

nature

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## Don't rush them to predict earthquakes

MORE people died in Turkey last Saturday as a result of an earthquake than have ever died in the United States from earthquakes. And yet earthquakes in the United States attract an enormous global attention. One reason is simply human curiosity that a technological leader can be laid low by acts of God; for much the same reason are medical bulletins of heads of state read with fascination. A more subtle reason is the extraordinary way in which the lessons of every new major earthquake have been very rapidly learnt, although no doubt one could argue that the biggest lesson of all—don't live in regions prone to earthquakes—has yet to be assimilated.

The United States represents, in very crude terms, much less than a thousandth of the world's earthquake fatality potential—first, because a relatively small proportion of the world's active fault system is located in the United States; second, and more important, because awareness of the earthquake hazard is higher and thus elementary defensive measures are more widely practised, particularly in construction. Few people die from the shaking itself; it is the falling of buildings, the collapse of dams, the starting of fires and so on which claims life.

There is a worldwide interest in the earthquake prediction programme in the United States (completely over-shadowing the arguably more interesting and important programmes in the Soviet Union and China). This interest is bound to grow with the publication of *Earthquake Prediction and Public Policy*, an extensive document from the Panel on the Public Policy Implications of Earthquake Prediction under the chairmanship of Professor Ralph Turner, a sociologist from the University of California, Los Angeles. The layers of bureaucracy in Washington are so thick that initials must suffice to describe the report's parentage and destination: it was prepared by the PPIEP of the ACEP, CSS of the NAS/NRC for the FDAA of DoHUD.

Predicting the reaction of the public to an earthquake warning seems to be every bit as difficult as predicting the earthquake itself, and this, no doubt, contributes in great measure to the unmemorability of much of the report. No stone could be said to have been left unturned, even down to expressing concern that tourists be alerted and jewellers empty their shops. The consequences of a prediction could be enormous; evacuations, unemployment, political in-fighting, demands for more money for emergency services, nuclear reactor shutdowns, draining of dams, attempts to withdraw insurance cover, failure to keep up mortgage payments, political attacks on scientists, local/state/federal squabbles, profiteering in property sales, demolition of buildings. The consequence of error is appropriately large. Small wonder then that it has already been said by Garrett Hardin that prediction could be more devastating than the event itself. The committee's first

recommendation is that "The highest priority . . . should be . . . saving lives, with secondary attention to minimising social and economic disruption and property loss, *provided the costs of specific measures are within the limits that society is willing to accept*" (our italics). Quite apart from the vagueness introduced by the second half of the recommendation, it is entirely possible that the social and economic disruption and property loss from the prediction will greatly exceed that from the earthquake, and might counterbalance the benefit from lives saved.

The panel did not find this very acceptable; it was passed off as "a popular theme currently espoused among some scientists and science popularisers". Another idea that it didn't like was that scientists might desist from making public pronouncements, at least for a few years. "Earthquake prediction is a fact at the present time . . . attempts to suppress information concerning premonitory signs would certainly fail—as they should". Now this is half-truth. Many scientists with the best will in the world towards prediction are looking very carefully at the limited evidence available and still wondering not only how universally applicable predictive phenomena may turn out to be but also whether the quality of the data that will be accessible without an enormous investment of cash will be sufficient to give unambiguous warning in more than a very few zones. And which zones are to be favoured? There are, in California, as many major earthquakes off the San Andreas Fault as on it; no-one foresaw the San Fernando Valley as a danger zone in 1971. Earthquake prediction is a fact in much the same way that travel to the moon is a fact.

Further, it is only half-true to say, as does the report, that "there is no way to monopolise prediction capability" (and thus to prevent predictions being made). The tools required for prediction include access to a whole range of data libraries, and were the government to impose a moratorium on public announcements while seismologists were given time to conduct more thorough research, it is not at all clear that any independent agency would either wish or be able to jump the gun. There might be a general welcome in all communities, scientific, governmental, legal, insurance, constructional for a long pause before prediction was permitted. The spectacle that this report portrays is rather the opposite; of a well meaning panel riding a small band of experts as fast as possible towards a confrontation with nature.

On two counts, then, this report gives cause for concern: that scientists may be rushed, and that the case against making a major response to a prediction may not be adequately examined. And Turkey's misfortunes underline yet again how little even elementary information on earthquake proofing crosses national frontiers. □