It will be several weeks before the postmortem is done on Ginna's damaged steam generator. It is known, however, that special maintenance work was begun last year on the pipes in the steam generator, and that more work was planned for the spring. Whether this had an effect on the system remains to be discovered.

If corrosion was the villain, then many of the pressurized water reactors in the country may be regarded as potential victims of Ginna-like failure. The NRC reports that in 1981 alone, 14 reactors experienced small leaks in the steam generator resulting from stress and corrosion. And *Nuclear Technology* of last October notes that "Corrosion has affected almost 90 percent of steam generators operation prior to 1977. . . ." The problem is formidable.—ELIOT MARSHALL

Antinuclear Movement Gains Momentum

Prompted by activism in Europe and bellicosity at home, Americans are getting seriously worried about nuclear war

1982 promises to be a very big year for antinuclear war activism in the United States. A broadly based movement to bring about an end to the arms race has been unfolding with astonishing rapidity, perhaps marking the end of an era of relative political quiescence that began with the end of the Vietnam war.

The shape of the movement differs considerably from the antiwar movement of the 1960's. Unlike then, scientists and other professionals are very much in the lead, and student activism is little in evidence. Another difference is that this is a single-issue movement which is not linked, as was opposition to the war, to a variety of controversial social issues.

The current phase began in 1980 when the Cambridge-based Physicians for Social Responsibility took it upon themselves to stage several seminars across the country at which the consequences of a nuclear strike were graphically portrayed and audiences were educated in gruesome detail about the impossibility of an adequate medical response to casualties.

Although President Carter raised fears by opening the subject of a limited war with his famous directive allowing for selective strikes on enemy military installations, the behavior of the Reagan Administration has given strength to the movement by aggravating these fears. There was President Reagan's loose talk about the possibility of a limited nuclear war in Europe. There has been the volatile behavior of Defense Secretary Alexander Haig who suggested that a demonstration nuclear blast might be a good way to show we mean business in the event of a conventional war.

There has been the break from President Carter's nonproliferation policy in the form of a proposal to use wastes from nuclear power plants for the production of weapons-grade plutonium. There has been the decision to deploy MX missiles in old Minuteman silos, a move which is construed as a move toward developing a first-strike capability. And, of course, there is the European Nuclear Disarmament campaign, spurred in large part by the NATO decision to deploy new land-based missiles in Europe, which inevitably is worming its way into American consciousness. Today's activists are arguing that the costs of the arms race are becoming ever more numerous and visible: in alienating us from our allies, in draining resources away from social programs and diverting capital from the country's sagging industrial base, and in generating unprecedented feelings of insecurity among the citizenry. One Gallup poll, for example, revealed that no less than 47 percent of the public expects a nuclear confrontation with the Soviet Union within the next decade.

The rationale for continued weapons buildup has few prominent advocates outside the government these days. At the same time members of the arms control community—former U.S.S.R. ambassador George Kennan being perhaps the most prominent spokesman—are advancing increasingly urgent arguments in favor of reassessing the country's defense strategies.

What has happened in the past year or so, in short, is that arms control is no longer being identified in the public mind as synonymous with pacifism, unilateral disarmament, or naiveté about Soviet intentions. The massive involvement of churches in calling for disarmament is evidence that the issue has surmounted narrower causes. The Pope himself in December sent scientific delegations to the heads of nuclear nations about the need for disarmament.

The movement has nowhere near reached the proportions and intensity of the Vietnam antiwar phenomenon, but it shows potential for enveloping a far greater cross section of society and thus in the end being far less divisive. Significantly, the nuclear war issue is now becoming increasingly liberated from linkage with the antinuclear power movement. Indeed, many groups, notably the Union of Concerned Scientists, which spent the 1970's agitating against nuclear power have now turned their attention to war. Decoupling from the power issue has permitted involvement of many conservatives, says Jerome Grossman, president of the Council for a Livable World, who terms the nuclear power issue "very divisive."

Although the disarmament movement is blossoming all over the country, a large part of its root system is in Cambridge, Massachusetts, specifically in Harvard University and the Massachusetts Institute of Technology (MIT), and more specifically in MIT's physics department, which contains veterans of the Manhattan Project. No one has a compelling reason for why this is so, although physicist Kosta Tsipis of MIT—who is working on disarmament issues full-time now—suggests that Cambridge is the only place with a closely grouped cluster of institutions where "the density of motivated people is high."*

The thrust of the movement so far has been educational, aimed at the grass roots rather than the decision-makers. Many organizers have been concerned about the ramifications of getting people scared out of their wits about nuclear war without offering them a specific alternative to work for. But now the idea of a bilateral nuclear freeze—that is, a halt to the production, testing, and deployment of nuclear weapons and delivery systems, seems to have become the

*Among physicists MIT is contributing to the nuclear war debate are George Rathjens, Henry Kendall (head of the Union of Concerned Scientists), Kosta Tsipis, Jack Ruina, Herman Feshbach, Bernard Feld, Francis Low, Victor Weisskopf, and Jerome Wiesner.

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rallying point for most groups. The freeze idea has been around in various forms for a long time and was considered but rejected at the Democratic convention of 1980. It took the efforts of one woman, Randall Forsberg, director of the Institute for Defense and Disarmament Studies in Cambridge, to package the idea in a way that has become widely palatable. Nuclear Freeze as an organization has been in action since last March and has already been endorsed by dozens of groups and prominent individuals as well as 29 members of Congress, including two senators, Claiborne Pell (D–R.I.) and Lowell Weicker (R–Conn.). The biggest development to date for the campaign is a petition drive in California, which has more than 100,000 signatures, to have a ballot initiative on the subject. Several states have already passed resolutions supporting the freeze (Oregon, Massachusetts, and New York) and petition campaigns are under way in 25 other states.

Some of the most visible activities are now being conducted by the following new coalitions and old groups with new missions:

• Ground Zero: a scheme, organized by former National Security Council official Roger Molander, which is just now getting launched. The group is sending out educational materials and calling local organizations all over the country—churches, unions, civic groups, and so forth—to help them organize activities for Ground Zero Week, scheduled for 18 to 25 April.

• Union of Concerned Scientists: The UCS headed by Henry Kendall of MIT spent the 1970's worrying about nuclear power. It has now turned its attention to war. On 11 November, with the aid of the Council for a Livable World, it held a series of "convocations" on 155 campuses across the country which drew a far greater response than expected. Now, according to a spokesman, "we're reassessing our entire approach because we're further along than we thought." It intends to draw more than 300 campuses into convocations to be held next November and is also planning a series of "miniconvocations" to deal with specific aspects of the arms race. The UCS is also involved in an initiative by a British group, Scientists Against Nuclear Arms, to arrange an international meeting of scientists in New York City to coincide with the United Nations Second Special Session on Disarmament to be held next June.

• Physicians for Social Responsibility: This Cambridge-based group, spurred by the enthusiastic response to its horrifying symposia, is planning more in Washington, D.C., Minneapolis, Houston, and Atlanta in 1982. It will also be assisting locals in other cities in setting up similar presentations. The director, Thomas Halsted, says the group has gone from a membership of 1,000 to 10,000 in a year and now has 65 chapters in 40 states. Two-thirds of the members are physicians.

• Federation of American Scientists: the FAS recently set up a nuclear war project headed by Barry Casper of Carleton College, Minnesota. This entails development of slide presentations on war and the arms buildup; publication of a "nuclear war reader" within the next couple of months; a nuclear war education newsletter, and development of courses on nuclear war.

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Old groups such as the American Friends Service Committee and the Council for a Livable World are lending support to the new initiatives. So is the Committee for a Sane Nuclear Policy, whose membership has grown 80 percent, to 30,000, over the past year. Even the American Medical Association has passed a resolution urging physicians to educate themselves and their patients about the medical consequences of a bombing. A newer alliance, the Committee for National Security headed by former SALT negotiator Paul Warnke, is attempting to revive public interest in a comprehensive nuclear test ban treaty.

New groups continue to pop up. One of the most recently formed is the Lawyers Alliance for Nuclear Arms Control (also in Cambridge), which opened an office last month. On its board are Tsipis, Abraham Chayes, and Roger Fisher of Harvard Law School, and Paul Warnke.

Although scientists have long been involved with arms issues, the engineers are now stepping in with the formation of a group called High Technology Professionals for Peace. Established last March, it is basically an employment agency for engineers and computer professionals who do not want to have anything to do with arms work. Alan Hochberg, an electrical engineer also working in the Boston area claims that "for the engineering community, this is the first time in the history of the arms race that the issue has been raised." "During the Vietnam war," says Hochberg, "the engineering community was kind of isolated" from the issues. Now, people from other employment agencies tell him that up to 50 percent of their applicants specify they do not want a weapons-related job.

According to the people in the movement, Administration officials continue to remain oddly immune from influence by the growing anger, fear, and frustration that all this activity reflects. Science adviser George Keyworth is perceived as a good guy but not one with the experience, influence, or inclination to try and bend Reagan's ear about taking a new look at the arms race. Cold comfort is offered by the replacement of Richard V. Allen with William P. Clark, a former judge with avowed lack of experience in international affairs, as head of the National Security Council.

One of the most articulate spokesmen for Administration policy is Richard Perle, assistant secretary of Defense. Yet at a symposium at the recent AAAS annual meeting he failed to address the points raised by fellow panelists, Harvard economist John Kenneth Galbraith, Richard Barnet of the Institute for Policy Studies, and Roger Fisher. The points they made included the fact that the threat of nuclear force is useless when the ends a nation seeks cannot be gained by such force if negotiation fails (such as freeing Poland or getting hostages out of Iran). They also made the simple psychological point that the more the U.S. threatens the Soviet Union, the more frightened—and therefore dangerous—the adversary becomes. Perle replied to the effect that "our purpose is not to increase the threat but to ensure a retaliatory capability"—a distinction many listeners failed to appreciate. He added that "nuclear war does not necessarily mean the end of civilization."

Even if the Administration continues to believe its own logic, evidence is accumulating—in the form of the rapid growth of antistrategic weapons sentiment—that such reasoning is extremely difficult for the average thinking person to follow. The simple notion that America needs to be at least as strong as the Russians has finally got a strong competitor: the simple notion that the arms race poses an even greater threat to security than the Russians.

—CONSTANCE HOLDEN