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**COVER:** Opposing theories predict that violent sports such as football either substitute for or increase the warlike tendencies of a culture. Anthropologists look at the development of human aggression and warfare. See p. 250. (Photo: Dick Darcey/Washington Post)

<b>Publisher</b>	E. G. Sherburne Jr.
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<b>Advertising</b>	Scherago Associates, Inc. 11 W. 42nd St., New York, N.Y. 10036 Fred W. Dieffenbach Sales Director

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**Subscription Department**  
231 West Center Street  
Marion, Ohio 43302

Subscription rate: 1 yr., \$10; 2 yrs., \$18; 3 yrs., \$25. (Add \$2 a year for Canada and Mexico, \$3 for all other countries.) Change of address: Four to six weeks' notice is required. Please state exactly how magazine is to be addressed. Include zip code.

Printed in U.S.A. Second class postage paid at Washington, D.C. Established as Science News Letter in mimeograph form March 13, 1922. Title registered as trademark U.S. and Canadian Patent Offices.

Published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington, D.C. 20036. (202-785-2255). Cable SCIENSERV.

october 20, 1973

## COMMENT

### Quake prediction, the good and the bad

The long-sought goal of earthquake prediction seems now in sight. Seismologists have never been so optimistic. Many difficulties lie ahead, but geophysicists now have a whole set of premonitory symptoms of earthquakes and for the first time the making of a physical theory to explain them (SN: 9/29/73, p. 200). The prospects are that a fairly clear warning of many earthquakes will be possible within 10 years.

All to the good, right? Not necessarily. The point is that earthquake prediction, like any new technological capability, will have both positive and negative effects. Along with the obvious unmitigated benefits will come a host of side issues and new problems that we have all failed to give enough thought to in following the trail toward a predictive capability. As the editor of the British journal *NATURE*, himself a seismologist, observed a few weeks ago: "The situation is in some ways similar to that in 1939 when nuclear fission suddenly became a reality. The prospects for society are neither uniformly good nor uniformly bad and there is still time, but relatively little, to explore ways in which good prospects can be encouraged and bad ones minimized."

What, for example, will people do if told there is a 75 percent chance of a 5.0-magnitude earthquake in their town or city within six months? What can they do? Might even the prospects of panic at a prediction of catastrophe outweigh the advantages of prior knowledge? On the other hand, certain vested interests—realtors, businessmen, insurance companies, banks—could profit enormously from knowledge of predictions in advance of their public release. They might be tempted to try to suppress public announcements. New companies marketing quake forecasts for private clients are sure to spring up.

These are only a few speculations on the immense social effects of an ability to predict earthquakes. Great wisdom will be required. Seven years ago, Garrett Hardin wrote an essay, reprinted in his recently published book *Stalking the Wild Taboo*, in which he argued that earthquake prediction is a case in which knowledge is worse than no knowledge and urged that no further research on the subject be done. His is obviously an extreme position—one unacceptable to almost all scientists. But he shows how earthquake prediction would differ fundamentally from weather prediction (which he regards as a positive good). And he contends that a predictive ability, by removing earthquakes from the category of "fate" to a matter which people would feel the need to do something about (even though they could do very little), would generate anxieties and lead to psychological and sociological dangers uncomprehended by scientists and technicians concerned only with their narrow specialties.

The problem ahead is to start thinking about all these questions and to start setting up a framework to deal with earthquake predictions, so that when the capability arrives, the result will be for the public good.

### The National Medal of Science awards

President Nixon's talk to winners of the National Medal of Science last week at the White House (see p. 247) offered few tangible insights into any shift of his attitudes toward science. But he seemed congenial and relaxed, despite heavy pressures and concerns (Spiro Agnew's resignation was announced two hours later), and most all the scientists and guests seemed pleased with the ceremonies. The President expressed pleasure that for the first time all the awards were for peaceful research, while commending the scientific community for its past efforts in developing the nation's defense capabilities. His most substantive remarks concerned the need for the nation "to become self-sufficient in energy." He noted that "the budget for science is not moving up at the levels that many of you think is essential," but offered no hint of remedy except in the areas of energy and the environment, which must receive "a larger portion of our national income." Last year no National Medal of Science awards were given, and some interpreted this as an intentional sign of White House displeasure with scientists. The fact of this year's awards, the good-natured tone of the ceremonies, and some peace-keeping remarks by White House Adviser George Schultz seemed to indicate a desire toward better relations with the scientific community.

—Kendrick Frazier