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HOME WITH A VIEW: CHAPARRAL FIRE HAZARD AND THE SOCIAL GEOGRAPHIES OF RISK AND VULNERABILITY

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The purpose of this paper is to outline the political and space economy of fire hazard in the chaparral-covered hillsides of California. The tragic Oakland fire briefly focused national attention on the recurrent natural hazard of brushfire on the montane fringes of California urban areas and the Los Angeles fires of Fall, 1993, have set off another brief flurry of reportage. Unlike coverage of the Midwest flooding of 1993 (e.g., Price 1993), however, media analysis never addressed the larger social and environmental context of such brushfires in California. As many geographers have noted, such events are not disasters or natural hazards as things-in-themselves (Alexander 1991; Burton and Kates 1964; Burton, Kates, and White 1978; Wisner 1991). A natural event becomes a natural hazard or disaster only when it interacts with a society arranged in space so as to expose portions of its population or assets to the forces unleashed in that event.

The first section of this paper reviews relevant background concepts in prior hazards work in geography and related disciplines, while the second presents the hypotheses guiding this study. The third section sketches the ecological functions of fire in chaparral and the mechanisms by which chaparral ensures its occurrence. The fourth section addresses cultural and economic factors in Southern California that create the chaparral fire hazard. The last section distinguishes risk and vulnerability and examines processes allocating each across space and social strata.

Natural Hazards in Prior Literature

The classic geographical literature on natural hazards stems from the work of White (1942, 1964), Kates (1962), and Burton and Kates (1964).

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Its focus is largely on the following four themes: (1) the distribution of events across space and through time; (2) social and individual vulnerability to natural hazard; (3) perceptions of risk on the part of potential victims; and (4) behavioral responses to perceived or experienced hazard on the part of individuals and agencies.

Tacit in this approach is an individualistic, even atomistic, conception of society. Society and its institutions are depicted as comprised of individuals, who try more or less rationally to optimize their private benefit to cost ratios in their behavior toward potentially hazardous situations (Watts 1983). Much attention is given to individual awareness of hazards, individual choices to live or work in hazardous situations, and individual decisions on mitigating hazards through such actions as taking out flood or earthquake insurance (Blanchard 1993; Cook 1993; Lansana 1993; Palm 1990; Palm and Hidgson 1992; Sorkin 1982).

By the late 1970's, another approach emerged in the work of those geographers doing work on natural hazards in Third World contexts (Liverman 1989; Rivers 1982; Susman, O'Keefe, and Wisner 1983; Watts 1983; Wisner 1991; Wisner et al. 1976). This approach focuses on the structuring of individuals into groupings based on certain common interests, which quite often conflict with the interests of various other classes. Classes are not equal in power, so the dominant classes and groups can impose constraints on the behavioral options of subordinated classes and groups, making them highly vulnerable to the effects of an extreme event.

In the Third World contexts in which this approach evolved, such research has focused on the concept of marginality and its connections with vulnerability (Susman et al. 1983). That is, it is the marginalized, the poor and powerless who are most vulnerable to natural hazards. Such vulnerability expresses social and economic constraints on their abilities to live or work in less hazardous places. For many of the most marginalized in the poorest countries, it is a question of living and working in a hazardous place or not working and living at all. The marginalized members of society, too, have the fewest resources to evade, withstand, or recover from natural hazards (Wisner 1991). Because of the political powerlessness of the marginalized, socio-political mechanisms for assisting the stricken and rebuilding damaged infrastructure will be tardier in poorer areas than in more prosperous ones (Haas, Kates, and Bowden 1977; Rovai 1993; Susman et al. 1983).

This line of argument, however, has largely confined itself to the analysis of natural hazard in Third World contexts, rather than addressing hazard in First World or Second World contexts. This paper attempts

to apply this more structural approach to a First World natural hazard: montane suburban brushfire.

Hypotheses

From the structural approach comes an expectation that poor, marginalized people should prove more vulnerable to hazard. From the classical approach comes an expectation that wealthier individuals with a high degree of autonomy over their options in life seek to optimize their personal benefits to costs ratios in choosing to live in a hazardous area. These expectations are evaluated around fire companies 99 and 39 in and near the Santa Monica Mountains area of the City of Los Angeles (Figure 1) by examining the physical nature of the hazard, the demographics of those exposed to it, and the societal mitigations of that hazard.

Chaparral: A Fire-Dependent Vegetation

Chaparral is a scrub vegetation comprised of broadleaf evergreen shrubs between 1 and 4 meters high. It typically occupies the steepest slopes and most skeletal soils in the mountainous areas of California below roughly 2,000 meters in Southern California and 1,000 meters in Northern California. The leaves are sclerophyllous and aromatic and resist decay upon falling from the shrubs. As the plants age, the ratio between dead wood and active stems and twigs increases. The accumulation of fuel within the plants and below the plants sets the stage for brushfire (Minnich 1988; Schoenherr 1992; Vankat 1979). The chaparral not only is adapted to tolerate fire, but many of its species are actually dependent on fire for reproduction and renewal (Vankat 1979).

The steady accumulation of fuel is the mechanism by which chaparral creates a condition on which it depends. As a result of this accumulation, the longer the period since a fire, the greater both the probability and the magnitude of the next fire. In such a fire-dependent vegetation system, residential construction and occupation necessarily expose certain people to the destructive potential of a natural event, which is thereby transformed into a natural hazard or even outright disaster (Biswell 1974; Cooper 1922; Minnich 1988).

Human Occupation of the Chaparral-covered Hillsides

Few details are definitively known about human use of the chaparral-covered hillsides of Southern California before the arrival of

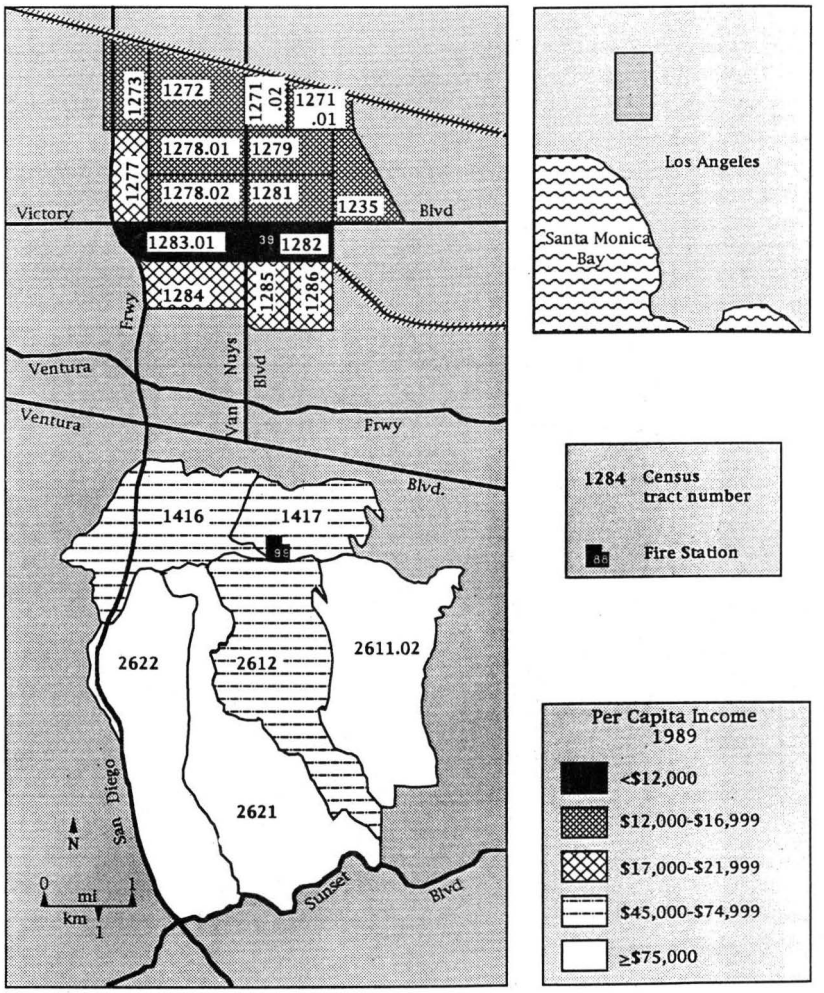

Figure: 1 Fire Companies 39 and 99
Los Angeles City Fire Department

Jim Keller
CSU Chico

Anglo-Americans in the wake of the Gold Rush in Northern California. Native American base camps and more permanent settlements tended to avoid these mountainsides, though they were exploited for hunting. A number of the early Spanish explorers noted the extent of smoke and fires in those mountains. They commented that certain Native American groups set the hillsides on fire to aid them in a hunt or to encourage soft, nutritious new growth, both for favored game species and for their own direct consumption (Aschmann 1959; Heizer and Elsasser 1980; Kroeber 1925; Minnich 1988; Stewart 1951).

The Spaniards and then Mexicans who took Alta California did not settle on the chaparral-covered hillsides: in both Spanish and Mexican writings, the hills are conspicuous in their absence from stated concerns. There is some evidence that they may in fact have set the mountains on fire themselves, continuing the indigenous practice, but for the purpose of increasing cattle forage (Minnich 1988).

Southern California was very much a backwater for the Anglo-Americans who took over California from Mexico as a result of the Mexican-American war of 1846-48. The Anglo-American presence in Southern California increased in the 1860's, but the drought of 1862-64 put an end to the success of the local cattle industry in securing the gold of the miners. Land values plummeted, and San Francisco-based speculators took the ruined ranchos with Comstock Lode or Central Pacific Railroad wealth. The huckstering of Southern California's balmy climate began in earnest. By the 1920's, real-estate promotions were encouraging the Anglo-American cultural fondness for "homes with a view," and the *nouveaux riches* of the movie colony were beginning to turn the chaparral-covered hillsides into chic addresses (Banham 1976; Davis 1991; Hornbeck 1980; Lavender 1987).

For whatever reason, hillside residence is highly valued by Anglo-Americans and other Americans who have enculturated or acculturated into the dominant culture's ideas (Gillard 1980). In the ensuing competition for suitable building sites and dwellings, the value of such homes and lots is bid up out of reach of households of modest means. This can be illustrated by an examination of the characteristics of two representative areas of Los Angeles, one in the hillside area and the other on the valley floor. The Census tracts within the service area of Fire Company 99 in the Santa Monica Mountains have an average 1989 per capita income of $76,688, as opposed to the $13,873 average per capita income in the Census tracts around Fire Company 39 in a nearby flat portion of the San Fernando Valley (Table 1). A similar pattern is seen (if less adequately, due to Census classificatory limitations in the L.A. area) in the median values of owner-occupied housing units between the two areas.

All tracts around Company 99 in the mountains report medians in the topmost Census category of more than $500,000. The median of median home values in the tracts around Company 39 is $231,000 (Los Angeles City Fire Department 1990; U.S. Bureau of the Census 1990).

It is the well-to-do, then, who have the resources to act on the cultural preference for hillside residence (Aschmann 1959). Given this and the fire-dependency of chaparral, chaparral fire becomes a natural hazard in the Los Angeles political economy. Oddly enough, it would appear that it is the wealthy and powerful who are at greatest risk to chaparral fires.

The Social Geography of Risk and Vulnerability

Prior work on hazards dealing with the structuration of vulnerability assumes that the risk of hazard falls overwhelmingly on the poor and marginalized of a society. Yet, in this instance, there appears a seeming counterinstance: it is the richer and more powerful who live in a hazardous zone. Susman et al. write that "Vulnerability is the degree to which different classes in society are differentially at risk, both in terms of the probability of occurrence of an extreme physical event and the degree to which the community absorbs the effects of extreme physical events and helps different classes to recover.... And poor people are generally more vulnerable than rich ones" (1983). In order to address more fully the concepts raised by structural hazards theory in the context of Los Angeles fire hazard, it is necessary to differentiate between risk and vulnerability, which have generally been conflated in this literature.

Risk is actual and direct exposure to the destructive aspects of a natural event: in this case, losing one's home, assets, mementos, and, quite possibly, one's life, health, or loved ones in a chaparral fire gone structural. Vulnerability could usefully be defined as low capacity to evade, withstand, or recover from a disastrous event through personal resources or societal mechanisms of risk mitigation. The first is a statistical concept; the second is a social, economic, political, and, sometimes, a cultural one. The wealthy households in the Santa Monicas indeed are at risk to chaparral fire, but they are scarcely vulnerable, due to the many chaparral fire hazard mitigations available in contemporary California society.

At the household level, obviously, households with per capita incomes in excess of $76,000 have personal resources to learn of oncoming fire and evacuate themselves and many of their possessions from the path of wildfires moving into the suburban fringe. At a more broadly socialized level, fire insurance is a critical mitigation for chaparral fire

FIRE COMPANY 39 (Van Nuys)

Tract #	Persons	Per Capita Income ($)	Total Income ($)	Median Home Values ($)
1235.00	6839	12388	84721532	269900
1271.01	5977	13783	82380991	231000
1271.02	4031	13490	54378190	225800
1272.00	8152	13263	108119976	201600
1273.00	4280	13161	56329080	207200
1277.00	4836	17508	84668688	282300
1278.01	5657	14791	83672687	208200
1278.02	6344	12953	82173832	240800
1279.00	7631	13028	99416668	235900
1281.00	6231	14952	93165912	227500
1282.00	7049	10972	77341628	229900
1283.01	8349	9060	75641940	182000
1284.00	3880	17713	68726440	237200
1285.00	3512	20573	72252376	241000
1286.00	5223	18704	97690992	285500
Sums	87991		1220680932	
Mean		13873		231000

FIRE COMPANY 99 (Sherman Oaks)

Tract #	Persons	Per capita Incomes ($)	Total Income ($)	Median Home Values ($)
1416.00	3978	50353	200304234	>500000
1417.00	2607	85197		>500000
2611.02	4165	88620	369102300	>500000
2612.00	4228	58938	249189864	>500000
2621.00	3576	106249		>500000
2622.00	3833	77269	296172077	>500000
Sums	22387		1716823478	
Mean per capita Income		76688		

Table 1. Per capita incomes and median owner-occupied home values in the census tracts served by fire companies 39 and 99

there. This increase in utility and in the benefits to cost ratio can actually raise the exchange value of a parcel or home in the hills. The increase in home and lot prices thus encourages even denser land use, in this case, in the chaparral. Increased residential density, in its turn, simply magnifies the number of people and assets at risk to chaparral fire and the magnitude of societal vulnerability through insurance and governmental fire fighting services.

Conclusion

The literature on environmental perception and behavioral geography leads to analyses of individual and household evaluation of utility benefits and hazard costs. Consideration of chaparral fire hazard in the Santa Monica Mountains suggests that the benefits of an amenity view are privatized, while the private hazard costs to the household are reduced by the socialization of fire hazard mitigations. Household benefits seem higher than household costs, thus encouraging action on environmentally dysfunctional landscape values if households have the resources to act on them.

Hazard literature developed in Third World contexts argues that, within a society characterized by polarization in wealth and power, it is the poor and marginalized who are vulnerable to natural hazards. It is they who are most likely to have to live or work in hazard-prone areas, and it is they who are least able to bear the losses of a hazard and the costs of recovery (Liverman 1990; Susman et al. 1983; Watts 1983; Wisner 1991; Wisner et al. 1976). A desultory look at the Santa Monica Mountains case suggests that the wealthier and more powerful voluntarily place themselves in a highly hazard-prone environment. They are better able to recover from the hazard through wealth and insurance and through the socialization of attempts to reduce the fire hazard and control outbreaks of fire. The well-off are thus not as vulnerable to the hazard as the event risk they incur in their residential choices would lead one to expect. Vulnerability is thus diffused spatially and socially among the larger taxpaying public, and an implicit opportunity cost is the corollary reduction in overall tax funds for other governmental functions and purposes (such as, perhaps, health, education, and welfare functions that would benefit people on the opposite end of the social spectrum). Such diffusion of vulnerability costs thus amounts to a hidden and government-mediated upward income transfer in the service of environmentally inappropriate cultural values.

Further work in this area needs to address the following areas. First, empirical work is needed to evaluate the social geography of vulnerabil-

ity in the fire insurance industry. Do the rates charged to property owners accurately reflect the underlying geography of event risk? If not, what is the geography of under- and overpayment in fire insurance rates? Complicating analysis is an "apples and oranges" issue implicit in comparing fire insurance rates in richer and poorer neighborhoods. That is, while chaparral fire hazard poses an additional voluntary risk to customary fire insurance provision, there may be a countering involuntary additional risk among lower income people. That is, poorer people typically must live in lower quality dwelling units and in older units. Condition of building is inversely related to fire incidence (Munson and Oates 1983). There may be a greater level of fire hazard due to aging electrical wiring and undercapacity. Too, it may be impossible to compare such rates in any case, due to the reluctance of insurance companies to provide fire insurance in poorer neighborhoods (Syron 1983). Even if these complications are not insuperable, the comparative geographies of event risk and insurance rates may obscure the voluntaristic component of hazard exposure in this case.

Second, the actual geography of chaparral fire itself is surprisingly poorly documented. No fire fighting agency keeps detailed records of the exact spatial extent of a fire (Cook 1993). Fire agency data typically break emergency incidents down by such categories as numbers of structure fires, non-structure fires, and fire rescues. The categories used are not particularly helpful for the needed analysis. A structure fire covers such varied fire types as homes lost in a chaparral fire, apartments destroyed due to a smoker in one of them falling asleep, or a warehouse burning in circumstances suggestive of arson. Non-structure fires could take in a chaparral fire confined to a wildfire classification or a burning car on the Harbor Freeway. The cost of fire loss is normally aggregated, not broken out by type and location (Los Angeles City Fire Department 1990).

Third, other applications of a structural approach to natural hazards in the First World are needed to determine its usefulness in hazard situations here. Can a structural analysis be applied directly from Third World contexts to a variety of natural hazards in North America? or does it need modifications along the lines presented in this paper in order to address hazards outside the suburban hillsides of California? Two studies currently in progress are applying structural approaches to the earthquake hazard in the north coast of California and to fire hazard in rural northern California.

An investigation of emergency relief, media coverage, and disaster recovery efforts following the California North Coast earthquakes of 1992 focuses on the communities of Ferndale and Rio Dell. Ferndale is a

more "upscale" community, which has attracted much media attention to the damage done to its restored Victorian homes. Reconstruction and recovery are further along than in Rio Dell, an old blue-collar Italian community, which had been experiencing job loss and in-migration by welfare recipients trying to stretch their meager incomes (Rovai 1993). In this case, as in many Third World situations, risk and vulnerability can safely be conflated.

The Fountain Fire east of Redding in 1992 may prove directly analogous to hazards in Third World contexts. The study area is socio-economically markedly different from urban coastal California, being significantly poorer and more reliant on the extraction and export of primary raw materials (e.g., forest products, farm goods, and water) than the rest of the state. In many ways, the North State exists in a condition of dependency on (and some resentment of) the urban core of the California coast, of which it is a hinterland. This relatively underdeveloped area appears thus far to satisfy the expectations of the structural model concerning the social and spatial distribution of hazard risk and vulnerability in a more straightforward way than in the Los Angeles chaparral case (Carrothers 1993).

A fourth line of work is needed in the area of policy, both for governmental planning agencies and for the insurance industry. Both the equity and efficiency of fire-fighting resources are compromised by a hazard in which there is a strongly voluntaristic component to risk exposure. At this late date in the settlement of the suburban hillsides, what kinds of strategies can local or state government bring to bear on this problem in an era of fiscal strain, anti-tax sentiment, and well-funded homeowners' associations? The insurance industry finds its practices under acute scrutiny in many areas, from health care to automobile insurance. Can the industry afford not to examine the geographies of risk, insurance rates, and insurance availability and its possible subsidy of voluntary risk-taking by the well-heeled?

A master's project is now underway to address this issue in the case of the Laguna Beach fire of 1993 (Herman n.d.). Perhaps this and the other Southern California fires of 1993 have underscored the need for a critical look at the social and spatial allocations of fire costs and view amenities in the hillside suburbs and exurbs throughout California.

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References

Alexander, David. 1991. Natural disasters: A framework for research and teaching. *Disasters* 15, 3:209-26.

Aschmann, H. Homer. 1959. Evolution of a Wild Landscape and Its Persistence. *Annals of the Association of American Geographers* 49, 1:35- 56.

Banham, Reyner. 1976. *Los Angeles: The Architecture of Four Ecologies.* New York: Penguin Books.

Biswell, H.H. 1974. Effects of Fire on Chaparral. In T.T. Kozlowski and C.E. Ahlgren (eds.), *Fire and Ecosystems*: 321-364. New York: Academic Press.

Blanchard, R. Denise. 1993. Calm before calamity: Communicating risk toward the earthquake hazard. Paper presented to the Association of American Geographers, Atlanta (April).

Burton, Ian and **Robert W. Kates.** 1964. The perception of natural hazards in resource management. *Natural Resources Journal* 3 (January):412-41.

Burton, Ian; Robert W. Kates, and **Gilbert White.** 1978. *The Environment as Hazard.* New York: Oxford University Press.

Carrothers, Jamie. 1993. The 1992 Fountain Fire of Northern California: Risk, vulnerability, and recovery. Senior thesis (working title) , Department of Geography and Planning, California State University, Chico (in progress).

Cook, Steve. 1993. Wildfire at the wildland/urban interface: Results of a decisionmaker survey. Paper presented to the Association of American Geographers, Atlanta (April).

Cooper, William S. 1922. *The Broad Sclerophyll Vegetation of California: Ecological Study of the Chaparral and Its Related Communities.* Washington, DC: The Carnegie Institute.

Davis, Mike. 1991. *City of quartz: Excavating the future in Los Angeles.* London and New York: Verso.

Gillard, Quentin. 1980. *The Value of a View: Housing Market Differences in the Evaluation of a View Lot.* Rutgers Geography Discussion Paper Series No. 16 (April).

Haas, Eugene; Robert W. Kates and **Martyn J. Bowden,** (eds.). 1977. *Reconstruction following disaster.* Cambridge, MA: The MIT Press.

Heizer, Robert F. and **Albert B. Elsasser.** 1980. *The natural world of the California Indians.* Berkeley, Los Angeles, and London: University of California Press.

Herman, Matthew. n.d.. The Social Geography of Fire Risk and Insurance Mitigation in the Laguna Beach Fire of 1993. Master's Thesis (working title). Department of Geography and Planning, California State University, Chico (in progress).

Hornbeck, David. 1983. *California patterns: A geographical and historical atlas.* Mountainview, CA: Mayfield.

Kates, Robert W. 1962. *Hazard and choice perception in flood plain management.* Chicago: University of Chicago Press. Department of Geography Research Paper No. 78.

Kroeber, Alfred L. 1925. *Handbook of the Indians of California.* Washington, DC: Smithsonian Institution. Bureau of American Ethnology, Bulletin 78.

Lansana, Florence M. 1993. Coping with an environmental hazard: A study of residential areas around Freshkills Landfill in Staten Island, New York. Paper presented to the Association of American Geographers, Atlanta (April).

Lavender, David. 1987. *California: Land of new beginnings.* Lincoln and London: University of Nebraska Press.

Liverman, Diana M. 1990. Drought impacts in Mexico: Climate, agriculture, technology, and land tenure in Sonora and Puebla. *Annals of the Association of American Geographers* 80, 1:49-72.

Los Angeles City Fire Department. 1990. *Annual report: 1989-1990.*

Minnich, Richard A. 1988. *The biogeography of fire in the San Bernardino Mountains of California: A historical study.* Berkeley, Los Angeles, and London: University of California Press. Publications in Geography No. 28.

Munson, Michael J., and **Wallace E. Oates,** 1983. Community characteristics and the incidence of fire: An empirical analysis. In Chester Rapkin (ed.), *The social and economic consequences of residential fires*: 61- 78. Lexington, MA, and Toronto: Lexington Books.

Palm, Risa. 1990. *Natural hazards: An integrative framework for research and planning.* Baltimore: Johns Hopkins University Press.

Palm, Risa and **Michael Hodgson**. 1992. Earthquake insurance: Mandated disclosure and homeowner response in California. *Annals of the Association of American Geographers* 82, 2:207-222.

Price, Richard. 1993. Working class is hardest hit. *USA Today* (23 July): 3A.

Rivers, J.P.W. 1982. Women and children last: An essay on sex discrimination in disasters. *Disasters* 6, 4: 256-267.

Rovai, Eugenie. 1993. The social geography of disaster recovery: Differential community response to the North Coast earthquakes. Paper presented to the Association of Pacific Coast Geographers, Berkeley (September).

Schoenherr, Allan A. 1992. *A natural history of California.* Berkeley, Los Angeles, and London: University of California Press. California Natural History Guides No. 56.

Sorkin, Alan L. 1982. *Economic aspects of natural hazards.* Lexington, MA, and Toronto: Lexington Books.

Stewart, O.C. 1951. Burning and natural vegetation in the United States. *Geographical Review* 41:317-320.

Susman, Paul; Phil O'Keefe, and **Ben Wisner.** 1983. Global disasters, a radical interpretation. In K. Hewitt (ed.), *Interpretations of calamity:* 263-283. Boston, London, and Sydney: Allen and Unwin.

Syron, Richard F. 1983. The hard economics of ghetto fire insurance. In Chester Rapkin (ed.), *The social and economic consequences of residential fires: 349-363.* Lexington, MA, and Toronto: Lexington Books.

U.S. Bureau of the Census. 1990. *Census of Population and Housing.* Summary Tape File 3A. Geography: California, Los Angeles County.

Vankat, John L. 1979. *The natural vegetation of North America: An introduction.* New York and other places: Wiley.

Watts, Michael. 1983. On the poverty of theory: Natural hazards research in context. In K. Hewitt (ed.), *Interpretations of Calamity: 231-262.* Boston, London, and Sydney: Allen and Unwin.

White, Gilbert. 1942. *Human adjustment to floods.* Chicago: University of Chicago Department of Geography Research Paper 29.

_____. 1964. *Choice of adjustment to floods.* Chicago: University of Chicago Press. Department of Geography Research Paper No. 93.

Wisner, Ben. 1991. Rural livelihoods in Kenya, 1971-1990: Further reflections on justice and sustainability. Paper presented to the Association of American Geographers, Miami (April).

Wisner, Ben; Ken Westgate, and **Phil O'Keefe.** 1976. Poverty and disaster. *New Society* (9 September): 546.