WHY WE TEST NUKES

by Dixy Lee Ray

The current Soviet propaganda campaign, intense both here and abroad, for a comprehensive nuclear test ban began with an announcement from the Kremlin last fall of a self-imposed moratorium on testing. The Soviets called on the U.S. to follow suit—an appeal made, as usual, through television and news outlets rather than through proper diplomatic channels. The publicly broadcast appeal came immediately after the Soviets had completed an extensive series of underground tests of their own, and would not need to test again for some time. Nevertheless the campaign is unrelenting; in this country it has been picked up by church organizations, local disarmament groups, and even some members of Congress.

But the calls for a ban on nuclear testing overlook the many reasons why tests are conducted in the first place. The assumption that testing is solely or even primarily for the purpose of adding still more weapons to existing arsenals is simple-minded and deeply mistaken.

Since 1945, the nature of the nuclear threat has changed greatly, and deterrence, which requires the maintenance of a credible weapons stockpile, has responded to those technological developments. Today's weapons are not, as is so often implied, just as indiscriminate but more powerful than the bombs used on Hiroshima and Nagasaki. In the 1960s, for example, the total destructive potential of our nuclear arsenal was four times as great as it is today. Modernization of our stockpile over the last twenty years has produced warheads that are smaller, more compact, incorporate less fissionable material, are safer for handling and transportation, less susceptible to tampering and unauthorized uses, create less fallout, and are designed specifically for military targets instead of civilian populations. All these improvements have required new weapons designs, and these designs must be tested.

Nuclear weapons exist; and since they exist we have the corollary responsibility to ensure that they are as safe, controllable, and reliable as humanly possible. This requires research and development, of which testing is an indispensable component. Moreover, for nuclear weapons to be credible we must know, with certainty, that the weapons will work as planned if called upon to do so. We cannot afford any "paper tigers" in the stockpile. But there's the rub. Nuclear weapons are very complex devices that are perishable. They deteriorate in time and become unreliable, inoperable, or function differently from the way they were designed. According to current estimates, the reliable life of a nuclear warhead does not exceed twenty years.

For nuclear weapons it is not necessarily a matter of "wearing out"; they are required to operate only once. There is essentially no wear except for that associated with handling and transport. But, like some household appliances that have been stored for several years unused in a family's basement, when closely inspected they may be found to have deteriorated into an unusable condition.

This susceptibility to deterioration tends to be much higher for nuclear weapons than for other equipment, partly because weapon design must be determined mainly by the desired weapon performance and by safety considerations rather than by demands for resistance to deterioration. Chemically reactive materials such as uranium, plutonium, high explosives, and plastics are inherently required in nuclear weapons. The fissile materials are subject to corrosion. Plastic-bonded high explosives and other plastics tend to decompose over time.

U.S. practice has been to monitor the nuclear stockpile closely in order to detect deterioration at an early stage. Monitoring requires a sample inspection of each weapon type. This is not as easy as it might seem. The weapon must be taken apart for the internal components to be inspected, which is more than a simple matter of undoing some bolts and screws to separate the various parts. U.S. nuclear warheads are brazed, welded, and cemented together. To disassemble a modern weapon is to destroy it; many portions have to be machined apart. Few of the components could be reassembled and used again in a rebuilt weapon. Generally only the nuclear material is worth recovering, and it must be melted down and refabricated. If deterioration is found during the inspection, the weapon might require redesign to avoid the problem. Any design change introduces some degree of uncertainty, which may need to be resolved by a nuclear test. If the warhead requires replacement by a different type, the replacement warhead will need various certification tests in its new role. It will also require non-nuclear operational tests in the environment of the carrier vehicle, which could mean developmental flight tests—these are also prohibited under most test-ban proposals. Were there to be a ban on testing, the U.S. would have no effective means to rehabilitate its stockpiled weapons.

Those who support a nuclear test ban usually include the words "mutual" and "verifiable." In reality a test ban could be neither. First, although the proposals are always aimed at the United States and the Soviet Union, both China and France possess nuclear arms and delivery systems, and both have stated unequivocally that they will continue testing regardless of what the U.S. and the Soviet Union agree to. Moreover, expectations of a mutual and verifiable ban ignore the events of the last thirty years. Practices we would view as unacceptable, or even illegal, have been treated by the Soviets as allowable within the context of specified agreements.

On August 22, 1958, President Eisenhower announced that the United States was "prepared, unless testing is resumed by the Soviet Union, to withhold further testing . . . for a period of one year." This unilateral moratorium began on October 31, the day test ban negotiations were scheduled to begin in Geneva. Despite concerted efforts by the Eisenhower

Dixy Lee Ray is the former governor of Washington State and former chairman of the Atomic Energy Commission.

Administration in 1959, the U.S. delegation in Geneva was unable to reach agreement with the Soviet Union on the terms of the test ban. Finally, the administration agreed to the USSR's insistence that a test ban be considered separate from other arms control issues. The U.S. proposed a ban to cover "all tests above the ground up to the greatest heights to which effective controls can now be agreed, all tests in the oceans, and all underground tests above a seismic threshold of 4.5." The Soviet Union accepted these terms and added a condition of its own—that the major powers agree to a three-year moratorium on *all* tests, including those below the threshold. As Atomic Energy Commission Chairman McCone pointed out, the Soviet proposal amounted to nothing more than a comprehensive test ban without safeguards. But so great was the public sentiment to cease testing that the U.S. accepted the proposal. The "mutual" test ban began.

Then what happened? Fruitless discussions on verification and other issues continued in Geneva while President Kennedy supported the ban, and all U.S. weapons work, including research and development, remained on hold. Months passed, and while discussions were still in progress, the Soviet Union, on August 30, 1961, announced its intention to resume testing. Its first nuclear test took place the next day and it continued testing until August 1963. The Soviet program consisted of about one hundred tests in the atmosphere, an unknown number underground, and several at very high altitudes. Some of the high altitude tests involved previously launched missiles, and it is likely that the Soviets learned, at this time, both how such explosions can be masked by the sun and about the X-ray effect from hydrogen bombs. The shots in this Soviet series ranged from very small yields to the largest nuclear explosive test ever conducted, 58 megatons. (The largest test ever conducted by the U.S. was in the Castle series in March 1953, measuring 15 megatons.)

In the two years 1961-63 the Soviets conducted elaborate weapon systems tests and very complex tests involving missiles and radars, all of which took long lead-time preparation. The USSR conducted more tests above one megaton than the U.S. has in its entire history, about three hundred megatons in total. The United States has detonated only about one-tenth of that.

The Soviet resumption of testing caught the United States totally unprepared. We know now that whereas the U.S. held a substantial lead in nuclear technology in 1959, by 1963 that lead had essentially disappeared as a result of this Soviet test series. It is fair to say that while the U.S. observed the test moratorium and refrained from even research and development on improved weapons systems, the Soviet Union used the moratorium to conceal its preparations for the world's largest, most extensive, and best-planned series of tests searching for improved nuclear weapons technology. The Soviets can protest that, technically, they did not break the moratorium because they did not actually conduct any tests during it. But they made all the extensive preparations for the tests at this time, since they were able to execute a great many within a month of starting up. (The typical lead time for preparing a test is six to eighteen months.)

Verification of a test ban is one of the most difficult issues to understand, and one of the most important. In principle, the USSR has agreed to voluntary site inspection, but in fact the Soviets are demanding that the United States (and any other nation) be required to produce extensive seismic proof that a test has been conducted before the Soviets even consider a request for onsite inspection. Should the Soviet Union conduct a secret test, the conclusive evidence we

are least likely to have is seismic.

True, the pattern differences between earthquakes and nuclear explosions are easy to discern if the waves are received strong and clear. But the waves lose their identity at lower levels. True, there is an international network of seismic receiving stations. But there are also a large number of unidentified seismic events every year. Signals are confused in the natural noise of the earth, and many events simply escape seismic detection.

Moreover, tests are now usually identified because of their known location near a test site, or because of other identifying information. Tests conducted in hard rock are more easily identified than those detonated in soft earth, and it makes a big difference whether the test takes place above or below the water table. Shifting the test to previously unused areas of different geologic composition or into seismically active regions would make accurate seismic detection much more difficult and uncertain. Finally, tests can be camouflaged in real earthquakes, multiple detonations can be designed to simulate earthquakes, and nuclear explosions can be set off in large "decoupling" cavities such as salt domes and even contained in large steel spheres.

The United States would find it hard to detect such tests, and even if they were detected we would have much greater difficulty identifying them. Should the U.S. discover what it believed to be a covert Soviet test, it would be hard to pinpoint the exact location, and to provide sufficient proof to convince a world which did not wish to see violations that indeed a violation had already occurred. What remedy would be available to the United States if the Soviet Union refused to acknowledge its violation and also refused to permit onsite inspection? As long as the Soviet Union insists that onsite inspection is essentially voluntary, on a case-by-case basis, and requires seismic evidence to support an inspection request, non-seismic intelligence will be of limited value to enforce a comprehensive test ban treaty.

In the absence of clear and unambiguous safeguards including guaranteed onsite verification, issues that are still unresolved despite more than a quarter century of effort, a nuclear test ban is not in the best interest of the United States or of the free world. □

SPECTATOR'S JOURNAL

THE MALTESE FALTER

by William McGurn

Valetta, Malta—In a country known for its *festi*, or religious festivals, Easter week in Malta is one of the more colorful, with each parish trying to outdo its neighbor. Thus Mosta boasts a solemn Good Friday procession of biblical characters and holy statues, followed by hooded, white-robed *penitentes* slogging through the streets with heavy chains tied to their feet, while on Easter Sunday the men in another parish heave a life-size statue of Christ in the air to signify He is Risen. Amid the celebrations the tourist might be hard-pressed to find any dark shadows falling on this tiny, sun-drenched island sixty miles to the south of Sicily.

But at the same time the pious Maltese were preparing for Easter their unelected prime minister, Carmelo Mifsud Bonnici, was making a pilgrimage to Tripoli. There he told Muammar Qaddafi that the Maltese were "one with the people of Libya" during this "grave hour"—i.e., the skirmish with the U.S. Sixth Fleet in the Gulf of Sidra. If the tourist looked a bit closer, he would find other disquieting signs. The Grand Harbor that once played host to Phoenician trading galleys and as recently as 1979 served as a strategic British port now caters to Soviet tankers. Opening up the socialist daily, he would find an advertisement for Libyan mercenaries to fight against "U.S. aggression" (*before* the strike against Qaddafi). Further inland, the visitor might be surprised to find a branch office of the Palestine Liberation Organization, a police force armed and trained by the North Koreans, and an alarming number of Libyan males of military age.

Welcome to Malta, problem child of the Mediterranean.

In its move toward the Soviets and the "non-aligned" bloc, tiny Malta is rumbling down the same path that has proved so disastrous for other erstwhile European colonies. But in this country, where the British are still popular, the violent lurch belies a long and noble tradition as a Western bastion. Only four decades ago this little island stood alone in the entire Mediterranean against a ferocious air attack by the Axis powers, a display of fortitude that earned the Maltese the King George Cross that today adorns their flag. Some four centuries before that this same island—with a handful of armed knights and a few thousand locals—repulsed the vastly superior forces of the Sultan of Turkey in a victory that set church bells a-ringing even in the Protestant England of Elizabeth I. Called the Great Siege, the battle reversed the direction of history in favor of Christian Europe.

Today Malta is in the midst of a second siege on the Western way of life, but this time from within. The lion's share of the credit for the country's slide from democracy and its newfound kinship with folks like Kim Il Sung and Colonel Qaddafi (both of whom have been decorated with Malta's highest honor) belongs to its prime minister until 1985, Dom Mintoff. A Rhodes scholar, Mintoff was said to have ruled the island with the contempt of a colonial governor, and this description was lent credence by the successor he chose to inflict on his people, his education minister, Mifsud Bonnici. Having led his people from a robust democracy to the fringes of the collectivist Promised Land, Mintoff has left it to Mifsud Bonnici to cross the Jordan.

No doubt there is a dash of malice in this choice, considering that the humorless Mifsud Bonnici early in his career backed the island's reactionary archbishop, the late Michael Gonzi, in the latter's efforts to deny the sacraments of the Roman Catholic Church to Mintoff and other Labor party leaders, this in what is probably Europe's most devout country. "You have to understand that Mintoff is a rogue," says one supporter of the opposition Nationalist party. "Mifsud Bonnici, on the other hand, has merely switched religions. He is as zealous for socialism today as he was for Christianity twenty years ago." Nicknamed

William McGurn is editorial features editor of the Wall Street Journal/ Europe *and a European editor of* The American Spectator.