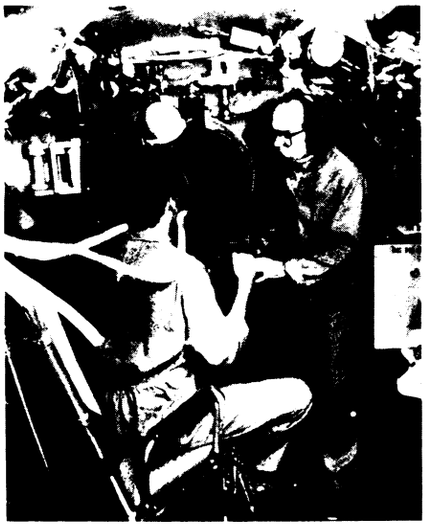
tently gives the system enough time to catch up. And the intermittent schedule may stimulate the production of enzymes.

Free radicals, which are credited with enhancing wound repair, have also been associated with cancer, but hyperbaric oxygen researchers note that they are treating life-threatening conditions and that they do not suspect use of hyperbaric oxygen will cause a problem. "Breathing oxygen at high pressure is not a new thing," says Lambertsen, noting that divers have been doing it for years. "The process turns off as soon as oxygen administration is stopped."

Al Tappel of the University of California at Davis, an expert in free radicals, says that while he is unaware of studies of hyperbaric oxygen and cancer, he suspects the link, if any, would be small because people naturally have protective enzymes against free radicals.

"From the clinical standpoint," says Davis, a former head of the Undersea Medical Society, "we have never seen any evidence [of carcinogenicity] to concern us."

What researchers fear today is "another simultaneous wave of not very scrupulous characters who set up chambers in offices to make a lot of money," says Davis. "It's an expensive modality. We're very concerned about overzealous uses."



A researcher monitors the effect oxygen poisoning has on vision. The subject here is breathing 100 percent oxygen at three atmospheres of pressure.

The therapy has proven its value as an adjunct for certain conditions, and controlled clinical trials are under way for other ailments. What would be most damaging now, say these researchers, is another unfounded rise in expectations. □

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urements at a site provide the best indications of a potential hazard. Data collected in the past or in other countries are sometimes difficult to use because the measurement techniques were different or standards varied.

Earthquake engineers are also far from being able to make accurate predictions about how much the ground will shift if an underlying sand layer liquefies, says Youd, because so many factors influence the process. Many more case histories are needed to shed light on exactly what happens, he says.

The problem is that there are very few places where both the characteristics of a shaking during an earthquake and the soil properties before an earthquake are known. Nevertheless, some researchers are digging into historical records and geological data for clues about past episodes. Photographs and written accounts of the 1906 San Francisco earthquake, for example, clearly show that soil liquefaction played an important role in destroying buildings resting on landfill and in breaking gas and water mains. Although the focus on soil liquefaction research is relatively recent, the problem has existed for as long as earthquakes have affected civilization.

Despite the uncertainties, soil liquefaction is a hazard that's now relatively recognizable, says William F. Marcuson III of the U.S. Army Corps of Engineers in Vicksburg, Miss., but selecting a solution can get very complicated. "There will never be a cookbook approach for seismic stabilization," he says. "It has to be done on a case-by-case basis."

Experience shows that soil liquefaction can damage all types of structures, from dams and towers to roads, pipelines and underground storage tanks. If a soil at a particular site turns out to be susceptible, then the structure must be abandoned, relocated or improved. Improvements, which include replacing or packing down loose sand, providing better drainage or rebuilding a structure on deeper pilings, may be very costly. On top of that, adds Marcuson, "We have little field experience for guidance."

To earthquake engineers, large earthquakes like the one that rocked Mexico, although a human tragedy, provide valuable information about what works and what doesn't work. How large a role liquefaction played in destroying buildings in Mexico City won't be known until a direct inspection takes place. Earthquake specialists are heading for the city to see at first hand what happened and to garner clues that could lead to better construction practices and remedial measures.

"Any progress that we make in understanding [soil liquefaction] is important," says Frank Press, NAS president and a geophysicist by training. "We respond to crises as they happen," he says. "That's wrong. We need to plan ahead to take this and other potential hazards into account." □

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The Second Self: Computers and the Human Spirit — Sherry Turkle. People, according to the author, tend to perceive a "machine that thinks" as a "machine who thinks." They begin to consider the workings of that machine in psychological terms. Why this happens, how it happens and what it means for all of us is the subject of this book. Originally published in hardback in 1984. S&S, 1985, 362 p., paper, $8.95.

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Superforce: The Search for a Grand Unified Theory of Nature — Paul Davies. Astronomer-author Davies sets out here a complete theory of the universe, including its origin. New advances and discoveries in modern physics continue to be reported. "It is too soon to proclaim the bold ideas that are emerging as well established," says Davies, "but the general scenario is rapidly becoming accepted by scientists." Originally published in hardback in 1984. S&S, 1985, 255 p., illus., paper, $8.95.