

Natural Hazard Research

**FIELD OBSERVATIONS IN MEMPHIS DURING THE
NEW MADRID EARTHQUAKE "PROJECTION"
OF 1990:
HOW PSEUDOSCIENCE AFFECTED A REGION**

by

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SUMMARY

On November 29, 1989, the Arkansas Democrat published an article entitled, "New Madrid Tremors Due, Forecast Says." The 260-word piece stated that Iben Browning, described as a climatologist, scientist, inventor, and holder of a doctorate in physiology, was "projecting" a 50% probability that an earthquake would occur on or around December 3, 1990, within the New Madrid Seismic Zone (NMSZ). The NMSZ is found along the Mississippi River, abutting the states of Arkansas, Missouri, Tennessee, Kentucky, and Illinois. Although four devastating earthquakes occurred in the area during 1811 and 1812, and several other significant shocks were felt in 1843, 1895, 1917, 1934, and 1968, there have been no tremors within recent memory that would heighten concern.

Between November 29, 1989, and December 3, 1990, more than 300 articles about the forecast appeared in more than 45 national and local publications. As public concern rose over the possibility of an earthquake, demands were made on those who could provide general information about earthquakes or preparation/mitigation advice. Entities such as the American Red Cross, the Central U.S. Earthquake Consortium, and Memphis State University's Center for Earthquake Research and Information, were overwhelmed by requests for information. As December 3 neared, media coverage accelerated, and reporters descended on the agricultural community of New Madrid, Missouri.

The bulk of this paper consists of observations made in Memphis, Tennessee, and its environs from December 1 to December 4, 1990. Information was obtained by monitoring radio and television broadcasts, attending a press conference, interviewing a television reporter from Nashville, Tennessee, and conversing with personnel from entities such as those listed earlier. In addition, the impact the earthquake projection had on some local businesses was explored, some outlying areas were visited, and "impromptu" interviews were held with members of the public. These interviews were not rigorous in the sense that a specific sample of the population was sought out; instead, people were simply approached if they looked amenable to chatting with a stranger. Under these circumstances, brief conversations were held with a bus driver, a cleaning person, a hotel sales manager, a hotel guest, waitresses and waiters, desk clerks, businesspersons, insurance agents, fellow bus and airplane passengers, and two airport ticketing agents.

The local media coverage was extensive and ranged from inflammatory to calm and rational, with occasional humor. Public response appeared calm and rational, if sometimes amused or occasionally bewildered, but there was no evidence of panic or expressions of strong fear. There was no consensus among or between response personnel, media representatives, or elected officials regarding whether Browning had harmed or aided earthquake recognition/preparation efforts in the region.

magnitudes estimated between 8.4 and 8.7 jarred the region and caused widespread effects, such as bells ringing in Boston, Massachusetts, doors rattling in Washington, D.C., and toppled chimneys in Cincinnati, Ohio (Rockaway, 1990). These events would eventually become known in the region as the Great New Madrid Earthquakes of 1811-1812.

Although the towns of New Madrid, Big Prairie, and Little Prairie were destroyed by the earthquakes, the tremors caused few deaths. The loss of life was restricted because of the simple lifestyles and small numbers of area residents. Buildings were generally log cabins or light, low, wood-framed structures, construction types that are least susceptible to seismic damage (Rockaway, 1990). This is not the case today. In Memphis and its environs, unreinforced masonry structures and high-rise office buildings constructed without the benefit of seismic codes dominate the landscape.

The threat of an earthquake within the New Madrid Seismic Zone (NMSZ) is very real (Figure 1). Fortunately, the possibility of huge episodes in the near future, such as those that took place from 1811 to 1812, seem remote. Studies suggest that the recurrence interval for such an event could be anywhere between 500 and 700 years (Johnston, 1982). However, the nature of the ground surface in the NMSZ does not require a large event to result in substantial damage. The eastern and central U.S. are geologically characterized as having "low attenuation of seismic intensity" (Hopper and Algermissen, 1985, p. 89). This means that earthquake effects are amplified and can be felt over larger regions than are similar events in the west (e.g. California). Johnston and Nava (1985) estimate a 40-63% probability of a magnitude 6.0 or greater earthquake occurring in the region between 1985 and 2000, with that probability rising to 90% by the year 2040. Under current circumstances, an earthquake of that size within the New Madrid Seismic Zone would probably kill and injure many people and cause extensive property damage.

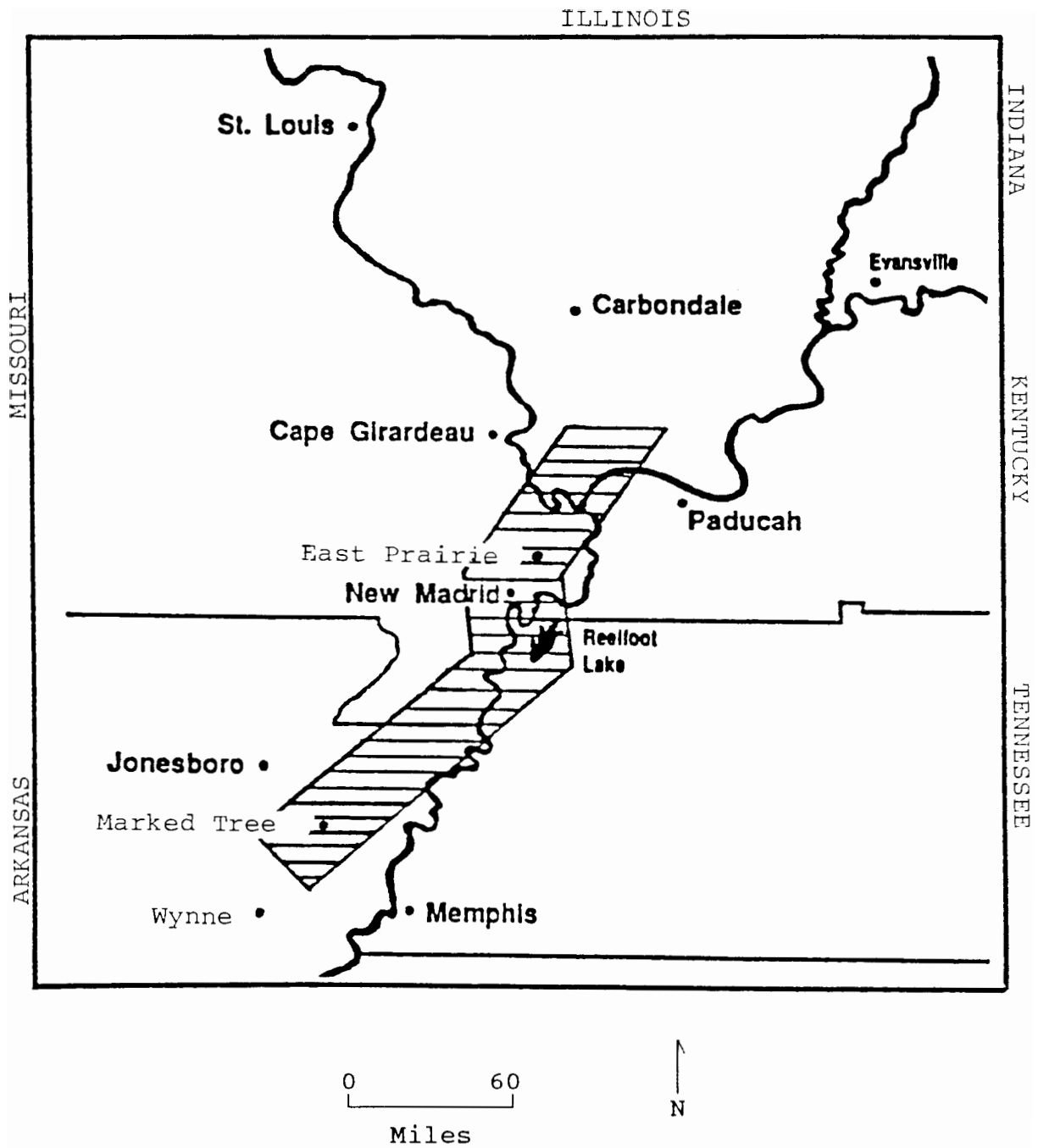


Figure 1. The New Madrid Seismic Zone

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scientist, inventor, and holder of a doctorate in physiology, is "projecting" a 50% probability that an earthquake will occur on or around December 3, 1990, within the NMSZ. Such a projection is bound to arouse concern because of the Great New Madrid Earthquakes of 1811-12. However, Dr. Browning is neither a geologist nor a seismologist, and he has no formal training in climatology. Additionally, the projection is based on a widely discredited theory that links the occurrence of earthquakes with tidal forces. Nevertheless, as the projected date draws near, rumors abound, citizens discuss leaving the area, and a virtual frenzy of earthquake preparedness is evident.

June through October: During this five-month period, the major local newspaper in Memphis, the Commercial Appeal, publishes at least 19 articles addressing the projection and related stories.

October 18, 1990: The National Earthquake Prediction Evaluation Council (NEPEC) holds a press conference during which a 66-page document is issued discrediting Browning's methodology and the projection.

October and November: PBS airs Fire on the Rim, a documentary about earthquakes and volcanoes.

November 11 and 12: NBC airs the made-for-television movie The Great Los Angeles Earthquake.

November 13: CNN Headline News discusses a Los Angeles earthquake prediction and PBS airs "NOVA's" Earthquake!.

November 14: A segment of "Unsolved Mysteries" (ABC) examines the Browning projection.

November 16 and 17: CNN Headline News features a segment showing the female star of The Great Los Angeles Earthquake urging people to undertake personal mitigation efforts.

November: During this single month, the Commercial Appeal publishes at least 12 articles discussing the projection and related issues.

December: The Commercial Appeal publishes at least 16 articles during the 4-day period, December 1 - 4, 1990, that discuss the projection and related issues. The broadcast and print media flock to New Madrid and surrounding areas, lured in part by more than 300 articles in over 45 national and local publications and extensive television coverage. As a result of the furor, people gather in New Madrid to look at the media. Disaster researchers, in turn, also come to the area, lured by the nearly unprecedented opportunity to observe, assess, and analyze the unfolding scenario.

SOME OBSERVATIONS IN MEMPHIS

Public Reactions

People living and working within the NMSZ were caught in a maelstrom of media hype, official response, and associated confusion. Some of these people were interviewed about the projection and their reactions ranged from calm assessment and low levels of concern to bemused incredulity, with, almost always a wry sense of humor over the commotion.

I held short interviews with 17 individuals ranging in age from approximately 19 to 45. No formal set of questions were asked of those interviewed; therefore, assumptions about their beliefs cannot be made when their statements do not directly address a specific aspect of the projection.

Aggregate Comments

Five of the 17 thought the projection was beneficial (even though it may have hurt business) because individual preparation had improved significantly. They generally believed that the interest in preparation/mitigation that had been generated by the projection was exciting, was of a positive nature, and that it would have been difficult to achieve such levels of individual preparedness as quickly under ordinary circumstances.

Six of the 17 mentioned that they had undertaken some sort of mitigative activities such as carrying emergency items in

their cars, placing emergency items in their garages, and preparing their homes. One of these individuals mentioned purchasing purification tablets, another one had stored two gallons of water, and two of them knew to "duck/cover/hold" in the event of an earthquake. Only one person specifically said that no mitigative action had been taken. Six of the 17 volunteered the fact that they did not believe Browning's projection that there would be an earthquake on December 3. Along the same lines, four individuals noted that there was a possibility of an earthquake occurring at some time, but believed that it was not possible to specify a date.

The rumor that Browning had changed the location of the earthquake danger to Tokyo, Japan, a few days before December 3 was related twice, as was the comment that the news media were responsible for generating public reaction by "hying" the projection and having "fun" with it. Two of those interviewed also offered the observation that emergency management/response agencies were actually happy about the projection because the level of interest that had been generated could never have been created under normal circumstances. These individuals did not believe that the immediate preparatory activities being accomplished could have been generated by a "normal" process, such as through U.S. Geological Survey urging.

Additional Comments

One individual had purchased a bottle of Tequila and noted that if an earthquake occurred there was plenty of water in their waterbed. Another mentioned Browning's tidal forces theory and seemed to regard it with skepticism. After initial comments suggesting bravado, a third showed concern that classes had to be attended in a building "right next to the river!"

A desk clerk greeted me with the statement, "So what do you think about the earthquake?" This person thought that many people were leaving Memphis because of the projection and used the lengthy lines at the gas stations that day as evidence. However,

the lines could have been due to the national five cent tax on gas that was to become effective the next day. This individual also believed that the people leaving town must not be Christians because they did not trust in "the Lord" to keep them safe.

Two others believed that people were taking the risk seriously and were concerned, but emphasized that no one was panicking. Another individual, a nonresident who had experienced an earthquake in California, found the entire situation amusing. And a fourth could not understand how Browning was able to generate so much concern or why people seemed to believe the projection.

One individual "didn't think anything" about the projection but was not trying to be flippant. It appeared that this person was a little concerned but did not know how to articulate those concerns. And another person, who was going to Ohio for a vacation, did not think that the relatives in Ohio were even aware of the projection because they had not communicated any concerns about a relative being in the NMSZ.

Although none of the people interviewed believed the projection, at least seven of the 17 had taken some measures to prepare for an earthquake. Generally, those interviewed perceived the effects of the projection positively, maintaining that the level of preparation and recognition of the threat was greater than could have been achieved through normal methods of public outreach. Although many expressed incredulity regarding the evident immensity of public response to a projection that they did not believe, none of them vented any anger at Iben Browning.

The Author's Comments

Memphis residents need to establish an "earthquake culture" much like that described by Miletic and Hutton (1986). Their Parkfield, California, study found that locals had "fully incorporated the earthquake hazard into their local culture, beliefs and norms," which included "not only recognition and acceptance of earthquake risks, but also ideas about what to do

to 'successfully' live with earthquake risk and earthquakes" (Mileti and Hutton, 1986, p. 4). One way to live successfully with the risk of an earthquake is to learn how to differentiate between projections or predictions originating from acceptable versus unacceptable sources. The Browning earthquake projection gave residents of the NMSZ their first experience with a form of pseudoscience with which California residents are much more familiar.

Effects on Businesses

This section presents general observations made during visits to some businesses and a shopping mall, telephone interviews with local insurance companies, a personal interview with the sales manager of a hotel, and a telephone interview with a successful business that owed its existence to the projection.

General Businesses

I visited a local Wal-Mart (extremely crowded with holiday shoppers) and sought out earthquake/survival supplies because there had been reports of a "run" on such items. Plenty of batteries, flashlights, bungee cords, and metal strapping materials were found in several different locations. There was an apparent "earthquake display" (although there was no sign designating it as such) near the entrance, composed of two two-shelf stacks containing first aid supplies (hydrogen peroxide, alcohol, gauze bandages), flashlights, hurricane lanterns, canned foods, and batteries. When another disaster researcher, who was also visiting the store, took a flash photograph of this display, almost immediately, the researcher was accosted by a store employee who wanted an explanation and an assurance that the researcher was not from the media. Evidently, store personnel were somewhat sensitive to the media presence in Memphis.

Later, I visited a major mall and searched for earthquake-related items. A search of all stores on both floors revealed only one t-shirt store selling shirts with a quake-related logo,

and these shirts were mixed among other shirts on a rack inside the store, not prominently displayed in the store's window.

Hotels

Hotels seemed to suffer during this time period. The hotel I occupied while in Memphis seemed to have few other occupants. My room was located in an expanded section featuring an atrium, which allowed five floors containing 112 rooms to be visible. I saw no other guests in that section from Friday until Saturday night when I observed a single guest entering a room and later, when I heard voices in the atrium. There were few sounds (e.g., footsteps, running water) to indicate that others were present. Evidently few guests ate at the free continental breakfast offered in the atrium Saturday morning because, by 7:45 a.m., only four coffee cups and three juice glasses had been used, an extra busing tray in the hallway was empty, and no other guests were about. (Styrofoam cups were available, so it is possible that people used them rather than the china.)

The Saturday night (December 1) dinner crowd at the restaurant of another major hotel chain was sparse. I asked a restaurant supervisor if the crowd was smaller than usual. The supervisor agreed that it was quiet for a Saturday but was not sure if it was due to the state of the economy (recession worries) or to the earthquake projection. The supervisor also seemed to think that this time of year was normally quiet for the hotel (as opposed to the comments of another hotel sales manager, which follow).

On Sunday morning (December 2), I observed more guests. Around 8 a.m., four people were in the lobby and twelve guests were observed enjoying the continental breakfast in the atrium. The total number of rooms available in this hotel, including the atrium section, is 345.

I visited another major, downtown hotel, reportedly a popular spot among city workers at the end of the day, on Monday night (December 3). The hotel's cocktail area and dining room are

normally crowded, but that night the parking lot was nearly empty, only two other tables were occupied in the cocktail area, and one other table taken in the dining room. Employees confirmed the impression that hotel business was off, saying that occupancy was somewhere between 15 and 21%, and that rooms and meetings had been cancelled because of the projection.

I interviewed the sales manager of one hotel in an effort to assess the general economic impact of the projection on hotel business. According to the manager, the projection had adversely impacted revenues. The first week of December is usually a busy week because people begin their holiday parties, but this year activities coinciding with the projection's dates, such as parties, business meetings, and even weddings, had been cancelled. However, the manager believed the projection would be beneficial over the long-term, even though it had adversely affected the hotel during this period. The projection had acted as a catalyst to create or revise in-house disaster plans. In the case of the sales manager's hotel, 19 employees with Red Cross training had been designated as leaders in different sections of the hotel in the event of an emergency. Supplies and first aid materials were stored in different sections, and all employees had been issued hard hats. The manager emphasized that the preparations were for tornadoes as well as for earthquakes. The hotel's disaster plan is reproduced in Appendix 1.

Insurance Companies

An insurance agent interviewed by a local Memphis television station stated that there had been three times as many earthquake insurance sales in 1990 as in 1989 and that half of those sales had taken place in the last two to three months. On Tuesday, December 4, I telephoned some local insurance companies to determine if those figures were accurate.

I reached six companies: Allstate, CNA, Hartford, Nationwide, Metropolitan, and State Farm. Contacts at five of the companies felt that the estimates given during the television

interview were accurate, the sixth simply could not confirm those estimates with their own figures. All companies noted that there had been a substantial increase in the number of requests to add earthquake coverage to policies. The CNA contact felt that 95% of their customers who did not have earthquake insurance before the projection had added it to their policies. The Hartford contact was amazed because one day they received 678 requests by mail to add earthquake coverage to existing policies. At Nationwide and State Farm, current policy holders who did not have earthquake coverage were contacted to see if coverage was desired. Ninety percent of the Nationwide customers added the coverage, and State Farm's customer response was characterized as "good." One of those interviewed asserted that what upset consumers was the impression that if Browning was right then "I've lost my house."

Premiums for earthquake insurance in the Mid-South are low, especially when compared to California's rates. For instance, at CNA premiums ran from \$0.85 to \$1.01/\$1000 depending on whether the house was a brick or wood-frame. These low rates may be responsible for the reports of a few companies refusing to write earthquake policies because of the fear that they would go bankrupt if an earthquake actually took place. However, none of the companies interviewed were refusing to sell quake insurance.

The CNA employee said in jest that insurers had had a "good time" during the last few months, but that things had calmed down radically after December 3. The State Farm contact agreed, saying that "things have been going wild in this office," but after December 3 had passed, it was as if "the water had been turned off."

Entrepreneurial Endeavors

I conducted a telephone interview was conducted with a representative from Earthquake Clothing, a company created in response to the projection whose hot pink business card declares, "Our Specialties are What's Shakin'." The enterprise began on Labor Day, 1990, by selling shirts along the roadside, and local

television stations (channels 3, 5, and 13) arrived to videotape the story. The company sold their entire stock of 144 shirts within four hours. Among other items, shirts were sold that declared whether the wearer was "staying" or "leaving" Memphis on December 3. (Ultimately, 4,386 staying and 2,112 leaving shirts were sold. Once the popularity of the shirts was well established, \$1 from the sale of each shirt was donated to St. Jude Children's Hospital.)

It was necessary for these entrepreneurs to protect themselves from "copycats." The logo on their shirt was registered as a trademark so that the design could not be stolen and, indeed, a lawsuit was filed against someone who copied the design and was selling the shirts in another city. The suit did not involve a cash settlement, but it the copier was enjoined from selling additional shirts. This legal action helped corner the market for Earthquake Clothing. The company placed advertisements every day in the newspaper and on radio, and some shirts were given to radio stations for promotional giveaways.

The notoriety of this company became widespread in the region. At their booth at the Mid-South Fair (a large event drawing participants from Tennessee, Arkansas, Alabama, Missouri, and Mississippi), company personnel reported that fairgoers would stop and ask for advice regarding earthquakes and mitigation measures.

Media coverage was also extensive. There were radio interviews at the 10-day fair, and approximately 20 television interviews had been given since October. The CBS station in Los Angeles ordered tapes of the coverage from the local affiliate. Newspaper coverage included an article in a Sunday issue of the Commercial Appeal. The person interviewed was amazed that an 8-inch story could generate "so much attention." The company was also interviewed by newspapers from Milwaukee, Wisconsin; Orlando, Florida; Nashville, Tennessee; and Dallas, Texas; as

well as USA Today, the Wall Street Journal, and the New York Times.

Earthquake Clothing's cofounder had worked in construction for 15 years before starting the company and hoped to expand the new business by selling t-shirts and sweatsuits to schools and other concerns. Although some people expressed dismay to the owners that anyone should profit from the earthquake scare, others seemed to admire their entrepreneurial spirit. The cofounder's final comment was, "It got so wild"

The Author's Comments

Not surprisingly, a prediction of impending natural disaster has a dampening effect on activities that would normally have been scheduled to coincide with the phenomenon, including fund-raising events, company parties, meetings, and even weddings. Capital investments such as land purchases or home and office building construction may be delayed until after the prediction deadline passes. In other cases, insurance companies and entrepreneurs can profit from the public interest, at least in the near term.

Still, many questions remain, such as: Will the cost of the economic hardship suffered be offset by an increase in spending, construction, and the like after things return to normal? How long does it take for the impacted area to recover? What other factors may have exacerbated the situation in the Mid-South, such as recession worries and the possibility of a war in the Middle East? and, Is it possible to consider any cost to be marginal when balanced against accelerated mitigation efforts and the increased public awareness of, and preparation for, earthquakes?

PRESS CONFERENCE: DECEMBER 3

The Business Emergency Preparedness Council (BEPC) was formed in Memphis in November 1989 and was created in response to the dual disasters of Hurricane Hugo and the Loma Prieta earthquake. Since BEPC's inception, response from the business

community has been termed "phenomenal," and membership has grown to at least 200, including 100 businesses. Among its other activities, BEPC has developed preparedness handouts and other materials and has produced a videotape called Don't Let the Quiet Fool You.

BEPC held a press conference in Memphis on the morning of December 3. The conference was well attended by the media and included six television crews and at least one radio station reporter. The two mayors (the local government structure provides for both a city and a county mayor) made statements. The speakers made the following remarks (author's clarifications are in parentheses).

The Mayors' and the Moderator's Comments

Mayor Hackett (of the city of Memphis) came to the conference "with some reluctance," because he "was very concerned that some [people] in this community [would] think [he] might be giving this Browning fellow's quote-unquote prediction some credence." The mayor wanted "to assure everyone that that is not why" he came to the conference, that he did not give the projection "any credence whatsoever." What he wished to emphasize was that the city had "made quite a commitment to being prepared for a disaster of any type in our community."

Mayor Morris (of Shelby County) raised the point that Browning's projection simultaneously "did us a great disservice, yet on the other hand perhaps a great service." The projection of an earthquake on December 3 was regarded as a disservice, but by the same token, the projection "reminded us through the local and regional and national media that there was absolutely the possibility of an earthquake sometime now or down the road." Morris asserted that Browning's projection made the community "totally alerted to the fact that we must do some kinds of things differently than we have in the past," listing as examples the need to construct public facilities such as schools, hospitals, and emergency service buildings differently. Already, "standards"

(seismic codes?) had been changed between 1989 and 1990, but more needed to be done "to raise those standards." The mayor also praised the "unprecedented high quality job" of the emergency services and felt that "with the association with our business leadership, we're going to be much better aware of what's going on" so that in the future "the citizens of this community will not be so subject to paranoia in the event that somebody makes a prediction, but will deal with the reality."

Don Bachelor, moderator and BEPC's chair said that he was afraid that "there [was] a degree of fear out there" not yet acknowledged. Bachelor felt that the important message to deliver, especially to students, was "that earthquakes or other disasters are survivable," and he wanted that concept promoted in the future.

As a final note, during the press conference, one of the television crew said to a colleague, "This is a festival."

DAILY MEDIA COVERAGE

I monitored the news media intermittently during my four days spent in the area. The following notes represent a synopsis of 13 television and three radio broadcasts.

December 1 - Saturday: A 5:30 p.m. television news broadcast included a five-minute presentation that covered the disaster drills in Arkansas, showed home preparation displays at the Central U.S. Earthquake Consortium (CUSEC), and offered a free earthquake preparation pamphlet to viewers who wrote to the station. The broadcast emphasized that 1) Browning was not a seismologist, 2) most scientists discounted Browning's projection, 3) there was as much a chance of an earthquake occurring on December 3 as on any other day, 4) an earthquake will happen at some point, and 5) a rumor that bridges over the Mississippi River would be closed for the next two days was false.

At 6:00 p.m., a local television program used a panel format with telephone call-in lines. The moderator introduced the program by stating that the holidays should be a time for happiness, but with the Middle East crisis, an economic downturn, and earthquake warnings, it may be hard for some people to be cheerful. The topic for the program was the phenomenon of holiday depression. The moderator indicated that the program would include a portion called, "10 Years Ago an Earthquake Struck." Local crisis center representatives who were on the show reported that incoming calls had increased in 1990, but primarily due to economic concerns, the loss of a spouse, or stress due to the Middle East crisis. Fears of an earthquake were not mentioned as an issue, and call-ins to the station that night did not mention Browning's projection. The topic of "10 Years Ago an Earthquake Struck" was not reintroduced.

At 9:30 p.m., two disc jockeys (DJs) on a country-western radio station discussed whether or not to go to work on Monday, December 3. One DJ played the "I don't know . . ." role, and the other said Monday was going to be just like any other workday. The second DJ described some promotions the station would be doing and closed by saying, "There isn't going to be an earthquake."

December 2 - Sunday: At 7:30 a.m., a local television religious program featured a panel format. At the end of the program, the moderator mentioned that people were pulling children out of school and leaving town and asked the panel how they were comforting people who seemed genuinely concerned about the projection. A priest said his church invited a "knowledgeable woman from the earthquake center here in Memphis" to talk to them, and she told them they should always be prepared, now, 10, or 100 years from now. The priest said the presentation was like a sermon and added that earthquakes were mentioned in the Bible, citing Matthew: 28, "Behold, a great earthquake took place." A minister on the panel said that a young man had asked him what to

do, and he answered, "God will be in charge of his world on the third just as he is always in charge, and I left it at that." On that note, the program closed.

At 8:00 a.m., a CNN news promotion ended with the announcer saying in a sonorous voice, "Live updates from the faultline, Monday on CNN." The implication was that CNN would be covering the story of the projection throughout the day.

At approximately 11:45 a.m., a country-western radio broadcaster said that "reporters from all over the country are in New Madrid waiting to see if something will happen" and referred to Browning's projection that there was a 50-50 chance that a major earthquake will hit the "New Madrid fault" sometime in the next four days. The station also reported that Missouri's governor was going to New Madrid to show his disdain for the projection and that the National Guard's simulated earthquake exercises were dealing with an increased number of deaths, injuries, and damages during the second day of operations.

At approximately 12:50 p.m., a radio station promotion told people to listen on December 3 because the station would be reporting "about the fault line that runs from New Madrid to Marked Tree" and broadcasting from a station that would be "well out of the way."

At 5:30 p.m., a television special entitled "Earthquake: Are You Prepared?" aired. During the half-hour program, Browning's tidal theory was described and Arch Johnston, director of Memphis State's Center for Earthquake Research and Information (CERI), displayed a map of the substantial seismic activity within Browning's December 3 "danger zone" of 30-60 degrees north latitude. Johnston explained that one reason Browning's projection was not accepted by the scientific community was that these kinds of events occur approximately every other day. Browning's transcribed comments from a conference in California prior to the Loma Prieta earthquake, in which he was supposed to have predicted Loma Prieta's occurrence, were displayed. It was

pointed out that Browning's comments were vague and that San Francisco was not mentioned as a potential locale for an earthquake. The program was evidently attempting to reduce Browning's credibility. Next the fault was discussed while a satellite image of the region was displayed, and Jill Stevens, manager of CERI, was interviewed.

The program's focus then switched to preparedness. CUSEC's home preparation displays were shown, and actors in a business setting demonstrated appropriate responses to an earthquake, from preparation, to the actual experience of an earthquake, to building evacuation. A typical survival kit was displayed, and instructions were given for stocking a home emergency supply pantry and finding and shutting off gas and water valves.

The voice-over stated that chances of a 6.3 (or higher) magnitude earthquake were 40 to 60% by the year 2000 and were 86 to 97% by the year 2035. The current state of seismic monitoring was described, and the point was made that scientists were a long way from being able to predict earthquakes within the New Madrid Seismic Zone. The statement was also made that "no responsible scientist is able to predict" the day an earthquake will occur and that there is no connection between tides and the earth's crust. Finally, the voice-over stated that it was hoped that some good had come from the projection in terms of emergency preparedness, but that there were worries that harm (or complacency) may come, too. This report was calm and very thorough for a half-hour show. A great deal of information was disseminated, and the visual aids—using actors to demonstrate preparation and response—may have helped some people remember appropriate responses such as "duck, cover, hold."

This special was immediately followed by a 6 p.m. local television news program. A reporter interviewed shoppers in a mall who reiterated the feeling that it was important to be prepared, and a young couple from southern California thought the projection was good for the area because it helped people

prepare. The reporter added that 1) the projection had given people lots to talk about, 2) there was little fear, and 3) he did not believe Browning convinced many people that there was anything to be afraid of. Then the footage switched to an old man who was packing a bag because he was leaving the area, and the reporter said that many homes in Marked Tree, Arkansas, were for sale because people were leaving due to the projection. Additional footage showed day-care centers and schools practicing earthquake drills, schools stocking pantries with emergency supplies, and a man buying an earthquake survival kit. The reporter feared that residents would not remain prepared after December 3 and hoped that awareness would remain high. Also, the station received many calls concerning the validity of rumors, such as "boiling water" at Reelfoot Lake, a lake in northwest Tennessee that was created by the 1811-12 earthquakes.

At 6:15 p.m. a reporter on a national television news program interviewed New Madrid's mayor who said that his community had to be ready for an earthquake now and 10 years from now. The mayor said the projection had been good for the tourist trade but had stymied efforts to attract industry to the area.

At 10 p.m., a local television news reporter summarized the day in New Madrid by showing bumper-to-bumper traffic, television satellite trucks parked side-by-side, t-shirt vendors on street corners, people singing earthquake songs they had composed, restaurants selling "quake burgers," and a truck cruising slowly up and down the streets with "end of the world" messages taped to its sides.

Many people were in New Madrid to watch the media; the town was referred to as the "epicenter of media attention." School and campground closings were announced, while the reporter twice stated that, while no one can predict earthquakes, residents should be prepared (information was offered to those who wished to write the station). The reporter also related some of the

titles of sermons given that day, such as "Earthquake - Fear or Fate?"

During this broadcast, a Los Angeles man, who claimed to be a psychologist, said he came to New Madrid because he believed the event was comparable to the recent Los Angeles Nostradamus prediction, which frightened some people into leaving that city. In this case, Browning was not the only questionable scientist gaining notoriety from the projection. A visitor in New Madrid on December 3 saw a psychologist asking children leading questions, such as: "Are you afraid of an earthquake?" and "Are you having trouble sleeping?" The psychologist then told the children there was not going to be an earthquake that day, and showed them a doll that was supposed to be Iben Browning, and encouraged them to punch and step on the doll. I observed this scene on a television broadcast and read similar descriptions in newspaper and magazine articles.

December 3 - Monday: At 6:20 a.m., a CNN reporter broadcast live from a Blythville, Arkansas, resident's kitchen. The resident said that she understood an earthquake could happen at any time, but did not "think it'll happen, its wrong to scare the children, now I'm kinda mad." The woman's young daughter said she was scared and the woman giggled at the end of the interview while the reporter said he would be broadcasting from the area all day. On the half-hour, a sonorous voice-over said, "People are waiting in New Madrid to see if a predicted earthquake comes true. CNN will be broadcasting live from the New Madrid fault all day."

At 7 a.m., the local television news voice-over announced, "And in New Madrid, . . . where people are playing a waiting game with nature." A reporter asked someone who appeared to be a radio station owner questions, such as "What does it feel like to be in the danger zone?" The person being interviewed said most people were not too worried and were dealing with the possibility of an

earthquake with humor, adding that he carried supplies in his car "in case I get caught between here and home."

At 12 p.m., a local television news reporter stated that open schools were fairly empty and others were closed in all districts from Cape Girardeau to New Madrid.

At 10 p.m., a local television news program showed people in New Madrid buying t-shirts and taking pictures of the media. A house in Marked Tree was shown burning, but no one was home because the occupants had left the area due to the projection. The biggest concern at that time, according to the reporter, was that the possibility of an earthquake would be ignored after the December 3 deadline. The station offered a free brochure on preparedness to those who wrote to the station.

December 4 - Tuesday: At 6 p.m., a local television news reporter discussed how New Madrid appeared to be quiet after the previous day's chaos and said there were only a few TV satellite trucks remaining.

INTERVIEW WITH A TELEVISION REPORTER

I interviewed a television reporter from Nashville, Tennessee, at the BEPC press conference on December 3 in order to see how a practitioner perceived the media's response to the projection. The following remarks are from that taped conversation; the author's comments or clarifications are in parentheses.

The reporter said:

We did only one piece on the prediction and how ludicrous the whole idea is, other pieces were on preparedness and related material. But, the problem is that when you do stories on things like this, people don't listen. They hear quake, they hear December 3, they hear prediction, and they don't listen. Now, you can do as much as you want, but people in this area don't understand things like earthquakes. They don't want to understand them. It's not like California where they understand because they've heard it for so long. Here, this is the first round, and they want to hear the rumors, and there's not a lot you can do other than just volume to convince people otherwise. We did our series in October, as opposed to doing it last week like a

lot of stations who only succeeded in racheting up the tension. A few hours, a few days before a prediction is not the time to be debunking it. The time to debunk it is long ahead of time.

Everybody here [at the BEPEC press conference] is real excited about the level of preparedness. I think its going to be exactly the opposite. I think people are going to totally disregard the everyday danger after this is over with because they're going to be so disgusted and embarrassed by being so prepared. I think they'll tire of it and just write the whole thing off. I'll be surprised if a year from now people are as willing as they are today to fund earthquake preparedness programs or any kind of [earthquake] programs because they'll say, "Oh, we went through that, that was a lot of nonsense." Everyone is trying to put the best face on it, [but] I think there's a real whiplash possibility, which would be unfortunate.

Some people are genuinely scared, and that's really sad. I've done some school programs because, unfortunately, I'm as close as we come to an earthquake expert in our area. The children are genuinely frightened. I get them to talk about what is actually going on and what is or is not going to happen. And there are children who are genuinely frightened. Some time back I interviewed a child psychologist in Jonesboro, Arkansas, and as early as October, children were coming to his clinic suffering from such things as loss of sleep, separation fear, and bed-wetting. That's a lingering, genuine fear. Jill [Stevens of CERl] has had a least one child that I know of, and maybe more than that, who she had to invite to the center, so she could walk them through and give them the scientific viewpoint.

I think the media's generally done a lousy, terrible job. You should go for the facts, find out if this guy's a climatologist or a zoologist. I called the University of Texas to find out what he was. Why didn't the print reporters do that? Why didn't the reporters delve into this guy's past? He's making money from the \$99 video tapes; the revenues go into a trust fund so his family can benefit from the money. His daughter told me that the number of people subscribing [to The Browning Newsletter] has increased. His speaking engagements are very popular, and he has a full schedule lined up. You know, the truth of the matter is that this hasn't hurt him at all because even if it doesn't come true, he's still a very famous person. There are plenty of Watergate burglars around making a living because you don't have to win to be a big name. So I'm not sure that this is all as positive as everybody thinks, I think that there's a big downside to it. I think most of the people who have written about the projection don't understand much of anything about earthquakes and haven't spent much time investigating the story. Our competitor in Nashville did a whole series just last week called "Fear on the Fault Line,"

and it had nothing to do with debunking or investigating the projection. The entire series was based on the idea that people were scared. And Bob Bazell has an article out about the projection in New Republic, but where is his piece on the "Today" show? Its fine to write magazine articles and newspaper articles, but where's his piece on his own medium? He didn't do one! I don't understand, I just don't understand.

The national networks have done an especially poor job, and right in the middle of all this NBC runs The Big One! However, "Unsolved Mysteries" did do a respectable job [with their piece on the projection], unfortunately they didn't look into Dave Stewart's background, to find out that he had had a previous experience with a psychic in North Carolina. Stewart and the psychic flew over a nuclear power plant and she felt pulls in the northeasterly direction like a 4.0.

I'm not going to go to New Madrid because I feel the same way about that that I felt about Hurricane Hugo. We could have gone, but the people there already have enough to deal with and you're just putting upon folks who don't really need it. The hotels up there are full. I know of one network that had to stay at a convent this weekend. I told them it would be good for them because it would keep them out of the bars. But the best joke of the day up there was that the forecast has changed. Its not an earthquake, it's a flood because tomorrow everybody's going to pour out their emergency water.

The Author's Comments

Few would argue against the media's responsibility to warn the public of threats to life and property. But what is readily apparent in the case of the New Madrid earthquake projection is that the media as a whole did not react in a cohesive manner. In some cases, coverage was inflammatory, playing upon the audience's fears and uncertainties. Other approaches attempted balanced coverage, or gave emphasis to the humor and irony of the situation. This fragmented process cannot help but confuse a public that already finds scientific statements couched in probabilities difficult to comprehend.

Stories about disasters and risk are difficult to report because they are complex and require context. Readers will seek to reduce uncertainty by pursuing advice regarding, first, whether the threat is real, and second, what preparation and mitigation measures are warranted (Wilkins and Patterson, 1990).

Unfortunately, the media tends to initially focus on the drama and novelty of an event, which discourages in-depth research, reporting on its antecedents or the consequences of fanning public concerns. As Wilkins and Patterson (1990) suggest, news reporters need to devise better ways of signalling risky events, as well as ways of providing the public with methods to adapt to the risks.

COMMENTS AND REACTIONS FROM PERSONS DEALING WITH THE EVENT

The following section relates impressions from visits to the Central U.S. Earthquake Consortium (CUSEC) and Memphis State University's Center for Earthquake Research and Information (CERI), and from telephone conversations with the local American Red Cross's earthquake education coordinator and the director of the Memphis and Shelby County Mental Health Center.

Central U.S. Earthquake Consortium

CUSEC held an open house December 1-3 so the visiting public could view in-house preparation/mitigation displays and videos. Harvey Ryland, CUSEC's director, said the agency was not sure what level of response to expect (e.g. 10 or 100 people), but that up to that point, the center had been fielding approximately 100 calls per day about the projection. No large crowds visited the center Saturday morning and most of those who visited appeared to be members of the news media. At times two to four members of the public were seen viewing the displays, at other times none.

CUSEC's displays were well organized. The agency is located in a renovated home, which provides an excellent way of displaying what private homeowners can do to reduce earthquake damage. Videos ran continuously among displays of emergency kits and handouts and models of how to strap things down (e.g., water heaters). Velcro secured all items to flat surfaces or walls, the refrigerator and water cooler were stabilized with bungee cords, cabinets had locks, and plywood restraining walls were built

around interior chimney masonry. Outside, an Emergency Operations Center (EOC) trailer demonstrated mobile emergency communications capabilities.

The media were everpresent. Early Saturday morning, a television crew was filming the front of the center, and a crew from another station arrived shortly thereafter. At noon, a third television crew was filming the front of the center, and a fourth television news car was coming down the driveway. On the afternoon of December 4, two news cars were still parked at the center.

Center for Earthquake Research and Information

At CERI, conversations with several people over several hours brought out many comments and questions regarding Iben Browning and the projection's impact.

Comments

1) A few projection queries arrived in November, 1989, but the number of requests rose noticeably beginning in July and August of 1990.

2) As the television reporter stated earlier, a frightened child was invited to the center and given a tour.

3) Generally, it was hard to determine if an earlier response from the National Earthquake Prediction Evaluation Council (NEPEC) could have reduced public concern. NEPEC may have been hesitant to attempt an earlier evaluation for fear that official attention might lend the projection credibility. Once the NEPEC statement was released, the media did not seem to give it the same degree of attention that it had given to Browning's projection. The statement seemed to be relegated to a back page or mentioned as a late item in a news broadcast. The impression was that the media gave NEPEC's discrediting of the projection an "Oh, by the way, these scientists say not to worry about this . . ." but not before proclaiming "Earthquake! Earthquake!"

4) The situation provided a wonderful study of rumors because many earthquake-related rumors were started and swept

through the area in hours. The area provided fertile terrain for someone who wanted to discover how rumors start, spread, and ultimately get discredited.

5) The totality of the public response and reaction could not have happened without the occurrence of the Loma Prieta earthquake in California.

6) Some people regard Browning as a con artist, winning confidence by using underhanded techniques. Browning sprinkles his vague talks given at business conferences with facts and terminology that make his remarks sound convincing; he asserts that he uses procedures or equations he can understand but others cannot; and he builds the impression that his thought processes operate on a higher plane than most of the population's. All of Browning's projections are generalized, protecting him from real liability (for instance, 50% and 50-50 are some of Browning's favorite terms).

Questions Raised

- 1) What did Browning gain from the publicity?
- 2) Was there a subliminal public need in the region for an earthquake "guru," and has he acquired "disciples"?
- 3) How much of Browning's believability rested on his charisma?

Jill Stevens, CERI's manager, had stacks of phone messages and unopened mail on her desk and said the center's resources had been stretched very thin and that put her weeks behind in her work. When people questioned her about the projection, she used the analogy that an equivalent statement would be to predict a 50-50 chance of snow in the northeastern United States in January--there is bound to be snow somewhere.

It was difficult to disassociate the town of New Madrid (as opposed to the New Madrid Seismic Zone) from the projection and thus, from the earthquake. On December 3, a reporter called CERI to complain that there were no scientists to interview in New Madrid and wanted to know when one would be coming. When told

that scientists were not coming because there was no reason for them to, the reporter was surprised that no scientists would be where the earthquake was supposed to happen.

As far as the center knew, Iben Browning and his wife left their home in New Mexico for a vacation at least two weeks prior to December 3. The couple remained incommunicado throughout the projection "window" from December 1 to December 5.

The American Red Cross

Because of the number of calls to the American Red Cross (ARC) regarding the projection, a voice-mail message was created. This message asked those requesting earthquake brochures to leave their name, address, and telephone number along with the number of pamphlets desired and said that no one would return the call if the materials were available. Callers requesting earthquake presentations were promised a call as soon as possible and were also instructed to leave their name, organization, telephone number, date and time the presentation was desired. The message continued, "Please accept our apologies right now because we are currently receiving between 50 and 60 calls a day for earthquake information or presentations. Because of this volume, it may take us several days to call you back."

The Memphis chapter of the Red Cross received a grant from their National Headquarters in March 1990 to produce an earthquake text and develop programs for businesses, communities, and schools. An earthquake education coordinator was hired and contacts with CERI, CUSEC, emergency management agencies, and Memphis Light, Gas, and Water were established. For one month, the coordinator, Jody Buchignani, focused on her assigned project and received only one or two calls per week requesting earthquake information. Then, Browning's projection became more widely known, and the calls to the coordinator's office increased with the majority of the initial calls originating from northeast Arkansas.

Responding to the increased number of information requests, the office quickly produced materials drawn in part from items from the Los Angeles Chapter of the ARC. The first printing of 3,000 brochures was gone "like lightning." Successive printings of 5,000, 10,000, and 20,000 were also quickly produced and distributed. In mid-November, the local Federal Express office produced its own booklet and donated 5,000 to the Memphis ARC. Memphis Light, Gas, and Water also helped produce ARC brochures. An estimated 200,000 were mailed. Information requests came from northern Mississippi, Tennessee, Texas, Missouri, Illinois, and Oklahoma, as well as from the local area. There were numerous requests for presentations from December through January, and 45 requests for presentations at later dates, indicating there was some hope that people would still be interested in preparing after December 3.

The coordinator felt she was approximately two weeks behind in call-backs to the telephone messages. Part-time help was hired to keep up with the volume of telephone and mail information requests. The whole Red Cross chapter ultimately became involved. At one point, earthquake calls were so overwhelming that information was distributed to all departments and anyone with a free telephone line got the call. The office was so inundated with calls that the voice-mail started to malfunction, and it became impossible to maintain a telephone log.

Buchignani estimated that for the previous two and a half months, six ARC employees had worked continuously on requests for information, material preparation, presentations, and the like. Buchignani said the effect of this inundation was like being under siege or being victims of an in-house disaster and stretched the staff to the limits of their endurance.

Buchignani believed that Browning frightened many people and related that even rational people seemed to be leaving town (including a relative and spouse). She called a major airline and confirmed a rumor that all flights leaving Memphis were full. The

ticket agent even admitted putting her own son on an outgoing flight. Citing absenteeism at schools on December 3, the coordinator reported that people said "I don't really believe the prediction, but"

On a positive note, the coordinator did believe the ARC was able to reach and help prepare many people for an earthquake. Presentations were well received, and many people appreciated the preparedness information. However, she also thought the media raised anxiety levels by 1) calling the "projection" a "prediction," 2) focusing on December 3, and 3) misquoting Browning. In addition, she thought the reporting was not balanced because news about the "prediction" was being broadcast for two or three months before the scientific response was presented.

During the airing of NBC's movie The Big One, the ARC handled inquiries by setting up a temporary phone bank at the local NBC affiliate. All four lines rang continuously. They received more than 200 calls within the first 20 minutes of the first night. Because approximately 2,000 calls were handled during the two nights of the program, staff members stayed on the lines until after 1 a.m. each night. Crisis counselors handled about four callers that the regular staff were unable to calm. During the days following The Big One, the office switchboard had calls backed up when the office opened at 8:30 a.m. The calls continued throughout the week, and staff even began joking about the "e" word, no longer wanting to even say the word earthquake.

Mental Health Society of Memphis and Shelby County

I contacted Anne Tuttle, director of the local Mental Health Information line (run by the Mental Health Society of Memphis and Shelby County) to determine if the number of callers exhibiting anxiety had increased. Tuttle reported that the public's biggest worries were still unemployment and stress associated with the holidays. However, there had been an increase in earthquake awareness from "shut-ins" who frequently called with concerns about their lack of mobility and delivery of their medicine.

Manic depressives who were being helped by the Mental Health Society also were more worried about obtaining their medication without interruption. But there was no barrage of calls from the general public expressing fears about the projection. In general, people were more worried about food and shelter than a possible earthquake.

Those who called with questions or concerns about the projection were referred to sources that could provide preparation and mitigation advice. The director did not believe that the general public was panicking and thought the media had done a good job downplaying the threat and keeping things as rational as possible. However, she admitted the media had had a "good time" with the projection and described how one radio disk jockey had broadcast from a downtown billboard where he was ostensibly earthquake watching, while another broadcast from a hot tub filled with jello.

The Author's Comments

One reason callers to the Mental Health Society or to local television community programs (as described earlier, regarding holiday depression) did not express increased concern over the earthquake projection was because hazards issues are generally considered by a populace to be of "low salience and low priority" (Sood, 1982, p. 98). Even in Southern California, where earthquakes are more common, a survey found that "only 35 out of 1,450 people interviewed . . . identified earthquakes as one of the three most urgent problems" of the region (Sood, 1982, p. 98). More immediate issues, such as unemployment, interpersonal problems, and economic concerns, normally take precedence over events of an obscure, and as yet, uncertain nature.

Characteristically, following the extensive media coverage about this projection, the public directed massive numbers of inquiries to those considered to be earthquake, and disaster preparedness and mitigation, experts. Such "a large-scale information-seeking response from the public" is "an adaptive and

rational" way to deal with the situation (Nigg, 1986, p. 9). Such a response will occur despite the media's efforts to provide sufficient information, mainly because many members of the public will want to obtain their information directly from what they consider to be a primary source.

PERSONAL OBSERVATIONS

On Saturday, December 2, I drove to Marked Tree, Arkansas (population 3,201), often cited as the southernmost town in the seismic zone. The area is agricultural. I saw no signs or billboards regarding earthquake projections on the way out of Memphis or into Marked Tree. In town, one church signboard advertised a sermon entitled "Give Praise To Our God Who Can Shake The Earth If He Wants To." The town was quiet and small, and took only about two minutes to pass through. I went through in both directions to make sure I missed no earthquake signs in store windows or elsewhere. I then drove from Marked Tree to Wynne whose population is more than 7,000. On the main street through town there were no earthquake related signs or advertisements. I then drove out of Wynne and passed through the little town of Carbondale, where a church signboard said "Sunday A.M., Hear 'Be Prepared'".

Monday morning traffic on I-240 appeared heavy and normal for a workday. In Memphis, I found two signs referring to the earthquake were found. One outside a chiropractic clinic read, "Shake Rattle or Roll, We Are Open Monday." The other sign was personal and proclaimed "The Earth May Shake Rattle And Roll, But John Henry Will Still Be 40 Yrs Old!"

The Author's Comments

By the end of my 4-day stay, the frequent discussions about earthquakes and the projection on television and radio broadcasts became wearisome. It is not difficult to imagine how tiresome the subject had become for people living in the region. The media

were omnipresent from December 1 to 4 with two or more TV trucks parked outside CERI and CUSEC throughout that period.

Those organizations forced to respond to the projection, such as emergency services and mitigation agencies and universities, appeared to have nearly exhausted their human and material resources. The employees were so busy trying to calm people and were spread so thin (literally, for it seemed that they were constantly on the run giving presentations) that if an earthquake had taken place on the appointed day they would be trying to respond while already in a state of near-exhaustion and would be geographically dispersed around the region.

The openness and willingness with which various personnel discussed the effects of the projection gave the impression that they had had few opportunities to discuss events with someone who was not asking them for advice or "sound bites." They worked nonstop with little opportunity to pause and try to comprehend the phenomena or assess whether they responded in the most effective manner. By necessity, there also had been much improvisation, which created additional stress.

There was no sense of panic among the populace. Some people seemed to want to joke about the possibility of an earthquake but did not know if it was appropriate. In all, people seemed concerned and possibly a little tense, but they were not panicking.

A GAME AND SOME RUMORS

The Game

A numbers game travelled about the area by word-of-mouth. Using "1234567890": 123 = December 3; 456 = 4:56 (am or pm?); 78 = 7.8 (on the Richter scale); and 90 = 1990.

The Rumors

Several rumors were also frequently voiced:

1) An angel was seen on one of the bridges crossing the Mississippi.

- 2) A hitchhiker got into a car, said there will be an earthquake, then disappeared.
- 3) Cows were bumping their heads against trees.
- 4) Cows were butting their heads against barns as if they were trying to commit suicide (kamikaze cows!).
- 5) Zoo animals were acting strangely.
- 6) Birds were not singing.
- 7) An earthquake alert had been declared but only distributed to emergency personnel so they could escape.

DISCUSSION

Nigg's observation that researchers "should not overlook the impact of nonscientific-based forecasts on public response, or of predictions by scientists which lack the support of others in the scientific community" (Nigg, 1986, p. 3) was certainly on the mark for the New Madrid projection. As has often been pointed out, the key element behind public response to a prediction lies in the credibility of the warning and of the predictor. Iben Browning's projection may not have been believed by a majority of the area's residents, but his credibility, well established by the media, raised doubts in their minds.

In the future, natural hazards and emergency preparedness researchers and practitioners will see new prognosticators of disaster appropriate their "fifteen minutes of fame." When those soothsayers appear and begin capturing media and public interest, we need to be ready to satisfy the public's quest for expert opinions and information without interrupting normal duties or exhausting our resources. Guidelines need to be developed to help personnel recognize when a prediction is gaining momentum so that temporary help can be reassigned from other quarters or otherwise be acquired, trained, and in place before the bulk of the public assault begins.

Some might hold the mass media responsible for catapulting the New Madrid earthquake projection into prominence. However,

several factors modify the impacts of messages, including "interpersonal relationships and personal influences; the audience member's perception and retention; the groups to which an individual belongs and the group norms to which . . . [they] adhere, and . . . conflicting messages on the same issue presented by the media itself" (Sood, 1982, pp. 101-102). Obviously, if the Browning projection had been aimed at San Francisco, a different kind of response would have been expected. However, mid-southern earthquakes are no more familiar to the press than to the public. In this case, the media presented conflicting information regarding the significance of the projection by choosing different approaches to the story. Consequently, not even preparedness personnel and local experts who bore the brunt of public reaction can agree over the question of whether the media did a "good" or a "bad" job.

Rather than focusing on the past events and players, on real or imagined culpability, emergency preparedness and mitigation experts in the NMSZ need to take advantage of the groundwork that has been laid by recent events. Earthquake warnings are a fairly new social phenomenon, but it is well known that the public will initially expect the media to provide clues regarding how to interpret and respond to such warnings. Unfortunately, in the early stages of dramatic stories the media have a tendency to "focus on panic and other non-adaptive responses" (Nigg 1986, p. 12). However, members of the media are also well aware that they cannot attempt to continuously focus on such nonadaptive responses without compromising their own credibility. Now, with the seismically peaceful passage of December 3, there is a golden opportunity to begin developing the "earthquake culture" so badly needed in the Mid-South.

Although people can garner an abundance of information from the mass media, only time can produce behavioral and cognitive change. Thus, "any attempt to use the mass media to create hazard awareness must be an extended, ongoing effort" (Sood 1982, p.

102). Perhaps the Mid-South's state and local governments, schools, public radio and television stations, as well as ARC, CUSEC, BEPC, CIRE, and other entities, should regularly publish or broadcast information that could save lives and reduce property damage when the next sizable earthquake strikes the New Madrid Seismic Zone. With regular dissemination of earthquake preparedness and mitigation information, it may be possible to help residents within the NMSZ develop "schemas" as described by Wilkins and Patterson (1990). They found that people cannot absorb certain types of information if past experience and socialization has failed to provide them with appropriate "schemas" by which that information can be assessed. Accordingly, "the schemas the media need to adopt are ones which raise issue salience while encouraging mobilisation" (Wilkins and Patterson, 1990, p. 92). The recent projection concerning the New Madrid Seismic Zone has provided the chance to prove the thesis that long-range planning provides the best basis for hazard reduction. Hopefully, responsible parties will be able to capitalize on that opportunity.

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APPENDIX 1

Hotel Disaster Plan for Earthquakes and Tornadoes

Introduction:

With over 2 million people residing in the Memphis metropolitan area, it is crucial that everyone knows what to do before, during, and after an earthquake. Your safety and well being is at stake—BECOME EDUCATED NOW!

What to expect during an earthquake:

1. You may notice gentle shaking at first.
2. Hanging plants and light fixtures may start swaying. You may hear objects on shelves start to wobble.
3. You may be jarred by a violent jolt at first (similar to a sonic boom).
4. You may hear a low or perhaps very loud rumbling noise.
5. It is very important to take immediate action at the first indication of ground shaking.
6. Free standing cabinets and bookshelves are likely to topple.
7. Suspended ceiling components may pop out.
8. Door frames may be bent by moving walls and may jam the doors shut. Moving walls may bend window frames, causing glass to shatter.

Earthquake response guidelines:

If indoors:

1. Stay inside; move away from windows, shelves, heavy objects and furniture which may fall.
2. Take cover under a table or desk, or in a strong doorway.
3. In hallways, stairways, or other areas where no cover is available, move to an interior wall. Turn away from windows, kneel alongside the wall, bend head close to knees, cover sides of head with elbows, and clasp hands firmly behind neck.

If outdoors:

1. Move to an open space, away from buildings and overhead power lines. Lie down or crouch low to the ground (legs will not be steady). Keep looking around and be aware of dangers that may demand movement.
2. Stay away from power lines, overpasses, buildings and bridges.

What to expect in an earthquake

During an earthquake, the "solid" earth moves like the deck of a ship. The actual movement of the ground, however, is seldom the direct cause of death or injury. Most casualties result from falling objects and debris because the shocks can shake, damage, or demolish buildings.

Earthquake injuries are commonly caused by:

- * building collapse or damage, such as toppling chimneys, falling bricks from wall facings and roof parapets, collapsing walls, falling ceiling plaster, light fixtures, and pictures.
- * flying glass from broken windows. (This danger may be greater in modern, high-rise structures).
- * overturned wall units, bookcases and other furniture.
- * fires from broken chimneys, and ruptured gas and electric lines. The danger may be worse due to a lack of water caused by broken mains.
- * fallen power lines.
- * drastic human actions resulting from fear.

Before an earthquake

- * Check for defective electrical wiring and leaky gas or inflexible connections are very dangerous in the event of an earthquake.
- * Know where and how to shut off electricity, gas and water at main switches and valves.
- * Place large and heavy objects on lower shelves. Securely fasten shelves to walls. Brace or anchor high or top-heavy objects.
- * Bottled goods, glass, china, and other breakables should be stored in low or closed cabinets.
- * Overhead lighting fixtures such as chandeliers should be made fast. A little wiring or anchoring will usually take care of these risks.
- * Deep plaster cracks in ceilings and foundations should be investigated and repaired.

During an earthquake

- * First and foremost, STAY CALM. Think through the consequences of any actions you take.
- * If inside stay inside, if outside stay outside. In earthquakes, most injuries occur as people are entering and leaving buildings.
- * In a high-rise building, don't dash for exits, since stairways may be broken or jammed with people. NEVER use elevators since power may fail.

After an earthquake

- * Be prepared for additional earthquake shocks called "aftershocks". Although most of these are smaller than the main shock, some may be large enough to cause additional damage or bring weaker structures down.
- * Check for injuries. Do not attempt to move seriously injured persons unless they are in immediate danger of further injury.
- * Turn your radio to get the latest emergency information from your local authorities.
- * Check your utilities. The earthquake may have broken gas, water and electric lines. If you smell gas, open windows and shut off main gas valve. Then leave the building and report leakage to authorities, do not re-enter the building until a utility official says it is safe. If electrical wiring is shorting out, shut off current at the main meter box. If water pipes are damaged, shut off the supply at the main valve. Emergency water may be obtained from hot water tanks, commode tanks (not bowls), and melted ice cubes.
- * Check to see if sewage lines are intact before using sanitary facilities.
- * Do not touch downed powerlines or objects in contact with downed lines.
- * Immediately clean up spilled medicines, drugs, flammable liquids and other potential hazardous materials.

Emergency check list

1. FLASHLIGHT with spare batteries. DO NOT use matches or candles after an earthquake until you are sure no gas is leaking.
2. PORTABLE RADIO with spare batteries, or a DYNAMO RADIO which needs no batteries. Most telephone service will be interrupted during a major disaster, and only emergency use is suggested.
3. FIRST AID KIT with basic first aid knowledge, recommended first aid book to be included with the kit is "Standard First Aid & Personal Safety by the American Red Cross. As many employees as possible should be CPR & basic first aid trained.
4. FOOD especially non-perishable food. Such things as powdered milk, canned juices, dried cereals, fruits and non-salted nuts are a good source of nutrition. A supply sufficient for 72 hours is recommended.
5. WATER, a supply of water can be the most important survival item. During a disaster the water supply may be cut off completely, or polluted. Purchase commercially bottled water in 5 gallon bottles. Commercially bottled water should be stored in airtight containers and replaced every 5 to 10 years.
6. TOOLS to have on hand should include pipe wrenches and or crescent wrenches for turning off gas and water mains. Work gloves, heavy shoes and rope should also be on hand.

Earthquake procedure for all personnel

When an earthquake occurs you should do the following:

1. STAY CALM. Think through the actions your going to take.
2. If inside the hotel STAY INSIDE. If outside, STAY OUTSIDE, away from the building.
3. If assigned a special task, do not hesitate, the safety of guests and employees depends on fast response.

Hotel Manager or Manager on Duty

1. Report to the Front Desk, which will serve as the Command Post. The back-up Command Post will be the security office located at the employee entrance.
2. The manager will obtain the Emergency Keys, and a copy of the rooming list. Handicapped guests will have three (3) astericks (***) next to their names.
3. The manager will be in communication by radio, using channel #1. Security and engineering will direct status report to the command post. The radio is located in the hotel manager's office.
4. There is NO EVACUATION of the hotel until shocks stop. Everyone is safer inside.
5. If power fails, allow NO SMOKING or CANDLES or MATCHES to be used. The danger of fire is great due to the possibility of a gas leak.

Front Desk/Night Audit/Accounting

1. Get Emergency Keys and Guest List out. Give to Hotel Manager.
2. Remain at you station, you are members of the Command Post team.
3. Incoming calls from guests who are requesting information about the quake, should be answered in a calm manner. Example: "We are experiencing a quake, remain in your room, stay away from the windows, we will keep you informed."
4. Each station at the front desk should have a flashlight.
5. In case of a power failure, SHUT OFF all computers. A return of power will destroy stored information.

Telecommunications

1. Stay calm, remain at your station.
2. Incoming calls from guests requesting information about the quake should be answered in a calm manner. Example: "We are experiencing a quake, remain in your room and stay away from the windows, we will keep you informed."
3. If the earthquake is serious, house phones may go out. However, it is a possibility that public telephones may still remain in service.
4. DO NOT attempt to put through calls from outside the hotel to guests. We will need all our lines for emergency use as long as thay remain in service.

5. Have flashlights in case of a power failure. DO NOT use matches or candles.

Housekeepers/Housemen/Night Cleaners

1. Housekeepers when a quake is felt, stay on the floor assigned and inform our guests to remain calm and stay in their rooms. Housekeepers should move to an interior wall, kneel alongside wall, bend head close to knees, cover side of head with elbows, and clasp hands behind neck.
2. After quake is over, assist with calming guests, call on house phones or if phones are out, report to Front Desk for instructions.
3. During quake DO NOT USE ELEVATORS.

Food and Beverage Outlets

1. Stay calm, do not panic guests.
2. Kitchen workers are to shut off all gas and electric equipment.
3. Servers are to assist persons to move away from windows and take cover under tables etc. Have guests move to interior walls, and kneel alongside the wall, bend head close to knees, cover side of head with elbows, and clasp hands behind neck.
4. Everyone is to remain inside the hotel, until all shocks are over.

Guest Services

1. When an earthquake happens, all doormen and valets on duty at the Motor Entrance are to move inside the hotel. Valets who are out in the parking lot should stay there. Stay away from the sides of the hotel.
2. Do not allow guests or employees to leave the hotel during the shocks.
3. Stay away from windows and glass doors. Stay next to interior walls.

Engineering

1. STAY CALM. Know your duties and perform them efficiently.
2. Shut off gas mains.
3. If water mains are broken, shut off main valves.
4. When shocks are over, immediately start damage survey. Damage reports are to be made to the Command Post by radio.
5. Hotel Fire Brigade must be prepared to respond to fires as well as rescue operations, since public services (fire-rescue) may not be able to function.
6. If electric power fails and the emergency generator fails to start automatically the engineer on duty must start it manually. This will supply emergency lighting and will lower elevators to lobby. Elevators will not work on emergency power.

Security Services

1. Remain calm, stay at your duty station. Think through the consequences of any action you take.
2. All radio's will switch to channel #1. If power is out, we will be able to remain in operation for about 16 hours.
3. Command Post will be the Front Desk, the back-up post will be security office station 162, employee entrance.
4. Officer at 162 will when shocks are felt shut off the main gas valve located at the loading dock. A wrench/key is provided. Instruction provided by engineering.
5. Security will have access to emergency bottled water and flashlights.
6. Security officers must be ready immediately after the quake to supply needed First Aid and assist with rescue operations.
7. Due to the earthquake, it may not be possible for police, fire and EMS to respond. We must be prepared.
8. If after the quake, it becomes necessary to evacuate the hotel you will be notified by the Command Post.
9. All security officers are to read this entire plan, as you will be looked to for guidance during an emergency.

MISSION STATEMENT

In a major disaster we will not have time to call for assistance from those services trained in police, fire and EMS, we must all strive to do our duty to the best of our ability. Everyone on duty is expected to assist in every way to safeguard the lives and property of our guests, our employees and the Peabody.

Emergency Disaster Supplies

Recommend the purchase of the following items:

1. 400 flashlights (disposable) or 400 lightsticks (no batteries).
2. 50 2 cell "D" flashlights for engineering, security and offices.
3. 400 gallons of commercially bottled water, shelf life of 5 to 10 years.
4. 2 large First Aid Kits.
5. 500 ft of 3/4 inch hemp rope.
6. 1 Porta-power unit.

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