The role of seismology

SIR — *Nature*'s leading article on the Kobe earthquake[1] referred to the lack of progress of Japan's earthquake prediction programme towards its stated goal, a point I have also raised[2,3]. Asking "Is there nothing seismology can do?", the leading article suggested increased use of seismological data to design earthquake-resistant structures. Much work is being carried out in this area; further progress is certainly desirable.

But the most important duty of seismologists is to provide the public and government with accurate and speedy information on earthquake source parameters. Because this was not done for the Kobe earthquake, there were needless casualties and property damage.

The Japan Meteorological Agency (JMA) initially announces the 'intensity' recorded at each observatory on an arbitrary and somewhat subjective scale from 1 (barely perceptible) to 7 (violent shock). Both the public and the government seem to regard intensity, rather than magnitude and hypocentre (which are announced simultaneously, but not emphasized), as the main data characterizing an earthquake.

The use of intensity, which is an archaic parameter dating back to pre-instrumental seismology, had disastrous consequences. All telephone lines in the Kobe area were immediately knocked out by the earthquake. Because intensity data are normally transmitted by ordinary telephone lines, intensity readings from the most severely damaged areas were not immediately available. As a result, the initial JMA announcement, made 18 minutes after the earthquake, showed a highest intensity of 5 (strong shaking), at Kyoto, Hikone, and Toyooka[4]. It is remarkable that the JMA did not immediately grasp the implications of the failure of observatories at Kobe and Awaji Island to issue reports. But, in any case, the announced maximum intensity of 5 caused the government and national media, which are based in Tokyo, to underestimate the size of the earthquake. Intensity reports trickled in by radio from the most severely damaged areas, but the full extent of the damage only gradually became clear to people outside the Kobe area, including the cabinet, about 4–6 hours after the main shock.

The Kobe earthquake had a magnitude of 7.2 (JMA), and the initial data-processing showed that the hypocentre was clearly shallow. All seismologists know that an earthquake of this size at a shallow depth under a densely populated metropolitan area will cause severe damage. If the implications of the Kobe earthquake's magnitude and location had been properly explained to government authorities, they would have known they had to begin disaster relief operations even before receiving damage reports from the field. Such a prompt response could have saved the lives of many victims trapped in collapsed buildings, and minimized the damage caused by fires.

The initial announcement should give not only the magnitude and location but also data describing the strength of the ground motion at each observatory. But, rather than intensity, a physical parameter such as the maximum acceleration should be given.

The JMA already has elaborate bureaucratic procedures for issuing an earthquake prediction, although none has ever been issued. In contrast, as shown by the present case, the procedures for promptly notifying the government and media when a damaging earthquake does occur are inadequate and must be rethought. The CUBE (Caltech–USGS Broadcast of Earthquakes) system provides a useful model[5] for what might be done on a national scale in Japan.

Seismologists failed to serve the public properly in the Kobe earthquake. To prevent the recurrence of such a tragedy, Japan's earthquake prediction programme should be abolished, and an entirely new programme for fundamental research in seismology, rapid dissemination of accurate earthquake parameters and research and observations in strong motion seismology should be instituted.

Robert J. Geller
Department of Earth and Planetary Physics,
Faculty of Science,
Tokyo University,
Tokyo 113, Japan

1. *Nature* **373**, 269 (1995).
2. Geller, R. J. *Nature* **352**, 275–276 (1991).
3. Geller, R. J. *Proceedings of earthquake prediction research symposium* (in Japanese), Tokyo (1994).
4. *Daily Yomiuri*, 29 January 1995.
5. Kanamori, H. *Proc. IDNDR Intl Symp. on Earthquake Disaster Reduction Technology*, (Tsukuba, Japan, December 1992).

Salam's successor

SIR — Your article about the search for a new director for the International Centre for Theoretical Physics in Trieste contained several inaccuracies (*Nature* **373**, 182; 1994).

The search party concluded its work in March 1994. Following agreement between the directors general of the International Atomic Energy Agency (IAEA) and the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and consultation with the Italian government, Dr Praveen Chaudhari, a scientist of Indian origin — not Pakistani as stated in your article — who was one of the candidates recommended by the search party, was offered the post. He subsequently declined the offer, for personal reasons. Since then, the two directors general have interviewed other scientists whose names had been suggested by the search party. No decision has yet been taken. Your article is wrong in saying that the search party has been reconvened.

The Italian law on the transfer of administrative responsibility for the centre from the IAEA to UNESCO was approved in January. Contrary to the statement in the last paragraph of your article, financing is also now secured beyond 1998.

Finally, the former director, Professor Abdus Salam, is 69 years old, not 78.

Hans Blix
(Director General)
International Atomic Energy Agency,
PO Box 100, A-1400 Vienna, Austria

□ The information about the reconvening of the search committee was based on information provided by the IAEA. Although the Italian parliament had agreed at the time of writing to provide support for ICTP beyond 1998, the decision had yet to be published in the official gazette as required before it can become law.
Editor, *Nature*

Darwinist Lysenko?

SIR — You say (*Nature* **373**, 90; 1995) that "Neither the magazine [*The Spectator*] nor Collins appear to have remembered that Soviet-style Marxism backed Lysenko against Darwin. . .".

This is not so. Lysenko claimed to be a Darwinist, which was the 'official line'. In the purging of Bukharin, Prezent, an ally of Lysenko, accused Bukharin of "erroneous and anti-Darwinian theories" and also said that "bandits" had annihilated instruction of students in Darwinism in the Leningrad State University (Z. A. Medvedev, *The Rise and Fall of T. D. Lysenko*, Columbia University Press, 1969). Dunin said: "the enemy of the people, Bukharin, fought Darwinism. . ." Lysenko wrote a polemic "Of the distorting mirror and some anti-Darwinians," grouping them with his hated Morganist–Mendelists. Lysenko said that Darwinism was part of Marxism. He also said "[Prezent] showed me that the roots of the work I am doing lie in Darwin. And I, comrades, must confess here straightforwardly in the presence of Iosif Vissarionovich [Stalin] that to my shame I have not studied Darwin properly".

Evidently Lysenko tried to justify his nonsense by calling on Darwin.

Thomas H. Jukes
Department of Integrative Biology,
University of California, Berkeley,
6701 San Pablo Avenue,
Oakland, California 94608, USA