News and Comment

French Nuclear Arms: Program Calls for Atomic Force by mid-1964 and Hydrogen Capacity at End of Decade

Paris. France is within 18 to 24 months of achieving an airborne atomic force, primitive by American and Soviet standards but of sufficient potency to mark the beginning of a new chapter in the arms race.

Despite an originally adamant but now somewhat wilting American refusal to help France into the nuclear club, the French have gone ahead with their own resources. It is now expected that sometime around mid-1964 they will have 80 to 100 fission weapons of at least Hiroshima size, designed for a fleet of some 50 light supersonic bombers. Since early 1960 they have tested six atomic devices (they failed to announce one test but informally confirmed it when the U.S. underground detection network picked it up), and prototypes of the air fleet are now flying. When that force and its weapons are operational, the French will have completed the first phase of their nuclear weapons program. Meanwhile, they have embarked toward a more ambitious goal: a hydrogen force, equipped with land- and submarine-based missiles, to be operational by 1970. In a step toward this goal they are expected to explode their first fusion device early next year. To provide highly enriched U^{235}, they are now building an isotope separation plant at an estimated cost of $700 million. It is scheduled to go into operation by 1966. The missiles are now under development, while the submarine program calls for the adaptation of conventional underwater crafts as a first step, possibly followed by the construction of nuclear-powered submarines.

Thus, the *n*th power problem is very close to changing from a possibility to a fact of international life, which, despite a lot of wishful thinking, does not appear the least bit likely to disappear with de Gaulle. France embarked on its ambitious weapons program before de Gaulle came to power, and while his stress on French independence of the Anglo-American nuclear deterrent has served to focus the effort, de Gaulle neither created the nuclear ambition nor imposed it on an unwilling nation. Defense Secretary McNamara's Michigan speech, in which he contended that national deterrent forces are inadequate and hazardous, may make sense from the American perspective, but it is reported to have caused scarcely a ripple of interest among French politicians and strategists.

Underlying the French willingness to pay the costs of a nuclear arsenal is, first of all, a concept of national grandeur that the United States, which is amply endowed with grandeur, finds difficult to comprehend. As one French official put it, "A nation cannot be great today unless it has nuclear weapons and a space program, and we are determined to be great." Cutting sharply into this sensitivity about status in the world community is the American policy of sharing nuclear information with Great Britain while France is rigidly excluded. If we are full partners, the French have said, why can the bomb cross the Atlantic but not the Channel?

The determination to achieve their own nuclear force is futher reinforced by serious doubts about the United States' willingness to protect France against Soviet aggression if the price may be a Soviet blow at American cities. A popular refrain on this is, "If they bomb Marseilles, will you bomb Moscow at the risk that they may bomb New York in return? Or, will you say that now is the time to negotiate, even if it means writing off Marseilles?" The American declaration that an attack on Western Europe would bring immediate U.S. retaliation is unquestionably made with full determination to abide by it, but France, which has had more experience than the United States in topsy-turvy politics and the erosion of national will, prefers not to take the chance that time or technology may undermine that determination.

Furthermore, the argument that France cannot possibly match the Soviet Union in nuclear strength carries little weight among proponents of the French weapons program. The United States, they point out, accepts the likelihood that it would suffer enormous damage under a Soviet attack, but it is convinced that it could cause even more damage in return. France, they continue, could unquestionably be obliterated, but with submarine-borne missiles, an airborne alert, and some secure land-based missiles it could wreak destruction on the Soviet Union that would be small as compared to American capabilities but still of calamitous consequence for the Soviets. Thus, as far as the French are concerned, to acquire a nuclear force is rationally in the national interest—and not simply a grandiose aim.

While the French have made it clear that they plan to become a nuclear power, they have been extremely coy about the political ties that they envisage for their new military strength. American efforts to influence the French toward incorporating their nuclear strength into NATO have brought noncommittal replies, largely, it is believed, because de Gaulle wishes to keep the threat of nuclear independence as a bargaining force within the Western alliance while, at the same time, pacifying domestic elements that wish to keep close ties to the United States and NATO. For example, a recent report by the Defense Ministry describes the nuclear force as "a major instrument of the policy of the Government, freed of any external dependence, but capable of employment within the framework of the alliance. It can act at any moment, any place." The coyness also reflects French suspicions of American motives in urging France to put its nuclear strength under multinational control. French officials point out, with anger, that the United States has gone through the motions of placing elements of its nuclear power under NATO control but has made certain that, regardless of the paper arrangements, American and British personnel remain exclusively in control. The decision to place six American Polaris submarines under NATO control was hailed by American spokesmen as a significant step toward giving NATO control over a piece of the American deterrent force, but the French regard it as rather a poor joke. The submarines, they point out, are still manned exclusively by Americans, and while the vessels may occupy a place on NATO organizational charts, their deployment will re-

flect the United States' concept of its obligations to NATO, not the will of the NATO nations. There is thus little likelihood that when the French nuclear force comes into being France will be willing to dilute its control over its own forces, unless the United States is ready to take the same step. And while the Kennedy Administration has been doing a great deal of thinking and talking about the means of placing the American nuclear deterrent under NATO control, it has made no progress in solving the political problem of selling this idea to Congress, or the technical problem of reconciling multinational control with the need of instantaneous response.

The Issue of American Assistance

Since the start of the French weapons program, the issue of American assistance has been a constant source of irritation between the two nations. Officially, American policy remains strictly opposed to futhering the nuclear ambitions of any nation. But under the impact of French determination and success in going it alone, U.S. policy has slowly evolved toward some cooperation; meanwhile, however, a fairly heavy toll in political animosity has been paid. For example, the United States has been seeking to involve the French scientific community in cooperative space efforts without furthering French missile capacity. Thus, there is traffic in instruments for high-altitude research but the United States will not furnish the French with inertial guidance equipment for their own rockets. It has also refused to furnish information on rocket fuels. At the same time, the Administration has agreed to sell the French 10 KC-135 jet aerial tankers that are intended to extend the range of the French atomic air fleet. The rationale offered by the Administration is that, while it will not assist the French in developing weapons or missiles, it is willing to cooperate in extending the reach of conventional means of delivery. The hairsplitting is admirable but the French view the distinction with amusement and some contempt, pointing out that American determination to refrain from assisting France's nuclear development seems to have diminished under pressure to reduce the gold flow from the United States. The tanker deal will bring the United States about $50 million, and this goes a good way toward offsetting the annual $250 million loss of American gold to France.

As France comes close to membership in the nuclear club, interest there is growing in the considerable body of literature on arms control and disarmament that has been produced in the United States and Great Britain. Such interest is not nearly as widespread in France as it is in the U.S. and Great Britain, nor has nuclear-age strategy achieved a place in French academic life. But many Frenchmen for the first time are becoming aware of such works as the *Daedalus* volume on arms control, disarmament, and national security. One French official who is associated with the civilian side of the nuclear effort commented, "Many of us are discovering that a whole world of scholarship exists of which we know nothing at all." And a French journalist who has been trying to promote broader acquaintance with arms control and disarmament literature added, "A lot of people here are now first coming into contact with such concepts as counterforce and first- and second-strike capabilities. It is not unusual," he said, "to encounter persons who are involved in developing the French nuclear force who are not the least bit familiar with these concepts."

American officials here have noted this lack of intellectual ferment over the implications of nuclear power, but outside of an informal and personal recommendation that such and such a book might be interesting, there is no effort to promote interest in the subject. One official said that, "in a most tentative way," there has been some thought about making available some information on the United States' relatively long experience in command and control of nuclear forces, but it appears that at this late stage there is little that the United States can do to influence French intentions. James Gavin, the outgoing American ambassador to France, is generally reported to have argued that the United States should actively assist the French with the nuclear program, extracting some element of political control or cooperation as the price for sparing the French some of the enormous costs. The French have indicated informally that they might be receptive to American assistance, especially for some heavy equipment for their gaseous diffusion plant, but it is generally felt by American officials here that the French are so far along with their weapons program that even a sudden turnabout in American policy on assisting them would not be matched by French willingness to alter their goal.—D. S. GREENBERG

Announcements

The National Academy of Sciences has established an ad hoc committee for international programs in **atmospheric sciences and hydrology** to prepare a United States scientific program for international consideration. The committee was formed at the request of the Federal Council for Science and Technology under a recent United Nations resolution that called for an international program in atmospheric sciences to be organized through the World Meteorological Organization and UNESCO. Under the chairmanship of Sverre Petterssen, of the University of Chicago, the group will deal with hydrology; atmospheric transfer processes, circulation, prediction, and modification; solar terrestrial relationships; aeronomy; physics of the lower atmosphere; atmospheric chemistry and tracers; meteorological services; and biometeorology. An additional panel on education is planned. (NAS, Geophysics Research Board, Washington 25, D.C.)

A series of eight **cancer research documentaries** will be released after 15 October as a part of the American Chemical Society's weekly radio series, "Men and Molecules." The tape-recorded programs, produced by the society, will cover recent research in leukemia, new anticancer drugs, biochemical aspects of cancer, and the relationship between human cancer and viruses, air pollutants, and tobacco.

Letters from the late Sir **Henry Tizard** or information concerning his life and work, are being solicited for use in the preparation of his biography. (Ronald W. Clark, 10 Campden St., Kensington, London W.8, England)

The first test hole to be drilled on phase II of **Project Mohole**—the National Science Foundation-sponsored effort to drill completely through the earth's crust and sample the mantle beneath—was begun this week 1½ miles east of Mayaguez on the west coast of Puerto Rico. The 1000-foot test well is located near two proposed Mohole drilling sites: one north of Puerto Rico and the other off its east coast. Two other prospective sites are located in the Pacific off the Hawaiian Islands.

The test cores, which will measure 1⅞ inches in diameter, will be analyzed to aid engineers in the design of drill