport Hilton in Woodson Terrace.

Robert Wesson, who interviewed Browning at length by telephone, said the panel had found "no scientific basis for Doctor Browning's prediction" and that it was "a disservice" to citizens of the central United States, where a major New Madrid quake would be felt.

Wesson is the U.S. Geological Survey's chief earthquake scientist.

Agnew said the national panel "could see no basis for the selection of the New Madrid seismic zone as an area particularly ripe for failure."

Although they blasted the Dec. 3 prediction, the scientists stressed the need to continue general preparations for a quake in the area of the New Madrid fault.

Browning was unavailable for comment. Reached by phone in Sandia Park, N.M., his wife, Florence Browning, said: "As of five weeks ago, he isn't giving interviews anymore." Browning is in ill health.

The report was prepared by a working group of 11 experts on various aspects of earthquakes, including the influence of tidal forces. The group



Wesson

invited Browning to submit information about his method and record.

The council is an advisory group to the U.S. Geological Survey. It studied Browning's prediction at the request of the Central United States Earthquake Consortium, a group of emergency management officials.

The issue of Browning's track record is important because it has played a major role in the credibility of his Dec. 3 forecast with the public, the scientists said.

The panel's report says that what was alleged to be Browning's predic-

tion of the Oct. 17, 1989, California quake actually made no mention of a quake occurring anywhere in that state, much less in the San Andreas fault, where it erupted. Some businessmen who attended a talk by Browning a week before the quake had said they heard him predict it.

But according to a transcript of Browning's talk obtained by the scientists, he had said only: "There will probably be several earthquakes around the world, Richter 6-plus, and there may be a volcano or two" around Oct. 16.

The national council's report concludes that because Browning "did not specify any location or a magnitude, he can hardly be given credit for a successful prediction."

An average of 110 quakes a year worldwide have registered 6.0 or greater, so "the likelihood of such an earthquake occurring within a three-day window is therefore very high," the report says.

The foundation of Browning's method is his projection of a band of latitude around the globe where the tidal pull of the moon and sun will peak at



Iben Browning  
Quake forecast challenged

certain times. He has picked Dec. 3 as a time when tidal forces will be at their highest in 27 years.

In addition to the New Madrid fault, Browning has made predictions for that date for a similar quake in the Hayward Fault in northern California and a fault near Tokyo, Japan.

10-19-90

Southeast Missourian  
(Cape Girardeau, Mo.)

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## Scientists rebuff prediction

By Jim Grebing  
and David Hente  
Staff Writers

ST. LOUIS — An ad hoc group of earthquake experts from around the nation has concluded there is no scientific basis for a forecast of a major earthquake along the New Madrid Fault around Dec. 3.

The 11-member group was appointed by the United States Geological Survey to specifically review the validity of a prediction by Dr. Iben Browning that there was a 50 percent chance that tidal forces could trigger a magnitude 6.5 to 7.5 earthquake in the region in early December.

"There is no scientific basis for Dr. Browning's prediction and furthermore this prediction is a disservice to long-term efforts to address the very real earthquake hazard present in the United States," said Dr. Robert L. Wesson, of

Reston, Va., chief of the Office of Earthquakes, Volcanoes and Engineering for the U.S. Geological Survey.

Details of the report were released Thursday morning at a press conference at the St. Louis Airport Hilton Hotel.

Wesson noted that the group had talked with Dr. Browning and reviewed the methodology he used to make the forecast, but could find no basis to justify it.

Dr. Duncan Agnew, a professor at the University of California at San Diego and a member of the group that drafted the report, said they could find no basis for Browning's contention that there is a correlation between high tides and the occurrence of earthquakes.

He added that there is no basis for selecting the New Madrid Fault as ripe for failure on the dates in December.

Browning, a New Mexico climatologist and business consultant, has caused concern and

## 10-19-90 Southeast Missourian (Continued)

some panic in the seven states along the New Madrid Fault with his prediction. The forecast has made earthquake preparedness a major issue and has caused many schools to cancel classes on Dec. 3 and 4, including the Cape Girardeau Public Schools.

What has made Browning's forecast even more believable for many people is that he is credited with having predicted several other earthquakes and volcanic eruptions within one or two days.

However, Agnew explained the working group reviewed those claims and found that Browning had not predicted specifically where earthquakes would occur, only that one would occur within a certain time period.

Agnew noted that there is an earthquake of 6.0 magnitude or greater every three days in the world, which means, "you could pick dates by throwing darts at a calendar and get the same result" as Browning's forecasts.

The concern over public reaction to Browning's forecast is what led the Central United States Earthquake Consortium (CUSEC), an organization of the seven states along the New Madrid Fault, to seek help from the National Earthquake Prediction Council.

The report of the ad hoc group was reviewed and unanimously endorsed by the earthquake prediction council and the U.S. Geological Survey.

The group acknowledged that a major earthquake along the Fault is inevitable, and everyone who spoke Thursday stressed the importance of trying to maintain the momentum caused by this forecast in preparedness efforts.

Representatives of the Red Cross and Federal Emergency Management Agency outlined some of the work being done by their agencies with publications and planning assistance for earthquakes.

Dr. Brian Mitchell, a professor at St. Louis University and a member of the committee, said using tides to forecast earthquakes is not a new idea but most scientists discount the theory.

Mitchell noted that Browning's approach to forecast the December quake is "not consistent with the normal process for achieving credibility" in scientific studies.

Wesson added that there is "only a kernel of science" in what Browning said.

The last major earthquake in Southeast Missouri occurred in 1895. Centered near Charleston, the quake registered a magnitude of 6.2.

Dr. Jerry Hauer, chairman of CUSEC, said he was concerned that if a major earthquake does not occur in early December, the public will become complacent and feel the threat of an earthquake has diminished.

"That is not the message we want to get across to the public today," he said. "We need to continue to focus on earthquake preparedness, mitigation, particularly in seismic codes for buildings, preparedness and response, and public education."

Although discounting Browning's prediction, Hauer said some good has come of it because more atten-

tion has been focused on the risk of earthquakes in the Central United States.

"The problem is, in the emergency preparedness business, when you educate people, you can't get to the point where you scare them into panic, and I think that what we are sensing in some states is a level of panic," he said. "That is counterproductive to what we are trying to accomplish. There is too much anxiety about one specific date."

The Thursday news conference, which was arranged by the U.S. Geological Survey Wednesday morning, drew representatives from about 40 different media outlets. Among the cities represented were St. Louis, Kansas City, Springfield, Ill., Memphis, Little Rock, Paducah, Jonesboro, Ark., and

Cape Girardeau.

Besides Agnew and Mitchell, members of the ad hoc working group that prepared the report were: Dr. James F. Davis, chairman, from the California Division of Mines and Geology in Sacramento, Calif.; Michael Bograd, of the Bureau of Geology in Jackson Miss.; Dr. Thomas H. Heaton, of the U.S. Geological Survey in Pasadena, Calif.; Dr. Arch H. Johnston, of Memphis State University; Dr. Lyle D. McGinnis, of the Argonne, Ill., national lab; Dr. Christopher G. Newhall and Dr. Randall G. Updike, of the U.S. Geological Survey in Reston, Va.; Dr. Lawrence W. Braile, of Purdue University; and Dr. Ira R. Satterfield, of the Division of Geology and Land Survey in Rolla.



### Quake expert disputes Browning

Dr. Robert Wesson, chief of the Office of Earthquakes, Volcanoes and Engineering for the U.S. Geological Survey says a study group concluded there is no scientific basis for Iben Browning's prediction of a major earthquake along the New Madrid fault Dec. 2 or 3. (Photo by David Hente)



## Doctors prepare for psychological impact of a quake

By Tom Neumeyer  
Staff Writer

*Last in a series*

CAPE GIRARDEAU — "Panic is much more dangerous than earthquakes," said Iben Browning, a New Mexico scientist and business consultant who has forecast an increased chance of a major earthquake occurring along the New Madrid Fault in early December.

Browning believes unusually high tidal forces will unleash seismic activity measuring 7.0 or greater on the Richter scale. An unusual alignment of the sun, moon and Earth, coupled with the moon being closer to Earth than usual, is behind Browning's forecast.

Seismologists have criticized his methodology as "invalid" and "ineffective." They say no correlation exists since tidal forces put relatively

little amount of stress on the fault.

Regardless, anxiety levels are increasing in some people who live in this earthquake-prone region. Earthquake seminars are attracting more-than-capacity crowds in St. Louis; Cape Girardeau public schools and other schools have decided against holding classes Dec. 3 and 4; and some parents plan to stay home with their children those days.

Families are assembling disaster survival kits with food, water and personal necessities stashed in covered containers. People have exhausted local inventories of mechanical can openers and other items, both old and new, they think they might need in the event of a major earthquake occurring.

"There has already been an emotional toll," said Ken Callis, a licensed psychologist in private practice in Cape Girardeau whose speciality is family and child psychology.

While some people are skeptical about the prediction and others are gathering preparedness information, Callis said some already have reached a point of hysteria and are in a state of panic.

"They are so fearful, it is affecting their functioning," Callis said. "They are so agitated they are missing work and showing physical symptoms such as headaches, stomach-aches, irritability and lack

of sleep."

Callis said he knows of two families who have packed their belongings and moved away since the 4.6 Richter-scale tremor of Sept. 26. They plan to stay away until after the first of the year, he said. One parent of a pre-schooler said her son often is in tears before going into his morning sessions because the school has daily earthquake drills.

Callis recommended that parents and teachers take a rational approach to the situation to avoid creating needless anxiety in children.

"Parents should spend time gathering factual information on what an earthquake is and is not," the psychologist said. "They should share it with their children and put it on their children's level so they can understand it.

"Parents should not pass judgment on their children's fears," Callis said. "The children should be allowed to express their fears. Younger ones can use dolls or draw if they cannot verbalize. Kids should not be ridiculed for their fears."

He recommended that children and students be involved in disaster-preparation activities. This gives them more of a feeling of control, which can lessen their stress levels, he said.

"Parents should be very honest about their own emotional reaction," Callis said. "They should not put on a mask of bravery if they are crumbling inside. That creates distrust in the child."

Callis said schools have an opportunity to allay fears in students and their parents if they take a responsible approach. He recommended that schools have a reasonable, written disaster policy in place that has been discussed with teachers; that teachers be confident that they are adequately trained; that they be responsive to the fears students and parents may have; and that they implement disaster plans calmly when the circumstances occur.

School administrators are being criticized, whether they plan to hold classes or not on Dec. 3 and 4, he said. As more schools announce closings, peer pressure is increasing the tendency for schools to close, he said.

Callis predicted that people will stay close to their home and family members Dec. 3 and 4, and some may leave the area then. "I expect that the people who stay will have a break in their usual activities — it will not be business as usual," he said.

"If there is a balance there, realistically, attending to the emotional and physical safety of one's family is normal," said Callis. "If they are immobilized by their fears, with their lives disrupted for days and weeks, that's a problem."

Some business owners are concerned with having sufficient manpower on the days the quake is predicted because some people intend to stay home with their children.

Art Wallhausen, assistant to the president of Southeast Missouri State University, said the school will grant leave requests to university employees who request them on those two days. Instructors will decide whether student absences are excused on those days, he said. Otherwise, it will be business as usual at the university, said Wallhausen.

Sister Jeanne Goessling, principal of St. Mary's Cathedral Grade School here, plans to keep the school open Dec. 3 and 4. She said that maintaining normalcy is best.

"I lived in California and experienced none of this kind of hysteria," she said. "We can't let fear rule our lives." She discouraged instilling fear in children.

People who are skeptical of Browning's prediction are planning to carry on business as usual.

Callis said he expects people will have a high level of anxiety in early December with the heightened awareness of the stresses involved.

"You can't worry your life away," said Barry Bernhardt, director of activity bands at Southeast Missouri State University. He spent 1984 through 1987 in southern California and experienced the Whittier earthquake in 1987.

"It hit around 7 a.m., just as I was getting up," he recounted. "My wife Laurie was feeding our 1-year-old, Jonathan. When it hit she grabbed Jonathan, yelled for me, and we stood in a doorway. I remember watching the water splashing out of the apartment pool. The floor of the apartment was rolling in waves."

Bernhardt said friends who lived in nearby Whittier, the quake's epicenter, suffered from stress because their houses were damaged severely. "It was hard on them," he said. "But they accepted what happened to them. They had been living out there for 30 years."

Bernhardt said he felt shaky after the quake, wondering if another large quake would occur as an aftershock. He said he was in a building set on large rollers when an aftershock occurred two weeks later. Such buildings roll with the waves from a quake, he said.

"Due to the frequency of tremors in California, people take it calmly," he said. "They take it as calmly as we take thunderstorms in spring around here."

Bernhardt said he is taking Browning's prediction in stride. He said people should not panic.

Bernhardt said: "Regardless of the skepticism Browning has generated, we all need to be prepared for an earthquake whenever it happens. You need to know what to do and where to go when and if it happens, and carry on with your daily life."

"We should not change our lives because of it," he said. "Unfortunately, a lot of people are getting panic-struck."

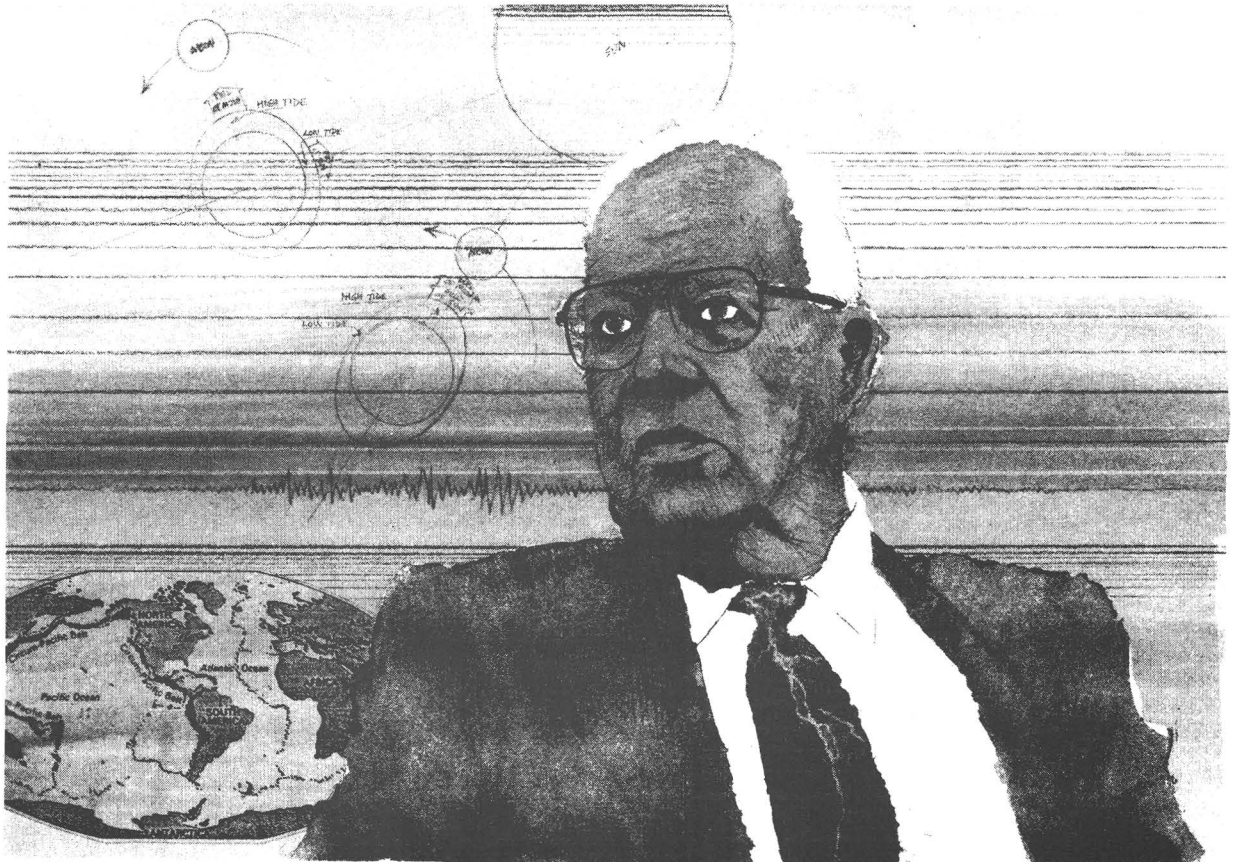
Information on earthquake preparedness can be obtained from several sources, including the Community Counseling Center, Center for Earthquake Studies at Southeast Missouri State University, the American Red Cross and public libraries.

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Southeast Missourian  
(Cape Girardeau, Mo.)

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**Arkansas Gazette**Reprinted by permission of the  
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Dan Morris/Gazette Staff

## Quiet scientist's quake forecast shakes up controversy, criticism

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By Phoebe Wall Howard  
Gazette Staff

ALBUQUERQUE, N.M. — Iben Browning's pace is slow and deliberate as he steers toward the back room of a local diner.

He's wearing ankle-high house slippers to ease the pain in his feet.

It's 6:30 a.m. on a Friday. Browning, 72, slides a chair from under the table, delicately lowering himself onto the seat.

Eventually the scientist is joined by 17 friends for a breakfast chat, the latest in a twice-monthly ritual that began in 1971. The group includes an artist, a former politician, a mathematician, an astronomy teacher and an engineer.

Browning is not so easily categorized.

He is an inventor, a high-tech optics researcher and a climatologist. He has

helped develop military weapons, searched for a cancer cure and taught on major college campuses.

On this morning, he jokes and laughs with his colleagues. But he solemnly asks a visiting reporter to refrain from taking notes.

Browning despises media attention. He describes it as "fabulously repugnant."

He has been dogged by reporters for the past year, since he triggered a national controversy by forecasting that an earthquake could rock Middle America in early December.

"Why not someone else?" he asked during a recent interview, his tone tinged with regret that his research has so disrupted his life. "I feel like I'm under a rain cloud."

During a speech last fall, Browning an-

See **QUAKE/10A**

nounced that the New Madrid Fault, which reaches into Northeast Arkansas, stood a 50 percent chance of being hit by an earthquake between Dec. 1 and 5.

Since then, he said he has refused at least 1,000 requests for interviews. As the date draws nearer, pressure and publicity have intensified, and critics have emerged from all corners of the country to condemn his prognostications. Established earthquake scientists say Browning's theories are flawed and that he is generating public fear in a drive for personal publicity.

Browning refuses to acknowledge his critics.

But his wife Florence, a former military nurse, said she worries that the constant badgering will worsen her husband's health. Their phone sometimes rings until 2 a.m., she said.

Browning has survived chronic skin cancer and two heart attacks. Last year, he was diagnosed with diabetes. Recently he had surgery to relieve bad circulation in his legs. He wears slippers because shoes put too much pressure on his healing skin.

His health problems have reduced his speaking schedule, but Browning still shows up for work everyday at Summa Medical Corp. in Albuquerque.

"His mind is just something else — his health hasn't affected that," said Neil Tucker, vice president of Summa, whose office is steps from the overstuffed blue chair in which Browning does much of his work.

"He absorbs everything. He is very eclectic in his thinking. He's a historian, he's an economist, he's an engineer, he's an expert in the area of optics, biology and chemistry ..."

Over the past two decades, Browning also has served as a consultant to businessmen and farmers, forecasting weather trends and their possible effects on crops and businesses.

Roger Spencer of Chicago has commissioned Browning several times to lecture his company's employees about climatology. Spencer is first vice-president of Paine Webber Inc., a leading brokerage and financial services firm.

"He's a card-carrying scientist," Spencer said of Browning. "I've been around him with other really top-gun scientists. When he starts to talk, they shut up really fast."

But when it comes to earthquakes, most experts say Browning doesn't know what he's talking about.

"I feel that, in terms of earthquakes, seismology and geophysics, I don't regard him as a scientist. It's just that scientists get into trouble when they step outside their field. It has happened to Nobel Prize winners," said Arch Johnston, director of the Center for Earthquake Research and Information at Memphis State University.

**“I feel that, in terms of earthquakes, seismology and geophysics, I don't regard him as a scientist. It's just that scientists get into trouble when they step outside their field. It has happened to Nobel Prize winners.”**

—Arch Johnston,  
Center for Earthquake Research  
and Information

Some detractors have gone even further. Evelyn Garriss, Browning's daughter, said one person called their home and accused him of being an Arab terrorist trying to create mass hysteria.

#### **“Renaissance man”**

Actually, Browning was born and raised in Texas. His mother was a native of Mountain Home, Ark. His father was a cotton farmer.

After finishing high school in 1933, he studied zoology and physiology at the University of Texas at Austin, where he earned his master's and doctorate degrees. He also earned bachelor's degrees in physics and mathematics, with minors in genetics and bacteriology. He has taught at the University of Texas and the University of Pennsylvania.

*The New York Times*, in a 1976 profile, called Browning a “Renaissance man.”

His resume is extensive.

During World War II, he was an Air Force test pilot, flying battle-worthy aircraft to make sure it was properly repaired. He also worked with Disney Studios producing military flight training films during the war.

After the war, he worked as a weapons systems analyst at Sandia National Laboratory in Albuquerque, which develops high-tech military weapons. He was part of a team that searched for peacetime uses for atomic weapons. He also worked at the Bell Aircraft Corp. in Buffalo, N.Y., where he helped develop a delivery system for the hydrogen bomb.

Browning said he holds 68 patents. Among them is a hand-held instrument for the blind called “hear-a-light.” The user points the device toward an object, such as a spotlight, and it makes a sound that indicates whether the light is red, yellow or green.

Browning also developed an interest in the Earth's climate because, he says, it affects everyday life and shapes history.

“As a biologist, I have dealt with many species. My very favorite one is the human race,” he said.

Browning and his daughter are in their 14th year of publishing *The*

*Browning Newsletter*. For \$225 a year, subscribers have monthly access to Browning's research on climate trends. Farmers, commodities investors and businessmen around the world dominate the list of subscribers, Browning said. He refused to reveal its circulation.

Dwaine Rogge sits on the newsletter's advisory board and has known Browning about 14 years. Rogge also is president of Commerce Financial Group, an investment company in Lincoln, Neb.

About six years ago, Rogge said, he read in the newsletter that growing seasons would shorten. Rogge advised his brother, a farmer in Nemaha County, Neb., to switch to a variety of soybean that matures quickly. The last two growing seasons indeed have been shorter, Rogge said, and his brother's soybean fields are producing at least three to five bushels more per acre than his neighbors, who still use longer-maturing beans.

To determine climate trends, Browning refers to more than just meteorological records. He uses such things as tree rings and France's wine growing records.

Businessman Nelson Bunker Hunt of Dallas, son of late billionaire oil man H. L. Hunt, has used Brown's forecasts to help decide locations for offshore drilling rigs and avoid possible hurricanes.

“I've always had confidence in Browning's work,” Hunt said. “But nobody's infallible.”

#### **Earthquake studies**

Browning started studying earthquakes and volcanoes in the late 1950s.

Recently he determined that at the beginning of December, the sun and the moon will align and come closer to the Earth than they have in nearly 70 years. The gravitational pull created by these forces, Browning theorizes, will create a strain so severe that the Earth's crust may rupture along already weakened faults.

Browning refuses to apply the word “prediction” to his work. Instead, he says that “conditions will be favorable” for an earthquake in three areas: The New Madrid Fault, which runs from Marked Tree, Ark., through the Missouri boot heel to Cairo, Ill.; the Hayward Fault in northern California; and Tokyo Bay in Japan. Browning's research suggests that the two American faults could experience quakes ranging from 7 to 7.25 on the Richter scale. Tokyo's could reach 8.25.

Browning's latest prediction gained credence because of reports that he correctly forecast last fall's San Francisco Bay area earthquake, which killed at least 62 people.

One Chicago man said that Oct. 10, 1989, Browning forecast San Francisco and New Madrid earthquakes during a speech to the Equipment Manufacturers Institute, a trade association that was meeting in San Francisco.

James Ebbinghaus, vice presi-

**10-21-90**  
**Arkansas Gazette**  
**(Continued)**

10-21-90

Dallas Morning News

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# Analysis fails to quell fears of predicted quake

By Lee Hancock

Staff Writer of The Dallas Morning News

At first, it barely stirred across the nation's heartland. But with summer, its rumbling grew, and in the last month, it's become a monster that even the nation's top scientists can't stop.

It's the Great New Madrid Earthquake Panic, an emotional tremor set off by a Sandia Park, N.M., man's prediction that a quake could rock the nation's midsection within 48 hours of Dec. 2.

On Thursday, 11 quake experts assembled by the U.S. Geological Survey issued a 39-page report rejecting the prediction of researcher Iben Browning of an earthquake along the fault that runs from Marked Tree, Ark., into the Missouri bootheel.

"Our panel found that Iben Browning's record for predicting earthquakes is about as good as that of someone throwing darts at a calendar," said USGS official Walt Hays.

But emergency officials say the panel's effort may have come too late. Across the

Mid-South and Midwest, entrepreneurs are cashing in on the panic. Earthquake insurance, survival kits and even a \$99 videotape of Dr. Browning have been peddled in the seven states atop the fault.

Anxiety escalated after a small tremor shook the region Sept. 26. And now, even NBC-TV is capitalizing on the hysteria. A miniseries, *The Big One: The Great Los Angeles Earthquake*, depicts how a controversial prediction of a huge quake comes true,

devastating Los Angeles.

NBC publicity cites Dr. Browning's prediction along with last year's San Francisco earthquake as proof that "other parts of our nation are vulnerable" to a killer quake like the one in the show, scheduled to air Nov. 11 and 12.

Describing the New Madrid prediction, an NBC news release asks: "Was the 4.6 quake on Sept. 26 a sign of more to come?"

"It's just one more thing in a long sequence of unfortunate events that have done nothing but add to people's concern," said Jerome Hauer, Indiana's emergency management director and chairman of the Central U.S. Earthquake Consortium, a seven-state planning agency.

The furor began last fall when Dr. Browning announced that he had calculated a 50-50 chance that a tremor measuring between 6.5 and 7 on the Richter scale would hit the New Madrid fault Dec. 2.

Dr. Browning, 72, a retired scientist with a doctorate in biology, publishes an investment newsletter outlining his theories on climate's effect on the global economy. He also claims to have predicted the San Francisco quake and other seismic events.

Dr. Browning, who has refused interviews, contends that quakes and volcanoes are set off by the gravitational pull of the sun, the moon and of other planets. Those tidal forces ebb and flow in cycles. He theorizes that high periods of tidal forces are likely dates for seismic activity, and he contends that forces will be at a 167-year high, ready to set off quakes, on Dec. 2.

As word of his New Madrid pre-

dition began spreading early this year, legends about the subterranean fracture fueled alarm.

The New Madrid fault is one of the most active in the United States. In 1811, it unleashed the largest temblors in U.S. history — quakes that rang church bells in Boston and made the Mississippi River run backwards.

Seismologists initially dismissed Dr. Browning's prediction for Dec. 2 as unworthy of serious consideration. The Central U.S. Earthquake Consortium's pleas for a formal evaluation of the prediction were rejected by the National Earthquake Prediction Evaluation Council, a USGS-sponsored scientific group.

"None of us anticipated the high level of public concern it would cause and, in retrospect, I think it would have been better if we had evaluated it in the spring," said Arch Johnston, a member of the national council and head of Memphis State University's Center for Earthquake Research in Memphis, Tenn.

By summer, prediction furor was so high that one Arkansas school district canceled classes for early December. Emergency officials saw demand for quake information skyrocket, and many planned disaster drills near the predicted date to ease fear.

As officials scrambled, earth scientists fumed that the hype was being fanned by one of their own, Missouri geologist David Stewart.

Dr. Stewart, director of the Center for Earthquake Studies at Southeast Missouri State University, began touting Dr. Browning's theories after visiting him and writing a memo praising his theories early last summer.

In interviews published nationwide, Dr. Stewart said he didn't

fully understand Dr. Browning's prediction but couldn't discount it because Dr. Browning's earlier earthquake calls had been "verifiable home runs."

And as he moved into the epicenter of the New Madrid furor, other earth scientists began worrying that history was repeating itself for Dr. Stewart.

Dr. Stewart lost a professorship at the University of North Carolina at Chapel Hill in the mid-1970s as a result of backing an earlier quake prediction.

In 1975, he published a paper warning that bulges on the North Carolina coast might be precursors to seismic activity. He and other geologists notified the Nuclear Regulatory Commission because a nuclear power plant was being built in the area, said geologist Charles K. Ross.

But then Dr. Stewart invited a California psychic into the fray. He wrote at the time that he asked the psychic to come to North Carolina after reading about her earlier quake predictions in the *National Enquirer*.

He flew her across North Carolina, and as they passed over Wilmington — the area where he noticed the bulges — she declared that a quake measuring 8 on the Richter scale would hit within a year, probably on Jan. 17, 1976.

The Wilmington area has no known faults and no recorded seismic activity, but Dr. Stewart embraced the prediction and publicized it widely. The result: low-level panic until after Jan. 17, when nothing happened.

"A great many people in North Carolina took the prediction seriously because it seemed that a faculty member at the University of North Carolina was taking it seri-

"None of us anticipated the high level of public concern it would cause."

— Arch Johnston,  
National Earthquake  
Prediction Evaluation  
Council

ously," said David Dunn, then a geology professor at UNC-Chapel Hill.

"His logic seemed identical to that he's using now," said Dr. Dunn, now dean at the University of Texas at Dallas school of natural sciences and mathematics. "He takes an undocumented claim, he says the individual has a track record of success and, therefore, he says, the individual can't be ignored."

Dr. Stewart said he won't apologize for arguing publicly that Dr. Browning's theories shouldn't be ignored.

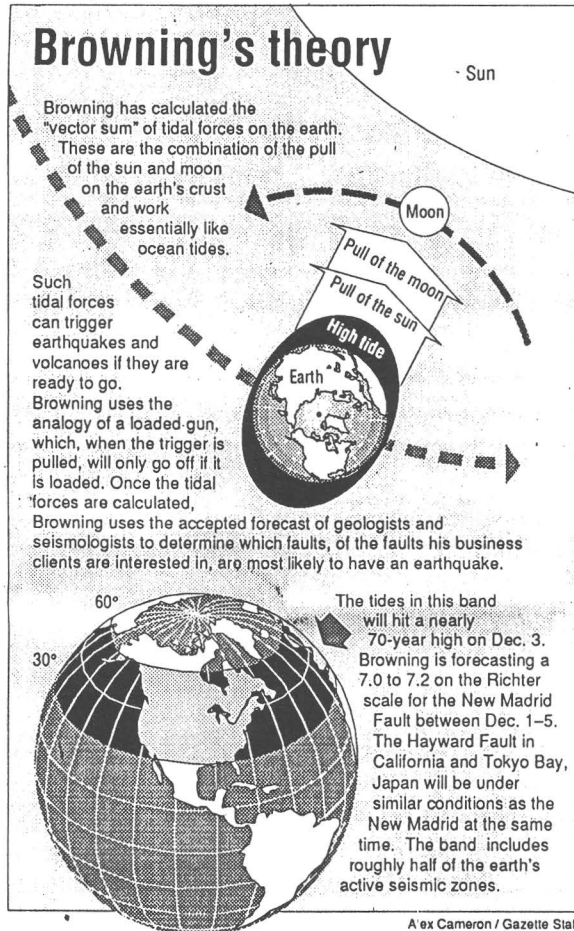
He issued a news release Friday saying the USGS evaluation released Thursday didn't disprove Dr. Browning's theory "by the scientific method." And in an interview, he said there are no parallels between his work with Dr. Browning's prediction and the North Carolina debacle.

"That was an unfortunate incident," he said. "It's not the same. Dr. Browning is not a psychic. He's a scientist, a genuine scientist."

Goaded by regional alarm and Dr. Stewart's persistent, public support of Dr. Browning, the Central U.S. Earthquake Consortium in July again pleaded for scientific help.

Finally, the USGS ordered a study of the prediction. Experts huddled last month in Dallas to study it, and the result was

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(Continued)



dent of the institute, said Browning forecast that the California area would shake sometime between Oct. 15 and Oct. 17. It shook the 17th.

Browning acknowledged he made the forecast.

Ebbinghaus also remembers that Browning said several times during the California speech that an earthquake could strike the New Madrid zone around Dec. 3, 1990.

However, Ebbinghaus said, "We don't have a transcript."

The press picked up on the New Madrid forecast after Browning mentioned it in a speech at the Missouri Governor's Conference on Agriculture in Lake Ozark, Mo., several weeks after the San Francisco speech. The state of Missouri sits on the fault line.

"I did not release the information to the public," he insisted. "It was leaked from a business talk. Panic can kill more people than an earthquake."

#### The skeptics speak

Skeptics contend Browning "predicts" a lot, while he claims only his successes.

Some say Browning has created unnecessary panic from Arkansas to Tennessee to Missouri. Numerous school districts have an-

*"He absorbs everything. He is very eclectic in his thinking. He's a historian, he's an economist, he's an engineer, he's an expert in the area of optics, biology and chemistry ..."*

—Neil Tucker,  
Summa Medical Corp.

nounced plans to suspend classes in early December, and local, state and federal authorities have responded to public concern by drafting earthquake-response plans.

A group of New Madrid Fault experts reviewed Browning's research and announced Thursday that his scientific methods are no more accurate than throwing darts at a calendar. The group, the National Earthquake Prediction Evaluation Council, is an advisory board to the U.S. Geological Survey.

Those experts echoed another of Browning's vocal critics, Douglas A. Wiens.

"The date of earthquakes cannot be predicted," said Wiens, a professor of earth and planetary sciences at Washington University in St. Louis. He recently wrote a newspaper column, distributed nationally, that denounced Browning's theory.

"Perhaps he actually believes what he's saying," Wiens said. "He may believe that his method is valid, not having apparently researched other studies that have been done."

Wiens and other scientists say research on the connection between tidal forces and earthquakes has been inconclusive.

"A number of people have done careful studies on the subject, taking into account a lot more factors than Browning," Wiens said.

Some critics say Browning's purpose is self-promotion.

"Nobody should make any plans on the basis of this prediction," said Johnston of Memphis State. "He talks for a healthy fee. It creates a lot of interest. This kind of thing we roll our eyes at."

Browning's consulting fee is \$2,500 a day.

However, he has only made a handful of speeches over the last year because of his health, his daughter said. Previously, she said, Browning spent about half the year on the road.

Early this year, Browning appeared in a videotape lecturing about the climate, geological events (including earthquakes and volcanoes) and their impact on the economy. He made the tape in February, after doctors gave him two weeks to live, his daughter said. The video sells for about \$100. The money, Browning said, goes directly into a college trust fund for his grandchildren.

Dr. David Stewart, director of the Center for Earthquake Studies at Southeast Missouri State University in Cape Girardeau, Mo., is the only earthquake specialist in the country who has met with Browning in New Mexico to discuss his research.

"I'm not endorsing what he said at this point," Stewart said. "I think he's a credible scientist who deserves a fair and objective hearing on the part of the scientific community."

#### Avoids the media

During Browning's breakfast meeting, some friends mentioned they saw him on national television. Browning looks perplexed.

"Really?" he responds. He figures excerpts from his videotape are being broadcast by news organizations that have never interviewed him.

Browning has avoided the media because he believes non-scientists don't understand the science behind his theories. He says there's no point in discussion anyway.

"Truth is the only thing that stands the test of time," he said.

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## Dallas Morning News (Continued)

unveiled Thursday in St. Louis: Both Dr. Browning's prediction and his purported track record were debunked.

"Most of his claimed successes are actually what I call post-dictions," Dr. Johnston said. "When you examine his record, it just doesn't hold up."

Dr. Browning refused to provide data for the study, stating in a brief letter that he was too busy and believed that the panel shouldn't form any policy because "the government has an unblemished record of screwing up everything it touches."

Mr. Hauer hopes that the evaluation will quell regional fears, but he and others concede that it may be too late.

More than a dozen schools in Arkansas, Missouri, Tennessee and Indiana have canceled classes or are considering closing Dec. 3 and 4. In Arkansas, Kentucky, Indiana and Missouri, emergency workers have scheduled quake drills on or near Dec. 2. Mississippi officials will air a 2½-hour TV program on earthquake preparedness across the state next month.

"We're seeing an extremely heightened level of awareness," said Jim Maher, Mississippi emergency management director. "We've got a lot of happy insurance salesmen around here."

Worst of all for the jittery region, Dr. Browning has made another prediction. In an interview aired last week by Cape Girardeau, Mo., TV station KFVS, he warned that if a quake doesn't hit Dec. 2, it might on New Year's Eve.

Whatever happens, emergency planners are resigned to more weeks of worry.

"The real impact of this on our economy and our region won't be clear until well after Dec. 4," Mr. Hauer said. "But my biggest concern is that on Dec. 4, people are going to say, 'We've dodged the bullet, and there's nothing more to worry about.' The tragedy would be people becoming complacent and ignoring a real risk."

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## St. Louis Post-Dispatch

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# He Calls It 'A Fact'

## State's Quake Expert Believes In Psychic Phenomena

By William Allen

Of the Post-Dispatch Staff  
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The director of the Center for Earthquake Studies at Southeast Missouri State University and an adviser to the state on earthquake policy says he believes in psychic phenomena.

David Stewart, director of the earthquake center, is the only seismologist to publicly support Iben Browning's prediction of a major quake in the New Madrid fault around Dec. 3.

Stewart said he did not believe Browning was a psychic. But in 1976, while a professor at the University of North Carolina in Chapel Hill, Stewart backed a psychic's prediction for a major earthquake near Wilmington, N.C.

Because of that position, he was denied tenure at the university.

In an interview Thursday, Stewart, 52, said his views had not changed since a 1976 faculty meeting when he said: "The psychic and the intuitive approach to scientific endeavor is both valid and valuable. Psychic phenomena is a fact."

Three-fourths of Stewart's salary is paid by Southeast Missouri State University and one-fourth by the State Emergency Management Agency.

Stewart's support of psychic phenomena puts him outside the mainstream of scientific thought and raises questions about the credibility of his support for Browning, several scientists said. The scientists also criticized what they believed was Stewart's extreme interest in publicly promoting Browning's prediction and method through the news media.

"I don't think a responsible scientist would do what he did" in supporting Browning, said David Dunn, dean of the School of Natural Sciences and Mathematics at the University of Texas at Dallas.

Browning has forecast a 50-50 chance of a quake in the New Madrid fault within 48 hours of Dec. 3.

Also on Thursday, a national panel of earthquake experts said that the prediction was not scientifically valid and that Browning had not predicted any previous earthquakes or volcanoes, as he and his backers had claimed. Panel members with the National Earthquake Prediction Evaluation Council said further public concern about the Dec. 3 prediction was unwarranted.

Stewart, who was not on the panel, has been alone among scientists in

publicly suggesting that Browning's forecast has credence.

Dunn, of the University of Texas, was a colleague of Stewart's in the geology department at North Carolina when Stewart brought in a psychic to investigate the possibility of an earthquake in the Wilmington area.

Stewart said that one day in the fall of 1975, while he stood in line at a supermarket, he saw a quake prediction for Hawaii in the National Enquirer by California psychic Clarissa Bernhardt.

Among other predictions Bernhardt has made in her career was that scientists would accidentally shoot down a UFO with a laser beam and John McEnroe would retire from tennis to play baseball for the San Francisco Giants.

Stewart said the Hawaii quake actually occurred, as did two others Bernhardt had predicted. Other scientists hotly disputed those claims, calling them unsubstantiated.

Stewart said he had found data indicating a possible earthquake in the Wilmington area, so he invited Bernhardt to North Carolina in December 1975. They flew and drove around the region, with Bernhardt advising him of her feelings about earthquakes at specific locations.

Bernhardt then issued a prediction that a quake measuring 8.0 on the Richter scale would strike the Wilmington area within a year, most likely within three days of Jan. 17, 1976. Such a quake would have been the largest in the history of the eastern United States.

"Since her first three [predictions] were good, we cannot ignore the possibility that her fourth may also be

"The parallels between the Wilmington prediction and this one with Browning are pretty striking," said one earthquake expert who asked not to be identified. "Both predictions are based on the flimsiest possible scientific evidence."

Arch Johnston, a seismologist at Memphis State University, said the Browning furor also is reminiscent of a scare in 1982 along the San Andreas fault in California. At that time, someone with no background in seismology predicted a quake would hit because of the alignment of celestial objects.

"I'm very concerned that we haven't learned our lessons from past episodes," Johnston said. Stewart was not connected with the San Andreas scare.

Stewart said that for scientists to bring up the Wilmington psychic prediction now is "character assassination. As far as I'm concerned, this Clarissa Bernhardt thing is ancient history."

Stewart said Browning's prediction is "a totally different ball of wax," appearing to have a scientific basis.

"He is going beyond the scientific method," Stewart said. "I just call it judgment."

Several scientists said Stewart was responsible for needlessly causing public anxiety by giving Browning's prediction undue credence in interviews with reporters and public speeches.

Stewart said he simply makes the point that any open-minded scientist should consider the possibility that Browning's method works because of Browning's record.

Stewart said he would have to study the national panel's report before commenting on whether it effectively rebutted Browning's claimed track record.

Stewart has been director of the Center for Earthquake Studies, at Cape Girardeau, since it opened in April 1989. He holds a doctorate in geophysics from the University of Missouri at Rolla.

He joined the North Carolina faculty in 1971. After he was denied tenure and given a grace period, Stewart left the university in 1978. He then ran a publishing company and became a best-selling author of books on natural childbirth and midwifery.

In 1988, he became the executive director of the Central United States Earthquake Consortium, a group of quake preparedness officials. Later that year he joined the Southeast Missouri State faculty.

**"The psychic and the intuitive approach to scientific endeavor is both valid and valuable. Psychic phenomena is a fact."**

good," Stewart said at the time.

Insurance agents were swamped with calls for quake insurance. Some people made plans to leave town on that date and emergency preparedness officials warned them not to panic. The quake never happened.

Browning's prediction has caused similar reactions in Missouri, Illinois and other states where an earthquake in the New Madrid fault could be damaging.



## Quake Adviser Gets Vote Of Confidence

By William Allen  
Of the Post-Dispatch Staff

Missouri's top emergency management official backed earthquake scientist David Stewart on Monday, saying Stewart's belief in psychic phenomena is irrelevant to his role as an adviser to the state on quake policy.

Stewart has done an "outstanding job" of alerting the public to the need to prepare for a major quake — whenever it happens, said R.D. Ross, director of the state's Emergency Manage-

ment Agency.

Stewart is a professor and director of the Center for Earthquake Studies at Southeast Missouri State University, in Cape Girardeau. He is the only seismologist to publicly support Iben Browning's prediction of a 50-50 chance for a major quake in the New Madrid fault around Dec. 3.

Last week, a national panel of quake experts called the prediction scientifically invalid.

Several scientists have criticized Stewart for supporting the prediction, saying his actions parallel his 1976 support of a psychic prediction for a quake in North Carolina — a quake that never happened.

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10-26-90  
Science  
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## Earthquake—or Earthquack?

On 3 December in southeastern Missouri, schools will be closing, factories will be shutting down, and families will be fleeing to safer ground. Why? Because that's the day iconoclast scientist Iben Browning has predicted a killer earthquake will strike the New Madrid area of Missouri, 250 kilometers southeast of St. Louis.

Although no one has yet successfully predicted an earthquake anywhere in the world with the accuracy that Browning is claiming, his forecast gained credence with residents of three states because news reports have credited him with a number of successes, including the prediction of last year's Loma Prieta earthquake in California. Such is the social upheaval in Missouri that a reluctant National Earthquake Prediction Evaluation Council (NEPEC) felt compelled to examine Browning's claims. Their verdict? You could predict the date of an earthquake just as accurately if you threw darts at a calendar.

In a report issued last week, an ad hoc working group of NEPEC disputed Browning's claims at nearly every turn. To begin with, they could find no firm scientific support for his methods. Browning, a Ph.D. in biology and a business consultant, arrived at his conclusion by calculating how the tides raised in Earth's crust by the sun and moon—tides just like those raised in the ocean—periodically increase the strain on faults. He noted that within a couple of days of 3 December the sun, Earth, and the moon will be lined up and the moon will be especially close to Earth, producing one of the greatest tidal strains of the century.

Browning then looked for places around the world where faults have had time to accumulate most of the strain needed to break them again. The New Madrid fault produced three huge temblors—each the size of the great 1906 San Francisco quake—in 1811–1812. Putting New Madrid's obvious potential together with a tidal trigger, Browning came up with a prediction that there is a 50% probability of a magnitude 6.5 to 7.5 earthquake in the New Madrid region between 1 and 5 December.

To calm jumpy Midwesterners, the NEPEC group released last week a report citing numerous objections to the particulars of Browning's method. For one, the peaks in crustal strain caused by tides are tiny and peaks essentially the same size as December's have occurred in recent years without effect. The group summed up with the claim that "there does not appear to be a theoretical basis for Browning's prediction, and in fact, it appears theoretically implausible." And even if Browning was on to a physical mechanism the experts could not understand, the group asked, why hadn't any of the numerous searches of the past few decades for a tide-earthquake link turned up a reliable statistical connection?

Besides Browning's science, NEPEC investigated his track record. The 11-member NEPEC working group decided not to rely on reports from witnesses, as the media had, of Browning's Loma Prieta prediction. Instead, the group obtained a transcript of Browning's talk given in San Francisco the week before the 17 October quake. According to the report, the transcript revealed that the prediction consisted of the statement that on or about 16 October "there will probably be several earthquakes around the world, Richter 6+, and there may be a volcano or two." There was no mention of the North American continent much less the Bay Area. And the NEPEC report notes that a quake of that size strikes somewhere around the world once every 3 days on average.

To check his other predictions, the members of the working group compared Browning's 20 days of predicted "high geologic danger" in the period 1985–89 with actual earthquakes and volcanic eruptions. Browning's success rate was no better than



Iconoclast. Iben Browning has the Midwest buzzing by predicting a big quake for early December.

if he had pulled his dates out of a hat, they concluded.

The NEPEC panel has finished criticizing Browning's work, but individually some panelists have additional complaints about the media. Like many other geophysicists, they concluded that Midwesterners didn't get much help from the media in dealing with the unsettling prediction. "A lot of the news people have been very noncritical," says Heaton. The media treatment of the science often consisted of statements by scientist A in favor of Browning's prediction and by scientist B questioning its validity.

Under other circumstances, this journalistic ploy might keep news stories objective. But many scientists noticed that journalists were relying heavily on David Stewart of Southeast Missouri State University in the role of scientist A. Stewart is one of the few credentialed scientists, if not the only one, to publicly defend Browning, and some observers familiar with a bit of history have serious reservations about Stewart's suitability as a news source.

According to James Devine of the U.S. Geological Survey in Reston, in 1974 Stewart, then on the faculty of the University of North Carolina at Chapel Hill, was predicting that a magnitude 6+ earthquake would strike the Wilmington, North Carolina, area the next year. On the basis of what he saw as geophysical precursors, Stewart asked the governor to close down a nearby nuclear power plant.

When the state of North Carolina requested the USGS's advice, the Survey decided that Stewart's evidence did not even warrant an intensive study of the area. According to Devine, who helped prepare the USGS response, Stewart then became involved in an effort to use paranormal means to refine the prediction. On at least one occasion, Stewart flew over the area with a psychic.

All this doesn't mean Midwesterners are safe, of course. Although the NEPEC panel disputes Browning's specifics, it points out that the New Madrid area is a reasonable place for something serious to happen sometime. So, sales of the video of Browning pitching his prediction at \$99 a shot could still be brisk. And then there's his prediction that the U.S. government will collapse in 1992 after massive crop failures. NEPEC declined to comment on that one.

■ RICHARD A. KERR

10-29-90

Newsweek

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NATIONAL AFFAIRS

## Quake, Rattle and Roll

### The Midwest gets ready

A few years after the last big earthquake hit Marked Tree, Ark., in 1812, explorer Henry Schoolcraft wrote that "The rivers they boiled like a pot over coals/And mortals fell prostrate, and prayed for their souls." Now the town's 3,201 citizens are preparing for another big one—predicted to strike around Dec. 3—and they're about as ready for an earthquake as any small town can be. The school has been practicing earthquake drills, and the mayor's office has obtained a list of who owns heavy equipment and two-way radios. "I think we're in pretty good shape," says Marked Tree Mayor Lawrence Ashlock, who has also insured all city property against quake damage. "I don't think it's gonna happen, but there's no need to take any chances."

The man behind the earthquake preparations is 72-year-old Iben Browning, a New Mexico climatologist who predicts quakes on the basis of unusual tidal forces and alignment of the planets. While the method is disdained by mainstream geologists, his prediction of a quake registering as high as 7.5 on the Richter scale somewhere along the 120-mile New Madrid fault (stretching from northeast Arkansas to Cairo, Ill.) is being taken seriously; Browning has taken credit for predicting



STEVE KEESEE—ARKANSAS GAZETTE

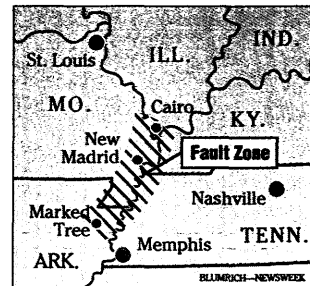
last year's devastating San Francisco Bay Area quake within a day of its occurrence, as well as the quakes in Nicaragua in 1972 and the San Fernando Valley in California in 1971.

Many experts say Browning's forecasts are shaky. "The predictions have very little scientific content," warns geophysicist Arch Johnston, director of the Tennessee-based Center for Earthquake Research and Information. The scientists don't stop with New Madrid. A 35-page study released last week takes issue with the latest prediction and with Browning's previous picks; while Browning predicted that natural disasters would occur on certain dates, he didn't actually predict *where* the quakes would happen. For example, Browning claims he predicted the San

Francisco quake after saying that on "the 16th of October . . . There will probably be several earthquakes around the world, Richter six plus, and there may be a volcano or two." Yet because Browning's prediction was made *in* San Francisco, people assumed he meant the city. "These are what I call 'postdictions,'" quips Johnston. "He just picks a time of geologic danger and if something happens at that time then he claims it as a prediction."

Browning refused to answer calls to his New Mexico home. His wife said that several weeks ago he decided not to grant any more interviews because of poor health, and because he says interviews were infringing on his work time. Meantime, Marked Tree isn't taking any chances. But with precautions taken, they're not too shaken up about the future. "We're having a Fault Festival on the second and third of November," Mayor Ashlock says. "It's called Quake, Rattle and Roll."

JOHN SCHWARTZ with PETER ANNIN



**A marked town? Children prepare for another big one**

10-30-90

St. Louis Post-Dispatch

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# SHAKY

# GROUND

Earthquake experts  
say predictions aren't  
scientifically valid

By William Allen  
Of the Post-Dispatch Staff

**T**HE QUAKEBUSTERS have landed. And they're zapping Iben Browning's forecast of a Dec. 3 earthquake with a barrage of evidence and analysis.

A team of 11 earthquake experts convened by the National Earthquake Prediction Evaluation Council asked the question: Is Browning's prediction for a quake along the New Madrid fault scientifically valid?

In a word, the panel said: "No!"

The latest version of Browning's forecast is for a 50-50 chance of a quake around Dec. 2-3 and ranging from 6.5 to 7.5 on the Richter scale, the panel said. He bases the forecast on an expected peak in tidal forces related to the positions of the sun and moon.

These forces are said to focus on a certain band of latitude in the Northern Hemisphere. They could trigger quakes on the New Madrid and other faults where scientists who have detailed knowledge of the faults say stress is gradually building, Browning said.

In releasing a report on their findings earlier this month, the quake experts concluded that Browning had failed to accurately predict earthquakes or volcanoes, as he and his supporters have claimed (see related story on this page). Browning, who has no formal training in geology or seismology, has declined to comment on the panel's report.

The panel also concluded that there was no "credible evidence" that a damaging quake was any more likely on the New Madrid fault Dec. 2-3 than during any other two-day period.

Here are the panel's four main critiques of the scientific validity behind Browning's forecast:

**Is the general concept that tides trigger quakes valid?**

"Despite years of study, the question of tidal triggering does not yet have a definitive answer," the report said. Several studies reported a positive correlation and many found no correlation.

"Perhaps the most common problem with published studies of the correlation between earthquakes and tides is a misuse of statistical methods," the panel reported. Another study relied on by Browning, published in 1968, was shown in a 1970 paper to have been based on mathematical errors.

Among other weaknesses, Browning's calculation neglects the fact that the entire Earth is elastic and deforms over a broad region in response to tidal pulls. The tidal forces produce stresses that are "much smaller" than the stresses regularly applied on the fault by surrounding geologic materials.

Taking these complexities into account, calculations by the national panel showed the New Madrid fault was exposed several times in the past two years to tidal stresses almost identical to those expected on Dec. 2-3 — with no major quakes.

Browning assumes that quakes strike after a slow increase of strain on a fault builds to a critical amount, which is triggered by minor tidal forces. That assumption is too simplistic, the panel said.

In theory and in practice, fault behavior is much more complex, the report said.

**How likely is a magnitude 6.5 to 7.5 quake in the New Madrid seismic zone?**

Browning's 50-50 prediction for Dec. 2-3 may seem statistically "safe," since he is technically saying, as he once put it, "That means maybe, but maybe not." But a closer look shows that his odds actually represent a greatly increased chance of a quake.

The most widely quoted scientific probabilities for a magnitude 7 quake in the fault boil down to 1 chance in 60,000 for any two-day period. So Browning's 50-50 forecast over two days increases the odds 30,000 times, said Arch Johnston, one of the national panel members and a seismologist at Memphis State University.

For Browning to suggest that a "minor" stress change from tidal forces could increase the likelihood of a quake by that much "is outside the range of responsible, supportable science and in the realm of pseudo-science and personal conjecture," Johnston said.

Browning told the panel that he picks specific earthquakes by reviewing scientific literature. He looks for areas within his chosen band of latitude where sufficient strain has built up in a fault, where enough time has passed that another quake is likely or where there are other signs of stress.

The national panel concluded that even though the New Madrid seismic zone carries a "long-term large earthquake potential," there is "absolutely no scientific basis for selecting New Madrid from among other seismic zones as the site of a major earthquake on Dec. 2-3, 1990."

The New Madrid fault runs more than 100 miles from northeastern Arkansas through southeastern Missouri and into the southern tip of Illinois.

Browning has relied on outdated estimates of strain buildup in the fault — estimates that seismologists now consider too large. He also has mistakenly assumed that that equates with "imminent failure" of the fault, the report said.

**How likely is it that a quake would be triggered by the high tide around Dec. 3?**

The panel found that the strength of the tidal peak would not be "materially above" that of a peak that occurred on the fault in 1988.

This poses the question "why the earlier condition did not trigger the earthquake," the report said.

Natural processes such as weather fronts, heavy rainfall and high river stages can put higher stress on the fault than tidal forces and still not trigger a quake, according to a report in June by Johnston and St. Louis University's Brian Mitchell. Mitchell, who initiated that report, also was a member of the national panel. Both seismologists specialize in the New Madrid fault.

The national panel rejected Browning's claim that the chances for a quake are enhanced because 1990 falls 179 years after the start of the 1811-12 sequence of great New Madrid earthquakes. The tides exhibit a similar 179-year period, he says, so the Dec. 2-3 peak may be a repeat of the 1811-12 earthquake events.

But using the same computer program Browning used to calculate tidal forces, the panel's calculations showed the tidal period to be different. The tidal peak that corresponds with the one expected Dec. 2-3 actually occurred at the end of 1813, well after the start of the great quakes.

Mitchell and Johnston had shown that only one of the five major earthquake episodes in the fault since 1811-12 came at a time of peak tidal forces. That peak — around Dec. 16, 1811 — was not unusually large, Mitchell said. In fact, larger peaks had occurred earlier that year.

**Do Browning's data and predictions support a correlation between tidal forces and geological events like quakes and volcanoes?**

Not only does no link exist between earthquakes in the New Madrid seismic zone and high tidal peaks, but there's no such link for quakes around the world, the panel said.

To come to that conclusion, panel members obtained a catalog of earthquakes from September 1985 to September 1990 that were greater than magnitude 6.5. That's the lower limit predicted for New Madrid. The catalog was prepared by National Earthquake Information Center in Golden, Colo.

The scientists compared the "dates of geological danger" picked by Browning in a key 1985 document with the actually recorded earthquakes. To be conservative, they expanded the "danger date window" to three days on either side of the date picked by Browning.

The national panel found that of the 182 quakes during the three-year period, 14 fell within Browning windows. Random picking would have hit on 13.7 quakes.

Browning could have done as well "by throwing darts at a calendar," said panel member Duncan Agnew, a geophysicist at the University of California at San Diego.

10-30-90  
**St. Louis Post-Dispatch**  
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## Panel Analyzes Browning Record

**I**BEN BROWNING calls them "projections" for dates with geological danger. Earthquake experts call them "predictions."

The bottom line in this war of semantics is that Browning and his supporters claim that on several occasions he accurately picked dates and locations where earthquakes or volcanoes erupted.

Here is a list of those claims and the

analysis of them by a special panel of the National Earthquake Prediction Evaluation Council:

■ **Claim:** At a business meeting in San Francisco on Oct. 10, 1989, Browning predicted the Oct. 17 Loma Prieta earthquake in the San Francisco area.

**Analysis:** A transcript of Browning's talk showed that he had said only: "There will probably be several earthquakes around the world, Richter 6-plus, and there may be a volcano or two" around Oct. 16.

The national council's report concluded: "Because I. Browning did not specify any location or a magnitude, he can hardly be given credit for a successful prediction." Also, Browning made no specific mention of the San Andreas fault, where the quake erupted.

■ **Claim:** Browning predicted the Feb. 9, 1971, earthquake in San Fernando, Calif.

**Analysis:** "We could find no evidence to document whether I. Browning had predicted it, or had merely retrospectively noted its occurrence," the report said. Browning's only reference to predicting that quake the night before it happened came in a book published in 1975, said panel member Duncan Agnew, a professor of geophysics at the University of California at San Diego.

■ **Claim:** Browning predicted the May 18, 1980, eruption of Mount St. Helens by telling an audience in Portland six days in advance that an eruption was likely "in about a week."

**Analysis:** The volcano had been erupting since March 27 and was bulging about 6 feet per day when Browning made the statement. Geologists' warnings of an eruption were widespread in the news media at the time.

■ **Claim:** Browning predicted the Dec. 23, 1972, earthquake in Managua, Nicaragua.

**Analysis:** The panel found no evidence that Browning predicted the quake.

■ **Claim:** Browning predicted the Sept. 19, 1985, earthquake that hit Mexico City.

**Analysis:** The panel found no documentation of any prediction.

■ **Claim:** Browning predicted the Nov. 13, 1985, eruption of Nevado del Ruiz volcano in Colombia.

**Analysis:** Eruption had already begun in September of that year. Publicity and public warnings about a major eruption were widespread.

The panelists' report said: "The second, deadly phase of this eruption did occur on an I. Browning 'danger day,' but nowhere in the considerable volume of postmortem inquiry about this eruption is there any indication that I. Browning or anyone else had forecast an eruption of [the volcano] on this particular date."

None of these predictions fits standards established by the Seismological Society of America, the leading professional body of seismologists, for a credible prediction, the panel said.

The issue of Browning's track record is important because it has played a major role in the credibility of his Dec. 3 forecast with the general public, the scientists said.

"His claimed success rate should not, in our opinion, be used to underscore the need for public response to his December 2-3, 1990, New Madrid prediction," their report said.

— William Allen

11-8-90

**St. Louis Post-Dispatch**  
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## Quake Expert Stops Talking Of Forecast

By William Allen  
 Of the Post-Dispatch Staff

Earthquake expert David Stewart, the only seismologist to publicly support Iben Browning's Dec. 3 quake forecast, said Wednesday that he would no longer talk about the prediction.

Stewart is the director of the Center for Earthquake Studies at Southeast Missouri State University, in Cape Girardeau. He is also an adviser to the state on earthquake policy.

Scientists will need to study Browning's approach to earthquake prediction for a "considerable time" before it can be "either fully developed or fully discredited," Stewart said at a news conference on campus.

Such research "cannot be conducted in the media by sound bites," he said. "Therefore, until such a time, there shall be no further public comments by myself nor by anyone with the Center for Earthquake Studies on this subject."

Coincidentally, Stewart defended Browning Wednesday night on national television. During the previously recorded NBC program, "Unsolved Mysteries," Stewart said the Dec. 3 forecast could not be ignored because Browning had "hit some home runs in the past."

Browning, a climatologist in New Mexico, has forecast a 50-50 chance of a quake in the New Madrid fault within 48 hours of Dec. 3. He said the quake would measure between 6.5 and 7.5 on the Richter scale.

A national panel of earthquake experts has concluded that the prediction has no scientific validity. Stewart said he had not been pressured by university or state officials to stop talking about Browning.

"I've made the mistake, perhaps, of making some statements that really should have been kept to myself," he said. "When I make a personal statement, it's interpreted, perhaps, with more authority than it should be."

The mission of the center, which opened in April 1989, was to provide information and training that would save lives, prevent injuries and reduce property losses from earthquakes, he said.

Speaking about Browning's forecast "doesn't serve the purpose of mitigation, which is why I am here and why the center is here," Stewart said.

He said he neither endorsed nor rejected Browning's method for making earthquake predictions, but he rejected the idea that the national panel had put the issue to rest.

"The bottom line is, Dr. Browning has yet to be properly scrutinized by the scientific community," Stewart said. "That's going to take time — maybe a year or so."

Stewart said he ignored Browning's forecast when it "first became national news a year ago." He arranged to meet with Browning several months later to learn more after the center received many calls from people wanting "to know if Browning should be taken seriously or ignored."

He concluded that "what Dr. Browning was doing merited a thorough scientific investigation until it was either verified or disproved. That was, and is, my position. It did not occur to me that such a position would be controversial."

Paula Davenport, a special correspondent for the Post-Dispatch, contributed information for this story.



Stewart

11-11-90

**Arkansas Gazette**  
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Arkansas Democrat-Gazette

*Accidental release of quake forecast  
hurtles scientist into public eye*

# Iben Browning

By Phoebe Wall Howard  
Gazette Staff

ALBUQUERQUE, N.M. — Iben Browning is an intellectual chameleon.

As a scientist, he has researched and developed classified military weapons, high-tech optics, cancer treatments, among other scientific advancements.

Despite his extensive career, he has earned little public notice.

Until now.

Browning, 72, has become the subject of intense public curiosity, controversy and criticism since he forecast an earthquake for the New Madrid Fault area.

During a speech last fall, Browning announced that the New Madrid Fault, which reaches into Northeast Arkansas, stood a 50 percent chance of being hit by an earthquake between Dec. 1 and 5.

Established earthquake scientists say Browning is generating fear in a drive for self-promotion.

A group of nationally recognized earthquake experts compared Browning's scientific methods to throwing darts at a calendar. Other scientists have said he is simply outside his areas of expertise.

"In science, you're assumed wrong until proven right. It's the opposite of the legal system ... That's how science protects itself from pseudo science," said Arch Johnston, director of the Center for Earthquake Research and Information at Memphis State University.

Dr. David Stewart, director of the Center for Earthquake Studies at Southeast Missouri State University at Cape Girardeau, Mo., is the only earthquake specialist in the country who has met with Browning in New Mexico to discuss his research.

"I'm not endorsing what he said, at this point," Stewart said. "I think he's a credible scientist who deserves a fair and objective hearing on the part of the scientific community."

Browning is a climatologist who started studying earthquakes and volcanoes as a hobby.

Recently he determined that at the beginning of December, the sun and the moon will align and come closer to the Earth than they have in nearly 70 years. The gravitational pull created by these forces, Browning theorizes, will create a strain so severe that the Earth's crust may rupture along already weakened faults.

Browning doesn't use the word "prediction." He instead says that conditions will be favorable for earthquakes along a band around the Northern Hemisphere.

Browning's research suggests that the New Madrid fault could experience a quake ranging from 7 to 7.25 on the Richter scale.

The press picked up on the New Madrid forecast after Browning mentioned it in a speech at the Missouri Governor's Conference on Agriculture in Lake Ozark, Mo.

"I did not release the information to the public," he insisted. "It was leaked from a business talk. Panic can kill more people than an earthquake."

Besides studying climatology in his spare time, Browning is an inventor. He recently acquired his 68th patent.

Born and raised in Texas, Browning helped his father in the cotton fields. His mother was a Mountain Home, Ark., native.

Browning earned bachelor's degrees in physics and mathematics at Southwest Texas Teachers College. He went on to study zoology and physiology at the University of Texas at Austin, where he earned his master's and doctorate degrees. He also has an extensive academic background in biology, genetics and bacteriology.

He taught at the University of Texas and the University of Pennsylvania.

During World War II, he was an Air Force test pilot, flying battle-

wear aircraft to make sure it was properly repaired.

After the war, he worked as a weapons systems analyst at Sandia National Laboratory in Albuquerque, which develops high-tech military weapons. He was part of a team that searched for peacetime uses for atomic weapons. He also worked at the Bell Aircraft Corp. in Buffalo, N.Y., where he helped develop a delivery system for the hydrogen bomb.

For the past two years, Browning has worked as chief scientist at Summa Medical Corp. in Albuquerque, where he heads research on projects such as high-definition television and voice-activated electronics.

"I would call him a sponge — he absorbs everything. He's a man of tremendous knowledge," said Neil Tucker, vice president of Summa. "Dr. Browning is very unconventional ... Most of the things he thinks about, most of his science, is way out of the mainstream of what his peers are doing."

For the past 20 years, Browning also has served as a consultant to businessmen and farmers, forecasting weather trends and their possible effects on crops and businesses.

He and his daughter are in their 14th year of publishing *The Browning Newsletter*. For \$225 a year, farmers, commodities investors and businessmen have monthly access to Browning's research on climate trends.

Roger Spencer of Chicago has commissioned Browning several times to lecture to his company's employees about climatology. Spencer is first vice-president of Paine Webber Inc., a leading brokerage and financial services firm.

Spencer said he takes Browning's earthquake forecast seriously.

"A lot of experts say it's mumbo jumbo and witchcraft," he said. "People that haven't heard of him, it's easy to pooh-pooh. Those that know him will have their houses insured for earthquakes and are gonna be damn careful on the third or fourth [of December]. I know I am."

Browning's climatology consulting fee is \$2,500 a day.

However, he has only made a handful of speeches over the last year because of his poor health. Browning has survived chronic skin cancer and two heart attacks. Last year, he was diagnosed with diabetes.

11-11-90

St. Louis Post-Dispatch

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Margaret Goz, a museum employee in New Madrid, Mo., displaying some of the earthquake-related shirts on sale at the shop. AP

## NBC Won't Delay Quake Miniseries

By William Allen  
Of the Post-Dispatch Staff

The NBC television network has rejected a request by a group of Midwestern earthquake preparedness officials to delay airing a quake-disaster movie.

Officials with the Central United States Earthquake Consortium said they feared that the TV miniseries would fuel anxiety in the Midwest about a much-criticized forecast by Iben Browning that a major quake might hit the New Madrid fault around Dec. 3.

"So far we don't see that they've really done anything to respond to the request," said Jerome Hauer, chairman of the consortium. "We'll just have to deal with the outcome of the miniseries between now and Dec. 3."

NBC spokeswoman Iris Gelt said the miniseries could not be moved because "very long-term decisions" had been made to air it during the

November ratings sweeps. These decisions were made long before the Browning prediction became known."

"We feel that from the outset this is a work of fiction and never has anybody pretended that this is based on real events," Gelt said.

The series, called "The Big One: The Great Los Angeles Earthquake," is scheduled to air tonight and Monday.

The network's promotional material for the series cited Browning's prediction and asked whether a 4.6 earthquake in the fault on Sept. 26 was "a sign of more to come."

The earthquake consortium's Hauer said: "Connecting the Browning prediction to the miniseries is irresponsible, because it is not a credible prediction."

He said a segment about the Browning prediction that aired Thursday night on the NBC program "Unsolved Mysteries" was geared to

"hype the miniseries."

Browning, a scientist from New Mexico who does not specialize in earthquakes, has forecast a 50-50 chance of a quake measuring between 6.5 and 7.5 on the Richter scale between Dec. 1 and 5. A national panel of experts has concluded that the forecast is ridiculous.

The consortium sent a letter Nov. 2 to NBC officials asking them to delay the miniseries until January, Hauer said.

Edward Piette, general manager of KSDK (Channel 5), the NBC affiliate in St. Louis, said he was unaware of the consortium's request and that the station planned to broadcast the miniseries.

But for four nights beginning Sunday, the station's news programs will feature a series that will show that the Browning prediction "is about as likely to happen as the moon falling out of the sky," Piette said.



ERIC MINK

## 'Big One': Exploiting Shook-up St. Louis

11-11-90  
St. Louis  
Post-Dispatch  
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**W**HEN THE MOVIE "Earthquake" premiered in 1974, people paid their money mostly to see if the "Sense-Surround" gimmick really made it feel as though the theater were shaking. (It didn't.)

The film's dramatic quality was laughable, but nobody expected any better from what was just the latest example of Hollywood's then-hot trend: disaster flicks.

Part I of NBC's "The Big One: The Great Los Angeles Earthquake" is easily dismissed as a faithful descendant of those pictures: harmless, if inane, disaster opera.

- Plots and subplots could have been written by a computer program called "TV Movie: Generic."

- A couple of mini-quakes are tossed in to maintain interest and, in true huckster style, tease viewers for the so-called big one in Part II.

- Capable actors lumber like automatons through ridiculous parts, dragged down by a ludicrous script.

- Characters are so blatantly stereotyped that predicting what they're about to say is about as challenging as brushing your teeth.

- The dialogue is wretched, often hilariously so.

If Part II of the four-hour film matched the tone and style of Part I, the whole thing would be a silly breeze, a made-for-TV diversion good for a few hours of mindless, microwave-popcorn entertainment with some laughs and some nifty special effects as a bonus. That isn't the case.

Instead, Part II is gratuitously violent, needlessly cruel, emotionally dishonest and one of the most cynically exploitive TV productions I can recall.

Having watched the entire production — and given the brink of earthquake hysteria on which our community seems to be teetering — I would suggest that airing this film locally not only fails to serve the public interest, it actually may damage the public interest. Channel 5, the local NBC affiliate, would be well within its rights to not air it at all, and it would deserve hearty congratulations if it chose that path.

If, however, the film airs as scheduled, I feel obliged to let you know what you're in for.

**First, a warning** to responsible parents: *Keep your kids away from this film, Part II in particular.* It seems almost deliberately designed to traumatize children, even those as old as 12 or 13, heightening what may already be marked fears stirred up by all the talk about a possible earthquake here.

In the past, there have been challenging "serious" or "issue" movies from which kids and their parents could benefit if they watched them together and discussed them afterward. Topics have included everything from the effects of nuclear war to child abuse to AIDS. Such projects undoubtedly will come along again in the future, but this is not one of them.

Try as I might, I have been unable to find any saving grace for this project. Dramatically, it's a joke in Part I and an abomination in Part II.

Public-spirited education? Its less-than-half-hearted effort at giving earthquake-preparation tips occupies three minutes of the film at most, and those are negated by having important characters violate virtually all recommended actions for behavior after an earthquake occurs.

Can fear possibly encourage people to become informed and take precautions? In some cases, maybe. But, if anything, the scale of destruction and human tragedy depicted in this film is so broad that those viewers unfortunate enough to see it may well be left with a feeling of hopelessness that overwhelms any inclination to take rational advance preparations for an earthquake.

**Does the film** show the danger of government officials ignoring the advice of scientists? Yes, but the lesson is rendered impotent by the dramatized panic that ensues when officials finally listen to the scientists and issue a public warning.

And, finally, unlike the hyper-exaggerated, laughable violence that characterizes slasher films, the violence in this project seems to have no purpose other than provoking distress for its own sake.

In other words, no matter how you examine this film, it has no redeeming quality. It also has no shortage of unconscionable elements. Children, for example, are repeatedly shown agonizing over being separated from their parents.

In one scene, a terrified girl makes her way home after the quake, finds the family's telephone answering machine on the floor and then listens to a recording of her father screaming in fear and pain. In another, a character who has had a fairly large part is shown being electrocuted when a building's electrical supply line falls into a pool of water in which he is standing.

Eventually, you start wondering if there's any point to subjecting these characters to an apparently endless amount of random tragedy:

- The mother and sister of protagonist Claire Winslow (Joanna Kerns) reconcile their differences while trapped in an elevator during the quake. But the mother (Bonnie Bartlett) plunges to her death when an aftershock breaks the elevator cables just after the sister, Laurie (Lindsay Frost), is rescued.

- Laurie's boyfriend, Matt (Alan Autry), a police patrolman, is gunned down by an assassin hired to kill a visiting black South African official. The assassin also kills Matt's pal, Det. Bob Bryant (Clarence Gilyard Jr.).

- Claire and a neighbor manage to save her daughter, Heather (Holly Fields), from drowning in rising water while trapped in the basement under debris.

- The Winslow family's housekeeper, Sonia (Silvana Gallardo), watches her son die on a hospital operating table following injuries suffered in the collapse of a school auditorium.

- The quake throws real estate developer Warren Cates (Robert Ginty) out the window of his office to his death.

- City official Chad Spaulding (Joe Spano) is accidentally electrocuted.

- The film ends with Claire and Heather being reunited with husband/father Steve (Dan Lauria), who was badly injured at LA's airport but somehow got home.

In recent weeks, virtually every television station in St. Louis, commercial and non-commercial, has aired special programs or series somehow connect-

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(Continued)**

ed to earthquakes. (This newspaper printed and distributed a special section on the subject a couple of weeks ago.) The stations' efforts varied in quality but at least they addressed a topic of legitimate public interest, whether or not the area is hit with an earthquake in early December.

Most immediately, Channel 5 has plans for a four part series on earthquake prediction, which is scheduled to air on its late newscasts starting Sunday night. The station's chief meteorologist, Bob Richards, apparently will emphasize, as he did in a report last Wednesday, the lack of scientific validity







in the method used to "predict" an earthquake here. Ironically, the impact of his stories could well be undermined by hysteria whipped up by the miniseri- es airing on his own station.


NBC's two-part film (airing Sunday and Monday nights) serves no interest at all — either as entertainment or information — except the network's interest in suckering viewers to watch sponsors' commercials. It seems to me that in this case, at this time and in this place, NBC's objective runs counter to the interests of the citizens of the St. Louis viewing area.

**"My God!  
The ground  
won't stop  
shaking!"**

**THE BIG ONE:  
The Great Los Angeles  
EARTHQUAKE**

**A SOON-TO-BE TRUE STORY.**

					
<b>JOANNA KERNS</b> THE SEISMOLOGIST	<b>ED BEGLEY JR.</b> THE RESEARCHER	<b>DAN LAURIA</b> THE HUSBAND	<b>RICHARD MASUR</b> THE NEWSMAN	<b>BONNIE BARTLETT</b> THE MOTHER	<b>JOE SPANO</b> THE BUREAUCRAT

**WORLD PREMIERE EVENT!**  
**8PM 5** 



## Mid-South's readiness for earthquake studied

The Associated Press

NEWARK, Del. — The University of Delaware's Disaster Research Center is surveying Memphis residents to gauge their preparations for an earthquake forecast for early December.

"The primary focus of the survey is on ... how residents of Memphis perceive earthquakes in general and what are they doing to prepare for one," Kathleen J. Tierney, research director, said Monday.

"Do they think it's a serious risk for Memphis? Do they think one is going to strike in the next few years? How concerned are they personally and what are they doing about it?"

Climatologist Iben Browning

has said conditions will be right on or about Dec. 2 or Dec. 3 for an earthquake at a latitude that includes Memphis.

The Farmers Almanac also predicts Dec. 3 begins the month's "most likely five-day period of earthquakes in the northern hemisphere."

Even though geologists say Browning's prediction is only a guess, earthquake survival kits are selling well.

The Delaware research center has mailed 1,150 surveys to Memphis residents and researchers hope 80 percent are returned.

The survey asks whether the respondent felt a quake in the area in September that measured 4.6 on the Richter scale and what they thought about it.

There are questions on what

respondents think of Browning's prediction and whether respondents are strengthening their homes or purchasing earthquake insurance.

Ms. Tierney said some respondents might be influenced by the television miniseries that began Sunday on a major earthquake in Los Angeles.

"We're hoping the movie encourages people to return the questionnaire, but it also represents a type of interference in our research design. People might be influenced by it. But since we'll know who returned the questionnaire before and after the movie, we might be able to do some comparative analysis," she said.

Surveys are also to be mailed soon to public officials in Memphis to see what local jurisdic-

tions are doing to prepare for an earthquake.

"For example, are they doing disaster drills, are they engaged in disaster planning, engaged in any special planning for earthquakes?" Ms. Tierney said.

In a separate but related study, a team of three researchers from the center plans to be in Memphis from Nov. 30 to Dec. 6.

"They will 'observe what preparations local government is making and what emergency agencies are doing to prepare,'" Ms. Tierney said.

She said the team plans to tape local television news programs dealing with quake preparation.

The research is funded by a \$250,000 grant from the National Science Foundation.

The center has conducted several disaster studies.

11-13-90

## St. Louis Post-Dispatch

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## 'The Big Baloney'

### TV Miniseries Conveyed Misinformation, False Alarm About Quakes, Experts Say

By William Allen

Of the Post-Dispatch Staff

Earthquake experts are panning "The Big One," a television movie about an earthquake in Los Angeles.

They say the two-part miniseries, which concluded Monday night on NBC, conveys a number of false impressions, including that:

- The prediction of quakes is possible.
- Scientists are hiding something.
- A widely discredited forecast for a quake Dec. 3 could have merit.

Scientists and quake-preparedness officials agree that the movie depicts an extremely unlikely quake with the worst possible damage. A quake lasting more than five minutes — as the movie's "big one" does — is two to three times longer than possible, the experts say.

R.D. Ross, director of the State Emergency Management Agency in Missouri, said he and other emergency-preparedness officials in the Midwest were concerned that the film's "doomsday scenario could become a powerful disincentive to any preparedness measure on the part of businesses and other groups anywhere in the country threatened by earthquakes."

The experts also are upset with information displayed at the end of the film, saying it could leave viewers with the impression that an earthquake of the same magnitude could strike beneath St. Louis. Local seismologists emphatically deny that that is

possible. At its closest point, the New Madrid Fault is more than 100 miles from St. Louis.

"The whole thing is silly," Ross said.

The scientists in the movie rely on misinformation to piece together their prediction, said James Williams, Missouri's state geologist.

Their clues, such as the monitoring of radon gas and the level of oil wells, were once believed to be related to quakes. But that idea was rejected by scientists more than a decade ago, Williams said.

One of the film's most misleading suggestions is that scientists can predict quakes, said Douglas Wiens, a seismologist at Washington University.

"It's really not possible at the current level of the science," Wiens said. "We aren't able to pin down the year that an earthquake would happen, much less the size and exactly where it is going to hit."

Quake experts also see a major problem with the film's central conflict: that of a seismologist who believes a quake is coming and an earthquake official who wants to hold back on warning the public.

Among the critics is seismologist Lucy Jones, on whom the film's main character is based. She works for the U.S. Geological Survey in Pasadena, Calif.

Jones called the movie plot "completely unrealistic. Some really responsible people were portrayed very badly."



Ross



Browning

Iben Browning of New Mexico, a climatologist who does not specialize in earthquakes, has forecast a 50-50 chance of a New Madrid quake measuring between 6.5 and 7.5 on the Richter scale between Dec. 1 and 5. A national panel of quake experts has concluded that the forecast is ridiculous.

Even so, the network's promotional material for the series cited Browning's prediction and asked if a 4.6 earthquake on the fault Sept. 26 was "a sign of more to come."

Officials with the Central United States Earthquake Consortium asked NBC to delay airing the miniseries until next year, but the network said it could not because the show had long been scheduled.

Jerome Hauer, chairman of the consortium, said the mood in Missouri, Illinois and the other states around the New Madrid fault "is somewhere between a hysteria and a panic. There's no question that people are taking this prediction very seriously."

Quake prediction is "a really complex matter," he said. "That show made it sound like it was something simple and that did the public a considerable disservice."

The idea that prediction is possible "plays into the hands of quacks who say they can do it, and it leads the public to believe that scientists really do have this information but are keeping it from them."

11-16-90

St. Louis Post-Dispatch

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# Quake Forecaster Now Predicting Depression

By William Allen  
Of the Post-Dispatch Staff

The man who has forecast an imminent major earthquake in the New Madrid fault predicted Thursday that the United States was nearing an economic depression worse than the Great Depression of the 1930s.

"For climatological reasons, we will reach the bottom of a depression about the end of 1992," said New Mexico climatologist Iben Browning. "And 1993 will be the worst [depression] since 1776 and more severe than the 1930s."

Browning has forecast a 50-50 chance of a quake measuring 6.5 to 7.5 on the Richter scale between Dec. 1 and 5 in the New Madrid fault. A national panel of quake experts has concluded that the forecast has no merit.

About 600 people, mostly local businessmen and businesswomen, heard Browning speak at a \$25-a-plate lunch at the Breckenridge Frontenac Hotel. The talk was sponsored by the Building Owners and Managers Association of Metropolitan St. Louis, a group that serves real estate, property management and related industries.

Browning is a consultant to several businesses, including PaineWebber Inc. He consults on how such natural events as volcanoes and weather patterns affect agricultural and other investments.

After his speech, Browning was asked how he

would react to his Dec. 3 quake forecast if he lived in the St. Louis area.

"If a person has any doubt about whether I'm wrong or not, he should at least take care of his children," Browning said.

The one-hour talk delved into the intricacies of Browning's idea that tidal forces set off a series of events that result in political upheaval. He has written books and spoken widely on that theme.

"Human events parallel these tidal forces, which trigger volcanoes, which change the weather," he said. The volcanoes send dust into the atmosphere, cooling the globe and causing crop failures.

Browning showed several graphs linking tidal forces to volcanic activity, revolutions and wars. The world is cooling off, which will deplete already-low grain reserves, he said.

In 1992, the United States will face "our lowest yields and highest prices of grain," which will raise the price of food and lower the amount of disposable income that Americans have, he said.

Because disposable income is key to economic health, a depression will result, Browning said.

During his talk, Browning made no reference to his forecast for the New Madrid fault. But questions from the audience afterward focused on the earthquake prediction.

Audience members said later that they had been surprised by the prediction of a depression, but were more interested in the quake forecast.

John Theiss, president of Theiss Engineers Inc. of St. Louis, said he had learned nothing new from the talk. Using charts and technical details showed that Browning was "trying to prove his case as scientist, but I don't think it meant anything to the audience," Theiss said.

"From comments I heard at my table, everybody is behind the man, but nobody knows whether they should believe him" about Dec. 3, Theiss said.

Bonnie Holmes said she had not changed her view that a quake Dec. 3 was no more likely than on any other day. Holmes is executive director of the Flooring Industry Council, a trade association that has headquarters here.

But her opinion of Browning did change. Holmes said she had heard that Browning was "a kind of academic Jean Dixon," the psychic. But after his talk, she believed Browning was "a very learned man who does his homework and truly believes what he said."

Asked by one questioner why the scientific community "doesn't believe you," Browning said: "For me to have an opinion [on that] would be pure overhead. I try not to have an opinion. I stick to my work."

11-18-90

Chicago Tribune

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# Major quake prediction reaffirmed

## Climatologist stands by projection of many December disasters

Chicago Tribune

FRONTENAC, Mo. — Iben Browning on Thursday stood by his controversial projection of a "50-50 probability" of a major earthquake along the New Madrid Fault "on or about" Dec. 3.

At the same time, he defied history and science in explaining the impact of climatic forces on world events, using the same evidence he uses to project earthquakes.

In the view of the climatologist and \$2,500-a-day business consultant from New Mexico, tidal forces and volcanic eruptions have been responsible for, among other things:

The French and Indian War, the American Revolution, the Civil War, social unrest in the United States "beginning in 1961," acid rain and the collapse of the Soviet agricultural system.

"THEY THINK communism

failed," Browning said. "No, the weather failed."

By the end of 1992, he adds, the United States will be in its worst depression, because of "climatory reasons." And contrary to the conclusion of most climatologists, Browning said the world was getting colder, not warmer.

Speaking to nearly 700 people at a builders association meeting in suburban St. Louis, Browning reaffirmed his projection that, based on 60-year peaks in tidal forces, the New Madrid Fault is due for a major quake in early December. He also broadened his projection, saying that earthquakes also could occur then in northern California or Tokyo.

Browning's statements have set off unprecedented alarm in an area where, for more than 180 years, residents have known they were vulnerable to earthquakes.

The projections have been dis-

credited by a panel of seismologists and geologists, including scientists from the U.S. Geological Survey. The panel characterized Browning's projections as "ridiculous" or "as accurate as throwing darts at a calendar."

"THERE IS no scientific basis for correlating high earth tidal times with earthquakes or volcanoes," said Arch Johnston, director of the Center for Earth Research and Information at Memphis State University, and a member of the panel. "Seismologists have examined this question for 50 years and it just doesn't hold up."

Brian Mitchell of the St. Louis University Earth Sciences Department shared Johnston's view. "One benefit of it is it does increase earthquake awareness, but that has to be played off against the fact that near panic has been caused in some places," he said.

"It also diverts people from the

fact that there is really a long-term problem and they should take normal precautions all the time instead of extraordinary precautions for one day," he said.

PART OF the criticism of Browning stems from the fact that he is not a seismologist or geologist. He holds a doctorate in physiology, genetics and bacteriology. He is a biophysicist, climatologist and consultant to businesses about the economic impact of climate and geological events.

In his presentation, for which he was paid \$2,000 to \$3,000, Browning used an array of charts and graphs that he said reflected various temperature, volcano and earthquake activity over the last 2,000 years.

Browning said he had to modify the research techniques he used when he was a scientist, noting that the demands of business often required projections based on less than comprehensive information.

# Ability to Forecast Quakes Shaky at Best, Experts Say

■ **Seismology:** Most scientists dismiss a widely reported prediction of a major Midwest temblor in December.

By LEE DYE  
TIMES SCIENCE WRITER

"Only fools, charlatans and liars predict earthquakes."

That unkind assessment of those who claim to know when the Earth is most likely to shudder has been attributed to the legendary pioneer in seismology, Charles Richter. The quote has become part of the folklore of the dark art of predicting earthquakes, and many would say it is as true today as when it was allegedly muttered by the Caltech scientist who gave the world its earthquake magnitude scale.

For despite decades of research and enormous progress in understanding the mechanics of earthquakes, experts agree that no one has come up with a formula that is likely to lead to a reliable prediction of exactly when and where an earthquake is about to strike. Even Caltech's Clarence Allen, the dean of Southern California seismologists and an eternal optimist in the field of earthquake predictions, admitted recently that science is still a long way from being able to do that.

"I don't think I'm going to live long enough to see any kind of routine short-term predictions," said Allen, 66. Then, yielding to the optimism that has marked his long career, he added: "But I hope in my lifetime I will see some intriguing signals."

That, right now, is about the most that any reputable scientist is hoping for, despite highly publicized claims by some who say they have successfully predicted earthquakes. And that includes a climatologist who has predicted a catastrophic earthquake in early December for the New Madrid fault that runs through southeastern Missouri, using a theory that has been examined and discarded by numerous experts.

Most seismology experts are instead focusing on two expected earthquakes, one in Japan south of Tokyo and one in Central California east of Paso Robles, and either of those quakes would provide clues that will enhance the chance of predicting earthquakes elsewhere. Both projects are based on the belief that some earthquakes strike on fairly regular intervals.

But scientists in Japan are not

certain they will detect evidence that their quake is imminent in the hours before it hits, despite a high degree of instrumentation throughout the region. And the Central California quake is already past due.

So for now, scientists believe that the best they can do is issue "forecasts" of the probability of a specific fault rupturing within a given number of years.

The problem is that increased understanding of seismology has led to a greater awareness of the complexity of earthquakes and a keen sense that no two earthquakes are exactly alike. Thus what "triggers" one earthquake may not trigger another, and events leading up to one quake may be absent from the next.

That has left scientists with a grab bag of clues but no formula that will tell them which events, such as smaller temblors, will precede a major quake. This has made seismologists a humble group, and many are more than a little outraged by the New Mexico climatologist's claims that a catastrophic earthquake will strike the nation's heartland on Dec. 2 or 3.

Iben Browning based his claim on an alignment of the Earth, sun and moon, and his forecast sent shock waves throughout much of the nation—from Chicago to New Orleans—even though a special panel of experts set up by the U.S. government concluded "there is absolutely no scientific basis" for Browning's prediction.

And although the federal government has spent hundreds of millions of dollars on earthquake research, it has issued only one official prediction of an earthquake, and that temblor is now past due. Based largely on an average period of 22 years between quakes on a Central California segment of the San Andreas Fault, the U.S. Geological Survey predicted in 1985 that an earthquake of about 6 magnitude would strike near the community of Parkfield around 1988.

The government has spent \$15 million setting up instruments to record every event leading up to this quake, and at least 50 experts have devoted chunks of their careers to preparing for the temblor. But Parkfield continues to doze.

The prediction said the quake

could come within five years on either side of that date, so it is not yet invalid, but many scientists are beginning to wonder whether nature has played a cruel trick on them.

And new evidence is not encouraging, according to Evelyn Roeloffs of the U.S. Geological Survey, who is chief scientist on the Parkfield experiment. Recent work suggests that past earthquakes in that area differed considerably from each other, and those quakes may not have hit with the regularity experts had thought.

So Parkfield, once thought to be the safest of adventures into earthquake predicting, is demonstrating just how difficult the field can be.

The real world of earthquake forecasting, it turns out, bears little similarity to a recent television movie in which some experts became convinced that the Big One was about to strike Los Angeles because conditions here were so similar to events leading up to a catastrophic quake near Mexico City in 1985.

In reality, the Big One could come with no warning whatsoever. All the money in the world and the best experiments that scientists can create may fail to warn the people of Southern California that disaster is just hours away.

On the other hand, there might be ample clues so that even the dullest of seismologists will figure out something is about to happen.

History teaches that lesson quite clearly. In 1975, clues were so persuasive that China evacuated the city of Haicheng in the hours before a 7.3 quake, which leveled the city. Residents throughout the region had been alarmed by frequent foreshocks that rumbled through the region even as residents were being evacuated, as well as by peculiar animal behavior for weeks before the quake.

As a result of the evacuation, there were few deaths. But only a year later a 7.6 quake destroyed the city of Tangshan, China. About a quarter of a million people died. There had been no warning signs. There had been no prediction. Earthquakes are like that.

The humbling nature of seismology left many experts chuckling to themselves when they first heard that an obscure climatologist had predicted a major quake on the New Madrid fault system, which ruptured in the early 1800s with a series of quakes that rank among the most powerful ever to strike North America. But some Midwestern officials took it seriously, vowing to close schools and other facilities for the days of "geological danger" cited by Browning.

11-18-90

Los Angeles Times

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Browning publishes the Browning Newsletter, which is sold to industrial customers and has warned of everything from the probability that the U.S. government will be overthrown next year to the imminent beginning of an ice age just as most scientists are worrying about global warming.

Browning's prediction of a New Madrid quake snowballed in credibility when some of his subscribers claimed that he had successfully predicted such things as the Loma Prieta earthquake that devastated the San Francisco Bay Area last year and the eruption of Mt. St. Helens.

Faced with growing public alarm, the U.S. Geological Survey established an "ad hoc working group" to evaluate Browning's prediction.

"We took it seriously and looked at it carefully, even though we were very skeptical [of the prediction]," said Thomas Heaton, a scientist in charge of the Geological Survey's Southern California office and a member of the working group. But after examining the evidence, the prediction "just didn't make any sense to us," Heaton said.

On Oct. 18, the group issued a report challenging virtually every aspect of Browning's prediction, including the claim that he had predicted the Loma Prieta quake.

Browning, who is recovering from an operation, has declined all interviews. A woman who answered the phone at his home said simply that the 72-year-old business consultant would stand on his record, despite a strong attack from the seismological community.

But did Browning really predict the catastrophes he claims to have foreseen?

The working group reviewed a videotape and a transcript of two speeches Browning gave before the Loma Prieta quake, in which he claims to have made the prediction. But according to the report, Browning never mentioned California and said only that "there will probably be several earthquakes around the world, Richter 6-plus, and there may be a volcano or two."

The report concluded that his track record in predicting volcanoes is even less impressive. He did predict Mt. St. Helens, the report says, during a speech in Portland, Ore., six days before the eruption. But by then the area around the volcano had already been evacuated, and geologists had issued numerous warnings "that a major eruption was imminent," the report said.

Browning's predictions are par-

Please see **QUAKE**

11-18-90

Los Angeles Times  
(Continued)

## QUAKE: Seismologists Leery of Forecast

Continued from A1

ticularly frustrating to experts because they are based on a phenomenon that has been extensively researched and discarded as the "triggering" mechanism for earthquakes. He believes major quakes are triggered by the alignment of the Earth and the sun and the moon—in other words, when there is either a full moon or a new moon.

Years ago, many scientists thought the same thing because during such a period the stress on the Earth is particularly high. The ground bulges and contracts, just as the seas swell in tidal actions, so it seemed reasonable that such immense stresses could cause earthquakes.

Ironically, Heaton himself once

thought that might be true, and his early work has been cited by Browning to support his prediction.

"I wrote a paper I would just as soon forget," Heaton said.

Heaton later repudiated his own work after conducting more extensive research. When he looked at earthquakes on a global scale, Heaton found that 79 out of 80 quakes did not fit the pattern because they did not occur at times of maximum tidal stress.

"If you have 79 out of 80 occurring randomly, there's not much predictive value in a full or new moon," Heaton said.

The working group's report expressed puzzlement over why Browning zeroed in on early Dec-

ember. Even if tides do play a role, Heaton said, there is no reason to believe quakes should occur at one particular peak tide.

In fact, the tidal conditions in early December will not be significantly different than they were as recently as three years ago, and no earthquake struck then.

Tidal stresses on Jan. 17, 1988, were only a little less than they will be on Dec. 2 and 3, and the difference is so slight that even subtle changes in atmospheric pressures would make the stresses indistinguishable for the two dates.

So the report concludes that the danger on Dec. 2 and 3 will be no greater—and no less—than on any other day.

Unfortunately, despite the condemnation of Browning's method, no seismologist can say there won't be an earthquake because no one knows exactly when one is going to strike. And strike it will, someday.

Asked what he will say if a major earthquake hits the Midwest in early December, Heaton winced. With his face nearly contorting in agony, he said, "I guess we will just say, 'damn.'"

If it does hit, even though Iben Browning's method could still be as flawed as the experts think, the world would never forget a cantankerous climatologist who caused a lot of folks in the Midwest to schedule their vacation trips for early December.

11-18-90

Paducah (Ky.) Sun

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## Time to stand up to fear of the stupid

Last Thursday, Iben Browning (of Dec. 3 earthquake hysteria fame) spoke to a gathering of scientists in St. Louis. Do you know what he said?

He said tidal forces will cause the U.S. economy to experience a dreadful depression in 1992, and "for climatological reasons, we will reach the bottom of the depression about the end of 1992 ... I expect it will be the most severe since 1776, more severe than the 1930s."

Do you know what else he said?

That high tidal forces triggered the rise of Nazism in Germany before the second world war!

I'm not pulling your leg, and I trust the Associated Press was not pulling mine when it reported all of this.

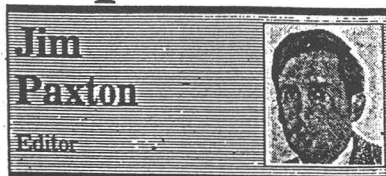
It is this very same Iben Browning who has cowered our region and much of the Midwest by saying that these same tidal forces will create a better-than-even chance of a major quake on the New Madrid Fault on or about Dec. 3.

Holy moly, sell my stock and call Nancy Reagan's astrologer for a second opinion! This is ridiculous folks. Tides and Nazis? A depression worse than the 1930s that will bottom out in less than a year?

Do you know what else happened on the very same day that Dr. Browning was making these remarks in St. Louis?

Yet another area board of education voted to close down its schools on Dec. 3 and 4 because of fear about the quake, or, perhaps more accurately, fear that lack-of-attendance due to quake worries will make school not worth having. I will not name the particular board; it is not my intention to single it out; others will follow suit.

Imbeciles.



A national disaster does await our region on Dec. 3, but it will not be an earthquake. The nation's press has booked every hotel room within miles — not in expectation of filming vast destruction on that day, but in anticipation of an opportunity to depict us as a region of semiliterate, hare-brained hicks (accurately I might add, given the way things are shaping up).

According to the Associated Press, Iben Browning makes his living as chief scientist for a biotechnology company. His doctorate degree is in physiology, not geology or planetary physics — fields in which one might more expect to find someone pronouncing theories such as this.

Instead, Dr. Browning derives his New Madrid disaster theory from a pursuit he calls "climatology," a field in which he says he is self-educated and pursues as a hobby.

I suppose the hobby amuses him. It ought not amuse us. We have let ourselves be terrorized and made fools of by Dr. Browning's half-baked musings. I cannot for the life of me understand why so many seemingly intelligent people are giving in to it.

What kind of example does it set when boards of education close down schools based on a projection like Browning's, which has been almost universally assailed by the scientific

community? Do any of them have the sense or the guts to let reason prevail over the almighty dollar here? (High absentee rates cost local school boards some of their state monies). What will they do next month if some TV evangelist predicts the Second Coming will be the first Wednesday in February? Where does it stop, and how will they stop it?

Friends, I have looked at Dr. Browning and his projection from a wide array of perspectives, and I have formed an opinion. It is this:

Dr. Browning is a charlatan who has used his "hobby" and this "projection" to gain national attention at the expense of inflicting great anguish and fear upon thousands of people in our region.

He feigns dislike of publicity. Yet we have all seen the TV ads for a videotape of Browning's remarks on the earthquake subject. It goes for \$90 a pop. Compare that to prices of a few of the blockbuster movies at your local video store. Someone is making out in this deal; I'm not quite sure who. But I'll bet P.T. Barnum would be proud.

And how about Dr. Browning's famed "prediction" of last year's San Francisco quake? One of WPSD-TV's senior reporters did a nice job of getting at that issue a few weeks ago. He obtained a transcript of Browning's comments in which the San Francisco prediction allegedly was made. From what I could make of those comments, Browning no more predicted that quake than the man in the moon.

My very great regret in all of this is that I have let my own newspaper go way too far in giving Dr. Browning a forum. That I plan to change. I hope that the school boards, other media, and other institutions that people look to for leadership wake up on this issue in the reasonably near future as well.

11-18-90

St. Louis Post-Dispatch

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## Producer Defends Gas Shut-off Valves

By William Allen

Of the Post-Dispatch Staff

Producers of valves that automatically stop the flow of natural gas in a major earthquake say their product is a useful safety device, despite criticism by utility and emergency-management officials.

The valves reduce the risk of fire from a gas leak in homes, schools and businesses after a quake, says Gary Lacy, vice president and director of marketing for Quake Master Inc. of Anaheim, Calif. The company makes the valves.

Emergency officials and Laclede Gas Co. say the valves can shut off gas needlessly.

But Lacy says that the valves seal off the gas flow only if the line is shaken by a major quake. Valves for homes cost between \$400 and \$450, including installation.

The Cairo (Ill.) Public Utility Commission recently decided to offer the valve to customers, Lacy said in a visit last week to St. Louis.

Laclede has no plans to install the valves on its lines, but the company neither favors nor opposes customers' installing them on the customers' side of the gas meter, said Howard Elliott Jr., Laclede's vice president for administration.

In a written policy statement on the shut-off valves, Laclede officials warn that the valves could shut down lines needlessly if "moved or bumped or vibrated by nearby traffic, demolition or construction."

The statement says also that a mass shut-off of gas "could be potentially life-threatening if it occurred in the middle of a St. Louis winter" and that the problems would be "compounded" when devices that had been re-set were "again triggered by inevitable [earthquake] aftershocks."

Several emergency officials in Missouri and Illinois echoed those concerns.

But Quake Master's Lacy said that vibrations caused by traffic and other normal activity were far smaller than those that would trigger the shut-off valve. "Our valve will work only if it's needed" — in response to forces that "will cause possible damage to in-structure gas systems," he said.

As to the prospect of living without heat for a few days in winter, Lacy said: "I assume, if you're from St. Louis, that most people have winter clothing."

"The bottom line is, would you rather be without gas or have a gas leak that could destroy your house?" Lacy said.

People should consider what would happen to latch-key children and anyone who might become trapped, he said.

## Some Delay Christmas Shopping To Buy Quake Supplies

By William Allen

Of the Post-Dispatch Staff

Some residents of southeastern Missouri are putting off their Christmas shopping to buy food, flashlights and other emergency supplies in anticipation of an earthquake in the New Madrid fault, which runs through the region.

Some have even made plans to leave the area.

Anxiety about Iben Browning's forecast of an earthquake around Dec. 3 has cut into Christmas shopping plans of Mary Jo Byrd's friends.

"Many of them are waiting until after that date," said Byrd, an elementary school teacher in the Bootheel town of Kennett.

Schools up and down the fault line have closed for one or more days around Dec. 1-5, the dates Browning says have an unusually high probability for a major quake there. A national panel of quake experts says the forecast has no merit.

Like others in southeastern Missouri, residents of the town of New Madrid have stocked up on household emergency items, said Mayor Dick Phillips. The city has stocked similar supplies around town and moved its emergency equipment to open lots.

Phillips said nobody in town was panicking, although some have plans to leave town for a few days.

"We'll have more TV, radio and newspaper people here than we'll have people who'll leave, for sure," he said.

Phillips said Dec. 1-5 will "for all practical purposes be business as usual," although one tavern plans a "Shake, Rattle and Roll" party.

The forecast is a constant topic of conversation around Kennett, Byrd said. Some residents of that town also plan to leave.

Byrd said she, her husband and two children will stay, but she is going to keep her children "where I can see them."

She recently received a letter from her mother, who lives in Florida, asking the family to leave during the first week of December. The letter contained traveling money.

"I understand why she's concerned," Byrd said. "I have the same concern when there's a hurricane in her area."

Some residents of Sikeston and environs "have figured it's a good time to go see their aunt in Arizona that they haven't seen in a while," said Richard Dale, disaster service chairman of the American Red Cross Scott County Chapter.

Some residents of southeastern Missouri outside the quake zone are worrying unnecessarily, said Dennis Mobrize, spokesman for the State Emergency Management Agency in Jefferson City.

"A lot of people in rural areas aren't aware that their county won't be impacted," Mobrize said. "Because of rumor, innuendo and dissemination of the Iben Browning projection, they overreacted."

11-18-90

St. Louis Post-Dispatch

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# Quakemaniam: Some Tremble In Fear, Others Plan To Party

## 'The Lighter Side' Gets Attention, Too

By William Allen  
and Thom Gross  
Of the Post-Dispatch Staff

Rather than trembling over an earthquake forecast for Dec. 3, the residents and staff of the Westchester House, a nursing home in Chesterfield, are planning a party.

While wearing plastic hard hats, they will eat *tossed* salad, *mashed* potatoes and *upside down* cake. They will play songs like "I Feel the Earth Move" and "Shake, Rattle and Roll."

The home is also taking the prediction seriously. It is stocking extra food, water and other emergency supplies. But the party was scheduled to "go on the lighter side and take the focus off the quake scare," said Laura Burnell, admissions coordinator.

The Westchester House party is just one of several scheduled around the St. Louis metropolitan area for Dec. 3. The centerpiece at another party will be a Jello mold topped with tiny toy houses.

The bashes are in response to a forecast for a quake on the New Madrid Fault by Iben Browning, a climatologist from New Mexico. Otherwise, life at school, work and home in the region will go on as usual around that date, officials said.

Meanwhile, unprecedented numbers of area residents are learning about quake preparedness ... and easing their fears in the process.

Browning predicts a 50-50 chance of a quake measuring 6.5 to 7.5 on the Richter scale on the New Madrid Fault between Dec. 1 and 5. A national panel of earthquake experts who stud-

ied Browning's forecast concluded it had no merit.

Although officials maintain that area residents are handling the forecast well, some people outside the region are overreacting.

The U.S. Figure Skating Association has decided to change the dates of a regional competition that had been scheduled to begin Dec. 3 in St. Louis.

About 270 boys and girls from eight states, ages 8-17, were to compete Dec. 3-8 in the Upper Great Lakes Regional Figure Skating Championships, said Cynthia Allen, local co-chairman of the event.

But after pressure from parents and officials, the association last week decided to reschedule the championships to Dec. 6-9.

"It's a real mess," Allen said. "We've had to cut out half the events. People are furious about the extra expense."

The decision to change the dates was "partly politics in the association, but people were terrified," she said. "People had heard that we were taking the Arch down piece by piece and that all the bridges across the Mississippi were being closed."

Within the St. Louis region, most officials say they have detected few signs of fear.

"I don't feel there's a sense of panic," said Frieda Smith, an official with the American Red Cross who has delivered quake preparedness lectures in the area.

"People in the audience are saying, 'We're concerned, it's time to get informed and we're glad to have this opportunity to find out what we should do,'" Smith said.

Henry Hummert, director of psychology at Lutheran Medical Center's Psychiatric Institute, said he saw no signs of an increase in psychological disorders in the region as a result of the forecast.

"Some citizens are just a little more nervous," Hummert said. "And some of their kids are picking up on it."

Many residents are reacting like Bonnie Holmes, a St. Louis businesswoman.

"I don't know that I believe an earthquake is any more likely on Dec. 3 than at any other time, but I also believe in 'better safe than sorry,'" Holmes said. "I'm not going to leave town, but I have made preparations at home."



Jared Hennings dressed as Captain Disaster talking to third-grade pupils at Glenridge School in Clayton about the effects of an earthquake.

Sam Leone/Post-Dispatch

Businesses plan to operate as usual in the first week in December, according to a poll conducted by AAIM Management Association, 8514 Eager Road.

Of 250 businesses polled, none reported plans to close. Some will take down heavy, stacked material that might tip. Several travel agencies said they had experienced no increase in bookings for flights leaving St. Louis during the period.

Officials from several area schools said they had detected no great fears about the quake forecast among parents and students.

Ron Riegel, superintendent of Belleville Public School District No. 118, said only one or two parents had called to ask about keeping their children home Dec. 3.

John Siemers, director of public affairs for the Parkway School District, said administrators had received more calls after the first reports of the earthquake forecast than recently.

Church officials on both sides of the Mississippi said they sense little alarm among their congregations.

"We're praying that no disaster happens, whether it's an earthquake here or war in the Middle East," said the Rev. Elder Dwight McDaniels, pastor of San Francisco Temple, 10191 Halls Ferry Road. "We're concerned and prepared about it, but we're not falling apart over it. What the Lord wants to do, he'll do."

Despite the low level of anxiety, interest in earthquakes and how to prepare for them has been extraordinarily high, officials said. That's good, they said, because becoming informed helps lessen fears.

John Ingrham, of the Madison County Emergency Services and Disaster Agency, said his agency had been "besieged with requests" for quake preparedness presentations.

But he added, "I think people are becoming a little more relaxed at this point" because scientists have discredited Browning's forecast.

The Red Cross chapter has nearly run out of 230,000 comprehensive quake preparedness guides it published in late October, said Sabrina Kalleberg, a chapter spokeswoman.

Judy Mosinger Ogilvie, an employee at the St. Louis Science Center who frequently talks with visitors, said a "tremendous amount of interest" in earthquakes had not let up. Last week, a small quake was recorded on the center's seismograph as a group looked on.

"In a case like that, we end up talking to people much more about the science of earthquakes" than about the Browning forecast, Ogilvie said. "They just want to know more."

Visitors to the Science Center "tend to be skeptical" about the possibility of a quake on Dec. 3, but they have not completely rejected the forecast.

"There's also a strong feeling that we have been unaware of the earthquake threat in this area and that Iben Browning has done us a great service in getting us to prepare," she said. "Even those who discount him say that."

Robert Kelly and Robert Sanford of the Post-Dispatch staff contributed information for this story.

# Nothing to fear but fear itself, and Iben Browning

By Bill Haltom

**T**HANKS to Iben Browning, a lot of Mid-Southerners aren't nearly so thankful this Thanksgiving weekend. Browning has scared the stuffings and dressing and sweet potatoes out of thousands of folks by stating that conditions are ripe for a major earthquake in this area during the first week of December.

Browning is a climatologist who forecasts such catastrophic events as earthquakes, volcanoes and worldwide depressions. He's not exactly the kind of fun guy you would want to have over for a party. ("Hey, everybody! Iben's here! Let the bad times roll!")

Browning's predictions are rather vague. He has made a "guesstimate" (his word) that there *could* be an earthquake on Dec. 3 in the Mid-South or maybe in California or, then again, maybe in Japan. Despite Browning's incredibly imprecise forecast, there is panic in the autumn air here in the Mid-South. It has already been announced that a number of schools and factories will be closed during the first week of December. Local television stations are broadcasting terror-filled movies with provocative titles such



Bill Haltom

as "The Big Terrible Disastrous Earthquake That Will Be So Bad That It Will Make What Godzilla Did Pale By Comparison."

Moreover, thousands of people are planning family vacations for the first week of December at such tourist spots as Panama City, Fla., and Pigeon Forge, Tenn. It's not that Goofy Golf and Dollywood are particularly nice this time of year. The attraction of these tourist meccas is that they are several hundred miles from Memphis, and thousands of miles from Los Angeles and Tokyo. (Let's not take any chances, folks.)

Recently, however, a number of scientists in the Mid-South have tried to quell the fears inspired by Browning's "guesstimate." These scientists have questioned Browning's methodology and have said that while a major earthquake could well occur in this part of the country sometime in the next several years, it is impossible to forecast an earthquake for a particular day or week, like Willard Scott forecasts thunderstorms.

But despite this criticism, Browning is apparently sticking by his prediction or guesstimate or forecast, or whatever the heck it is. This raises the question of whether we should believe Browning or the counterexperts in the scientific community.

To resolve this question once and for all, I recently consulted with the Mid-South's foremost expert on earthquakes, Dr. Chick N. Little. Dr. Little is

11-24-90  
Memphis  
Commercial  
Appeal

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*Despite Browning's  
incredibly imprecise  
forecast, there is panic  
in the autumn air here  
in the Mid-South.*

professor of quakeology at UCLAOB. That's the University of California at Los Angeles at Olive Branch.

I reached Dr. Little by calling him at his condo in Panama City. For reasons he would not disclose, Dr. Little is on sabbatical from UCLAOB through the first week of December.

I put the question to Dr. Little point-blank: "Is Iben Browning correct in his prediction that there could be a major earthquake in the Mid-South on December 3rd?"

"Of course not," replied Dr. Little in a calm, reassuring voice. But then he added, "However, there is some bad news . . . the sky is going to fall on December 4th!"

Personally, I believe (to paraphrase a former president) that we have nothing to fear but fear itself and Iben Browning. Nevertheless, why take chances? See you in Dollywood.

Bill Haltom is a Memphis lawyer.

11-25-90

Miami Herald

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# Quake forecast shakes up Mississippi Valley

By FRED GRIMM  
Herald Staff Writer

COOTER, Mo. — An oozing panic has inundated the Mississippi Valley. A quiet hysteria. A strange, self-conscious, slightly embarrassed earthquake phobia.

Folks are packing up the china, closing schools, buying insurance, shutting businesses, skipping work, selling homes, moving to Texas, taking unplanned vacations and shipping the kids off to Granny.

They're so worried about the shaky prognosis of a lone, eccentric climatologist that they're discovering within themselves a sudden need to visit that niece in Phoenix.

They're stocking up on axes, ropes, ladders, generators, canned food, sleeping bags, batteries, radios, flashlights, T-shirts with the

*'I'll be in a motel in Little Rock. People say we're silly, but they're not the ones sitting on that earthquake fault.'*

HAZEL CLARK,

Missouri store owner who says she'll leave the state for most of the week

advice to "Get the Hell Out of Memphis" and enough bottled water to irrigate the Sahara.

Old Dody McClure is thinking about relocating, temporarily, into the Cooter City Calaboose — the dank, smelly but solid concrete-and-steel jail, retired some 30 years ago. His daddy, the late Cooter, Mo., town marshal, built the squat little structure in 1925.

"He built those walls a foot

thick," said McClure, 77. "I don't think the earthquake's going to knock it down."

Down through the Missouri Boot Heel, in the southernmost reaches of Illinois, on the flat alluvial plains along the Mississippi River in Arkansas and Mississippi, in the foothills and river bluffs of the western fringes of Tennessee and Kentucky, the fear is not of an earthquake.

It's *the* earthquake, the one coming Dec. 3. Or maybe Dec. 4.

Despite an overwhelming, nearly unanimous chorus of derision from the scientific world, including the U.S. Geological Survey, the "projection" of New Mexico climatologist Iben Browning of a December earthquake along the area's New Madrid Fault has set off an extraordinary reaction.

Browning, 72, figured a 50-50 chance for a quake along the New Madrid, and thousands of residents found him credible enough to see the situation as two stark choices — leave and be safe or stay and, as Wallace Caruthers of Ridgely, Tenn., put it, "maybe get swallowed

PLEASE SEE PHOBIA, 8A

11-25-90

Miami Herald (Continued)

# Tremor projection shakes 'em up

Dec. 3 doomsday forecast leaves many Mississippi Valley folks edgy

PHOBIA, FROM 1A  
up by the earth."

"I'll be in a motel in Little Rock," said Hazel Clark of Cottonwood Point, a little Missouri farm town by the Mississippi River and slap on top of the infamous New Madrid Fault. She'll close her tiny grocery store, shrug off the lost business and be gone most of that week. "People say we're silly, but they're not the ones sitting on that earthquake fault."

The New Madrid is a geological crack in the earth's crust zigzagging along the 120 miles from Cairo, Ill., to the village of Black Oak, five miles below Marked Tree, Ark. The fault produced a series of the most horrific earthquakes in U.S. history during the winter of 1811-12, disturbing the surface so violently that the Mississippi River reportedly flowed upstream for four days.

Since then, the fault has produced occasional mild tremors, but until recently it has been mostly ignored. "To tell you the truth, I haven't even thought about that fault until about two months ago," said Steve Pardue, a ranger with Reelfoot Lake State Park in the northwest corner of Tennessee who grew up within 15 miles of the fault line.

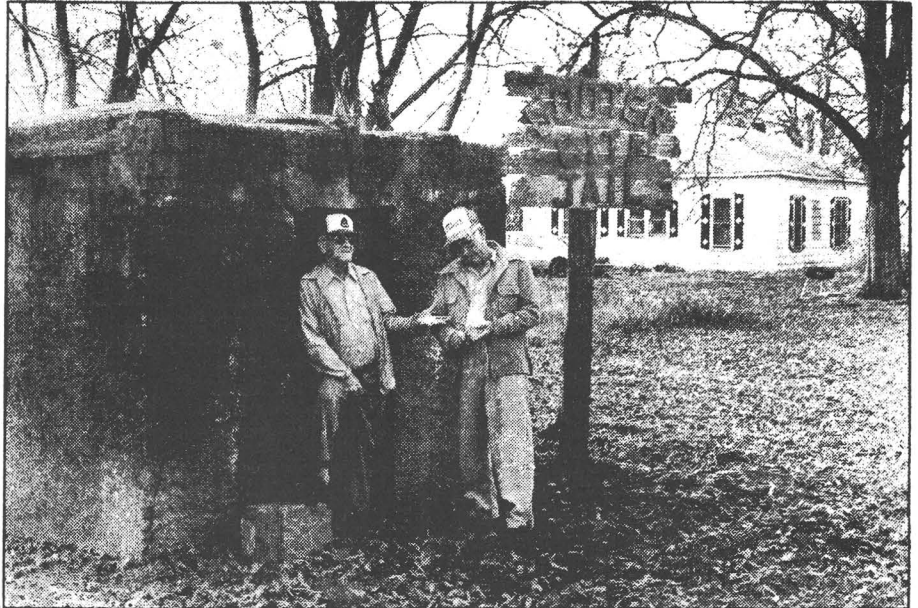
**'Earthquake lake'**

No one in the area paid it much mind, although Reelfoot Lake is advertised as Tennessee's "earthquake lake," created, geologists think, when the 19th-Century quake compressed the earth beneath a sprawling swamp and raised the earth's surface downstream to create a natural dam. But since Browning's warning, Reelfoot Lake has become less of a natural resort than an ominous monument to the awesome danger beneath the surface — another reason to head for the hills.

"I'll be glad when Dec. 3 has come and gone," said Pardue, whose park staff has grown increasingly antsy about working that day.

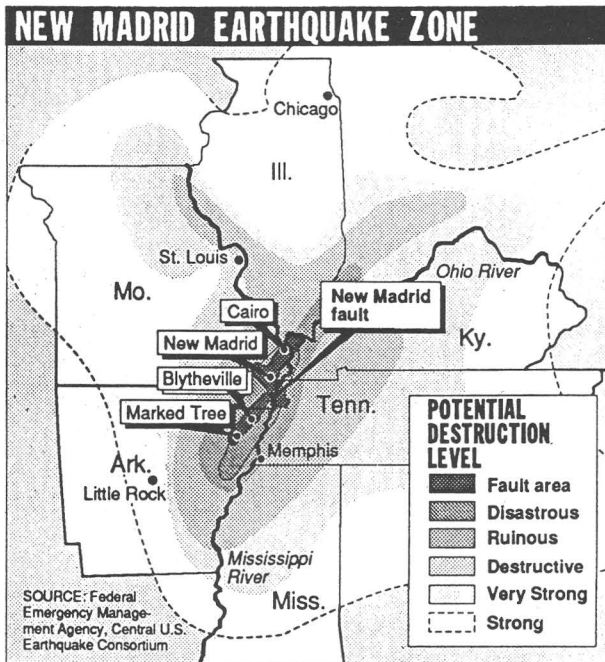
Scientists for years have been warning of a terrible earthquake looming along the New Madrid, but few paid much attention. Memphis, for example, has largely ignored their warnings to pass stringent earthquake-safe building codes.

Suddenly, to the chagrin of the nation's earthquake scientists, a pseudo-geologist has everyone listening — warning that not only was an earthquake possible, it was imminent. While the geologists would only say there was a strong possibility of a major earthquake sometime



FRED GRIMM / Miami Herald

**JAILHOUSE REFUGE?:** With Ray Pugh at his side, Dody McClure, left, says he may move into closed Cooter, Mo., jail to avoid possible Dec. 3 quake: In 1925, his daddy built the jail walls 'a foot thick.'



SOURCE: Federal Emergency Management Agency, Central U.S. Earthquake Consortium

Knight-Ridder Tribune News

in the next 50 years, this fellow Browning captured a massive audience by naming the very week he figured it could strike.

The public, their fears intensified by claims that Browning predicted last year's earthquake in the San Francisco area, abruptly was jolted from a blissful complacency to a wide-eyed, run-for-the-hills dread.

The scientific community has tried in vain to discredit Browning's methods and soothe the infectious trepidation along the fault line. But no matter, the public alarm seems to have gained momentum.

**Schools call off classes**

One school system after another along the New Madrid Fault announced, sometimes sheepishly, that classes won't be held Dec. 3 or 4. "I don't really believe Browning's theories," said John Sellars, principal of the R-3 School in Pemiscot County, a rural Missouri county left pocked by ponds and sinkholes after the 1812 earthquake.

But he canceled classes anyway. Sellars said the school should be closed for practical, economic reasons. Missouri schools are paid according to their average daily enrollment. The principal said that



his school, like most others along the fault line, expected attendance to be so low those two days that to remain open would be a costly venture.

"We've got some parents, even some teachers who are just hysterical over this," he said.

Sellars admitted a certain uneasiness; while he doubted Browning, he was cowed by even a minute prospect of the old school's brick walls caving in on his 200 pupils, grades kindergarten through eight. "If nothing happens, I guess people will laugh at us," he said. "Well, it's still better to be laughed at than to take a chance with the lives of children."

The closing of some schools has lent Browning's earthquake theory a certain respectability, increasing the pressure for others to follow suit. Towns and counties along the fault canceled vacations for firefighters and police officers. Once lonely state and county emergency preparedness officials have suddenly been booked solid, giving earthquake survival tips to standing-room-only crowds in rural schools and churches. Three hundred crowded into Sellars' little

brick school last month for such a talk.

### Insurance is booming

Insurance companies have done an unexpected business, selling \$40 to \$90 premiums for a year's worth of earthquake insurance. State Farm Insurance's regional office in Monroe, La., reported that sales of earthquake insurance have jumped from 100 policies a month to 10,000.

Store owners have reported equally large sales of emergency supplies for folks who plan to stay. Pam Wright, who runs the Marked Tree city water department, said many who are staying in town Dec. 3 aren't doing so out of skepticism toward Browning's prediction. "They're afraid of looters."

"Of course, I'm worried," said Dude Provost, whose soybean and cotton farm at Black Oak, Ark., is at the southernmost end of the fault. The pastoral setting, this expanse of rich, flat farmland, so unthreatening, adds a certain surreal air to talk that this same earth could administer killer tremors.

There are plenty of skeptics. "I

guess if I can't hop out of one of those cracks, I'll be in big trouble," laughed Buck Tucker, 69, of Black Oak.

"I think that a lot of folks are just looking for a reason to get out of a day's work," Jesse Davis, a grocer from Cottonwood Corners, Ark., said wryly. "When I first heard about this, I thought it was a rumor started by the insurance companies."

W.D. McElhane, 87, of Caruthersville, Mo., waved his arms in disgust. "I tell you what they know about predicting earthquakes," he said, leaning on his bicycle. "You know when it hits. You know when it quits."

### Moving out

But everybody knows someone who's leaving.

Gerald McKenzie drove from San Antonio to Marked Tree, Ark., last week. "Just one reason — to get my mother and take her back to Texas before Dec. 3."

11-25-90

## Miami Herald (Continued)

John H. Brown, who owns the Cow Bar restaurant in Marked Tree, is staying. "But my sister quit her job, a good-paying job, and moved out two months ago and took my momma with her. All because of this earthquake."

Brown points to a gray brick house across the street with a "for sale" sign in the front yard. "Those folks moved away without even selling their house. They said they'd come back and sell it later. If anything was left."

J.D. Dunlap said he knew a family down the street from his home in Lepanto, Ark., that just moved away. "Said it was because of the earthquake. Course, it could be that they owed money to everybody in town."

"I don't believe any earthquake is coming Dec. 3," Dunlap said. Then he allowed himself a small grin. "Of course, I don't believe I'll be going up in any tall buildings that day."

# Is doomsayer a fraud or earthquake guru?

By JAMES KINDALL  
Newsday

On Oct. 10, 1989, in a conference room at the historic San Francisco Hotel, a stooped man with a gray burr cut and the demeanor of a tired professor shuffled to the podium. Gazing at a roomful of manufacturing executives, Iben Browning once again issued his prognosis for the planet, talking of storms, tornadoes and volcanic eruptions and the revolutions, famines and plagues likely to result.

In closing, the 72-year-old climatologist and inventor made a startling projection: A major seismological event would take place somewhere in the world in seven days. Almost to the day, the Loma Prieta earthquake struck in California, leaving 67 people dead.

A year later, Browning recalls feeling "terrible" after the quake. He blinks like a befuddled owl behind his bifocals. "There is no scientific attitude toward disaster. There's only a human attitude toward disaster," he says.

Asked about the swirl of publicity over his dark foresight, reports in which he has been characterized as everything from a charlatan to an earthquake guru, his response again is emphatic.

"It's a curse," he says.

Browning is a New Mexico sci-

entist who has long theorized that solar and lunar forces can have a triggering effect on volcanoes and earthquakes. Now he has caused a few tremors of his own with his projection of a 50-50 chance of an earthquake around Dec. 3 along the New Madrid fault close to the Mississippi River.

Seismologists acknowledge this fault is potentially the nation's most dangerous, one long overdue for a major shake. But will it shake again around Dec. 3? Most experts scoff.

Browning's method of quake prediction has been discarded as being unreliable, authorities say. Last month, 11 scientists stated that it was based on "random guessing."

The U.S. Geological Society, which obtained a tape of Browning's San Francisco speech, noted that he never mentioned a location and his projected magnitude was 6 on the Richter scale. There are about 110 quakes each year registering 6, which gave Browning's projection a one-in-three chance of success.

But Browning has supporters, including David Stewart, head of the Center for Earthquake Studies in Cape Girardeau, Mo., a geophysicist and seismologist who sees the New Mexico scientist as a misinterpreted genius.

Says Stewart, "This is the kind

of a mentality the scientific community so rarely sees, they seldom understand it. Who understood Einstein? He never said it was certain. He just said conditions are right. He issued an earthquake watch, that's all."

Browning bases his statistical "projections" — not predictions, he insists — on the pull of the sun and moon and their alignment in relation to Earth. Using these figures, he says, he has successfully called six other major upheavals, including the 1980 Mount St. Helens eruption and the 1985 Mexico City earthquake.

The highest combination of these forces in 60 years will come together Dec. 3, he says, and might cause any number of earthquakes or eruptions within the horizontal band of 30 to 60 degrees latitude in the Northern Hemisphere. This includes places such as Tokyo and San Francisco's Hayward fault.

During a rare interview, he leans on the arm of his wife of 45 years, Florence, and hobbles on fleece-lined house slippers.

His voice hardly rises above a hoarse whisper. He hints of droll humor. Mentioning possible quake sites in December, he says, "I'm rooting for Iraq."

Browning is the chief scientist at Summa Medical-Corp., a biotechnology research company. He writes a monthly newsletter about global climate effects.

His jobs have ranged from college teacher to weapons analyst

for the federal government, the result of his decision to change occupations every three years. Who's Who lists him as a Ph.D in physiology, genetics and bacteriology, a holder of numerous U.S. and foreign patents, the author of three books and a researcher in optical engineering, information theory, brain physiology, enzymes and climatology.

Though his projections involve computer analysis of gravitational forces, he has no argument with seismologists who contend earthquakes and volcanoes are caused by internal, not external forces. Of course, he says, the energy comes from within; he's talking about what starts them.

"Everyone has the same bowl of beads I do," he says. "I just string 'em differently."



'IT'S A CURSE:'  
Iben Browning.

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11-25-90

Paducah (Ky.) Sun

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# For once, you won't read it here first

Last Sunday I swung a pretty mean stick at school boards and other education officials who are buckling under and closing their schools because of an earthquake projection by a man who even they admit is probably out to lunch.

It was not an easy thing to do. I like these people. But I stand by what I said. It is time to exert a little leadership, dammit.

But in fairness, school superintendents and board members should not have to face this music alone. They have been placed between the proverbial "rock and a hard place" and in all honesty, the state (preferably through the leadership of the governor) should have stepped in to give them an out. It still may not be too late.

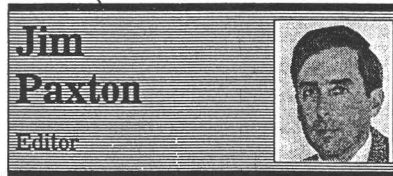
The problem is that in Kentucky, state money to the schools is paid based in part on daily average attendance. Superintendents in various systems told me last week that they conducted surveys and determined as many as 40 percent of their students would stay home on Dec. 3-4 because of the quake "projection."

One superintendent said such an outcome would cost his system about \$40,000 in state money. He says his system runs on as lean a budget as possible, and cannot afford to forego such money simply to make a point.

Another superintendent told me he was at a meeting in Tennessee, and school officials there were somewhat amused by Kentucky's dilemma. Tennessee, he says, uses a different formula for allotting the state money. If I remember correctly, that state considers the average attendance over three-month periods, and bases the payments on the best two attendance months out of the three. Such a system apparently makes it easier to stand up against a two-day fearfest.

But that's getting a bit afield. Long term, certainly this sort of formula may be something Kentucky will want to look at. But my question is this:

Why, given these extraordinary circumstances, can't the state step in and suspend the monetary disincentive for keeping the schools open? It seems the state did something like that in 1977-78, when we had the big snows. Why not now?



I am always at a loss to explain why some of my Sunday rambblings generate volumes of "atta-boys", others bring out the ugly en masse, and still others seem to generate no interest at all. They all seem about the same to me when I write them.

But my crack at the absurdity of the quake mania generated more calls and mail by far than anything I have written all year. Save complaints from a couple of superintendents that my wording was pretty undiplomatic (which it was) and a letter from a schoolteacher who basically did not want to put up with a lot of scared kids on Dec. 3-4 (she could not bring herself to sign her real name, which is sad commentary) the calls and letters were otherwise universally supportive.

I suppose that is good in a way, although my favorite saying to callers, pro and con, is that one cannot run a popularity contest and expect to run a decent newspaper at the same time. It worries me too. I wonder about the 20-20 hindsight that is likely to erupt when people wake up a few weeks from now, realize this whole "tides and earthquakes" furor was dumb and start looking for someone other than themselves to blame.

The press seems a likely (and rather deserving) target; so, too, do the school systems. Rationality certainly hasn't governed this debate so far, so I don't expect that to change after the fact. It could get ugly, folks.

Let he who is without sin cast the first stone. I mentioned today and in my last column that

a healthy share of blame for the earthquake scare can be placed at the feet of the press and other media. I also wrote last Sunday that I would try to grind the Dec. 3-4 "projection" hoopla off of the pages of this newspaper.

It has been like trying to kill a cancer. My reporters and editors have found it next to impossible to report the school closings, disaster drills, etc., without making some reference to the growing hysteria.

So Friday, I imposed Draconian measures. I told my reporters that, other than further school closings or an actual quake, no more earthquake stuff of any kind is to grace our pages until at least the weekend after Dec. 3-4. I told them I also would ask the publisher to reject ads for earthquake supplies and strongly discourage earthquake-related promotional ads during that period. The latter remains the publisher's call, of course (he has been out of town).

These steps are painful. On the dollar side of the issue, times are not wonderful for newspapers or many other businesses I know of. And if we were to shove the responsibility issue aside, even I admit covering the hysteria and the descent of the national press upon us Dec. 3-4 would make for fun, well-read stories. Other media will do those stories. We won't. It will be hard on my reporters.

And there is always the remote chance that a big quake might actually coincide with the aforementioned dates, in which case I suppose I'll be told to start brushing up on the law business again.

But this is a fine newspaper and my predecessors in this job have moved mountains and endured much to establish it as a credible and trusted institution in this community. Continuing that tradition requires us from time to time to take controversial and perhaps unpopular stands on the side of reason.

This is one of those times.

*Jim Paxton*

11-25-90

St. Louis Post-Dispatch

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## Warning

### Some Experts Favor Early Quake Alert

By William Allen  
Of the Post-Dispatch Staff

**R**ESCUE WORKERS who crawled beneath the wreckage of the Cypress Street Viaduct in Oakland, Calif., after the earthquake in the San Francisco area in October 1989 were glad to know that they would have some warning of aftershocks.

That warning came from a makeshift system built within a week of the quake by scientists with

the U.S. Geological Survey. They placed three tremor-sensitive devices near the quake's epicenter and linked them via radio to a loud warning signal at the crumbled viaduct, more than 50 miles away.

Because radio waves easily outrun the shock waves of a quake, the rescuers would get about 20 seconds warning of impending damage from a strong aftershock. Theoretically, it would allow them to escape from dangerous spots.

"In a practical sense, it didn't end up having too much impact," said Thomas Heaton, a seismologist with the survey. "But in the future, we'll be in a better position to set up that kind of system faster, and some of us think we should be prepared to do so."

A disputed forecast for a major earthquake in the Midwest's New Madrid fault about Dec. 3 has brought forth a proposal for a similar warning device in the St. Louis region. The proposal itself is controversial.

11-25-90

## St. Louis Post-Dispatch (Continued)

The system could give St. Louis area residents 30 to 60 seconds of warning if shock waves from a potentially damaging quake were headed here, said Peter Handel, a physicist at the University of Missouri-St. Louis. That might be enough time for some people to avoid dangerous situations and find secure places to ride out a quake.

"It would give time for the dentist to take the drill out of a patient's mouth and for the person ready to step into the bathtub to put something on and run outside the house," Handel said.

But other scientists are skeptical that such warning would be sufficient to take useful safety steps. Some believe a warning, even if it were accurate and timely, would do more harm than good by causing panic and injuries.

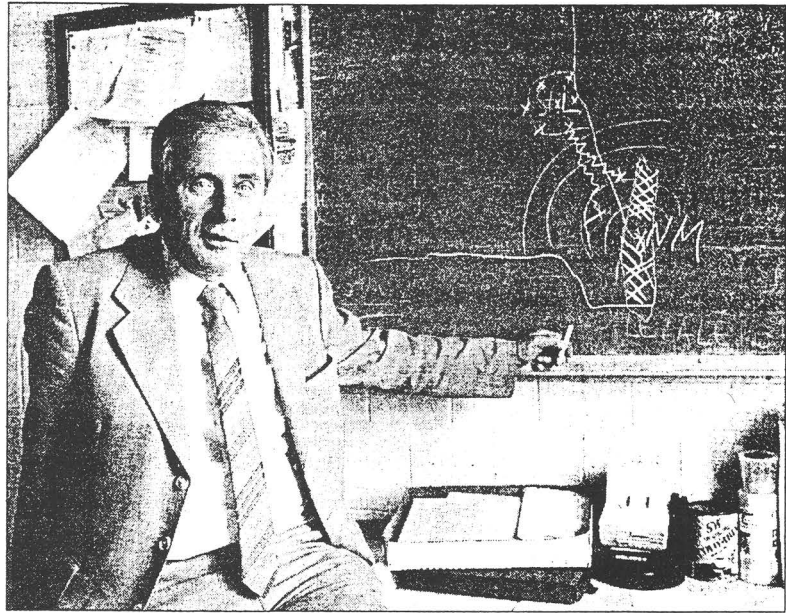
That's because Midwesterners are relatively unfamiliar with earthquakes and how to respond to them, these experts said.

Earthquake warning systems have been used on railroad systems in Japan since the 1960s, said Heaton, of the U.S. Geological Survey, in Pasadena, Calif. The devices were crude at first, but they have evolved into efficient, automatic warning systems that get frequent use.

The best-known application is on Japan's bullet train system. An array of sensing devices placed in geologically active areas shuts down trains if it detects a quake strong enough to damage the rail system and cause an accident.

In a 1985 paper in the journal *Science*, Heaton proposed a model for a computerized seismic alert network for California. It would sense a major quake as it was erupting, instantly calculate its size and where it would strike, and trigger warning systems in appropriate areas.

Such a warning might provide enough time for people to evacuate hazardous areas and for automated devices to shut down elevators, utilities, industrial processes and other activities that would suffer from the impact of a major quake.



Gary Bohn/Post-Dispatch

Peter Handel, a physicist at the University of Missouri-St. Louis, who backs an earthquake warning system that would trigger loud signals around the St. Louis area.

### In principle, seismic alert systems could be useful for more than just warnings, Heaton said. They could help emergency officials determine the impact of a quake so they can respond appropriately.



Post-Dispatch Map

"You'd be amazed at the confusion following a major quake," he said. "You don't know where the hardest hit areas are or what the size of the problem is. It takes time to determine this, often at a time when communications systems aren't functioning properly."

The current seismic network in California is not so advanced. It does not issue warnings. Scientists are trying to improve it so it can give important quake information to emergency officials within a few minutes of a quake.

"As we evolve our system, it's only a matter of time before it turns out warnings," Heaton said. "It's a matter of technological development."

Handel, the UMStL physicist, said a crude version of a seismic alert network — meant solely to issue a warning — would be simple and cheap to create. He is a highly regarded theoretical physicist who has

pioneered in the field of solid state physics.

After detecting a major quake on the fault, the system would send a message over a telephone line that would outrace the quake's worst shock waves. The message would trigger loud warning signals in the metropolitan area, Handel said.

Even if the quake erupted on the northern part of the fault, roughly 150 miles from St. Louis, the system could give residents here close to 60 seconds warning that the destructive forces of a quake were on the way, Handel said. Such a system wouldn't help people living closer to the fault because the distances involved are shorter.

The warning system would be set up something like this:

- A series of four seismic wave detectors would be placed in the area. They would be programmed to respond only when they detected the forces of a major quake that could cause damage in St. Louis and St. Louis County.

- If such a quake is detected, a signal would be sent instantly over a telephone line or radio link to a central location in St. Louis.

- The signal would trigger a distinctive warning noise. The noise could come from automatically triggered cannons or from existing weather warning sirens, Handel said.

Those warning techniques may seem impractical, he admitted, but some way should be found to use a sufficiently loud and recognizable noise to notify people throughout the region about a quake, whether they are at home, at work, at school or on the street.

Handel said he was proposing the warning system because of public anxiety about New Mexico climatologist Iben Browning's 50-50 forecast of a major quake in the fault about Dec. 3.

Officials should set up the system before that day, even if only crudely, he said. Then, they should conduct "a well-advertised drill to familiarize the population with the special warning signal."

Mark Gartland, director of the St. Louis County Office of Emergency Management, said he wasn't

sure how such a system could be integrated into the area's current system for severe weather warnings.

"But if we can come up with anything that can give us an advanced warning, even 20 to 25 seconds, you could cover yourself and protect yourself from falling objects," Gartland said. "The big thing is to see how reliable it is."

To Fred Williams, director of emergency management for the city of St. Louis, Handel's proposal "didn't sound practical."

"A lot of geologists and seismologists have been working on that for a long time and have not come up with a way to do it," Williams said. He said Handel should discuss his ideas with experts in the field.

Several earthquake scientists in St. Louis said that even if technical roadblocks could be overcome, the warning time wouldn't be enough.

Sean-Thomas Morrissey, a geophysicist at St. Louis University, said the warning system would provide "no advantage whatsoever."

The chances of a quake sufficiently large to cause significant damage in St. Louis are slim enough that the risk of causing panic doesn't outweigh the advantages of a quake warning, Morrissey said.

"Why give people a heart attack?" he said. "Anything that enhances public panic at this point is counterproductive. Everybody is overreacting."

Handel said the purpose of the exercise is to reduce panic.

If the system could give only 35 seconds of warning, "The people should know that they have these 35 seconds," he said. "This knowledge is worth lives."

The geological survey's Heaton said quake warning systems are "not something you want to cobble together."

"You have to think about them, and people need to understand what they are and how they work," he said.

On the other hand, Heaton said, "If you were an emergency worker and digging through rubble, you might like it if somebody slapped something together."

11-28-90

USA Today

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## COVER STORY

# Fault line's threat hits fever pitch

A lot of people will be sitting on pins and needles Buying quake insurance, **2B**

By Carolyn Pesce  
USA TODAY

NEW MADRID, Mo. — Two hundred times a year, the earth shifts, usually imperceptibly, below cities and towns stretching from Cairo, Ill., to Marked Tree, Ark.

But one man's prediction of a major earthquake — of at least 6.5 on the Richter scale — on Monday or close to it,

has dramatically affected the 33 million people in striking distance of the New Madrid (pronounced MAD-rid) fault.

The prediction by climatologist Iben Browning has been publicly scoffed at by experts. To no avail. In the seven states along this town's namesake fault, and even in the states beyond, disaster plans are in the works and foreboding, fear — even panic — is in the air.

"A lot of people will be sitting on pins and needles waiting for the earth to shake," says Stephen Renfro, director of the county's health clinic.

Up to 40,000 students are being let out of school Monday — and that's just in Missouri. Across the region, businesses are closing, police are standing by, quake insurance is selling and many residents are fleeing the area.

In White Bluff, Tenn., Mayor Lawrence Brown has even canceled the town's Christmas parade, planned for Sunday.

"I'm the joke of the community right now," says Brown. "But let it be. I'd rather have that happen than have a bunch of power lines fall on kids or have gas lines start popping."

## Continued from 1A

A big quake could be much worse than that. Studies done by the Federal Emergency Management Agency say the area — site of three monster quakes in 1811-12 — is ripe for a new disaster.

Major cities like Memphis, Little Rock, Ark., and Evansville, Ind., are built on soft soil that could literally liquify in a tremor. Brick buildings could collapse. Roads could buckle. The Mississippi could flood. Damage could exceed \$50 billion.

If the quake happens at night, when people are home, hundreds could die, the FEMA study says. If it happens in the day, when people are in high rises, 5,000 could.

That is why people are afraid. "People are gullible," says Carl Bender, professor of physics at Washington University in St. Louis. "There is a real panic on, and in a panic people are willing to believe the most outrageous things."

Outrageous is one of the kinder things scientists from the U.S. Geological Survey are saying about Browning these days. While they agree that the New Madrid is due for a major quake sometime in the next 30 years, they've called his day-specific prediction bunk, and worse.

The reason Browning is focusing on Monday — his exact prediction is Monday or 48 hours on either side of that day — is because that's when tidal forces will reach a 60-year high for much of the Northern Hemisphere. That will "pull the trigger" on earthquakes and volcanoes around the world, he says.

Browning, 72, claims to have predicted last year's 7.1 California earthquake, though that's in great dispute. Now, he spends most of his time as a consultant for businesses, predicting how weather trends will affect crops and companies.

But here in New Madrid, the USA's oldest city west of the Mississippi River, the most fearsome consequence of his prediction is at the end of Main Street. There, a great le-

vee holds back the Mississippi. In a major quake, it could burst.

Others are looking over their shoulders, too:

► In Arkansas, earthquake drills are slated for Dec. 1-5. "You have never seen the kind of damage we are going to be faced with," says Office of Emergency Service official Dan Cicirello.

► At least 1,600 members of the Kentucky National Guard are on call. "We will be standing by breathlessly," says Adjutant Gen. Michael Davidson.

► In St. Louis, meetings, conventions and conferences scheduled to start this weekend have been canceled. Residents are booking flights out of town.

► In Evansville, the Quake Master gas shutoff valve is a hot seller. The \$390 valve is supposed to stop the flow of natural gas into buildings after a quake. Browning is "throwing darts at a calendar but I bless his heart for doing it," says company owner Frank Cici, who's sold 400 valves already.

► In Collinsville, Ill., trucker Robert Mathis is trying to prepare but, "My house is brick and they tell me that's the first to fall down. . . . I'm trying to secure a few things, but that's it. If the earth underneath your house crumbles, you can't tell me you can do anything about it."

Even those out of the fault-zone are worried. Schools in northern Alabama aren't taking chances. They've added earthquake drills to daily routines. In Louisiana, officials are concerned about oil and chemical spills from plants upstream in St. Louis.

"Look at the map," says U.S. Army Reserve Col. Ray Pendleton. "They're looking at a shake-and-break . . . so spectacular that it's blinded them to the possible effects past the seven-state area. But it's natural that things flow downriver."

The frenzied reaction upsets people like Douglas Wiens, seismologist at Washington University:

"I'm worried about this sort of hysterical tone that's come out . . . be-

cause it's completely ridiculous."

Others think massive attention from the media has fueled the problem. In New Madrid, it has sometimes seemed absurd.

William Clark, owner of Tom's Grill, decided Tuesday how much to charge a Peoria, Ill., radio station that wants to broadcast from his restaurant: a steep \$200 for three hours.

Says Clark: "I think they'll be disappointed. They're not going to see any shaking. . . . Probably what will happen is we'll all get settled down and it'll happen in a year."

But no one's betting the farm. "We're believers," says waitress Ginger Wasem of Collinsville, who'll head to Wisconsin in early December — with 10 family members.

"We take this very seriously," says Jim Rexroat of St. Louis.

Francis Payne, who has lived in Marianna, Ark., for 75 years, is using the trunk of her car and several rooms in her house to stash medication, food and water. She even got a utility worker to come out to show her how to turn off the natural gas.

People in the smaller communities, like this one, know it'll be neighbor-helping-neighbor if there is a big quake. Disaster relief will go first to cities like St. Louis and Memphis, where casualties could be high.

"We're prepared for the worst," says Chris Henry, emergency management planner for New Madrid. The town has spent close to \$6,000 on emergency supplies for its 3,300 residents in case of a quake.

Still, New Madrid is short on equipment, manpower and money, and has crammed what should have been three years of planning into three months.

"If it does happen we'll be without help for awhile," says Henry. "But I think we'll survive."

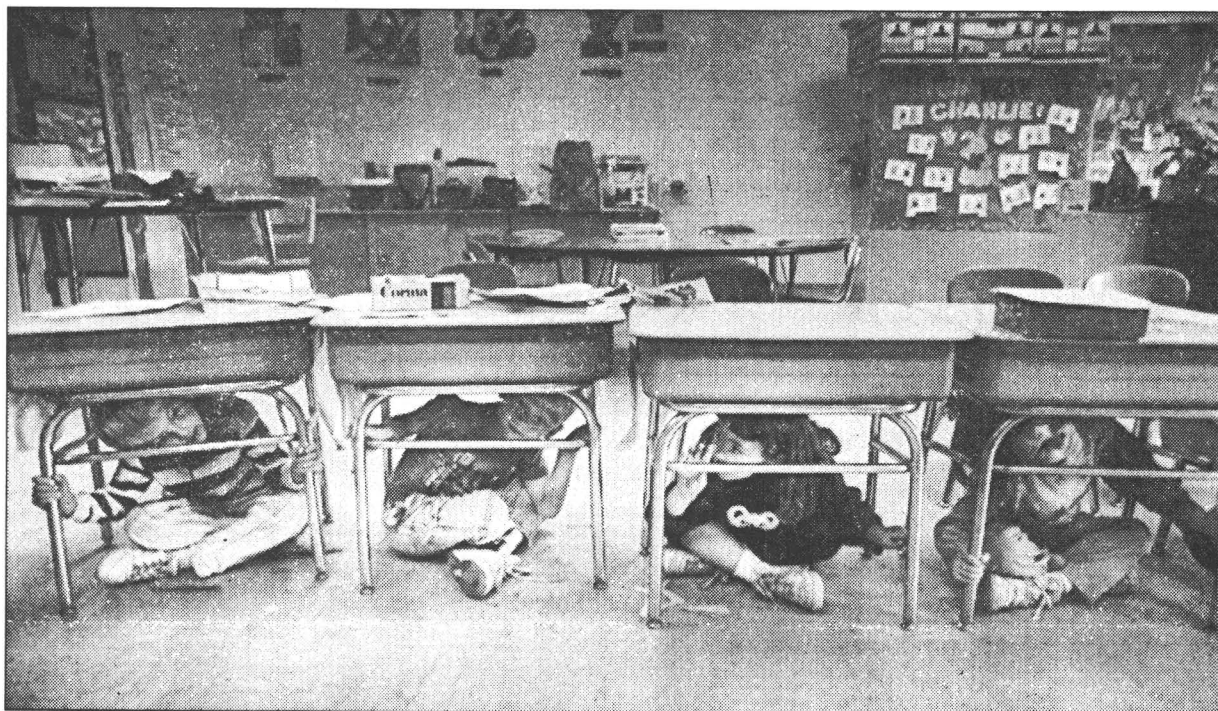
Mayor Dick Phillips, who refused to cancel Monday night's regular City Council meeting, has a more stoic approach.

"We accept this fault as a way of life," he says. "It's been here, and it'll be here when we're dead and gone."

11-29-90

**Louisville Courier-Journal**  
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## A LESSON IN PREPAREDNESS



ASSOCIATED PRESS

First-grade students at Liberty (Ind.) Elementary School crouched under desks during an earthquake-preparedness drill this week. Left to right are Tucker Hoog, Bobby Pence, Jessica Jones and Katie Estridge.

## Browning says projection has not changed

Associated Press

New Mexico climatologist Iben Browning is standing by his controversial projection of a 50-50 chance for a major earthquake Dec. 2 or 3, his daughter said yesterday.

Evelyn Browning Garriss, who works closely with her father and edits "The Browning Newsletter" on climatology, said nothing had changed, despite reports originating yesterday with a San Francisco radio station that Browning was backing down from his projection by saying the chances of a quake appeared less likely in the United States.

"We have not changed our projection," she said in an interview with The Associated Press at her home in Tijares, N. M., outside Albu-

### News reports caused confusion

querque.

Browning has projected a 50-50 chance of an earthquake on the New Madrid Fault on Dec. 2-3, give or take 48 hours, and an even greater chance in Japan, which lies on several faults.

Earthquake experts and other scientists have repeatedly said that Browning's projection — which relies on tidal forces — is no better than a random guess.

In fact, on Tuesday, a scientist from the U. S.

Geological Survey strongly discounted the projection in a briefing of congressional staff members in Washington.

"I can summarize our findings by saying there is no reason . . . that a large earthquake is more likely to occur . . . Dec. 2 or 3 than it is today, three weeks from today or any day in the future," said Randall Updike, associate chief of the survey's Office of Earthquake, Volcanoes and Engineering.

However, scientists do agree that a major New Madrid quake is likely sometime in the next 15 years, and almost certain to come within the next 50.

And disaster officials say that media coverage of Browning's projection has raised public awareness about earthquake preparedness that could prove useful when that day comes.

11-29-90

USA Today

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# 6 years old and 'scared'

## 2nd-graders caught up in quake fear

By Carolyn Pesce  
USA TODAY

NEW MADRID, Mo. — Camden Allgier went into the principal's office crying.

"I dreamed me and my mom were sitting down and the earthquake started shaking everything," says Camden, 8.

Travis Brown is afraid of flooding because he can't swim. David Spencer worries about taking care of his pregnant mother. Tabitha Clark says she doesn't want to die.

These are the second-graders of New Madrid — 6- to 8-year-olds who should be running around the playground

without a worry in the world.

But Iben Browning's prediction that a major earthquake could strike the New Madrid fault around Monday has the children here caught up in fears as bad as those gripping adults from Illinois to Arkansas. Or worse.

They talk about buildings falling, rocks hitting people on their heads, bad fires and big cracks that swallow up people into the ground. And while millions of grown-ups scramble to get ready for a possible quake, the little people are left struggling to understand.

"Schools focus on drills, first aid, things like that," says Los Angeles psychologist Robert Butterworth, who is coming here to counsel townspeople on handling stress. "Often, they don't focus on the emotional."

And the 650 children in

school at the edge of town are carrying emotional baggage.

"I don't like being scared," says Tabitha, 7, whose family is leaving town because of quake fears. "I don't want to die."

Kristen Riggs, 7, talked to his mother about the quake possibility and worries about being left at the baby sitter without her. "Some buildings might fall over," he says.

"I want to leave. I don't want to be dead," says Nicholas Harris, 7, who's just positive a quake is going to happen. "Even if it doesn't happen, I still want to leave. I don't want to be in an earthquake."

Many were scared after watching an NBC-TV mini-series about a killer quake.

"It was kind of scary just thinking that would happen here," says Lacy Hailey, 8.

Principal Agnes Harrington

and teachers around the building have been doing what they can to calm the fears.

"At one point, there was a lot of bickering and fussing going on with the kids," says Harrington. "I think it was because of the stress."

Superintendent Robert Payne says the entire county school district is prepared for a quake, with a disaster plan that went into the works last February. Even so, school has been canceled Monday and Tuesday — a reaction, says Payne, to the desire of the community.

Harrison says she'll be at the front door of the school Friday afternoon, saying goodbye to the kids. But there'll be no talk of earthquakes.

"I hope we can make it through" Monday and Tuesday, she says, "and then pick up our lives and go on."

11-30-90

Louisville Courier-Journal

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# Media hit for fueling quake fears

By ROBERT T. GARRETT  
Staff Writer

WASHINGTON — With growing consternation, journalists and press critics alike have begun to question the news media's role in creating hoopla and hysteria with coverage of a renegade scientist's claim that a major earthquake is a 50-50 likelihood in the Midwest this weekend or early next week.

The press blew this one big-time, according to a variety of science reporters, journalism professors and media critics who were interviewed this week.

"The media have been awful," said William Booth, science writer for The Washington Post. Booth said even major national

## Critics assail press for failure to probe claim

publications are guilty of treating the earthquake forecast uncritically, thereby giving it undue credibility. "The media got taken for a ride," he said.

"This has been pretty silly," added John Franklin, who won two Pulitzer prizes as a science reporter for the Baltimore Sun and is now chairman of the journalism depart-

ment at Oregon State University.

"I would venture that most of the reporters reporting it think the argument (that quakes can be triggered by the pull of a full or new moon) is reasonable," Franklin said. "They don't know enough about science to see the holes in it. It's a sad commentary."

Victor McElheny, director of the Knight Science Journalism Fellowships at the Massachusetts Institute of Technology, said: "You all better get a better list of experts to call and call them more promptly than you did on this one. We just can't have witch doctors like this allowed to spout stuff without the press really checking it out. At some

See JOURNALISTS  
Back page, col. 1, this section

## Journalists

Continued from Page One

point, sanity has to break out."

None of the science journalists and media observers interviewed said the news media should have ignored the claims of New Mexico climatologist Iben Browning.

(In several speeches and interviews, Browning has stated that there is a 50-50 chance that a quake measuring between 6.5 and 7.5 on the Richter scale will strike along the New Madrid Fault, which runs from Arkansas to Southern Illinois, between tomorrow and Wednesday.)

"You're only kidding yourself to say to yourself that you're not going to publish it and keep it out of public circulation," said David Shaw, media critic for the Los Angeles Times.

"But you report it in some context," Shaw said. "You remind people that nobody can predict earthquakes, that nobody ever has been able to and this guy probably doesn't know his ass from his elbow. But you say, 'We thought it was interesting and we'd let you know.'"

Several science journalists, journalism professors and media critics said the regional and national press failed to treat skeptically Browning's claims and past track record of predictions; to question Browning's one widely quoted supporter in academic circles; and to explain that seismologists have examined and discarded the "crustal tides" theory underlying Browning's predictions.

"Where we have had experience with earthquakes, nobody would take a prediction like that seriously at all," said Edwin Guthman, journalism professor at the University of Southern California. "No self-respecting newspaper would pick up

those kinds of things unless it came from a very credible source."

Browning's credibility — and how tough the press was in questioning it — dominates the second-guessing of the coverage of the affair.

One issue was whether Browning accurately predicted, one week in advance, the earthquake that rocked the San Francisco area on Oct. 17, 1989. In August and September of this year, both the New York Times and Wall Street Journal repeated claims that he had.

Last month, however, a team of scientists empaneled by the U.S. Geological Survey released a transcript of Browning's speech to farm-equipment manufacturers in San Francisco on Oct. 10, 1989. It showed that Browning said, "There will probably be several quakes around the world on Oct. 16, 1989." But he didn't specify where, and he didn't predict one for California, the transcript showed. He was also off by a day.

Another issue has been the media's reliance on one professor and several business associates of Browning who back his credibility.

Science magazine reported last month that David Stewart — the earthquake expert at Southeast Missouri State University who has been widely quoted as admiring Browning's techniques and intelligence — had used a psychic and other paranormal techniques to try to refine an earthquake prediction he had made in North Carolina in 1974.

Efforts to reach Stewart yesterday were unsuccessful.

The Courier-Journal reported early this month that virtually all of the people who could be found to verify Browning's claims of accurate earthquake predictions had business and social ties to him.

A larger issue has been how the media have presented the claims of Browning, a 72-year-old business

consultant with a background in biology, not geology.

The Geological Survey's team of scientists noted that about 110 quakes with a magnitude of 6.0 occur each year, or roughly one every three days.

Thomas Heaton, the scientist who heads the Survey's Southern California office, told the Los Angeles Times this month that he had once studied 80 quakes to see whether the gravitational pull of the moon and sun could have triggered them. Heaton found that 79 of the 80 did not occur during new or full moons, the times of maximum tidal stress.

Part of the allure of the story, several people said, has been the intriguing possibility that an old man could outperform government agencies that have been thoroughly frustrated in trying to predict quakes.

"We let this guy get away with being highly and wildly irresponsible," said Booth, the Washington Post science writer. "It's fun. Everybody likes to write about the iconoclastic scientist who goes his own way and goes against the ivory tower. . . . But this guy didn't have the goods and we didn't give people a way to decide if this guy was a flake or not."

Despite such shortcomings, some editors and media critics said they believe the stories about Browning's forecast have served a useful purpose — raising public awareness about earthquakes where such consciousness didn't exist.

Still, the extent to which the public has taken Browning seriously — as reflected by sales of homeowners' earthquake insurance and survival kits, and announcements that

many schools will be closed Monday — has left many journalists questioning their own performance.

One newspaper editor in Western Kentucky, which sits atop the New Madrid Fault along which the quake is supposed to occur, felt so guilty about contributing to the panic that last week he ordered a two-week ban on earthquake news in his paper. That is, unless a quake occurs.

"Ninety-nine percent of the people in the media think this guy (Browning) is not credible, and yet it's just filling up our newspapers and the TV stations are having ratings wars over it," said Jim Paxton, editor of The Paducah Sun.

Paxton said he made his decision after he read that Browning told a St. Louis audience on Nov. 15 that high tidal forces triggered the rise of Nazism in Germany in the 1930s. "The time came to say no," he said.

Irene Nolan, managing editor of The Courier-Journal, said the newspaper would continue to cover residents' preparations for the predicted quake and their activities and reactions through Tuesday.

"This phenomenon has grown and grown since we first heard about it, and there's little doubt in my mind that media coverage has helped it grow," Nolan said.

"But on the other hand, I don't think ignoring it is responsible either. The real question is how the media handle it after Dec. 3. . . . I hope that after Dec. 3 the media will continue to find out what kind of (disaster-readiness) preparations are being made in their area. I think it's a significant issue."

11-30-90

St. Louis Post-Dispatch

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## FEARS OF AN EARTHQUAKE

# Quake Forecast Stalled State Disaster Planning

By William Allen

Of the Post-Dispatch Staff

Iben Browning's earthquake forecast has seriously disrupted Missouri's plans to respond to earthquakes and other disasters, an official with the State Emergency Management Agency said Thursday.

Overwhelming public reaction to the disputed forecast forced emergency officials to take staff members off two key emergency preparedness projects, said Charles Walker, operations officer with the agency.

"He [Browning] has caused us undue hardship," Walker said. "I wish the panic had not gone along with the preparedness."

Walker made the comments at a seminar on earthquake preparedness

sponsored by the Urban Land Institute. The seminar was held at the Missouri Botanical Garden.

Browning, a climatologist from New Mexico, has said there is a 50-50 chance of an earthquake measuring between 6.5 and 7.5 on the Richter scale in the New Madrid Fault this Saturday through Wednesday. A national panel of earthquake experts has called the forecast "scientifically invalid" and found Browning had predicted no other earthquakes.

Staff members at the state agency spent weeks answering "thousands and thousands" of telephone calls from residents in Missouri concerned about Browning's forecast, Walker said. The staff members mailed information about earthquake prepared-

ness and established a speakers bureau that fanned out around the state to discuss the earthquake threat and to "calm some people down."

Meanwhile, two efforts to improve the state's disaster plan languished. The plans detail how officials should respond to damage caused by floods, tornadoes, earthquakes and other disasters.

"We need to do these [improvements] badly," Walker said.

Staffers at the agency started the year working on a new crisis management system that had received funding from the Federal Emergency Management Agency, Walker said. They also began a study to improve the state's communications plan.

The crisis management system

would help maintain the "continuity of government" after a major disaster, Walker said. It would include plans for moving state operations from Jefferson City to Rolla if government activity in the capital was disrupted by a disaster.

The communications plan would improve the chances that state officials could get in contact with each other immediately after a disaster to coordinate emergency operations.

Speakers at the seminar discounted Browning's forecast. Instead, they focused on how architects, engineers, real estate developers and others can plan to make the St. Louis region safer from damage from an earthquake sometime in the next few decades.

11-30-90

## Weekly Record (New Madrid, Mo.)

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## Reporters Betting On Quake To Occur

by Clement Cravens

The weekend we have all been waiting for has finally arrived. We now get to find out if Iben Browning is a quack or on track.

Our town will soon be flooded with members of the news media who are hoping to catch on film, or describe in words, the next major earthquake to occur in the United States.

One of two things will occur, this will either be the most well-documented disaster in our nation's history, or it will be the most well-documented farce in our nation's history. I (with crossed fingers) choose the latter.

Over the past several months our

area has literally been "put on the map" by the publicity surrounding Browning's "projection". Television, newspaper and radio crews have swarmed our streets like ants invading a picnic, but hopefully they will find no food.

Initially, there presence was "neat" as we all were excited about our first interview on TV or quoted in a national or big city newspaper. But as the number of reporters grew, and the list of NEW questions decreased, our media friends began to be welcomed much the same as the above mentioned ants at a picnic.

But, we can't blame them. They are just doing their job. Right now, we

ARE the biggest story that's about to happen (they hope, and we hope not).

In my opinion, there is a good side and bad side to all this hoopla surrounding our earthquake prediction.

On the good side, we ARE better prepared for an earthquake that ALL experts agree will occur in most of our lifetimes. Without this exposure we probably would not have prepared to the degree that we have. This will definitely save lives whenever we have the earthquake. Now or in 1999.

On the bad side, too many lives have been changed, especially the elderly and homebound, who now sit and worry about their impending doom. They should not have to suffer

this way every day of their lives.

Natural disasters do happen, and they are tragic when human lives are lost, but we should not live our lives in constant fear of what we have no control over. All we can do is prepare the best we can, and then carry on with our lives.

But, for now, we have to get through this weekend of national notoriety, and let come what may on Monday or Tuesday.

Closing on a positive note, I will let you in on some inside information I received just before deadline.

Mr. Paul Patchin, a researcher from Kansas City who says he has developed an instrument that detects changes in the density of matter (which he says occurs prior to earthquakes), told me Wednesday morning that matter was not dense enough right now for a major earthquake in the New Madrid area. A small one maybe, but not a major one.

It's funny. I don't believe in predictions, but somehow that makes me feel better.

12-1-90

## Memphis Commercial Appeal

Reprinted by permission of The Commercial Appeal

## Japan, Calif. stay cool as Midwest sweats out Dec. 3 quake forecast

By Marc Perrusquia  
The Commercial Appeal

Iben Browning has Middle America all shook up, but his earthquake prediction hasn't dazed residents in California and Japan.

Mike Blackburn, a Marine guard in the American Embassy in Tokyo, said Friday that he isn't losing sleep worrying about the Big One.

"I've been here over a year now and I've experienced probably over 300 earthquakes," said Blackburn, 24, of Cincinnati. "Everybody just goes ahead with their lives."

Browning, a New Mexico climatologist, says high tidal forces make a major quake likely on or about Monday for the Midwest, California and Japan. The prediction, rejected by most earthquake experts, has raised fears along the New Madrid seismic zone, which runs from Cairo, Ill., to Marked Tree, Ark., some 35 miles northwest of Memphis.

In announcing his prediction this week, Browning said he is particularly concerned about Japan and worried about California.

In other quake prediction de-

velopment metropolitan-area residents believe Browning's prediction.

■ Earthquake-preparedness tips will be offered today at an open house provided by the Central U.S. Earthquake Consortium, a regional group devoted to educating the public and minimizing seismic hazards. The free event is scheduled for 10 a.m.-3 p.m. at CUSEC headquarters, 2630 E. Holmes Road.

■ Memphis Housing Authority employees prepared for the "Big One" Friday when 200 MHA staff members participated in an emergency preparedness drill at MHA headquarters, 700 Adams.

Californians and Japanese citizens, who are accustomed to earthquake activity, aren't getting rattled by Browning's concern.

"There's been amazing calm in the community in the face of this," said Gayle Orr-Smith, San Francisco's deputy mayor for public safety. "We have not gotten a lot of inquiries."

Ms. Orr-Smith attributed the calm to two factors: The devastating Oct. 17, 1989, quake that shook the Bay Area and continual slew of earthquake predictions in California.

"We get predictions about quakes all the time here," said Ms. Orr-Smith, who likened the process to crying wolf. Ms. Orr-Smith said the San Francisco quake last year still is recent enough that people there are not alarmed about having another big one so soon.

Ms. Orr-Smith said San Francisco residents can't help but chuckle a bit when reading news accounts of panicky residents fleeing New Madrid, Mo. "Well, gee, why?" she said.

In Japan, where earthquakes are common, the Browning prediction has received little atten-

tion.

Because of a constant earthquake threat, most buildings and public works in Japan are designed to be earthquake resistant. A devastating quake killed 140,000 people in and around Tokyo in 1923, but a 1984 quake registering 7.9 on the Richter scale caused little damage.

"They're just prepared for it," said Blackburn, the Marine embassy guard.

In Arkansas, Gary Talley, spokesman for the Office of Emergency Services, called damage resulting from the east Arkansas quake scenario "devastating. Absolutely devastating."

Under the scenario, an earthquake measuring 7.6 on the Richter scale was centered at Marked Tree at 3 p.m.

At 4 p.m., the scenario called for OES getting no word from its county coordinators in 15 eastern Arkansas counties, Talley said. The lack of communication would make it impossible to tell how many people were killed in the first hour of a quake, he said.

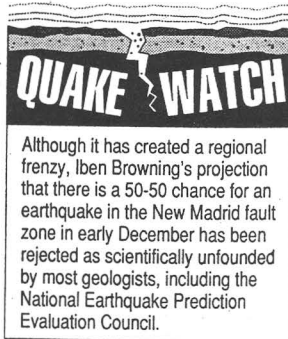
"It's the quiet areas that are the hardest hit," he said.

Meanwhile, the Memphis State survey shows area residents know a lot about earthquakes, but they aren't too rattled by forecasts for a temblor next week.

"The general feeling from the people is, 'It's not going to happen,'" said O. C. Ferrell, a distinguished professor of marketing who helped conduct the survey.

Of 143 metropolitan-area residents questioned in the survey, only 8 percent said they believe a quake is likely on or near Monday, as projected by Browning.

The random survey was conducted by Ferrell and assistant marketing professor T. Bettina Cornwell this week.



velopments Friday:

■ Arkansas officials pretended Friday that an earthquake struck eastern Arkansas and that it cut off electricity, communications and travel to 16 counties. The drill will begin in earnest at noon today when officials with more than a dozen state and federal agencies, including the Arkansas National Guard, open sealed packets that outline the damage in their counties.

■ A scientific survey by two Memphis State University marketing professors this week shows that very few Memphis



## Ingenuity replaces missing ingredients for quake cooking

By William C. Bayne  
The Commercial Appeal

Now let's face it. If a major earthquake *did* happen, even the Piggly Wiggly might close. And that could mean that you might have to live with what's on hand for a few days.

You might even have to cook it yourself — and that could be a sudden burden for those who don't have charcoal grills or who think outdoor cooking is a skill best left to Boy Scouts.

So if you're faced with Craig Claiborne-style Armageddon, keep it simple. First, gather the necessary tools: long-handled forks, tongs or pancake turners; cast-iron skillet and other pots and pans; heavy aluminum foil.

Most department stores and a number of hardware stores have cans of "liquid heat" that can be used repeatedly for cooking.

Outside is better than in for any type of open-fire cooking, and best results will come if you protect the flame from the heat-scattering winds.

A homemade, substitute, steady burner can be made: Tightly coil up rough cardboard, place inside a coffee or smaller can, cover cardboard with melted paraffin and allow the wax to congeal. The cardboard will serve as a wick from which the paraffin is burned gradually.

The flame can be used directly to heat a pot, for soups or stews, or it can be used under a grill to heat a skillet or pot. When it's time to douse the flame, put a larger pot over the fire.

Food sources will require thought. If your freezer is full, the frozen food will stay cold longer if the freezer door is kept shut. Generally, foods frozen hard will last for up to 36 hours in a closed freezer.

Milk, butter, margarine, yogurt and cheese will spoil — likely in that order — if not kept cool. If the outdoor temperature is 40 degrees or less, items will be cooler outside in the shade than in an inoperative refrigerator.

If ice is available, wrap dairy products in a sealing plastic wrap and put them on ice until used. In the event of a major power outage for 72 hours or less, the ice could keep dairy products fresh.

If it appears that the power will remain off for an extended period, use perishable frozen or refrigerated foods first, and fish first of all. Canned goods will last longer, as will dry goods such as rice, dried beans, flour and cornmeal.

Common sense will tell you that boiled eggs will keep longer than uncooked fresh eggs; pickled eggs — boiled, peeled eggs dropped in a gallon of vinegar with a tablespoon of salt — will last longest.

Dutch ovens can be used over the flames to bake bread or to cook soups or stews. Use a large skillet for fried foods.

Storing prepared foods without refrigeration may be difficult; try not to cook more than is needed right away.

Cleaning up may be more difficult, too; the water may be off. You might try getting water for cleaning from a creek — and boiling it 12 minutes to make it safe for washing dishes.

Cast-iron skillets and woks may be cleaned without soap. Add a small amount of water and place it over an open flame.

When the heat brings the water to a boil, remove the skillet, pour out the boiling water and scrub it out with a good abrasive pot scraper. Swish a small amount of water around the bottom of the skillet to remove any small residue and then dry well with a cloth or paper towel.

Figure out ways to cook items on your grill that normally would be cooked indoors. For example: Bake fish, potatoes, onions, apples, or even a whole chicken by wrapping the item completely in foil and placing it on the grill or directly on the coals.

Heat will be uneven, so turn food often with long-handled tongs and remember that cooking may take longer. A chicken, for example, might need an hour in an oven to bake. Add at least 30 minutes if cooking outdoors.

Overcooked food might not be as tasty — but remember, it may be much safer than undercooked food.

## Climatologist's predicted act of God aids church

By Tom Bailey Jr.  
The Commercial Appeal

Insurance agents aren't the only ones taking advantage of the earthquake frenzy. The hula-hula over whether a quake will happen Monday is not lost on the church, either.

"You don't get breaks like this often," Rev. Frank McRae of St. John's United Methodist Church said, chuckling.

The sign outside St. John's on Peabody advertises the title of Sunday's sermon, "When Will It Happen?"

Mr. McRae wants passersby to assume he's going to preach on the earthquake.

"But, of course, this is the first Sunday in Advent," Mr. McRae said.

"This is the coming of Christ. The Advent is not the advent of the earthquake, but there are some parallels."

The Advent season, the four Sundays before Christmas, is a time when many Christians prepare spiritually for Christmas. It's not that the ministers are taking climatologist Iben Browning's projection for a major quake seriously.

They are seizing an opportunity.

It happens that the Biblical passage on which Mr. McRae and many other ministers have long been scheduled to base their Dec. 2 sermons seems to fit the earthquake hubbub.

"But of that day or that hour no one knows, not even the angels in heaven, nor the Son, but only the Father," Jesus tells His disciples in Mark 13:32-37. "Take heed, watch; for you do not know when the time will come..."

Shirley Prince, associate minister of Mississippi Boulevard Christian Church in Whitehaven, said the church delivered its earthquake sermon Nov. 25. The

title of the sermon was "Standing on Shaky Ground."

"Why wait until the last minute?" Ms. Prince asked.

Rev. Jesse Garner, pastor of First Presbyterian Church on Poplar, said he plans to refer to the earthquake Sunday.

"But in an ironic or jocular fashion — nothing serious, I'm sure," he said.

The sign in front of Crestview Baptist Church on Winchester states: "Preparing For The Big One? Are You Prepared For The Last One?"

"We're just using the uproar as an attention-getter on the sign," said Rev. Clif Springer, pastor of Crestview.

Not all churches are taking the projection so lightly. Winchester Heights Christian Church on Winchester is conducting a prayer vigil from noon Saturday until the Sunday morning worship.

"Because of the anxiety and concern of so many people in our city anticipating the earthquake, the members of the congregation felt that our prayers should be focused on God, who will take care of us," states a press release from the church.

Rev. W. P. Dixon, pastor of Greater Lewis Missionary Baptist Church on North Manassas, says his church will talk about the projection, but he won't have a special message on it.

"It is something the Lord said would happen but He didn't say when, where or how," Mr. Dixon said.

Rev. Charles H. Ryans, pastor of Salem Gilfield Baptist Church on Kimball Avenue, agreed.

"I think there is a possibility an earthquake could occur. However, I don't necessarily think there is a likelihood, not on (Browning's) schedule," Mr. Ryans said.

Staff reporter Quintin Robinson contributed to this story.

**12-1-92**  
**Press release from**  
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LOS ANGELES, CALIFORNIA

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**IN NEW MADRID VIA CABANA MOTEL (314) 748-5513**

## **PSYCHOLOGIST TO STUDY NEW MADRID QUAKE PREDICTION STRESS.**

**A PSYCHOLOGIST WHO DEBUNKED THE NOSTRADAMUS EARTHQUAKE HOAX IN 1988 AND BECAME KNOWN AS THE, "NOSTRADAMUS BUSTER" IS IN NEW MADRID, MISSOURI TO STUDY REACTIONS TO WHAT THE EARTHQUAKE EXPERT CALLS, "EARTHQUAKE PREDICTION HOAX II -- THE SEQUEL".**

New Madrid, MO. (Dec. 1, 1990) -- "The Nostradamus prediction of a catastrophic earthquake in May of 1988, frightened a great number of individuals in Southern California. Many were affected psychologically. Earthquake trauma phone lines established to calm people were jammed much of the time with hundreds of anxious callers needing reassurance. As the May 10th prediction date drew near, people became preoccupied with fantasies of destruction, hypervigilant to any sudden noise or movement, afraid to sleep indoors with the most-jittery residents making a run on travel agents, real estate brokers and moving companies -- This erratic stress behavior exhibited in California could occur along the New Madrid Fault as the December 3, prediction date approaches."

This according to California psychologist, Robert R. Butterworth Ph.D., who established the Nostradamus stress hot-line in Los Angeles and counseled anxious residents who experienced psychological prediction symptoms as a result of the 1988 California Nostradamus earthquake scare.

A prediction that a massive earthquake could strike Missouri and neighboring states that run along the New Madrid Fault has triggered this California psychologist to issue a Psychological, "stress-alert" for that region of the country.

Dr. Butterworth warns mental health professionals in the area of the New Madrid Fault to be on the alert for increased, quake prediction stress symptoms in the population.

### Earthquake stress symptoms include:

Panic attacks, increased anxiety, depressive mood, feeling of sadness, gloom, dread and pessimism.

Insomnia, increased irritability and nervousness, loss of concentration and productivity.

Rise in rates of alcohol and drug use. Increase in domestic abuse and possible divorce rates. A growing preoccupation with earthquakes.

"It's important for people not to joke tease or make light of those suffering from these prediction symptoms -- Stress and anxiety will not diminish by dismissing fears or rejecting the validity of the predictions." Said Dr. Butterworth who also added, "Individuals who are the most afraid and anxious concerning earthquakes are those who are the least prepared and knowledgeable about them -- Lack of knowledge breeds panic and anxiety due to helplessness."

Dr. Butterworth believes that scientists or seers who make frivolous earthquake predictions that are not based on hard data should be responsible for the emotional trauma inflicted. "Legal guidelines need to be established concerning damage awards for false predictions. If I yell, 'fire' in a crowded theater and a stampede results, injuring people I can be prosecuted if there wasn't a fire -- Why should someone be able to yell "earthquake" in a crowded region and be immune to the disruption and anxiety that result."

Psychologist Robert Butterworth Ph.D., is co-director in Los Angeles at Contemporary Psychology Associates, Inc., an established researcher in the field of psychology.

Mailing Address: Post Office Drawer 76477 • Los Angeles, California 90076

# Give him this: Inventor made Earth stand still

By Tom Charlier  
The Commercial Appeal

History will record that during the first week of December 1990, an eccentric 72-year-old inventor with no formal training in earthquake science shook nerves in seven states with his dramatic vision of The Big One.

And as the country hovers on the brink of recession and war, with deficits soaring and taxes rising, frightened Memphians call authorities to ask if it is true that Reelfoot Lake is bubbling and hissing — and to ask what to do if a quake releases lions and tigers at the zoo.

What, indeed, hath Iben Browning wrought?

The occasion: a celestial rendezvous that today will bring a nearly full moon in line with the sun at a point unusually close to Earth. And as Browning figures it, that alignment means an even-money chance of a major quake along the New Madrid seismic zone by Wednesday.

That's this neck of the woods. And as the heavens move and the clock ticks on Browning's projection, schools and homes are emptying and families are stockpiling supplies.

The projection by the controversial New Mexico climatologist clearly has brought the roller coaster of public interest in earthquake hazards to an all-time peak, authorities say.

But they add that whether it stays high or plummets if, as expected, Dec. 5 passes without a tremor is open to debate.

"We've been trying for 15 years to get people to listen to this stuff. He did more in six months in getting the interest there," says Jeff Crenshaw, director of the Memphis-Shelby County Emergency Management Agency.

But other officials see a major potential drawback.

"I think overall, it's probably counterproductive. We know that fear is not a really good way to get people to prepare," said Tom Mullins, public affairs director of the California Office of Emergency Services.

Browning's claims that unusually strong tidal forces are likely to trigger a quake in the Northern Hemisphere during a five-day period that began Saturday have been rejected by seismologists from across the nation. A quake could happen at any time, they say, adding that there is no

known correlation with tides or any other way to pinpoint when.

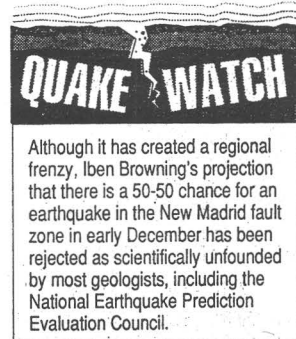
But scientifically merited or not, the projection has touched a nerve with the public.

Crenshaw's agency now is taking 250 earthquake calls and making about 10 presentations on the subject each day. Memphis State University's Center for Earthquake Research and Information averages about 150-200 phone calls and three presentations a day.

The Central U.S. Earthquake Consortium (CUSEC), which moved its headquarters to Memphis in April 1989, has noted a reversal in public apathy, as well. CUSEC is distributing 100 earthquake information packets daily and has doubled its staff to deal with calls from the public.

As a result of the interest generated by the Browning projection, CUSEC is "about done" with the first task it had assigned itself — informing the public of the regional earthquake hazard, executive director Harvey Ryland said.

"There are very few adults



## The Danger Underfoot

The amount of damage caused by an earthquake depends in large measure on the types of soil on which buildings are constructed.

Soft clays and sand found along the Mississippi River and its tributaries readily transmit the seismic vibrations that can undermine buildings. Because of its lack of cohesiveness it also is more likely to liquefy — the process in which the ground loses its stability during quakes and turns to virtual quicksand.

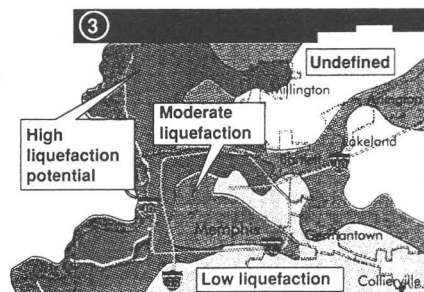
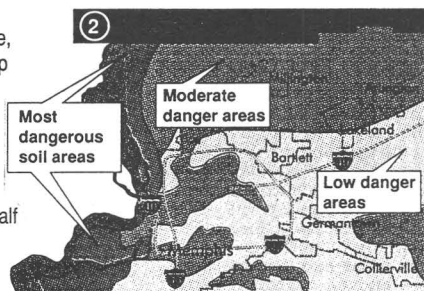
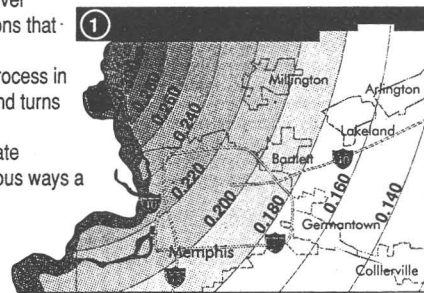
Prepared through recent research by Memphis State University experts, the three maps at right show various ways a quake in the New Madrid fault zone could affect the Memphis area. Researchers emphasize that localized variations exist within each broad soil zone.

Map 1 shows the force of shock waves, measured in units of gravity, that could hit Memphis from a 7.5 magnitude quake centered at Marked Tree, Ark., the closest point in the zone to the city. The map indicates that in the Meeman-Shelby Forest State Park area in the northwest part of Shelby County, the quake's energy would be 0.3 units of gravity, or nearly one-third the force of gravity. By the time they reached Collierville, in the southeast corner of the county, the waves would be less than half as strong.

Map 2 shows how different soil types found throughout the county would likely transmit vibrations, with the darkest region being the most dangerous.

Map 3 shows where the potential for liquefaction throughout the county would be highest during a 7.5-magnitude quake in Marked Tree. The liquefaction threat would be reduced in less-powerful temblors.

As shown by the maps, the riskiest place to build generally is along the Mississippi River, including a sliver of downtown. However, most of the county is underlain by good, stable soils.



Source: Memphis State University

12-2-90

## Memphis Commercial Appeal (Continued)

who are not aware of the earthquake risk here in the Central United States," he said.

Interviews with residents throughout the New Madrid zone, which extends from southern Illinois to Marked Tree, Ark., and surrounding regions, tend to bear that out.

"Suddenly, everybody is aware of the danger. We've never been as well informed before," said Elaine Van Horn, a resident of Houston Levee Cove near Collierville.

Mrs. Van Horn and her neighbors have organized elaborate earthquake-preparation measures — listing out-of-state contacts, stockpiling supplies and exchanging information. They each keep a bag containing tennis shoes, a flashlight and a quart of water nearby at all times.

In Paragould, Ark., Alice Stuart's family has been getting ready, too.

"We're prepared. We've got our hot-water heater belted down, we've got food that you don't have to heat..."

Even residents living far from areas likely to be damaged by a New Madrid quake are worried.

Earthquake insurance has been selling fast as far away as Nebraska and Michigan.

In Port Gibson, Miss., 250 miles from the southern end of the fault zone, schoolchildren have begun regular earthquake drills. In northeastern Louisiana, business owners are reinforcing windows and residents are getting ready.

"I don't think it's widespread, but ... I've heard of instances where people have been stockpiling groceries, canned goods, that stuff," said Carl Walk, city clerk in Tallulah, La., some 200 miles south of Memphis.

The reaction of some residents approaches panic.

"I can't hardly breathe, it upsets me," said Terri Barton, a housewife in Kennett, Mo. "I didn't know we could even have big ones."

Crenshaw said his agency has received calls from parents saying children have reverted to bed-wetting since the publicity began. Mental health officials report few additional anxiety calls resulting from the scare.

"They are mostly clients who have fear of just about any type of calamity," said Judy Caldwell,

director of operations at Southeast Mental Health Center on Winchester, which has fielded "five or six" quake-related calls.

Local school officials, responding to parents' fears, have canceled classes in at least 30 districts in five states.

Carl Bender, a physics professor at Washington University in St. Louis, says such reactions are unwarranted — but explainable.

"I think the reason people are scared is they see other people being scared," he said.

While many residents and local officials take the Browning prediction seriously, others dismiss it.

"I don't believe that people are really believing him, but since we all live on the fault we know for sure that there will be one (someday)," said Marsha James, who works with a disaster-preparedness committee in Lake City, Ark.

In the Gates community of Lauderdale County, Tenn., Zona Childress isn't perturbed about Browning's prediction, either.

"I try to ignore it as much as I can ...," she said. "If the Good Lord wants you, he's going to get you, regardless."

The region's response to the Browning prediction is the focus of studies by two universities.

Researchers at the University of Colorado and the University of Delaware have been surveying residents to see how much they know about the prediction and to what lengths they're going to prepare.

"There's no discernible median," said Pam Showalter, a graduate student at the Colorado school's Natural Hazards Research and Applications Information Center.

The center polled some 1,000 residents in Marked Tree and Wynne, Ark., and East Prairie and New Madrid, Mo.

Although Browning has specified faults in California and Japan as being at risk this week, too, nearly all the attention has been focused on the New Madrid region. Mullins said the forecast in California has been little-publicized and largely ignored because "earthquakes aren't the mystery they are in some other parts of the country."

Earthquake predictions have caused panics before, however. Lima, Peru, was convulsed by a

false 1981 prediction made by two geologists, and seven years later a bogus forecast shook up some Los Angeles residents.

"This kind of thing doesn't happen very often. ... I think that's why so many people are studying it — we're just fascinated," said Ms. Showalter.

Researchers and authorities express concern that interest and preparedness could tail off dramatically after this week. They note scientific projections that show the New Madrid region faces at least a 40 percent chance of experiencing a significant quake in the next 15 years.

Washington University's Bender said it is hard to get the public interested in those kinds of scientific predictions because they are complicated and heavily

qualified.

"Scientists generally make predictions that are much less interesting than anti-scientists (such as Browning)," he said.

Despite the public interest, Bender sees only harm resulting from the projection. He said falsehoods should not be used to motivate people. "If you don't want your kids to smoke, you don't tell them their hands are going to fall off."

Arch Johnston, director of the MSU center, agreed that little long-term good can come from the commotion.

"It's the wrong message," he said. "The earthquake hazard here is a part of life. ... It's a long-term hazard, so dodging this day or that isn't going to change things."

## SCHOOL QUAKE CLOSINGS

Numerous schools in the region will close for up to a week in reaction to Iben Browning's earthquake prediction.

Some school boards felt students just needed to be at home that day. Others closed anticipating high absenteeism. Some decided to shut down after polling the community. Schools closing are:

### TENNESSEE:

Lake County, Monday  
Lauderdale County, Monday  
Dyersburg, Monday

### MISSISSIPPI:

Coahoma Junior College, Monday  
First Presbyterian Kindergarten in Greenwood, Monday and Tuesday  
Grenada County, Monday

Tougaloo College, Jackson; Monday-Friday

### ARKANSAS:

Cross County, Monday and Tuesday  
Earle, Monday and Tuesday  
East Arkansas Community College, Forrest City; Monday-

Wednesday  
East Pointsett, Monday and Tuesday

Forrest City schools, Monday-Wednesday

Hughes, Monday and Tuesday  
Marked Tree, Monday and Tuesday

Marvell, Monday-Wednesday  
Palestine-Wheatley, Monday-Wednesday

Parkin, Monday and Tuesday  
South Mississippi County, Monday-Wednesday

West Memphis and all other Crittenden County schools except Marion; Monday and Tuesday

### MISSOURI:

Cardwell, Monday and Tuesday  
East Prairie, Monday and Tuesday

### KENTUCKY:

Daviess County, Monday and Tuesday  
Hancock County, Monday and Tuesday  
Hopkins County, Monday and Tuesday  
Livingston County, Monday and Tuesday  
McLean County, Monday and Tuesday  
Muhlenberg County, Monday and Tuesday  
Ohio County, Monday and Tuesday

Owensboro and Owensboro Catholic, Monday and Tuesday  
Union County, Monday and Tuesday

# Animals seemingly have ESP for quakes

By William Thomas  
The Commercial Appeal

If your cat leaves home, your fish jumps out of its tank, your canary goes nuts and your dog barks at the wind, there's a 50-50 chance you're about to get all shook up.

Or so says the pet theory of earthquake predicting.

It goes back thousands of years when people first noticed that animals, birds and fish act weird just before the big ones. And although scientists pussyfoot around the so-called evidence, the theory is alive and well today among folk who live along the New Madrid faultline.

And it could be a good thing, since climatologist Iben Browning has predicted the Big One could hit the New Madrid zone sometime this week.

Consider, for example, the strange experience of Jack Moore Jr., who lives in Sikeston, Mo., and keeps a small flock of chickens. As he was leaving for work one morning a few weeks ago, Moore noticed that all eight of his pullets were lying on their sides as if playing statue.

"At first, I thought they were dead," said Moore, who is in the carpet-cleaning business. "Chickens don't turn themselves upside down. In fact, if you lay them on the ground that way, they won't move."

Moore was still puzzling over the mystery when a small tremor shook the area. Now, he's convinced the birds knew it was coming all along. And maybe the fish did, too.

"I know two people who keep tropical fish," he said, "and in both cases, fish jumped out of the tanks that day. One of the tanks had 12 fish in it, and when the owner came home they were all dead on the floor."

Bizarre as that sounds, it is no stranger than the stories of wild animal behavior that have been passed down as earthquake folklore for generations.

Five days before the ancient Greek city of Helice was destroyed in 373 BC, for example, a historian reported rats, snakes, weasels, centipedes, worms and beetles taking the road out of town in droves.

In modern times, earthquake watchers have reported cows bellowing, flapping their ears and whipping their tails; dogs barking and racing around, small pigs biting each other, pigeons flying into the air and circling endlessly, bees becoming confused and swarming into churches, catfish leaping out of the water like salmon and hibernating snakes awakening and crawling out of the ground to freeze to death in the snow.

Then, there are the cats, who

are said to become so nervous before a major quake that they leave home and don't return until long after the danger has passed. Mother cats try to drag their kittens to safety. House cats try to get out the door.

Abnormal cat behavior is so predictable that a geologist in San Francisco has used it to make 270 predictions during the past 15 years, with, he says, a 75 percent success record.

According to the 1991 *Old Farmers Almanac*, the geologist James Berkland watches the "lost pet" ads in the newspaper classified sections. When 25 cats and 60 dogs are advertised as missing, he becomes worried, measures the tides and considers sounding a warning.

Just for the record, the number of missing dogs and cats in *The Commercial Appeal* want ads rose sharply during the last week in November.

However, a spokesman at the Memphis Humane Society said animals always move more in cold weather — and that may be the explanation.

On the other hand, maybe they know something we don't.

"Cats show especially marked reactions during earthquakes," says Helmut Tributsch, author of a major earthquake study of animal behavior titled "When the Snakes Awake."

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## Memphis Commercial Appeal

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Much of the study deals with the city of Haicheng in China, which supposedly watched its animals for signs of a coming earthquake — and evacuated the city shortly before it was destroyed in early 1975. Makes you think the folks in Tangshan ought to have paid attention; 242,000 people died in a quake there the next year.

And what do the scientists say about all this?

"It's still an open question," says Dr. Peter Kopfer, zoologist at Duke University, who reviewed the Tributsch book. "All the evidence is not in. There's no doubt that a host of physical changes occur preceding an earthquake which are within the range of animal senses.

"Snakes, which have a keen olfactory sense, may be responding to the emission of gases. But some of these things are almost impossible to test."

Jim Dorman, associate director of the Center for Earthquake Research and Information at Memphis State University, says animal behavior is "a valid field of earthquake-related phenomena."

"There's no question that animals are very sensitive to seismic waves. They can feel movement we can't. Even so, the idea of organizing a great pig-watch network doesn't thrill me."

# Quaketime

## Region Awaits The Big One; Some Find Time For Parties, A Movie, T-Shirts

By Margaret Gillerman  
Of the Post-Dispatch Staff

"Earthquake" — the Charlton Heston-Ava Gardner version — is on the tube Sunday in St. Louis. "Shake, Rattle and Roll" parties are in vogue. T-shirts boasting "I survived Dec. 3, 1990, St. Louis, Missouri" are being stamped and sold.

It's the day before the day much of the public has been awaiting, dreading or just wants to be over.

A forecast of an earthquake made by climatologist Iben Browning has rocked the region, crazed consumers, scared schoolchildren, sparked new interest in disasters, outraged scientists and enlightened the Midwest to fears West Coasties face every day.

Even a comic strip in the San Francisco Chronicle, a knock-off of Doonesbury, has joked that New Madrid — the tiny town-in-Missouri's Bootheel — could become the "next California," with nouvelle cuisine and stress-reduction classes.

Browning has forecast a 50-50 chance of a quake measuring between 6.5 and 7.5 on the Richter scale in the New Madrid Fault from Saturday through Wednesday.

Browning's method of tidal predictions has been discredited by earthquake experts.

A national panel of earthquake experts found that Browning successfully predicted no other earthquakes, despite such claims by him and his supporters.

Seismologists say there's less than a 10 percent chance of any quake occurring over the next 15 years that would cause widespread damage anywhere in a seven-state area.

Some St. Louisans are finding the frenzy something to spoof. At the Westchester House nursing home in Chesterfield, the staff and residents were gearing up for a rock 'n' roll party Monday night, with bricks for decorations and hard hats for favors

and a theme song of "I Feel the Earth Move."

But others remained jittery. At Sam's Wholesale store in St. Charles, "the hype about the earthquake" has chased away any hint of an economic recession. "It's helped us to clear some items out," said Troy Dooley, 24, general manager of Sam's.

"Sales are unbelievable on bottled water, flashlights, aluminum foil, tarps, charcoal, lighter fuel...and we're completely out of kerosene heaters," Dooley said Saturday.

"We probably sold about 150 first aid kits just this past week alone," he said. "Canned meats are real big right now. Believe it or not, they're buying a lot of whiskey, too."

Other big sellers: radios that operate on batteries, fire extinguishers, which are selling at 100 to 125 a day, and generators, with the most popular model selling out at \$469.99.

Meanwhile, travel agents are noticing unusual trends.

Jennifer Cardwell, a TWA employee, said that more people "are cancel-

ing flights into St. Louis than out," although she added that travelers don't generally give a reason for changes. More outbound flights are "flying full" than usual, said Cardwell.

But it was Dec. 1 as usual on Saturday for many St. Louisans.

Debbie Burkemper, 36, of St. Charles, was visiting Union Station with her three daughters and mother — and happy throngs of others who were enjoying the twinkling lights, Santa and carols.

"We're all doing our Christmas shopping and not giving the earthquake a thought," Burkemper said. "They said it could be 10 years before or 50 years after. You can't sit at home and worry."

Contrary to national press reports, Frank Viverito, a spokesperson for the Convention and Visitors Commission in St. Louis, said Saturday there were no conventions canceled in St. Louis "that we had anything to do with or that we know of."

The Associated Press contributed some information for this story.

12-2-90

## St. Louis Post-Dispatch

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# Some Worry, Others Joke About Quake

By Tom Uhlenbrock  
and William Allen

Of the Post-Dispatch Staff

NEW MADRID, Mo. — Mildred Parker packed her bags and loaded her car, then reconsidered and carried everything back into the house.

"I just really didn't want to go in the first place," she said. "Then different ones told me it's not going to be here, it's going to be somewhere else."

"Watch and now it will be here."

Like nearly everyone else living on the New Madrid fault line, Parker is anxious and confused over Iben Browning's forecast of a 50-50 chance for a major earthquake during a five-day period that began Saturday.

The scientific community scoffs at Browning's tidal-wave theory. But the publicity given his prediction causes Parker to wonder if she wouldn't be better off visiting her daughter in Springfield, Ill., for a few days.

"It's really got people stirred up in this town," said Parker. "And it hurts us; there's homes for sale and nobody's buying them."

Her fears finally got the best of her, and Parker trudged her things back out to her car and left town.

Parker was getting mixed signals. First, Browning pinpoints the New Madrid fault, but reports then say Japan is more likely to get hit.

If Browning can be dismissed as a quack, why

are the governor and legions of reporters descending on New Madrid and other Bootheel towns?

Rumors — and there have been many — even have Dan Rather booked for Monday at the Cabana, New Madrid's only motel. The Cabana consists of trailer homes laid end to end.

Parker has only to look at her front door to hear yet another voice coming from Mott Street, where the Rev. Sanford Berry is broadcasting his "earthquake rapture" message from loudspeakers attached to his 1967 white Ford van.

Berry, who also writes a column for three local newspapers, is preaching not to worry — God has heard the prayers.

"God has revealed to me, through other people, a prophecy that there is not going to be an earthquake here this time," Berry said. "Even if there was an earthquake destined, thousands of people have been praying and God is listening."

"Some people think I'm a little wacko, but, the thing is, Mr. Browning does not know — I do not know — but I'm doing what in my heart I believe Jesus wants."

While some worry, others make light of the situation. A sign on a storefront on Main Street says: "Coming soon. New Madrid II, the Sequel."

At Rosie's restaurant, the back bar features two special drinks — the "Earthquake" and the "Aftershock." Don't ask what's in them.

All agree the prediction has put New Madrid in the national and international spotlight.

"We had a film crew in here last week from Tokyo, Japan," said Virginia Howell, a guide at the New Madrid Historical Museum, which sits in the shadow of the Mississippi River levee.

"Last week we had our biggest week ever," she said. "We had 891 visitors, where we'd normally get about 250."

And quite a few of those visitors walk out with a T-shirt — \$10 for adults and \$7.50 for children — that says, "It's Our Fault" or "Visit Historic New Madrid (While It's Still Here)."

A silent exchange took place all weekend long near the museum, where a half-dozen television stations from as far away as Dallas and Oklahoma City had parked their satellite vans.

Locals in cars and pickups paraded by with Instamatics and video cameras, taking pictures of the news crews taking pictures of them.

At the tourist information center on Interstate 55 just outside New Madrid, Reida Hall faces a barrage of questions from drivers who pull off when they see the city limits sign.

"Are you ready? When's it going to happen? Are you scared? Where can we see the fault?" she recited. "I just tell them they're standing on it."

Browning has forecast a quake measuring between 6.5 and 7.5 on the Richter scale. The forecast covers the period Saturday through Wednesday, but centers on Monday — the day Gov. John Ashcroft is scheduled to visit the area.

Browning bases his forecast on an unusual alignment of the sun and the moon. He says abnormally strong tidal forces caused by the alignment can result in major earthquakes.

A national panel of earthquake experts has called the forecast and his

## COMMENTARY

### Use Quake Scare As Learning Tool

*Canceling Classes Is No Way To Combat Ignorance*

By Paul Flemming

Koshkonong, Mo., won't be having school on Monday. A front-page story in the *West Plains Daily Quill*, my paper of record down here in southern Missouri, announced the School Board's decision. On the basis of Iben Browning's well-publicized prediction of an earthquake on or about that day and the consequent concern of parents, classes are canceled.

"An early spring break," Superintendent Darrell Cook called the one-day leave of absence. What they're really taking leave of is their senses. Today they take the word of a climatologist from New Mexico. Tomorrow will they consult a cosmologist from Ohio? I have to suppress the hope that an earthquake will strike on Thursday, after everyone has returned to school confident of his or her safety. My interest in this decision is not merely academic, though it is decidedly that, in more ways than one. My wife teaches high school English in Koshkonong and won't be going to work on Monday now. Instead she'll spend President's Day in the classroom come February.

Koshkonong is not alone in taking this action. Other schools in Missouri and Arkansas, most of them closer to the New Madrid fault, also will be shutting

down, and I don't want to ridicule the decision. Oh, yes I do.

But in the name of constructive ridicule, I have an alternate plan. Schools are in the business of imparting knowledge and developing the ability to use that knowledge. So let's seize upon this opportunity to teach the kids of Koshkonong and everywhere else in the Hysteria Zone a real-life lesson with the tools of

point out this discipline's difference from climatology. "Can Willard Scott predict earthquakes?" the science teacher might ask.

History classes will focus on instances of mass hysteria in the past. Maybe they will listen to tapes of "The War of the Worlds," or the hearings of Sen. Joseph McCarthy. The zoology teacher will make lemmings the day's subject. In civics the students will debate what constitutes proper reasoning for public policy.

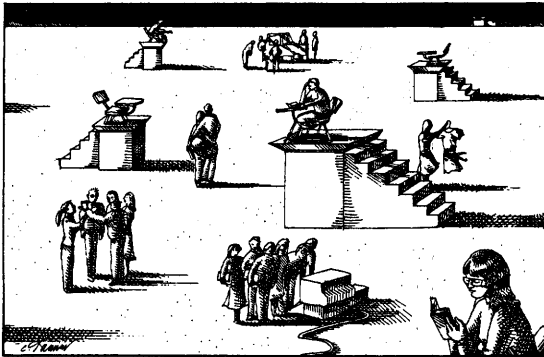
Statistical analysis will be covered in math class. These students will learn why insurance companies are so eager to take earthquake premiums from their customers. English students will read the works of Mark Twain, a man familiar with hoaxes. His characters Tom and Huck were both thought dead prematurely and the author himself was reported dead by The Associated Press while he was

still quite a live.

Perhaps a foot of snow on Sunday will make the whole issue moot. Maybe there really will be an earthquake and the school board members can congratulate themselves for great wisdom.

Only if that snow falls in hell.

*Paul Flemming, West Plains, Mo., is a free-lance writer.*



education: knowledge, reason and truth.

First, hold classes but make them voluntary. Those who wish to expressly exhibit their ignorance may stay home, supposedly to let the world know just how smart they are. Second, the day's curriculum should be dedicated to the study of earthquakes and the frenzy that has resulted from Browning's prediction.

In science, students will learn about geology. The teacher will be careful to

12-2-90

St. Louis Post-Dispatch (Continued)

## Press Shares Blame For Shaking Public Up

By Michael Zimmerman

When Nancy Reagan's frequent consultations with an astrologer became public, the nation's news media, rightfully, had a field day. That anyone, especially anyone with Mrs. Reagan's influence and power, should take seriously the absurd pseudoscience of astrology is an indictment of the failure of the scientific community to educate the public. As a scientist, I was very encouraged to see the media attack astrology for its lack of any scientific foundation.

I am coming to suspect, however, that the media's stance on astrology was more a way to ridicule the Reagans than it was a principled stand against the dangers of pseudoscience. Consider that the media are on the wrong side of another scientific debate, one with even greater consequences than Mrs. Reagan's personal beliefs. The media, and by that I mean reputable entities rather than the *National Enquirer*, have been paying enormous amounts of attention to Iben Browning, a business consultant with a Ph.D. in biology who claims that a huge, killer earthquake will occur along the New Madrid fault on Monday. The controversy is not over the New Madrid fault itself; it is known to be more active than California's San Andreas fault. The problem lies in the specificity of Browning's prediction. No scientific basis exists for it. And yet the media continue to promote what can only be called a doomsday scenario. A naive public, poorly educated in scientific matters, is overreacting.

Exactly how are the media responsible? First, and most simply, they have paid attention to Browning's claims. Although he is not a geologist, Browning is pushing the notion that tidal strain is responsible for earthquakes. He goes on to argue that the alignment of the sun and the moon on Monday will be especially propitious for a major quake.

But the National Earthquake Prediction Evaluation Council concluded that "there does not appear to be a theoretical basis for Browning's prediction, and in fact, it appears theoretically implausible." The media might as well be promoting disaster predictions by Jeane Dixon and others of her ilk. (Interestingly, Browning's prediction that the U.S. government will collapse in 1992 after massive crop failures has not received nearly as much attention.)

Second, the media seem to feel that journalistic integrity demands that both sides of all issues be presented, even when

only one side exists. In Browning's case, like those of most pseudosciences, the situation is difficult because it is all but impossible to find reputable experts to support Browning. Undaunted by lack of expertise, the media promote whomever they can find. In the present case, it is David Stewart, a geologist at Southeast Missouri State University.

Stewart, however, has a bit of a checkered past on earthquake predictions. In 1974 he predicted a magnitude 6-plus quake for the Wilmington, N.C., area, and demanded that the government take precautionary steps. When the mainstream geologic community refused to take his prediction seriously, he resorted to paranormal means to refine his prediction, including flying over the area with a psychic. Needless to say, no quake occurred. But Stewart is getting a good deal of attention in the press these days.

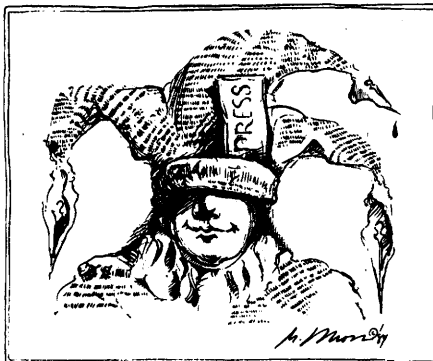
Third, the media are far too willing to accept claims of previous predictions. One way the media justify taking Browning so seriously is his claim that he accurately predicted last year's quake in San Francisco. Nothing could be further from the truth, however. What he actually said, the week before the quake, was that on or about Oct. 16 "there will probably be several earthquakes around the world, Richter 6-plus, and there may be a volcano or two." Given that 6-plus quakes occur about once every three days or so, it would have been more newsworthy had Browning's prediction failed to be borne out.

Who stands to gain by promoting the disaster prediction? Clearly, this sort of sensationalistic journalism benefits the media, at least in the short run. And given that Browning was hawking a \$99 video of himself making his pseudoscientific prediction, he is quite pleased with all of the publicity.

Who stands to lose? The disruption of life in the three states adjoining the New Madrid fault should not be ignored. More strikingly, however, think about the message we are sending schoolchildren. A quack predicts a quake and we shut the schools down. Is this the nature of science in America today? Are we swiftly becoming a society in which various pseudosciences (New Age mysticism, homeopathy, creation science, handwriting analysis, etc.) have acceptance equal to or greater than real science?

I fear for the future of such an ignorant society.

Michael Zimmerman is a professor of biology at Oberlin College in Oberlin, Ohio.



tidal theory "scientifically invalid." The panel also found that Browning has predicted no other earthquakes with success, despite his claims. Browning also forecast possible major quakes for Saturday through Wednesday near Tokyo and in northern California.

One sign in New Madrid reads: "This office will be closed on Monday, December 3, 1990. The Circus is coming to town." It's on the door to Lynn Bock's law office downtown.

Bock is taking the day off Monday. "I'm going to make the most of it," he said. "There are more reporters here than there have been since the Civil War."

Most New Madrid residents are concerned about the possibility of a major quake sometime in the next several years, "but if we took it as seriously as a lot of media want us to, we'd probably worry ourselves to death," said Bock.

Many reporters have been "trying to find the town idiot to talk to," Bock said. "They want to portray us as a bunch of hillbillies, and we don't appreciate that."

Lori Bess, a waitress at Rosie's, said she's off Monday, but she's not leaving town. Bess has received several dozen calls from journalists since her picture appeared in *People* magazine.

She will be home with her son, "answering the telephone, I guess," Bess said.

Lori Krebs, who works at the Show Biz Video store in New Madrid, said she and other downtown merchants will be at work Monday.

"I know Dr. Browning is a very smart man, but in this case I hope he's wrong," Krebs said. "It's been 179 years years since the last big one, and I hope it's another 179 before the next."

Farther north in the fault zone, in Cape Girardeau, some students at Southeast Missouri State University headed home while others planned earthquake parties. The university will remain open this week.

Christine Fechter, a junior from Chesterfield, planned to stay in her house on campus and study for an earth science class scheduled to meet at 8 a.m. Monday.

Fechter was in the class mapping earthquakes that have occurred around the world when a quake measuring 4.6 on the Richter scale shook the Bootheel on Sept. 26. She and her roommates have stocked up on food, water, flashlights and other emergency supplies.

"I don't know if it's going to happen" on Monday, she said. "But I've taken precautions. Better safe than sorry."

Lisa Benton, a junior from Decatur, Ill., went home for several days and plans to return to campus Tuesday night. "I don't really believe it's going to happen," Benton said.

Kimberly Presnell, a senior from Patton, Mo., is staying on campus.

"The more I learn about his theory of tidal forces, the more I think it's ridiculous," said "He's scaring people for an idiotic reason."

## Missouri National Guard, State Workers Stage Earthquake Drill

By Marinell Landa

Post-Dispatch Special Correspondent

JEFFERSON CITY — About 700 National Guard troops, 1,000 state employees and a new computer participated Saturday in a statewide earthquake response test.

In the exercise, called "Operation Show-Me Response 90," a make-believe earthquake hit the New Madrid Fault at 7 a.m. Saturday. The National Guard troops were called up, and a new \$15,000 computer at the State Emergency Management Agency was put into service to pinpoint and assess "damage" reported by the troops.

National Guard helicopter and fighter pilots were dispatched for aerial reconnaissance and rescue missions in southern and southeastern Missouri; radio operators relayed information; and administrators gave orders.

The exercise is continuing Sunday with responses to the purported damage.

The operation is the state's fifth annual disaster exercise, and officials said it was only a coincidence that it was taking place the same weekend that climatologist Iben Browning fore-

cast a possible earthquake.

This year's operation is the most elaborate, said Richard Rice, director of Department of Public Safety. The department coordinated the drill.

In a real disaster, about 12,000 National Guard troops would be available, said Maj. Ken MacNevin.

The purpose of the drill is to identify weak points, MacNevin said.

"You don't purposely try to trip people up, but you do things that will test their ability to plan and react," he said.

12-2-90

St. Louis Post-Dispatch

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ERIC MINK

## Falling For Earthquake Frenzy

**I**F YOU'RE READING THIS, we are at least two-fifths of the way toward confirming the foolishness of nearly six months of earthquake hysteria.

The news media have been major players in fueling that hysteria since Iben Browning's "prediction" broke into the public consciousness on June 19, and television has been at the forefront, with its built-in tendency to leave viewers with impressions rather than information.

The television networks have played their part, to be sure. All the networks, for example, have offered occasional news reports of varying quality on the likelihood of a quake somewhere on the New Madrid fault, and the entertainment divisions have chipped in more than their share as well.

NBC's "Unsolved Mysteries" — a show whose presentation style tends to undercut whatever value its factual content may possess — came to the Midwest to slap together an earthquake segment. ABC's "Good Morning America" offered a one-on-one interview between Browning and a particularly fawning science correspondent. CBS and ABC both did reports for their respective evening news programs.

And Channel 5's insistence on carrying NBC's "The Big One: The Great Los Angeles Earthquake" — a gratuitously violent and dramatically dishonest fictional miniseries — exploited local fears and, in the process, exacerbated them.

Channel 5 also was early to take advantage of the preparedness dodge, in which stations made hay (and hyped ratings) off the rising hysteria by giving people genuinely useful information on preparing for disasters. It pre-empted its network in prime time in mid-October for a one-hour syndicated special, appropriately pumped up with dramatic elements, in which host Robert Conrad gave all sorts of tips on what to do when disaster strikes.

Channel 4, meanwhile, had meteorologist Mike Nelson emcee a 30-minute special, also in prime time, about earthquake preparations. Channel 9 did its own half-hour show and has since been marketing it on videocassette through a local grocery chain. Channel 2 put together a multipart news series in which reporter Donn Johnson offered a mixture of local earthquake history and current events as well as some safety tips.

Channel 5 had meteorologist Bob Richards do a multipart series debunking the Browning "prediction," although the station cynically timed it to coincide with the broadcast of NBC's "The Big One."

As Dec. 3 has approached, activity has intensified. Just last week, Channel 4 sent reporter-anchor Russ Mitchell south along the New Madrid fault for live reports and some well-

crafted taped features each night from Memphis, New Madrid and even Marked Tree, Ark. Channel 5 shipped reporter Mike Owens out on a similar assignment.

And just a few days ago, Channel 2 paid a little less than \$5,000 for the purchase and installation of a helical drum recorder, an instrument connected by telephone lines through the St. Louis Science Center to one of the 60 drum recorders at St. Louis University's Geophysical Observatory. Those recorders are connected, in turn, to seismographs scattered throughout the Midwest.

The truth is that, except for Channel 5's poor judgment in carrying "The Big One," even the best of intentions would not have freed local stations

from the vicious earthquake-reporting cycle that formed around this story.

Browning's initial "prediction" was unquestionably newsworthy and, therefore, had to be reported. Reaction to it and against it by reputable

scientists, therefore, also had to be reported.

There were other complications: The fact that an earthquake on the New Madrid fault is bound to occur *some* time made it impossible for authorities to dismiss the notion entirely, no matter how goofy Browning's methods were. And then there were those fresh memories and emotions — which stations were only too eager to resurrect via file footage — of the

devastation of last October's quake in northern California.

All these factors combined to begin and feed a public frenzy over the possibility of an earthquake. Initial reports stirred public concern, which turned into public reaction as coverage of the dispute continued. Concern became reaction.

The media reported public reaction. Doubts about the credibility of Browning's statements — brief disclaimers like, "Reputable scientists say Browning's theories have no basis in fact" — got lost in the middle of stories about school and business closings, runs on survival supplies and the like. Coverage of public reaction fueled heightened public concern and more reaction. Stations, citing intense public concern over the issue, intensified their coverage.

If there is any lesson at all to be learned from all this, it may be that the media need to be more cautious about conferring the status of "expert" on individuals. As this episode has illustrated all too vividly, once the story is out of the bottle, the media have little power to control it, much less contain it. What we've seen at work here is the equivalent of yelling, "Earthquake!" in a crowded fault zone.

## More Funds For Seismograph Networks

By Arch C. Johnston

**T**he Midwest is supposed to be jolted Sunday or Monday by a major earthquake, according to a prediction that has been rejected by the great majority of earthquake scientists.

As one who has studied earthquakes for 17 years, I certainly share that skepticism. A serious earthquake will occur eventually along the New Madrid fault system in Missouri, but we cannot predict exactly when.

Nonetheless, whether the quake strikes Sunday, next month or in future decades, what Americans in the Midwest — and throughout the country — should be concerned about is the ability of scientists to monitor and understand seismic conditions. The regional seismograph networks needed to accomplish this are in crisis, facing technological obsolescence or outright closure.

About 50 organizations throughout the United States operate networks that comprise 1,500 seismograph stations. The networks monitor everything from the Kilauea volcano in Hawaii and last year's Bay Area quake to seismic conditions in the Midwest and East. Although seismic activity in the United States is highest on the West Coast, 39 states are located at least partially in moderate- to high-risk zones.

Regional networks peer into the earth to observe and interpret this seismic activity. Just as CAT scans provide surgeons with three-dimensional images of the human body, so do the closely spaced sensors of regional networks provide detailed images of the earth's interior.

Earthquake prediction remains inexact. But in the two decades since most of them began operation, regional networks have produced data that are essential not only for earthquake monitoring, but also for the safe siting and design of bridges, dams, nuclear reactors and



other structures. Nonetheless, the networks face serious funding problems. Most have obsolete equipment, inadequate computers and too few personnel. Even worse, many of the networks could be eliminated by a plan of the U.S. Geological Survey and the Nuclear Regulatory Commission to establish about 60 modern seismograph stations in the central and eastern United States. The new stations would be of high quality but they are too few and widely spaced to duplicate the output of the regional networks. The dense coverage provided by regional networks is irreplaceable.

Two examples illustrate the importance of regional systems. On Oct. 1, 1987, a moderate earthquake occurred in Los Angeles, causing three fatalities and more than \$350 million in damage. The extensive system of sensors around

the area enabled scientists to pinpoint the quake quickly and to identify a previously unknown fault. Prompt transmission of such information can guide salvage and rescue operations.

By contrast, another earthquake occurred in northeastern Ohio on Jan. 31, 1986. Experts suspected this one was triggered by more than 260 million gallons of fluid that a waste-disposal company had injected into a deep well over several years. But their seismic instruments were too sparsely spaced to confirm this. Nor was it clear how the earthquake affected the safety of a nearby nuclear power plant. As a consequence, disputes about both the waste-disposal facility and the reactor continue.

So regional networks are irreplaceable. Yet, under the new system, they will remain static at best in the West and will largely disappear in the East.

This is not to say that the proposed system makes no sense; the modern new stations are welcome. But what's needed is a more rational system that combines them with the existing regional networks. This could be accomplished with a \$2 million annual increase in the current budget and a one-time capital investment of \$15 million, spread over five years. That is a small price considering the potential savings in lives and property and the acquisition of knowledge.

Regardless of when an earthquake strikes, all Americans have good reason to worry about the demise of regional monitoring networks. We need to keep our electronic ears to the ground. Seismic networks are not the only means to understanding and eventually predicting earthquakes, but they are an indispensable component.

Arch C. Johnston is a professor of geophysics and director of the Center for Earthquake Research and Information at Memphis State University.



## Siren Test Canceled; Quake Fear Cited

St. Louis and St. Louis County have canceled their monthly siren tests scheduled for Monday.

Officials believe that sounding the sirens might lead the public to assume an earthquake was occurring.

Climatologist Iben Browning has forecast a 50-50 chance of a significant earthquake along the New Madrid Fault in southeast Missouri around Monday. Scientists have discounted the prediction.

The sirens, intended to signal bad weather, are tested at 11 a.m. on the first Monday of every month. The tests are canceled during threatening weather.

12-2-90

St. Louis Post-Dispatch

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12-3-90

Blytheville (Ark.) Courier News

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of the Associated Press

# Drills, exodus highlight Quake Watch '90

MARKED TREE, Ark. (AP) — The earth stood still Sunday, as usual. The only thing moving was the stream of jumpy residents fleeing in fear of an earthquake.

New Mexico scientist Iben Browning projected a 50-50 chance of a major temblor along the New Madrid fault for the five days that began Saturday. The fault's southern end is under this town of about 3,200 people. It runs northeast to Cairo, Ill.

Browning, 72, bases his theory on the gravitational pull of the sun and moon, which he says will be particularly strong during the period.

On the basis of that, dozens of people have packed their things and left town.

Scientists have scoffed at his projection. But these same scientists say an earthquake is likely someday.

So even skeptical residents, like convenience store cashier Rheba Womack, aren't taking any chances.

"If this doesn't happen, I don't want to hear anything else about earthquakes," Mrs. Womack said.

A few hours later, on Saturday night, Mrs. Womack and her hus-

band, Scott, left town, joining the temporary migration.

Those who stayed prayed. "Bless all of us, oh Father, that are upset about the earthquake," said Ira Whitfield when he opened Sunday school at St. John Missionary Baptist Church.

Church Deacon Sterling Ivy said he had expected the crowd to be smaller than usual. It was, what with some people suddenly out of town and others afraid to leave their houses.

The same concern has closed schools in parts of Tennessee, Arkansas, Missouri, Kentucky and Illinois for a few days early this week.

Judy Byrd of Evansville, Ind., isn't waiting for local school administrators to decide. Though she said she doesn't believe earthquakes can be projected, her 11-year-old son won't be in school Monday.

"He asked me if he could stay home," Mrs. Byrd said. "At this age, they really worry about everything. War. An earthquake. Water. The environment. I figured if he really was that worried about it, it should be up to him."

Other people were looking for a more precise warning.

In Illinois' St. Clair County, residents were watching cats, dogs and cows for signs of nervousness.

"If we notice any exceptional behavior, we will not hold school Monday," said Superintendent Bill Gullick of the county's Marissa Community Unit School District 40.

The Chinese have been using that method to anticipate earthquakes for more than 1,000 years, Gullick said.

Some people here have chosen to stay put. What they're afraid of, they say, is worse than any earthquake: looters and bad publicity for the town.

Police Officer Jay Woods said looting hasn't been a problem, especially with a lot of people gone.

"I stopped a lady for speeding last night, and she said, 'Officer, I'm just in a hurry to get through Marked Tree.'"

Woods couldn't bring himself to write her a ticket, he said.

While residents wrestled with their anxieties about whether to stay or go, emergency experts in

Arkansas were busy Sunday planning for an earthquake they could believe in.

In an earthquake disaster drill planned long before Browning's projection, officials were assessing an imaginary toll of death and destruction from a hypothetical earthquake. On paper, the quake laid waste to much of the northeastern part of the state.

The drill, involving the Arkansas National Guard and other state and federal agencies, was based on a worst-case scenario of an earthquake measuring 7.6 on the Richter scale.

The Richter scale is a gauge of the energy released by an earthquake, as measured by ground motion recorded on a seismograph.

The make-believe quake hit Friday. By Sunday, according to the drill's script, the toll in eastern Arkansas had reached 4,950 dead, 25,097 seriously injured and 98,020 left homeless.

"Realistically we would still be in a search and rescue mode," said Gary Talley of the Arkansas Office of Emergency Services, which coordinated the drill.

12-3-90

Memphis Commercial Appeal

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The New Republic, Inc., 1990

## Browning on the fringe

By Robert Bazell

DR. Iben Browning is now famous, at least among frightened Missourians, for his prediction that a massive earthquake will strike southeastern Missouri on Dec. 3. What isn't generally known is that this is only the most recent of many dubious theories offered by Browning in a long and varied career on the fringes of science.

In the early 1960s Browning believed that by implanting remote-controlled electrodes in the pain and pleasure

centers of the brains of whales, he could guide the animals wherever he wanted. The idea was to strap on hydrogen bombs and send the nuke-bearing whales into the harbors of Soviet port cities. The Sandia National Laboratory near Albuquerque supported this effort. Whale training can be difficult in the New Mexico desert, so Browning started with donkeys. Asses with Browning's electrodes in their skulls were reportedly a common sight on a special track at the top-secret facility.

Dr. Robert Park of the University of Maryland, who headed the surface physics division at Sandia then, says

such projects were "much in favor" with Sandia's science administrators.

Neither Park nor anyone else I spoke with knows whether Browning moved on to whale work. (Browning did not return my calls.) But he later became a paid consultant for NASA, and as the agency was beginning to prepare for the 1969 Apollo landing, he concluded that the moon was covered with a layer of dust so thick that neither human-occupied nor robot spacecraft could possibly land on it.

*This was excerpted from an article in The New Republic by Robert Bazell, science correspondent for NBC News.*

The New Republic  
United Feature Syndicate

12-3-90

## Memphis Commercial Appeal

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# When going gets shaky, city goes shopping

By Barbara A. Burch  
The Commercial Appeal

As of late Sunday night, George Bush was still president, American troops were still in Saudi Arabia, Elvis Presley was still dead and the earthquake projected by a New Mexico climatologist still hadn't occurred. Things seemed normal in Memphis Sunday, although people were still stocking up on disaster survival supplies in response to Dr. Iben Browning's prediction that high tides would trigger an earthquake today, give or take 48 hours.

Earth scientists, who acknowledge there is a threat of a major earthquake on the New Madrid fault in the next 50 years, have scoffed at his theory, and say there is no way to predict the exact date of an earthquake.

While the Center for Earthquake Information and Research reported no unusual seismic activity, the center's seismographs did record two quakes early Sunday.

One, measuring 2.0 on the Richter scale of earthquake magnitude, occurred at 3:32 a.m. It was centered in the Ozark Mountains in Arkansas, not in the New Madrid fault zone. The other, at "5 something," occurred at about 9:45 a.m. in some distant location, possibly Mexico or South America, center director Arch Johnston said.

The center received dozens of calls Sunday, some plaintive and some bizarre. Somewhere in Memphis, a woman is going to bed wearing a hard hat — just in case of you-know-what. She obligingly called the earthquake center to let them know.

While the Earth stayed quiet here, Memphis was by no means deserted. Revelers at the P&H Cafe at 1532 Madison had an Earthquake Eve party that drew international attention. Waitress Lisa Messer, niece of owner Wanda Wilson, was interviewed live by a Tokyo radio station Sunday afternoon.

It was the second time in a week that Ms. Messer has been interviewed by a foreign radio station. She was interviewed by the British Broadcasting Co. on Friday.

Elsewhere in Memphis, stores fumbled with crowds of Christ-

mas shoppers.

At Raleigh Springs Mall, Laverne Chunn of Frayser and her daughter, Marilyn Wright of Midtown, took a break from shopping outside Goldsmith's.

Mrs. Wright said she never considered canceling her shopping trip with her mother because of the earthquake scare.

"But Mrs. Chunn said, 'I thought Friday I might not (go), but I decided I had too much to do. I had to get out.'"

She said she and her husband stocked up on survival supplies, including water, flashlights, a radio, a first aid kit and food.

Both she and Mrs. Wright said they planned to be at work today. Mrs. Chunn works at Methodist Hospital, Mrs. Wright at Federal Express.

"You have to go on with your lives," Mrs. Chunn said, adding, "I did practice getting under my desk Friday."

Just down the street from the mall, Danny Colley and his brother, Wayne Colley, were selling what was left of their earthquake T-shirts and sweat-shirts.

As of Sunday afternoon, they had sold 6,036 shirts — 4,031 to people who said they were

staying in town, and 2,005 to people who said they were leaving. "It's been great the last two days," Danny Colley said Sunday. "People are buying them to wear to work tomorrow."

Area residents were still stocking up on earthquake survival supplies at Central Hardware at 4400 Summer, said assistant manager Keith Speer. However, he said the activity seemed a little slower Sunday than it was in the past two or three weeks.

Several times, the store has had to restock metal strapping tape (for securing water heaters), wrenches (for turning off gas and water) and a tool that can be used for turning off both gas and water and for other survival purposes.

"Anything you can tie down a house with, they're buying," Speer said. The store stocked 5,000 rolls of strapping tape and had about 250 left Sunday. The store also has sold 750 to 1,000 fire extinguishers, he said.

At the Seessel's store at 3545 Austin Peay Highway, there was a noticeable gap on the shelves where the Spam and the Vienna sausages used to be.

"This was stocked when I left last night," said Cindy Luttrall, floor manager of the store.

The store has sold its supply of the multipurpose quake survival tools, and on Wednesday and Thursday did a booming business in canned goods, bottled

water, dried milk and crackers.

Rev. Frank L. McRae, pastor of St. John's United Methodist Church, admitted to 200 or so people attending services Sunday that he "caved in to peer pressure" and bought a super-duper flashlight, a crescent wrench to cut off his gas and a chain to attach to the meter. He said he also climbed into his attic to tie down his water heater.

"Tomorrow is the day," Mr. McRae said. "One man's prediction has sent panic and precaution through our seven states."

The people are frightened. Today, all over this region of the New Madrid fault, pulpits will be ringing with words of confidence and caution.

Mr. McRae used the interest in earthquake preparedness to remind people of another coming event, Christmas.

Sunday was the first Sunday in Advent, a time when Christians prepare for Christmas.

He drew a parallel between the coming of Christ and the eventual earthquake expected in the region to show the need to be prepared for both.

"It is good to be prepared," he said. "The coming of God is something like an earthquake."

The bottom line, of course, is that nobody knows when either will occur.

Staff reporter Tom Charlier contributed to this story.

# Quake or not, some firms give priority to readiness

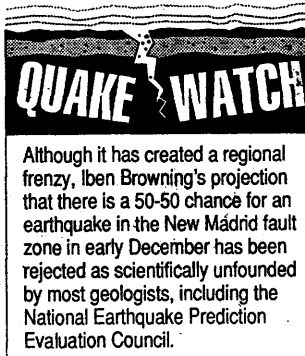
By Roland Klose  
The Commercial Appeal

Even if Iben Browning's earthquake prediction were to come true, several major Memphis businesses say they have plans to get back to work as soon as possible after the shaking stopped.

That's because some firms didn't need Browning's tidal theories to convince them of the need to develop plans to cope with a major disaster. The New Madrid fault hasn't been a secret for well over a century. And the possibility of other disasters that could face everyone — from fires to floods to power outages — has had some firms on their toes for a long time.

An informal survey suggests that companies ranging from banks to trucking firms to manufacturers have developed emergency plans that would allow them to resume some functions within days of a major quake or other cataclysm.

Yet many others still have a



Although it has created a regional frenzy, Iben Browning's projection that there is a 50-50 chance for an earthquake in the New Madrid fault zone in early December has been rejected as scientifically unfounded by most geologists, including the National Earthquake Prediction Evaluation Council.

long way to go. And just how severely the community's most critical services are damaged — mainly, power, water, communications and transportation — will go a long way to determining how fast anyone can get back on their feet and on the job.

When and if the big one comes, restoring service at local medical facilities will be a top priority for both South Central Bell and Memphis Light, Gas &

Water Division, spokesmen say.

"We're looking at trying to restore power for lifesaving and life support, and this would translate into hospitals and water pumping stations," said Manuel Peters, LG&W assistant manager of systems operations.

LG&W's power is supplied entirely by the Tennessee Valley Authority, which operates the Allen Steam Plant in Memphis and also transmits power to area bulk power substations.

TVA covers a seven-state region in the Southeast, and a quake is unlikely to disrupt the entire system. But the Memphis substations are vulnerable to an earthquake, said Peters. LG&W has started tying down and reinforcing critical transformers that carry TVA power into Memphis.

Restoring air transportation also would be a priority.

"The airport is one of the few major agencies of the city which, by regulation and policy, has an ongoing disaster prepar-

Please see **PLANS**

12-3-90

## Memphis Commercial Appeal (Continued)

From Page A1

# Plans

edness program," said Larry Cox, president of the Memphis and Shelby County Airport Authority.

The plans cover a range of possibilities — crashes, tornadoes, fires and bombs. But Cox hastens to add: "We don't believe any of the rumor of the earthquake (and) we're not taking any special extra precautions."

Cox points out damage to airports in Los Angeles and San Francisco, cities both hit by quakes, was minimal.

"We're more concerned about the national economy and the price of jet fuel."

Other businesses also have emergency plans to get off the ground.

Even if their local facilities are wrecked, officials with Union Planters Corp. could tell a customer her bank balance, Morgan Keegan & Co. could execute a trade and The Commercial Appeal would publish. Other large companies — like Federal Express Corp. — say they're prepared to quickly divert their operations outside of Memphis.

Yet more businesses — especially those that would provide essential recovery services — may need to assess their operations and prepare plans to cope with a large disaster.

"We're not fully prepared," acknowledged Donald Batchelor, chairman of the Business Emergency Preparedness Council, an organization set up this year to promote coordinated disaster planning. "Overall, what we lack is years of this community focusing on this problem with the energy and commitment we need."

Batchelor, who serves as risk manager for Union Planters Corp., said the October 1989 San Francisco quake spurred local firms to improve coordination of business restoration plans. In San Francisco, life safety and life support issues were addressed immediately, but Batchelor said, "once those were handled, businesses were left in the dark."

UP started to develop its own contingency plans months before the San Francisco quake.

"We began looking for resources and we couldn't find any," Batchelor said.

The Business Emergency Preparedness Council now counts about 100 local members, Batchelor said. "Several members of our organization have started from zero and now have a 99 per-

cent complete plan. There are other businesses who are just starting to ask, 'What do I do to write a plan?'"

Memphis-based AutoZone Inc. is one of the leaders when it comes to putting together a comprehensive plan.

"We started formalizing a written document a year and half ago," said John Geelan, AutoZone director of risk management. "It was part of our company's philosophy to be able to take care of our customers."

The company sells auto parts, car batteries, gas cans and flashlights — items in peak demand after a disaster.

AutoZone, which has 1,500 employees in Memphis, also has taken steps to improve safety at its local operations, including fastening filing cabinets together and lowering book shelf heights to 6 feet.

"Some companies have been more aggressive than others. The key to any type of plan like this is to have top management support and to commit the resources," said Geelan.

The Memphis and Shelby County Emergency Management Agency has been encouraging area businesses to share their disaster plans with the agency.

"We'd like a copy of their plan so we can see what they will do," said Don Wood, a planning officer for the agency.

"Our feeling is that businesses, especially food stores and banks, are a vital part of a recovery. We'll have to get those back in business as quickly as possible."

"Obviously, we want to know the plan for a chain of food stores. In terms of your general run-of-the-mill business, we'd consider it a courtesy."

Oh yes — the newspaper the Union Army couldn't close also plans to provide uninterrupted coverage in the event of a disaster, said Jim Hamilton, director of operations of Memphis Publishing Co., which publishes The Commercial Appeal.

The newspaper's building, constructed in the late 1970s, does not have seismic design. "We're assuming if this building is totally destroyed, most buildings in Memphis also would be."

But the newspaper already has agreements with other publishers within a 200-mile radius of Memphis to set type and print newspapers, Hamilton said.

Alternative printing sites would be needed even if the newspaper building is not structurally damaged, but electrical service and water are lost. Electricity runs the computers and presses. Water is critical to

printing and setting type and also is used to cool the newspaper's computer system.

Structural damage caused by a large quake could rupture tanks and pipes, causing fires and the release of toxic chemicals.

Manufacturers of chemicals and companies that deal with hazardous materials have been part of a required federal and state contingency plan system for more than two years.

Most large manufacturers emphasize their plans address a wide range of possibilities, not just earthquakes.

"Earthquakes do occur," said Neil O'Brien, manager of external affairs for Procter & Gamble Cellulose Co., which operates a cotton linter pulp producing plant in Memphis. "We don't believe that a specific time for an earthquake can be predicted with any accuracy."

Procter & Gamble Cellulose is

one of about 10 Shelby County manufacturers that participate in the Community Awareness and Emergency Response plan with local emergency services.

"Our job is to make sure the industries and government are prepared for any type of chemical emergency," said Joe Marshall, Procter & Gamble Cellulose environmental manager.

Marshall said the companies plan a communitywide drill next spring.

Mother Nature, of course, may have the final word. Bob Alexander, vice president of refining at MAPCO Petroleum Inc., said without knowing the impact of an earthquake on the local refinery, it's difficult to predict the level of response that would be needed.

"We're sort of at a loss to deal with the question of an earthquake," said Alexander.

12-3-90

## St. Louis Post-Dispatch

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# Quake Forecast Warranted More Scrutiny, Panel Told

By Andre Jackson  
Of the Post-Dispatch Staff

Both the news media and scientists should have taken a closer look at Iben Browning's prediction of an earthquake along the New Madrid Fault, according to journalists and guests who took part in a discussion Sunday of news coverage of the prediction.

The discussion, at Washington University's Alumni House, was sponsored by the St. Louis Chapter of the Society of Professional Journalists. Browning's prediction has been discounted by earthquake experts.

Those attending had the opportunity to question four panelists drawn from the print and broadcast media, a government planning agency and the scientific community.

Dan Freet, deputy director of the St. Louis County Office of Emergency Management, said that city and county officials had made a decision several months ago not to support the prediction of Browning, a climatologist from New Mexico.

But disaster planning officials did use media and public interest in the prediction to sell their standard message of encouraging long-term preparation against possible earthquakes, Freet said. "We rode the crest of the wave — is what we're saying," he said.

Browning has forecast a 50-50 chance of a major earthquake during

a five-day period that began Saturday. His forecast has been widely discounted by scientists, and earthquake experts have found that Browning has successfully predicted no other earthquakes, despite claims by him and his supporters.

Douglas Wiens, a professor of earth and planetary sciences at Washington University, suggested that some scientists had not spoken out earlier against Browning's prediction because they "hoped it would eventually blow away."

Wiens said that scientists in Memphis and St. Louis had written as early as June that Browning's forecast was unfounded.

Wiens said that he had been surprised that reporters had not taken a closer look at Browning's earlier predictions.

"He's basically claiming to do the miraculous," Wiens said.

Another panelist, Post-Dispatch reporter William Allen, said people who criticized the news media for "allowing the Browning matter to get out of hand are missing obvious complications."

Allen noted that Browning was a consultant to businesses, a research institution and other organizations. Still others subscribe to a newsletter published by Browning, Allen said.

"I'm not prepared to say that all those people are stupid," Allen said.

12-3-90

St. Louis Post-Dispatch

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# Quiver: New Madrid Tries To Get Through The Day

By Peter Hernon  
Of the Post-Dispatch Staff

NEW MADRID, Mo. — Most residents in this trembly town will try to make this a day like any other. But it won't be easy, thanks to a widely discounted earthquake prediction that has zeroed in on today for a potential Big One.

Although the forecast has been blasted by the nation's leading quake experts, the prediction has upset the rhythm in this rural community, where the surrounding fields are dusted white by cotton fragments left recently from the fall picking.

Among other things, the prediction by Iben Browning of a major earthquake has closed schools and prompted one large employer to hand out smoked turkeys to tempt workers to show up for their shifts.

It also has led to the stockpiling of emergency food, water and medical supplies.

Today, seven first aid stations will be staffed by volunteers in this community, which numbers 3,200 residents. The fire department's two vintage pumpers will be parked in a reinforced building near the Mississippi River levee. And Gov. John Ashcroft — unmoved by talk of "quake, rattle and roll" — is scheduled to visit the local grain inspection office.

"We've been planning for three months for this," said police Chief Jim "Mr. Jim" Helms as he worked on an ailing Chevrolet engine Sunday. "I've never seen people cooperate any better than this. We've done everything

we can to get ready" for something that most authorities agree will happen someday if not today.

Many of the 1,500 employees at the Noranda Aluminum Inc. plant — by far, the town's largest employer — are expected to stay home. Plant managers planned to use turkeys to try to coax them to the plant, which dominates the low-slung New Madrid skyline.

It was a similar story in nearby Portageville, another Bootheel community 15 miles away. An automotive parts plant that normally employs 600 at this time of the year will have only a skeleton work force — if that, said Ernie Payne, a company manager.

"I sent my wife and kid to Dallas," Payne said Sunday afternoon after shooting a round of golf at the New Madrid Country Club. "I don't think anything is going to happen, but..."

It's the "but" that has kept residents here on edge a tad. They don't believe Browning's forecast, and yet they will feel far better when it's expired and the last of the small army of reporters has decamped and gone home.

When the Rev. Paul D. Latham, pastor of the First United Methodist Church, asked his congregation, "Has anyone not been interviewed yet?" only one woman raised her hand.

There were reporters enough for every denomination on Sunday. The Catholic, Baptist, and Presbyterian churches all had their contingent of television and print people talking to congregants on the front steps. It was no different in Latham's tidy brick

church. "It's like having an elephant in the house, folks," Latham announced from the pulpit, grinning. "We're going to kept bumping into them, so we might as well get acquainted."

Like so many others in New Madrid, the pastor, who doubles as a disaster coordinator for his church, doubts anything will happen today. "Things are pretty much normal here," he said. "But that's not to say some of us aren't worried."

Outside, the sign in front of the church said: "The Best Preparation — A Personal Relationship with Jesus Christ."

Latham's congregation, by the way, has experience with earthquakes. It was founded in 1810, the year before the great quake that put New Madrid forever on the map as a blip on one of the potentially most dangerous earthquake zones in the world. Residents easily recite the details of these monstrous shocks: the Mississippi whip-sawed and flowed upstream, church bells rang as far away as Boston and Reelfoot Lake was formed across the river in Tennessee as huge tracts of land sank.

"Church attendance picked up a whole lot after that quake," Latham said.

The New Madrid Fault is a broad belt of weakened rock that stretches 120 miles from Marked Tree, Ark., to Cairo, Ill.

Browning, a climatologist from New Mexico, has predicted a 50-50 chance of a quake measuring between 6.5 and

7.5 on the Richter scale on the fault. His forecast covers the period from last Saturday through Wednesday but focuses on today. He calls the spread "dates of maximum danger."

A national panel of earthquake experts calls it something else — baloney. Scientists from the National Earthquake Prediction Evaluation Council pronounced the prediction a "disservice" to the public and said they found "no scientific basis" for it.

Street hawk John Harlow, who drove five hours from his home in Alabama to sell T-shirts, just knows that Iben Browning is putting some change in his pockets. His "It's Not My Fault" shirts were selling briskly along Main Street on Sunday afternoon.

"I tried to sell them in Memphis, but they weren't moving, so I came up here," said Harlow, 23.

A dozen or so television stations from places as far afield as Louisville, Ky., Kansas City, Atlanta, and St. Louis had parked their trucks on Main Street, not far from the New Madrid Museum.

There were so many people from the media that the city's leaders held a fish-fry for them.

The television crews were shooting the locals, who were shooting back with their own cameras.

"I just wanted to film the news media, filming the residents, who were filming the news media," said David Crowe of Cape Girardeau. "It's a heck of a time."

## Drills Pretend Earthquake Prediction Comes True

By Phil Linsalata  
and Robert Manor

Of the Post-Dispatch Staff

The subterranean command post of the city of St. Louis emergency management response team was packed Sunday morning, and every available seat was taken by team leaders ready to dispatch crews ranging from firefighters to water company workers.

In the world according to Iben Browning, it was prime time for an earthquake, and the people who were crammed into the room beneath Soldiers Memorial were pretending that Browning's prediction for an earthquake this week was real. The prediction has been discounted by earthquake experts.

North-Tucker Boulevard had collapsed in the 900 block. Bridges along Kingshighway were down. Bridges across the Mississippi were impassable except to emergency traffic. The Fire Department's main communication link went down with its main antenna, forcing conversion to an auxil-

ary system.

More than 1,000 firefighters, emergency medical technicians, police officers and others participated in the mock disaster, according to William Kuehling, the city's director of public safety. They drove to scenes, assessed damage and looked for ways to improve their approach.

Meanwhile Sunday, an earthquake drill in St. Charles County included the "collapse" of Francis Howell High School near Weldon Spring, which simulated the deaths of 40 people and the injury of 80 others.

Browning, a climatologist, has predicted a 50-50 chance of a quake measuring between 6.5 and 7.5 on the Richter scale in the New Madrid Fault from last Saturday through Wednesday. A national panel of earthquake experts has called the forecast "scientifically invalid" and has found that Browning has predicted no other earthquakes, despite claims by him and his supporters.

In St. Louis on Sunday, the drill

peaked shortly before 11 a.m. with reports of the partial collapse of the Missouri School for the Blind, 3815 Magnolia Avenue.

In St. Charles, as many as 1,500 people, many of them emergency workers volunteering their time, dealt with a simulated earthquake registering 7.6 on the Richter scale.

Sarah Sever, Jackie Wolf and Bobbie Thomas, all 16 and residents of the New Melle and Defiance areas, were assigned to struggle with firefighters after they were rescued, to demand medical attention they didn't need and to scream, which contributed to a general sense of panic.

Ray Kemp, a spokesman for the St. Charles County Ambulance District, said the exercise turned up at least one problem: not enough medical personnel were available to treat the simulated injuries.

Others in St. Louis treated life under Browning's cloud in a completely relaxed fashion Sunday.

At the ticket counter for Grey-

hound-Trailways Bus Lines, agent Beverly Smith said she saw no evidence of an exodus.

Nor has fear chilled holiday shopping fever. "It's a full pack," said Northwest Plaza security officer Ken Phillips.

At the Gateway Arch, visitors abandoned their concern and embarked on a trip to the top.

"Sure I was thinking about it," said Chris Wichmann of St. Louis. "All the way up, I kept thinking that Iben Browning is a clown."

Tom Mansell, in town from upstate New York with his family for his daughter's cross-country competition Saturday, compared the risk of a trip to St. Louis with a trip to New York City.

"New York is one big fault," he quipped.

"You might get caught in an earthquake in St. Louis," Mansell said. "But in New York City, you will get mugged. The earthquake never entered our minds."

VIRGIL TIPTON DRIVE TIME

12-3-90

St. Louis Post-Dispatch

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# Illinois Isn't Talking About A Study Of Bridge Approaches In Quake

**I**F YOU'VE EVER wondered if the approaches to the Poplar Street Bridge would survive an earthquake, don't ask officials at the Illinois Department of Transportation.

They're not telling. Today's a natural day to ask the question. New Mexico climatologist Iben Browning has forecast a 50-50 chance of a big quake hitting the New Madrid Fault within 48 hours on either side of today.

I think the prediction is nothing but baloney, but asking the question about the bridge approaches is easy.

Getting the answer is not.

**Under a contract** with the department, Sverdrup Corp. of St. Louis, has written a study of the impact of an earthquake on the approaches to the bridge. It's part of the department's program to decide which bridges in the state are in most need of reinforcement to withstand earthquakes.

With each big earthquake, engineers know a little more about what effect an earthquake would have on bridges and other structures, said Ralph Anderson, who heads the bridge office at the department's headquarters in Springfield. Often that new knowledge is reflected in federal or state construction codes.

The Poplar street bridge was built more than two decades ago, when engineers did not design it with today's standards in mind. So the purpose of this study is to determine how to reinforce the approaches and how much that work would cost.

The department has the 100-plus-page report but doesn't plan to release it for several weeks, said John Burke of the department's public relations office in Springfield.

That's because the study now in hand is just a draft, not the final document, Burke said. Department bridge experts are studying the report now to verify figures and other items, he said.

**So although interest** in quakes is high right now, Burke won't let the public see one page of the report.

A suspicious person might think that the report contains bad news, news that the department would like to let the public see in a few weeks, when the earthquake frenzy has settled a bit.

I'm glad I'm not a suspicious person.

How could Burke keep that report — draft or not — from the public? After all, taxpayers paid for it.

Burke and department lawyer George Tinkham cited a law called the Illinois Freedom of Information Act, which says which government documents must be made public. They cited a portion that exempts drafts of internal documents.

It's a funny word when a law called the Freedom of Information Act is used to seal records away.

In fact, Burke went a step further. He said that because the law allowed a government agency to withhold drafts of internal documents, if he made that study public now, he

**The department has the 100-plus-page report but doesn't plan to release it for several weeks.**

would be *breaking* the law.

I'm not a lawyer, but that one had me scratching my head. I mean, if you've got a license to drive a truck instead of a car, does that mean you *have* to drive a truck? In other words, couldn't Burke release that document if he wanted to.

Eventually, we'll find out what the report says. Eventually we'll find out whose predictions about quakes were right.

**But last week**, Burke managed to issue a prediction that proved to be amazingly accurate. Sitting in Burke's office, Tinkham and I agreed that the contract with Sverdrup might give some clue as to whether the report could be released.

As we waited for a copy of the contract, Anderson called Burke to ask if I needed to talk with him before I left for the day. Yes, I would, I told Burke, if Tinkham decided I could get the report. "You won't get it," Burke said.

And he was right.

12-3-90

USA Today

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## Quake day is here — maybe

### Prediction is 'history for New Madrid'

By Carolyn Pesce  
USA TODAY

**NEW MADRID, Mo.** — This cotton-farming community in the USA's heartland was a frenzied carnival Sunday, as tourists, officials and hordes of media flooded downtown before the big earthquake predicted to hit today.

Traffic jammed Main Street, guitar players sang quake songs, vendors were running out of quake T-shirts and preachers were talking about the end of the world.

Townpeople, armed with cameras and video recorders, took pictures of the media taking pictures of them.

"This is phenomenal," said Los Angeles psychologist Robert Butterworth, who set up shop in the packed historical museum to counsel those stressed by the prediction.

Since New Mexico scientist Iben Browning predicted last fall there was a 50-50 chance of a major quake on the New Madrid fault, this namesake town has been turned upside down. And the zoolike atmosphere

here Sunday was just the beginning of what's expected to be another wild day today.

"This is history for New Madrid," said Heidi Nesselrodt, who sent her four children to their grandmother's house in Mississippi because of the prediction — but stayed herself to film the action.

There was plenty to record, with a survival revival in Sikeston, 20 miles away, stories about highway angels telling hitchhikers to leave the area, bars selling earthquake drinks, and local hotels advertising special quake rates.

Tom's Grill opened for the first time ever on a Sunday. Patrons joked about getting their eggs "earthquake shook" instead of scrambled.

Sam Hunter Jr., president of the New Madrid Bank, had 22 of his family members over for a quake breakfast.

Hunter gave bank employees their Christmas bonuses 10 days ago so they could use the money to get ready for the earthquake.

"At least everybody knows how to pronounce our name now," said lawyer Lynn Bock (it's new MAD-rid).

"This is the biggest thing that's happened around here for a long time," said Kenny Davis, who has been working non-stop for Southwestern Bell

installing 40 extra phone lines for the dozens of reporters.

An empty field across from the history museum became the parking lot for television satellite trucks and vans and mobile homes full of reporters, producers and editors.

The running joke in town: Residents are more afraid of getting run over by a TV truck than getting hit by a quake.

The Rev. David Hulshof, of Immaculate Conception Catholic Church, was almost late to his 10:30 a.m. Mass because of all the phone calls asking if he was going to talk about the quake. He wasn't.

And at the Baptist church, the Rev. Dean Wallace interrupted the service when a cameraman started moving around the room shooting pictures.

"It was questionable to allow you in," he scolded. "Please respect our right to worship."

Elijah Streicher, who arrived from Cincinnati in a beat-up car plastered with religious messages, had his own prediction: that the entire town needed to repent for its sins — "and fast" — or God would destroy the city in 40 days.

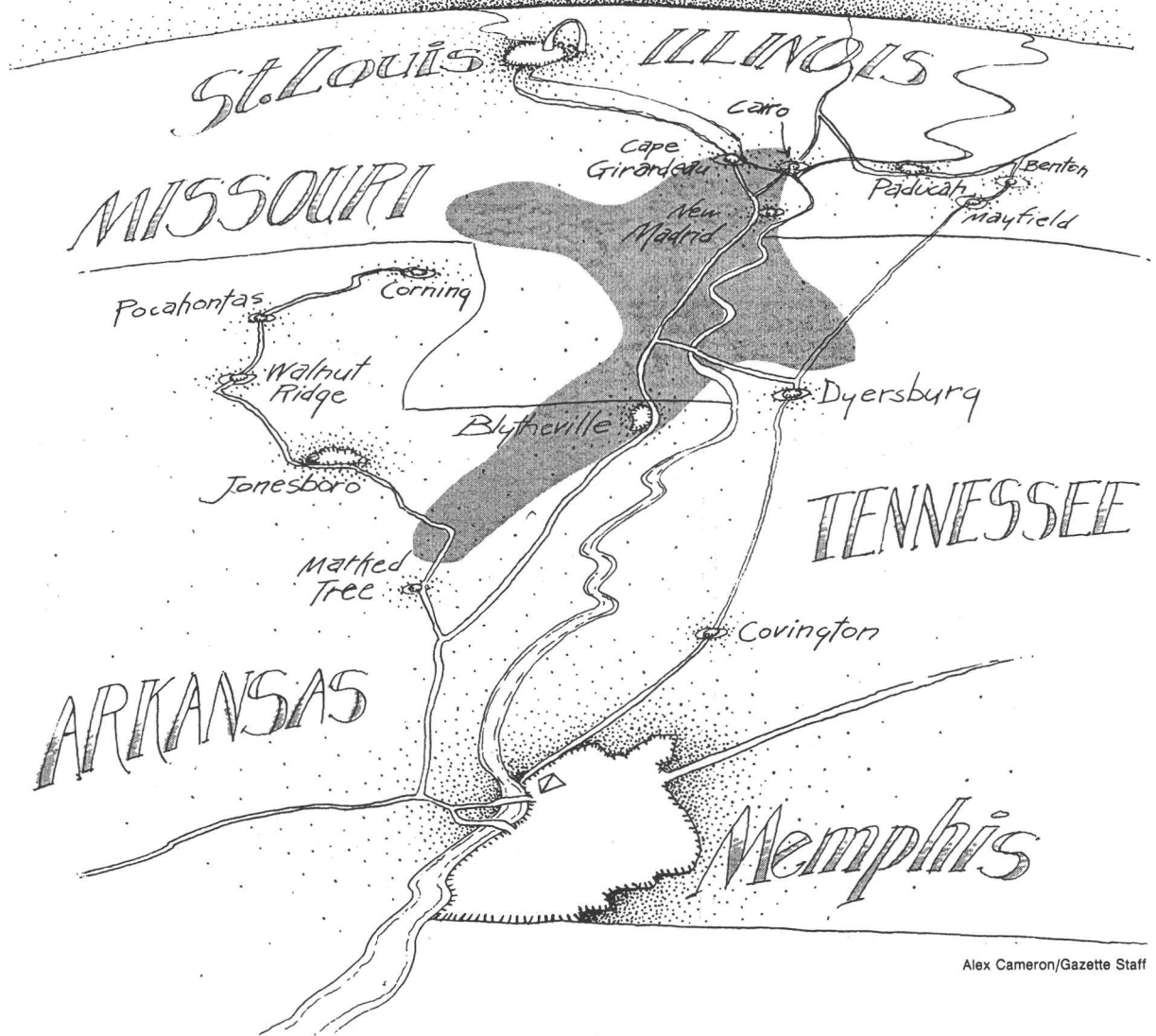
"Lord help us," said Mayor Dick Phillips of the scene.

His strangest call to date: areport about blackbirds flying backward — supposedly a sign of the quake.

12-4-90

Arkansas Gazette

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Alex Cameron/Gazette Staff

# QUAKE TALK

## Heard along the fault line

**E**ven though scientists made disparaging remarks about Iben Browning's earthquake forecast, Arkansans certainly paid attention to it.

12-4-90

**Arkansas Gazette**  
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Arkansas Democrat-Gazette

## Town mostly quiet on quake day

By Jennifer Gordon  
Gazette Jonesboro Bureau

**MARKED TREE** — Monday may have been a day of tension and suspense for the scientific community and the media as the world watched to see if the ground would shake.

But the conversation at Buck's Supermarket leaned more toward the people who had left town and missed the parade of cameras and reporters.

Barbara Tate, a cashier at the supermarket, said her brother-in-law and his wife took off to the Ozark hills to wait out the earthquake — just in time for the Ozarks to have their own 2.0 temblor. She said she couldn't stop laughing when she heard about the quake.

No one could laugh, however, about the cinders that were left of one family's home. Tommy Blaine, an Emergency Medical Technician with the ambulance service, said the fire department received a call about 1:41 Monday morning to put out a house fire on Homes Street. After searching the structure, firefighters were informed that the family had left to stay with relatives in Texas until after the earthquake scare was

over. Blaine said he did not know if the family had been notified and did not want to reveal their names.

Tate said the people of Marked Tree bought items to prepare themselves for an earthquake weeks ago and Monday were content to buy regular groceries. She said most people who come through the line want to know why the media is still in town if the earthquake is supposed to be so devastating.

Bill Henderson a 10-year city council member for Marked Tree, said the people of the town are veterans of survival. Most of the men have supplies on hand for deer hunting, he said, so the families already have the supplies they need to survive without food and shelter. He said he is more worried about tornadoes than he is about a projected earthquake.

Dan Cicerello, OES earthquake preparedness supervisor, said he was glad to see towns that were not prepared for an earthquake six months ago participating in the weekend drill. He said future preparedness depends on attention from the media and area officials.

## School closings

Schools in Northeast Arkansas that stayed open Monday reported high absentee rates. A survey of selected districts found these attendance rates Monday:

Jonesboro — 65 percent.  
Harrisburg — 60 percent.  
Blytheville — 50 percent.  
Marion — 40 percent.  
Paragould — 62 percent.  
Trumann — 42 percent.  
Piggott — 60 percent.  
Wynne — 50 percent.  
Manila — 35 percent.  
Marianna — 60 percent.

Even in central Arkansas the Pulaski County, North Little Rock and Little Rock school districts all reported noticeably higher-than-average absenteeism at some schools Monday, although they didn't have exact figures.

## It never hurts to be prepared

**YELLVILLE** — It doesn't seem much different from getting ready for an ice storm. Check the oil lamps. Get kerosene for emergency heat. Extra food — the roads will be impassable. Matches?



Cam Semelsberger

What's the weather in Fayetteville? Has it hit Oklahoma?

In an ice storm, we'd have some warning. We'd have a few hours warning, and then, once it arrived, we would go to bed snug in the knowledge that we were ready.

The problem is, we're not under a winter storm watch; we're under an earthquake watch. Now we ask, blankets? Water for two weeks? Where will we cook? The concept of preparing for a disaster takes on another dimension. If only intellectually and materially, we can be ready for the ground to shake.

David Davis, the Civil Defense coordinator for Marion County, has been giving earthquake preparedness speeches at the rate of one a day since the prediction by Mr. Browning was publicized. By the time I saw Mr. Davis' presentation in November, it was speech number 45, and the posters were getting a bit dog-eared. Still, they were very effective. One poster showed the epicenters of earthquakes in Arkansas for the last 10 years. The run-together dots

around the New Madrid fault line were not so interesting to us as the three red dots across the lower section of Marion County. Forget the New Madrid — we're quakin' and shakin' right here.

Mr. Davis' message was delivered in his matter-of-fact, down-home manner. It was perfect for a hysteria-prone subject. Although I had been following news about the New Madrid fault for about 13 years, I learned a lot. Especially about those three red dots in Marion County.

Mr. Davis laid it on the line. The high population centers will get the most attention, and they will get it first. Consider that our electricity is not generated locally. Consider the number of bridges linking our county with the rest of Arkansas. We will be low priority, and we will need to be able to fend for ourselves and help our neighbors.

There has been a lot of earthquake talk around the county, and it's good that the people's level of awareness has been raised. It's good to think out a plan and to consider survival strategies. Not all the talk is planning, of course. There are the pooh-poohers who say it's all a bunch of bunk and who come close to denying that the earthquakes of 1811-1812 ever occurred. A few are scared witless about it. Some talk of howling dogs and booms deep in local caverns at the time of the latest quakes. One friend said we weren't in any danger and turned to his wife to tell her that they'd probably lose their chimney.

Most people are just like me, I would guess. They've done everything they can think of, and they keep thinking of other things they can do to prepare. (Pack away great-grandmother's compote!) They are going ahead with their lives with a wary approach to this week and beyond.

The big one will probably not occur this week, but now we are more aware and more prepared

than we were even a month ago. Probably, the reality of it is that we will need our survival skills and our emergency kits eventually. In the meantime, we can count our blessings and call it an easy winter if we can make it to spring without using the kerosene, the lamp oil and the extra food during an ice storm.

Community columnist Cam Semelsberger is a writer and innkeeper in Yellville.

## No sign of quake in Memphis — yet

By John Reinan  
Gazette Staff

**MEMPHIS** — Tennessee's largest city stood still Monday.

Oh, the people of Memphis moved around plenty. But the city itself, built on the silty banks of the Mississippi River, didn't experience the major earthquake that New Mexico climatologist Iben Browning had forecast for it.

Browning's forecast included a two-day window on either side of Monday, so the jury is still out on his forecast until Wednesday — except, that is, in the minds of the top elected officials of Memphis and Shelby County.

At a Monday breakfast meeting of the Business Emergency Pre-

paredness Council, Memphis Mayor Richard Hackett and Shelby County Mayor Bill Morris denounced Browning's forecast in the strongest terms.

"Browning has absolutely no credibility," Hackett said, calling the quake forecast "a ridiculous suggestion." "I came to this meeting with some reluctance," Hackett told the group of about 50, "because I was concerned that some people might think I was giving Browning's forecast public credence.

"I don't give it any credence whatsoever."

Morris said that Browning had

See MEMPHIS

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Arkansas Gazette  
(Continued)

## Memphis

Continued from Page 1A

done Memphis "a great disservice," but acknowledged at least one positive aspect to the quake hysteria.

"I think this community has become totally alerted to the fact that we've got to approach things differently than we did in the past," Morris said.

"A year ago, nobody talked about seismic things — it was a word that was hardly in anybody's vocabulary.

"But I'm going to go downtown now and show you my confidence," Morris said. "I have an office on the eighth floor of the low-bid, low-budget county office building, and I'm going to be there the rest of

the day."

Dr. Arch Johnston, director of the Center for Earthquake Research and Information at Memphis State University, said that quake hysteria gained momentum because "the practicing earth science community" did a poor job of presenting information to counter Browning's forecast.

Asked why earth scientists didn't act sooner to counter Browning, Johnston said, "You set a bad precedent. There are a lot of fringe predictions out there... In essence, there was such a lack of scientific content out there that you couldn't evaluate it."

At the Memphis State earthquake center, a dozen or so seismographs were quietly tracing smooth patterns Monday morning. There were none of the swooping, jagged

lines that are the graphic evidence of seismic tremors.

Included among the center's battery of seismographs are instruments that take their measurements at Hoggard's Bluff, Wittsburg Lake and Olyphant, Ark.

At Mud Island downtown, workers continued their labors on the Great American Pyramid, despite the fact that Mud Island would be hit hard if a major quake were to occur.

Amos Miller, a scaffold builder at the Pyramid site, said he was keeping alert for any signs of a quake.

"I'm concerned about it, sure," Miller said. "There's too much steel and concrete up above me.

"I tell you, if I feel something I haven't felt before, I'm getting out of here."

12-4-90

Jackson (Tenn.) Sun

Reprinted by permission

## A DAY ON THE NEW MADRID FAULTLINE

# Earthquake Center workers field hysterical phone calls

### 'What time?' is most often asked question

By Mary S. Reed  
Sun senior writer

MEMPHIS — Officials at Memphis' Earthquake Center spent Monday calming people's nerves and answering media questions.

"Callers want to know what time it's going to happen," said secretary Anitra Williams, who answers the center's phones. "What time? What time. But we have no way of knowing when an earthquake is going to happen."

One woman phoned Monday just to tell Williams that she was going to sleep in a hard hat until Thursday, Williams said. Another wanted to confirm — erroneously — that earthquakes don't happen at night, she said.

"It's been a long time since I got any normal work done."

The Center for Earthquake Research and Information at Memphis State University has sent out 10,000 earthquake preparedness kits and fielded thousands of calls since climatologist Iben Brown-

ing projected a 50-50 chance of major quake on the New Madrid fault Monday.

Officials like director Arch Johnston and associate director Jim Dorman spent the day meeting media representatives from as far away as Kansas City, Kan., and Montgomery, Ala. Other professors at the center are attending a geophysical conference in San Francisco this week.

"We really are trying to do business as normal," said Jill Stevens, in charge of the center's public information, of Monday's activities.

Geology students from Austin Peay State University in Clarksville toured the center on their way to New Madrid, Mo., and Reelfoot Lake.

"We wanted to be here if it happened," joked student Tony Gibbs.

The biggest blip on the drums recording seismic activity at the center Monday morning was a quarry dynamite blast near Pickwick Lake. The 13-year-old center has 80 underground sensors

scattered throughout several states, said Greg Steiner, technical director.

"The worse possible thing that could happen today is a felt earthquake," said Steiner Monday. "It would give credence to this pseudo prediction."

Center draftsman Tonya George found a way to make some extra money by peddling \$16 sweatshirts, which said, "I survived the Great Quake of '90."

"I'm amazed," George said, "I didn't think anyone would want them."

Phone calls to the center seemed to reach their hysterical peak last Wednesday and Thursday with rumors that Reelfoot Lake was bubbling and the fault line was steaming, said Williams. Monday's calls were calmer, she said.

The center's staff takes each call seriously, though it's hard not to laugh at times, said Stevens.

One of the phone calls fielded by George was from a woman asking how long gravity would last on earth after the quake struck. Said George:

"I told her I wasn't worried because I have Velcro on my shoes."



12-4-90

Memphis Commercial Appeal  
Reprinted by permission of The Commercial Appeal

# New Madrid 'frenzy' finds fault

Media, residents gather to 'spit in the face of death'

NEW MADRID, Mo. — By the time we arrived here Monday, the media feeding frenzy had become an ancient Roman feast.

Out-of-town news photographers and New Madrid residents repeated the days-old ritual of staring deep into each other's zoom lenses. The locals took pictures of news crews as the crews filmed locals. The news crews took pictures of locals as they took pictures of the film crews. And even that got old.

If the earthquake had hit Monday, as climatologist Iben Browning predicted there was a 50-50 chance it might, the result would have been alphabet soup.

KWTV, WTVC, KYTV, WLEX, KSDK — the call letters of more than 30 television and radio stations would have been scattered across downtown, along with the massive satellite trucks which the letters adorn — the "Skylink," the "Newstar," the "Live Eye."

A person standing at the corner of Main and Mott streets, in the heart of downtown near the Mississippi River levee, could turn in a circle and see a hundred or more news media representatives in a several-block area. They outnumbered mere curiosity-seekers about 3-to-1.

Not that everybody wasn't having a great time. The earthquake was all but forgotten except as an excuse for a party. Nobody seemed to expect the big shake, even though this was NEW MADRID. The town, after all, gave the New Madrid fault zone its name after being all but destroyed in the quakes of 1811 and 1812.

Monday, a single eccentric, such as 72-year-old Joe Brasher of Poplar Bluff, Mo., could have five microphones and cameras in his face at any given time — just as he planned.

"I knew I'd get on the air with this hat on," said Brasher, who wore a low-rent cowboy hat and strummed a walnut guitar at a high-visibility intersection. "I'm over here to cut up with all you and these ignoramuses. I don't know who's more ignorant, you or me — you traveled thousands of miles to get here."

A traveler from Los Angeles, psychologist Dr. Robert R. Butterworth, was camped out in the New Madrid Historical Museum, where it would be impossible for the reporters to miss him.

"This is the most amazing



ON THE FAULT LINE WITH JOHN BEIFUSS

thing I've ever seen, and I've traveled all across the country," the doctor said of the media onslaught. "I'm a psychologist, and I can't explain it."

Butterworth said his specialty is child psychology.

Chris Porter, 10, confided that he was disappointed he hadn't been filmed by a news camera. The reporter told him if he went back to Dr. Butterworth and asked about his puppets, he would probably get on TV.

It worked. Butterworth pulled out a green, cloth ghoul and said: "This is Iben Browning. Do you want to punch Iben Browning? Go ahead, punch him."

Chris punched the puppet. Then Butterworth dropped it on the floor. "Kick him!" Chris obeyed. Mission accomplished! The cameras rolled.

"This is the bottom line," Butterworth said. "If you can get little kids to punch Iben Browning and kick him around the room, maybe you can change the fear



into anger."

Despite all this excitement and the wall-to-wall people, business at the museum hasn't been very good the past few days, said museum board member Evelyn Duncan. "We're all full of media, and they don't pay."

Nevertheless, the hype provided many with an opportunity to have fun, make money and save souls:

■ Amy Long, 15, and her friends sold homemade "Quake Cookies" (chocolate chip) and "Faulty Muffins" (blueberry and banana nut).

■ Groups of students from Southwest Missouri, Western Kentucky and other universities came to see and be seen. Doug

Miller, 22, and friends drove six hours from Owensboro to be here on Quake Day. "It was just a chance to spit in the face of death," he said.

■ Tom's Grill served Shake 'n Bake chicken and "Quakeburgers," touted as burgers that had been cut jaggedly in half. But the ones we received only had a break in the bun.

■ Rev. Sanford Berry, 62, of the Assembly of God Church drove around town in an Econoline van on which he had painted the words: "Earthquake? or Rapture?" Speakers mounted on the van played inspirational music. He said people should quit worrying about the quake. "Far more important and far more imminent for sure is the coming of Jesus Christ."

■ Volunteers with the New Life Evangelical Center, a St. Louis-based coalition for the homeless, passed out flashlights, "solar blankets," and dried food — just in case.

Just in case: That's why Jim Helms, 63, police chief of this town of 3,204, has all six police officers and all 15 auxiliary officers on 24-hour standby.

That's why seven first aid stations are ready to go. And remember, Browning said the quake could happen within 48 hours of Dec. 3 — that leaves today and Wednesday, too.

"I've said before, I'm more afraid of the media trucks running over somebody than I am of the earthquake," Helms said.

## Scientists renew Browning attack

50-50 earthquake odds 'ridiculous'

By Lee Siegel  
The Associated Press

SAN FRANCISCO — Earth scientists renewed their attack Monday on climatologist Iben Browning's prediction that unusually high tides make chances of a major New Madrid fault quake 50-50 by Thursday.

"There is no scientific basis to the Browning prediction," said Lawrence Braille, a Purdue University seismologist and member of a U.S. Geological Survey working group that debunked the quake projection in October.

"There is a small probability of an earthquake on any given day, but it's the same today as on any other day," he added. "Browning has put a 50 percent chance on it, which is a ridiculous number."

Braille, Tom Heaton and other

scientists criticized the projection about the New Madrid quake during a press conference at the American Geophysical Union's fall meeting.

However, they refused to rule out the possibility of a major quake this week along the New Madrid fault, in California or Japan, where Browning has said the gravitational tug of the moon and sun might produce severe quakes this week.

Browning, a climatologist and business consultant, projected a 50-50 chance that the New Madrid fault would be rocked by a tidally triggered quake measuring 6.5 to 7.5 on the Richter scale this week.

The advisory panel concluded in October that Browning's forecast lacked scientific validity. The 11 scientists said that although the New Madrid fault is likely to be hit by a large earthquake someday, such a disaster is no more likely this week than at any other time.

The New Madrid zone stretch-

es from Cairo, Ill., southwest through New Madrid, Mo., to Marked Tree, Ark.

In the winter of 1811-1812 when the region was sparsely populated, the fault produced three or four great earthquakes estimated at more than 8 on the Richter scale. The scale had not been invented yet.

The 1811-1812 quakes were the strongest in recorded history in the United States. A repeat today could cause 4,500 deaths and \$51 billion in damage in Little Rock, Memphis, Carbondale, Ill., Evansville, Ind., Paducah, Ky., and Poplar Bluff, Mo., according to a study done by a Memphis engineering firm in the Eighties.

Jer-Ming Chiu, a Memphis State seismologist, said a seismic network in the New Madrid region has detected only a few tiny, unfelt quakes in recent days.

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12-4-90

## Memphis Commercial Appeal

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# MSU center keeps vigil as machines draw blanks

By Tom Charlier  
The Commercial Appeal

With a dark, scrambled line, the seismograph signaled something was going on up in Dyersburg, Tenn., Monday. Uh-oh. Could it be . . . ?

"Probably a farmer in his field," assured Kyle Tong, a student technician at Memphis State University's Center for Earthquake Research and Information.

In these days of earthquake paranoia, a corridor of seismographs at the MSU center has become an epicenter of nondrama. For several days, students, parents and reporters have passed by trying to derive some reassurance or meaning from the pulsating lines that would provide the first tangible record of a tremor.

Monday was the main "danger" date specified by New Mexico climatologist Iben Browning in his projection for a possible quake within the New Madrid seismic zone. However, just about the only vibrations picked up by MSU were from "background" noise, such as farm machinery and quarry blasts.

As graduate students and technicians tried to go about their normal research and work at the center, visitors checked for signs of activity Monday.

"I've been real scared, so I just came by," said Missy Foster, a freshman nursing student from Memphis. "If there had been any activity, I was to go to go home and put my head under my desk."

The seismographs register ground vibrations on graph paper mounted on slowly turning drums. The machines receive signals picked up from sensors, called seismometers, buried in more than a dozen locations throughout the Mid-South.

Both Memphis State and St. Louis University operate permanent seismometer stations serving the New Madrid Seismic

Zone, which stretches from near Cairo, Ill., to Marked Tree, Ark. The stations annually record some 200 quakes having magnitudes of 1.0 or greater on the Richter scale within the zone.

However, a new, high-tech network of portable stations not tied into the seismographs records some 400 tremors with magnitudes as low as 0.5. The Portable Array for Numerical Data Acquisition (PANDA) network uses 40 buried geophones — small, sensitive devices developed by the oil industry — which transmit radio signals to amplifiers and to an MSU station in Tiptonville, Tenn., where any quake information is recorded on computer discs.

There has been no unusual seismic activity since the countdown began Saturday on Browning's projection, experts say. The seismographs did record a minor tremor in the Ozark mountains early Sunday, and some faraway quakes since then.

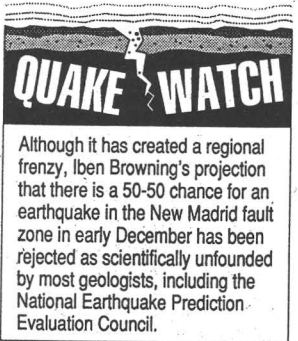
Arch Johnston, director of the Memphis State center, said the minor quakes in the New Madrid region, if anything, should be reassuring.

"One of the precursors of a big quake is the small quakes shut off — what we call 'seismic quiescence,'" Johnston said.

A quake's first signature on the seismograph comes in the form of a low-amplitude zigzag. It represents the "p" wave, which is the sound wave that travels through the ground when a tremor occurs.

The "p" wave is followed by the "s," or shear, wave, which brings higher-amplitude and more damaging vibrations. The time difference between the two waves — a matter of seconds — grows as they emanate from the quake epicenter.

The best stations for recording New Madrid quakes generally are the ones situated in bedrock, outside the actual seismic



zone in locations like Hoggard's Bluff, Ark. The soft sediments found within the zone readily amplify "outside" noise, such as the farm machinery picked up by the Dyersburg station, making it more difficult to discern quakes.

"It's a crummy place to run a seismic station," said Johnston.

## New Madrid fault is inching across hot inner layer like 'eggs on a skillet'

The Associated Press

The New Madrid fault, site of past and predicted earthquakes, is a series of cracks running through a plate in the Earth's crust, a Memphis expert says.

The geographical formation, about 15 miles wide and 200 miles long, runs along the Mississippi River from southern Illinois to Marked Tree, Ark., just north of Memphis. New Mexico climatologist Iben Browning had said there was a 50-50 chance that a series of strong earthquakes would hit the fault early this week. Many scientists dismissed his forecast, but said there will be a quake measuring up to 6.0 on the Richter scale in the next few decades.

The New Madrid fault is in the middle of the North American Plate, one of dozens of plates that slowly inch across partially molten layers beneath the Earth's surface, like eggs on a gigantic skillet. It is unlike most fault areas, which occur where two plates collide.

The New Madrid fault was formed when the North American Plate stretched to the cracking point, more than 500 million years ago. Fractures formed, allowing magma to intrude into the Earth's crust, said Arch Johnston, director of the Memphis State Earthquake Research and Information Center.

As the strain of stretching continued in the middle of the huge plate, magma (or molten rock) drained to the surface, triggering further cracking.

Next came the Paleozoic era, more than 225 million years ago. Prolonged compression caused the area to sink, and shallow seas deposited layers of sedimentary rock over it.

Then, in the Mesozoic era, the area rose again. This allowed magma to once again intrude into the crust. Johnston says the modern fault area is in a period of compression and the slow sinking eventually will lead to a strong quake.

Unlike the San Andreas fault, which is visible at the surface of the Earth, the New Madrid fault

is buried deep under many layers of sedimentary rock. The shifting of these underlying faults causes many quakes each year, most of which are not felt.

However, Johnston says the fault area has been reactivated.

A quake of up to 6.0 on the Richter scale is expected eventually. A quake that size can cause severe damage. In October 1989, 66 people died in a northern California earthquake that was recorded at 7.1. A quake of 7.1 would be 10 times stronger than a quake of 6.1 on the Richter scale.

Earthquakes along the New Madrid fault in 1811-12 were strong enough to shift the course of the Mississippi River and ring church bells on the East Coast. Quakes struck along the fault in later decades, but these are the most powerful known along the New Madrid fault. They were estimated at up to 8.75 on the Richter scale, which hadn't been invented then. The highest earthquake that has been measured registered 8.9 on the scale.

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# Arts events feel impact of worries over quake forecast

By Whitney Smith  
The Commercial Appeal

Earthquake worries are hurting ticket sales for local holiday arts events that are traditionally big moneymakers.

Climatologist Iben Browning's widely publicized quake prediction damaged attendance at a few arts events Sunday and Monday, and has affected ticket sales for future events, some arts officials said. But others said they have noticed no effect.

Hardest hit has been Memphis Concert Ballet, whose annual production of *The Nutcracker* — its biggest moneymaker — opens Friday at the Orpheum theater.

The *Nutcracker* Ball, a new fund-raiser planned for last

weekend, with ticket prices up to \$250 and a goal of \$100,000, was canceled.

Ball organizers "felt there was going to be such an overreaction to this ridiculous earthquake prediction that it would be very difficult to sell the event," said Dorothy Gunther Pugh, Memphis Concert Ballet's artistic director.

Tickets never went on sale for the Saturday event. "They felt we would invest money in the ball, and people would be so frightened, they would not respond."

Meanwhile, *Nutcracker* student matinees were trimmed from four to three, and attendance is expected to drop from 8,000 to about 6,000. Also, sales for public shows are down 27 percent from last year.

"This may be more than the earthquake," Mrs. Pugh said. "To me, it's also the beginning of the effect of the economy. A recession is pending and people are holding on to their money longer."

Below-par attendance was reported after Monday's Theatre Memphis student matinee of *A Christmas Carol* and Sunday's Memphis Symphony concert.

## 12-4-90 Memphis Commercial Appeal Reprinted by permission of The Commercial Appeal

But Monday's Playhouse on the Square matinee of *Annie* was packed and Monday night's Memphis Youth Symphony concert was scheduled to go on as planned.

The extent and impact of the drop in revenue some groups have experienced won't be known until after the holiday shows close.

"There will certainly be an impact on our bottom line, if we are not able to show excellent attendance at *The Nutcracker* and are not able to recoup dollars with other fund-raisers," said Evelyn Craft, Concert Ballet's general manager. "This has significantly affected our planning. We had hoped to raise \$100,000 on the *Nutcracker* Ball, and we are busily regrouping to put together two or three fund-raisers before the end of the year."

As of last Friday, some 1,561 single tickets for the four public *Nutcracker* shows had been sold, down from 2,128 last year, said Concert Ballet marketing

director Cam Williams.

Attendance will also be down at student matinees, a major revenue source, Ms. Williams said. Three morning matinees will go on as planned Wednesday, Thursday and Friday, but a traditionally slow-selling noon matinee was dropped.

*A Christmas Carol* matinees at Theatre Memphis ordinarily sell out, but 150 of 425 seats were filled Monday, said marketing director Brad Watson.

"Our night performances have not been interrupted at all," Watson said. "But there were a couple of matinees disrupted because some schools were reluctant to come."

Watson said if attendance declines continue, ShoWagon, a youth-oriented performance troupe of paid actors who performs a condensed version of *A Christmas Carol*, could be affected.

About a third of their budget is made each year off *A Christmas Carol*, he said.

## Pressing On

### New Madrid Ready For Media To Leave

By Peter Hernon  
Of the Post-Dispatch Staff

NEW MADRID, Mo. — Mayor Dick Phillips hopes that stories of crows flying backward, bubbling river water and other rumors that have made sides shake, if not the ground, in this earthquake-prone community will soon become as rare as roving television crews.

Reporters planned to pack up their cameras and notepads today and leave town. It was time to clear out, now that a discounted earthquake forecast appeared to be as reliable as the elderly woman who telephoned Phillips from Salem, Ore., to firmly warn that a Big One was a certainty Monday because her back ached.

After some 500 visitors poured into this picturesque community of 3,200 — the most Phillips can remember — residents are daring to talk about life after Iben Browning's much-criticized earthquake forecast.

"I think quite a few people will be sorry to see all the news people go," he said. "It's given us the opportunity to be national news for four days, but now that's history."

Not quite. Although Browning's prediction of a 50-50 chance for a quake measuring between 6.5 and 7.5 on the Richter scale zeroed in on Monday, his forecast extends through Wednesday. Schools will remain closed today — many of the children were down on Main Street on Monday watching the

reporters — and state and local offices expect to be short of staff. Schools reopen Wednesday.

Scientists have blasted the forecast by Browning, a climatologist from New Mexico, as a "disservice" — if not downright quackery. Browning's prediction, they say, carries "no scientific basis."

Sen. Christopher S. Bond, R-Mo.,

who visited New Madrid on a chilly Monday afternoon, was more charitable. Although he gave a curt "no" when asked if he thought a quake would rumble, he said that Browning "may have done us a service" by calling attention to the dangers of earthquakes and other natural disasters.

Bond was beset by about 20 reporters hungry for a fresh face — even a

U.S. senator's — after days of covering a story that was turning stale.

Bond also took pains to boost New Madrid's tourism and business potential, which must have sounded like tonic to Phillips and other city leaders, who admit that they worry about the effects of the Great Earthquake Scare on their community.

And Bond wasn't the only politician



Gov. John Ashcroft speaking at a press conference Monday at a grain inspection office in New Madrid. Ashcroft said he feared some weren't taking earthquake preparations seriously.

Wendi Brown/Post-Dispatch

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## St. Louis Post-Dispatch (Continued)

touring New Madrid on its day of days. Gov. John Ashcroft, who visited several communities in the Bootheel, also was in town.

Again, he faced a wall of eager reporters at a grain inspection office. "I fear some of this hype might cause some people not to take earthquake preparation seriously," he said.

Phillips, a husky man who often speaks through a blue haze of cigar smoke, started Monday with an appearance on national television. He has been mayor for more than six years. He also runs a fertilizer and chemical company.

Phillips, a longtime Democrat, didn't mind the visit by two of the state's most prominent Republicans. If it draws attention to the risk of an earthquake, that's fine with him.

Phillips, 64, has lived all his life over the New Madrid Fault, which takes its name from his community. He has grown accustomed to occasional trembling.

The fault stretches 120 miles through Missouri, Arkansas, Tennessee and Kentucky; it is considered to have the potential to be one of the most dangerous in the world.

"I just hope we don't let all of the preparations we've made since Browning's forecast fall by the wayside," Phillips said.

The mayor faced a steady stream of reporters at the New Madrid Historical Museum, where one St. Louis radio station broadcast a morning show.

Hap's Bar, a popular watering hole, was staked out by another station.

There were stories enough for everyone. Joe Brasher, an aging guitarist wearing a red cowboy hat, strummed a ballad to his "Filipino Baby" on Main Street. An airplane did barrel rolls over the Mississippi River.

And Pat Broyles, owner of P and J Crafts, hoped that residents would get over their uncertainty about the future in time to do their Christmas shopping.

Robert R. Butterworth, a psychologist from Los Angeles who specializes in "quake prediction stress," punched a nasty-looking green puppet he called "Iben Browning."

He said the puppet was a wonderful way for children to release their anxiety. He got a nice crowd, especially when he smacked away.

The story of the big quakes that jolted New Madrid in late 1811 and early 1812 is well known in these parts. Ben H. Ashley, the New Madrid County recorder of deeds, pulled out a record book used then, its brittle pages still legible. He pointed out the last entry by a recorder named M. Amoureux.

Dated the day after the worst of the shocks in February 1812, it was an announcement that his ledger "hath been closed."

"He cleared out," said Ashley.

So had most of Ashley's staff and other workers in the white-stone County Courthouse. Many had been given Monday and today off.

Ashley had taken the precaution of bolting down the files in his office's vault and reinforcing the windows — just in case. Like most other residents here, he is fatalistic about the prospect of a quake. A big one is bound to happen sooner or later, the experts say.

Van Sharp, the county clerk for 40 years, agreed. For his part, he is happy to see the tide of news people wash out of town.

"I'd rather we hadn't had the publicity," he said. "But I think all of this will be forgotten real quickly."



**TERRY  
HUGHES**

## Shake, Richter And Trembley

**WHAT'S IN A NAME?** the poet asked.

A few good laughs, I answered. When, that is, the earth and moon line up just right — and you're in the proper mood.

...And what do you do while waiting for an earthquake? A few good laughs seemed like the answer there, too.

Thumbing through the St. Louis area telephone book, I stopped at page 900. There, like an early Christmas present from the gods of fine print, were nearly two full columns of Richters. I started dialing.

"We have a scale, but we usually just stand on it to find out our current weight," cracked Daniel Richter of Shrewsbury. Nothing unusual registered on that Richter's scale Monday morning. Daniel found himself preoccupied not with shaking ground but shaking trees.

"I'm just hanging out here, watching the wind blow," he said. "I might go out in a while and fempt fate — maybe drive back and forth on [Highway] 40, you know, the depressed section downtown. What the heck."

A bold man, indeed. He was pretty blasé about the whole idea of an earthquake rocking the nation's midsection (news speak — ain't it grand?) and about the New Madrid Fault in general.

"It's there," he said, sounding like he might yawn. "Someday it'll hit. What can you do?"

Well, you could do like the A. James Richter family of Chesterfield.

"We just took down all our pictures this weekend, moved some glass items and such," said John Richter, 17, who stayed home from school Monday with a cold.

His folks were at work. But they had stocked some emergency supplies at home and worked out a disaster plan complete with a phone number that each family member could call to let the others know he was all right.

John Richter professed skepticism that he would have to use the plan any time soon. He said his folks seemed more serious about it.

Humor them, John. You know how parents are.

Elizabeth Richter, out in Ballwin, said she had a couple of bottles of water tucked away in the closet. But she added that she really didn't have time to worry much about an earthquake, what with her two preschool-age children running around the house.

As if on cue, her daughter started chirping, "Mommy, Mommy!"

Out in St. Charles, Liz Shake had to put up with obnoxious phone calls from relatives, as well as this stranger. Both her mother and sister called early in the day to ask "what's shaking" or if she was "shaking yet."

But then, she's gotten used to that sort of thing since marrying Harlan Shake 10 years ago. As a single woman, she had acquired the nickname Strawberry. When she married — well, you can guess what happened.

In fact, these two Shakes aren't beyond making a few bad puns themselves.

"We only wish we owned half of Steak n Shake," Liz said.

She didn't have any special plans for Q-Day. She and her husband were out of town over the weekend; he had to attend a disaster drill with his Army reserve unit. Liz Shake said she was behind on the housework because they didn't get back home until late Sunday night.

Liz said she and her husband might really clean up if there was a whole lotta shakin' going on.

"We own our own business — a janitorial service."

Just back from the beauty parlor and grocery store, Genelle Trembley was anything but. In fact, one got the definite feeling that no earthquake would dare mess with her.

"If we do have an earthquake, I'm really going to be mad," Trembley snapped. "I finished my Christmas shopping this last week, and anybody who thinks I'm going to go out and do that again is crazy."

"As a matter of fact, I was thinking about wrapping things today. I'll probably do that."

Having one's Christmas shopping done by Dec. 3 is, I think, at least as earthshaking an accomplishment as a 6.5 quake. But Trembley said she's just one of those people who has two choices — superorganized or total chaos.

"I don't live well with chaos. That's why I've decided against the earthquake. It's not going to happen," she said.

Of greater concern, she said, was how much damage the few snowflakes she encountered between her car and the store had done to the new hairdo.

But she was not terribly worried about the snow, either. She grew up in a rural community in northwestern Missouri, she said, and knew a thing or two about snow.

"In the part of the country I grew up in, you smell snow if it's coming — and it doesn't smell like snow," she said.

She laughed, but I think she really meant it. And I believed her.

Next time I want a forecast, I'll call Trembley. Sure, scientists might dispute her methods. But she's not making any money off her predictions — and she has a great laugh.

## Wind Blast Hurts Two In Family Camping Out To Escape 'Quake'

By Donald E. Franklin  
Of the Post-Dispatch Staff

Dennis Loyd thought that he was protecting his family by moving it in his \$16,000 camper to a field away from their home in Campbell, Mo., in the Bootheel.

Instead, wind rolled the camper three times, injuring Loyd's wife and son.

"We tried to get away from the earthquake, and a tornado got us," said Dennis Loyd, 41. "It was an unusual experience that I'll never forget."

Loyd said he moved his camper Friday night with five others in a circle away from power lines and trees as a precautionary measure.

Loyd said the strong wind hit the area about 1:25 a.m. Monday. His

wife, Sheila Loyd, 39, and a son, Danny, 16, were injured. Sheila Loyd was treated for a head bruise at Doctors Regional Medical Center in Poplar Bluff and released. Danny was admitted to the hospital with pelvic injuries.

An older son, Dennis Loyd Jr., also suffered cuts and bruises when his camper overturned. Four of the campers withstood the high wind.

Loyd said the occupants of the other campers returned to their homes after the incident.

Campbell is about 60 miles west of New Madrid.

"I was worried and still am," Loyd said. "My wife said if she still had a trailer, she'd be out there tonight."

# Nothing Shaking

## Schools, Shopping Centers Have Slow Day

By Tom Uhlenbrock  
Of the Post-Dispatch Staff

Sue Ann Kirst felt the tremors, but they were from brisk wind that swayed the top of the Gateway Arch — not from Iben Browning's forecasted earthquake.

"I said we should all get T-shirts that say: 'I survived the Arch on Quake Day,'" said Kirst, a nurse visiting Monday from Scottsdale, Ariz.

Monday was the bull's-eye of the five-day target period Browning gave in his forecast of a 50-50 chance for a big quake on the New Madrid Fault.

Although experts have called Browning's prediction poppycock, many St. Louisans decided that Monday was a good day to stay home.

Even the attendance at a couple of earthquake parties Monday night was down. Only about 80 people were at a well-advertised party at Blueberry Hill, a bar in University City, and most of the customers were regulars.

"My boss, Joe Edwards, said we would have had a better crowd if the weather had been better," said manager Jill Posey. "Maybe people are just tired of the earthquake."

Edwards had organized an "Earth-shaker!" pinball tournament in the bar's window, introduced two somewhat unsettling drinks, compiled a list of 150 earthquake-related songs and provided earthquake helmets for his employees.

"I took off my hard hat," Posey said. "It hurt my head."

Michael Kanyuck, a contractor by day, popped into Blueberry Hill in a kelly green hard hat and a lime green T-shirt that read, "Bring On The Quake!" He said he had invited 120 friends over Saturday night for a "Pig Out Before We Dig Out" earthquake party and that he was about partied out.

"I made 100 of those drinks with Jello and vodka, and they were gone in less than an hour," Kanyuck said.

No wonder he had no interest in

trying Edwards' drink called "The Earth," a mixture of vanilla pudding, Bailey's Irish Cream, Chambord (a raspberry liqueur) and chocolate chips, served with a spoon.

At the Hi-Pointe Cafe, six people sat at the bar, while another four hovered around a pool table. The bartender insisted that the bar was never busy until about 10 p.m.

"I was a little nervous all day about it, because I live on the 14th floor of an apartment building," said Jamie Williford. "But I'm OK now."

Bill Reyland said he had never believed the prediction, but he had packed up some bottled water, blankets, medical supplies and a pup tent. But Reyland hadn't brought any of his supplies to the party.

Kelly Schaper, manager of the Top of the Riverfront, the revolving restaurant atop the Clarion Hotel, said business was down Monday night.

"It's looking pretty bleak as far as reservations," she said. "We have one for a party of two, the Rumbles. We're debating whether that's a joke or not."

School attendance was down, drastically in several districts, and some shopping centers were nearly deserted.

"Traffic was definitely lighter," said Cpl. Ben Flowers of the Missouri Highway Patrol office in St. Louis County. "I would think a few people took the day off."

Kirst, the nurse from Arizona, and two friends found no wait in the line for the tram ride to the top of the Arch.

"It's less than half of what our normal business is," said Stuart West, a supervisory ranger with the National Park Service.

"A lot of visitors on Monday are school groups," West said. "We had three groups scheduled and two canceled. Normally, we'd have six to nine, but teachers picked today as a day not to visit the Arch."

Crowds were spotty at department stores. Union Station looked as if the last train had pulled out.

The Athens Cafe at the station had few takers for its earthquake chili:

"One bowl and you can survive anything."

"Terrible day," said Myron Parker, manager of the station's Rocky Rocco pizza place. "I'd say this is the worst day — other than a snowstorm — that we've ever had. We never had our lunch rush."

That was fine with the women from the Lafayette Older Adults Program from the Rockwood School District. They found no crowds to battle on their annual shopping trip downtown, and were unfazed by predictions of pending disaster.

"Have we had it yet?" chuckled Ruth Rose of Manchester.

"Honey, at our age, we defy everything," added Frances Herdlika of Ballwin.

Virginia Hiscox said the group's members voted on whether to ignore Browning and shop. "Thirty-five out of 44 came, so we had a few chickens in there," she said.

While some schools reported attendance rates only slightly down — 5 percent in Parkway schools — city schools were hit hard.

At elementary schools in St. Louis, attendance normally is 94 percent, but it ranged from 50 to 70 percent Monday. High schools average 83 percent but ranged from 45 to 93 Monday.

"Apparently, some people were very concerned," said Charles Burgess, a spokesman for the city schools. "I suspect we'll see some recovery tomorrow."

In Jefferson County, a district official said he was "quite shocked" to find only two-thirds of the students in school. St. Charles, Lincoln and Warren counties also reported poor attendance.

John Lawrence, superintendent of the Troy school district, said the district normally has about 130 of its 2,900 students absent on a typical day. Six hundred were missing Monday.

"We had no real anticipation of this large of an absentee rate," he said.

William A. Gullick, superintendent of schools in Marissa, asked a committee of parents and district employees to monitor their dogs, cat and farm animals for strange behavior before

he decided whether to cancel classes.

Classes were held Monday, but Gullick said they could be called off later this week if the animals act up.

"One of the people on the committee is a farmer," Gullick said. "He was the last person we checked with early this morning, and everything was OK."

Gullick is a student of Asian culture and explained his theory this way: "You know how we are sometimes. If it doesn't have the word 'science' on it, we're a little skeptical. Look how long it took medicine to recognize that acupuncture has some positive effects."

Although hospitals reported no postponements of surgeries, doctors and dentists said their patient load was minimal.

"It isn't so much canceling as people refusing to take today for appointments — I couldn't give it away," said Judy Walsh, office manager for Dr. Leslie Rich, a dentist in Kirkwood.

Attendance was about normal at noon Mass at the St. Louis Cathedral. Leo Putney said his visit was not prompted by fears of an earthquake.

"No way. I don't believe in that nonsense," said Putney, a driver for Yellow Cab. "Some of my passengers were saying they were going to leave town. It has been the major topic of conversation."

One popular rumor making the rounds promoted the "numerology" viewpoint of Browning's prediction. The rumor had it that a quake would occur at 4:56 a.m. or p.m. on Monday at a magnitude of 7.8 on the Richter scale.

Those numbers, when combined with the numbers for the third day of the year in the 12th month of 1990 gave this sequence: 1-2-3-4-5-6-7-8-9-0.

When 4:56 p.m. approached Monday, at least two employees of the St. Louis County Election Board took vacation time to leave an hour early, citing the county's deteriorating parking garage.

Patricia Corrigan, Thom Gross, Pat Gauen, Robert Manor, Virgil Tipton and Leo Fitzmaurice of the Post-Dispatch staff provided information for this story.

# Seismography: All Is Quiet On The Expert Front

By William Allen  
Of the Post-Dispatch Staff

A watched seismograph never quakes.

The drum recorders went 'round and 'round Monday at the St. Louis University seismology lab, but they picked up no earthquakes that could be attributed to Iben Browning's discounted quake forecast for the New Madrid Fault.

"It didn't happen," said Sean-Thomas Morrissey, technical director of St. Louis University's geophysical observatory. The university runs a network of 60 seismographs that sense the slightest tremor in the fault.

"Nothing's going on," Morrissey said. "We're overdue for even our normal background events."

Browning forecast a 50-50 chance of a quake

measuring 6.5 to 7.5 on the Richter scale between Saturday and Wednesday. A national panel of quake experts found the forecast "scientifically invalid."

The forecast is based on Browning's view that a 27-year maximum in tidal pull by the sun and moon could trigger a quake. The peak pull occurred at 5 p.m. Sunday.

"Once that point is past, no earthquake could be associated with the maximum," Morrissey said.

By Monday evening, the National Earthquake Information Center in Golden, Colo., had reported only one earthquake above 5.0 on the Richter scale on Monday. That was a 5.1 near Tonga Island in the South Pacific, about 1:40 a.m. St. Louis time.

Since 12:01 a.m. Saturday, only three other 5-

point quakes were recorded — all in the southern hemisphere. Browning predicted quakes on the New Madrid Fault and a few other spots in the northern hemisphere.

Nothing over magnitude 6 was recorded.

Meanwhile, St. Louis University geophysicist Robert Hermann went about a normal day's work — grading papers, preparing for class and conferring with colleagues and students on the study of earthquakes. One notable difference was a tuxedo with royal blue cummerbund and bow tie.

He wore the outfit to the lab's "fake quake" party. The festivities included an earthquake-resistant house made from cookies, a cake of the United States split down the middle and "dirt cake" made from crushed chocolate cookies, whipped cream and candy worms.

12-5-90

Riverfront Times (St. Louis)

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# The Riverfront Times

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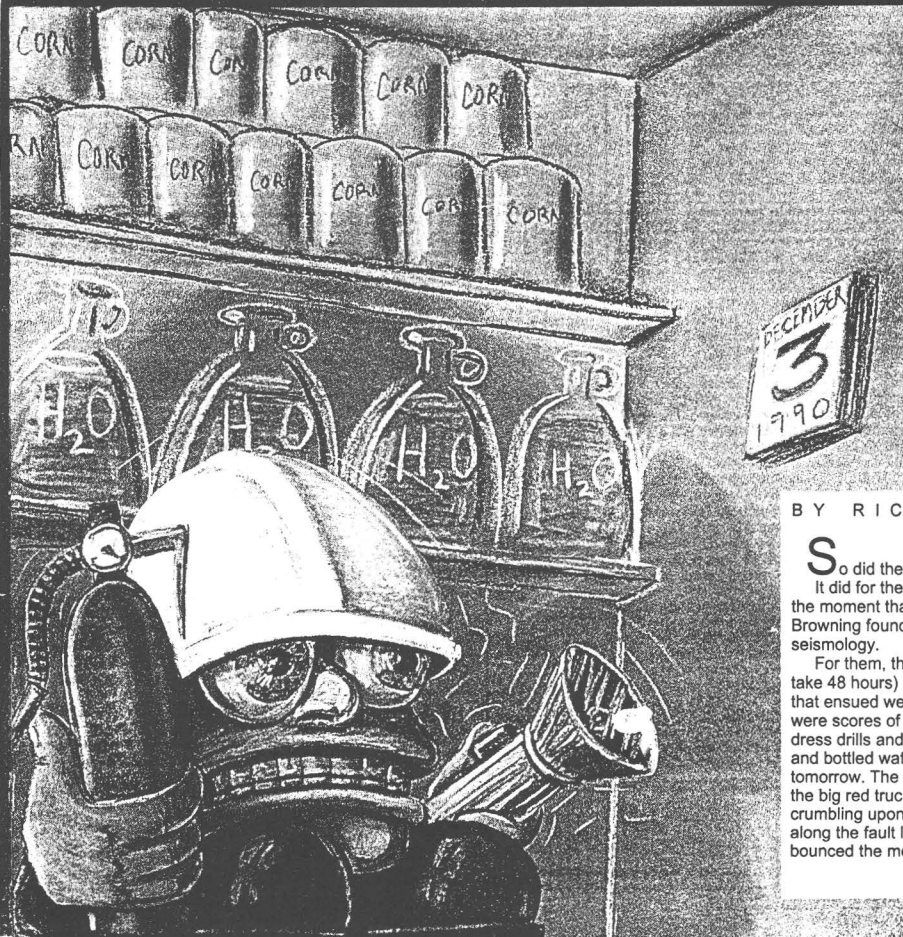
ST. LOUIS' BEST... EVERY WEEK

76 PAGES

DECEMBER 5-11, 1990

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# EARTH QUACKS



*The great quake of 90 scored a zero on the Richter scale, proving that Iben was as terrible as the hysters who took him seriously. The Midwest had gotten stupid for nothing. And it wasn't New Madrid's fault*

BY RICHARD BYRNE JR.

**S**o did the earth move for you?

It did for the media and for local government, from the moment that climatological crackpot Iben Browning found a Midwestern audience for his bizarre seismology.

For them, the prediction of a Dec. 3 quke (give or take 48 hours) on the New Madrid fault and the panic that ensued were nothing short of titillating. There were scores of earthquake-preparedness videos, full-dress drills and pull-out sections. Guns and batteries and bottled water sold like there was, literally no tomorrow. The boys in the fire departments parked the big red trucks outside to keep the firehouses from crumbling upon them. John Ashcroft trudged grimly along the fault line, while scores of satellite dishes bounced the message of doom from the still earth to

*continued on page 10*

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Riverfront Times (Continued)

# EARTH QUACKS

*The great quake of 90 scored a zero on the Richter scale, proving that Iben was as terrible as the hysters who took him seriously. The Midwest had gotten stupid for nothing. And it wasn't New Madrid's fault*

continued from cover  
the heavens to the still earth.

Let's face it. The media and the pols were a big easy for the quacks and maniacs. But was it as good for you as it was for them?

And more important: Do you still respect them in the morning?  
Hardly.

**T**he facts about Browning — climatologist for corporate boards and earthquake hobbyist — have been out since October.

Browning has never accurately predicted an earthquake. His theory of tidal motion triggering them is described by the National Earthquake Prediction Evaluation Council as "theoretically implausible." David Stewart — director of the state's Center for Earthquake Studies and Browning's main supporter — believes in psychic phenomena and once had a psychic help in an earlier (and off-base) quake prediction in North Carolina.

Add to this the fact that the chances of the kind of large earthquake that would cause serious damage in St. Louis are minuscule for the next 10 years and slim over the next 50 years

(see charts), and that local earthquake experts like Washington University's Douglas Wiens and St. Louis' Brian Mitchell have emphasized the utter unpredictability of earthquakes.

But despite the general availability of this information, public officials still held drills, closed schools and parked the fire trucks outside. People called in sick, canceled dental appointments, even went to visit family. The least that most companies did was pass out information. Some stocked up on thousands of dollars of supplies. (See related story.)

Why?  
"The media are having fun in New Madrid covering a non-story," one local media personality says, "but there are people out there who are really scared."

The Wednesday morning quarterbacking on the Great Midwestern Earthquake Scare has begun, and the fingers are pointing at the media. The "Commentary" page in Sunday's *Post-Dispatch* published an opinion piece by Oberlin College biology professor Michael Zimmerman, blaming the media for whipping up quake hysteria in an "ignorant society," and local experts put the media in their sights.

"The media wanted to see it as a scientific debate," Wiens told a Society of Professional Journalists (SPJ) gathering on Sunday. "Only there was no debate; they gave credibility to a prediction that should have had no credibility."

Channel 5 meteorologist Bob Richards is strident about the ludicrousness of Browning's prediction.

"I feel good that we didn't run earthquake-preparedness specials," Richards says. "The Browning forecast is so ridiculous. Why give out earthquake-preparedness information when the chances of your house catching fire are much greater?"

The media could (and do) argue that journalistic balance requires that both sides be reported in an equal and impartial fashion. But when a story like this one grows to such proportions in the public imagination, is it the duty of the media to be more scientific than journalistic?

William Allen, the *Post's* science writer and main reporter on the earthquake story, has been wrestling with that question, and concedes that the media (including himself) do bear some responsibility for letting the Browning-mania "get out of hand."

"I've had half-sleepless nights over (it)," Allen says about his Aug. 26 article on Browning, the prediction and scientific reaction. "I started by noting that scientists disagree with him. Obviously it wasn't enough."

In retrospect, Allen says, he wishes that he had another week to work on that particular story.

"But it was not a simple case of an obvious quack," Allen added. "This man had the support of major players who insisted that Browning had a good track record."

"To dismiss Paine Webber and all those people who subscribe to his service," Allen concluded, "amounts to calling all of those people stupid."

But Browning's predicted window for an earthquake is over, and a whole bunch of people look stupid. But the questions remain: What more (or less) could the media have done? Was it their fault, New Madrid's fault or everybody's fault?

## FINDING FAULT

Most of the media say it's not their fault; they just live here.

"Sure we're taking it seriously," says KTIV-TV (Channel 2) news director Bill Berra. "You can say what you want, but (Browning) is a respected scientist. I don't want to be in a position to be pooch-pooching this. I know this much: Do you really want to be the fire chief with your equipment caught (inside)?"

Despite the clear emphasis on Browning's fallacious prediction, Berra fell back to the media party line, saying he thinks the media "has played it straight. They've reported what's going on."

KMOV-TV (Channel 4) news director Al Holzer also thinks that the media have successfully straddled the

line between alarming and alerting.

"There have been a lot of people who say the media have caused some of the fear and paranoia, but I think we've been useful in alerting the public. The New Madrid Fault is one of the most active faults in the country. What we're doing is acknowledging that."

(Channel 5 news director Cliff Abromats did not return calls.)

But the local media are culpable of more than a mere "acknowledgment" of the Great Midwestern Earthquake Scare. It's been more like a Nabokovian obsession. To wit:

• KSDK-TV (Channel 5) ran *The Big One: The Great Los Angeles Earthquake* — a graphically and scientifically absurd miniseries depicting a major earthquake. The series ended with a trailer saying that a big earthquake was predicted for this area.

• Channel 4 ran a half-hour, prime-time earthquake-preparedness special hosted by its meteorologist, Mike Nelson.

• KETC-TV (Channel 9) put together its own earthquake-preparedness video and marketed it through Schnucks.

• Channel 2 did a special miniseries on earthquakes with Donn Johnson, and also brought a seismograph into its studio.

• The *Post* put together a 20-page "Earthquake Preparedness Guide" for its Oct. 28 issue. Editor William Woo hoped readers would find it "helpful and reassuring."

And I'm not mentioning all the stories on New Madrid, the radio contests and the pool of personnel assigned to the stories. The *Post* had five staffers in New Madrid over the prediction period. The TV channels sent their best reporters — 5's Mike Owens, 4's Russ Mitchell, 2's Paul Schankmann — to New Madrid for updates. Christian radio station WCBW (104.9 FM) converted to what they called an "all-earthquake format," playing a song called "Shake" over and over. KSD (93.7 FM) sent its "Breakfast Club" down to New Madrid.

Post radio critic Darrell McWhorter said his impression of KSD's "Breakfast Club" show in New Madrid was that J.C. Corcoran and Joe Mason "did as much as anybody could expect."

"With the slim chance that the ground was going to shake," McWhorter says, "all they could do was be silly."



KMOV's Larry Connors told his audiences that aliens had landed in New Madrid

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## Riverfront Times (Continued)

On the plus side, McWhorter adds, the silliness "did diffuse a lot of the tension."

By Monday evening, when it was apparent that nothing was going to happen, everybody's tension level had dipped. The late newscasts were filled with bits of silliness — guys strumming guitars and interviews with partygoers whose main statement on Iben Browning was "I ben drinking." Channel 2 even had a precious bit where what appeared to be a child psychologist was exhorting children to punch a green doll.

By the end of the day, I think everyone was punch-drunk.

Post TV critic Eric Mink says that the TV stations "got caught in a vicious cycle. Even in debunking Browning, they've had to repeat the previous assertion," Mink says.

Mink went even further in his Sunday TV column, saying, "Initial reports stirred public concern, which turned into public reaction as coverage of the dispute continued."

In general, however, Mink says that the TV stations were doomed to be drawn into the "vicious earthquake-reporting cycle."

That cycle could easily be extended to the radio and print media as well. KSDK's Richards complains that "all we've been doing is covering people panicking."

And even the critics' hands aren't entirely clean. Mink ripped into NBC's *The Big One* before it aired, revealing the plot line, offering alternative viewing suggestions and warning parents to keep their kids away, in some strong — maybe too-strong — language. Richards' miniseries debunking Browning not only coincided with *The Big One*, but also had some sensational earthquake footage to promote it.

What I found in my review of the media coverage of the quake is that everybody's got what Sartre called *les mains sales* — dirty hands.

## ANATOMY OF A CRACKPOT

As the spirited discussion of media coverage at the SPJ meeting Sunday proved, everybody in the media has got an opinion on whether the highly public education about earthquakes was worth the panic. A county official admitted to using the widespread interest to educate.

"Before the prediction, we tried to get the message out," Dan Freet, deputy director of the St. Louis County Office of Emergency Management, told the SPJ audience. "Nobody but the *Post* had much interest."

"After the prediction, there was no middle stage," Freet continued. "We went from apathy to absolute panic."

But, Freet concluded, the the Browning prediction did help in making the public aware.

"When this idea came to the forefront," he says, "I was in a quandary. If I stand up on TV and say there's no

credence to this, would I be diminishing the interest? Our concern was that this was an important message. If we didn't take advantage of the public's ear, we might not get it again."

Such thinking obviously filtered down to the local media, who seized every available chance to "educate." But was an education based on

Browning's fringe science the best way?

Richards and Wiens don't think so.

"I think a tremendous wrong was done," says Richards, who called his series debunking Browning "Faulty Reasoning." "Not enough press was given to those who debunked Browning. Not enough attention was

given."

At Sunday's panel, Wiens seemed genuinely angered by the seriousness with which Browning was taken.

"There's a long history of crackpot earthquake predictions," Wiens argues, citing false predictions of earthquakes in Peru, earthquakes due to the "Jupiter Effect" and the revival

## FEAR AND TREMBLING

In the course of examining the media's role in the Great Midwestern Earthquake Scare, we were curious as to how it filtered down to local governments, hospitals, hotels, shopping malls and companies. We didn't get much in the way of surprises — for the most part the answers were earnest, sober and perched on a limb between "concerned" and "panicked." We think it reveals that no matter how deeply the earthquake hype got into people's heads, they invariably turned their face toward public relations. (All quoted statements were made by spokespersons for those questioned about their earthquake preparedness.)

Clayton Fire Department — Moved their personnel to the Community Center. Moved their fire engines out of the engine house.

Fenton Fire Department — Made arrangements to pump fuel in case of disaster. Trained its personnel in earthquake measures.

St. Ann Fire Department — "Besides laugh at it? No, nothing out of the ordinary."

Belleville Fire Department — Parked its equipment outside. Some personnel took equipment home with them.

St. Anthony's — "As a hospital, we're better off than most people. We're really always ready for any emergency. We're basically a self-contained city."

St. Mary's — Sponsored programs for employees, including a movie and pamphlets. "It's a reality now — it's a probability. We need to prepare for it just like we keep fire extinguishers on hand in case of a fire."

Barnes — "It's business as usual. We offered home earthquake-preparation classes in November."

St. John's Mercy — Produced 12,000 booklets on earthquake preparedness for the home. Also developed one master earthquake plan — a multifaceted plan based on California hospitals. "It was emphasized that Mr. Browning's prediction has now been proven to be bogus."

Southwestern Bell — Passed out pamphlets and gave training to employees. "Really, our preparations are not centering on Dec. 3."

General Dynamic — Gave out refrigerator magnets with earthquake information to employees. Encouraged employees to bring in water and clothes from home. "We've done quite a bit while trying to keep it low key."

May Company — Put out a pamphlet, "Emergency Procedures," but had no earthquake survival kits or drills. "I'm on the 13th floor, so I hope I'll be at home then, if it happens."

Apex — "No comment."

Ralston Purina — "A lot of work done around the square," plus information on preparedness, but no drills.

McDonnell Douglas — "No specific earthquake preparation going on right now. Some employees are bringing little disaster kits to work." Doesn't give a lot of credence to the Dec. 3 predictions, but posted information on what to do in any disaster.

Monsanto — "We have been doing preparations since one year ago. The prediction has given us added impetus to get things done." Distributed and posted information and had drills. "We believe it will happen sometime but not necessarily Monday."

Mansion House Center Apartments — Provided an informational brochure.

Canterbury Gardens — Passed out pamphlets in tenants' mailboxes.

Plaza Square Apartments — No earthquake-survival kits, drill or information.

West Pointe — Made their residents aware by handing out pamphlets.

DeBaliviere Place — Had a police officer come and give a lecture and also had a neighborhood meeting. Said they did not give out information, because in the event that something does happen, they will be held accountable in part if the necessary information were left out.

Laclede Town — Circulated Red Cross packages and told people to have flashlights and blankets. Said they were not worried about one-story buildings — they're wood structures and are not prone to potential damage like brick or frame structures.

Henry VIII — "No, nothing. I guess we're pretty much safe here. Ha. Ha."

Clarion — Held two seminars, but no survival kits or drills.

Northwest Plaza — Notified all tenants, and made sure gas valves and other such things were secure. Posted information.

Webster University — Made information packets to send to all employees. "We used the opportunity to plan for all disasters."

UM-St. Louis — "We've integrated the earthquake concern into an overall preparedness plan." Also posted earthquake information.

The Adam's Mark, Washington University, Chesterfield Mall, St. Louis University, A.G. Edwards and Schnucks did not return RFT calls.

Compiled by Amy B. Watzke, Sam Hananel and Jason Guthrie Barton.

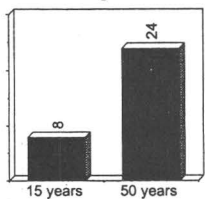


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Riverfront Times (Continued)

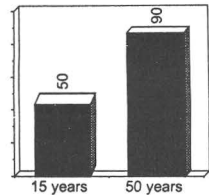
Probability of Major Earthquake in the New Madrid Fault

source: Memphis State University

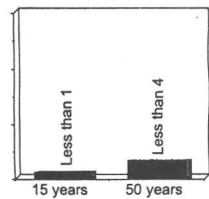
richter magnitude 7.6



richter magnitude 6.3



richter magnitude 8.3



of Nostradamus predictions in the last 10 years.

"It's a lack of scientific knowledge," Wiens continues. "A general credulity at Browning's predictive record. He is claiming to do something no legitimate scientist can do, with no background in that field."

So how did this crackpot prediction take hold? It's a question that vexes the *Post's* Allen, who took the SPJ audience step by step through the *Post's* coverage of Browning's prediction.

The two major events in the *Post's* coverage came on Aug. 26 and Oct. 21 — a span almost two months apart. The Aug. 26 Page 1 story on Browning was the first extended look at Browning and his theory, obtained by Allen during an interview with the subject in New Mexico.

Allen and I sat down after the panel discussion and went through the story. The writer pointed out numerous spots in the piece where Browning was disputed, and described the difficulties he had in interviewing the ailing earthquake. Allen's article managed to gather up and clarify a number of the inconsistencies in what had been, until that time, a murky prediction.

I agreed that the article didn't support Browning, but couldn't help but notice the pull quote and photo of Browning that also appeared on Page 1. In it, Browning tells people that whether or not they believe in his prediction, they should take care of their children. Allen agreed that the pull quote — in larger type and set off from the body of the article — didn't help matters any.

The other big story came almost two months later, on Oct. 21, when Allen wrote another front-page story, this time on the background of Center for Earthquake Studies director David Stewart. Before Allen's article appeared, Stewart was the source of choice among those who wanted to make the earthquake story (as Wiens suggested) a "scientific debate." Stewart was a man alone — the only scientist anyone could find that would support Browning's prediction.

Stewart is also the director of the state's earthquake center (which is affiliated with the Missouri State Emergency Management Agency),

and, one would think, a trusted authority on quakes.

And trust him the local media did, for a few crucial months. Then Allen's second big story broke.

Allen's Oct. 21 front-page piece trumpeted Stewart's less-than-stellar background and his belief in psychic phenomena — a belief that puts him squarely out of the scientific mainstream.

"Psychic phenomena is a fact," Stewart told Allen.

Allen also found out that Stewart had not only predicted a quake that would register 8.0 on the Richter scale (a massive quake) in North Carolina in 1976, but flew in psychic Clarissa Barnhardt to help predict it. Stewart told Allen it was "ancient history," but the incident did help deny Stewart tenure at the University of North Carolina.

Allen said that "no one told us until it was too late that David Stewart was on the scientific fringe," adding that the story "seriously damaged Stewart's credibility."

(Channel 4 featured Stewart in its earthquake coverage on Monday.)

Coupled with the announcement three days earlier that the National Earthquake Prediction Evaluation Council (NEPEC) considered Browning's prediction "implausible," the Stewart story should have been the death knell of the Great Midwestern Earthquake Scare.

The wheels of hysteria, however, were already in motion. The two months of "debate" had planted the earthquake seed within the head of the public imagination, and it sprouted quicker than Jack's Beanstalk.

Richards — like Wiens and Zimmerman — argues that the persistent earthquake preparedness and argument/counterargument, even in the face of a thoroughly debunked prediction, created the stir.

"What kind of message does it send," Richards asks, citing the *Post's* pull-out section as an example, "when you do an earthquake-preparedness guide at this time? What message is that sending to an uninformed public? The public's saying, 'Gee, maybe they know something I don't know.'"

"Undaunted by lack of expertise," Zimmerman writes, "the media promote whomever they can find."

"The early *Post-Dispatch* coverage was less accurate," Wiens concluded. "Since NEPEC, their coverage has been responsible."

It is important to note that the *Post's* coverage since the Stewart story has concentrated more on debunking Browning, including a Nov. 27 story by E.J. Porter that cast a long shadow of doubt on Browning's tidal-forces theory.

"I can understand why Professor Wiens feels that Browning's claims were highlighted," Allen told his listeners on Sunday. But Allen also argued (along with others in attendance) that the information needed to be reported.

"It smacks of elitism," Allen argued later, "to say that we should keep this from the 'poor boobs.'"

PANIC PATROL

The "poor boobs" didn't do well with the information they did get from the media. To wit: all the wackiness along the New Madrid Fault this week.

Part of the problem was all the coverage given to the wackiness. When Channel 4's Robin Smith, for example, proclaimed that Browning's projected window for an earthquake could be "five of the most dangerous days in Missouri history" on last Saturday's newscast, that isn't quite a debunking.

The problem, of course, is compounded by the reaction of local officials who should have known better. If the media sent out a mixed signal with its coverage, the elected officials who ran earthquake drills on Dec. 2 (including St. Louis City, St. Louis County and St. Charles County), parked the firetrucks outside the station and canceled the air-siren tests were cuckered in by the bad science — setting a bad example for everyone.

And one can't help but think that the bad science, and the public's inability to distinguish it from good science, is at the root of the problem.

Allen's *Post* pieces on the earthquake were carefully reasoned, chock-full of detail and very complicated all at once. A nation obsessed with astrol-



Browning's prediction had Missouri Gov. John Ashcroft walking the fault line

ogy and UFOs can't be expected to grasp tidal forces and seismology, no matter how graphically it's presented.

And television, while it's become the main font of information in our society, is not adept at presenting science.

"It's a visual medium," Allen said on Sunday. "So you've got pictures of the (San Francisco) Marina District burning and cars going off bridges while the voiceover says 'Iben Browning is full of crap.'"

Holzer, too, admits that TV isn't the ideal place to convey such "complex issues":

"TV news tends to capsulize. Newspapers have time and are designed for that."

A big step in that direction was taken by KSDK's Richards on his Monday-night weathercast. Richards used colorful graphics to compare the 3 millibars of pressure that the earth is subjected to during Browning's "earthquake window" with the 20-millibar force that a cold front like the one that passed through Sunday night creates.

"So," Richards said, "under Browning's theory, we'd have an earthquake every time a cold front came through."

The other channels stuck to their quiet seismographs.

The bottom line is that science is a complicated business. Its experts can't agree when life begins, let alone where and when a quake will strike. In school, you're taught that scientists use the scientific method. They formulate hypotheses, test them, and use the knowledge that they get not to prove anything, but to formulate more hypotheses.

If the Midwest's first grand experiment in earthquake coverage failed, it doesn't mean that the media should give up the ghost. What the failed experiment should do is refine the local media's journalistic method — particularly its method of explaining the unsexy parts of science in a clear and responsible manner. ■

12-5-90

St. Louis Post-Dispatch

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# Aftershock

## Earth Didn't Move, So Bootheel Starts Return To Normal Life

By Peter Hernon

Of the Post-Dispatch Staff

NEW MADRID, Mo. — With the clock about to run out on a discredited earthquake prediction, children are returning to their classrooms today as residents ponder the aftershocks to their community.

The 2,400 pupils in the New Madrid County school system know what Iben Browning's widely assailed forecast cost them — two days of lost schoolwork that they will have to make up.

It's not so edgy for their parents and others to assess repercussions in New Madrid, a small Bootheel community that a giant quake put on the seismological map nearly 180 years ago. Browning's prediction of a 50-50 chance of a major earthquake could have enduring consequences, some fear.

"It's going to hurt us in the long run," said Clement Cravens, editor of the Weekly Record, circulation 1,500. "It's going to leave a big red mark on the map that there's an accident waiting to happen down here."

Cravens and other residents thought the national media hoopla — others call it hysteria — over Browning's prediction would damage the city's economic future. "We can joke about it now," he said. "But in the next two or three years, there's no telling what the result of all this will be."

For more than a week, New Madrid became a flashpoint of news because of Browning's forecast, which was roundly criticized by scientists. Never, some joked, have so many reported so much about so little.

The prediction by Browning, a climatologist from New Mexico, ran from Saturday through today. He claimed that unusually strong tidal forces caused by the alignment of the sun and moon might trigger a quake in that period.

Instead, Browning triggered a media invasion. Doves of reporters from as far afield as quaky Japan checked into the area's motels. There were reporters from such cities as New York, Washington, Baltimore, Chicago and Des Moines, Iowa.

Sightseers flocked to Main Street, which ends abruptly at the Mississippi River levee.

City officials were unable to say what this ebb and flow would mean to the local economy. But at the town Historical Museum, near the levee, Virginia Carlson said T-shirts and other souvenirs were in short supply. On Monday, D-Day for Browning's prediction, the museum restocked its sales shelves three times, Carlson said.

Don Lloyd, the city administrator,

### At New Madrid County Central High School, Jim Mauk prepared for today's return of about 900 students.

■ IT MAY BE some time before New Madrid recovers... Page 3A

doubted that "the circus" — as he likes to call it — would have any long-term effect. "It's been an interesting diversion for a couple of weeks," he said.

By mid-Tuesday most of the 20-odd television trucks had lowered their satellite dishes and returned home. A few empty beer bottles in the gutter were the only evidence of the dawn-to-dark "quake, rattle and roll" parties held at several local bars.

At New Madrid County Central High School, Jim Mauk prepared for today's return of about 900 students. Mauk, 51, the school district's business manager, frowned when he discussed the decision to close the county's schools on Monday and Tuesday. "It was just because of the hysteria, if you will, caused by Browning's prediction," he said. "Our board reacted to the sentiment of the community."

And for some in the community — especially many of the elderly — the prediction was frightening, said Saundra Thomason, the city clerk of Marston, a town about seven miles south of New Madrid.

"Some of the older people were really frightened," said Thomason.

Calvin Cook, the county's civil preparedness director, drank coffee and smoked a cigarette in Thomason's office. He looked tired after a week of quakemania.

Like many others, he condemned Browning but admitted that Browning had "opened people's eyes. We all know that we live here in earthquake territory."

The New Madrid Fault, considered one of the most dangerous in the world, passes north of this town. The fault extends about 120 miles through parts of four states.

Cook plans to keep the food, blankets, water and medical supplies stored in the former school building that now serves as the Marston municipal center. "Eventually we'll have one," Cook said. "It's a good idea to keep people on their toes in this part of the country."

12-5-90

Webster-Kirkwood (Mo.) Journal

Reprinted by permission

## Quake fears may have affected churches, schools

By Terry Edelman  
Journal staff writer

Officials from area churches reported a few extra people attending services Sunday.

But church officials weren't sure what impact — if any — an earthquake predicted for Dec. 3 had on attendance.

On the other hand, drops in attendance at area schools Monday appeared to be at least partly linked to earthquake fears.

St. Timothy's Episcopal Church, 808 N. Mason Road, attracted more people than normal Sunday, said the Rev. Warren Crews. But Crews said attendance was probably up because Sunday marked the start of the Advent season — not because of earthquake worries.

Attendance was also up at the Christ Church United Church of Christ, 7126 Bruno Ave. in Maplewood, said Joyce Wolf, a church spokeswoman. But the increase was more likely caused by Sunday being a fellowship day rather than earthquake jitters, Wolf said.

At Parkway Baptist Church, 2210 Morris Drive, attendance on Sunday climbed to 575 from an average of 525, said the Rev. Earl Haskins.

"It could have been because of the earthquake, although our parishioners are well-grounded," Haskins said. "They know where their treasures are."

Kathy Holman, a spokeswoman for the Clayton School District, said above-average absenteeism Monday appeared to be related to earthquake fears.

"We have 20 to 25 more students missing from the high school than usual," Holman said. "And parents of about 10 students at one of our elementary schools said they were keeping their children home because of the earthquake prediction."

John Siemers, public relations director for the Parkway School District, said a preliminary check of attendance figures showed the numbers were down.

"We normally have about 95

percent attendance, but we were at about 85 percent Monday," Siemers said. "It would appear that some parents are keeping their children home."

The Kirkwood School District had an absentee rate about 10 percent higher than normal, said Rhonda Eschmann, a district spokeswoman.

Holman and Siemers said the rate of absenteeism was higher among transfer students than among students who live in the school district.

"Probably some parents were worried about the bus transportation," Holman said.

Bob Guttman, a spokesman for the Pattonville School District, said the district had an absentee rate of about 16 percent on Monday — compared to a usual rate of between 7 and 8 percent.

"It could be fear or it could be flu," Guttman said. "We're getting a lot of parents calling in and saying their children have the flu."

Don Wilson, a spokesman for Mary Institute's Beasley School, 101 S. Warson Road, said the school had only a few more absences than usual.

"We weren't decimated," Wilson said.

And a spokesman for Our Lady of Lourdes School, 7157 Northmoor Drive in Clayton, said attendance there was off only a little.

Attendance was almost 100 percent at Eden Laboratory School, a preschool at 204 E. Lockwood Ave. in Webster Groves, said Sharon Harkins, a spokeswoman for the school.

But Harkins said the school director, Ann Schroer, had given parents of students three options.

"Ann sent a note home Thursday," Harkins said. "She told parents they were free to come and stay in the classroom with the children, attend a parent meeting at the school or keep the children home."

A number of the parents attended the meeting, Harkins said.

12-6-90  
**St. Louis Post-Dispatch**  
**Editorial**  
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## *Ready For The Big One?*

Missouri's reputation as the hard-nosed, skeptical Show-Me state is ruined. Destroyed. Left scattered about in little pieces. Iben Browning and media hype did it, and now Missourians look to all the world like they were left holding the bag in one of the biggest snipe hunts in American history. Mr. Browning's prediction that Missouri had a 50-50 chance of being rocked by a major earthquake along the New Madrid fault in early December has been shown for the foolish guess that it was.

In one sense, Mr. Browning did the region a favor. He made many residents think about how well prepared they are for an earthquake. His

guesswork, given life by sensationalist reporting, has caused local civil defense units to think through how they would deal with a major natural catastrophe. Schools have held drills; emergency sirens have been tested. Parents have talked to their children about how to react and where to go should the ground begin shaking.

After the media circus has moved on to its next stand, prudent Missourians will have learned how to be prepared. Now they can think of themselves as residents of the Ready-For-Anything State. And, as it turned out, the only damage was to the credibility of Iben Browning and the news media.

(See editorial 7-25-90.)

12-6-90  
**USA Today**  
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# The quake that wasn't cost \$200,000

By Carolyn Pesce  
 USA TODAY

Officials in seven Midwestern states Wednesday started tallying the costs of the earthquake that never came. And they say it will be months before they know the true economic impact of Iben Browning's faulty prediction.

Early estimates of quake preparedness spending are close to \$200,000.

But that doesn't include money spent by thousands of communities along the New Madrid, Mo., fault — or dollars lost when businesses shut down and kids stayed home from school because of quake fears.

"I don't think we understand the economic impact," says Jerome Hauer of Indiana's Emergency Management

Agency. "People were scared to buy a TV for Christmas."

Browning, a New Mexico scientist, has stopped giving interviews since predicting this fall that a major quake could hit within 48 hours of Dec. 3.

In Kentucky, where schools get state money based on their average daily attendance, Clarence Salyer of the Division of Pupil Attendance has received calls from 30 districts asking if they'll get "financial relief" from the state. "The answer I have to give to them right now is 'No,'" says Salyer.

Around the region:

► Mississippi was forced to spend at least \$31,000 — 5% of the state's emergency management budget — for things such as extra travel and materials for quake presentations.

► Illinois increased staffing

at its 24-hour communication center in Springfield to handle quake calls. Estimated spending: up to \$10,000.

► Arkansas spent \$42,000. In 1989, the state distributed 90,914 quake-preparedness brochures, compared with 143,759 this year — most requested after the prediction.

► In Missouri, officials spent between \$40,000 and \$60,000. "We got more productivity from the dollars we spent than we did in probably three years worth of spending," says R.D. Ross, emergency management director.

► Indiana spent about \$20,000.

► Tennessee estimates spending \$20,000, mainly reprinting quake brochures and meetings with officials in the 12 counties closest to the fault.

12-8-90

St. Louis Post-Dispatch

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# Media At Fault Over New Madrid Quake Scare

Now that the countdown is over and, as everyone with any brains knew would be the case, nothing has happened, it is left to the news media to look back on the wreckage that was their coverage of this non-event.

They are, it's hoped, experiencing that embarrassing what-could-I-have-been-thinking feeling, as the realization sinks in that they gave credibility, voice and fame to a the-end-is-coming crank, and reported exhaustively on something that did not happen and was never going to.

To have such a feeling is probably too much to expect of television news. The only rational explanation for local television's comical news reporting — and, I guess, its only defense — is that it's cooked up by dramatists posing as assignment editors and writers and read to us by actors. These people can't really be expected to distinguish between entertainment and information.

But it doesn't seem too much to expect of newspapers like the *Post-Dispatch*, which still claim to be able to make just such distinctions.

This isn't to suggest that the story could or should have been completely ignored by the *Post-Dispatch*. It just should have been treated like the curiosity that it was. That means occasional and brief back-page coverage of the odd behavior of the people of New Madrid and its environs in reaction to the predictions of a man whose scientific methodology, the scientists tell us, is more or less on a par with poking through the entrails of goats for signs and omens.

But instead, it was given extensive and serious front-page coverage which, all by itself, gave the entire affair a level of believability, of reality, that no amount of carefully crafted lead-paragraph disclaimer language could neutralize.

And how about those reputable scientists? They repeatedly said Iben Browning was full of beans, but seemed incapable of saying that without attaching to it an unctuous warning regarding the inevitability of an earthquake on the New Madrid fault, sometime. Sometime?

This is science? What use is a prediction of a natural disaster "sometime" — as in, before the year 2000, in the next 25 years or the next 50 years? How are we supposed to react to that? What are we supposed to do? Stock up on non-perishables and will them to our grandchildren?

The only excuse for not kissing off this guy and his crystal ball from the very beginning was what appeared to be a certain scientific standing on his part. But once it was established that whatever the nature of that standing in general, he didn't have any in this field, and that he had no particular



Joe Sharpnack/Southtown Economist-Chicago

track record of predicting earthquakes — both of which were established early in the proceedings — there was no excuse.

The *Post-Dispatch* and all the rest of the news media should have jumped off the bandwagon. Instead they jumped on.

John Terry  
Kirkwood

As the near hysteria of Iben Browning's great 1990 non-quake fades away into a sea of mirth and jokes, some hard questions remain to be answered. Most of these are not for Browning, who is, after all, now busy predicting volcanoes and depressions, but for the St. Louis media, particularly the *Post-Dispatch*, three local TV stations and the dominant local a.m. band radio station.

Since the *Post-Dispatch* has a public responsibility untempered by any direct public accountability, its editors will have to judge for themselves whether their conduct in this matter was an example of responsible journalism.

As every good journalist knows, a non-event or a near non-event can be made into an event merely by giving it enough coverage. Lineage, headline

type and point, story placement, color pictures and a major supplement all combine to convey a message.

Of course people's fears, bizarre behavior, events and preparations are news, but the reporting of these beliefs, events and preparations can become the new and magnified creation of those same fears and preparations if it is repeated loudly enough and often enough.

Even the public-service dimension of an earthquake preparedness guide needs to be evaluated, given the state of the public mind and the responsibility of the media to simply report facts rather than create them. A case could be made for leaving the printing of such materials in the hands of appropriate and genuine emergency agencies such as the Red Cross.

I thought journalistic sensationalism had been left behind at the supermarket counter. Apparently it has not been. I suspect in years to come this little episode will find its way into the journalism texts as a good example of how not to pursue the craft.

Philip M. Niblack  
Florissant

I would like to congratulate Ibej Browning for successfully taking advantage of the fact that a fool is born

every minute. He and many others were able to profit financially from his incompetent claims and invented theories.

By the way, I dreamed that a huge comet might strike the Earth sometime between Feb. 2 and 4, 1991. I urge you all to declare a national holiday. And order your comet-proof umbrellas directly from me.

Donald S. Levy  
St. Louis

I lived in New Madrid County during the 1930s and '40s, and I used two pigs, Oogie and Iben, and a mule named Fool to do my quake forecasting. Oogie was very good but Iben did not have good balance and was unreliable.

Old Fool would be highly amused to see the present-day herd of braying jackasses thrashing about. All this has confirmed my suspicion: that someone made a rule that says the media must be staffed with simple-minded saps.

Some good has come of this. Almost all of them can now pronounce New Madrid correctly and next they should try to master Hayti.

My prediction: You won't print this.  
Thurlo V. Byers  
Pasadena Hills

12-9-90  
**St. Louis Post-Dispatch**  
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## 'Scientifically Irresponsible': Quake Expert Slams State Center

By William Allen  
 Of the Post-Dispatch Staff

INDIANAPOLIS — A leading scientific authority on the New Madrid Fault has lashed out at Missouri's Center for Earthquake Studies and its director, saying they fueled public anxiety about a major quake around Dec. 3.

"The conduct of that center in the Dec. 3 episode has been scientifically irresponsible," Arch Johnston, a seismologist, said Friday. He heads the Center for Earthquake Research and Information at Memphis State University.

Johnston criticized the Missouri center and its director, David Stewart, saying they disseminated "downright false information" about the possibility

of an earthquake.

"We must get the message out about the complete failure of the forecast of Dr. Browning and Dr. Stewart," Johnston told officials and scientists at a meeting of the Central United States Earthquake Consortium in Indianapolis. The consortium is a group of top earthquake preparedness officials from the Midwest.

The Memphis center "has severed any ties" with the Missouri center, he said. The Missouri center is situated on the campus of Southeast Missouri State University, in Cape Girardeau.

Stewart was the only seismologist to give public support to Iben Browning's forecast for a 50-50 chance of a major quake in the fault from Dec. 1 through Wednesday. The forecast was de-

bunked by a national panel of experts, which included Johnston.

No major earthquakes were recorded in the fault during the period.

Stewart, who was not at the meeting, could not be reached for comment. Linda Dillman, a program specialist at the center, said the center had "done a great deal of good in the area" by answering mail and phone requests for information on how to prepare for a quake.

"People are better prepared for the eventuality of an earthquake than they have been anytime in the last 10 years," Dillman said.

R.D. Ross, director of the State Emergency Management Agency, said: "I guess the pit he [Stewart] fell into was [saying] that the Browning

projection should be checked into.

However erroneous Dr. Browning's projection may have been, he has pushed the understanding of people in the central U.S. to levels never before seen."

Johnston said that "science in the region received a real black eye."



Stewart

## Why Many Believed Quake Prediction

By Peter Hernon  
 and William Allen  
 Of the Post-Dispatch Staff

A year ago this month Iben Browning — inventor, author and to some a dangerous charlatan — made his now-famous earthquake prediction. On the seismic scale of publicity, Browning's shocking remarks about a 50-50 chance for a strong quake along the New Madrid Fault generated only brief tremors.

The real trembling came later — fear, hysteria, rumors of impending disaster and news coverage that critics likened to the screaming headlines of the Front Page era.

Bogus stories rippled out like shock waves. The public was eager to believe them. The memory of the fatal Loma Prieta earthquake that had hit the San Francisco area on Oct. 17, 1989, remained chillingly vivid.

One rumor had a St. Louis utility company stockpiling 6,000 body-bags in anticipation of the carnage. Still another said no seats were available on flights out of the quake zone just before Dec. 3, the bull's-eye of Browning's prediction.

Some schools closed. Emergency drills were held, and medical supplies were stockpiled. In Missouri alone, worried homeowners shelled out about \$22 million to add earthquake coverage to their policies.

Why was a prediction scientists thought unbelievable so readily believed?

Partly to blame is what one physicist calls the public's appetite for such "anti-science" as ESP and astrology.

"It all happened for the same reason there are 10,000 astrologers in this country and only 2,500 astronomers," said Carl Bender, a Washington University physicist. "It's still incredible to me."

Blame, too, a bizarre mixture of events that included a minor quake near Cape Girardeau, Mo., that measured 4.6 on the Richter scale. The quake, in late September, burned Browning's prediction deeply into the mind of an already jittery public.

Add to the list:

— A five-month delay by prominent scientists to debunk Browning's theory, allowing it to develop critical

mass.

— The broadcast of a sensational, much-criticized NBC miniseries on a fictional Big One in Los Angeles.

— The curious defense of Browning by David Stewart, a well-known Missouri quake expert who later admitted he supported psychic phenomenon.

Finally, with the fire already flaming nicely, the news media poured on gasoline.

"We were participating in a media feeding frenzy," said George Kennedy, a journalism professor at the University of Missouri at Columbia. "There was ... a kind of momentum and a level of fascination that is irrational."

In the week bracketing Browning's prediction — it covered Dec. 1-5 — nearly 30 television stations sent trucks to New Madrid, a small com-



Guitar player Joe Brasher of Malden, Mo., being interviewed by some of the journalists in New Madrid last week. The earthquake prediction and the arrival of visitors from around the country gave the town's economy a momentary boost.

Wendi Brown/Post-Dispatch

12-9-90

## St. Louis Post-Dispatch (Continued)

munity in the Missouri Bootheel that gave the fault its name.

Most parked in a two-block area along Main Street and there they remained for nearly a week. There were so many television people and so little real news that they wound up shooting footage of themselves and bar scenes.

When Iben Browning visited Missouri last December to make his prediction, he chose a preferred and paying audience — a governor's conference on agriculture at Osage Beach. Browning likes businessmen — he sells them a newsletter on the climate's impact on the economy — almost as much as he dislikes journalists. His listeners were primed for what he had to tell them.

Browning, after all, had a track record, some said. He claimed he had foretold several nasty quakes, including the killer in San Francisco and the word was out he would be doing the same thing at Osage Beach.

Browning did not disappoint. At the close of his remarks, he made his "projection" for an earthquake measuring 7.0 erupting somewhere on the New Madrid Fault. The band of weakened rock stretches 120 miles through parts of Missouri, Arkansas, Tennessee and Illinois.

Browning calculated his 50-50 odds, he said, by studying other scientists' reports of faults in a band of latitude that would experience a 27-year-high tidal force pull during his five-day window of opportunity.

After Browning's visit to Missouri last December and a brief flurry of often-sensational reports about his prediction, there was a long, almost lulling period of quiet.

It wasn't until May that a group of earthquake experts in the New Madrid Fault region virtually begged the National Earthquake Prediction Evaluation Council to comment on Browning's forecast. The council declined, curtly saying it was not "a public forum for evaluation of any and all 'predictions' sent our way."

The decision was later criticized by scientists like Washington University's Bender, who argued that it permitted the fear associated with Browning's prediction to gain momentum.

"I wish the experts would have done something months earlier," said Bender, "I'm sure that would have a calming effect."

After the initial plea for an assessment, five months elapsed before the experts finally ripped Browning and said his theory that tidal forces can trigger a quake had no scientific basis and was a "disservice" to the public.

David Stewart, director of the Center for Earthquake Studies at Southeast Missouri State University, also fed the fires, say Bender and others.

Stewart said he found Browning's ideas "worthy of serious and thorough consideration." Virtually Browning's sole supporter among scientists, Stew-

art had a high media profile.

It soon developed, however, that Stewart had stuck his neck out the same way once before. In 1976 he backed a psychic's prediction for an earthquake in Wilmington, N.C., after reading about the psychic in the National Enquirer. The quake never occurred. The incident prompted the University of North Carolina in Chapel Hill to deny him tenure.

After complaining about "character assassination," Stewart announced that he would not comment any more about Browning's forecast.

In the late summer, when interest in his prediction — he prefers the word "projection" — was rapidly building in the Midwest, Browning suggested that he might not live to see whether it came true. At age 72, he suffers from diabetes and circulatory problems and is in frail health. But his health was not too frail for occasional lecture trips to the danger zone from his home near Albuquerque, N.M.

Browning visited St. Louis on Nov. 15 to speak before 600 people at a \$25-a-person lunch. He spent most of his time making another prediction — an economic crash worse than the Great Depression by 1992. Browning did not mention his quake forecast until asked what he would do around Dec. 3 if he lived in St. Louis. He said:

"If a person has any doubt about whether I'm wrong or not, he should at least take care of his children."

Browning did not talk to journalists. Almost as if they didn't need him any more, reporters were ready to start talking to themselves.

In May 1988 thousands of panicky residents fled from Los Angeles because of an earthquake forecast. It was based on a highly creative interpretation of a prediction by a 16th-century French fortuneteller named Nostradamus. Bumper stickers announced: "Honk if You Believe Nostradamus."

Horns blasted across hazy Los Angeles, but the quake never came. Still, the prediction was widely believed and just as widely reported.

"Much of the willingness to accept

this... is due to a personal hunger on the part of people for interesting news," said Bender.

Bender, a Harvard-trained physicist, has published about 120 papers on mathematical and particle theory. He is also an outspoken debunker.

It doesn't matter, Bender said, that on average only seven people die from earthquakes each year compared with 7,000 killed annually from falling in their homes. Earthquakes, in the minds of many, are still regarded as a greater threat. Bender said it gets

back to polls that show that 64 percent of those with college degrees believe in ESP and that 27 percent of the public believes they've been in touch with someone dead.

Scientists have spoken of the danger of blindly accepting what they regard as a non-scientist's prediction about an event that so far can't be predicted with any degree of precision, namely big earthquakes.

So, again, why did it happen?

"Claims like these are marketable," said Bender. "People are hungry for them and, by God, do they sell. Browning says he's a business consultant. To sell his wares, he's got to make them interesting." The news media, he said, bought in and so did the public.

There were some pluses to the

earthquake scare. It made the public and their officials more aware of disaster preparedness.

But down in the Bootheel, the city fathers of New Madrid admit they worry about the long-term economic impact on their town's 3,200 residents.

Merchants report that Christmas sales are down as shoppers delayed making purchases until they were sure the ground wouldn't rumble. And after booming sales, insurance companies like State Farm report that applications for earthquake coverage in Missouri have fallen from 2,000 a day before Dec. 3 to less than 50.

"After the boom" of publicity, "there's always a bust," said Bender. "I think people are going to find that wasn't worth the cheap thrill."



LARRY  
FIQUETTE  
READER'S  
ADVOCATE

## How Quake Prediction Hysteria Grew

NOW THAT the curtain has rung down on the Browning Saga, criticism of "media hype" has prompted me to go back to the beginning and try to figure out where and how all the earthquake-prediction hysteria gained such a head of steam. Also, I have looked back at the Post-Dispatch coverage of that story.

Climatologist Iben Browning has been a news source about earthquake activity at least as far back as October 1989, when the big quake struck San Francisco. He was quoted then as claiming that on Oct. 10 he had predicted the Oct. 17 quake within one day.

From that point on, his prediction of a quake in the New Madrid Fault sort of eased its way, through the back door, into the awareness of St. Louisans and readers of the Post-Dispatch.

A year ago this week, Browning addressed a farm conference in Osage Beach, Mo. That's when, according to an Associated Press story, he stated (or restated) his now-famous prediction: the New Madrid Fault "could be the center of a major quake in less than a year."

That item was printed Dec. 14 in the St. Louis Sun — but not in the Post-Dispatch.

On March 19 of this year, an AP dispatch from Carbondale, Ill., told of Carbondale's decision to prepare for a possible earthquake on Dec. 3 and 4. That story appeared in the Post-Dispatch only in the Illinois edition.

An article in this newspaper on June 22 on Page 38E — far back in a big paper — written by science writer William Allen, quoted Browning's daughter, Evelyn Browning Garriss, who spoke at a meeting in St. Louis. She stated her dad's prediction then, hedged with the phrase "if the gun isn't loaded, it doesn't go off."

That article quoted Brian Mitchell, head of earth sciences study at St. Louis University, in the fourth paragraph: "I don't think [the prediction] is something we should pay attention to."

The story did not closely examine Browning's record of predictions or his methods. It can be argued that this was the point at which the Post-Dispatch should have checked Browning's track record.

On July 10, an AP story reported from Wilson, Ark., that a northeast Arkansas school district would close schools during the predicted time slot. On July 14 in St. Louis, Mitchell, of St. Louis University, and Arch Johnston, of Memphis State University, debunked the Browning prediction, saying it "should not be considered seriously."

On July 21, the Post-Dispatch quoted David Stewart, head of the seismology department at Southeast Missouri State University, saying Browning "should be taken seriously." The story said "Browning predicted the earthquake on Oct. 17" in San Francisco, and "also accurately predicted the earthquake in Sept. 1985 in Mexico City... and 'the earthquake in 1971 in San Fernando, Calif.' None of those predictions has been substantiated.

A Post-Dispatch editorial on July 25 said Browning "has a good record of accurate predictions — good enough to be taken with a great deal of caution. That means he should be heeded."

Next, spread across the top of Page One on Aug. 26, a Sunday, was Allen's interview with Browning at his home in New Mexico. The story began: "Iben Browning doesn't care that earthquake experts have denounced his forecast..."

12-9-90  
St. Louis  
Post-Dispatch  
(Continued)

# Quake

## Apathy Feared In Wake Of Bad Forecast

*The next earthquake comes when the last one is forgotten.*

— Peruvian folk saying

By William Allen  
Of the Post-Dispatch Staff

INDIANAPOLIS

**M**idwestern earthquake-preparedness officials fear that their second-worst nightmare may become a reality: Nobody will listen to their message that the region needs to get ready for a quake.

Their worst nightmare, of course, is a severe quake.

Their dilemma is that they know one's coming sometime in the next few decades, even though Iben Browning's forecast for a major quake in the New Madrid Fault flopped.

"The problem now is one of sustaining momentum," said Thomas Zimmerman, earthquake program manager for the Illinois Emergency Services and Disaster Agency.

Zimmerman's comment was echoed by other officials and scientists who gathered in Indianapolis through Sunday for a meeting of the Central United States Earthquake Consortium. The consortium is a group of top earthquake preparedness officials from the states on and around the New Madrid Fault zone.

They analyzed the impact of the October 1989 Loma Prieta earthquake in California and the New Madrid, Mo., quake scare brought on by Browning's forecast. No major quakes occurred in the New Madrid Fault in those 14 months, but both events had lasting effects on earthquake science, education and planning in the Midwest, they said.

"I don't think we'll ever be the same," said Arch Johnston, director of the Center for Earthquake Research and Information at Memphis State University.

**The forecast by Browning**, a New Mexico climatologist, called for a 50-50 chance of a quake measuring between 6.5 and 7.5 on the Richter scale from Dec. 1 through Dec. 5. The forecast triggered unusual public anxiety, even though it was discounted by a national panel of quake experts.

No significant quakes occurred in the fault during the five-day period.

After the Browning forecast became widely known, emergency pre-

paredness officials in Missouri, Illinois and other nearby states dropped almost everything else on their agendas to respond to a deluge of written and telephone requests for earthquake information.

"It remains to be seen, though, how many of those people who asked for information actually did anything with it," Zimmerman said. His agency will try to assess what steps Illinois citizens actually took toward preparing for a quake.

**"In our nation's history, there has always been a price for preparedness, but it's only a pittance compared with the price of unpreparedness."**

R.D. ROSS,  
Emergency Management Agency

If apathy reigns, officials must devise new ways to encourage action, he said.

The officials agree that despite a public letdown, preparation is crucial to save lives and dollars when a major quake does strike the Midwest.

"In our nation's history, there's always been a price for preparedness, but it's only a pittance compared with the price of unpreparedness," said R.D. Ross, director of Missouri's State Emergency Management Agency.

**For those who fear** the public will now go to sleep on the earthquake issue, one social scientist had some encouraging news.

Joanne Nigg, director of the Disaster Research Center at the University of Delaware, in Newark, cited the case of a quack earthquake prediction in the Los Angeles area in the 1970s. The prediction got intense media coverage and generated requests for information that overwhelmed local universities and disaster officials — a scenario remarkably similar to the

Browning episode.

But after the predicted date produced no earthquake, "people still wanted more information... from scientifically credible sources," Nigg said.

Preparedness efforts dropped off, "but never to the level they were before," she said.

Nigg urged the scientists and officials to keep the earthquake issue before the public, especially pursuing such "real problems" as the need for building codes that better address seismic design of new buildings and strengthening of old ones, especially schools and hospitals.

William Anderson, an official with the National Science Foundation, in Washington, said the agency has been supporting studies of public reaction to Browning's prediction.

"There's a great deal we can learn to channel the public response to predictions," Anderson said.

Meanwhile, emergency management officials are making plans to move ahead with their agenda.

"Our challenge is to do our best to maintain an appropriate and constant level of awareness," said Wallace Stickney, director of the Federal Emergency Management Agency, also in Washington.

Such awareness is essential to making it possible for local officials to push through new building codes "that will eventually save a lot of lives," Stickney said.

The Browning episode will have a positive effect if it "re-establishes a sense of humility that the Earth does what it wants to when it wants to, and we must govern our lives accordingly," he said.

"Unfortunately, many lives have been disrupted."

Randall Updike, an official with the U.S. Geological Survey, in Reston, Va., said the survey will redouble its efforts to understand the intricacies of how earthquakes occur.

Memphis State's Johnston said that the Browning episode had given science in the Midwest "a real black eye." He urged more study of the probabilities and hazards of quakes "so that a pseudoscientific event like the one that happened on Dec. 3 will never happen again in this region."

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St. Louis Post-Dispatch  
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**12-12-90**  
**Greensboro (N.C.)**  
**News & Record**  
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## Earthquake Prediction Missed Mark In N.C., Too

GREENSBORO (AP) — An earthquake prediction for North Carolina's coast 15 years ago by a Tar Heel scholar didn't result in the near-panic that took place this week in Missouri.

In 1976, while living in North Carolina, professor David Stewart collaborated with a California psychic who predicted a giant tremor would hit the Wilmington-Southport area on a certain date.

Most recently, Mr. Stewart, now living in Missouri, showed strong enthusiasm for Texas climatologist Iben Browning, who frightened most of Missouri by predicting a big quake would hit the New Madrid area Monday or Tuesday.

"It surprises me that he didn't learn his lesson 15 years ago," Geoffrey Feiss, chairman of the University of North Carolina at Chapel Hill geology department and a former colleague of Mr. Stewart's, said in an interview published Thursday in the Greensboro News & Record.

While a geology professor at

Chapel Hill in 1975, Mr. Stewart stood in a grocery store line one day reading a National Inquirer story about a California psychic who claimed she could predict earthquakes.

At the time, Mr. Stewart, a seismologist, was convinced that a big quake was in the works for the Wilmington area. He invited the psychic to accompany him to the North Carolina coast.

She told him it would hit Jan. 17, 1976, and measure 8 on the Richter Scale. Mr. Stewart said at the time he felt a duty to make her prediction public.

The ground never shook.

In 1977, Mr. Stewart was denied tenure at Chapel Hill, even though he had once been voted best teacher of the year by geology students.

He left the world of academics but in recent years returned as director of the Center for Earthquake Studies at Southeast Missouri State University, not far from New Madrid.

He was the only academic to show respect for climatologist Iben Browning's prediction that a major earthquake would strike the New Madrid area.

Nothing happened.

Mr. Feiss said that in 1976 he chalked up Mr. Stewart's eagerness to embrace the psychic as the naivete of a young scholar.

"I think Dave is a unique fellow," he said. "He has a different sort of view of how science should operate. He feels there are things that operate in the physical world that we can't understand or we don't understand. So he has an open mind to all possibilities, which is good, but the problem in his case is he sacrifices his critical facilities.

**12-12-90**  
**Saint Louis**  
**Post-Dispatch**  
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## Quake Official Quits Job

### Expert At University Had Backed Browning

CAPE GIRARDEAU, Mo. (AP) — David Stewart, criticized by his fellow scientists because he refused to dissociate himself from an earthquake projection made by Iben Browning, has stepped down as head of the Center for Earthquake Studies at Southeast Missouri State University.

"Since some of my colleague's attacks on my position in regard to the Browning projection, as reported by the press, have become attacks on the center," Stewart said Tuesday, "my continued connection with the center could have a negative effect on its effectiveness in the continuing fight for earthquake preparedness in the coming months.

"For that reason, and for my own personal reasons, I have asked for assignment to a full-time teaching position."

J.O. Snowden, dean of the College of Science and Technology, said that he had approved Stewart's request and

that the center would report directly to his office until a new director is named.

"Dr. Stewart feels, and we support his opinion, that the public's understanding of the center's mission has been shifted away from its real focus on mitigation and education by the publicity surrounding the Browning projection."

Snowden said he believed that Stewart had performed a service to the area.

"It is apparent that the university and the region are better prepared now for an earthquake than they were a year ago," Snowden said. "That is chiefly due to the efforts of Dr. Stewart and his staff."

"Dr. Stewart recognized the impact of the potential loss of credibility on the work of the center. We all agree that the work of the center must go forward for the benefit of the people of this region."

Stewart said that his first love was teaching and that he looked forward to returning full-time to teaching in the school's Department of Earth Sciences.

Browning, a self-proclaimed climatologist, had projected a 50-50 chance for a serious earthquake along the New Madrid fault on or about Dec. 3 because of the gravitational stress caused by the alignment of the sun and moon. No earthquake occurred.

Most scientists had scoffed at the projection, saying that Browning's methods were about as accurate in predicting an earthquake as throwing darts at a calendar.

Stewart had said that Browning was a scientist and that his projection should not be discounted.

Despite his familiarity with the New Madrid Fault, Stewart was not included on a panel of experts gathered by the Central United States Earthquake Consortium to study Browning's projection. The panel concluded that there was no scientific basis for the projection.

**12-14-90**  
**USA Today**

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BEHIND THE SCENES WITH PEOPLE IN THE HEADLINES

## Quake shake-up: Scientist resigns

The Earthquake That Wasn't has claimed a victim.



STEWART: Said quake prediction 'worth looking into'

David Stewart, a scientist ridiculed by colleagues for refusing to discount the forecast of a major earthquake in the Midwest around Dec. 3, has resigned as head of a Missouri

university's quake center.

Stewart, 53, says he stepped down as head of the Center for Earthquake Studies at Southeast Missouri State University at Cape Girardeau to quiet criticism of the center.

Stewart had said the controversial prediction by New Mexico inventor Iben Browning deserved consideration.

"All I ever said was that the man is a competent scientist who deserves a fair hearing," Stewart says. "He may be right and he may be wrong, but he shouldn't be prejudged."

He says there were complaints since he called the forecast "worth looking into."

Stewart will remain at the university as a teacher.

He says all the hoopla had a positive result: public awareness of quake safety.

"Now, millions of people are ready for what all seismologists agree to be an inevitable occurrence on the New Madrid fault," Stewart says.

But Arch Johnston, head of the Center for Earthquake Research and Information at Memphis State University, says the attention the Missouri center gave Browning's prediction was "irresponsible" and caused unnecessary fear.

"It appeared that the scientific community was split, when in fact there was not a single practicing earth scientist who put any credence in the prediction," Johnston says. "It gave a lot of undue credibility to Browning."

— Thomas R. Raber

## Forecaster to keep low profile

Some call Iben Browning the "quake quack."

The man whose 50-50 forecast of a major earthquake along the New Madrid Fault came to nothing Dec. 3 has been out of touch ever since — and he says he'll stay that way.

"No one is going to get a

hold of me," Browning said from his Sandia Park, N.M., home before hanging up on a reporter. "I'm not going to give any interviews at all."

Scientists scoffed at his prediction of a quake within two days before or after Dec. 3 along the New Madrid Fault line from Marked

Tree, Ark., to Cairo, Ill.

But some people fled, some schools canceled classes, the National Guard practiced rescue work and police were barred from vacations.

Browning, 72, a science consultant for businesses, has also predicted a worldwide depression in 1992.



1-91

**ASNE Bulletin**  
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## THE EDITOR'S CHAIR

# THE GREAT MIDWEST EARTHQUAKE SCARE

## Why did we editors ignore our routine 'kook alarms' in this case?



By **JIM PAXTON**

Jim Paxton has been editor of the Paducah (Ky.) Sun for five years.

ON NOVEMBER 15, 1990, A NEW MEXICO SCIENTIST/ business advisor named Iben Browning spoke to a gathering in St. Louis. The Associated Press said Mr. Browning gave his listeners the following heretofore little-known bits of info:

- 1) Tidal forces triggered a chain of events that caused the rise of Nazism.
- 2) Tidal forces in 1992 will lead to the worst depression in U.S. history, but for "climatological reasons" we will start pulling out by the end of that year (an economic oxymoron, if one considers the Great Depression).

On the very day that Mr. Browning made these remarks, two more school systems in our 32,000-circulation daily's coverage area announced they would cancel classes Dec. 3-4.

Within 10 days, all but a handful of schools in our 17-county coverage area would follow suit. The reason: the same Iben Browning who associates tides with the Holocaust had made a prior, grossly overpublicized claim that tidal forces would create a 50-50 chance of a terrific earthquake in our region. It could occur on Dec. 3, give or take two days, on the nearby New Madrid Fault, he said.

For me, Mr. Browning's "tides and Nazis" comments were the final kook alarm. I decided our newspaper had gone too far in providing the man and his "projection" a forum.

A lecture to that effect to my reporters and editors fell mostly on deaf ears. Realizing I had a runaway train on my hands, I did what some consider journalistically unspeakable. I banned all mention of Mr. Browning and his projection during the week leading up to and the week following Dec. 3.

In a news story about our decision, I explained that the information we possessed in no way justified the attention we had given Mr. Browning's "projection." Yet our coverage of it had helped cause fear and hysteria. I said such coverage had been an editing mistake on my part, and I apologized.

People observing this situation from afar

will never fully appreciate the breadth and the reality of the suffering we in the press and other media helped to cause in the Midwest by our mishandling of this story.

Despite the fact that almost no one in either the scientific community or the press believed Mr. Browning's earthquake projection was credible, we shouted it from the rooftops, often adding only the most perfunctory disclaimers.

We did this despite the fact that most of us knew:

- Browning's doctoral degree is in bacteriological physiology and genetics, not geology.
- Browning based his quake "projection" on science he calls "dimatology," which, as best I can discern, is a sort of souped-up astrology. It is a field in which he says he's self-educated and that he pursues as a hobby.
- An advisory panel of the U.S. Geological Survey issued a highly publicized report in October 1990 saying there is no scientific basis for Browning's theories about tides and earthquakes. They have been studied and discounted.

• Claims that Browning had accurately predicted previous disasters with his methodology proved unverifiable.

Other than not covering the chaos in nearby

New Madrid on "quake day" our moratorium had little net effect on editorial content. We held up a handful of letters to the editor for six-to-12 days (all but one supporting our moratorium) and reported a few school closings without reference to Browning.

By the time of our ban, we had covered the Browning issue seven ways from Sunday anyway. We also had written reams about the fault zone and quake preparedness both before and after Browning's debut.

I feel the press ran into a quite comparable situation to the Browning claim a year or so ago when two Utah scientists announced they had almost by accident produced a "cold fusion" reaction in a kitchen-table experiment.

It was the stuff of science fiction, and if true, it also was the greatest discovery since fire. The press jumped all over it. But when the rest of the scientific community voiced serious and near-unanimous doubts, most of us did the right thing. We backed way, way off that story.

Why we did not handle the Browning situation in the same fashion is a mystery and an embarrassment to our industry. We should have collectively scoffed. Instead, we squandered millions of dollars and thousands of man hours to stage the greatest media debacle in decades. More than 200 news organizations had reporters on the streets of tiny New Madrid, Mo., on "quake day." Why? Did the nation's editors and news directors send them all there to die? Or did we send them there to scare the hell out of people?

Our computer system automatically kills unused copy every 24 hours. Yet just before noon on Dec. 4, I counted 27 stories in our system about the quake, filed by such varied organizations as *Newsday*, the *Washington Post*, the *Baltimore Sun*, and multitudes of AP and UPI staffers and members.

This is not a case of a bunch of reporters getting out of hand. It is, in the case of newspapers, a failure of editors to edit.

We all asked ourselves the easy question: Is this a good story? It was one heck of a story. But professionalism demands we ask ourselves a second question in volatile scenarios such as this: Knowing what we know, is it responsible to report it?

At some point, some point well before Dec. 3, deep down we all knew the answer to that question was no. But we pressed on, pursuing the story with such ferocity that Browning's scientifically ludicrous assertion took on an almost monstrous legitimacy in the minds of a great many people.

The press had a lot of fun with this story. Problem is, a great many people suffered as a result. I doubt that any of you really need a contentedly-obscure western Kentucky newspaper editor like me to tell you this was wrong. ■

3-21-91

St. Louis Post-Dispatch

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# Shatterproof

## Quake Readiness Survives Browning Scare

By William Allen

Of the Post-Dispatch Staff

A joke going around after the New Madrid earthquake scare in December poked fun at the abilities of Iben Browning, who forecast a 50-50 chance for the quake that didn't happen.

Question: "Did you hear about Iben Browning's next prediction?"

Answer: "There's going to be a major flood when everyone pours out their emergency water supplies."

In the months since "E-Day" on Dec. 3, some people have dumped their water, eaten their emergency food and returned gas-powered generators and other equipment to hardware stores, earthquake preparedness officials said.

But that doesn't mean the public has become apathetic. Instead, the Browning affair has helped move Missouri and Illinois toward addressing that threat, they said.

"The main benefit from Mr. Browning was the increased awareness to the fact that the Earth has moved here before, and it's going to move again," said Tom Redickas, coordinator of emergency services for Williamson County, with offices in Marion, Ill. "Even though it didn't happen according to his schedule, it's out there someplace."

Seismologists say the scientifically legitimate probabilities for a damaging quake in the New Madrid Fault are no different now than before Dec. 3: about 50 percent over the next 15 years and 90 percent over the next 50

years for a quake of 6.3 or greater on the Richter scale. Damage could vary widely depending on where the quake erupts in the fault, which stretches from Southern Illinois, through southeastern Missouri and into northern Arkansas.

Browning, of New Mexico, is an expert on climate. He called for a 50-50 chance of a quake measuring between 6.5 and 7.5 in the fault from Dec. 1 through Dec. 5. The forecast triggered public anxiety, even though it was discounted by a national panel of earthquake scientists. Browning has no formal training in earthquake science.

Despite the needless scare, the Browning affair showed school administrators and other public officials that they have a legal responsibility to protect their charges, Redickas said. Even after December, many officials in Southern Illinois have moved ahead with earthquake preparedness plans, and those who already have plans have tried to improve them, he said.

R.D. Ross, Missouri's top emergency preparedness official, said communities in the New Madrid Fault zone had reached "a certain maturity" about earthquakes as a result of the Browning scare.

Ross is director of the State Emergency Management Agency, in Jefferson City. He spent Sunday through Tuesday touring seven counties in southeastern Missouri.

"There's a level of preparedness never seen before," particularly in schools, hospitals and nursing homes,

he said. But many structures still need to be strengthened or replaced with seismically sound buildings.

If any falloff in earthquake preparedness activities can be detected among local and state officials, it's more due to budget upheavals than lack of interest, Ross said.

Most people he talked with on his tour realize that "we're a hundred days closer to the event than we were on Dec. 3, when the eyes of the world were on us," Ross said.

One of the downsides of the quake scare was that it panicked many people, said Dan Freet, deputy director of the St. Louis County Office of Emergency Management.

"But in the end it was good for the St. Louis region, because I do know a lot of people took preparatory steps that are still in place, and even those who didn't know in the back of their minds that this is an earthquake-prone area," he said.

Public discussion of the New Madrid earthquake threat may have fallen in the past three months, but planners and builders have been moving ahead on the issue.

"Responsible building owners, schools, utilities and other people who realize their responsibility to protect the public are proceeding," said Thomas Schwetye, an architect in Clayton. "They realize that earthquake statistics are as fickle as the weather, and it can happen any time."

Phillip Gould, chairman of civil engineering at Washington University, said "essentially all the principal in-

dustries in St. Louis" have started long-term programs to upgrade facilities to protect their business interests in a quake.

"A lot of what is being done is being done quietly," Gould said. "They know this is still a real threat and it's not going to go away."

A committee of the American Society of Civil Engineers met at the university March 12 and 13 to consider guidelines for bolstering the structure of buildings to make them safer in earthquakes. Such seismic guidelines are in place for construction of new buildings and have formed the basis for many local building codes.

About 30 earthquake engineers, architects and building officials discussed a preliminary report on seismic rehabilitation of existing buildings. The report was prepared for the Federal Emergency Management Agency.

The report aims to give advice to experts who soon will write national recommendations on bolstering existing buildings against a major quake.

Meanwhile, at the Adam's Mark Hotel downtown, the University of Missouri at Rolla sponsored a national conference on recent advances in earthquake engineering.

In an interview at the meeting, a U.S. Geological Survey engineer revealed that a downtown building will soon be chosen to house instruments in a study of earthquake forces. The instruments measure how the entire building moves when an earthquake hits.

### Iben Browning Gets 'Chicken Little' Award

Iben Browning has won the first Chicken Little Award of the National Anxiety Center.

"Browning managed to scare the daylights out of people in seven Midwestern states, provide one of the most dubious news stories of the year and demonstrate the way anyone with a Ph.D. is given free reign to create a high level of public anxiety," said Alan Caruba, founder of the anxiety center.

The center, based in Maplewood,

N.J., is a "clearinghouse and sounding board with a bit of a contrary voice in the face of the flow of misinformation and disinformation" provided by the U.S. news media, Caruba said.

Browning forecast even odds for a major earthquake in the New Madrid Fault about Dec. 3. A panel of earthquake experts ridiculed the forecast and the method behind it. No quake occurred.

— William Allen

# Quake registers 4.6, rattles area

5-4-91  
Belleville (Ill.)  
News-Democrat  
Reprinted by permission

By SETH COLEMAN  
News-Democrat

A minor earthquake registering 4.6 on the Richter scale shook the metro-east and six states Friday night.

The earthquake, centered 10 miles west of New Madrid, Mo., and about 150 miles south of St. Louis, hit at 8:19 p.m., said John Minsch, a geophysicist at the U.S. Geological Survey in Golden, Colo.

No injuries or damage was reported in the metro-east. Brian Mitchell, an earthquake expert at St. Louis University, called the quake "moderate."

"It was felt over a number of states, but we haven't had any reports of damage," Minsch said, adding it might not have struck on the New Madrid Fault.

"We haven't had time to check," Minsch said. "But it was in the fault zone."

In Pocahontas, Ark., a police dispatcher said there was a report the quake cracked a basement wall and separated the house's dining room wall. Other minor damage was

reported in Missouri.

Telephone service was interrupted in Newark and Oil Trough, Ark., and Malden, Mo., near the quake's epicenter, officials said.

Tom Ridickas, coordinator for the Illinois Emergency Services and Disaster Agency office in Collinsville, felt the tremor.

"The building began to talk to me," he said. "It started to make sounds I'd never heard before."

He said his office received about two dozen calls after the quake.

"People are saying windows and dishes were rattling," Ridickas said.

There were also reports in some areas of a second jolt about 10 minutes after the first one.

"We've gotten reports from five states (Kentucky, Tennessee, Arkansas and Missouri) including Illinois saying that they felt a quake," said former state Rep. Ron Stephens, now director of the Illinois Emergency Services and Disaster Agency. "There's been no report of damage and we are happy for that." Residents in Mississippi later also reported feeling the earthquake.

The quake came five months after climatologist Iben Browning had sent mid-America into an earthquake-prevention frenzy with his prediction that a major quake would hit the New Madrid Fault area on Dec. 3, 1990. "I was sitting in a chair in the second-floor bedroom, when my chair felt like it was wiggling," said Robert Kirgraber, who lives on South Charles

Street in Belleville. "It was like the whole house quivered a little bit; and my wife felt it also. It didn't last very long."

Sheriff Donald Ray of Jackson County, Ark., felt the earth move, too.

"I was sitting in the chair at Take One Video eating an ice cream and waffle cone, and it felt like someone was shaking the chair behind me."

LeAnn Holmes, an announcer with KOKR-KNBY in Newport, Ark., said: "We just felt like a tremor, and then it was 25 or 20 seconds and then another tremor. I thought somebody was trying to break into the radio station."

Officials at Memorial Hospital in Belleville said no one felt anything there, but Tom Vernier, a spokesman for St. Elizabeth's Hospital in Belleville had a different account.

"A couple of patients told nurses that they felt a little tremor, but that was it," he said.

Dozens of metro-east residents called area police departments to report they had felt the earthquake.

Law enforcement officials from the St. Clair County sheriff's department, Madison County sheriff's department and the Illinois State Police in Collinsville said they had received no reports of damage, and Illinois Power and Union Electric had no reports of power outages.

The last quake to hit the metro-east occurred on Sept. 9, 1990. It also registered 4.6 on the Richter scale.

The Richter scale is a measure of ground motion as recorded on seismographs. Every increase of one num-

ber means a tenfold increase in magnitude. Thus a reading of 7.5 reflects an earthquake 10 times stronger than one of 6.5.

An earthquake of 3.5 on the Richter scale can cause slight damage in the local area, 4 moderate damage, 5 considerable damage, 6 severe damage. A 7 reading is a "major" earthquake, capable of widespread heavy damage; 8 is a "great" quake, capable of tremendous damage.

The San Francisco earthquake of 1906, which occurred before the Richter scale was devised, has been estimated at 8.3 on the Richter scale.

*Some information for this story was provided by The Associated Press.*

## Shook

### Quake Rattles Area, Southeast Part Of State

By Donald E. Franklin  
Of the Post-Dispatch Staff

A small earthquake along the New Madrid Fault swayed chandeliers and made buildings creak across the St. Louis area Friday night but caused no damage.

The quake, which measured 4.6 on the Richter scale, was centered 10 miles west of New Madrid in southeastern Missouri, said Brian Mitchell, chairman of earth and atmospheric sciences at St. Louis University.

"It was the kind we would expect every five years," he

said. Mitchell said heavy damage might have occurred if the temblor had been centered in a heavily populated area.

Authorities said the earthquake also rattled parts of Illinois, Kentucky, Tennessee and Arkansas. No injuries or damage were immediately reported in these areas.

Jim Moore, a tree trimmer who lives in Affton said he was watching television when the quake began.

"It felt like somebody was shaking my chair," Moore said. He said that when the shaking stopped, he ran out into the front yard and looked around.

"I thought it might have been the big one," he said.

Mitchell said he did not feel the earth move at his home in Kirkwood, but Gene Pearlina, a University City auto salesman, said he and his wife felt the tremor on the fourth floor of

their apartment building.

"We were sitting in our den, and the building shook," Pearlina said. "We saw the chandelier sway back and forth. It was quite a feeling."

"I thought it was probably an explosion," Pearlina said.

Tom Ridickas, coordinator for the Illinois Emergency Services and Disaster Agency office in Collinsville, felt the tremor.

"The building began to talk to me. It started to make sounds I'd never heard before. I heard some creaking but didn't feel any shock," Ridickas said.

Ridickas's office had received about two dozen calls from area residents less than 30 minutes after the quake occurred.

"People are saying windows and dishes were rattling," he said.

In northeastern Arkansas, Jackson

County Sheriff Donald Ray said, "I was sitting in the chair at Take One Video eating an ice cream and waffle cone, and it felt like someone was shaking the chair behind me."

A deputy sheriff in New Madrid County said his office was swamped with calls just after the quake hit, although he said he did not feel it. He said the callers wanted to know if, in fact, an earthquake had occurred.

On Sept. 26, an earthquake centered in southeastern Missouri shook a large area along the New Madrid Fault. It also measured 4.6 on the Richter scale.

New Madrid County was the scene of a media spectacular in December when scientist Iben Browning predicted a earthquake for that area. An earthquake did not occur.

*The Associated Press contributed information for this story.*

5-4-91  
St. Louis Post-Dispatch  
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## APPENDIX D

# THE COMMERCIAL RESPONSE TO THE BROWNING PREDICTION

Earthquake-related advertising in the weeks preceding December 3, 1990

### INFORMATION PRODUCTS



## QUAKESAFE

s.m.

### A Preparedness Guide for Earthquakes

If there is a major earthquake you will be on your own for up to 72 hours, medical help or other support will be limited. Your children might be separated or badly injured.

<p><b>You might not have:</b></p> <ul style="list-style-type: none"><li>• Food</li><li>• Water</li><li>• Utilities</li><li>• Communications</li><li>• and/or shelter</li></ul>	<p><b>What will you do?</b></p> <p>This 46 page, 8½x11, extensive book on <u>safety</u> and <u>survival</u> for <u>before</u>, <u>during</u> and <u>after</u> an earthquake will tell you <u>exactly</u> what needs to be done.</p>
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Produced By US Art, Inc. in Cooperation With  
The Center For Earthquake Studies at S.E.  
Missouri State University.

Send Check or Money Order for \$6<sup>95</sup>\*  
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Suite 106  
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★ Portions of Proceeds go to Am. Red Cross Disaster Fund. Full Refund if not completely satisfied.

Chesterfield (Mo.) Journal

Earthquake Emergency Preparedness

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Weekly Record (New Madrid)

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Prepare and protect your loved ones. Over 50 common sense things to do before, during, and after an earthquake. Send \$3.95 to Lindsey Research Associates, P.O. Box 140085, St. Louis, MO 63114



PREPAREDNESS PRODUCTS

# EARTHQUAKE

**EARLY WARNING SYSTEMS**

**TIME IS LIFE!**

This new device detects the low frequency sound waves that precede a coming earthquake shock. So it can give you as much as 30 seconds warning time before the coming earthquake and may save your life. For this device plus an earthquake survival guide, send \$32 to:

**Chen & Associates**  
P.O. Box 15822  
St. Louis, MO 63114

## Schilling

### PREPAREDNESS JEEP 4x4s

**'91 JEEP CHEROKEE**

**\$0 DOWN**

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per month

**24 MONTH LEASE**

**TOUGH ENOUGH TO GO WHERE OTHERS CAN'T**

\*Must pay 1st mo. payment, security deposit, tax, license & tags for total of \$909.30 at inception. 24 mo. closed end lease. Customer may purchase at end of lease for \$11,613.36. 24 payments @ \$344.67 totaling \$8272.08. This includes all incentives, rebates and APR programs.

**Schilling**

**JEEP/EAGLE**

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**5390 FOX PLAZA DRIVE**

**Jeep Eagle**

# E<sup>3</sup> Pak

## Essential Emergency Equipment Pack

Each E<sup>3</sup> Pak contains essential equipment, supplies and instructions for use during a widespread emergency such as an earthquake, flood or major storm all packaged for immediate use. For home or office.

- 2 Gallons Water
- Meal Packs (for about 12 Meals)
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- Radio with Battery
- 10' of Rope
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- Garbage Bags

- Drinking Cups
- Cooking Heat (Sterno)
- Toilet Tissue
- Waste Disposal Bags
- Can Opener
- Disposable Lighter
- Flashlight with Batteries
- Whistle
- Spare Batteries
- Instructions

The supplies and equipment contained in the E<sup>3</sup> Pak will sustain you and your family for approximately three days, sufficiently long for professional disaster assistance personnel to clear roads and restore normal utility and communications services.

**DELUXE E<sup>3</sup> Pak**

**\$49<sup>95</sup>**

(Plus \$3.87 Sales Tax & \$3.00 Shipping & Handling)\*

Custom Business Packs are also available.

**\$39<sup>95</sup>**

(Plus \$3.10 Sales Tax and \$3.00 Shipping)

UPS will deliver your E<sup>3</sup> Pak to your door.

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Check One  E<sup>3</sup> Pak  Deluxe E<sup>3</sup> Pak  Comprehensive Medical Pack

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 • CAPS •  
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High Quality  
 Available Now At  
**PAR GAS**  
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Weekly Record (New Madrid)

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**"BRING ON THE QUAKE"**  
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*The Ultimate*  
*(and Easy Halloween Costume)*  
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 Send \$11.95 + \$1.50  
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Riverfront Times (St. Louis)

**I SURVIVED...  
 THE NEW MADRID  
 FAULT**



**ST. LOUIS, MISSOURI  
 DECEMBER 3, 1990**

T-SHIRTS AVAILABLE BY MAIL THROUGH:  
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 1600 Log Cabin Lane  
 St. Louis, MO 63124

\$26.00 includes tax and freight  
 Send name & address w/order  
 Sizes: Large or extra large

*White 50/50 t-shirt w/fushia silk screen.  
 "I survived New Madrid Fault  
 St. Louis, MO Dec. 3, 1990"*

Riverfront Times

By Robert Cohen



T-shirt sales were booming at a shop near Reelfoot Lake (Memphis Commercial Appeal).



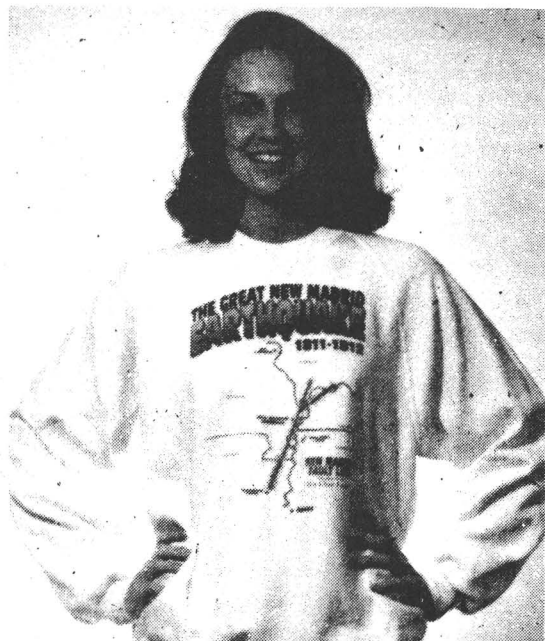


Photo by Ralph Palmer - Model Shannon Allred

## One-Of-A-Kind Earthquake T-Shirts & Sweat Shirts

Tees: S, M, L, XL in assorted colors (may list two color choices) PRICE: \$12 + \$2 shpng.

Sweats: S, M, L, XL in white, gray & blue PRICE: \$20 + \$3 shpng. (XXL \$22 + \$3)

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City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Tee: size \_\_\_\_\_ 1st color \_\_\_\_\_ 2nd color \_\_\_\_\_

Sweat: size \_\_\_\_\_ 1st color \_\_\_\_\_ 2nd color \_\_\_\_\_

Mail to: Chamber of Commerce, P.O. Box 96,  
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Weekly Record (New Madrid)

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Buy one get second  
**1/2 Price**

Try our dessert special  
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Offer good thru Dec. 6th

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A great place to meet with friends.

## THE COTTAGE RESTAURANT DECEMBER 3, 1990

### Our Most *EARTH SHAKING SPECIALS* Of The Day

Served on paper plates (*for your safety*) prevents cracking during meal.

- #1. CHICKEN FRIED QUAKE topped with Iben Brown gravy,  
Smashed Taters, Toppled Pole Beans &  
Crumb Cake (*for dessert*)      \$4.75
- #2. CRACKED RIBS OF BEEF  
Turned-up Greens, Sandied Yams (*direct from Bud Boogie Beach*)  
Crackberry Cobbler (*for dessert*)      \$4.90
- #3. CHICKEN AND CRUMLINS  
Brickeled beets  
Crack salad topped with Chipped bricks  
Tumbled Pyramid Jello (*for dessert*)      \$4.35

All of the above served with choice of Mississippi Mud or Wolfe River Bottom Tea  
Served in styrofoam cups (*you guess why?*)

*EAT AT THE COTTAGE ON DECEMBER 3, 1990*

ALL IN FUN

**CROSSROADS**  
ISALOON

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Saturday, Dec. 8

Weekly Record (New Madrid)



By Sue Ogrocki, Reuters

The Hap's Bar party in progress (Arkansas Democrat).

Memphis Commercial Appeal

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## APPENDIX E

### PREPAREDNESS LITERATURE

Examples of earthquake preparedness publications available in the New Madrid region in late 1990

#### Earthquake Guide



For home and office

Information provided by

Center for Earthquake Studies  
Southeast Missouri State University  
One University Plaza  
Cape Girardeau, MO 63701

Printed by



Southwestern Bell  
Telephone

#### EARTHQUAKE AWARENESS

*HELPFUL  
HINTS  
TO PREPARE  
FOR AN  
EARTHQUAKE*

COMPLIMENTS OF

**WAL-MART**

AND

**SAM'S CLUBS**

MEMBER'S ONLY

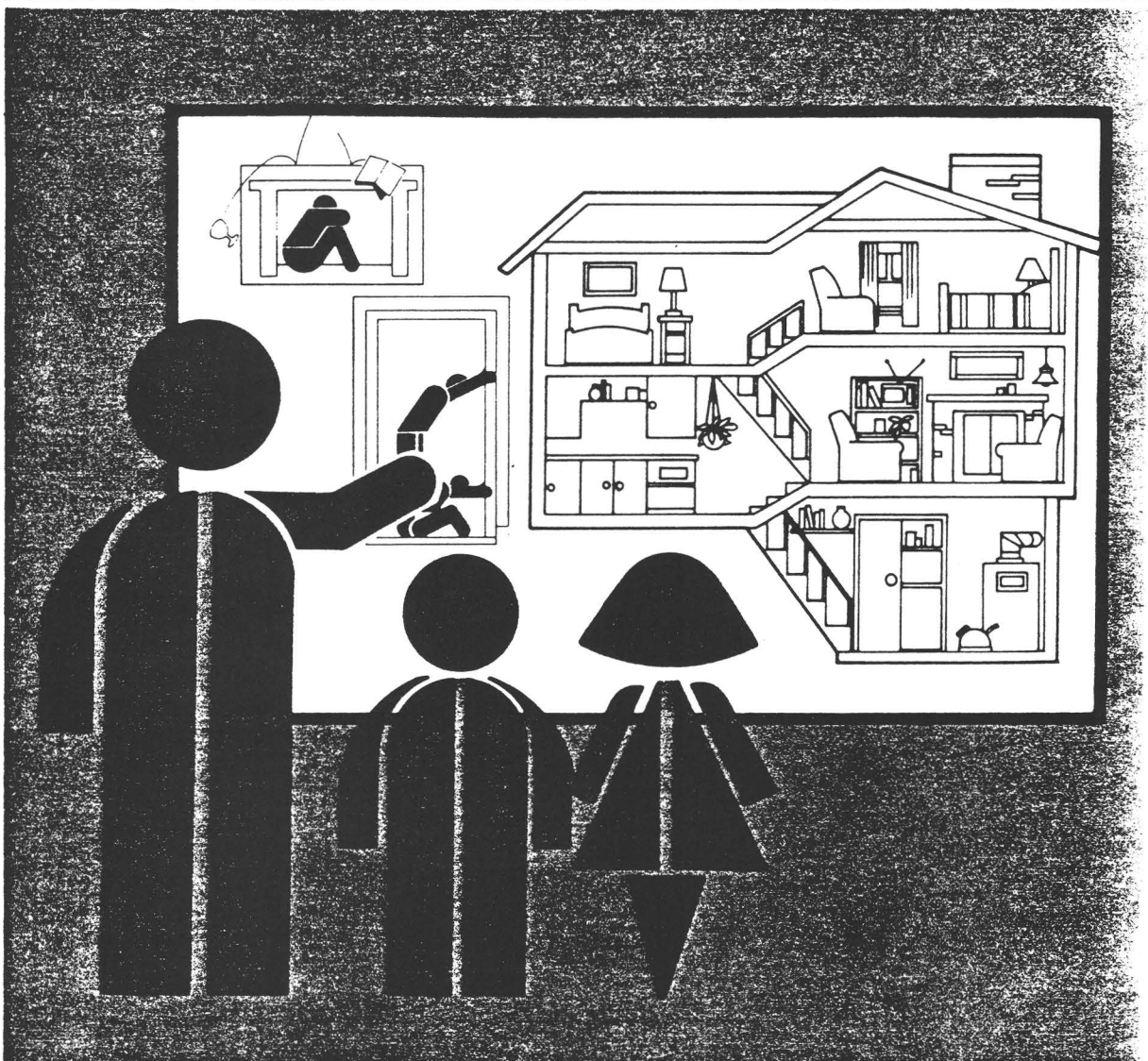
Covers of brochures distributed by two local businesses.

FEMA 113 / September 1986

( Supersedes FEMA 47 and FEMA 49 which may be used )

# FAMILY EARTHQUAKE SAFETY HOME HAZARD HUNT AND DRILL

American  
Red Cross +



# 27 things to help you survive an earthquake

Midwesterners are becoming aware of the potential of an earthquake creating damage and dangerous conditions. So if we don't properly prepare, the next quake may cause greater personal damage than necessary. Each item listed below won't stop the next earthquake but it may help you survive in a better way.

---

## 4 basics to do during an earthquake

---

1. STAY CALM!
2. Inside: Stand in a doorway, or crouch under a desk or table, away from windows or glass dividers. Don't rush outside. Do not use stairs or elevators while the building is shaking or while there is danger of being hit by falling glass or debris. Only in the case of an emergency should you use your telephone.
3. Outside: Stand away from buildings, trees, telephone and electric lines.
4. On the road: Drive away from underpasses/overpasses; stop in safe area; stay in vehicle.

---

## 6 basics to do after an earthquake

---

1. Check for injuries—provide first aid.
2. Check for safety—check for gas, water, sewage breaks; check for downed electric lines and shorts; turn off appropriate utilities; check for building damage and potential safety problems during aftershocks such as cracks around chimney and foundations.
3. Clean up dangerous spills.
4. Wear shoes.
5. Turn on radio and listen for instructions from public safety agencies.
6. Don't use the telephone except for emergency use.

---

## 14 survival items to keep on hand

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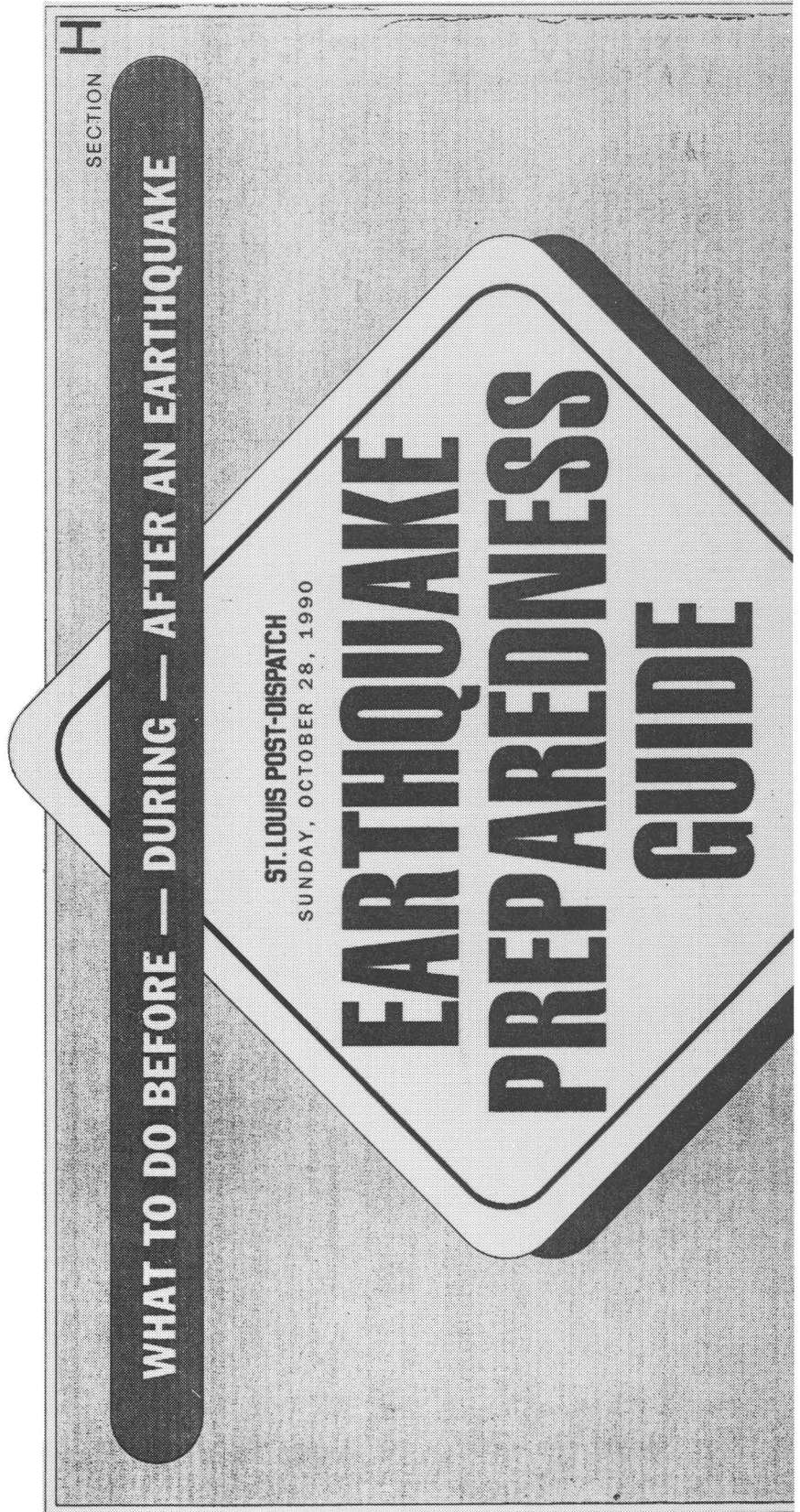
1. Portable radio with extra batteries
2. Flashlight with extra batteries
3. First aid kit—including specific medicines needed for members of your household.
4. First aid book
5. Fire extinguisher
6. Adjustable wrench for turning off gas and water.
7. Smoke detector properly installed
8. Portable fire escape ladder for homes/apartments with multiple floors.
9. Bottled water—sufficient for the number of members in your household.
10. Canned and dried foods sufficient for a week for each member of your household. NOTE: Both water and food should be rotated into normal meals of household so as to keep freshness. Canned goods have a normal shelf life of one year for maximum freshness.
11. Non-electric can opener.
12. Portable stove such as butane, or charcoal. NOTE: Use of such stoves should not take place until it is determined that there is no gas leak in the area. Charcoal should be burned only out of doors. Use of charcoal indoors will lead to carbon monoxide poisoning.
13. Matches
14. Telephone numbers of police, fire and doctor.

---

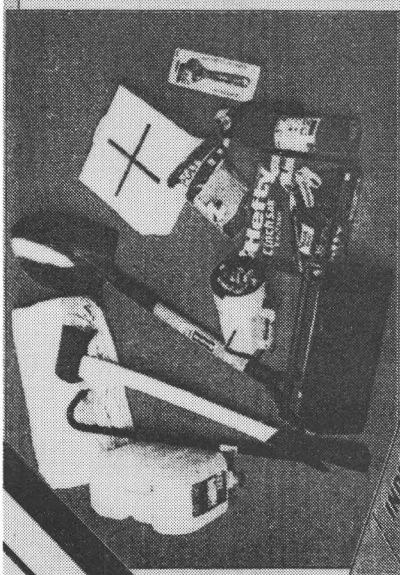
## 3 things you need to know

---

1. How to turn off gas, water and electricity
2. First Aid
3. Plan for reuniting your family





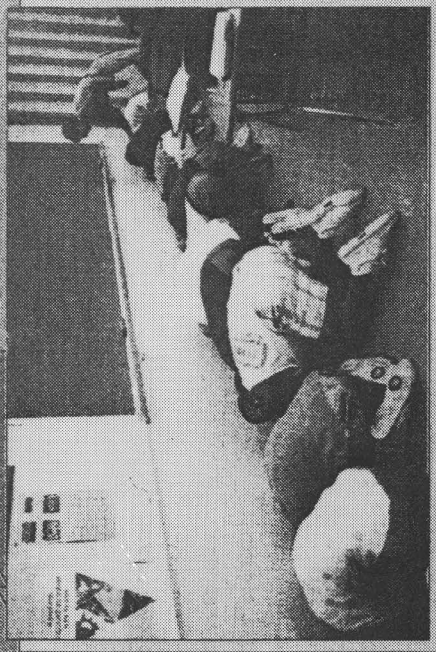
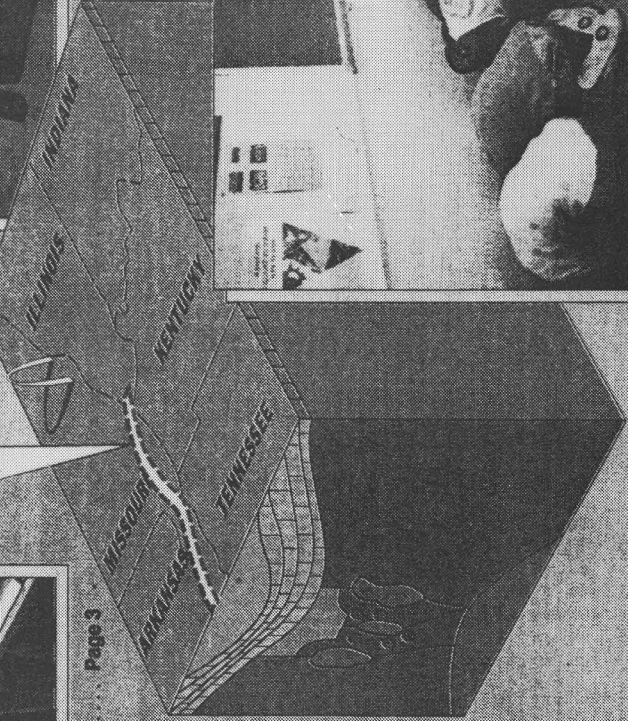


Preparing a home survival kit ..... Page 5

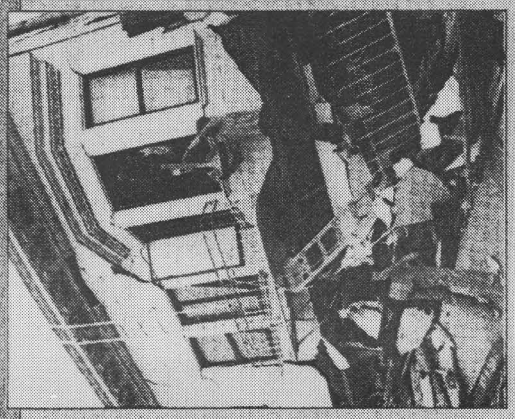


Understanding how earthquakes work ..... Page 3

**NEW MADRID FAULT**



Getting schools ready ..... Page 18



What to do when the dust settles ..... Page 14

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## EARTHQUAKE PREPAREDNESS

### FROM THE EDITOR

# For The Concerned: Earthquake Guide We Hope Never Has To Be Tested

By William F. Woo

The decision to publish the booklet that is in your hands was made on the afternoon of Sept. 26, in a meeting attended by senior editors of the Post-Dispatch and led by William Allen, our science writer. By coincidence, on that very morning an earthquake measuring 4.6 on the Richter Scale occurred south of Cape Girardeau, causing minimal damage but refocusing attention on the chance of a more serious seismic event along the New Madrid Fault.

Our meeting, however, had been scheduled well in advance of the temblor. Public concern about a major earthquake in the St. Louis area had been developing since the big Loma Prieta quake in the San Francisco area last October and it had been greatly intensified because of the predictions of Iben Browning, whose unorthodox methodology has made him controversial in seismological circles.

Some people had claimed that Browning had correctly predicted the Loma Prieta event, and late last year it was learned he had asserted a 50-50 chance of



William F.  
Woo

### INSIDE

#### BEFORE AN EARTHQUAKE

- **Earthquake scenario:** Here's what could happen to you and your home during a major earthquake . . . . . **3**
- **The way they work:** The first step in preparing for earthquakes is understanding the variety of forces at work . . . . . **3**
- **Safe at home:** Steps to protect your home range from cheap and simple to elaborate and expensive. Here's a list from which to choose . . . . . **4**
- **Survival Kit:** A list of items to serve you well if an earthquake puts your home out of commission . . . . . **5**
- **Practice makes perfect:** A family earthquake drill can help keep your loved ones safe . . . . . **6**
- **Help thy neighbor:** A neighborhood organization can reduce chaos and provide protection in the event of an earthquake! . . . . . **6**
- **Help for the disabled, elderly:** Often it's older adults and the disabled who suffer most in natural disasters, but much can be done to reduce the risk of injury before an earthquake . . . . . **6**
- **To buy or not to buy:** That's the question for homeowners considering earthquake insurance . . . . . **6**
- **Calming the kids:** Earthquakes can create long-term emotional difficulties for children. Some tips for coping with them . . . . . **8**
- **High Anxiety:** The best way to overcome earthquake phobias is to be prepared, the experts say . . . . . **8**
- **Terra firma?** Whether your home or office will be damaged by an earthquake depends in large part on the soil on which they stand . . . . . **10**

#### DURING AN EARTHQUAKE

- **Drop, cover, hold:** When an earthquake hits, you've got just a few seconds to find protection. Here's what to do if you are in your home, your office, a car, a high-rise building, a school, or a supermarket . . . . . **12**

an earthquake of 7.0 or more on the Richter Scale in the New Madrid Fault. This event was to occur within 48 hours of Dec. 3. Such an earthquake could cause billions of dollars in damage and the loss of life.

**As more became known** about Browning's predictions, apprehension began to rise. Civil preparedness officials reported increasing numbers of calls from worried citizens. School officials began to ask what should be done. Government officials began to look at earthquake preparedness plans. Earthquakes became the talk of the talk shows.

Browning's predictions might be dismissed by the seismological establishment, but reputable scientists using conventional forecasting techniques already had set the odds of a 7.0 earthquake along the New Madrid Fault at about 30 percent within 15 years. Sooner or later the earth was going to shake violently.

The question for us was, what should the Post-Dispatch do in response to the developing public anxiety? To fuel apprehension and possibly set off a panic would be irresponsible. But what if we carried on as usual, making no special effort, and an earthquake occurred? The knowledge that we could have helped our readers — but did nothing — would be intolerable.

We sought advice, from civil preparedness officials, from the Army engineers, from newspapers in the San Francisco area, from experts in seismology, geology and public health. Bill Allen was assigned to compile a comprehensive report, showing what might happen in an earthquake and how casualties and property damage could be minimized. He was asked to assess Browning's prediction in the light of prevailing seismic theory.

At our meeting on Sept. 26, we learned that there is a great deal that individuals can do to lengthen their odds of coming through an earthquake safely. We learned about simple household precautions and adjustments that can be undertaken and that these are well within the competence and economic means of most of our readers. We learned that there are basic steps that can be taken by families with small children to maximize safety and minimize the psychological burden of earthquake anxiety.

And because these "obvious" things were not obvious to us, the editors, we reasoned that they might not be obvious to you, the readers. Hence, the decision to publish this guide.

**In simple terms**, it would tell what to do before, during and after an earthquake. It would also tell something about earthquakes, to take the mystery out of the event. It would be a low-keyed product, easy to read and as comprehensive as possible. Most important, it should have a shelf life well beyond Dec. 3.

Ten days ago, we met to reconsider the decision. Earthquake experts, meeting in St. Louis, had denounced Browning's predictions as quackery. In light of this, should we proceed?

The answer, unanimously, was yes. The assumption that a major temblor will take place along the New Madrid Fault remained undisputed. The only question is when. Our conclusion: Better to do it now, while the subject is fresh in our readers' minds, than later, when they may be less interested in earthquakes or less inclined to take prudent preparatory steps.

So here it is, a booklet full of advice that we hope will never have to be tested. I think you will find it helpful and reassuring.

## AFTER AN EARTHQUAKE

- **After the quake:** When the dust settles, move cautiously, find your family members and check on the integrity of your home. . . . . **14**
- **Aftershocks:** After the big one hits, there could be more . . . . . **14**
- **Long-term recovery:** Tips on how to deal with your insurance company and get your house back in order **14**
- **Haywire:** Even a moderate earthquake could create havoc with pipelines, telephone and electric service. **15**
- **Getting back to normal:** It may take as long as a decade for the metropolitan area to recover from a major earthquake . . . . . **17**
- **Helping hand:** A major quake will likely bring with it offers of assistance from a variety of agencies . . . . . **17**

## LIVING ON THE FAULT LINE

- **Healthy skepticism:** Take earthquake predictions with a grain of salt. The science of earthquake prediction is in its infancy . . . . . **13**
- **Damage Estimates:** A look at the death and damage estimates predicted for New Madrid quakes . . . . . **15**
- **Understanding the fault:** Lying 10 to 12 miles beneath the earth's surface, the New Madrid Fault produces 200 minor earthquakes a year and has the potential to unleash a big one at any time. Here's why . . . . **16**
- **Checklists:** One checklist each for government officials, school administrators and business leaders to prepare their facilities and employees for a damaging earthquake . . . . . **18**
- **More information:** Lists of books and pamphlets where you can get more information . . . . . **18,19,20**

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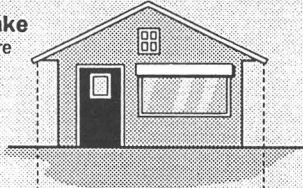
## EARTHQUAKE PREPAREDNESS

### Seismic Resistance In Structures

Inertia is the tendency of an object at rest to remain at rest and an object in motion to remain in motion. The diagram indicates the effects of inertia upon a simple structure caused by the back and forth movements of the ground during an earthquake. The process may repeat many of times.

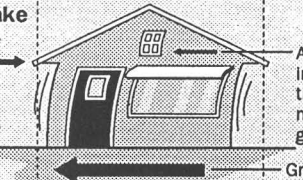
#### Before earthquake

Ground and structure are stationary.



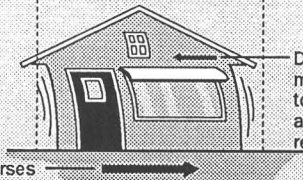
#### During earthquake

Inertia force initially resists the motion induced by ground acceleration.



After overcoming initial inertia force, the roof begins to move with the ground motion.

Ground Acceleration



Direction of roof motion is opposite to ground motion after ground motion reverses.

Ground motion reverses

Source: Federal Emergency Management Agency Post-Dispatch Graphic/James Cook

# How A Quake Works: Sorting Out Shakes, Rattles, Rolls — And What They Do

William Allen  
Of the Post-Dispatch Staff

**T**he first step in preparing for an earthquake is to understand how a quake works. Experts say that quakes don't cause damage and injuries — buildings and other objects shaken by a quake do.

Just what shakes you and your home, and how does it cause damage?

Earthquake forces have many different components. The most important one is a violent horizontal movement of the ground that shakes buildings — and anyone or anything in it — from side to side.

This earthquake force accelerates the house or other building in one direction at ground level. The force then reverses. This forward-and-back cycle can be repeated many times.

Meanwhile, because of its weight, the building itself exerts a force that resists the movement brought on by the ground acceleration. This resisting force is known as inertia.

Like a passenger standing on a quickly accelerating bus, the foundation of the building may lurch ahead with the ground movement, leaving the top of the building behind. Then the top begins to overcome its inertia

and move. But by then, the ground and foundation are already moving back in the opposite direction.

As a result, door frames, windows, structural beams, walls and other parts get twisted and jolted every which way.

Put simply, the damage caused by quake forces depends on three things: how fast the ground shakes, the distance it moves with each shake and how long the shakes continue. Even small movements can be disastrous if they are rapid and long-lasting.

In heavier buildings, more force is exerted, and greater damage can be expected.

The amount of damage also depends on how well a building has been designed and constructed. The exact damage cannot be predicted, because no two buildings behave the same, experts say.

Still, scientists and engineers agree on some trends.

- New buildings generally sustain less damage than older ones, which were built to earlier codes. Structures designed or "retrofitted" with seismic resistance do better than structures with no seismic design attention.

- Steel and wood-frame buildings

survive better than unreinforced masonry structures.

- Most people are safe at home if they live in a one- or two-story wood-frame building. These structures are best at absorbing earthquake vibrations.

- Common problems in wood-frame buildings include the collapse of unreinforced brick chimneys. Some older wood-frame houses may be hazardous if they are not adequately bolted to the foundation or if they have short "cripple" walls that are not braced adequately. Cripple walls are often found between the foundation and the first floor.

- The common form of damage in unreinforced masonry buildings is collapse of the load-bearing walls — the walls that support the structure.

- Mobile homes, portable classrooms and modular buildings can slide off their foundations during a quake.

- No matter what the structure, the contents of all buildings are subject to shaking.

Each building has its own vibrational characteristics. These depend on building height, type of structure and

See **WORK**, Page 7

# Quake Scenario: Experts Give Opinion Of What It Might Be Like

By William Allen  
Of the Post-Dispatch Staff

**E**arthquakes strike without warning. Emergency-preparedness experts say a major quake could leave parts of the St. Louis region without power, fuel, water and other necessities at any moment.

Residents may be on their own for several days in the dead of winter or heat of summer. Here, drawn from accounts by the American Red Cross and federal and St. Louis County officials, is how it might happen and what the result could be:

## A Major Quake Strikes

It starts with a low, rumbling, roaring sound. The noise builds for 10 seconds, getting louder and louder. Then, Wham! There's a terrific jolt, like someone suddenly slammed on the brakes in a car or a truck just rammed against the side of the building.

The floor seems to move. It's hard to stand up, or even stay seated. If standing, it's like riding a raft down a fast river. When walking, it's like trying to walk on a trampoline or waterbed.

Someone says, "Earthquake! Drop and cover!"

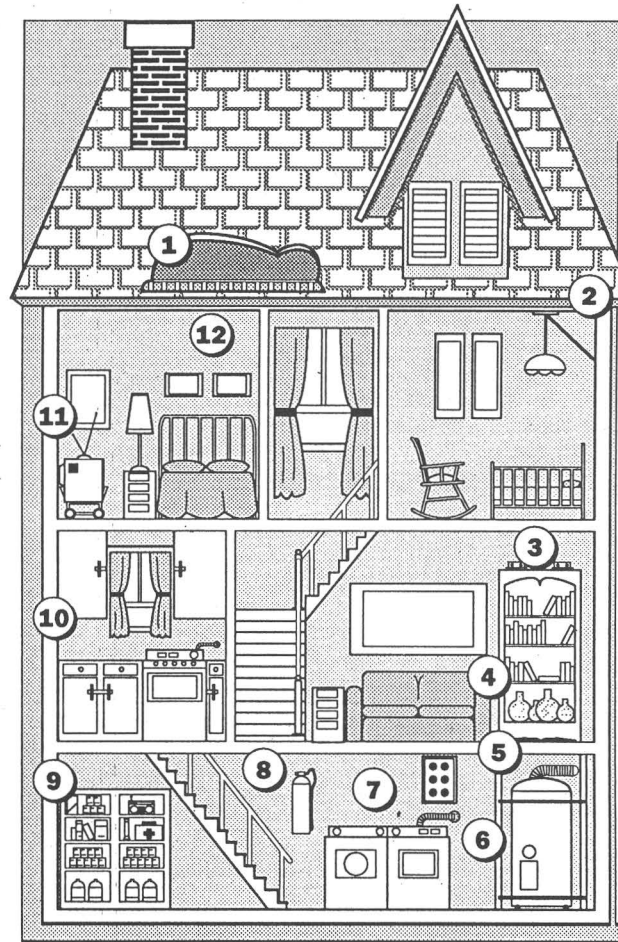
The shaking and commotion may last 60 seconds or longer.

The building creaks and rattles. Books fall from the bookcase. Hanging lamps and plants sway. Suddenly a pot falls to the floor and smashes, spilling the plant. A windowpane shatters and glass falls to the floor. A table slides across the room. A chair tips over.

Outside, dogs bark and cats meow. Babies cry in the distance. People shout and scream. The shaking makes church bells ring. You hear crashing sounds, from brick chimneys and other loose parts of buildings falling to the ground. Trees sway and scrape against the walls.

Inside, pictures move on their nails. One falls and crashes to the floor. Desk drawers slide open. Lights flicker on and off. Then they go off. Doors swing back and forth on their hinges. Some of them bang shut. Dishes slide out of cabinets. The water heater falls over with a crash.

See HOME, Page 7



Source: Federal Emergency Management Agency

## Minimizing Earthquake Damage In The Home

- 1 Nail plywood to ceiling joists to protect occupants from falling chimney bricks.
- 2 Anchor hanging lamps with closed hooks or relocate.
- 3 Secure top-heavy furniture to wall studs with metal braces.
- 4 Keep all breakables in low or secure cabinets.
- 5 Locate main electrical and gas switches for emergency shut-off.
- 6 Stabilize water heater with metal straps to wall studs.
- 7 Use flexible connectors where gas lines meet appliances, if local codes permit.
- 8 Keep fire extinguisher in accessible place.
- 9 Keep emergency supplies on hand, including drinking water, canned or dried foods, first aid kit, flashlight and portable radio with extra batteries.
- 10 Place secure latches on cupboards to prevent doors from swinging open.
- 11 Keep heavy, unstable objects away from exit routes and anchor wheels.
- 12 Replace heavy hangings over bed with lightweight alternatives.

Post-Dispatch Graphic/James Cook

## EARTHQUAKE PREPAREDNESS

# Checklist: Tips On What To Do To Make Your Home Safer

By Tom Uhlenbrock  
Of the Post-Dispatch Staff

**A** quake is coming, experts agree. The question is when. So what's a homeowner to do to prepare for the shake, rattle and roll? Plenty.

Steps range from the cheap and simple — like moving heavy objects off high shelves — to the more industrious, like bolting a frame house to its foundation.

Here is a homeowner's checklist. Many tasks can be accomplished on a Sunday afternoon. A little preparation today can mean less damage and fewer injuries tomorrow.

**Hanging objects:** The movement of the earth doesn't necessarily injure, but it does knock down objects that do. Light fixtures, such as chandeliers, and hanging plants should be secured with closed-eye screws into wooden studs. Ditto for heavy paintings or pictures, mirrors and shelves on walls.

Take special care with heavy objects over beds, chairs or couches; consider relocating them. At the minimum, use light-weight containers, rather than clay, for plants. Angle brackets screwed into studs may be necessary for the heaviest wall hangings. If an object is close enough to a window to break it while swaying, move it.

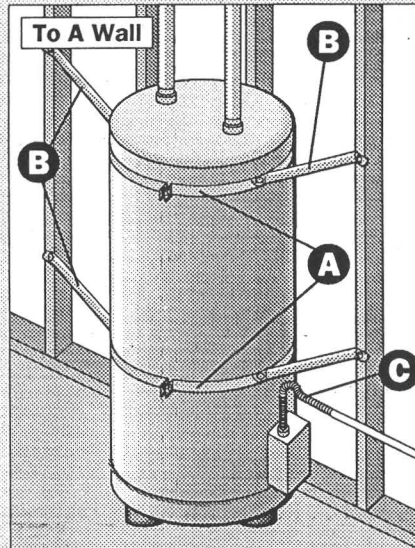
**Tall, heavy furniture and bookcases:** Free-standing furniture — such as bookcases, china cabinets and modular wall-units — can topple in an earthquake. These should be secured to the wall with metal angle or L-shaped brackets. Move heavy, unstable items away from exit routes.

**Shelves:** Heavy or breakable objects should be moved to lower shelves. Fishing line and eye screws can be used to secure them in place. A piece of wooden molding fastened to the front of shelves will act as a lip and keep objects from sliding off. Another option is placing a wire barrier across a shelf front. Be sure that adjustable shelves cannot slide off their supports.

**Cabinets:** Check latches on kitchen and bathroom cabinets to make sure they close securely and would keep contents from spilling out during a heavy shaking. Childproof latches are cheap, easily installed and hidden from view. For the basement and garage, use hook-and-eye latches. Magnetic "touch" latches should be replaced.

**Utilities:** Locate your gas, water and electric utilities, and know how to shut them off. Attach an adjustable wrench in a plastic bag to your gas meter. (After a quake, do not immedi-

### Securing A Water Heater

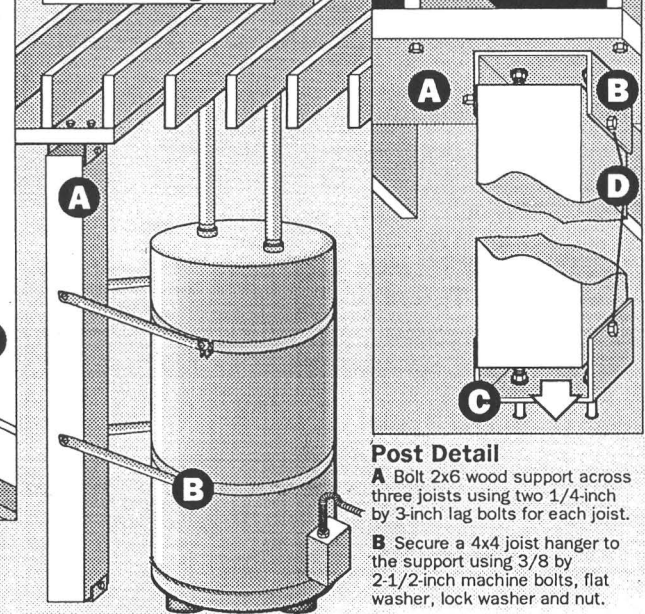


**A** Wrap a 1-1/2-inch-wide, 16-gauge-thick metal strap around the top of the water heater and bolt the ends together. Do the same about 1/3 of the way up the side of the water heater.

**B** Take four lengths of EMT electrical conduit, each no longer than 30 inches, and flatten the ends. Bolt one end to the metal strap as shown and secure other end to a wall stud using a 5/16-inch by 3-inch lag screw.

**C** Use flexible pipe to connect the water heater to the gas supply, where local codes permit.

### Freestanding Unit



**A** Anchor 4x4 wood post as indicated in the detailed drawing at right. Distance between water heater and post should be at least 18 inches.

**B** Secure the water heater to the support post in a manner similar to that described at left.

### Post Detail

**A** Bolt 2x6 wood support across three joists using two 1/4-inch by 3-inch lag bolts for each joist.

**B** Secure a 4x4 joist hanger to the support using 3/8 by 2-1/2-inch machine bolts, flat washer, lock washer and nut.

**C** Secure 4x4 joist hanger to floor with 1/4 long lag shields and 1/4 by 3-inch lag bolts.

**D** Secure each end of a 4x4 post to the joist hangers with a 1/2 by 4-1/2-inch machine bolt, flat washer, lock washer and nut.

ately turn off your gas, because it could be some time before the utility company can return service. Turn off the gas only if you detect an odor or notice a large consumption of gas being registered on the meter. Do not use matches, lighters or open flames in the home until you have checked for leaks.)

**Beds:** Place beds so that they are not near large windows or hanging lights. Heavy mirrors or wall hangings should not be located above the bed. Heavy table lamps on bedstands should be replaced with lighter lamps.

**Bathrooms:** Remove glass bottles from top shelves in medicine cabinets. Remove glass containers from around the bathtub.

**Appliances:** Refrigerators and other heavy appliances on

rollers — including televisions on movable stands — should be blocked in place. Large appliances in the garage or basement may be secured to wall studs with flexible cable, braided wire or strapping. Add bracing to secure window air conditioners. Install flexible connectors on all gas appliances, where allowed by local building codes. Electronic equipment such as computers, stereos and microwaves may be secured by using double-stick tape or Velcro fasteners. A restraining edge on a cabinet or shelf will keep a unit from sliding off.

**Overhanging trees:** Take a walk outside, and look for large, old trees that lean over the house. Check for root rot or dead branches, and remove those that would fall onto the roof.

**Hazardous materials:** Identify poisons, cleaners, solvents

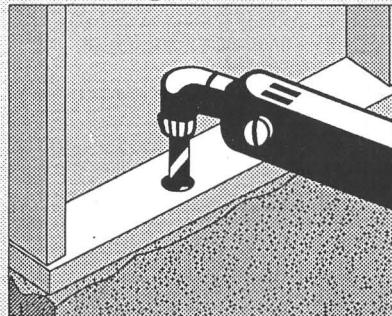
and pesticides in breakable containers, and move them to a low, ventilated storage area. Discard those no longer needed. Use plastic, rather than glass, containers when possible. Bungee cords may be used to keep containers in place.

**Fire extinguishers:** Distribute several small fire extinguishers in strategic, accessible locations around the house, and know how to use them.

**Chimney and roof:** Check for loose bricks or tile, and make necessary repairs. Older brick chimneys may be braced or replaced above the roof line with an all-metal brick veneer chimney. A contractor may be necessary for this job. Plywood

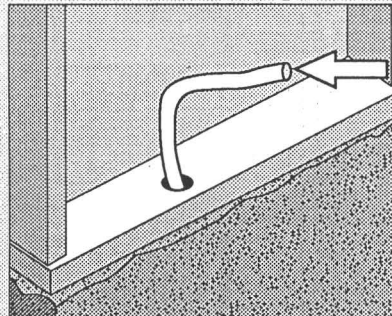
See SAFE, Page 5

## Reducing The Risk Of Earthquake Damage To A Wood Frame Building

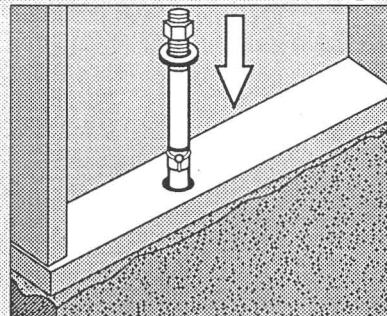


### Bolting the frame to the foundation

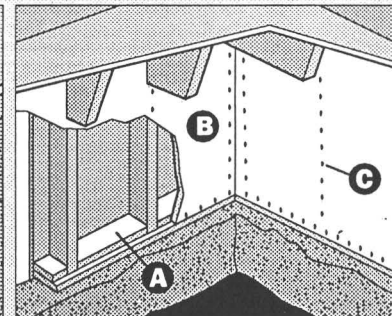
Using a right angle drill with a 1/2-inch bit drill a hole every 3 to 4 feet along the foundation.



Blow the concrete powder out of the hole with a small piece of flexible tubing.



Hammer in a 1/2-inch by 5-1/2-inch expansion bolt and tighten the nut.



### Reinforcing "cripple" walls

(A) Nail 2-by-4 inch block of wood to the mud sill as needed. (B) Cut 1/2-inch plywood to fit inner side of wall. (C) Fasten plywood along edges and to each stud with 8d nails spaced 3 inches apart.

Source: U.S. Geological Survey Post-Dispatch Graphic/James Cook

## EARTHQUAKE



## PREPAREDNESS



Post-Dispatch

You can find most of the items you need for an earthquake survival kit at a hardware or grocery store. Chances are you already have many of these items around the house.

## Survival Kits: They Must Be Well-Stocked

By Tom Uhlenbrock  
Of the Post-Dispatch Staff

No one knows when a damaging earthquake will strike, but when it does, the families who have prepared an emergency kit will probably be better off than their neighbors.

Already, many merchants are offering pre-packaged "survival kits." But before sending away for one, think about whether it fits your family's special needs. You should also compare prices.

of light. Remember to store extra fuel, matches, wicks and mantles. Candles also can be included, as can chemical reaction lightsticks. (Caution: Do not use matches, candles, lamps or an open flame until you are certain there are no gas leaks.)

**Radio:** An AM/FM portable radio, with extra batteries, may be your best source of information. Pay phones may be in service sooner than home phones.

**First aid book and supplies:** These should include one bottle of

juices. Don't forget food for your pet. Food supplies should be rotated periodically, so mark dates on cans. Other supplies include small butane stove, can opener, paper plates, cups.

**Toilet items:** Remember toilet paper, soap, toothpaste, sanitary napkins and plastic trash bags, which can be used for sanitary disposal.

Among other items that may be considered:

**Barbecue grill and supplies:** Remember, charcoal can cause carbon monoxide poisoning if burned

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## FAMILY EMERGENCY PREPAREDNESS CHECKLIST



**EMERGENCY  
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THERMAL PADS AND  
AIR MATTRESSES**



**PORTABLE  
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HAND AXE  
BOW SAW**



**FIRST AID  
KIT**

**EMERGENCY SURVIVAL  
HANDBOOK  
BOY SCOUT HANDBOOK**



**HAND HELD  
FLASHLIGHTS**

**POCKET FLASHLIGHTS  
FLUORESCENT LANTERNS  
REPLACEMENT BATTERIES**



Here are some items that experts agree could prove useful for 72 hours after a disaster when a family may be on its own.

**Bottled water:** Have enough for one gallon per day per person. Water purification methods such as chlorine bleach and cheese cloth also should be stored. Keep water in air-tight containers, and rotate every six to nine months. Empty plastic milk jugs can be used to store water, if thoroughly cleaned. Remember, an undamaged hot water heater can provide up to 50 gallons of usable water.

Water can be purchased in five-gallon jugs, and should be kept out of the sunlight.

A 72-hour water supply is the minimum; a two-week supply is recommended.

**Flashlights:** One heavy-duty flashlight per person is recommended. Remember to include extra batteries and bulbs.

**Lanterns, candles:** Camping lanterns provide an excellent source

alcohol and hydrogen peroxide, small bandages, tape, scissors, iodine, aspirin, sharp knife, clean sheet and any special medical items such as heart medication, insulin, etc.

**Tools:** These can include a crowbar, ax, hand saw, hammer and nails, 100 feet of nylon rope and a crescent wrench. The wrench is especially important for turning off utilities.

**Fire extinguisher:** Experts recommend that several small extinguishers be placed in accessible spots around the house.

**Bedding materials:** Blankets or sleeping bags should be part of your kit.

**Warm clothing:** Put aside extra coats or jackets, leather work gloves. Include sturdy shoes suitable for walking through debris.

**Food and utensils:** Experts recommend having on hand canned food, including meats, vegetables and fruits; cereals; dehydrated camping packages; powdered milk; and canned

indoors.

**Portable generator:** A generator can provide a safe source for lighting, cooking and refrigeration. It should be operated in an open area.

**Miscellaneous:** Tent, chain saw, kerosene heater and extra prescription glasses might come in handy.

**Storing Supplies:** Once the supplies are gathered, it is important that they be properly stored. They will do little good if located in an area not accessible after a quake, or if damaged or destroyed during the disaster.

One suggestion is to place the supplies in moisture-proof bags inside a large, covered trash container. The container should be placed in a cool, dry place.

Exactly where to locate the supplies is up to the individual homeowner. Some experts have suggested under a bed, or in a garage or closet. Choose a location where the supplies will be out of the way, but accessible in an emergency. Some experts suggest storing items in several places.

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WATER PURIFICATION DEVICE**

 **TENTS  
TARP/GROUND CLOTH**

 **PORTABLE GAS/  
PROPANE STOVE**

**PORTABLE GAS/PROPANE  
LANTERN**

 **PORTABLE PROPANE HEATER**

**PROPANE FUEL  
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## Safe

### From page Four

nailed to ceiling joists can protect occupants from falling bricks if a roof lacks solid sheathing.

**Foundations:** Check foundations for loose or cracked plaster. Wood-frame houses should be bolted to the foundation. The lowest piece of wood in contact with the foundation is the sill or plate. This flat piece of

wood should be bolted at 6-foot intervals with half-inch anchor bolts embedded in the concrete foundation. A handy homeowner may tackle this task, or hire a contractor.

Another possible weakness under the ground floor could be "crippled stud walls" or short stud-framed walls around the base of the house. These studs should be braced with plywood sheathing.

Homes with masonry foundations, built on a hillside or on a house over

garage" construction may need strengthening by adding an internal frame. An engineer should be consulted. Tying the masonry walls to the floors may be expensive.

**Mobile homes:** A mobile home propped on blocks or not tied to its foundation is likely to fall off its support. Diagonal bracing may be installed. A mobile home association or dealer may have the names and numbers of engineers who do this type of work.

## EARTHQUAKE PREPAREDNESS

# Family Drills: Everyone Should Practice What To Do

By Tom Uhlenbrock  
Of the Post-Dispatch Staff

An earthquake is not like a tornado in which you have time to run to a safer room in the home. A quake happens without warning. The room you are in is where you will ride out the shaking.

But there are safety hints that make a family drill invaluable.

### 1. Pick out the safe spots in each room and have each family member get into that space.

Practice taking cover by crouching in a safe spot, tucking your head under your arms and closing your eyes. This is especially important for children so they will remember what to do if an adult is not present to tell them.

What are the safe spots? Under a sturdy table or desk, standing or crouching in a supported doorway or

archway or braced in an inside corner of a house. Avoid a doorway if it has a heavy door that might swing during a quake.

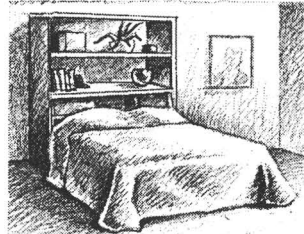
### 2. Identify the danger zones in each room.

Places to avoid are windows, large mirrors and other glass that might shatter. Stay clear of hanging objects and bookcases, cabinets and other furniture that might topple over.

Stay away from heating units, stoves, fireplaces and areas where chimney bricks might fall.

### 3. Hold surprise safety drills.

For children, this can be turned into a weekly or monthly game. Allow the child to shout "EARTHQUAKE!" and then check each family member's response. Did anyone seek shelter in a spot where heavy items could fall? Would the spot be sealed off by falling



**Bookshelves can be a danger zone during a quake.**

debris? Practice an emergency evacuation and a safe place to meet outside after the quake is over.

### 4. As a final precaution, practice shutting off utilities.

Everyone in the house should know where the water, gas and electric shutoffs are and how to turn them off.

(Caution: Do not actually turn the gas off during the drill because only the utility company can turn it back on.)

# Neighbors: Cooperation Should Begin With Planning

By Tom Uhlenbrock  
Of the Post-Dispatch Staff

Neighbors usually band together in the aftermath of a catastrophic event such as an earthquake. But forming a neighborhood emergency co-op now, rather than after the disaster, is a good idea.

Planning ahead is even more important when both parents work, meaning children may be alone or with non-family members in a quake.

Someone must take the initiative by sending notes to neighbors, asking them to attend a meeting to discuss setting up a co-op. Emergency experts suggest 10 families as an optimum size.

At the first meeting, select a coordinator and an assistant to guide the planning. Also determine whether any members have emergency medical skills, and assess who will require special help such as the elderly or disabled.

Write down who has four-wheel drive vehicles, heavy-duty tools such as chain saws and a CB radio.

Also pick a site — a neighbor's house or yard or a nearby park — where members of the co-op will report after a quake.

In the event of an earthquake, the coordinator should check off members as they arrive at the designated site. If someone doesn't report and can't be located after a reasonable time, a search team should be sent out.

Remember to be on the lookout

for potential hazards such as downed power lines or broken gas mains. Do not enter structures that appear to be damaged. After-shocks may occur.

Some emergency planners suggest each homeowner in the co-op hang a white flag or sheet outside to signal everyone in their home is OK.

Members of the co-op should fill out registration forms giving the following information:

- Family name and address.
- Number of family members, their names and ages.
- Places of employment with telephone numbers.
- Schools or day-care centers, including grades and teachers.
- Special medical needs for certain family members.
- Special skills, such as emergency medical training.
- Next of kin outside the disaster area.

The registration form also should include a release stating "In the event of a natural or man-made disaster, I hereby authorize my child to be released to . . ." The release should be signed and dated by the parent or guardian.

The emergency forms also could include a map of a homeowner's residence, indicating where the shutoffs for gas, electric and water are located.

# Insurance: Here Are Some Considerations

By William Flannery  
Of the Post-Dispatch Staff

As experts warn that the area is at risk for a damaging earthquake, homeowners must consider whether that risk makes earthquake insurance a good buy.

The answer may depend on the type of home you in which you live, your financial resources and your ability to live with risk.

Earthquakes are not covered under most residential insurance policies. If you need protection, you must get a rider.

While most insurance companies charge similar rates, there are differences in the deductibles and in the extent of coverage over contents. The

type of construction and the home's age are also factors in setting rates. So it pays to shop around.

American Family Insurance and State Farm Insurance both charge 40 cents for each \$1,000 coverage on a wood frame house and 65 cents for each \$1,000 on brick homes.

In most cases, brick and unreinforced masonry buildings are more vulnerable to quakes.

The deductible for both firms is 2 percent, but they also offer a 5 percent deductible that gives a lower rate for each \$1,000. For State Farm, a 5 percent deductible for a frame house is 30 cents for each \$1,000.

Other companies, such as Fireman's Fund Insurance, start their deduct-

ibles at 5 percent with an option for 10 percent.

Fireman's also takes account of the age of the house. The company's rate for a brick home built before 1950 is \$1.10 for each \$1,000.

The loss of content coverage will vary from company to company, with most offering 50 percent or 75 percent coverage based on the total policy amount.

Thus, a \$100,000 policy would give \$50,000 to \$75,000 worth of protection for furniture, clothing and home valuables.

But Joseph O'Shaughnessy, with American Family Insurance in Webster Groves, said some companies will

# Helping Hand: Elderly, Disabled Need Special Plans

by Theresa Tighe  
of the Post-Dispatch Staff

If the elderly and handicapped plan ahead, they can improve their odds of surviving a disaster without injury, experts say.

They should plan on being without services — including utilities or help — for up to three days. People on respirators are advised to buy a backup generator. Deaf people may want to get a visual fire-alarm system. Stores that sell these items are listed in the telephone book.

People with medical problems should stockpile three days of medication in a safe place, perhaps the refrigerator. They should carry medical information in their wallets or purses. Though they sometimes find it difficult to ask for help, the elderly and the disabled should recruit people — at work and at home — to help them.

They and their helpers should plan to practice emergency procedures, including several evacuation routes.

Those who live alone should make certain that someone will check on them after the quake.

During the quake, take cover in a doorway, under a bed, desk or table, away from outside walls, if possible. When outdoors, move to a clear area, away from trees, signs or buildings.

If trapped, do anything possible — kick walls, scream — to attract attention.

## The Bedfast

- Before a quake, make the area around the bed as safe as possible. Earthquakes happen so quickly that it will be impossible to move the person. The bed should not be placed under a window, pictures, mirrors or shelves.

- During an earthquake, those who are bedfast should pull the covers over their heads to protect themselves from debris.

- After the quake, unless there is immediate danger, the person should not be moved.

## People In Wheelchairs

- Before the quake, get an extra wheelchair. See OLD, Page 7

set limits on coverage of special items such as jewelry, firearms and computer systems.

"We have a \$5,000 limit on computers," O'Shaughnessy said. "So anything over that will require additional coverage."

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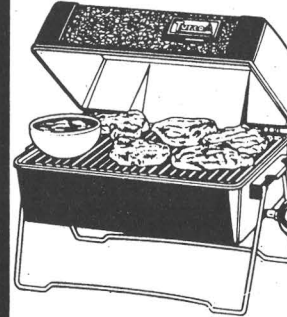
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## EARTHQUAKE PREPAREDNESS

### Work

From page Three

materials.

The earthquake also has its own peculiar vibrational pattern.

If the quake's vibrational frequency matches that of a particular building, the two can in effect lock hands in what scientists call "resonance." This, in turn, can increase the amount of the building's vibration and its subsequent shaking and damage.

The impact of an earthquake at a particular location also depends on how far its vibrations travel before reaching a structure. The soils they travel through can dampen them.

Earthquake forces travel many times farther in Missouri, Illinois and other central states than they do in California.

And that's why people in the St. Louis region — more than 100 miles from the northern end of the New Madrid Fault — need to prepare for a major quake.

### Home

From page Three

Then, as suddenly as the noise and shaking began, there's silence.

#### Aftermath In The Home

The dust settles. Of course, you won't see it if it's nighttime and the power is out.

If there is light, you may see dishes, bottles, books, lamps, plants and other items scattered across the floor and elsewhere. Furniture is toppled, curtain rods hang askew, windows are cracked or broken and walls and ceilings are cracked.

Plaster and ceiling tiles have fallen. Bricks from the chimney have come loose and fallen through the roof and ceiling.

Cleaning solutions from shattered bottles spread across the floor. Broken pipes spill water and the odor of natural gas fills the air.

Down the street, smoke pours from a house or apartment building that has caught fire.

Someone — perhaps another family member — has been hit in the head with a falling object or cut on the arm

- Overturned bookcases and other furniture.
- Fires because of broken gas lines and chimneys.
- Downed power lines.
- Human actions resulting from panic.

#### Emergency Response

Several large fires break out in the municipality as time progresses. Broken segments of underground natural gas lines add to the problem. Broken water pipes prevent some firefighting.

Disruption of electrical service and collapse of some radio towers hamper communications. Telephone service is lost temporarily. It is partly restored, but telephone communications are limited because of an overload of calls.

Injuries and deaths mount. Damaged bridges and overpasses cut off ground transportation. Strong aftershocks hamper search-and-rescue operations.

Mass shelters are needed to house a large number of people displaced from their damaged homes or afraid to re-enter them for fear of aftershocks.

Utility workers struggle for days to

### Everyone Is Wondering: What Will Happen To The Arch?

"What will happen to the Gateway Arch in an earthquake?"

That's a commonly asked question in St. Louis when quakes are discussed.

No one knows whether the Arch will withstand the force of a major New Madrid quake, says Kenneth Brill, professor emeritus of geology at St. Louis University.

The Arch's north-south orientation is more favorable than an east-west one because northbound New Madrid

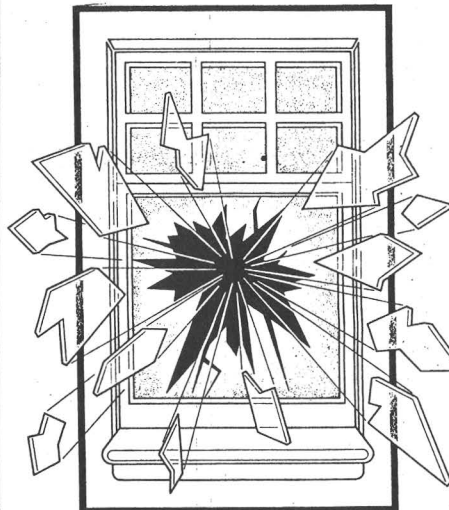
seismic waves are less likely to make the structure wobble.

The northern leg of the Arch was set firmly in bedrock, Brill said. But when drilling to set the southern leg, workers struck the first of many water-filled cavities in the rock.

They removed "huge areas of rotten limestone" and filled the cavities with concrete for support, he said.

— William Allen

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by glass.

According to the U.S. Geological Survey, injuries in a quake are most commonly caused by:

- Partial building collapse, including falling chimney bricks, interior and exterior walls, parapets, ceilings, light fixtures and pictures.

- Flying glass from shattered windows, especially in high-rise buildings.

## Old

From page Six

supply of charged batteries, battery rechargers, catheters and bladder pads. If toilets are out of order, catheters and bladder pads may be needed by those who don't normally use them.

- During the quake, if you are in your chair, roll into a doorway away from outside walls, lock the wheels and cover your head. If you are out of the chair, seek cover under a bed, desk or table.

## The Hearing-Impaired

- Before the quake, get extra flashlights, extra batteries for hearing aids, and pencils and paper. Store hearing-aid batteries at home and work. Put a pencil and paper at your bedside. Learn some basic hand signals for emergency communication.

- It is particularly important that you make arrangements before a disaster for neighbors and co-workers to

restore electrical, telephone, gas, water and sewer systems. Gas-company workers work for weeks going house to house to turn on thousands of gas lines turned off needlessly by homeowners.

State and federal emergency-response teams arrive in the area with food, water, medical assistance and search-and-rescue aid.

help you afterwards. Most people will rely on the radio for their emergency information. Someone will have to relay that information to you. Let emergency workers know you are unable to hear their instructions. They may not realize your plight and leave you behind.

## The Blind

- Before the quake, store extra canes at home and at work, even if you use a guide dog. Your dog may be injured or too frightened to respond. If you are diabetic, get extra insulin. Secure any objects that might fall and block your path. Put your emergency supplies in an accessible place. Practice several escape routes, as some may be blocked.

- After the quake, if you heard objects fall, check for obstructions. Use your cane. Ask others for help. If you are trapped, make noise. If the quake occurs at night and the electricity fails, you may be needed to lead your neighbors to safety.

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## EARTHQUAKE PREPAREDNESS

# Shocks: Children Have Trouble Handling Emotions

By William Allen

Of the Post-Dispatch Staff

*Many children . . . were awakened at 5:59 a.m. by a frightening shaking of the Earth, their beds rocking — sometimes moving across the room, furniture tumbling over, walls rattling, toys falling off the shelves. In many instances they saw their parents upset and frightened and perhaps clutching them.*

— Report on a 1971 earthquake in Los Angeles

Attention to a child's emotional needs is more important after an earthquake than after any other natural disaster, experts say.

A child's confusion, anxiety and other emotional reactions to an earthquake are often overlooked after a quake.

"There's no doubt that you have to deal with the physical safety of the child first," said Stephen Howard, a psychologist with the San Fernando (Calif.) Valley Child Guidance Clinic. "But after the safety has been established, something must be done about the emotional after-effects.

"The old feeling was that these fears were temporary, but we're now finding out that this is not so. Children may suffer emotional after-effects for some years to come."

Howard, a consultant to Los Angeles schools, cited a survey of children who went through a major quake in 1987 in Whittier, Calif. It showed that at least two years later many children still suffered anxiety generated by the

**"The old feeling was that these fears were temporary, but we're now finding out that this is not so. Children may suffer emotional after-effects for some years to come."**

STEPHEN HOWARD, psychologist, San Fernando (Calif.) Valley Child Guidance Clinic

quake.

The 1983 quake in Coalinga, Calif., left students with "fear of separation from their parents, fear of future disasters, apathy, regressive behavior, sleep disturbances and fear of natural events," according to a consultant's report. After the quake, students became afraid when big trucks rumbled past the school.

After the Oct. 17, 1989, Loma Prieta quake near San Francisco, mental health officials reported that some children became more aggressive, others more withdrawn.

Many were frightened by loud noises and quick movements — even curtains blowing in the breeze. This "hypervigilance" leads children to expect bad things to happen, said Robert Butterworth, a Los Angeles-based psychologist and

expert on earthquake-related mental health problems.

It also may lead to stomachaches and refusal to eat, go to the bathroom, bathe or go to school.

Experts with the American Red Cross and elsewhere recommend the following for parents and other adults concerned about children's reactions to an earthquake:

- Prepare the child in advance by holding earthquake drills, like the fire drills regularly practiced in schools. Such drills may create temporary anxiety but will lessen the long-term effects of a quake.

- Have family discussions about what to do in the home, school or anywhere else the child may be when an earthquake strikes.

- After a quake, reassure the child, but don't hide the fact that there

may be aftershocks. Parents should go to their children as soon as possible. Separation from parents is a much greater fear for children than physical harm.

- For a long time after the event, "There should be talk and talk and talk about what happened and how everyone feels," at home and in the school, Howard said. "We have made big mistakes in the past in not talking about it."

- If children are unable to discuss their earthquake fears, parents should encourage them to draw what they are feeling, "since young children have an easier time expressing feelings through drawing than through talking," Butterworth said.

- Parents should be aware of their own fears and uncertainty and of the effect these may have upon the child.

- Children who are more anxious than others can be allowed to sleep in the same room as another child or on a mattress in the parents' bedroom, but these arrangements should return to normal after a few days.

- Children should be included in post-earthquake inspection and clean-up activities. It is reassuring for the child to be involved with the parent in these tasks and to see that progress is being made in bringing the home back to order.

- If a child's sleeping difficulties, clinging behavior and other emotional problems continue, seek professional counseling.

**After the quake (1983, Coalinga, Calif.), students became afraid when big trucks rumbled past the school.**

# Before: Preparation Called Key To Prevention Of Psychological Problems

By William Allen  
Of the Post-Dispatch Staff

Psychological problems will be widespread and lasting if a major earthquake strikes the St. Louis region, psychologists say.

The best way to beat these problems of the mind is to do what experts say should be done in the home, school and office before a quake: Prepare.

People often get warnings of tornadoes, floods, fires and other disasters, said Stephen Howard, a psychologist with the San Fernando (Calif.) Valley Child Guidance Clinic. That makes it possible to escape or hide, which alleviates fear that may linger after the disaster.

"But earthquakes come suddenly and unexpectedly," said Howard, who counsels quake victims. "There is no way to hide, no way to escape, no way to do anything. So the fear is much greater."

Those who will be in the most vulnerable mental state after a major quake are those who saw the death and destruction it caused, psychologists say. Also likely to experience difficulties are those who

are normally anxious and those who are most dependent on others — the very old and very young.

Adults may be depressed and preoccupied with earthquakes. Many phobias can surface. People become afraid to drive on expressways and bridges, ride on elevators or walk near tall buildings.

Survivors overcome with grief or hysterical with fear will swamp emergency hotlines with calls or will report to hospitals.

"If someone in the family has been hurt, that just complicates things," said Robert Butterworth, a Los Angeles psychologist who has treated people who suffered emotional problems after earthquakes.

A wide range of quake-related psychological problems has been reported to mental-health agencies since the earthquake in the San Francisco area on Oct. 17, 1989.

"Adults have been spending sleepless nights, feeling jumpy and numb, finding themselves unable to concentrate, and some are feeling so hopeless that they are immobilized," reported Linda Fain and Diane Myers of the California De-

See PSYCH, Page 9

## ARE YOU PREPARED FOR AN EARTHQUAKE

We have compiled a complete and comprehensive guide to help you prepare. We've focused on children and family, such as:

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- INFANT, CAR AND WORK KITS
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## EARTHQUAKE PREPAREDNESS

### Psych

From page Eight

partment of Mental Health.

Some people are angry and anxious, because personal activities and relationships were disrupted by the quake. Many are grieving over the loss of loved ones, friends and prized possessions.

Within two months of the quake, department psychologists had seen more than 35,000 people with psychological problems in the seven counties hit by it. State mental health officials had held about 1,700 group counseling sessions.

Many rescue workers also had succumbed to the stress of toiling for long hours in traumatic

circumstances.

At government centers where people applied for financial assistance, some quake victims displayed "unusually intense" emotions, Fain and Myers wrote in a recent issue of a San Francisco area earthquake-preparedness newsletter.

As people made a complete list of their losses for the first time, "many began finally to express their grief and anger," they wrote. Also, "as people realized that there were limitations on the amounts and kinds of losses covered — as well as on their own eligibility — they started to manifest anxiety and fear over finances and general frustration about nearly everything."

That is a typical reaction, Butterworth said. After a quake, most peo-

**“People often get warnings of tornadoes, floods, fires and other disasters. But earthquakes come suddenly and unexpectedly. There is no way to hide, no way to escape, no way to do anything. So the fear is much greater.”**

STEPHEN HOWARD, psychologist with the San Fernando (Calif.) Valley Child Guidance Clinic.

ple feel relief at coming through without personal injury, "but then the reality sinks in that it does matter that your home and possessions are damaged," he said.

What can be done to heal the psychic wounds caused by a quake?

"The main thing is to talk about it

afterwards," Butterworth said. "People sometimes feel after it happens that they're the only ones to feel this way, and they're afraid to talk about it."

People who live in earthquake-prone areas can go a long way toward preventing such problems by

thinking ahead of time what they'll do in a quake — wherever they may be.

"The biggest problem that people have in Los Angeles during an earthquake is that they freeze or panic," Butterworth said. They either don't know or don't remember what they're supposed to do.

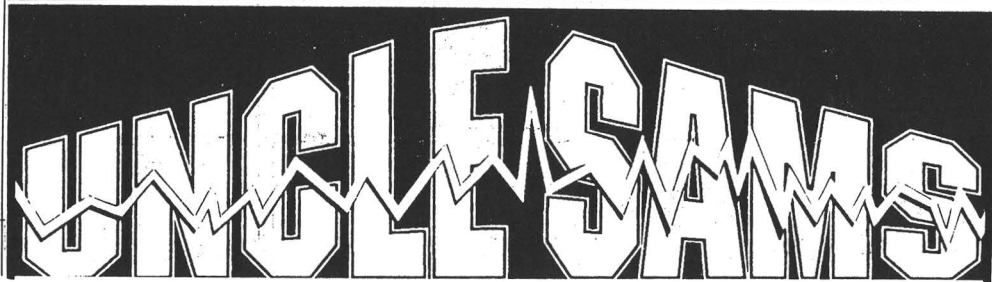
To avoid this situation, earthquake experts suggest regular practice of what you and your family will do in a quake — whether it strikes in the middle of the night or during the day, when parents and children are separated.

"It's basically the same principle as teaching fire drills in school," Butterworth said. "We hope that when a quake strikes, you will go on autopilot and do the right thing."

### Quake Quotes...

Here are comments from people who experienced the Oct. 17, 1989, earthquake in the San Francisco area.

- "People ran. It reminded me of those old Western movies where someone fires a gun at a herd of cattle and they stampede."
- "I feel like I've been run over, like I've been flattened."
- "You couldn't get your balance."





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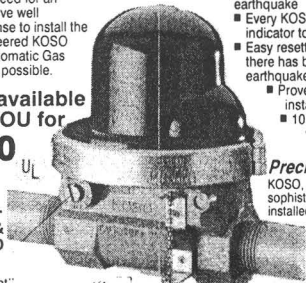
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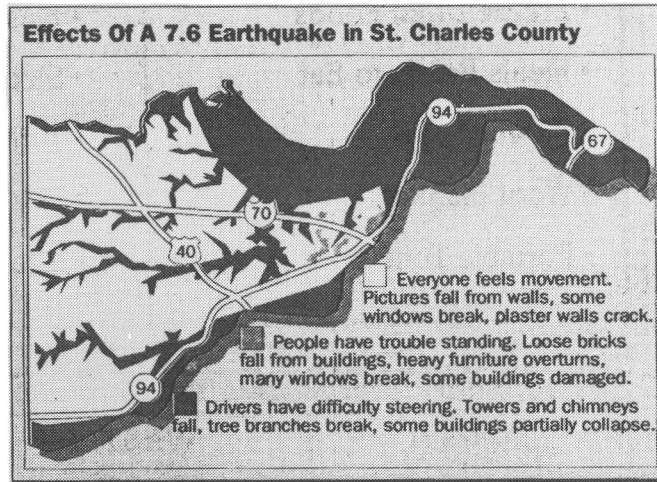
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# Built On Sand: Soil Type One Of 3 Major Factors In Amount Of Damage Done To Buildings In Earthquake

**A**mong the areas in the St. Louis region most threatened by liquefaction are those in the floodplains of the Mississippi, Missouri and Meramec rivers, experts say.



Source: Soil Consultants, Inc.

Post-Dispatch Map

By William Allen  
Of the Post-Dispatch Staff

**W**HETHER YOUR home is damaged by an earthquake depends on three main factors: the intensity of the ground motion that strikes the building, the structure of the building and the kind of ground on which it stands.

Since soils vary greatly by location — even within the St. Louis metropolitan area — the earthquake risk also varies greatly.

“It’s like the old Biblical saying where the building built on sand collapses before the one built on rock,” says Kenneth Brill, professor emeritus of geology at St. Louis University.

Structures built on rock can still be susceptible to collapse. Those built on bedrock “tend to sway with the bedrock,” but the ones on loose soils “are going to have more trouble,” Brill said.

Loose soils cause trouble for two main

Earthquake risk is also high in areas with steep slopes prone to landsliding and scattered areas with loose soils.

Houses and other buildings may be threatened by other underground dangers as well. They include natural clay deposits, abandoned mines, landfills and sinkholes.

Few of these hidden threats are recorded on existing maps in St. Louis, officials say.

The maps that exist for the bistate region are fairly rough, especially when compared with detailed soil hazard maps prepared for much of the San Francisco Bay area.


The maps for the bistate region match broad areas of different soil types with the expected intensity of a quake. They are called Mercalli intensity maps.


The Mercalli maps show what people in different areas are likely to feel in earthquakes of various magnitudes, as well as


**“It’s like the old Biblical saying where the building built on sand collapses before the one built on rock.”**

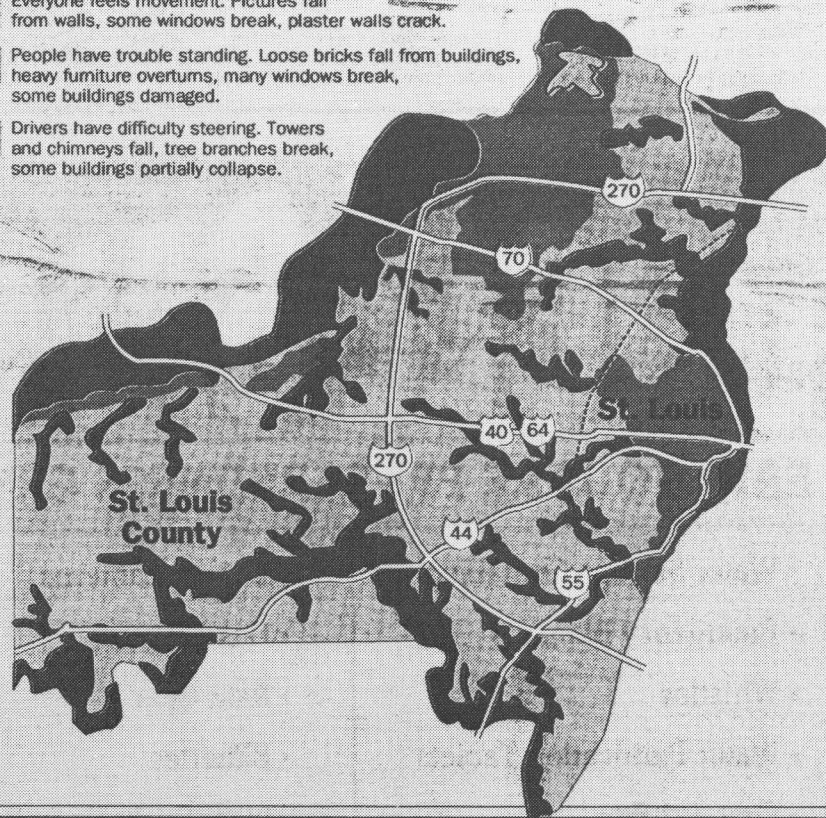
**KENNETH BRILL,**  
professor emeritus of  
geology, St. Louis U.

## Effects Of A 7.6 Earthquake In St. Louis County And City

 Everyone feels movement. Pictures fall from walls, some windows break, plaster walls crack.

 People have trouble standing. Loose bricks fall from buildings, heavy furniture overturns, many windows break, some buildings damaged.

 Drivers have difficulty steering. Towers and chimneys fall, tree branches break, some buildings partially collapse.



reasons: liquefaction and settling.

Liquefaction is the term commonly used to describe how water-soaked soils become liquid-like in a quake. And, like instant quicksand, they no longer support the structures built on them.

Most liquefaction in a quake occurs on river flats and along shores, where water is just beneath the soil surface.

"If the soil is dry and the water table considerably deeper, the liquefaction factor is not so important," Brill said. In that case, a quake shakes the soil down as air pockets between soil particles are moved around.

Among the worst scenes of destruction in the Oct. 17, 1989, quake in northern California were in San Francisco's affluent Marina district. There, soft soils and filled land near the edge of San Francisco Bay liquefied, leading to the destruction of many buildings.

That destruction occurred even though the Marina District was more than 50 miles north of the quake's center. And in California, earthquake forces travel far shorter distances than in the central states. Soils in California tend to dissipate those forces faster than in the Midwest.

Among the areas in the St. Louis region most threatened by liquefaction are those in the floodplains of the Mississippi, Missouri and Meramec rivers, experts say.

what kinds of damage may occur. For example, the map of the St. Louis region shows that on the river floodplains, some buildings will partially collapse, tree branches will break and towers and chimneys will fall during a quake of 7.6 on the Richter scale.

The best available Mercalli intensity maps of the bistate region accompany this story. No close-up map of other counties in the metropolitan area exists, experts said.

But the maps are too general in many cases to tell just where a vulnerable area begins and a less dangerous area ends.

More detailed information may be available from some local government planning offices or building departments.

But, according to the U.S. Geological Survey: "Even reasonably detailed maps give only an overview of potential for shaking, liquefaction, landsliding, faulting and damage. To be sure about a particular building site, you should consult an engineering geologist, geotechnical engineer or foundation engineer."

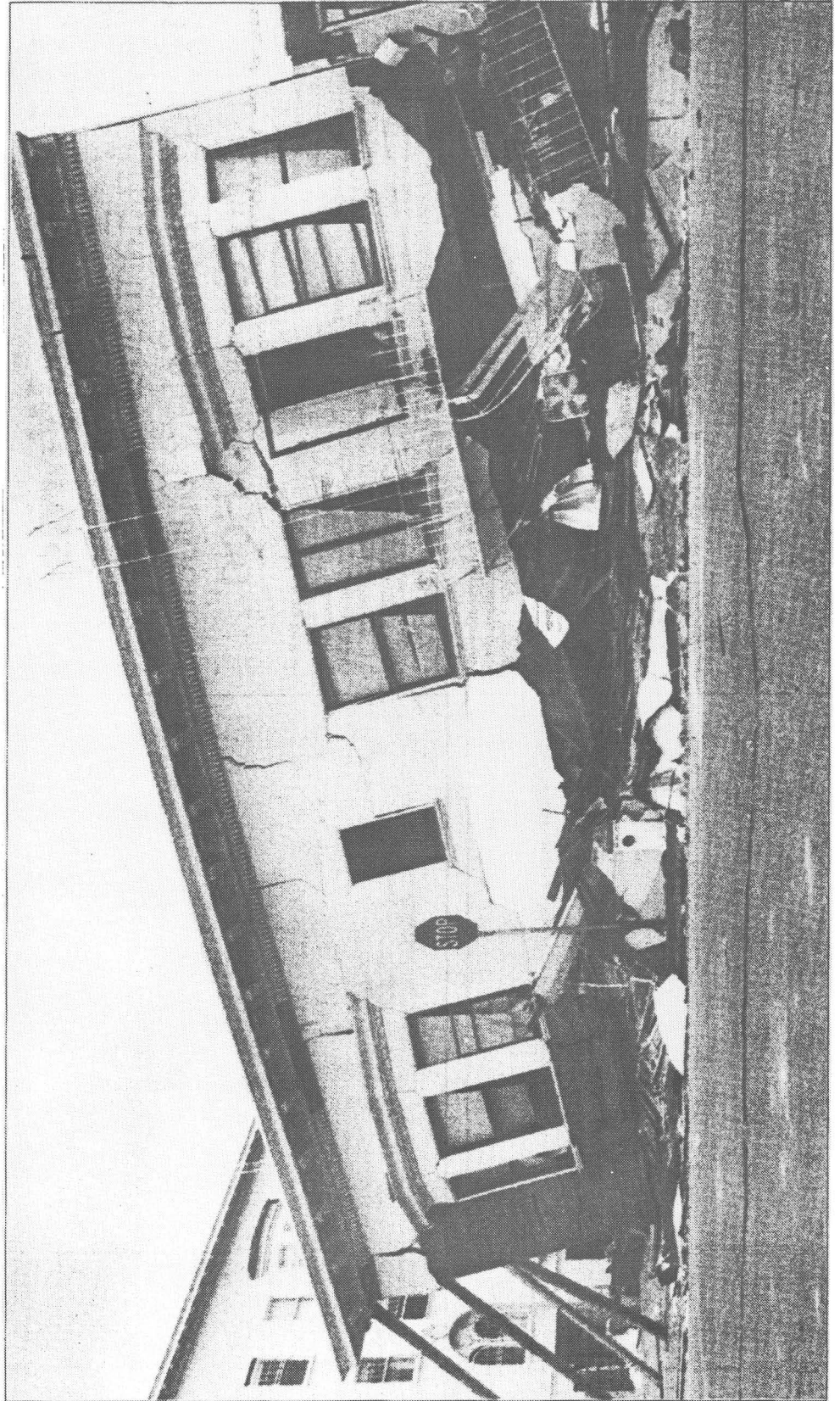
**Detailed maps** like those for California don't exist in Missouri and Illinois mostly because earthquake hazards have been ignored by the general public and most officials until recently. While California has been preparing for quakes at least since the great San Francisco quake of 1906.

Source: U.S. Geological Survey

Post-Dispatch Map

ST. LOUIS POST-DISPATCH, OCTOBER 28, 1990 11H




**PREPAREDNESS**



## Predicted Impact Of Earthquake






6.7 on  
Richter  
Scale

-  Almost everyone feels movement. Doors swing open, dishes break, some windows crack.
-  Everyone feels movement. Pictures fall from walls, some windows break, plaster walls crack.
-  People have trouble standing. Loose bricks fall from buildings, heavy furniture overturns, many windows break, some buildings damaged.



7.6 on  
Richter  
Scale

-  Drivers have difficulty steering. Towers and chimneys fall, tree branches break, some buildings partially collapse.
-  Most buildings seriously damaged, houses not bolted down move off foundations, the ground cracks.
-  Most masonry and frame structures destroyed. Some bridges are destroyed. Large landslides occur. Cement pavements and asphalt roads crack open.

Source: U.S. Geological Survey

Post-Dispatch Map by Tom Borgman

J.B. Forbes/Post-Dispatch  
A home in the Marina district of San Francisco toppled sideways after being knocked off its foundation.

Years ago the district was a swampy area that was filled in with landfill and was developed with no solid foundation

The quake rocked the area with actual waves as if it were a lake.

'EARTHQUAKE'



PREPAREDNESS

# 3 Lifesaving Words:

## When An Earthquake Strikes, Experts Say, A Safety Guideline Is To 'Drop, Cover And Hold'

By Tom Uhlenbrock  
Of the Post-Dispatch Staff

**W**hat can you do during an earthquake to help improve your chances of riding it out unharmed?

Scenes captured on security video cameras during the 1989 quake in the San Francisco area show the frightening quickness with which a quake strikes.

People are rolling shopping carts down supermarket aisles or sipping drinks in bars, when, suddenly, the earth is shaking and items are falling off shelves.

Public safety experts recently criticized one publication that advised people to "get outside" at the first sign of an earthquake. Moving from one room to another may be difficult, if not impossible, during a quake.

A mad dash outside makes you all the more vulnerable to falling objects — the main source of death and injury during a quake.

Having some idea of how to seek protection where you are will help avoid panic. Remember the first rule of safety — stay calm.

□

**Here is what experts advise if you are:**

**In your home:** Drop down under a sturdy table or desk or bed and stay put until the

best method to prepare for a quake is to conduct drills in each room of your home, identifying the safety spots and the hazards. Yell "EARTHQUAKE!" during monthly drills, and actually move to the safe position.

**Outside:** Move away from chimneys, walls, tall buildings, trees and power lines. The greatest danger is falling objects such as bricks or cornices. Stay in an open area until the shaking stops.

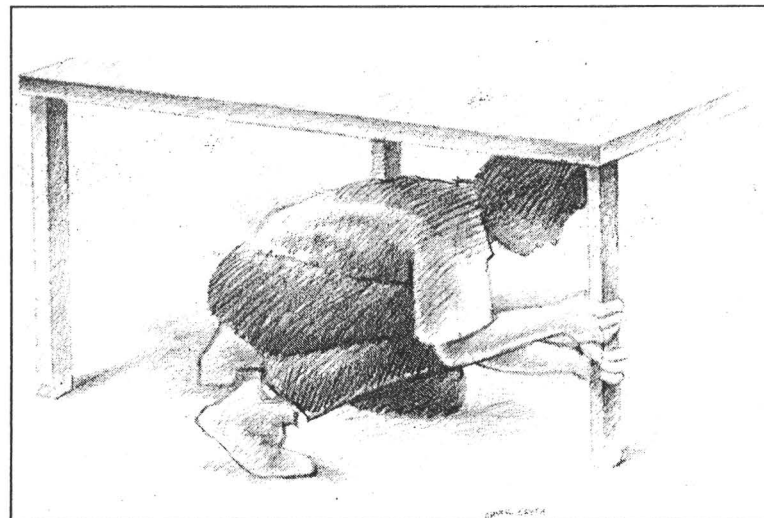
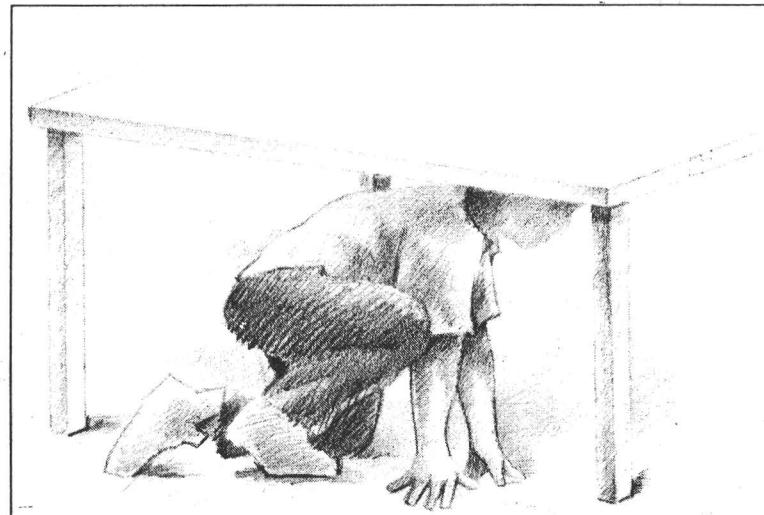
**In a moving car:** Steer to the shoulder of the roadway and away from underpasses, over-

passes and bridges. Stop in a safe place as quickly as possible — away from tall buildings and other structures — and stay in the car. The car may shake violently on its springs, but it offers protection. If you must resume driving, watch for fallen objects, downed power lines and broken or undermined roadways.

**In your office:** Duck under a sturdy desk or table. Avoid overhead light fixtures that might fall.

**In school:** Take cover under a desk, counter or

table and remain there silently until told to evacuate. Move away from windows, aquariums, light fixtures, trophy cases and other hazards.



shaking is over. If the desk or table moves, hold onto it. The key words are drop, cover and hold.

If no protection is available, move to a supported doorway or archway. Beware of heavy doors that might swing during a quake. Another alternative is to brace yourself against an inside corner.

Stay clear of windows or mirrors that might shatter, and avoid tall bookcases and other furniture that might topple. Avoid heavy hanging objects such as light fixtures or plants, and move away from fireplaces.

A hallway often is a safe spot because it is free of furniture and hanging objects.

Kitchens and garages may be dangerous because they often are filled with objects on shelves or heavy appliances.

If in the kitchen, turn off the stove, if possible, before seeking cover.

**In a supermarket or other commercial building:** Seek protection under a table or counter or against an inside wall, if possible. If not, drop, tuck and protect your head. Move away from windows and display shelves. Do not rush for exits or doors. Many injuries occur when people panic and try to leave at the same time. Do not use elevators or stairways.

**In a high-rise building:** Stay in the building, on the same floor. Get under a desk and stay away from outside walls and windows. Do not use the elevator. □

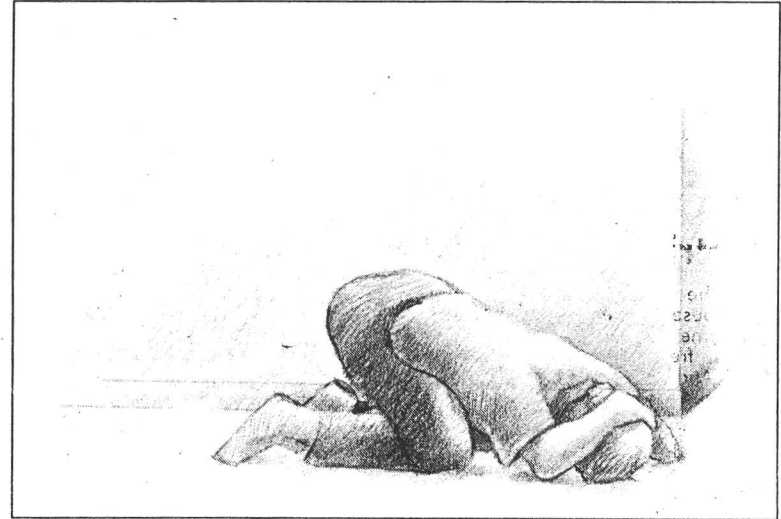
After the initial quake is over, be prepared for aftershocks. These may be strong. Seek cover again if necessary.

Do not use matches, candles or open flames until you have determined there are no gas leaks.

---

**S**tay clear of windows or mirrors that might shatter, and avoid tall bookcases and other furniture that might topple. Avoid heavy hanging objects such as light fixtures or plants, and move away from fireplaces.

---



Source: U.S. Geological Survey

Post-Dispatch Illustration by Chuck Groth

### What To Do In A Quake

Experts recommend that you "drop, cover and hold" when a quake strikes. Duck under a strong table or desk. Hold onto it and be prepared to move with it. If no table or desk is available, one option is to cover your head and face to protect them from broken glass and falling objects.

## EARTHQUAKE PREPAREDNESS

# Forecasts: As A Science, Earthquake Prediction Is In Its Infancy; But We Have Been At It For Years

By William Allen  
Of the Post-Dispatch Staff

Thousands of panicky Los Angeles residents fled that city in May 1988 because of an earthquake prediction, even though it was loosely based on a prophecy made 300 years before by the French fortune-teller Nostradamus.

The fleeing Angelenos wasted their time. The quake didn't happen.

Nostradamus made no prophecy for the New Madrid fault. But Missouri and Illinois residents within reach of the fault's power should know something about earthquake predictions so they can be ready for such pronouncements — whether from quacks or scientists, emergency-preparedness officials say.

That knowledge would be useful in assessing predictions like the controversial one made by New Mexico climatologist Iben Browning. Browning has predicted a 50-50 chance of a damaging quake in the New Madrid fault around Dec. 3.

Earthquake experts have attacked Browning's prediction and his method for making it, calling them "scientifically invalid." They also refuted his claim of a record of successful quake predictions, saying no evidence existed that he had made them in advance.

Earthquake prediction is still in its infancy. Scientists issue statements about the long-term probability of major earthquakes in specific fault zones, but short-term warnings are more of a goal than a reality.

Even if short-term warnings were

### The idea that animals may be able to sense an impending quake has been studied . . . in China and Japan, but Western scientists are skeptical.

perfected, they would warn only that the chance of a quake within a certain period had increased — not that a quake was certain. Still, many researchers believe that short-term predictions will be useful one day in lessening the death and damage from major quakes.

Scientists have predicted small quakes in California, New York and South Carolina with some degree of accuracy. Researchers in China and the Soviet Union also have claimed some success. But for each success, there are many failures.

An aura of folklore and snake oil also surrounds earthquake prediction. Some people claim to predict quakes with psychic ability; others use unproven or simply unreasonable methods.

Scientists generally dismiss such claims. The U.S. Geological Survey recommends that people consider these points when assessing quake predictions:

- Determine if the statement was made by a scientist from a reputable organization.

- Ask if the statement has been reviewed and endorsed by the National Earthquake Prediction Evaluation Council, a panel of the nation's leading

seismologists.

- Evaluate how much risk you and your family are likely to face during the anticipated quake.

### Looking For The Answers

Scientists once believed they were close to unlocking the secrets of quake prediction.

"But that optimism died out in the late '70s," said Brian Mitchell, chairman of earth and atmospheric sciences at St. Louis University. "It turns out to be a much more complicated problem."

The idea that animals may be able to sense an impending quake has been studied enthusiastically in China and Japan, but Western scientists are skeptical. Animals may be sensitive to changing electrical and magnetic fields, which may precede some earthquakes. Some people also report ringing in their ears or a sense that a quake is about to happen.

But many questions about these phenomena remain. Scientists generally agree that a sounder basis for prediction can be found by studying the physical changes that occur around faults before a quake. These include changes in the strain in the

rock, water levels, water chemistry, heat flow, magnetism, electrical potential and seismic waves.

Researchers have mounted an intensive experiment in Parkfield, Calif., where they have set up a battery of sensitive instruments at the San Andreas Fault in an attempt to detect signs of a quake days in advance.

If successful, the Parkfield Prediction Experiment could open the way to predicting quakes in any major fault where earthquakes are expected, including the New Madrid Fault. Even so, more study of New Madrid is needed, because it has many unusual characteristics.

To understand the fault better, St. Louis University scientists monitor a network of more than 40 seismic stations in the central United States. They also study water well levels in the New Madrid region, attempting to discern a relationship between them and earthquakes. To date, no link has been discovered.

Even if scientists learn to detect signs of impending quakes, prediction still will be a thorny issue. That is because it still would involve the same levels of uncertainty, risk and potential costs and benefits as hurricane and tornado warnings, social scientists



**Iben Browning**  
*Attacked by the experts*

say.

In all such decisions, officials must consider the consequences of causing needless panic and economic and personal disruptions if the prediction proves unfounded.

"But scientists and officials agree that any reliable information about an impending earthquake needs to be released rapidly, with an evaluation of how much is and isn't known," said Peter Ward, a seismologist with the U.S. Geological Survey in Menlo Park, Calif.

"Ultimately, it's up to the citizenry to decide," Ward said.

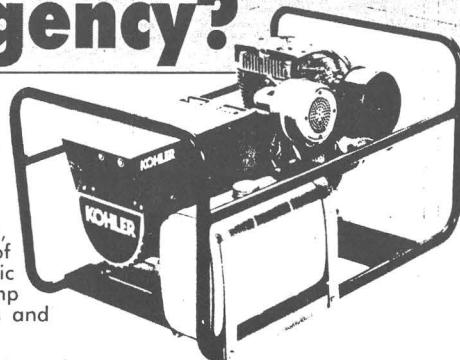


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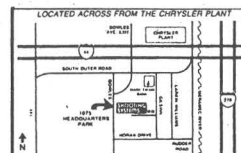
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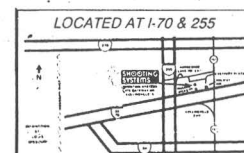
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## EARTHQUAKE PREPAREDNESS

# After The Quake: What To Do In Your House, On Your Block

By Tom Uhlenbrock  
Of the Post-Dispatch Staff

The quake is over. You've survived, but your house and neighborhood are in shambles. What's next?

The first thing to remember is that the episode may not actually be over. Be prepared for aftershocks that may be strong. Take cover if the shaking begins again.

If you have sturdy shoes available, put them on and calmly move out of the house. You should already have an evacuation plan and a pre-arranged meeting place for family members outside.

If you are trapped inside, be ready to make as much noise as possible to attract rescuers.

Inside or out, check for injuries and apply emergency first aid. Do not attempt to move seriously injured people unless they are in immediate danger of further injury.

If there are no serious injuries, place a sign outside the house saying "All OK," so emergency crews can concentrate on other houses.

Assuming you are free to move about, disaster planners suggest these steps after an earthquake:

**Examine the exterior of the house:** Do not re-enter a dwelling that has been severely damaged. If you must evacuate, leave pets in a secure place. They will not be allowed in emergency shelters. Leave a note on the house saying where you are going.

**Put out fires:** Small fires should be extinguished quickly if this can be done without risking personal safety.

**Check for gas leaks:** Do not use a match, candle, cigarette lighter, open flame, electrical appliance or

**You should already have an evacuation plan and a pre-arranged meeting place for family members outside.**

light switch until you are sure that no gas is leaking. A light switch can trigger an explosion.

If the odor of natural gas is detected, if there is a sound of escaping gas or if the meter is registering a high discharge, turn off the gas at the meter.

**Caution:** Do not turn off the gas supply unless you believe there is a leak. Once turned off, gas service must be restored by the gas company — and that could take days, or even weeks, in a disaster situation.

Check your furnace, water heater and other gas appliances to make certain they have not been damaged.

Before using the furnace or water heater, check chimneys and flues for cracks, and clear them of any fallen bricks, mortar or other obstructions. Use caution in approaching a chimney that may be weakened.

**Check wiring:** Shut off electrical power if the wiring is damaged. Check for downed power lines, and report them to the utility company.

**Clean up spills:** Medicines, drugs, cleaners, insecticides and other potentially harmful materials should be cleaned up and properly disposed of, if spilled or in damaged containers.

**Check water lines:** If leaks are found, turn off the water where it enters the building.

**Check closets and cabinets:**

Open closet and cupboard doors carefully; watch for leaning objects that could fall.

**Obtain drinking water:** If no bottled water has been stored, get emergency water supply from water heaters, the holding tank in toilets (but not in the bowl itself), melted ice cubes or canned foods packed in water.

A building's plumbing system will hold water after the line is shut off. Close all faucets in the building, except the highest and lowest ones, to set up a gravity flow out the lowest faucet.

If the water heater is damaged, do not use the water; it may contain glass fragments.

If undamaged, a water heater may hold 30 to 50 gallons of usable water. Turn off the heater, and drain the water through the spigot at the bottom of the tank. To obtain a freer flow of water, it may be necessary to open a valve near the top of the unit.

Even if your water service does not appear to have been disrupted after an emergency, the tap water may not be safe for drinking. Do not assume water is safe, even if it is clear and odorless.

To purify questionable water, pour it through cheese cloth or several layers of clean cloth to remove sediment.

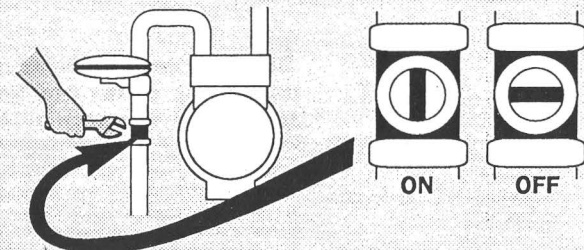
Boil water vigorously for three to five minutes. Aerate it to improve taste by pouring the boiled water from one container to another several times.

If boiling is not possible, use iodine or halazone purification tablets if available, following the directions on the package.

Household liquid chlorine bleach may be used to purify water. Add two drops of bleach per one quart of water

See STOP, Page 15

### Emergency Measures For Utility Services

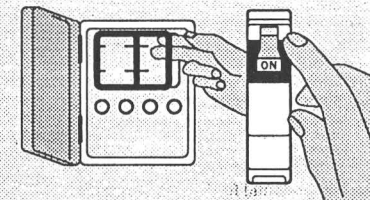


#### Gas:

Gas should be shut off only if there is a leak. The main shut-off is located next to your meter on the inlet pipe. Using a wrench, give the valve a quarter turn in either direction so that it runs crosswise on the pipe. The line is now closed.

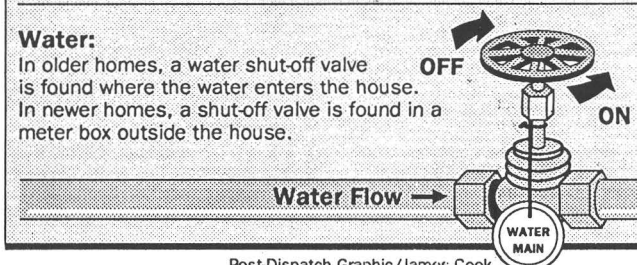
#### Electricity

Instruct responsible family members how to turn off the electricity at the main switch.



#### Water:

In older homes, a water shut-off valve is found where the water enters the house. In newer homes, a shut-off valve is found in a meter box outside the house.



Post-Dispatch Graphic/James Cook

## Aftershocks May Occur For Weeks And Months

In the weeks and months after a strong earthquake, many aftershocks can be expected. Some may be strong enough to damage structures already weakened in the main shock.

Technically, an aftershock is any earthquake that follows on the heels of the first one.

"Usually the aftershocks are smaller than the main event, and they decrease in number and magnitude as time goes on," said Brian Mitchell, a seismologist at St. Louis University. "The larger the earthquake, usually the larger the aftershocks and the larger the number of aftershocks."

But no one can precisely say what to expect in the New Madrid Fault because the last major quake on the fault was in 1895, before any seismographs to measure earthquake patterns were in place.

Because of the danger of large aftershocks, removal of belongings from damaged buildings may have to be delayed, according to the U.S. Geological Survey.

The three great New Madrid earthquakes of 1811-12 were followed by a total of at least five aftershocks of Richter magnitude 7.7 and at least 10 of magnitude 6.7., scientists say.

— William Allen

# Damaged Property: A Checklist Of Some Things To Remember Before The Insurance Adjuster Arrives

By Jerri Stroud  
Of the Post-Dispatch Staff

**E**mergency and public safety officials say residents could be "on their own" for three days to a week if a major earthquake occurs in the St. Louis area.

But as utility companies begin to restore power and public services begin to be available, it will only signal a start for residents who will need to begin putting their homes and lives back together.

For many residents, their losses will be uninsured. Most homeowners' insurance policies don't include earthquake insurance, said David Chartrand, a spokesman for the Insurance Information Institute.

Some earthquake insurance policies don't cover repairs to decorative treatments such as brick veneer on a frame house. Both earthquake insurance and insurance for items such as brick veneer are separate riders that homeowners must request if they want them.

For those who do have insurance, a quick call to their insurance agent or adjuster is in order. If a resident's home is uninhabitable,

---

**A** adjusters often go door to door to inspect damage. They may skip properties when they can't determine who owns them.

---

residents should tell the agent where they can be reached.

Here are some other tips on getting organized after a quake:

- Report damage to insurers before making major repairs.
- Minimize additional damage to the home. Some policies cover emergency repairs. But even if a policy doesn't cover such repairs, it usually requires homeowners to take steps to prevent more damage.

If the initial shock or aftershocks shatter windows, collapse walls or cause roof leaks, homeowners need to cover any gaping holes

to prevent water damage and discourage looting. Chartrand said residents should keep receipts for the cost of emergency repairs, which often will be covered by insurance.

■ If your home is uninhabitable, post signs in windows, in yards or on the home. Signs should include name, insurance company and where the owner or occupant can be reached.

After major disasters, adjusters often go door to door to inspect damage, Chartrand said. They may skip properties when they can't determine who owns them. Residents should ask for proper identification if an adjuster comes to their home.

- Keep an inventory or a videotape of your home's contents. That will ease the process of collecting from insurance companies. Keep a duplicate inventory, videotape or pictures at work or in a safe deposit box.
- Check with friends, the Better Business Bureau, bankers or insurance companies before hiring anyone to make repairs. People should be especially wary of contractors who want payment before they do any work.

ST. LOUIS POST-DISPATCH, OCTOBER 28, 1990

15H

EARTHQUAKE  PREPAREDNESS

# Lifeline: Even Moderate Quake Could Cut Off Homes' Utilities

By William Allen  
Of the Post-Dispatch Staff

**A**n earthquake that would cause only moderate damage to buildings in the St. Louis region still could have a devastating impact on water, electrical and telephone lines, scientists say.

Such an event could leave thousands of people without water for days and firefighters unable to control blazes. People might be unable to communicate with loved ones about their conditions, and businesses would be closed for weeks. If the earthquake struck in winter, it could leave homes without heat.

## Stop

From page Fourteen

if the water is clear, four drops if the water is cloudy.

One gallon gets eight drops of bleach if clear, 16 drops if cloudy.

Experts say a quake of magnitude 6.3 on the Richter scale in the New Madrid fault zone could disrupt the so-called utility lifeline systems.

In a major quake, many pipelines that carry water, sewage, natural gas and petroleum products would break; telephone lines and switching equipment would fail; and electric power would be disrupted when transmission lines and relay stations were destroyed.

Especially hard hit would be old pipelines in the city of St. Louis.

Utility lifelines are more vulnerable than buildings because they are so long and they go through risky areas, experts said.

Experts said there are ways to "mitigate," or lessen, the potentially devastating effects.

Examples include anchoring electrical transformers, joining pipes to storage tanks with flexible connections and designing water systems so that water can get to any given point from several routes.

John Masek, a consulting engineer

**Although phone service may be widely disrupted at first, restoration time could be significantly shorter than that required for other utility systems.**

with Dames & Moore in Santa Ana, Calif., said government and industry leaders, with assistance from earthquake engineers and other experts, should approach earthquake mitigation and preparedness in a measured way. Adequate preparations, although potentially costly, are necessary, effective and good investments.

"If this can be approached from a realistic standpoint, we can save a lot of lives," he said.

A report issued this summer by the Federal Emergency Management

Agency on the impact of a major quake in St. Louis city and county noted:

■ The region's electrical system is most essential to recovery and most susceptible to earthquake damage. Switchyards and transformer stations are most vulnerable. Electric power loss will have a great negative impact on all other utility systems.

■ Although phone service may be widely disrupted at first, restoration time could be significantly shorter than that required for other utility systems. Emergency communications systems are expected to remain partially available even under worst-case conditions.

■ The natural gas system and the electric system represent significant hazards if damaged, especially during winter and when located near one another.

■ Failure of sections of the interstate natural gas pipeline system is likely during a major quake, particularly at river crossings. These systems

generally have parallel pipelines that can be isolated easily, so operators may be able to close certain valves and still maintain service. But the possibility exists that all large lines serving a region may be broken.

■ Loss of the water system will severely handicap post-earthquake fire-fighting efforts and cause personal hardship.

■ All of the wastewater treatment facilities in the St. Louis region are located along rivers where the soil types are the most susceptible to differential settlement during a quake. Damage to these facilities and their discharge piping could cause serious public health problems in the region and threaten the communities downriver that depend on the Mississippi River for water supply.

■ Buried pipelines are more vulnerable to such hazards as landslides and liquefaction than they are to ground shaking. Their vulnerability depends largely on the material, age, depth, thickness and diameter.

Five gallons takes a half-teaspoon if clear, one teaspoon if cloudy.

**Check food supply:** If the electricity is off or has been off, use perishable foods and food from the refrigerator first. Use foods in the freezer second; food in a well-insulated freezer will not spoil for several days. Open the freezer as seldom, and as quickly, as possible.

With no electricity, charcoal or camp stoves may be used outside.

Candle warmers, chafing dishes and fondue pots may be used for cooking.

Canned foods may be heated in the cans, after removing the label and opening the can.

Do not eat or drink anything from broken glass containers. Liquids may be strained through a clean cloth if there is a danger of glass fragments.

**Check sewage lines:** Avoid flushing toilets if sewage lines appear to be damaged.

If sewage lines are broken, set up a sanitary waste-disposal system. Plastic trash bags may be used to line a toilet bowl to collect waste. Following use, add a small amount of disinfectant and seal the bag. If water is available, a solution of one part liquid chlorine bleach to 10 parts water makes an effective disinfectant.

A plastic bag in a bucket may be substituted for the toilet bowl.

**Telephones:** Put your phone back on the hook if the quake has shaken it off — unhooked phones can contribute to clogging the phone network. Do not use telephones — including cellular phones and CB equipment — unless there is a genuine emergency. They probably will be jammed and needed for true emergencies. Use a portable radio for damage reports.

Report downed power lines and gas leaks to utility companies when possible.

**Do not go sightseeing:** Roadways will be busy with emergency vehicles. Stay away from damaged areas unless authorities request help. Don't spread rumors.

# Shaken: 7.6 Quake Would Kill 270 Here, Report Estimates

**A** daytime earthquake registering 7.6 on the Richter scale on the northern end of the New Madrid fault would kill 270 people in St. Louis city and county and seriously injure more than 1,000, a federal report estimates.

The quake would leave 200,000 people homeless and cause more than \$2 billion in damage to buildings if it struck during the day, according to the report from the Federal Emergency Management Agency. The report was released last summer.

A more powerful but less likely

quake — 8.6 on the Richter scale — would kill 1,400 people and seriously injure more than 4,500 in the city and county if it hit in daytime, the FEMA report said. That quake, which would be a repeat of one of the great New Madrid earthquakes of 1811-12, would leave nearly a half-million people homeless and cause more than \$5 billion in damage to buildings.

Slightly fewer casualties could be expected if the temblor struck at night, when more people are generally in safer buildings.

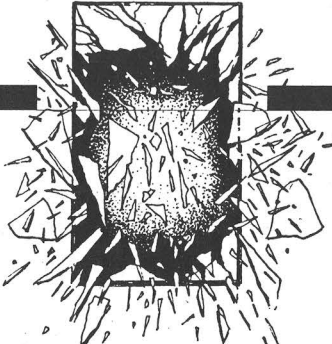
Regardless of the magnitude, about

one-fifth of the dead and injured would be school children if the quake struck during school hours.

About 98 percent of the casualties would be in unreinforced masonry buildings. Unreinforced masonry construction comprises 80 percent of the buildings in the city and 30 percent of those in the county, the report said.

The authors of the report recommended that government agencies identify the thousands of "high-risk buildings" where casualties are most likely to occur and evaluate the vulnerability of highways, bridges and rail lines.

— William Allen




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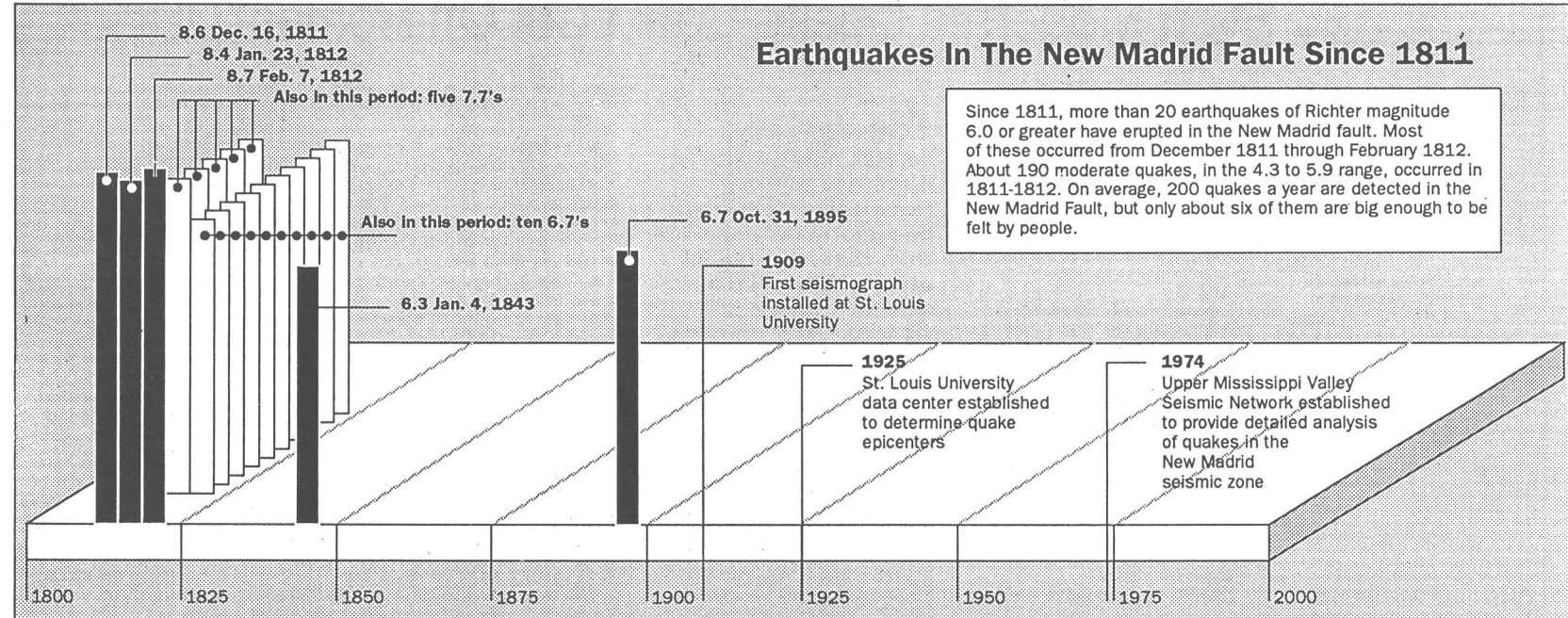
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# EARTHQUAKE PREPAREDNESS



Source: St. Louis University

Post-Dispatch Graphic by Tony Lazorko

# Geology: New Madrid Fault Is Different From Those Of The West Coast

By William Allen  
Of the Post-Dispatch Staff

**W**hat is the New Madrid Fault and why is it threatening to do terrible things?

The fault is a series of cracks deep in the Earth's crust. Seismologists say the fault zig-zags for more than 100 miles from northeastern Arkansas, through the Missouri Bootheel and into the southern tip of Illinois.

Unlike the San Andreas and other famous faults in California, the New Madrid Fault cannot be seen. It lies 10 to 12 miles beneath the land surface under ancient ocean and river sediment, bed-rock and part of the Earth's upper crust.

**Witnesses said the land rolled like ocean waves, huge crevices opened in the soil.**

It also works differently than the San Andreas. The California quakes are caused when the edges of two plates of the Earth's crust crunch as they move past each other.

The New Madrid Fault lies in the middle of one of those plates. The cracks are part of a rift in the crust that developed more than 500 million years ago when one of those plates, known as the North American plate, tried to pull apart. The rift is a weak spot in the crust.

Today, the New Madrid Fault bears the brunt of geologic forces pushing from the east and west, said Brian Mitchell, chairman of earth and atmospheric sciences at St. Louis University. The pushing increases stress on the fault.

"These stresses build up over long periods of time and eventually earthquakes occur," Mitchell said.

The immense natural power of a major earthquake could be unleashed at any time and any place along the

fault, scientists say. About 200 earthquakes a year measuring about 1.0 or greater on the Richter scale rumble out of the fault, although only a few are strong enough to be felt by people.

The New Madrid Fault is best known for producing a series of major quakes in 1811-12, including at least three measuring above 8.0 on the Richter scale, scientists say. At the time, the region was sparsely populated, and few deaths were reported.

But the power of the quakes was evident. Witnesses said the land rolled like ocean waves, huge crevices opened in the soil and new lakes, islands and streams were created. The quakes rang church bells on the

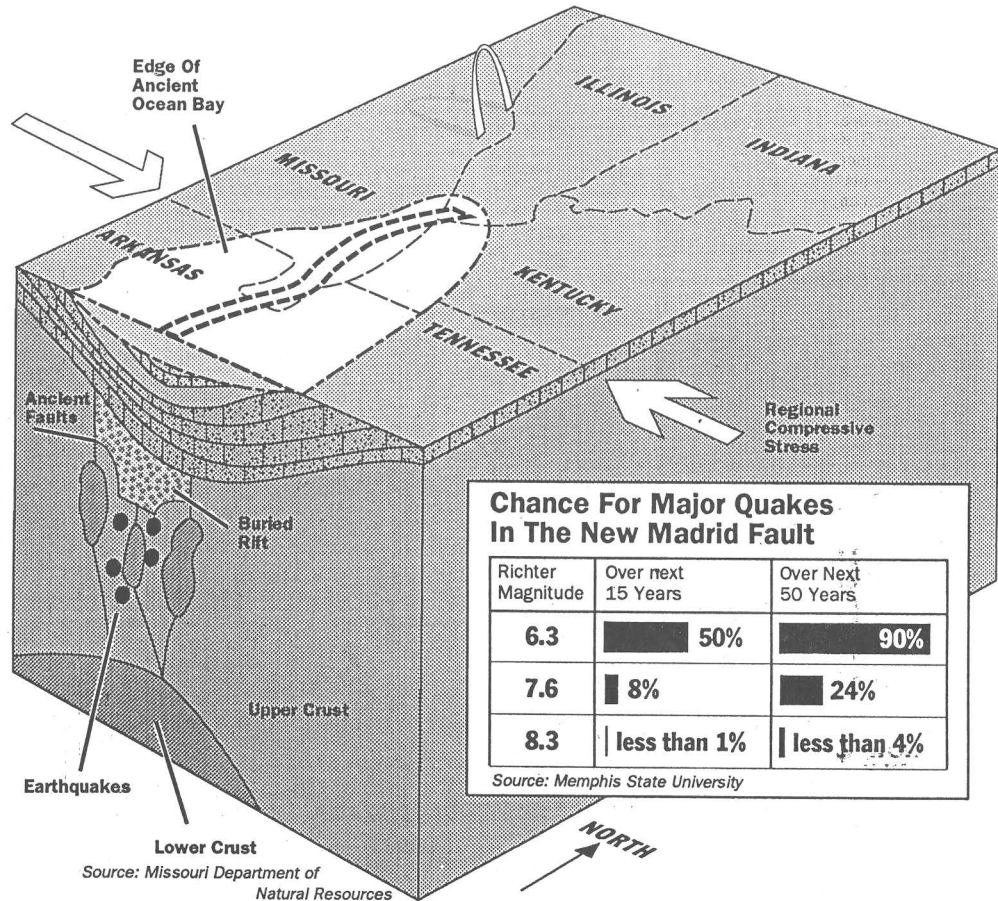
East Coast.

It split stone houses and toppled chimneys in the frontier town of St. Louis. The chances of a quake measuring 8 on the Richter scale are slim any time in the near future. But experts say a quake measuring Richter 6 today could also cause major damage. Quakes of that magnitude occurred in 1843 and 1895.

The most widely quoted scientific estimates give 50-50 odds for a Richter 6 quake in any given 15-year period and a 9-in-10 chance over 50 years.

Even though major quakes in the New Madrid fault happen less often than in California, their destruction spreads across 20 times the area hit on the West Coast.

Scientific understanding of the New Madrid Fault still has a long way to go. Little was known about it until a network of seismographs was installed in the fault zone in the mid-1970s by St. Louis University.



**Chance For Major Quakes In The New Madrid Fault**

Richter Magnitude	Over next 15 Years	Over Next 50 Years
6.3	50%	90%
7.6	8%	24%
8.3	less than 1%	less than 4%

Source: Memphis State University

ST. LOUIS POST-DISPATCH, OCTOBER 28, 1990

17H

EARTHQUAKE  PREPAREDNESS

## Recovery Process: It May Last Years As New Damage Is Uncovered

By Jerri Stroud  
Of the Post-Dispatch Staff

More than a year after a major earthquake struck northern California, the apartment building across from Marjorie Greene's office in downtown Oakland still has "Keep Out" signs posted outside.

"One thing about recovering from a major earthquake is that it takes years and years," said Greene, assistant director of the Bay Area Regional Earthquake Preparedness Project.

Closed freeway viaducts, ramps and bridges are daily reminders of the tremor that shook a broad area of northern California for about 15 seconds at 5:04 p.m. on Oct. 17, 1989. The Loma Prieta quake, as it has been named, measured 7.1 on the open-ended Richter scale and caused damages estimated at \$7 billion.

City officials in Whittier, Calif., originally thought that it would take

about two years to repair damage from a 5.9 magnitude quake that struck that Southern California city of 90,000 people more than three years ago, Greene said.

But officials are still finding cracked sewer lines and other damage from the 1987 Whittier Narrows tremor. Officials say they expect a full decade may elapse before Whittier recovers fully.

Most officials in the St. Louis area agree that the damage from a major earthquake here could be much worse and take far longer to repair. Few area buildings or highways have been designed to withstand earthquakes.

More than 180,000 homes and apartment buildings in the area are built of unreinforced masonry, said Fred Williams, the city's director of emergency management. Even frame houses often have brick chimneys.

"If we have an earthquake of any

**Building damage may not be obvious ... after an earthquake. Some buildings may crack but not collapse until an aftershock hits.**

magnitude, there will be a lot of collapsed buildings," Williams said. Sewers and highway overpasses also may collapse, adding to traffic and public safety problems.

City and state officials are working on plans to bring in structural engineers from other areas to help assess damage and determine the safety of buildings after an earthquake, Williams said. More than 7,000 engineers came to northern California from other areas to inspect damage after last year's tremor.

But the experts probably would inspect high priority sites such as hospitals, nursing homes, schools, fire stations and buildings that will serve as temporary shelters before they could begin looking at residential buildings.

And if other areas suffer heavier damage than St. Louis, the city might have to wait its turn before the volunteer inspectors would come here, Williams said.

Building damage may not be obvious immediately after an earthquake. Some buildings may crack but not collapse until an aftershock hits. In others, an expert's opinion may be needed to determine whether the damage is serious or cosmetic.

Inspectors in California tried to sort buildings into one of three categories, said Michael Smiley, plans and operations specialist with the St. Louis County Office of Emergency Preparedness. Buildings were either undamaged, in need of repair but habitable or unsuitable for

occupancy.

Smiley said building officials here expect to devise a similar system and a way of keeping track of the category assigned to each building. Once inspectors make initial inspections, a system of expediting permits for repairs may be needed.

County highway inspectors have devised a system for rapidly inspecting road decks, bridges and overpasses after an earthquake, Smiley said. They would make more detailed inspections later.

Federal money is available for some public repairs, but more money probably would be needed if a major earthquake strikes, Smiley said. After last year's California earthquake, the governor put in place a temporary sales tax to pay for repairs.

"It's very possible that in addition to lost services," Smiley said, "we'll have to take some of the burden on ourselves to pay for the recovery."



## Sham Artists: Disasters Draw Swindlers, So Beware On Contracts

The panic an earthquake or other major disaster inspires often leads some people to take advantage of others.

"After one of these disasters, you get a lot of sham artists who come in," says Brentwood Police Chief William G. Karabas. "They always ask for money up front."

Residents should ask for credentials from anyone who comes to their door claiming to represent an insurance company or public agency, said James Schmitt, head of the St. Louis Better Business Bureau. In widespread disasters, police or emergency officials usually issue special identification to legitimate insurance representatives or emergency personnel.

People also should be wary of contractors who go door to door, Schmitt said.

"In every disaster we've ever

had, good contractors are in such demand that there aren't enough of them to go around," he said.

People can call the Better Business Bureau, local building officials, banks and friends to check a contractor's reputation. Building and contractor associations listed on a contractor's card may be suspect because some profiteers invent phony trade groups, Schmitt said.

Public adjusters also may go door to door, offering to represent people making insurance claims, Schmitt said. Some are legitimate, and some are not. In either case, the adjuster usually takes a percentage of any claim.

"The main thing is, don't be in a tremendous hurry to sign a contract," Schmitt said.

— Jerri Stroud

## Help: State, Federal Sources Are Available

By Jerri Stroud  
Of the Post-Dispatch Staff

Families and businesses will be able to apply for help from several state and federal sources if an earthquake is severe enough for the president to declare the St. Louis region a disaster area.

The Federal Emergency Management Agency acts as an umbrella organization for 25 government agencies that deal with various aspects of disaster response and recovery, said John Coleman, FEMA's assistant director in the Kansas City region.

The federal government is the main source of money for disaster loans and grants, said Coleman. But state and local governments often run disaster field offices and administer certain grants.

After a disaster, individuals and families can apply for grants of up to \$11,000 through disaster field offices.

### After a disaster, individuals and families can apply for grants of up to \$11,000 through disaster field offices

The money can be used for expenses not covered by other programs or insurance, including essential furniture and appliances, said Paul Schleer, deputy director of the State Emergency Management Agency in Jefferson City.

In addition, federal unemployment assistance is available to workers who are out of work because of a disaster and who aren't eligible for regular unemployment payments.

The Small Business Administration handles subsidized loans to repair or

replace homes, personal property and businesses with losses not covered by insurance. The maximum loan amounts are \$100,000 for homes, \$20,000 for personal property and \$500,000 for businesses.

The Veterans Administration provides help to veterans applying for death benefits, pensions, insurance settlements and adjustments to VA-guaranteed home mortgages.

The Social Security Administration can help Social Security recipients with address changes. The agency also can expedite checks after a disaster. Social Security offices also can help disaster victims apply for disability, death and survivor benefits.

Farmers and ranchers can apply for disaster loans for up to 80 percent of their actual loss of production, up to \$500,000. The Farmers Home Administration administers the disaster loan program for farmers.

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## EARTHQUAKE PREPAREDNESS

# Guidelines For Governments, Schools

### LOCAL GOVERNMENTS

Here is what residents can ask their local governments to do to address the threat of an earthquake:

#### Preparedness and Mitigation

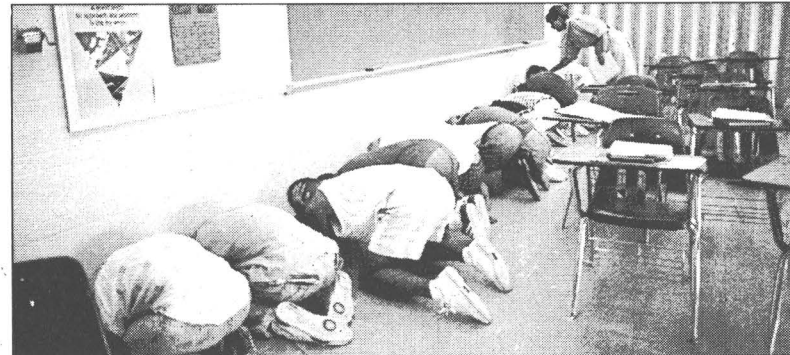
- Conduct a hazard-vulnerability analysis; finding the location of hazardous materials and determining the potential threat to the area.
- Develop a seismic-safety plan that addresses land-use and development decisions.
- Develop a plan to reduce the hazards posed by older and unreinforced masonry and concrete buildings.
- Identify nonstructural hazards in government facilities.
- Seek mutual-aid agreements between local and/or special purpose governments.
- Develop a coordinated disaster-management plan that incorporates all departments and managers.
- Train employees to act as emergency-services workers in the event of an earthquake.
- Identify potential sites for use as mass-care centers. Stockpile emergency supplies.
- Start community programs that stress the importance of home and individual planning.
- Distribute quake literature to private and public sector groups in the community. Develop special programs that deal with preparedness for the disabled, the non-English-speak-

systems.

- Equip shelters with enough health and sanitation supplies for large numbers of people.
- Identify potential casualty-collection points for triage and transport of the injured.
- Learn to use the news media to provide public information before, during and after the earthquake.
- Provide city and county agencies with emergency supply kits in their buildings.
- Identify potential sites for waste disposal.
- Establish procedures for timely inspection and condemnation of damaged structures.

#### Recovery

- Develop a plan to organize the recovery — such as a suggested recovery authority with functions and potential assignments.
- Research whether special ordinances and legislation will be required.
- Establish plans for assuring the continuance of government and business functions. Such contingency plans should assume the loss of records, supplies and inventories as well as of building space.
- Develop plans for providing immediate disaster assistance, such as temporary housing, mass feeding, financial assistance and psychological counseling to victims and families of victims.



Karen Elshout/Post-Dispatch

**Earthquake drills are only one of many steps schools can take to protect students and property.**

### LOCAL SCHOOL DISTRICTS

Here is what residents can ask their local school districts to do to address the threat of an earthquake:

#### Preparedness and Mitigation

- Prepare schools disaster plans and make staff members aware of their roles and responsibilities under the plan. Teachers and administrators may be responsible for the students for up to 72 hours after a disaster

#### Emergency Response

- Identify a central "command post" or other central planning area that contains maps of the campus, facilities and hazards in the area, an enrollment sheet for the current year, first aid materials, and other tools necessary to manage the emergency-response activities after a disaster.
- Give teachers basic operating proce-

- ing population and the elderly.
- Recruit business leaders to participate in private/public preparedness programs.
- Establish procedures for using volunteers before, during and after the earthquake.

## Response

- Assure that all agencies that could offer assistance at the time of an earthquake have been involved in pre-event planning.
- Establish a coordinated command system to ensure effective response at multiple sites.
- Set up procedures to quickly assess the need for outside resources.
- Build redundancy into communication

- Establish how public information needs will be handled. Develop procedures to help people find the missing and to notify employees whether and where to return to work.
- Establish plans for hazard abatement, such as inspecting, closing and demolishing hazards that are a threat to public safety
- Establish priorities for restoration of services.
- Plan to document and tally costs associated with the earthquake. Such information will be needed to substantiate disaster-assistance requests and insurance claims and to speed payment to vendors and mutual-aid partners.

Source: Bay Area Regional Earthquake Preparedness Project.

## BOOKS & BOOKLETS

### "Earthquakes in Missouri"

Department of Natural Resources  
Public Information Office  
P.O. Box 176, Jefferson City, MO 65102  
1-800-334-6946

- 50 cents plus postage
- Officials suggest calling first to determine total cost. This booklet gives an overview of the New Madrid Fault and what to expect.

### "The Next New Madrid Earthquake: A Survival Guide for the Midwest"

By William Atkinson  
Southern Illinois University Press, Carbondale, 1989

- \$19.95 cloth, \$10.95 paper.
- This book explains the quake threat and details how to prepare.

### "The New Madrid Earthquakes"

revised edition  
By James Lal Penick Jr.  
University of Missouri Press, Columbia, 1981; \$12.95.

- This book details the history of the great New Madrid quakes of 1811-12.

### "Earthquakes and Volcanoes"

Available from:  
Superintendent of Documents  
U.S. Government Printing Office,  
Washington, D.C. 20402  
Or by credit card at (202) 783-3238; \$6.50 a year.

- A bimonthly journal of the U.S. Geological Survey with information on quakes presented at a popular level.

### "Earthquakes"

By Bruce Bolt. W.H. Freeman, New York, 1988; \$13.95.

- This book details quakes and how they work.

### "On Shaky Ground: America's Earthquake Alert"

By John J. Nance.  
Avon Books, New York, 1989; \$4.95.

- This book outlines the threat quakes pose to the nation.

### "Terra Non Firma"

By J.M. Gere and H.C. Shah. W.H. Freeman, New York, 1984; \$12.95.

- Provides a general discussion of quakes...

occurs.

- Show staff the location of the main gas, electricity and water shut-off valves. Assign people to check their status and to turn them off if the need arises.

- Prepare a map of the school and school grounds and distribute to all staff members. Include basic evacuation procedures and potential earthquake hazards to avoid.

- Make a list and map of the location and availability of first aid kits, sleeping materials and other emergency supplies.

- Eliminate nonstructural hazards. Bolt all file cabinets, book shelves and equipment to structural elements of the buildings. Remove all heavy objects from high shelves. Secure all light fixtures and air ducts to the structural elements of the buildings. Equip windows with safety glass or cover them with protective film.

- Make inventories of hazardous chemicals in areas such as the science building and maintenance shops. Appoint someone to check on these chemicals after an earthquake.

- Arrange with structural engineers or contractors to report to the school directly after a disaster to determine the damage and the need to evacuate.

- Learn whether your schools have been designated as a potential mass-care shelter.

- Establish a back-up communications system such as a citizens band radio, ham operation or two-way radio to communicate with emergency services. Train someone to use this equipment.

- Include an earthquake-preparedness program in the curriculum.

- Establish programs between the schools and parent-teachers associations that encourage a home earthquake-preparedness plan and discuss the district's policies regarding student release and absenteeism.

- Secure vital data and records. Establish back-ups of important data and store them in an off-site location.

dures to follow. These include:

- Implementing basic "duck and cover" actions when an earthquake begins.

- Storing an emergency kit near the desk, containing a roll sheet, special medical information and student release information.

- Knowing when to evacuate and when to remain in the classroom after an earthquake.

- Administering first aid to those seriously wounded and comforting those who are in shock, frightened or hysterical.

- Check-out procedures for releasing a student to an adult.

- A "buddy system" with another teacher and class, so that if one teacher is injured, the other can take care of students and get them to safety.

- Establish damage-assessment procedures.

- Establish emergency sanitation procedures.

- Assign a representative to serve as liaison with the press after a disaster.

- Assign and train staff for search and rescue.

## Recovery

- Gather information on record-keeping requirements and financial-aid sources for disaster relief.

- Develop absentee policies for teachers and students in the event of a disaster.

- Contact mental-health organizations to provide counseling to students after an earthquake.

- Develop alternative teaching methods for students unable to return immediately to classes, for instance, correspondence classes, tele-teaching, group tutoring.

- Develop a plan for conducting classes if some facilities are damaged — half-day sessions, alternative sites, portable classrooms.

Source: Bay Area Regional Earthquake Preparedness Project

**EARTHQUAKE**  **PREPAREDNESS**

# Guidelines For Business

## BUSINESS AND INDUSTRY

Here are items for business leaders to consider when preparing for an earthquake:

### Preparedness and Mitigation

- Conduct a hazard vulnerability analysis of all the buildings and structures occupied by your business.
- Strengthen or eliminate hazardous structures.
- Eliminate nonstructural hazards. Bolt all file cabinets, book shelves and equipment to structural elements of the buildings. Remove all heavy objects from high shelves. Secure all light fixtures and air ducts to the structural elements of the buildings. Equip windows with safety glass, or cover them with protective film.
- Start employee earthquake awareness programs.
- Stress the importance of preparing a home plan to employees so that if the disaster occurs while they are in the office their families are prepared.
- Make agreements with vendors and suppliers to assure continuity of business.
- Develop and maintain inventories of critical supplies, equipment and employee skills.
- Establish specific company policies to inform the public about the continued delivery of services and goods in the event of an earthquake.
- Identify the company's vital records. Consider duplicating them and storing them off-site.
- Establish procedures for identi-

facilities and equipment.

- Plan to conduct initial damage assessments and identify perilous conditions.

### Response

- Plan to provide continuous communications with employees and other occupants of the building to provide hazard warning, instructions and announcements, status of critical lifelines and emergency services and information about damage and sources of assistance.
- Make available emergency power to supply critical operations, processes and emergency equipment.
- Develop and test evacuation plans.
- Develop a plan to determine when it is safe to re-enter buildings.
- Establish a plan to activate security procedures for securing vital records and documents?
- Offer first aid and CPR training courses to employees?
- Develop plans to provide for the emergency housing, feeding and non-medical care of employees and other building occupants for the first 72 hours after the disaster.
- Assign a spokesperson to act as liaison with the media after an earthquake to insure that accurate information is given.

### Recovery

- Plan to conduct a comprehensive damage survey of the facilities to determine the need for temporary relocation and/or the timing of

alternate headquarters, restoring damaged utility systems to minimal operating levels and controlling access to company facilities.

- Identify alternative sources of essential supplies and replacement parts if your normal vendors are unable to function after the quake.
- Make arrangements to provide information to the news media about service hours, location of operations and any changes in procedures.

**Source:** Bay Area Regional Earthquake Preparedness Project.



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fying and containing hazardous materials.

- Develop procedures for immediate cessation of processes which could threaten employees and general public safety if interrupted by an earthquake.
- Take steps to protect computer

reoccupancy.

- Develop plans for the clean-up and repair of company property.
- Establish plans for business restoration, including restoring essential facilities and/or establishing temporary facilities, ensuring key personnel report to work sites or

### BOOKS AND PAMPHLETS FROM FEMA

Here is a list of some of the free booklets and pamphlets produced by the Federal Emergency Management Agency that may be useful in reducing the hazards of an earthquake. They are available by writing FEMA, P.O. Box 70274, Washington, DC, 20024.

A complete list of publications in the Earthquake Hazards Reduction Series also is available from FEMA.

■ Earthquake Insurance: A Public Policy Dilemma, FEMA 68.

■ Earthquake Preparedness Information for People with Disabilities, FEMA 70.

■ Comprehensive Earthquake Preparedness Planning Guidelines: Corporate, FEMA 71.

■ Comprehensive Earthquake Preparedness Planning Guidelines: County, FEMA 72.

■ Comprehensive Earthquake Preparedness Planning Guidelines: City, FEMA 73.

■ Reducing the Risks of Nonstructural Earthquake Damage: A Practical Guide, FEMA 74.

■ Preparedness for People with Disabilities (Brochure), FEMA 75.

■ Preparedness in High-Rise Buildings (Brochure), FEMA 76.

■ Guidelines for Local Small Businesses, FEMA 87.

■ Societal Implications: A Community Handbook, FEMA 83.

■ An Action Plan for Reducing Earthquake Hazards of Existing Buildings, FEMA 90.

■ Preparedness in Apartments and Mobile Homes, FEMA L-143.

■ Seismic Considerations, Elementary, Secondary Schools, FEMA 149.

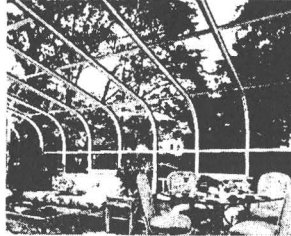
■ Rapid Visual Screening of Buildings for Potential Seismic Hazards: A Handbook, FEMA 154.

■ Earthquake Safety Checklist, FEMA 46.

See FEMA, Page 19

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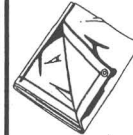
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## EARTHQUAKE PREPAREDNESS

### How To Get More Information

#### IF YOU HAVE MORE QUESTIONS

Answers to further questions about quake preparedness may be available from:

American Red Cross, St. Louis Bi-State Chapter, 4050 Lindell Boulevard, St. Louis, 63108; (314) 658-2000. The chapter recently published an "Earthquake Preparedness and Response Workbook."

Central United States Earthquake Consortium, 2630 Holmes Road East, Memphis, Tenn., 38118; 1-800-824-5817.

#### St. Louis residents

City Emergency Management Agency, 1315 Chestnut Street, St. Louis, 63103; (314) 622-3501.

#### St. Louis County residents

Office of Emergency Management, St. Louis County Police Department, 14847 Olive Boulevard, Chesterfield 63017. Earthquake information line: 331-0350. The line lists phone numbers

where residents in other Missouri counties can call for information.

#### Missouri residents

State Emergency Management Agency, P.O. Box 116, Jefferson City, 65102; (314) 751-9571.

Center for Earthquake Studies, Southeast Missouri State University, One University Plaza, Cape Girardeau, 63701; (314) 651-2019.

Federal Emergency Management Agency, Kansas City Regional Office, 911 Walnut Street, Kansas City, 64106; (816) 283-7061.

#### Illinois residents

Earthquake Information, Illinois Emergency Services and Disaster Agency, 110 East Adams Street, Springfield, 62706; (217) 782-4448.

Federal Emergency Management Agency, Chicago Regional Office, 175 West Jackson Boulevard, 4th floor, Chicago, 60604-2698; (312) 408-5540.

#### BOOKS & PAMPHLETS (FEMA)

### Hazards

From page Nineteen

■ Coping with Children's Reactions to Earthquakes and Other Disasters, FEMA 48.

■ Guidebook for Developing a School Earthquake Safety Program, FEMA 88.

■ Family Earthquake Safety Home Hazard Hunt and Drill, FEMA 113.

■ Earthquakes: A Teacher's Package for K-6 Grades, FEMA 159.

#### NEIGHBORHOOD ORGANIZATIONS

Here are items for residents to consider when preparing to establish a neighborhood response organization:

#### Preparedness and Mitigation

- Appoint a Neighborhood Leader or Block Coordinator who will keep a record of neighborhood residents, skills and equipment.
- Identify people in your neighborhood who may require special assistance in an emergency.
- Develop a list of tools, equipment and materials available in the neighborhood, including private sector resources.
- Organize first aid, search and rescue, communications, firefighting and damage assessment teams and give adequate training.
- Develop self-help networks between neighborhoods through a skills bank.
- Have a pre-established location where the injured can be treated.
- Know your neighborhood's ham radio and citizens band radio operators.
- Establish procedures for communicating with police, sheriff, fire and emergency services.
- Inventory the number and types of mobile (RV) equipment.
- Inform everyone which radio station to listen to and where emergency equipment and supplies are kept.

#### Response

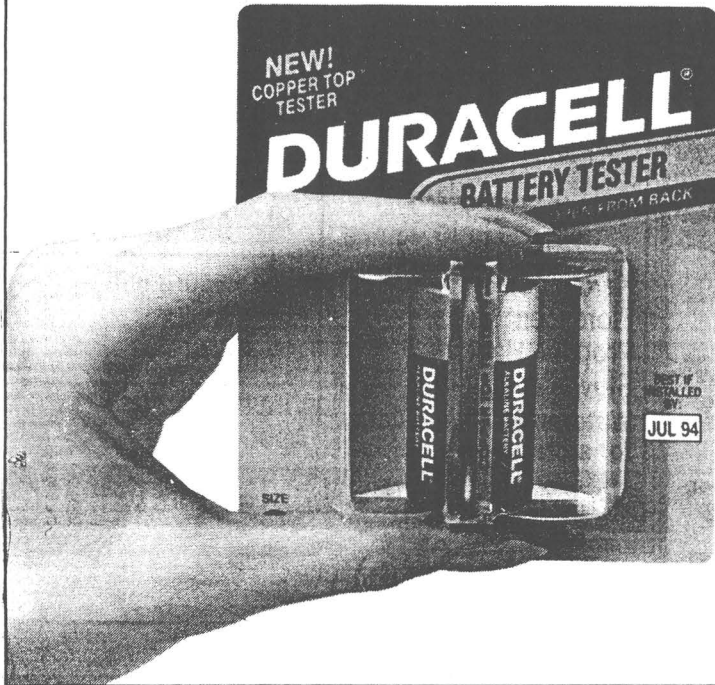
- Know how to check in on neighbors.
- Know how to check in with the Neighborhood Leader or Block Coordinator.
- Arrange to hang a white "flag" after earthquake to signal that everyone is all right.

- Volunteers should be available to:
  - Administer first aid to the seriously injured.
  - Conduct initial damage assessments.
  - Make a list of missing persons.
  - Make a list of injured persons and identify medical needs. If they require hospitalization, tag them before transporting in case they become unconscious. Keep track of where the injured are sent.
  - Begin removal of rubble and other material that may block emergency response functions.
  - Keep wandering pets in a confined area.
  - Identify those structures that pose potential hazards and post warning signs or cordon off.
- Set up a mobile/central communications center.
- Contact outside support services, report damages, request needed supplies and offer skills and resources that are available.
- Keep radio channels open and stand by for emergency information and instructions.
- Set up assistance centers for incoming evacuees.
- Set up procedures for water purification and alternative waste disposal.

#### Recovery

- Work in with public and private support organizations during the recovery phase.
- Determine water needs for the neighborhood and identify nearby water resources.
- Refer residents to the local Disaster Assistance Center for help in rebuilding, relocating and finding family members and friends.
- Provide updated status reports on damage to neighborhood residents.
- Promote earthquake preparedness in the recovery and rebuilding phase.

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Plans of action

Find out who's doing what to lend you a helping hand

What you can do

Learn what it takes to preserve health and hearth

A detailed index can be found on Page 2



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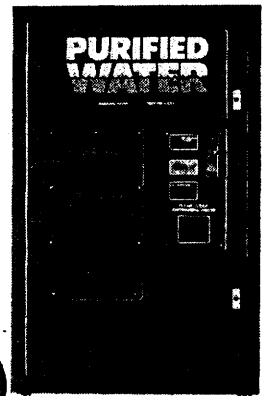
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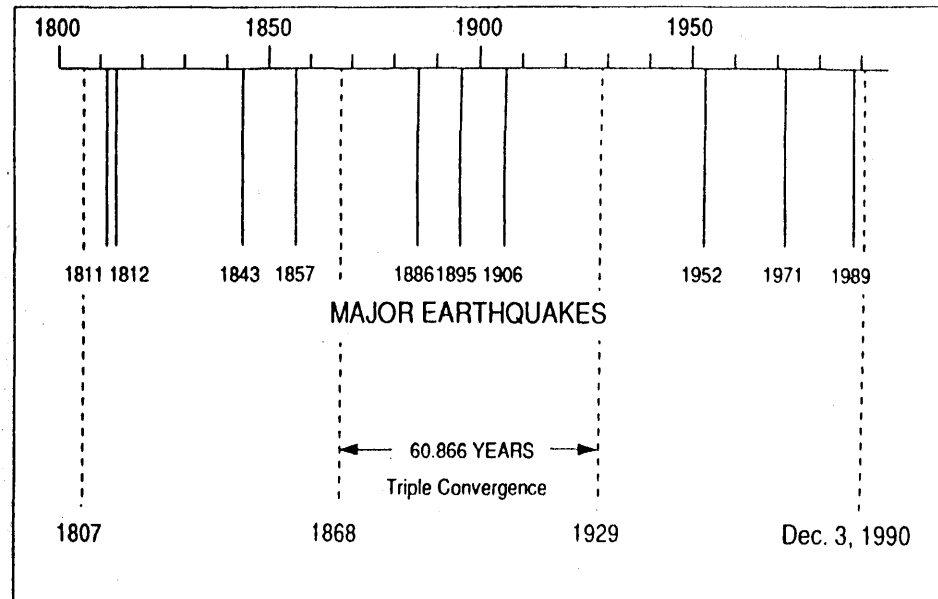
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# Quake expert: Iben Browning is out of his league



## Comparison of earth tides and earthquakes

This chart shows the historic lack of relationship between a triple convergence, upon which climatologist Iben Browning based his projection of an earthquake along the New Madrid fault, and any major earthquakes. The triple convergence of tides, moon and sun, which occurs about every 68 years, is set to occur Dec. 3, 1990. The triple convergence occurred four years — not 48 hours — apart from the New Madrid quake of 1811, and at least 12 years have separated the triple convergence from any other major historic quakes.

MEMPHIS, Tenn. — Climatologist Iben Browning has been described as both a "home run hitter" and a "pop fly artist" in relation to his controversial earthquake prediction for the New Madrid fault.

But a scientist at Memphis State University may have delivered the ultimate criticism: Iben Browning is simply out of his league.

Jim Dorman, associate director of the Center for Earthquake Research and Information at Memphis State, said few people have recognized that Browning, who lives in New Mexico, earned his Ph.D. in microbiology, not seismology.

His prediction techniques also point out the difference between valid scientific research and an educated hunch, Dorman said.

Nonetheless, Browning's 50-50 prediction of a magnitude 6.5 or stronger earthquake Dec. 2-3 has triggered waves of media attention and public hysteria. National Guard units were placed on alert in some Missouri and Arkansas counties. Some school districts have planned to close their doors. Talk of early December vacations are rampant.

Dorman thinks science became the missing element in these decisions. Unlike most scientific conclusions, which involve months of written verification and comparison with other research, Dorman said Browning pretty much skipped the documentation and went straight for the glory.

"He's got a hunch," Dorman said. "It's still a hunch which he hasn't checked out ... The Browning situation just drives you up the wall. It makes this whole game of science look different from what it actually is like."

A panel of scientists formed by the National Earthquake Prediction Evaluation Council ripped Browning's prediction last month, concluding that it has "absolutely no scientific basis."

Browning refused an interview with The Southern Illinoisan and referred all inquiries to David Stewart, director of the Center for Earthquake Information at Southeast Missouri State University. Stewart was an early supporter of Browning's work, a stance which brought him criticism from the scientific community.

Reports also resurfaced about Stewart's past faculty position at the University of North Carolina-Chapel Hill. In 1976, Stewart invited Texas' psychic Clarissa Bernhardt to campus, where she predicted an earthquake would hit the Wilmington area in January of 1976.

The earthquake never happened, but a swirl of controversy followed her prediction. Stewart was denied tenure in the UNC-Chapel Hill geology department the next year.

Stewart, contacted earlier this month, said he doesn't accept the scientific dressing-down of Browning's work. In fact, Stewart said that three of the 11 scientists on the panel had been calling Browning a quack months before the study was conducted.

"They didn't really look," Stewart said. "A scientific evaluation of Browning has yet to be done. This is something that is going to have to be done in the proper scientific setting."

Browning's research is based on the "triggering" effect of tidal forces on earthquakes, an area which Stewart feels needs more study. In the past two years, different scientific studies have made contradictory

conclusions about the ability of high tidal forces to cause earthquakes, he said.

Tidal maximums are times when the gravitational force of the sun and moon reach cyclical peaks.

Even if Browning's prediction proves false, the earthquake preparedness that revolved around the prediction has done a great deal of good for the six-state New Madrid region, Stewart said in a prepared statement.

Thousands of preparedness drills have followed the prediction, and people have made lasting structural improvements to their homes and businesses, he pointed out.

"These are lasting benefits. They are permanent," he said. "Regardless of when the big quake does occur, and it definitely will some day, lives will be saved and property losses reduced because of what people are doing now."

Stewart has described Browning as a "home run hitter" based on his past predictions of the San Francisco earthquake and the Mount St. Helens volcano. But the scientific team found actual transcripts of Browning's "predictions" that tell a vastly different story.

Regarding the Loma Prieta, Calif., earthquake of Oct. 17, 1989, a transcript of Browning's talk a few days before the earthquake did not mention San Francisco or even California. His words were: "There will probably be several earthquakes around the world, Richter 6-plus, and there may be a volcano or two."

Scientists at the conference said that there are around 110 earthquakes worldwide that register magnitude 6 or more every year. Guessing whether one will occur somewhere in a three-day period is an excellent bet.

**A scientific evaluation of Browning has yet to be done. This is something that is going to have to be done in the proper scientific setting.**

**David Stewart, director  
Center for  
Earthquake Information  
Cape Girardeau**

"That makes it look like a pop fly instead of a home run," Dorman said.

Researchers picked up a trend of vagueness in all the documented evidence of Browning predictions, including:

■ **The San Fernando earthquake of 1971, magnitude 6.6.** They found no evidence that Browning had predicted this one. The earthquake did occur on a tidal maximum, but that maximum was much smaller than more than 10 other tidal maximums that occurred over the prior 20 months.

■ **The Managua, Nicaragua, earthquake of 1972, magnitude 6.2.** There was also no written evidence found that Browning had predicted the earthquake as he had claimed. This earthquake occurred three days after a tidal maximum, but the maximum was not particularly large and was preceded by three much larger maximums.

With Browning's prediction of a Mount St. Helens volcano, Dorman said that anyone living in Washing-

ton could have predicted the eruption simply by reading the papers. Scientists in the area had been issuing warnings about increased volcanic activity for days in advance, and eventually evacuations took place near the volcano, he said.

The scientific team also looked at Browning's "danger dates," or periods of high earthquake danger due to tidal forces, and how past earthquakes correlate with those dates. They looked at the period from Jan. 1, 1986, to Sept. 28, 1990, and gave Browning an expanded window that included three days before and after his danger date.

From there, they began to plot 164 earthquakes of magnitude 6.5 or greater that occurred over that five-year period.

If all the earthquakes were dispersed evenly throughout that time frame, scientists found that 10.6 earthquakes would have fallen randomly on Browning's danger dates. As it happened, only 12 of the 164 earthquakes over that time fell within Browning's dates.

"Thus, this correlation concludes that Browning's 'predictions' are not significantly different than random," the report said.

Jill Stewart, seismic resource center manager at the Memphis State, said the report on Browning "put him right in the realm of astrology, where you say very general things, and then re-interpret it in the light of the real experience afterwards."

But the prediction could carry heavy consequences for the future of earthquake planning in the New Madrid region, she said.

"The downside to all of this is if people forget after Dec. 3," she said. "Then the disservice that Iben Browning will have done this area is absolutely immense."

# Predictions

## Uncertainty the only sure thing

By **Brian Mattmiller**  
Of The Southern Illinoian

MEMPHIS, Tenn. — National earthquake experts show great confidence in gunning down predictions that pinpoint earthquake dates, but there's less consensus about their own official forecasts of earthquake danger.

The New Madrid fault now has two scientific studies that predict the likelihood of earthquakes of magnitude 6 or more on the Richter scale. Most researchers agree that both are scientifically valid.

The problem is, both have significantly different results.

Arch Johnston, director of the Center for Earthquake Research and Information at Memphis State University, is an author of the most well-known forecast for earthquake danger along the New Madrid. Johnston used charts of past New Madrid earthquakes, culled from seismographs and historical records, to determine when larger earthquakes are likely to reoccur.

It's called a time-dependent model. Johnston said it's based on the concept that faults accumulate stress over time and will release that stress in a cyclical fashion.

According to his research, the probability of an earthquake of magnitude 6 to 6.3 is 40 percent to 63 percent in the next 15 years. That probability jumps to 86 percent to 97 percent over the next 50 years.

only beginning to go beyond the massive 1811-1812 tremors.

The random model "is sort of like a default model, when you can't do anything else," he said.

Another problem with getting confident predictions on the New Madrid fault is the relative strangeness of the 1811-12 earthquakes. Within that three-month winter period, an unprecedented four earthquakes beyond magnitude 8 rattled the region. It's hard to put those earthquakes into any sort of solid pattern, he said.

"That does throw another curve at figuring out what's going on," he said. "A sequence of major earthquakes like that is very rare. Usually, you get a well-defined main shock and a series of aftershocks in declining size."

One theory is that the New Madrid is a segmented fault zone, with three or four distinct fault lines. When one broke, it transferred stress to other segments of the fault. They broke soon after in a chain-reaction fashion.

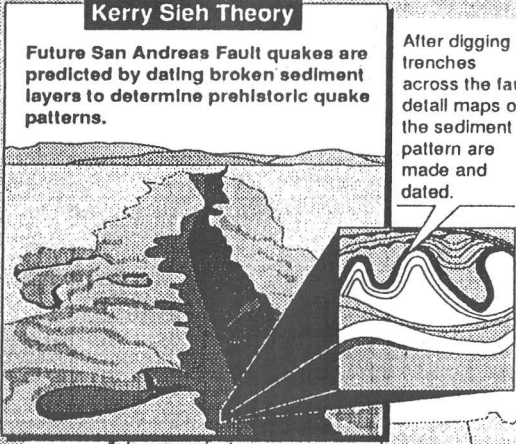
More accurate predictions will rely almost entirely on a better scientific understanding of the fault, Johnston said. In California, for example, scientists have a very good idea of what portion of a fault is more susceptible to an earthquake than others. They have a longer chronology of earthquake activity documented on the San

### Predicting Earthquakes

Seismologists believe earthquakes depend on the internal processes of the earth, not the external processes of the sun and the moon. Methods used by Kerry Sieh have been accepted while Browning theory is disputed.

#### Kerry Sieh Theory

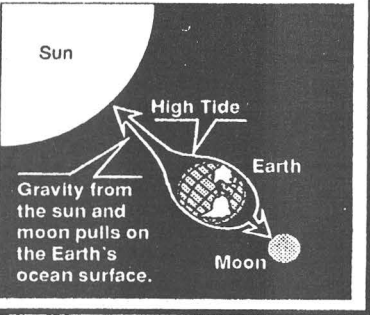
**Future San Andreas Fault quakes are predicted by dating broken sediment layers to determine prehistoric quake patterns.**



After digging trenches across the fault detail maps of the sediment pattern are made and dated.


#### Iben Browning Theory

**Bases theory on proximity and alignment of the sun and the moon that produce high tidal forces on the Earth's surface.**



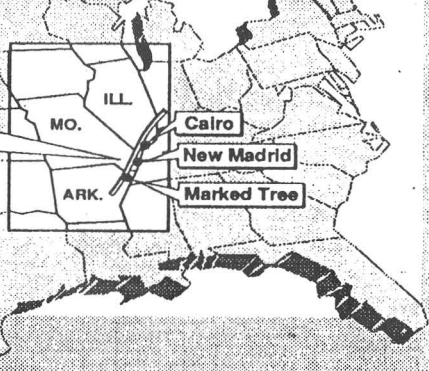
Gravity from the sun and moon pulls on the Earth's ocean surface.

#### San Andreas Fault



San Francisco  
NEV.  
Parkfield  
Carrizo Plain  
CALIF.  
Los Angeles

#### New Madrid Fault



ILL.  
MO.  
ARK.  
Calro  
New Madrid  
Marked Tree

Browning predicts probable quake Dec. 2 along the New Madrid Fault. On September 9, 1990, an earthquake, registering 4.6 on the Richter scale, occurred on the fault.

Sieh's work forecasts a 60 percent chance that a 7.5 or above quake will shake Southern California within 30 years.

AP/Martha P. Hernandez

However, an earthquake of magnitude 7 to 8.3 has a less than 1 percent probability in the next 15 years, and 2.7 to 4 percent in the next 50 years.

These numbers were the standard for earthquake readiness in the six-state New Madrid region. But a 1990 study, which used the same data but followed different assumptions about earthquakes, added a new perspective to the danger.

S. Nischenko and G. Bollinger, both from the U.S. Geological Survey, approached research with the assumption that quakes are triggered by the combined activity of numerous faults, and are not necessarily dependent on time.

Their research greatly reduced the odds of a magnitude 6 to 6.3 earthquake, which has a 16 to 24 percent likelihood in the next 15 years. A larger earthquake of magnitude 7 to 8.3, however, has a 2 to 4 percent chance over the same period — as much as four times more likely than in Johnston's research.

Scientists would probably love to have a unanimous voice, but Johnston said that isn't likely with the still-puzzling New Madrid fault.

"The range in probabilities is sort of the range of our uncertainty," Johnston said.

"What Nischenko and Bollinger are saying is that our state of knowledge about the earthquake process at mid-plate settings like the Eastern U.S. is so poor that time-dependent modeling is not called for," he said.

Time-dependent modeling is most accurate when researchers can look way back into historical records of earthquakes. At New Madrid, the earthquake record is

Andreas fault.

Johnston said having the same sort of information for the submerged New Madrid fault is a long way off.

Amid all this uncertainty, the public's willingness to embrace Iben Browning's Dec. 3 prediction is hardly surprising. Browning's theory of tidal forces triggering earthquakes, ironically, has been studied by scientists for almost 70 years, but the results have been either "marginal, negative or inconclusive," Johnston said.

Tidal forces refer to periods when the gravitational force exerted by the sun and moon are at their peaks.

"Tidal triggering can't be rejected out of hand — that's why we've had all these studies," he said. "My problem is that other things cause considerably larger stresses on the crust than tidal forces."

Man-made events, for example, have been proven to cause earthquakes.

"We've seen that when you form a large reservoir behind a new dam," Johnston said. "We see it at deep-well hazardous waste injection sites, where you're injecting fluid under the crust under pressure. The deep gold mines in South Africa trigger events above a magnitude 5 sometimes."

Johnston and others also believe they've found a correlation between the Mississippi River's high-water stage and some smaller earthquakes. "But the results are nothing you'd want to hang your hat on."

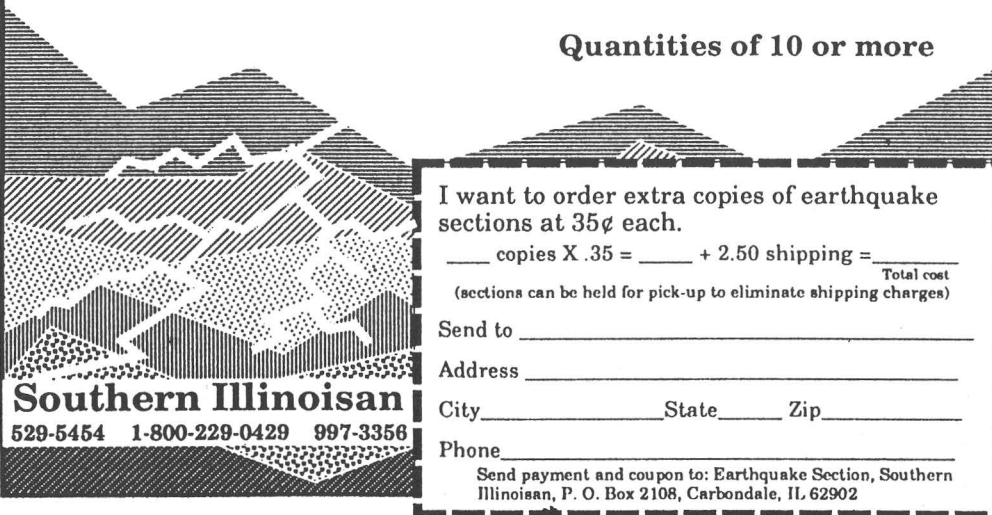
Earthquake prediction along the New Madrid is likely to remain soft around the edges. Scientists know a large earthquake will occur. When, where and why are still open questions.

# Need extras of this section?

limited quantity available

There will be a limited quantity of extra Earthquake sections available for schools or groups that wish to add this local information package to their program. Priority will be given to community education uses.

Quantities of 10 or more



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## EARTHQUAKE PREPAREDNESS LITERATURE

University of Arkansas



Fact Sheet S107

# Earthquake Preparedness

University of Arkansas, United States Department of Agriculture, and County Governments Cooperating

This fact sheet will help you plan for and survive a major earthquake. It tells you what to do before, during, and after the quake to lessen the impact on your family and your home.

One of the worst earthquakes in recent history occurred along the New Madrid Fault in the winter of 1811-1812. This fault zone is of great concern to Arkansans because of the amount of damage that will result should another quake occur. Geologists predict that the chances of another major earthquake in the area are quite high. Being prepared can lessen the impact.

Be prepared to be self-sufficient for at least 3 days after the quake. Following are precautions to be taken before, during, and after the earthquake.

## BEFORE THE QUAKE

1. Conduct a hazard hunt. Some possible hazards include:
  - Tall heavy furniture which could topple such as bookcases, china cabinets, or modular wall units.
  - Appliances which could move enough to rupture gas or electrical lines.
  - Hanging plants in heavy pots that could swing free of hooks.
  - Heavy picture frames or mirrors over the bed.

The map predicts damage corresponding to Roman numerals on the Modified Mercalli Scale in an 8.6 earthquake. If an earthquake is around 7.6 on the Richter scale, reduce the zone Roman numerals by one. For example, substitute X for XI in Mississippi and Crittenden Counties and read the damage on the Modified Mercalli Scale under X. If the earthquake is a 6.6, then reduce the zone numeral by two. For example, Mississippi and Crittenden Counties would experience damage listed under IX on the Modified Mercalli Scale.

### Modified Mercalli Intensity Scale

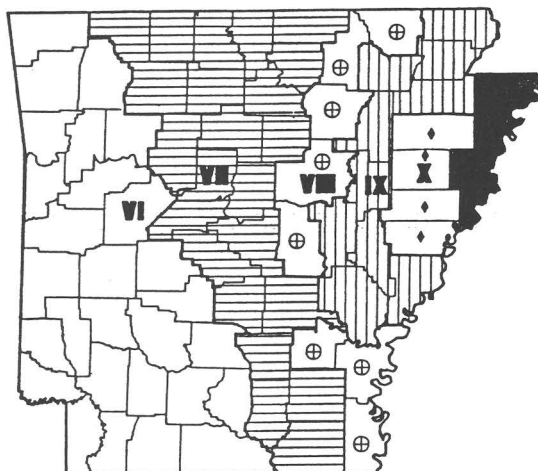
**VI** People are frightened and run outdoors. Heavy furniture may be moved; some instances of fallen plaster and toppling of chimneys. Slight damage.

**VII** Everybody runs outdoors. Damage is negligible in buildings of good design and construction, slight to moderate in ordinary structures, and considerable in poorly built or badly designed structures. Chimneys broken. Felt in moving automobiles.

**VIII** Some damage even in buildings of good design and construction. Considerable damage in ordinary buildings, with some collapsing. Great damage in poorly constructed buildings. Panel walls thrown out of frame structures. Falling of houses and factory chimneys, columns, monuments, and walls. Heavy furniture overturned. Sand and mud ejected in

small amounts. Changes in well water. Hinders driving of automobiles.

**IX** Damage considerable in buildings of good design and construction. Structures thrown out of alignment with foundations. Ground cracked conspicuously. Underground pipes damaged.

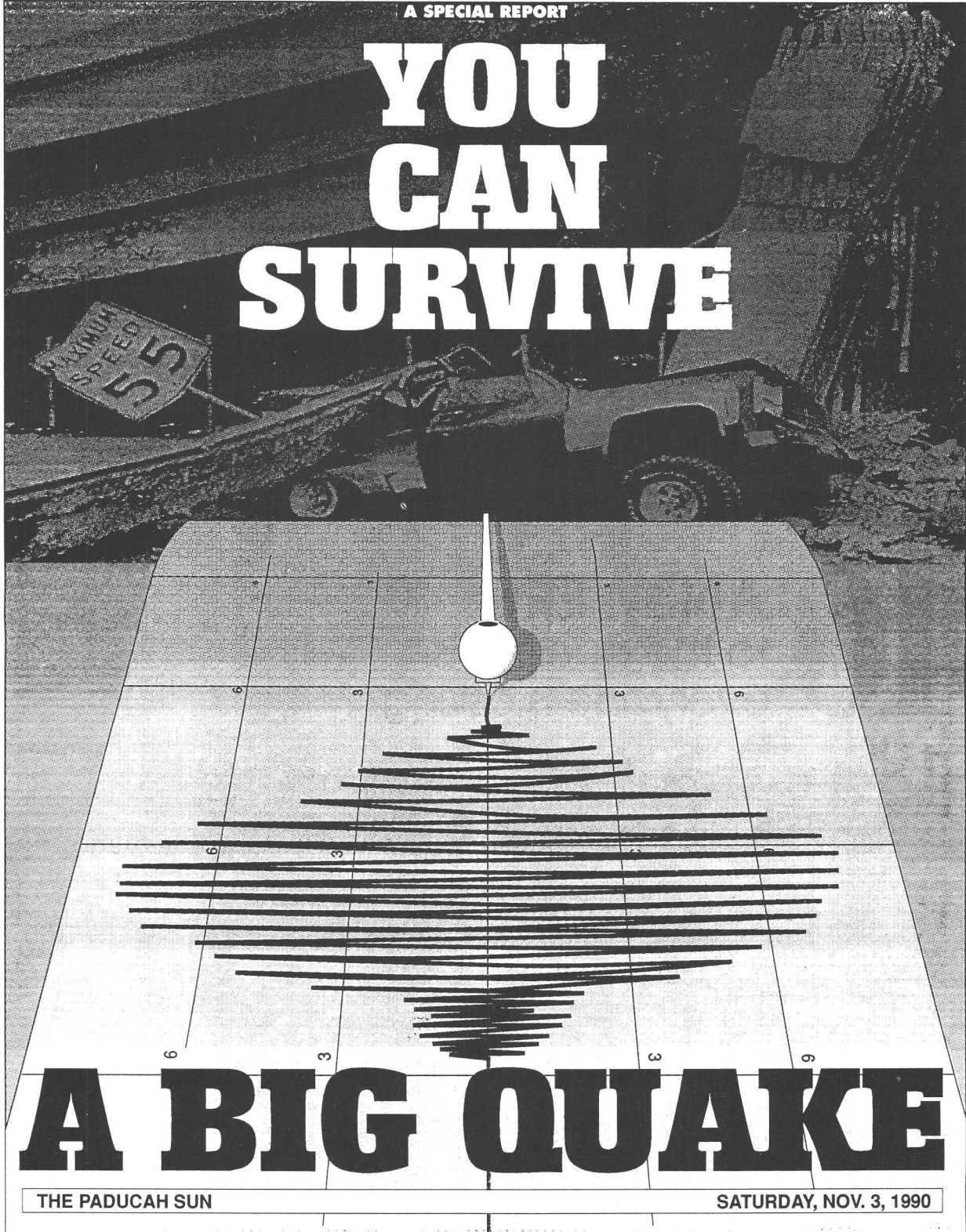


**X** Wooden houses of good design and construction collapse. Most masonry and frame structures destroyed together with foundations. Ground cracked causing damage, rails bent, slopes and embankments slide, water surface rises.

**XI** Almost all masonry structures collapse, bridges destroyed, fissures over entire surface of ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent prominently.

- Latches on kitchen or other cabinets which will not hold the door closed during shaking.
- Breakables or heavy objects that are kept on high or open shelves.

- A masonry chimney that could crumble and fall through an unsupported roof.
- Flammable liquids like painting or cleaning products that would be safer in a garage or outside shed.



A SPECIAL REPORT

# YOU CAN SURVIVE

## A BIG QUAKE

THE PADUCAH SUN

SATURDAY, NOV. 3, 1990

Reprinted by permission

## AN OVERVIEW

# Why we should take earthquakes seriously

No one can predict when an earthquake will strike, even "give or take 48 hours." But one thing is certain — if there is a bad earthquake *any time*, you could be on your own for up to three days.

What you do now will determine how well you handle those three days.

The chances of surviving an earthquake are extremely high, but the chances of damage to your home and temporary loss of utility services are high as well.

Geologists and seismologists, the experts who study earthquakes, believe there is enough energy built up in the New Madrid Fault to cause a quake of 7.6 on the Richter Scale. But because a fault seldom unleashes all of its energy in one quake, most experts believe a 6.0 to 6.5 quake is what we can expect. These occur about every 80 years. The last one was 95 years ago, so the experts think another one is overdue.

If there is a major quake in the range of 7.6, there would be severe damage to buildings and utilities. Your home or office could become a dangerous shambles of overturned furniture, leaking gas, falling plaster and broken glass. Phones, gas and

electricity would be out; overpasses and bridges may collapse or be unusable until inspected, so food could not be brought into west Kentucky for days; it may even be impossible for you or emergency workers to get across town because of the debris.

Undoubtedly there will be some emergency services, but you should not depend on them to help you; everyone else will be in as bad or worse condition than you.

If, on the other hand, we have a quake in the range of 6.0 to 6.5, damage would be much less severe. It would still be bad, and it is not to be ignored — a 6.5 quake would give us 100 times the shaking that the 4.6 quake gave us Sept. 26. Utility services and food supplies that we take for granted probably would be interrupted, perhaps for days. Your home may be unsafe to occupy.

Whether Iben Browning is correct in his assessment of earthquake conditions around Dec. 3 — he insists he did not "predict" an earthquake — is not the issue. Right or wrong he has awakened people across the Midwest to the fact that they live atop a sleeping giant, the New Madrid Fault, and that earthquakes are inev-

itable.

Every area of the country has its risks of natural disasters. The North has its cold winters, the coasts their hurricanes. There are risks even in driving down a street. All are potential killers, and all have killed more Americans than earthquakes.

Because we have not had any large quakes in living memory, (and, for the believers, if Dec. 3 passes peacefully), it does not mean that we can all relax.

If anything is certain, it is that earthquake forecasting is not certain. As a geologist readily admitted, "there's more that we don't know about earthquakes than we do know." They cannot say how any particular quake will affect any particular place. All they can say is that a serious quake is probable in the next few years, and a virtual certainty within the next generation.

While no one can say exactly when there will be an earthquake, we must be ready for one at all times. It does not take much effort to be ready for an earthquake. Most precautions are the same ones you might take to be ready for a tornado or long power failure. But the important thing is to do it.

# 10 ANSWERS to the questions everyone is asking

## 1 Will there really be an earthquake Dec. 3?

Iben Browning's forecast — he insists he didn't "predict" an earthquake — has caused a lot of fear. He based it on the sun, moon and earthquake cycles, give or take 48 hours. Geologists have spent years trying to find a connection between those things but have found none. Browning has scientific degrees, but none in the earthquake fields.

A group of scientists meeting in St. Louis Oct. 18 said his predictions were guesswork and coincidences.

In Browning's defense, it's worth noting that the biggest shocks during the New Madrid earthquakes of 1811-1812, with one exception, occurred during the new moon or full moon. A full moon is due Dec. 2.

Browning also says chances are greater than 50 percent that Tokyo will be struck by an 8.2 quake on or about Dec. 3.

More about Browning on the next page.

## 2 How bad an earthquake could we have?

Experts say the New Madrid Fault Zone is overdue for a 6.0 to 6.5 earthquake. They happen about every 80 years, and the last one was 95 years ago. A quake that size is just verging on a major quake. The late quake expert Dr. Otto Nuttli of St. Louis believed a 7.6

quake was possible, but not expected for a century. The worst New Madrid earthquake in 1812 is estimated at 8.8, and is expected only once in 600 years. More about this on page 3.

## 3 What are my chances of surviving?

Despite the damage, the chances of living through an earthquake are extremely good. In 1985, the Federal Emergency Management Agency estimated that in a 7.6 quake, 47 people could be killed in Paducah if it hit during the daytime, and 116 if it hit at night. Most experts, however, expect only a 6.0 to 6.5 quake — only one-tenth as strong as a 7.6 — so we could expect proportionally fewer deaths.

## 4 Didn't the quake last September make a big quake less likely, and doesn't it make a difference where on the fault a quake is centered?

The quake Sept. 26 measured 4.6 on the Richter Scale. A 6.5 quake — the one we're past-due for — would cause 100 times more shaking and release 1,000 times more energy. Or, to turn it the other way around, there would have to be 1,000 or so 4.6 quakes to equal a 6.5 quake. So the September quake won't have much effect on "the big one."

Distance from the epicenter of a quake does make a difference in how much damage it causes. But the New Madrid

Fault is only 125 miles long. Quake damage forecasts are based on a quake centered in the middle of the zone, around Caruthersville, Mo. The distance from the middle of the zone to the end is only 60 miles or so, which means that in a big quake, there wouldn't be much difference in damage if it is centered 60 miles either way.

## 5 Where is a safe place to be during a quake?

A quake will hit and be over so quickly you won't have time to go very far to a safe place. You should know of some places that are generally safe wherever you may be. At home, work or school, under a sturdy table or desk is fairly good protection.

## 6 Is my home or building safe?

Newer buildings follow quake resistance building codes, but may suffer some damage. Chimneys and brick veneer are especially vulnerable on any house. Most older homes could be heavily damaged in a bad quake. If you live in an apartment, check with the city to see if it meets quake standards.

## 7 Will the dams break and flood the area?

The Corps of Engineers says the dams were built to withstand a 7.6 quake. But, as an exercise, engineers figured out

that even if the water were already as high as it was in the 1937 flood AND Barkley Dam were then to break, the water would still be four feet below the top of Paducah's flood wall. More about the dams on page 16.

## 8 How soon can I expect help from emergency service people?

You should be prepared to be on your own for up to three days if a bad earthquake strikes.

## 9 Will any atomic radiation escape from the Martin Marietta plant?

In the worst possible case, says a Martin Marietta spokesperson, the chance of any radioactive material escaping would be "remote." The material the plant handles has such low levels of radiation that a short-term exposure — as in a cloud of it passing over — would be virtually harmless. More about possible industrial hazards on page 21.

## 10 Will my children be safe in school in an earthquake?

Conditions of the buildings and degree of earthquake planning vary. Emergency service officials fear a panic could result if parents all rush to the schools after a quake, and they hope schools could be prepared to keep children for a day or two if necessary. Schools outline their plans on page 18.



THE 'PREDICTION'

# Iben Browning: Genius, crackpot or does it matter?



**BY BILL BARTLEMAN**  
SUN STAFF WRITER

Iben Browning said it was in 1985 that he first made a projection that a major earthquake could hit the New Madrid fault region on Dec. 3, 1990.

While skeptics said there is no accurate way to predict an earthquake, Browning says he made another projection in 1985: that a major quake might hit the San Francisco area at 10 a.m. on Oct. 17, 1989.

The only mistake in the projection was the time of day. It actually struck at 5:04 p.m. on Oct. 17, 1989.

Browning, a New Mexico climatologist, based both earthquake projections on tidal forces, which cause pressure on the earth's crust. The amount of tidal force is determined on the position of the sun, moon and earth. (See diagram below.)

The tidal force on the earth's crust is similar to the force that causes high and low tides in the ocean.

Browning said the position of the sun, moon and earth during the first week in December will create the highest tidal force the New Madrid region has experienced in 60 years and equal to the force that existed in the 1811-12 quakes.

Browning says it is inaccurate that he made a "prediction" that an earthquake would strike. "I call it a projection," he said in a recent interview with KFVS-TV in Cape Girardeau, Mo. "The difference between a prediction and a projection is that a prediction is based on a crystal ball and a projection is based on hard numbers."

The New Madrid fault runs from Marked Tree, Ark., across southeastern Missouri to Cairo, Ill., and produces hundreds of small quakes every year, most of which aren't felt. It's named for the Missouri Bootheel town of New Madrid, about 140 miles south of St. Louis.

Officials say a major quake in the region would cause major damage in Kentucky, Tennessee, Missouri, Illinois, Arkansas and Indiana. It also could cause damage in other surrounding states because of the depth of the fault.

Browning has stopped giving interviews because of the high number of requests he has received and because of the emotion

surrounding his projection.

The Sun interviewed the 72-year-old climatologist in January, which was the first time his projection was made public in this area. His comments then were the same as his comments in his most recent interview with KFVS-TV.

Browning said the probability of an earthquake in the New Madrid fault during the first week of December is 50-50.

An earthquake is caused when pressure is released between two faults, or cracks, in the earth. Browning believes the tidal force is one of the "triggers" that can set off a quake.

Browning said his prediction of a 50-50 chance of a quake is based on studies by others that the New Madrid Fault is under extreme pressure "and 20 years over due for a major earthquake."

He said some seismologists have measured the fault and feel their is sufficient pressure built for a quake in the magnitude of 6.5 to 7.6 on the Richter Scale.

If it is ready to release its pressure, he feels the high tidal force during the first week in December will serve as the "trigger" to release the pressure.

Browning said he doesn't plan to be anywhere near the New Madrid fault in December. He advised residents of the region to be prepared for a quake by storing food and other necessities.

If the quake doesn't hit on or near Dec. 3, Browning said there will be a secondary triggering force on Dec. 31st, which is the first full moon after Dec. 3. "The tidal forces will not be as great then, but they will still be dangerously high."

Most seismologists discount Brownings' theory. They say the tidal force theory is unproven and that Browning is causing unnecessary alarm in the region.

Browning's mind isn't changed by his critics. "Scientists are not a particularly special breed of cat," Browning said in the television interview. "They have opinions ... biases. ... Luckily this is a free country. They're free to say anything they want to. And, by the way, so am I."

However, his said his theories are based on 30 years of research and claims to have made seven correct projections of either

earthquakes or volcanoes.

He said he correctly predicted a Feb. 8, 1971, earthquake in Fullerton, Calif.; a Dec. 23, 1972 quake in Managua, Nicaragua; a major quake in Indonesia for which he didn't recall the date; the Oct. 17, 1989, quake in California, and three volcanoes, including Mount St. Helen in Washington.

Browning said that in 1985 he also projected that a major earthquake would hit somewhere along the 20 degree northern latitudes on Jan. 18 or 19, 1992. That includes Southern Mexico and the Middle East.

Browning told KFVS-TV that he hasn't enjoyed the publicity that has surrounded his Dec. 3 projection. "It certainly has involved a lot of telephone calls and it hasn't contributed in any way to me making a living," he said.

He said he received calls from panicked housewives and school children. "I am a very private person and I don't enjoy all of the publicity. I wish it all would go away, but I recognize that it won't."

He feels people have a right to know about the projection, but hopes there isn't panic. "If the public panics, there may be more people killed than if they never heard of it."

Meanwhile, other scientists discount Browning's theory that tidal forces can be used to predict earthquakes.

At a press conference last month in St. Louis, 11 scientists discussed their evaluation of Browning's work in a report for the National Earthquake Prediction Evaluation Council. They said:

"Such a projection, especially at the predicted 50-50 chance level, implies a level of detailed knowledge ... that simply does not exist for the New Madrid or any other fault zone in the world."

The scientists also said they found no evidence that Browning had predicted last year's major earthquake in northern California.

"We can only infer that successes claimed before that time were retrospective — that he found after the fact that certain earthquakes occurred during times of his 'danger periods.'"

**“I call it a projection... The difference between a prediction and a projection is that a prediction is based on a crystal ball and a projection is based on hard numbers.”**

## Iben Browning's forecasts are based on several factors working together:

**1** The alignment of the Earth, sun and moon during the full moon and new moon, and especially during eclipses.

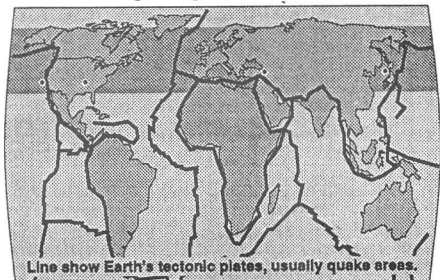


**2** The nearness of the moon to the Earth and Earth to the sun.

**3** These factors create a gravitational pull on the Earth that causes tides and distorts the shape of the Earth. Browning says that around Dec. 2 these forces will be the strongest in 60 years in the area between 30 degrees and 60 degrees north latitude.

**4** This added pressure could be enough to cause earthquakes in areas where the pressure already is high. The 30- to 60-degree latitudes include the New Madrid Fault zone as well as more active quake areas such as California, Turkey-Armenia and Japan, in the dark band at right. Browning says that whether any specific fault erupts into a quake depends on the pressure already built up there.

Most scientists don't believe the gravity of the sun and moon can set off earthquakes.



Line show Earth's tectonic plates, usually quake areas.

GETTING READY FOR AN EARTHQUAKE

# Odds favor 6.0-6.5 quake

Earthquakes cannot be predicted, but experts can give the likelihood of one happening based on history. These figures are from the Center for Earthquake Studies at Southeast Missouri State University.

An earthquake of this magnitude...	Is expected about every...	Experts give it these odds of happening by...
<b>4.0</b>	18 months	
<b>5.0</b>	10 years	
<b>6.0</b>	'80 years	50% by year 2000 90% by year 2040
<b>6.5</b>	55-85 years	40-60% by 2005 97% by year 2040
<b>7.5</b>	200-300 years	10% by year 2000 25% by year 2040
<b>8.0</b>	500-600 years	1% by year 2000 3% by year 2040

The last quakes of this size occurred in 1843 near Marked Tree, Ark., and in 1895 at Charleston, Mo.

Considered a 'major' quake, it's estimated this could cause \$30 billion damage in the New Madrid Zone.

The worst of the 1811-12 quakes have been estimated at 8 to 8.8. The scale did not exist then.

The most commonly used scale of reporting earthquake strength is the Richter Scale. Devised in the 1930s, it measures ground motion at a standard distance from the epicenter of a quake. (The epicenter is the spot on the surface directly over the center of the quake.) It is based on a scale of 1-10. Each whole number equals motion 10 times larger than the previous number. So a quake measuring 4.0 has 10 times more ground motion as a quake of 3.0.

If the 4.6 quake Sept. 26 made the ground move 1/4 inch, a 6.6 quake - which is about what experts say is due - would make the ground move 25 inches (.25 X 10 X 10). A 7.6 quake, which is the worst quake scientists believe is likely in the New Madrid Zone, could move the ground 21 feet (.25 X 10 X 10 X 10).

A tremendous amount of energy is needed to make the ground move. Each whole number increase on the Richter Scale equals a more than 30-fold increase in the amount of energy.

If this line, about 1 1/4 inches long, represented the energy released in the 4.6 quake on Sept. 26...

1 1/4 inches = 4.6 quake  
...the energy in a 6.6 quake would need a line nearly 100 feet long. To represent a 7.6 quake, the line would have to be twice as long as the Executive Inn.

# What you can do now to be ready for a quake

## HAVE ON HAND

**Flashlights with spare batteries.** Keep a flashlight beside your bed. Do not use matches or candles after an earthquake until you are certain no gas leaks exist.

**Portable radio with spare batteries.** Most telephones will be out of order or used for emergency purposes so radios will be your best source of information.

**First Aid Kit; first aid knowledge** - have a first aid book such as the Standard First Aid & Personal Safety by the American National Red Cross. Have members of your household take basic Red Cross first aid and CPR courses.

**Fire Extinguishers.** Keep a fire extinguisher handy for small fires. Class C extinguishers are designed to use safely on any type of fire. Your fire department can show you how to use it.

**Food.** It's always a practical idea to keep a supply of non-perishable food on hand which can be rotated into your diet and replenished on a regular basis. Have a sufficient supply of canned or dehydrated food, powdered milk and canned juices for at least 72 hours. Don't forget a can opener. Dried cereals and fruits and non-salted nuts are a good source of nutrition.

**Water** - should be stored in air-tight containers and replaced about every six months. Store at least three gallons of water per person to be prepared for a 72-hour period. Water can be purified by boiling for 5 to 10 minutes or by adding 10 drops of household bleach per gallon of water and letting it stand for 30 minutes. A slight taste or smell of chlorine indicates it is good to drink.

**Special Items.** Have at least a week's supply of medications and special foods needed for infants or those on limited diets.

**Tools.** Pipe wrench and crescent wrench - for turning off gas and water mains.

## KNOW HOW TO TURN OFF GAS

Teach responsible members of your family how to turn off electricity, gas and water at main switch and valves. Western Kentucky Gas Co. advises that you not turn off your gas at the main unless you know there is a leak. You can practice turning off the gas by turning the valve slightly, but do not shut off gas unless an emergency exists. If gas is ever turned off, all pilot lights must be relit quickly.

Label water shut-off valve, found where water enters the house, and the main shutoff valve, found with meter in a concrete box in the sidewalk.

## SAFE SPOTS; DANGER SPOTS

It's important to know where you should go for protection when your house starts to shake. In a quake, you will have only seconds to react, and you should know what to do without having to stop and think about it. An earthquake drill will help you remember what to do.

Each family member should know safe spots in each room. There will not be time to run to a spot in another room, and it may be dangerous.

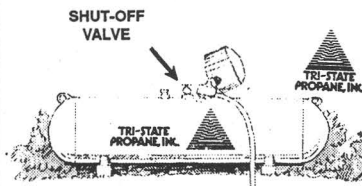
**Safe spots:** The best places to be are under supported archways, against inside walls, and under heavy pieces of furniture like a desk or sturdy table. Doorways are safe spots as long as there are no doors to swing closed on your hands. And find a place where you can hold on tightly; a severe shake can make it hard to hold on after a while.

**Danger spots:** Stay away from windows, hanging objects, mirrors, fireplaces and tall, unsecured furniture.

Reinforce this knowledge by physically placing yourself in the safe locations. This is an especially important step for children.

Sometime after this exercise, hold a surprise drill. This helps children remember what to do.

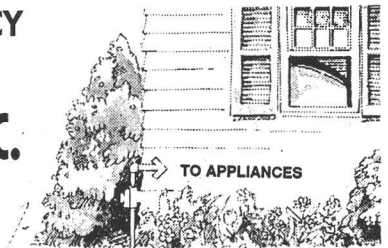
## KNOW HOW TO TURN OFF YOUR PROPANE GAS IN CASE OF EMERGENCY



### TRI-STATE PROPANE, INC.

4710 Clarks River Road, Paducah, Ky.

Phone (502) 898-7387

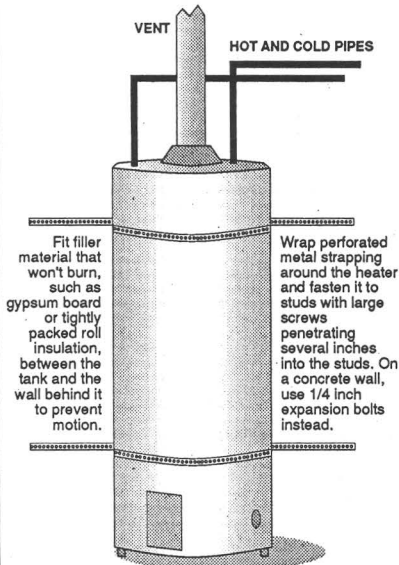


GETTING READY FOR AN EARTHQUAKE

# Look over your home for earthquake hazards

## Loose water heater could become your enemy in a quake

The 1989 San Francisco earthquake showed that damaged gas hot water heaters were the leading cause of fires after the quake. The heaters just broke loose from their pipes, and the gas escaped and exploded, touched off by the pilot light or a spark. A hot water heater can be secured for a few dollars, and even 'unhandy' people can do it themselves.



Have a plumber replace a rigid gas line with a flexible line like those used on gas kitchen ranges.

### SOME POSSIBLE HAZARDS

Tall heavy furniture which could topple, such as bookcases, china cabinets, or modular wall units. Secure them to a stud in the wall with an 'L' bracket. In most cases it can be on top of the cabinet, out of sight and causing minimal damage. Antique furniture may be secured with less damage by a bolt through the back and into a stud.

Hot water heaters which can be pulled away from pipes and rupture. The California earthquake in 1989 showed that gas hot water heaters that broke loose from their pipes were the major cause of fires after the quake. Hot water heaters can be secured to a wall for as little as \$5 if you do it yourself.

Appliances which could move enough to rupture gas or electrical lines.

Hanging plants in heavy pots that could swing free of hooks. Substitute closed hooks, and repot plants in plastic rather than heavy clay pots.

Magnetic latches on kitchen or other cabinets which will not hold the door closed during shaking.

Breakables or heavy objects that are kept on high or open shelves.

A masonry chimney that could crumble and fall through an unsupported roof.

A heavy picture, bookshelf or other object over your bed that could fall on you.

Flammable liquids, like painting or cleaning products, that would be safer in a garage or outside shed.

Glass bottles in a medicine cabinet that could fall out and break in the sink. Replace them with plastic bottles.

## 7.6 – the worst likely quake

An earthquake has only one Richter Scale magnitude, but the damage it can cause depends on several factors, like distance from the epicenter and type of soil. To show how much damage a quake might cause, experts use the Modified Mercalli Scale, which takes soil and other factors into consideration. Because a 7.6 is the 'maximum credible quake' for the New Madrid area, a Mercalli map has been prepared for one. The map for a quake we're most likely to have – a 6.0 to 6.5 – would affect a much smaller area. If an earthquake measuring 7.6 on the Richter Scale were to occur, we could expect damage as shown below. This is based on a quake centered in the Caruthersville, Mo.-Blytheville, Ark. area, the most probable earthquake 'source zone.'



- STRONG:** Trees sway, suspended objects swing, loose objects overturn or fall. This area extends far beyond this map – west into Kansas, south into Georgia, east into South Carolina and Pennsylvania, and north into Michigan.
- VERY STRONG:** Walls crack and plaster falls. This area includes all but the easternmost parts of Kentucky and Tennessee.
- DESTRUCTIVE:** Masonry cracks, chimneys fall, poorly built buildings damaged.
- RUINOUS:** Some houses collapse where the ground begins to crack, pipes break open.
- DISASTROUS:** Ground cracks badly, many buildings destroyed, railway lines bent, landslides on steep slopes. This area is the New Madrid Fault Zone.

## EARTHQUAKE PREPARED?

\* Recommended drinking water is 1/2 gallon per day or 7 gallons per week.



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## Some weird things from 1811 quake

Movies and TV documentaries report stories about animals behaving restlessly before an earthquake, birds flying away or sudden, eerie silences just before the big shake.

But people who survived the New Madrid Earthquake of 1811-12 reported some strange things, too:

■ **Darkness** — Several people said it fell totally dark during the daylight shocks (the earthquake was actually several severe shocks over several weeks, with the first one Dec. 16, 1811), and a similar "awful darkness of the atmosphere" accompanied a major shock at 4 p.m. Feb. 7, 1812, and a "dense black cloud of vapor overshadowed the land." At Herculaneum, Mo., on the Mississippi below St. Louis, the air "was filled with smoke or fog so that a boat could not be seen 20 paces, and houses were so shrouded as not to be visible 50 feet. The air did not clear until the middle of the day." A writer from New Madrid said "at the time of the shock the air was clear, but in five minutes it became very dark" and six shocks occurred.

■ **Odors and vapors** — Nearly every witness reported "sulphurous or otherwise obnoxious odors and vapors," that filled the air for hours, making it hard to breathe and contaminating water even 150 miles away. At Jeffersonville, Ind., "warmth and smokiness were noted for several days after the shock."

■ **Strange lights** — "There issued no burning flames, but flashes such as would result from an explosion of gas, or from passing of electricity from cloud to cloud," one witness said years later. At St. Louis, "gleams and flashes of light ... generally ascending from the earth." At Bardstown, "frequent lights during the commotion." At Knoxville, "two flashes of light very much like distant lightning." In North Carolina, "three large, extraordinary fires in the air... their continuance was several hours, their size as large as a house on fire." Nothing, however, was reported from New Madrid itself.

■ **Noises** — Witness compared the sound to steam escaping from a boiler, distant thunder, roaring, wind in the trees and explosions. One colorful description comes from Tennessee: "When the shocks came, the stones of the surface of the earth were agitated by a tremulous motion like eggs in a frying pan, altogether making a noise similar to that of the wheels of a wagon in a pebbly road."

In Louisville and Savannah, Ga., the noise was compared to a carriage going by on the street. Rumbling was heard in Washington, D.C. and Richmond, Va. In Charleston, S.C., "rumbling like distant thunder which increased in violence of sound just before the shock was felt."

Experts can explain the lights as unusual winter thunderstorms or Northern Lights, the odors as the escape of gas from decaying underground material, and the darkness as dust or condensation from warm underground streams in the cold winter air, but to the frightened observers, it must have seemed like a vision of hell.

— *Accounts from "The New Madrid Earthquake, a Scientific Factual Field Account" published in 1912.*

## Ride out an earthquake where ever you may be

### WHAT A BIG QUAKE FEELS LIKE

During a major earthquake, you may experience a shaking that starts out to be gentle and within a second or two grows violent and knocks you off your feet. Or you may be jarred first by a violent jolt — as though your house has been hit by a truck. A second or two later you'll feel the shaking. In either case, you'll find it very difficult if not impossible to move from one room to another. The shaking typically lasts from 20 to 60 seconds.

### WHAT TO DO WHEN IT HITS

Remember, there will be no warning.

The experts agree on one thing: Where ever you are, stay there. Don't try to run somewhere else.

#### AT HOME OR OFFICE

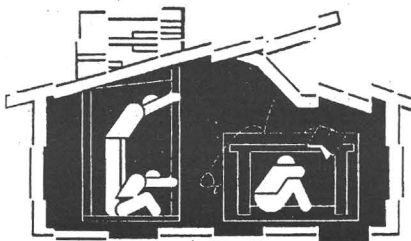
If you are indoors, stay there. Get under a desk or table or stand in a doorway (if there is not a door to swing against you) or corner like you practiced in your drills. And hang on tightly; trying to keep your balance for up to 60 seconds while everything is shaking can be very tiring, so find a place where there is something to hold onto. Remember, stay clear of windows, bookcases, china cabinets, mirrors, and fireplaces until the shaking stops. If you're under an office desk, watch out for equipment like computer terminals or typewriters that could shake off and fall on you.

In halls, stairways or other areas where no cover is available, move to the interior wall. Turn away from windows, kneel alongside the wall, bend your head down and cover your head with your hands behind your neck.

If you happen to be in the kitchen, turn off a gas stove at the first sign of shaking and quickly take cover under a counter or table, or in a doorway if there's no door to swing and hurt you.

#### IN A CAR

If you are in your car, pull to the side of the road and stop. Don't stop on a bridge or overpass. Do not park under overpasses or power lines. Stay in your car until the earthquake is over; a car is a very safe place to be, although it may bounce severely. If the earthquake has been severe, do not attempt to cross bridges or overpasses even if they look safe from the road. If you have to leave your car, leave a note if you can, giving your name



A crumbled house after the Loma Prieta quake in San Francisco in 1989.

and address and where you intend to walk.

#### OUTDOORS

If you are outside, get into the open away from buildings, trees, walls and power lines. Many older buildings will not stand up to an earthquake very well. If they do not collapse, they will shower loose bricks and pieces of heavy decorative moulding down on the streets.

#### AT THE MALL

If in a crowded public place like the mall, do not rush for the doorway since other people are going to have the same idea. You could be hurt in the rush. Move away from display shelves containing objects that may fall.

#### IN A HIGHRISE

If in a highrise building, get under a desk, stay away from windows and outside walls. Tall buildings shake like whips or radio antennas — there will be more motion at the top than at the bottom — but stay in the building on the same floor. Don't be surprised if the electricity goes out, or if elevator, fire alarm or sprinkler systems go on. Do not use elevators.

#### OTHER PLACES

In a factory, shut off machinery and get clear of it. Move away from overhead pipes or ducts that may fall, and heavy standing objects like air cylinders that could topple on you. Stay clear of windows.

On the river or lakes, the water will at first insulate you from shaking. But your boat may be thrown against a dock or snag as the waves worsen.

In a laboratory, shut off gas valves and get under a sturdy table. Stay clear of shelves of glassware and be alert for dangerous chemicals that may spill or heavy equipment that may slide off a table.

In a library, move away from shelves where books may fall on you.

Stop and think now about the places you go often, and spots there that would be safe in an earthquake. You won't have much time to think about them when it happens.

## AFTER AN EARTHQUAKE

# The first things to do when the shaking stops

## CHECK FOR INJURIES

If anyone has stopped breathing, give mouth-to-mouth resuscitation. Stop any bleeding injury by applying direct pressure to the wound. Do not move seriously injured people unless they are in immediate danger of further injury. Cover injured persons with blankets to keep them warm.

Check gas, water and electrical lines and check appliances for damage. Do not search for gas leaks with a lighted match.

If you smell gas, hear a hissing sound near a gas line or see a broken line, shut off main valve. If the pilot light has gone out on an appliance, first see if the gas is still on before trying to relight it. If there is no gas at the pilot light, you may have a leak in the line. If you hear or smell gas, look for a leak in the line, especially at the joints. If you determine there is no gas at all coming through the gas lines into your home, shut off the valve at the meter until gas service is restored. (If it is restored later and you haven't turned off the valve, gas will escape into your home through the pilot lights.) Do not switch on the gas or electricity again until the power company has first checked your home.

Turn on your battery-powered radio (or car radio) to **AM 570** for damage reports and information.

## CHECK FOR DAMAGE

If possible, put out small fires; if not, leave your home immediately and warn your neighbors.

Do not use electrical switches or appliances if gas leaks are suspected because sparks can ignite gas from broken lines.

Switch off electrical power if there is damage to your house electrical wiring. If you smell the tell-tale odor or electricity or burned wiring, shut off your electricity. If you have a breaker box, switch off the smaller switches; then pull the main breaker if you want.

Do not touch fallen power lines or broken appliances. If extremely high voltage lines are nearby, you could be electrocuted just by being too close to them. Stay at least 10 feet away from them.

Clean up spilled medicines, bleach, gasoline and other flammable liquids.

Check to see that sewage lines are intact before using the toilet. Plug bathtub and sink drains to prevent sewage backup.

Check food and water supplies. If water is cut off, use emergency water supplies found in toilet tanks (not the bowl), water heaters, melted ice cubes.

Check the building for cracks and damage, particularly the chimneys or masonry walls. Do not use fireplaces unless the chimney is undamaged and without cracks.

Check closets and cupboards. Open doors cautiously. Beware of objects tumbling off shelves.

Use charcoal broilers for emergency cooking, only out of doors.

Do not use your vehicle unless there is an emergency. Do not go sightseeing through badly damaged areas. You will only hamper the relief effort. If you were to hit a brick and have a flat tire, you would be in the way of emergency vehicles. Be aware that there may be looting in some places, and it can be dangerous for passersby.

Be willing to offer your assistance to emergency workers if you are physically able.

Be prepared for aftershocks. These are usually smaller than the main quake but some may be large enough to do additional damage to structures weakened during the main shock.

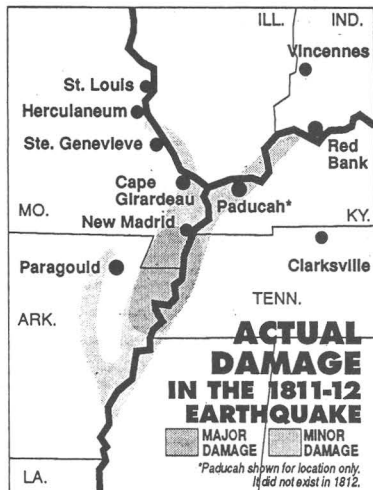
Finally, when you are able, contact a designated family member in another city to let them know how you are. You may have to seek out a ham radio operator if the phones are out.

## IF YOU MUST EVACUATE YOUR HOME

Post a message in clear view where you can be found. List reunion points in case of separation. Such points may be neighbors, friends, relatives, school or community center.

Take with you:

- Medicines and first aid kit
- Flashlight, radio and batteries
- Important papers and cash
- Food, sleeping bags/blankets and extra clothes.



## The fault that underlies all our problems

Little Prairie, Mo., isn't on any map today. It sank into the Mississippi during the greatest cataclysm in North America's recorded history — the New Madrid Earthquake.

Records disagree as to whether it was during the first, second or 10th severe quake that hit on Dec. 16, 1811, but the community vanished without a trace.

The 100 or so residents, shaken out of their beds when the first quake hit at 2 a.m., waded snake-infested swamps eight miles to the nearest dry land. When they reached the nearest community, New Madrid, 23 miles to the north, they found it also in ruins and its shivering residents camped outdoors.

The fearful quakes continued off and on through Christmas and well into the new year. During one, the heaving land made the Mississippi flow backward. On Feb. 7, 1812, the greatest shock hit — estimated today at 8.8 on the Richter Scale — causing New Madrid itself to sink 15 to 20 feet. When the spring floods came, the town was swept away.

It was not the first big New Madrid Earthquake nor the last — others were recorded in 1775, 1792, 1843 and 1895 — but geologic evidence indicates there had not been as bad a quake for at least 200 years before 1811.

The fault was the New Madrid Fault, a system of shifting cracks deep in the earth. The fault line runs south from around Cairo, Ill., through Caruthersville (near the site of Little Prairie) follows Interstate 55 to Blytheville, Ark., and ends near Marked Tree, Ark. It is not as active nor as visible as the San Andreas Fault system in California, but when quakes do occur on it, the damage can cover up to 20 times the area because our soft soil, built up by the Ohio and Mississippi rivers, shakes in waves like Jell-O.

Scientists say another Great Quake is unlikely, but they believe we are past due for a quake in the 6.5-magnitude range. Some estimate there is enough energy stored in the fault for a 7.6 quake.

## King credits Browning for quake readiness

BY BILL BARTLEMAN  
SUN STAFF WRITER

Kent King believes there is a silver lining in Iben Browning's projection that a big earthquake will hit the area next month.

The benefit, he said, is that people are taking the threat seriously and making preparations.

"The Dec. 3 projection was wonderful because usually it takes a major disaster to prepare people," said King, director of Disaster and Emergency Services for McCracken County. "We just don't experience enough moderate earthquakes here, like they do in California, to keep people prepared."

"If people are prepared for an earthquake, they are going to be prepared for any kind of a natural disaster or emergency."

King noted the region has annual threats of tornadoes, floods and snowstorms for which people rarely prepare.

"If there is a report in the morning that a major snowstorm is possible, there is a run on the grocery in the afternoon," King said.

Preparation involves storing food, water, emergency supplies, planning neighborhood rescue efforts, coordinating communications with family members and taking first aid classes.

If a big earthquake hits, next month or five years from now, people should be prepared to survive on their own for at least two days, King said.

Emergency services agencies will work under the direction of DES from its command center on Coleman Road. Widespread destruction could mean inability to

respond to calls for help.

"It's going to take a while before (emergency) people can get through the debris in the streets," King said.

"Since most of western Kentucky could be affected, we'll probably have to rely on help from eastern Kentucky, which may have to be airlifted in, since much of this area is accessible only by bridges."

King said it is likely residents would be without electricity, water, gas or phone service.

King encourages neighborhood residents to unite and prepare to help each other. He said neighbors helping neighbors would relieve emergency personnel for other work.

King and other officials say that if an earthquake hits, the first priority will be to rescue people. For example, saving lives would have a higher priority for firefighters than putting out fires.

Rescue efforts also would be prioritized. King and others say rescuing 100 students trapped in a school would have priority over rescuing five people trapped in another building.

Since it is likely telephone service would be interrupted, officials will rely on radio communications to report damage and dispatch emergency workers.

Amateur radio operators would play a key role in reporting damage and injuries in various neighborhoods.

If phone service is not interrupted, people not facing emergencies should not dial emergency 911 or any other agency.

A major emergency would be a life-threatening injury or situation. It would have priority over someone who might have minor injuries or a few broken bones.

**"If people are prepared for an earthquake, they are going to be prepared for any kind of natural disaster..."**

— KENT KING,  
McCracken County  
DES coordinator

### Major elements of McCracken DES earthquake plan

1. Emergency operations would be coordinated by DES through its Emergency Operations Center on Coleman Road.
2. Emergency personnel, such as firefighters, would report to their headquarters or the headquarters of the nearest agency.
3. Local fire departments would act as district coordinating facilities.
4. Damage would be reported to the DES headquarters by emergency personnel and amateur radio operators.
5. Schools would report damage to the central office and the central office would report to DES.
6. First Aid centers would be established on football fields, park lots of churches and other open areas. They would be staffed by volunteers with first aid training.
7. Travel would be restricted by unauthorized persons to enable emergency personnel to assess damage and respond to emergencies.
8. The public would be kept informed of vital information, such as the location of first aid stations and location of evacuation centers, on WKXY-Radio, which has been designated as part of the Emergency Broadcast System.



# WE ARE PREPARED

At Peoples First National Bank, we recognize that emergencies can occur at any time. To protect the interests of our customers, we have developed an extensive emergency disaster plan.

HIGHLIGHTS OF THE PLAN INCLUDE:

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#### CASH

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#### BALANCING INFORMATION

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#### SAFE DEPOSIT BOXES

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#### TRUST AND STOCK RECORDS

Records updated by Sungard Trust Systems, Charlotte, North Carolina.

If you have further questions regarding the bank's emergency disaster plan, contact the Disaster Recovery Coordinator of Peoples First National Bank and Trust Company.



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# APPENDIX F

## FAULT ZONE HUMOR

Cartoons relating to  
Browning's prediction

Arkansas  
Democrat

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Memphis  
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THE MOST DANGEROUS SIDE-EFFECT OF EARTHQUAKE PREDICTIONS...AFTER SHOCK.

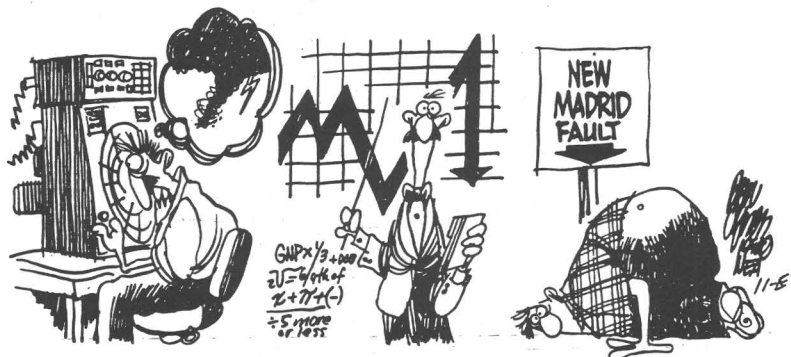
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EARTHQUAKE  
FORECASTING

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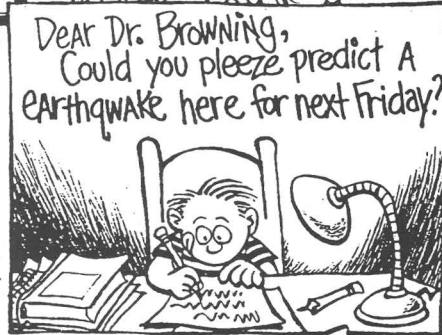
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News Flash: New Madrid Fault Claims One Victim