

## FOREIGN POLICY &amp; DEFENSE

*Invulnerable  
Submarines*

"Will Strategic Submarines Be Vulnerable?" by Richard L. Garwin, in *International Security* (Fall 1983), The MIT Press (Journals), 28 Carleton St., Cambridge, Mass. 02142; "The Invisible Force" by John Tierney, in *Science* 83 (Nov. 1983), P.O. Box 10790, Des Moines, Iowa 50340.

Two legs of the U.S. strategic "triad"—land-based ICBMs and B-52 bombers—are shakier today than they once were. But the 34 U.S. Poseidon and Trident submarines will remain a virtually invulnerable deterrent for a long time to come.

While some specialists fear that advanced technology will make the oceans "transparent," Vice Admiral Charles H. Griffiths, commander of the U.S. submarine fleet, declared in 1980 that oceans are "becoming more opaque as we understand more about them."

According to Garwin, an IBM researcher, conventional sonar has a short range and is easily evaded. Ships using it are very vulnerable to attack. "Passive" sonar (underwater microphones) can "hear" submarines many hundreds of miles away, but ocean currents of varying temperature and salinity bend the sound waves, making it hard to determine their point of origin. And since the 1970s, scientists have found that the deep seas are far more turbulent than they had thought. Finally, sound travels so slowly in water that a submarine cruising at a modest 10 knots (roughly 12 mph) will be miles away from its original location by the time most sensors can detect it.

The difficulty in pinpointing a submarine, adds Tierney, a *Science* 83 reporter, is illustrated by the Swedish Navy's failure after a three-week search in October 1982 to find a Soviet submarine it had trapped in an inlet 12 miles long and three miles wide. By 1990, U.S. Trident submarines will be equipped with new long-range missiles that will enable them to strike the Soviet Union from 6,000 miles away, giving the subs a hiding place of 40 million square miles of ocean.

The Soviets are so far behind the United States in antisubmarine technology that they have never successfully tracked a U.S. nuclear-armed submarine since the first went to sea in 1960. A single Trident can launch 200 warheads—enough to destroy every major Soviet city.

*A 'Romantic'  
View of War?*

"The Military Reform Movement: A Critical Assessment" by John J. Mearsheimer, in *Orbis* (Summer 1983), 3508 Market St., Suite 350, Philadelphia, Pa. 19104.

According to journalist James Fallows and other members of the increasingly vocal "military reform" movement, the U.S. Army needs fewer managers and more *leaders*. Today's field commander, they say, is mired in bureaucracy and weakened by reliance on unproven high-technology weapons.

Mearsheimer, a University of Chicago political scientist, dismisses