

PUBLIC SUPPORT FOR SEISMIC SAFETY: WHERE IS IT IN CALIFORNIA?

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INTRODUCTION

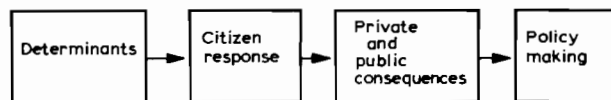
The area of seismic safety policy is a public problem without much of a public. The citizens of California appear not to be much worried about earthquakes. They do very little to protect themselves or their property from the earthquake hazard. They are not organized to insist that their government do something about it. Even people in the insurance business do not purchase earthquake insurance.

My own broker has tried to get me to buy it – I have never bought it. I live one and one-half miles from the San Andreas fault. It's just one of those things. I have a wood frame building built on concrete piers, and I don't know how it would survive a quake but I'm like the average Californian – the average American. I don't think it is going to happen to me [1].

A while ago an earthquake specialist told an assembled group of experts that local officials needed a popular mandate before they would use “rational” decision-making techniques with respect to seismic safety. In hope of the unlikely, if not the impossible, this specialist opted out of the problem of coping with reluctant officials. Waiting for the mandate means waiting until just after the next earthquake, but even then an active constituency of citizens will likely

be short-lived and be asking for relief rather than preparation for a future earthquake.

To understand the quality and extent of public support for seismic safety policies, let me outline two crude “models.” Each model has the following components:



Model I, Indifference

In this model citizens are indifferent to earthquakes in general and to seismic policies in particular. The citizen develops this indifference during the many years between major earthquakes. The determinants of such a response are obviously complex and include, among others, such factors as: personal experience with past earthquakes, length of residency, age, and having other concerns besides earthquakes. Regardless of the particular determinants, the indifferent response is translated into a number of private and public consequences. The citizen wearing his private hat, for example, seldom buys insurance and is more likely to resort to prayer than making his house resistant to earthquakes.

Because of prevailing indifference, the citizen is not likely to wear a second or public hat, and thus as a consequence is not a potential source of political support. Experts and public officials, therefore, attempt to change or implement existing policy without the direct political support and expression of interest from large numbers of citizens.

Model II, Concern

In this model, citizens are also usually indifferent, but this indifference, for some of them, turns to concern immediately after experiencing an earthquake. For the concerned citizens, the earthquake has acted as the primary determinant of their response. Privately, a few concerned citizens may buy insurance or prepare for a future earthquake. The public consequences of the citizen's concern, in terms of political support, may or may not be directed to seismic safety. In the aftermath of the Long Beach 1933 earthquake, for example, there was an expression of citizen interest in enhancing the safety of public schools. On the other hand, after the 1971 San Fernando earthquake, much of the concern of citizens was directed to non-seismic safety issues, such as securing relief and financial assistance. In both the Long Beach and San Fernando situations, public officials and their experts passed legislation aimed specifically at the issue of seismic safety.

In some ways the model of concern is a variant of the model of indifference. First, even after an earthquake, many citizens remain indifferent. Second, for those who are concerned, their concern rapidly disappears as time passes. Third, the concern of citizens after an earthquake is not necessarily directed at seismic safety issues. And, fourth, in both models policymakers operate on an assumption of public concern and support. That assumption may be valid in some cases, but in others it may prove to be illusory. It is true

that the occurrence of an earthquake provides policymakers with an opportunity for action, but it does not necessarily follow that such action is based on the direct expression of political support from citizens.

The existence of citizen indifference will come as no surprise to seasoned students of emergency preparedness and seismic safety. Nevertheless, it is a primary characteristic in the making and implementation of seismic safety policy. A fuller understanding of citizen participation, or more accurately the lack of participation, in the seismic safety policy arena can help us direct research efforts and assessments of the adequacy of present policy and the policy process.

In this essay it will not be possible to develop such a complete understanding by demonstrating the connection of citizen attitudes and behavior to the making of policy – in a sense to validate empirically the models of indifference and concern. For one thing, it is not particularly easy to demonstrate something which may not exist. For another, I have to rely on secondary analysis and anecdotal reports from newspapers and other sources. Instead, I will illustrate the extent of citizen indifference, discuss some of the determinants and consequences of citizen concern and indifference, and make some conjectural leaps in order to question the process of public policymaking and the role of citizens.

CITIZEN RESPONSE

Great expectations

Most Californians seem to accept the possibility of a serious earthquake in their area. In a survey taken seven months after the San Fernando earthquake of 1971, over 75 percent of the respondents felt that a serious earthquake was at least somewhat likely, while less than 20 percent felt that such an earthquake was not possible (see Table I).

TABLE I

Californians Accept the Likelihood of a Serious Earthquake in Their Area

	No.	%
Certain to happen sooner or later	112	22
Very likely to happen	166	33
Somewhat likely to happen	107	21
Not too likely to happen	84	17
Not at all likely to happen	12	2
Don't know, no opinion, no answer	19	4
	500	99

Source: *California Field Poll 71-04*, August, 1971, question 24: "As you understand it, how likely is it that a serious earthquake might strike here?"

Although earthquakes are infrequent and localized events, this poll indicated that at least a majority of California's citizens — including residents of the major population centers in Northern and Southern California, such as Los Angeles and San Francisco — believed that a serious earthquake was likely to happen where they lived. Unfortunately, as we shall see, expecting an earthquake is quite different from wanting to do something about it.

So far we have been discussing expectations, but what about actual experiences with earthquakes? Over the centuries earthquakes have caused thousands of deaths — for example, the 1556 earthquake in China, the 1923 earthquake in Kanto, Japan, and the 1976 earthquake in Guatemala, with estimated death tolls of 833,000, 143,000, and 22,000, respectively. If we consider the cumulative effects of earthquakes, we are talking about millions of lives lost and billions of dollars of property destroyed. Yet California, despite an image of being "earthquake country," has been fairly fortunate.

While Table II shows that California has had its share of property damage, the death figures certainly have not been as extensive as those in other parts of the world. As long as earthquakes in California continue to occur in the early morning, when most people are at home, or in locations of low population density, Californians may maintain their luck. To expect that earthquakes will choose an appropriate time or place to occur seems foolish, but it is a policy that many citizens and officials implicitly follow. A few even follow the policy

TABLE II

Selected California Earthquakes

Year	Location	Richter Magnitude	Lives Lost	Dollars of Property Damage*
1868	Hayward	7	30	\$ 350,000
1872	Owens Valley	8.2+	27	\$ 250,000
1906	San Francisco	8.3	800-1300	\$ 1 billion
1915	Imperial Valley	6-7	6	\$ 900,000
1925	Santa Barbara	6.3	13	\$ 8,000,000
1933	Long Beach	6.3	115	\$ 60,000,000
1940	El Centro	7.1	9	\$ 6,000,000
1952	Kern County	7.7	14	\$ 55,000,000
1954	Eureka-Arcata	6.5	1	\$ 2,100,000
1969	Santa Rosa	5.6-5.7	0	\$ 10,000,000
1971	San Fernando	6.5	64	\$511,000,000

Sources: California Legislature, Joint Committee on Seismic Safety, *Meeting the Earthquake Challenge*, January 1974, pp. 205–211. San Fernando figures are from the California Division of Mines and Geology, *San Fernando California Earthquake of 9 February 1971*, Bulletin 196, 1975, p. vii.

*Figures given are estimated total losses in dollars valued at time of occurrence.

explicitly, and one taxpayer association official, for example, argued on the day of the 1971 San Fernando earthquake that a bond election to build earthquake resistant schools should be defeated because no earthquake in California had occurred when school was in session.

DETERMINANTS

Experience and other concerns

One would expect that actual experience with an earthquake would be a primary determinant of citizen response, but the relationship is not clear as yet. Many Californians, of course, have never experienced a serious earthquake – for them, an invisible hazard which is easily ignored. Low-magnitude earthquakes are frequent enough in certain parts of California to be taken for granted, even regarded complacently as one of California's many exotic phenomena. Richard L. Humphrey (1907), an engineer, made the following observation after the 1906 San Francisco earthquake:

The average Californian becomes accustomed to the earthquakes which produce 'temblors' of sufficient intensity to rattle windows. Prior to the great earthquake of April 18, 1906, these temblors were of frequent occurrence, but occasioned no alarm and, indeed, scarcely excited a passing interest. Over two hundred earthquakes were recorded during the period from 1850 to 1886, being more prevalent in the vicinity of San Francisco Bay than elsewhere (p. 16).

After the 1971 San Fernando earthquake, the *New York Times* interviewed a number of citizens who lived along the San Andreas fault and was confronted with indifference and fatalism. One individual who had lived close to the fault for twenty-five years said "he would stay on the San Andreas for the rest of his life. His house was knocked down in an earthquake in 1952. Asked if he had rebuilt, he said: 'Nope, didn't own it. But there's no sense in being scared of earthquakes. It's natural for them to happen. People in a flood

area seldom move away. Why should I? Why, it's probably been this way for centuries.'" (29 April 1971, p. 32).

Despite attempts by public utilities, museums, and governmental agencies to alert the public to the potential hazard, citizen interest is slight. The University of California Extension, for example, recently offered a one-day seminar on building and investing in earthquake country and had to cancel it because only four people signed up. And as *San Francisco Chronicle* columnist, Herb Caen, remarked, "If there's one subject San Franciscans are completely fatalistic about, it's quivers and tremors" (10 March 1976). This lack of interest does not extend, of course, to movies, popular books, and newspaper stories. Earthquakes make good entertainment. To prepare for them is another matter.

Peter Yanév (1974), an engineer, has written a book suggesting some sensible and inexpensive steps property owners should take for their own protection. In his preface he comments on the public's ignorance of such safety precautions.

As ill-informed and ill-prepared as most Californians are regarding their earthquake problem, they are at least aware that there *is* a problem. The citizens and officials of the other seismically threatened states in the West seldom even know of the high risks they face. . . . Despite the long history of earthquake damage . . . and despite principles of earthquake-resistant construction and property location which have been known to builders and available to governments for at least three generations, the individual property owner and indeed most governing bodies remain blithely ignorant of the factors that determine earthquake risks and of the simple, relatively inexpensive corrective steps that could be taken (pp. 7–8).

One premise of Yanév's excellent handbook is that if you tell people what they can do to mitigate a potential hazard, they will do it. Experience would indicate otherwise. Information and education, while necessary, are not enough without motivation.

Many Californians living near fault lines believe that one part of "earthquake country" is about as safe as another and see little point

in moving. Besides, the fault zone area provides “nice flat depressions in otherwise hilly grounds — perfect spots for building.” Or, as one woman said, “We know the fault runs through here . . . but we don’t care. It’s nice here. There are not as many people here. The air’s clean, and there’s no smog. That’s reason enough to be here.” (New York Times, 29 April 1971, p. 32) [2].

Which brings us to another determinant of indifference: citizens have enough to contend with besides the possibility of destructive earthquakes. Getting the kids’ teeth straightened or dealing with congestion on the freeways are more pressing concerns. Indeed, more people in California worry about various forms of pollution (42 percent) than about earthquakes (25 percent), if we can judge by a 1971 state-wide poll (see Table III). In the Los Angeles area 37 percent were afraid of air pollution, while only 23 percent feared a possible disaster from an earthquake. Fear of race riots or campus disturbances was five percentage points higher, at 28 percent, than fear of earthquakes.

Well over 90 percent of the Field Poll sample had felt an earthquake. In addition, over 50 percent of the sample had been in a position to experience an earthquake in which there was visible damage to the surrounding area. Yet such experience with a “damaging” earthquake did not affect their relative fear

of earthquakes in general. Twenty-four percent of 261 respondents who had “seen” earthquake damage feared earthquakes over other disasters, which was quite similar to the 25 percent of the 234 respondents who did not have the benefit of such an experience and still feared earthquakes over other disasters (such as pollution, floods, mudslides, and riots).

From the above anecdotal evidence and survey data, I suspect that the relationship of experience with earthquakes to fear or concern over earthquakes is curvilinear. Consider a shallow U-shaped curve, with experience plotted on the horizontal axis and fear or concern on the vertical axis. Towards the top of the left side of the U are those citizens who have experienced not even a tremor and are not “accustomed” to them. As newcomers to California, perhaps, all they know are rumors, and they are afraid and concerned about earthquakes. At the top of the right side of the U are those citizens who have personally witnessed loss of life and experienced a major loss of property; they are as concerned as those without experience but perhaps not as afraid. At the bottom of the U are the bulk of citizens who have experienced tremors and maybe observed damage to somebody else. Having lived with the phenomena of earthquakes for a number of years, they are indifferent.

One might expect that if citizens were ever

TABLE III

Citizens Have Other Concerns Besides Earthquakes

Disaster Most Feared	Total		San Francisco Bay Area		Los Angeles Area		Other California	
	No.	%	No.	%	No.	%	No.	%
Earthquake	123	25	29	29	49	23	45	24
Air pollution	151	30	17	17	78	37	56	30
Water pollution	60	12	18	18	19	9	23	12
Riots	138	28	28	28	59	28	51	27
Floods	16	3	4	4	3	1	9	5
No answer	12	2	3	3	5	2	4	2
	500	100	99	99	213	100	188	100

Source: *California Field Poll 71-04*, August, 1971; Question 23: “. . . which of these possible disasters do you most fear?”

motivated to prepare, it would be right after a credible warning or an actual earthquake. Yet another survey of Los Angeles residents conducted in the spring after the 1971 San Fernando earthquake found that only 11 percent of them had made any preparations before the earthquake – in spite of various warnings from time to time, including the alarmist one about California “falling into the sea.” What is more relevant, “only 16 percent of the sample report making preparations since the earthquakes”. A higher percentage of those living closer to the earthquake reported making post-earthquake preparations (Table IV), but 16 percent is still a small fraction of the total residents of the Los Angeles area (Bourque, 1973) [3]. The ones who got hit on the head, literally and figuratively, learned a bit more than their neighbors, who unfortunately did not benefit from the experience. An ironic touch is that over half of the sample believed that an earthquake was likely to strike Los Angeles within twelve months.

Yet from the viewpoint of residents of the Los Angeles area these predominantly indifferent responses make some sort of sense: earthquakes occur rarely, and they had had theirs. A mixture of horse sense and nonsense, therefore, characterizes citizen response to earthquakes. Earthquakes, when they do infrequently occur, are localized events which affect only a small part of the population; whereas smog, for instance, has become a

daily menace affecting almost everyone in the Los Angeles area. Burning eyes and difficulty breathing are immediate and frequent experiences for many Angelenos. For the majority of Californians, a disastrous earthquake – which is likely to affect someone else’s life and property – is too ephemeral a threat to distract them from other preoccupations (Wolfenstein, 1957, p. 3) [4]. It is all too easy to discount not only someone else’s experience with an earthquake but one’s own experience as well, particularly as time passes and the memory of the disaster fades. As I will suggest in the next section, the passage of time, coupled with continuity of residence in an area, contributes to citizen indifference.

Relaxed residents

Another, perhaps independent, determinant of citizen response is length of residency. Residency encourages citizens to accept their region’s natural hazards. Thus a Californian is likely to be concerned about encountering a tornado when visiting the Midwest and tourists and other newcomers to California are often surprised by the nonchalance about earthquakes which they find here. Back East the spectre of an earthquake disaster was vivid and real. Out West one’s neighbors and friends are not agitated about the prospect of an earthquake. They are advocates for California and downplay their concern, if any, about

TABLE IV

Proximity Motivates Preparation

Post-Earthquake Preparation	San Fernando and Sylmar	Rest of San Fernando Valley	Rest of Los Angeles Basin	Total	
	%	%	%	No.	%
Yes	46	24	11	127	16
No	54	76	89	652	84
Total No.	70	135	574	779	100

Source: L. Bourque et al., *The Unpredictable Disaster in a Metropolis: Public Response to the Los Angeles Earthquake of February, 1971* (Los Angeles: UCLA Survey Research Center, 1973), Table 3.12, p. 28.

earthquakes. After a while the nervous newcomer becomes the old-timer who is a little cynical about the whole thing. Indeed, as Table V suggests, many long-term residents of fifteen years or more even begin to believe that earthquakes are less likely to occur. About half of the long-term residents thought a serious earthquake was likely to happen, while over two-thirds of the newer residents had similar feelings; 22 percent of the long-term residents thought that a serious earthquake was unlikely, as compared to 10 percent of the newcomers. The percentages are about the same for those residents who have lived in the state from five to fifteen years and for less than five years.

TABLE V

Long-term Residents Consider Serious Earthquakes Less Likely

Opinion	Length of Residence			
	Less Than 15 Years		15 Years or More	
	No.	%	No.	%
Likely	90	68	187	51
Somewhat likely	26	19	81	22
Unlikely	14	10	82	22
No answer	3	2	16	4
	133	99	366	99

Source: *California Field Poll 71-04*, August 1971; question 24: "As you understand it, how likely is it that a serious earthquake might strike here?"

Of course the differences indicated in Table V are not overwhelming, but note that the proportion of long-term residents who probably feel safe from serious earthquakes is twice that of the newer residents. If a person feels that an earthquake is unlikely, he probably also feels safe. That length of residency in California contributes to feeling safer about earthquakes was also partially supported by an analysis of what aspects of earthquakes most frightened the respondents. By grouping their responses into fear of "casualties" and fear of other effects such as noise or loss of electricity (Table VI), I found that those

TABLE VI

Long-term Residents Fear Casualties Less

	Length of Residence			
	Less Than 15 Years		15 Years or More	
	No.	%	No.	%
Fear casualties	83	62	200	55
Fear other results	50	38	166	45
	133	100	366	100

Source: *California Field Poll 71-04*, August 1971; question 25: "What things about an earthquake frighten you the most?"

residents who had lived in California for fifteen years or more tended to fear "casualties" less (55 percent) than the relative newcomers (62 percent). Once again the numbers are more suggestive than conclusive of the general point. The numbers, however, do run in the appropriate direction; for example, 81 percent of the residents who had lived in the state for less than one year feared "casualties" or loss of life. Unfortunately the number of respondents in this resident group, sixteen, was too small to arrive at definitive conclusions.

Length of residency also seems to affect the respondents' evaluation of their city's preparations for coping with a possible earthquake disaster. As shown in Table VII,

TABLE VII

Long-term Residents Are More Critical of Earthquake Preparations

Rating of Preparations	Length of Residence			
	Less Than 15 Years		15 Years or More	
	No.	%	No.	%
Good	25	19	50	14
Fair	50	38	107	29
Poor	40	30	148	40
No answer	18	14	61	17
	133	101	366	100

Source: *California Field Poll 71-04*, August 1971; question 22: "... which of the statements on this card ... best describes what kind of job you feel the responsible authorities in your city are doing to prepare for possible disasters such as ... reducing potential damage and hazards from a major earthquake?"

approximately 40 percent of the long-term residents rated preparations as poor, as compared to 30 percent of the newcomers. This criticism of local preparation may be due to awareness that local officials are not doing much, or it may be a projection of futility or indifference: nothing can be done, so local efforts are pointless.

Other variables might affect the influence of residency on citizen response. One is age, which in other instances has been connected with cynicism and apathy. For example, older respondents feared casualties less than the younger ones. They were more likely to be concerned about noise and shaking from earthquakes than about death. Forty-seven percent of those sixty or older feared casualties rather than other results of an earthquake, and this percentage increased as age decreased down to those respondents under twenty-five, with 65 percent. When age was controlled, however, the effect of residency was still apparent [5]. Nor did geographic location change the results. Long-term residents, for example, did not live in areas with perceived poor preparations and low earthquake likelihood. The residency groups were spread throughout the state, and opinion on preparation and likelihood did not differ much between regions. The proportion of respondents who had experienced a "damaging" earthquake did increase slightly with their length of residence. Yet, as previously noted, experience does not necessarily lead to greater concern about earthquakes.

What can we conclude about length of residency as a determinant of citizen response? Obviously a secondary analysis of a single Field Poll cannot provide definite conclusions. Not many surveys of earthquake response have been previously conducted with standardized questions, and as is typical with survey data, much depends on the question and its wording. When judging the likelihood of earthquakes, for example, does the respondent perceive a "serious" earthquake to be one in which his roof may fall in, or is "serious" just a slight

shaking feeling? Do long-term residents have a higher or more severe test of a serious earthquake?

Despite such reservations, it does seem to us, as a working hypothesis, that the longer one lives in California, the less one is likely to care about earthquakes. Long-term residency provides information and experience to the citizen. It provides the opportunity to experience earthquakes and then to discount that experience. He sees that after 15 to 20 years not much has happened to him. Indeed the experts tell him that a great earthquake only happens once in 50 to 100 years. He may have felt a tremor, observed damage in his area, but still not experienced severe personal damage. Then as he gets older, there are other perils to his health which he must confront, and his fear of dying from earthquakes diminishes. Cynicism creeps in, and the long-term resident soon feels that neither he nor the government can do much about earthquakes. So why not just relax?

PRIVATE CONSEQUENCES

The uninsured

If Californians wanted to take some action against a future earthquake, they could at least insure their homes and property. In 1975, according to the Insurance Information Institute, \$13.8 million in premiums, about two-thirds of the earthquake insurance written in the United States, was in force in the State of California. This appears to be a large amount of premiums but actually is quite small. As one insurance executive put it:

Less than 5% of the California property which is presently insured against fire is also insured against earthquake. This is true in spite of all the noise that has been made about the need for earthquake insurance in California. This is true in spite of the fact that companies have recently introduced improved earthquake insurance products and advertised them widely (Syfert, 1972, pp. 14-18).

Most of us have to buy fire insurance because the people who lend us money to buy our homes insist on it, but we don't have to do the same for earthquake insurance, and evidently not many of us do. Nor is our reluctance a recent phenomenon. Judging by the data presented in Table VIII, Californians have

1959	197	5.3	2.7
1960	216	5.5	2.5
1961	242	5.7	2.4
1962	265	5.0	1.9
1963	281	6.2	2.2
1964	316	4.9	1.6
1965	346	4.9	1.4
1966	381	5.3	1.4
1967	428	5.3	1.2
1968	475	5.2	1.1
1969	525	5.8	1.1
1970	597	5.8	1.0
1971	694	4.6	0.7
1972	807	8.9	1.1
1973	884	10.9	1.2
1974	959	12.9	1.3
1975	1088	13.8	1.3

TABLE VIII

Investment in Earthquake Insurance as Opposed to Other Property Insurance (In Millions of Dollars)

Year	Other Property*	Earthquake	Earthquake as a percentage of other property
1922	\$34	\$0.061	0.2%
1923	40	0.214	0.5
1924	41	0.298	0.7
1925	42	2.0	4.8
1926	45	2.4	5.3
1927	44	2.8	6.3
1928	43	1.8	4.2
1929	46	1.6	3.5
1930	42	2.0	4.8
1931	34	2.0	5.9
1932	31	0.7	2.3
1933	28	0.9	3.2
1934	28	1.0	3.6
1935	29	0.9	3.1
1936	28	0.9	3.2
1937	28	0.9	3.2
1938	29	0.8	2.8
1939	27	0.9	3.3
1940	29	1.0	3.4
1941	31	1.1	3.5
1942	34	1.2	3.5
1943	39	1.4	3.6
1944	48	1.7	3.5
1945	53	1.4	2.6
1946	75	2.4	3.2
1947	91	2.8	3.1
1948	92	2.7	2.9
1949	99	3.4	3.4
1950	106	3.3	3.1
1951	118	3.4	2.9
1952	120	3.9	3.3
1953	124	4.3	3.5
1954	109	3.8	3.5
1955	121	4.1	3.4
1956	125	4.3	3.4
1957	137	5.2	3.8
1958	170	5.5	3.2

Source: *Underwriters Report* (San Francisco: Underwriters Report of California).

*Includes: Fire and, from 1955 on, homeowner's multiple peril and commercial multiple peril.

usually spent only a small fraction of their other property insurance dollars on earthquake insurance — about 3 to 4 percent, from the 1930s to 1960. From the 1960s to 1975, the figures declined to about 1 percent as more property owners insured themselves against multiple perils (such as liability) and took advantage of homeowner policies.

To put these figures in perspective, a \$20,000 house, in the 1970s, might have a homeowner's policy premium of \$150 a year, with an additional \$40 for earthquake insurance — or 27 percent (Baker, 1971, p. 31). A homeowner's policy for a \$60,000 house might be about \$300 a year, with an additional \$120 a year for earthquake insurance — or 40 percent. Generally, earthquake insurance is sold at flat rates, such as \$2 per \$1000 for a wood frame dwelling in the San Francisco Bay Area. California's rates vary with the type of construction and its location by zone. The state is divided into three zones depending on the degree of seismic risk.

Many of the present earthquake insurance rules and rates were established in the aftermath of the 1925 Santa Barbara earthquake.

Only a small part of the losses then were covered by insurance, and after the earthquake the demand for insurance increased dramatically (U.S. Dept of Commerce, 1969, pp. 19, 75–76). We can see the effect of the earthquake on the demand for earthquake insurance clearly in Table VIII; earthquake insurance premiums shot up to \$2.8 million in 1927, or 6.3 percent of other property insurance premiums. This was roughly a tenfold increase in the figures for 1924.

During the depression, premiums for both earthquake insurance and other property insurance declined; thus the effect of the 1933 Long Beach earthquake on earthquake insurance was not pronounced. Earthquake insurance premiums increased only \$200,000 from 1932 to 1933. This low level of earthquake insurance premiums continued throughout the depression and most of World War II. After the war, premiums started climbing with the growing prosperity of California. During the 1950s, a number of earthquakes occurred which may have facilitated the slowly rising trend in earthquake insurance premiums. Besides property damage and some loss of life, shaking was felt over a large part of the state from a number of these earthquakes. In the San Francisco area in 1957, for example, a small earthquake (5.3 Richter Magnitude) resulted in the strongest shaking since 1906 (California Legislature, 1974, p. 210). State-wide earthquake insurance premiums increased slightly, from \$4.3 million in 1956 to \$5.2 million in 1957. A more dramatic increase started with the 1971 San Fernando earthquake: premiums were at a low of \$4.6 million in 1971 and have increased every year, so that by 1975 earthquake insurance premiums were \$13.8 million.

While we have seen that increases in the level of earthquake insurance premiums occur after an *observable* earthquake, we should also remember that the overall level of insurance protection is still relatively low. Less than one-tenth of the losses from the 1971 San Fernando earthquake – about \$46 million – were

covered by insurance (Baker, 1971, p. 31).

Moreover, the demand for earthquake insurance is not simply related to the occurrence of earthquakes. Other factors are involved: the level of economic activity, the form of the insurance itself, the willingness of insurance companies to sell it, and the awareness of citizens as to potential risk and availability of insurance. Consider those citizens who have directly experienced an earthquake. They may realize that the damage they are likely to suffer in the future is well within the 5 percent deductible feature of most earthquake insurance policies and may decide not to purchase insurance. From his survey of California homeowners, Howard Kunreuther found that “in earthquake-susceptible areas prior losses showed a negative relationship, if any at all, to the purchase of insurance (1976, p. 248). He concluded that prior damage has to be relatively high before there is an effect on the decision to buy insurance. He also found that friends and neighbors provide information on earthquake insurance, perhaps serving as examples or as a reference group for an individual making up his mind about whether to purchase earthquake insurance (pp. 246, 249).

If one can believe the trade publications, insurance companies have been making an effort to sell earthquake insurance. One company reported that, after a promotional campaign in southern California using newspaper advertisements, television, and mail announcements, it sold 125 earthquake insurance endorsements from November 1971 to June 1972. People were just not interested, although the company had made its effort shortly after the San Fernando earthquake. As the insurance company executive concluded:

It seems obvious that people would rather gamble on there being no earthquake disaster in their lifetime. Even after having survived one, the normal person rationalizes there will not be another. People also seem to prefer to gamble on incurring only minimal damage if, in fact, there is an earthquake in their lifetime Consequently, it often seems to be unwise to be prudent (Syfert, 1972, p. 16).

An insurance agent who worked the San Fernando Valley area sent out a flyer informing his clients about earthquake insurance. He sold two policies before the 1971 earthquake and, with the aid of his partner, about ten policies after the earthquake. Since the San Fernando earthquake, they get more inquiries but few buyers (Taney, 1971, p. 25). A chief deputy insurance commissioner for the State of California, however, does not believe that the insurance industry as a whole has been as aggressive in its marketing of earthquake insurance. Even when an agent goes all out, however, he is not likely to sell much. An aggressive agent in the San Francisco area, for example, found that less than 6 percent of his clients were interested in earthquake coverage. (Baker, 1971, pp. 31–32). This number squares fairly well with a survey in the Bay Area which showed that 7.5 percent of the respondents had insurance (Jackson and Mukerjee, 1974, p. 164) [6].

In short, since the purchase of insurance is a consequence of concern, the California earthquake insurance situation is simply more evidence of citizen indifference to the hazard. Once again I want to suggest a U-shaped curve as a tentative explanation, with purchase of insurance plotted on the vertical axis and experience with earthquakes on the horizontal axis. Towards the top of the right side of the U are those small groups of citizens who in the past have experienced major property damage from an earthquake and therefore buy insurance for protection in the future. Towards the top of the left side of the U are those citizens who have had little or no personal experience with earthquake damage but who either have greater fear of an earthquake or are influenced by what their friends and neighbors are doing. If their friends buy insurance, they will too. At the bottom of the U are most of California's citizens, who do not purchase earthquake insurance and who keep total premiums at a low level. Some are probably unaware of the future hazard or are unaware of the availability of

insurance or both. Some do not want to take the trouble to find out about insurance. Some because of prior experience feel that they can handle the future hazard without insurance. Some do not find it in their interest to insure: the costs may be perceived as high relative to the risk. In any event, most Californians do not take this minimal step to protect their homes.

Leave it to God

Because earthquakes are perceived as uncontrollable natural events, many citizens, as a private consequence, feel it appropriate to put themselves in the hands of a supernatural being. Such surrender of human responsibility may be a result of indifference. It may also indicate a measure of helplessness and reflect notions about the causes and religious meaning of destructive natural phenomena which community leaders have sometimes encouraged.

Those of us who have been reared on a diet of science and technology find it difficult to appreciate that people once believed earthquakes to be caused by the behavior of mythological animals or gods. Gigantic frogs, hogs, tortoises, and catfish have had their share of the blame. Nor has it been only the restless heavings of Poseidon the sea god which have made the earth tremble. Indeed, as David Niddrie points out:

The earthquake has been used by all kinds of moral and religious leaders as the heaven-sent opportunity to warn the community that all is not well, and that it was time to mend its ways. . . . Furthermore as recently as 1930 the Archbishop of Naples declared that the Italian earthquake in July of that year was a visitation from God provoked by the immodesty of women's clothing and the general immorality of the people (1962, pp. 13–14).

During and after the 1906 San Francisco earthquake, religious leaders around the world interpreted the disaster as a sign from heaven that their own parishioners might expect a similar fate because of their sins. In Oakland,

a Roman Catholic priest, Father Peter Yorke, observed the burning city across the bay and declared: "There has been no town in the world, in modern times or ancient, in which vice has been so naked and unashamed. Its people made it a merit when a stranger came to show them how wicked they could be. The town turned its face away from God. San Francisco has received her warning. Let us hope it has received purification." (Thomas and Witts, 1971, p. 217).

Whether San Francisco is as "sinful" as it once was is a debatable point, but at least some of its citizens believe in the efficacy of prayer as a means of coping with the earthquake hazard. In a recent survey, 36.7 percent of the respondents reported praying as a means of adjustment to the hazard. Prayer evidently was as effective as doing nothing (also 36.7 percent), and the two were the "most practiced adjustments. . . . Adjustments of a more substantial nature, requiring preparation, time, and investment, were adopted by few respondents" (Jackson and Mukerjee, 1974, p. 164).

Whatever the reasons, for centuries people have viewed earthquakes as a problem requiring the intervention not of human beings but of gods. Today, some citizens still believe that if an earthquake is an act of God, then God should take care of it and them. And it follows that if earthquakes are God's problem, they are not government's — obviously the separation of Church and State must be maintained! Because public officials can all too readily anticipate that citizens will not blame them for an act of God, they may have little incentive to do much about the potential hazards of a future earthquake (Abney and Hill, 1966, pp. 980, 981) [7]. Whether officials will have such an incentive depends on the presence of political support for seismic safety, an important public consequence of citizen response to which we now turn.

PUBLIC CONSEQUENCES

Political support?

In the making of public policy, political support can come from a number of sources. Sometimes a small concerned segment of the public, an attentive public, provides the requisite support (Key, 1964, p. 544) [8]. Other times the mass of citizens is the source of support. To be a source of support, however, citizens have to be concerned and pay attention to the public issue. Yet we have seen that citizens in their private behavior are indifferent to the seismic safety issue. Of course, the lack of attention of citizens to the earthquake problem is not unique. Citizens usually do not pay attention to many public policy problems at the same time, and they are more likely than not to pay only sporadic attention to a few problems. "American public attention," according to Anthony Downs (1972), "rarely remains sharply focused upon any one domestic issue for very long — even if it involves a continuing problem of crucial importance to society. Instead, a systematic 'issue-attention cycle' seems strongly to influence public attitudes and behavior concerning most key domestic problems. Each of these problems suddenly leaps into prominence, remains there for a short time, and then — though still largely unresolved — gradually fades from the center of public attention" (p. 38). Downs identifies five stages of the issue-attention cycle:

1. *The pre-problem stage.* The problem exists but only experts or interest groups are aware of it.
2. *Alarmed discovery and euphoric enthusiasm.* A dramatic event occurs and the public believes the problem can be "solved".
3. *Realizing the cost of significant progress.* Costs to solve the problem are high and involve "major sacrifices by large groups in the population".

4. *Gradual decline of intense public interest.* Either threatened or bored by the problem, the public turns its attention to another problem.

5. *The post-problem stage.* The institutions and their programs that were directed to the problem continue to work on it (pp. 39–41).

Let us see how well the earthquake problem fits these five stages. Before a major earthquake, certainly the experts, chiefly engineers and seismologists, are most aware of the potential danger from building practices and land use. Some of these experts may even have suggested that citizens buy earthquake insurance and brace their water heaters. After the earthquake, surely a “dramatic event”, the public does pay attention. The papers are filled with pictures of damage and stories of human interest and expert advice. According to the *Los Angeles Times*, Dr. Charles F. Richter, (as in “Richter scale”) is reported to have “behaved in human fashion” during the 1971 San Fernando earthquake, because “he jumped up screaming and scared the cat” (14 February 1971). People visited the scene of destruction because, as one Burbank resident put it, “I thought it would be a wonderful experience for the children” (Shaw, 1971, p. 1). People wrote letters to the editor of the *Los Angeles Times* praising volunteers who provided relief (18 February 1971), and criticizing public officials who flew around the scene of the disaster as sight-seers (23 February 1971). Two days after the earthquake, the *Los Angeles Times* printed an editorial, “To Cope with Future Quakes”, stressing the importance of building codes (11 February 1971). Others suggested that we direct our national priorities from Apollo missions to earthquake research (13 February, 1971).

These newspaper accounts did not indicate much feeling on the part of citizens that the earthquake problem could be “solved.” There were some voices, more likely to be experts than citizens, urging some action, but after three weeks to a month, the newspapers lost interest, and the general public found other

entertainment. In a relatively short period of time, the general public jumped from stage 2, alarmed discovery, to stage 4, decline of interest.

The attention span of the experts and of the earthquake’s victims was longer than that of the general public. The experts saw the earthquake problem in terms of seismic safety and emergency preparedness. For its victims, the San Fernando earthquake took on other personal meanings. These citizens were able to express their frustration and concern when their congressional representatives came to town to hold hearings on how well the Disaster Relief Act of 1970 (P.L. 91-606) had worked and, of course, to show these constituents that they cared. From my reading of the testimony, the citizens of the San Fernando area saw many problems, only a few of which, however, had anything to do with preparing for the next earthquake. They had formed new attentive publics and used existing interest groups for expressing such concerns as: getting loans or grants to rebuild houses and businesses, obtaining food stamps, urging the need for improved public transportation, highlighting unemployment and the necessity for using local people in debris removal, demonstrating that the government should have more minority and Spanish-speaking disaster personnel, and pointing out that private hospitals should be given the same financial assistance as public hospitals [9].

Most of the hearings contained testimony from experts and public officials about the adequacy of current disaster policy, the need for additional relief, the problems with non-earthquake resistant buildings and dams which were not earthquake-resistant, and the need for research to increase understanding of earthquakes. The testimony of citizens or representatives of community groups seldom dealt with seismic safety issues. One notable exception concerned the future safety of the Van Norman Dam.

My name is Betty Whirlledge, and I am a housewife and a resident of the evacuation area below the dam. We have already gotten together approximately 5,000 – perhaps more – signatures so far requesting that the Van Norman Dam be relocated. We have facts; we have talked to the Department of Water and Power; we have talked to our local officials; we have read reports by the geologists and the scientists questioning the safety of building in this area and that it is questionable geologically (U.S. Congress, Senate, 10–12 June 1971, p. 682).

Usually citizens were concerned about post-earthquake emergency procedures and financial problems.

My name is Bob A. Wiser. I am a representative of the Sylmar-North Foothills Home Owners. We formed right after the earthquake because we were having problems with the disaster service. It took over 48 hours to get water into our area and over 72 hours to get chemical toilets Another problem that is facing us right now is that the city is going to stop clearing all of the debris, the reason is the funds were cut off. However, the SBA [Small Business Administration] loans are just coming through for our people and that means that debris is going to be pushed into the street. We need 60 or 90 days debris clearance in our area. We are having our biggest problems, of course, with the mortgages being held by the savings and loans. We have one savings and loan called Fidelity and they have given us all kinds of fits. Up until the past week, we understand that they are foreclosing on three to five homes a week just in our area (ibid. p. 829).

David Geml substantiated the foreclosure problem.

I am one of the homeowners that everyone refers to. I suffered over \$14,000 in damage to a \$37,000 home and over \$2,000 in personal property loss Initially, I thought that I would attempt to repair my home using a combination of the SBA funds and cooperation of the Mortgage Holder. However, my loan is guaranteed by the Veterans' Administration and the lender would not cooperate since they would benefit from these guaranteed funds. Cooperating with me would cost them a good bit of money. Therefore, before I could even obtain an estimate on the damage from the contractor, they proceeded to foreclose on my loan. In fact, they even entered my home and repossessed all of the permanent fixtures including the kitchen sink. (ibid. p. 826).

Businessmen also needed help, as Bob Sprouls, president of the Sylmar Chamber of Commerce, made clear.

I feel that the hearings are coming a little bit late. They should have been some time in March or at the latest in April. We feel this lack of special attention from our State and Federal Government is one of the weakest parts in the whole disaster. Why should we, the people, who placed the representatives in office, beg for assistance when 1 week after the disaster, India was loaned \$165 million for 4 years at an interest rate varying from 2 to 4 percent? (ibid. p. 807).

H.E. Howard, a businessman from the San Fernando Valley, lost \$35,000 on his house and \$172,000 on his business. He described the plight of a number of his neighbors, including the owner of a small grocery store.

Here is a man lying with a heart attack crying, 'I have lost everything. I am broke.' I said, 'Don't worry. The Government understands your position.' Did they? After he got through looking it over he is through. He lost \$87,000, all he had. You see his debt is more than he can repay under the circumstances . . . (U.S. Congress House, 24 February 1971, p. 210).

For some citizens, particularly the poor and minorities, the San Fernando earthquake not only created new problems but exacerbated old problems. Edward Kussman, for example, stressed the unemployment problem and the importance of hiring local people for post-earthquake reconstruction.

I am the honorary chairman of the NAACP We have the job opportunity to come into the area, to put some of the men in our area to work on the clean up project. But instead of that it seems like the Corps of Engineers will hire a contractor from Los Angeles and he will bring in laborers from Los Angeles or the Los Angeles area and then we have the 18- to 50-percent unemployment in the area in which they are working. It seems unfair for this to happen continually . . . under the circumstances that the local people need work . . . (U.S. Congress, Senate, 10–12 June 1971, p. 851).

At the time of the hearings, most victims appeared to be still at the discovery stage of the issue-attention cycle: they expected that something could be done about their problem. But, as I have shown, their problem for the most part was not seismic safety. One difficulty with the notion of an issue-attention cycle is the assumption that the definition of the issue

will more or less stay constant throughout the cycle. Unfortunately a dramatic event, such as an earthquake, acts as a projective test for all sorts of definitions. A serious earthquake does gain the attention of both the general public and the victims, but the political currency of that attention is not likely to be focused on a single definition of the earthquake problem.

After the San Fernando earthquake, the state legislature responded, in part, to some of the problems of the victims – for example, by passing a resolution urging state agencies to employ those who had lost their jobs as a result of the earthquake by passing statutes which provided tax refunds for damaged cigarettes and alcoholic beverages and retroactive insurance assistance for veterans. At the same time, experts and their colleagues on the California Legislature's Joint Committee on Seismic Safety, with a skillful use of timing and, I would suggest, relying on an illusion of general public support, introduced and secured the passage of several important seismic safety bills, including a strong-motion instrumentation program which encouraged the installation of accelerographs throughout the state and a requirement that the general plan of local governments include a seismic safety element. In short, political support for legislation came from small attentive publics of victims interested in *relief* and from a small attentive public of experts interested in *safety*.

In 1971, according to geologist James E. Slosson (1975), the San Fernando earthquake

... stimulated great interest and the subsequent introduction of bills. The public and press were both very emotional as a result of this earthquake and, in turn, this emotion was transmitted to the elected officials. Of the 47 earthquake-seismic bills introduced, 23 were passed and 24 failed (p. 37).

Whether the general public was emotional and legislators knew it, as Slosson claims, remains an open question. I suspect that for most legislators their support was less a matter of transmitted emotion and more a matter of

the possible personal costs of opposition. In the aftermath of a crisis, it is easier to go along than to appear as an isolated impediment to progress. In any event a few years after the San Fernando earthquake, the batting average of the experts and legislators declined, and Slosson concludes that "there is generally a lack of action during the lulls between disasters . . ." (p. 37). Without the benefit of some public attention, the experts have to slug it out by themselves in Downs' "post-problem stage".

To summarize, as a consequence of public indifference, no broad-based political support exists for preparing for future earthquake hazards in the lulls between earthquakes. While waiting for the next earthquake, only small attentive publics of experts continue to press for safety and deal with interests (such as developers and builders) that may be adversely affected by seismic safety legislation [10]. Fragmented political support, mostly in the form of attentive publics, does develop after a serious earthquake, but it is not likely to be interested solely in preventive measures. Whatever broad-based political support that does exist soon disappears as memories of the disaster fade.

Rational citizens

Having learned that citizens do not prepare themselves for earthquakes, what can be said? When citizens seem indifferent to their seismic safety, are they being irrational? Ironically, the answer is probably no. Citizens do pursue their own self-interest in their avoidance of taking action against the earthquake hazard. Their indifference is a form of limited rationality – more a matter of having other concerns and not as a conscious choice based on complete information about relative risks. We must remember that earthquakes are events of low probability. Most Californians will never experience a serious earthquake in their lifetimes.

Those who have, are less likely to do so in the future. Californians are more likely to suffer property damage from termites than from earthquakes. They are more likely to die from disease or from driving on the freeways than from earthquakes. So it is quite rational for many of California's citizens to ignore the earthquake hazard.

CONSEQUENCES FOR POLICY-MAKING

But what is rational from the point of view of an individual citizen may not be rational from a public point of view. Granted citizens are indifferent, but this is no excuse why government should be. Certainly the government is in a better position than citizens to gather and disseminate earthquake information. Similarly, governmental regulation (e.g., through building codes) may reduce risks associated with day-to-day decisions that individuals make and protect us when those decisions are not in the direction of enhancing the safety of the community. Many facilities, both public and private, can affect the lives of citizens and the well-being of the community. Dams, fire stations, hospitals, schools, and theaters immediately come to mind. We would not want a dam to break and inundate a city because of an earthquake. We expect our fire-fighting systems to function after an earthquake and our hospitals take care of the injured. When we go into a public place such as a movie theater, we assume that it has been built so that we can enjoy the movie in safety. We don't want to have to check the theater's foundations. But suppose that the builders of such public facilities did not take the earthquake hazard into account because of the extra expense; suppose that our public officials did not insist that they do so — then what?

One essential problem with the public response of indifference to earthquake hazards is not that individual citizens decide, one way or the other, to live on the fault in a house without earthquake insurance and appropriate

bracing, but that such indifference contributes to the lack of political support for effective social action. When citizens are not aware of or concerned about a potential hazard to themselves, what is the likelihood that they will be aware of or concerned about the hazard to others? If the earthquake hazard is not to be believed on an individual basis, why should the hazard become any more credible on a community basis?

From a policymaking perspective, perhaps it would be preferable to accept the premise that citizens are an ephemeral, uninformed source of support and proceed from there. Not all public policy problems have to involve the public. The quality of public attention, however, does have important implications for the conduct of policymaking and politics. The attitudes of citizens toward a particular problem explains, in part, the failure of policy or the neglect of issues. An informed and concerned citizenry can contribute to the debate on important issues of seismic safety. Citizens can compensate for the narrow-based, and sometimes conflicting, criteria of experts. They can act to provide incentives for public officials to act. Without the attention of citizens or groups who perceive a community stake in the resolution of a particular problem, that resolution may never occur or may be deflected by other concerns. As a policy issue, seismic safety seldom will get on the public agenda, and when it does it will be controlled by experts and modified by fairly narrow interests. Public officials and their experts, who are in a position to stipulate the risks citizens must assume, will then be in the peculiar situation of trying to establish standards of safety without much public support and certainly with even less public understanding.

ACKNOWLEDGMENT

With thanks to Dan Smith and Karen Dolmatch Shaw, who helped gather data for this paper.

NOTES

- 1 Testimony of Mr. V. Slevin, American Insurance Association, in: California Legislature, Assembly Finance and Insurance Committee, *Transcript of Assembly Committee Hearing on Earthquake Insurance Hearing* (Sacramento: 1971, p. 5).
- 2 An extensive survey of over 1400 residents who live along the fault in northern San Mateo County also found this notion of not moving. About three-fourths of the respondents in 1976 knew that the San Andreas fault was within one mile of their residence, and a similar amount felt that they would not be any safer five miles away. (See Sullivan, 1977).
- 3 Table IV suggests a linear hypothesis: the closer to the earthquake (i.e., the greater the experience with the earthquake), the greater the preparation. These responses could also represent the right segment of the previously discussed U-shaped curve.
- 4 Martha Wolfenstein has examined the relationship of "denial towards remote threats" such as earthquakes. In her opinion: "We may exclude various threats from awareness. We simply do not think about them. Or if we think about them, we do not believe that they will happen, or that they can affect us."
- 5 With this particular sample (*California Field Poll 71-04* August 1971), the independent effects of length of residence and of age were not always consistent. For example, when I controlled for age and examined the effect of length of residence on opinions about preparations for an earthquake, I found that for age groups over forty-five, length of residence still made a noticeable difference, but for the younger age groups the differences were slight. When I controlled first for age and then for length of residence and examined attitudes on the likelihood of an earthquake, both variables seemed to be at work. When I did the same for fear of "casualties," both variables had an effect, but age had a stronger influence than length of residence.
- 6 There are some problems with their small sample of 120 San Francisco residents because of a 78 percent refusal rate. This high refusal rate itself is suggestive of the general public avoidance of the earthquake problem.
- 7 With respect to the aftermath of a hurricane, Abney and Hill found that "to blame mortal politicians for their deficiencies in hurricane protection was largely futile and seemed irreverent to many"; these citizens did not consider the hurricane a "legitimate political issue but rather an act of an inscrutable God".
- 8 In discussing public opinion and political behavior, social scientists generally refer to these segments as special or attentive publics to distinguish them from the general public or entire citizenry. For example, V.O. Key points out that "there exists a complex population of special publics whose attentions center more or less continuously on specific governmental agencies or fields of policy The most obvious attentive publics consist of those with a direct concern in particular policies or actions."
- 9 For a concise overview of these concerns, see Fried, 1973, pp. 220-229.

- 10 There are also amateur groups, such as the Quake Watchers Club in Glendale, California, where for \$30 a member gets a tiltmeter and instructions for recording anomalies, but it is not likely that such groups would be politically active.

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