the proposal may have to be revised. It may then be necessary to suggest that the British and French—or the British, French, and West Germans jointly—continue to hold their weapons. In effect two nuclear powers on each side would then exist. An attempt would have to be made to get the non-nuclear club sponsored by nations such as Japan, India, and Sweden. But obviously the greater the number of nations who insist on having their own weapons the less the hope of ever forming a non-nuclear club.

What about NATO?

The British proposal will have to be agreed beforehand with our allies in NATO. It ought to be as much in their interests as it is in ours. The dangers which flow from a multiplication of nuclear nations are common to all.

The difficulties here will lie in General Norstad's insistence on the need for tactical atomic weapons in Europe. This can be overcome in either of two ways. One is to let the Americans hold these weapons on behalf of the alliance (as substantially they do at present). The other is to recognize that tactical weapons cannot be used in Europe without so great a risk of all-out war that they are not worth having.

And American Bases?

These can remain in Britain. The non-nuclear club need not prevent their presence here. On the contrary, since the American strategic deterrent remains (as to-day) the key element in Western defence, the Americans ought to be given what facilities they want in the British Isles. So long as we shelter under the American's umbrella—as we have done ever since 1945—we must be ready to help hold it aloft.

When the Americans have produced enough reliable long-range missiles their need for overseas bases will decline. We have to recognize that they will then be less ready to risk an all-out war in defence of Western Europe. Their military guarantee of Western Europe may then become less reliable. This is one disadvantage of the non-nuclear club. Western Europe will be more vulnerable to Soviet threats. But at the same time if the Americans return to their earlier monopoly of nuclear weapons in the West their obligation to Europe is increased.

How Many Must Agree?

Before the club can be formed those countries which might have nuclear weapons in the next decade or so must come in. They include France, China, Japan, Sweden, Switzerland, Western Germany, Eastern Germany, India, Pakistan, Israel, the United Arab Republic, Argentina, Brazil, Poland, Czechoslovakia, Hungary, Bulgaria, Greece, Turkey, Canada, Australia, South Africa, and possibly some others. It is doubtful whether the club could be of any value if one of these countries stood out against it. But again they share a common interest in trying to prevent the spread of nuclear weapons.

The Americans and Russians must underwrite the agreement. If they were to agree also to inspection of their use of fissile materials—to begin, say, two years after the club had been formed—that would be most helpful.

Is It Likely To Succeed?

That depends in part on whether any British Government is willing to pursue the proposal with vigor. The British at present are particularly well placed to take the initiative. At later dates others may be better placed.

What if Other Countries Refuse?

Any British Government is bound to leave itself freedom of action in that event. It may choose to retain its separate weapons—although it may think that the development of new weapons is economically not worth while—or it may not retain them. Most probably it will be best to keep what it has in an increasingly uncomfortable world.

Space Agency-Pentagon Liaison Group Given New Authority

The Civilian-Military Liaison Committee, a governmental group composed of representatives of the National Aeronautics and Space Administration and the Defense Department, has been given expanded authority by President Eisenhower to deal with jurisdictional differences that arise between the two agencies. Both NASA and the Department of Defense are concerned with space projects. In the past, when conflicts arose between them, either had the option of asking the liaison committee to mediate. Under the new charter which President Eisenhower has recently approved, such conflicts must be mediated by the committee whether or not either of the participants requests such action. In a related development, William M. Holaday, chairman of the committee, was released from other duties, including that of director of guided missiles, to spend full time on liaison problems.

The action reflects a continuing effort by the Administration, under the prodding of Congress, to establish order and lines of authority among the many federal agencies concerned with space activities. Last February, similar action was taken when Herbert York, director of defense research and engineering, was given explicit authority to approve, modify, or disapprove programs and projects of all Department of Defense agencies, including the military services.

Cut in Space Budget

In another development involving the space agency, the House of Representatives cut $68 million from NASA's proposed budget of $530 million. This reduction, agency officials warned, will have the effect of slowing down United States efforts to place a man in space. The funds are needed, a spokesman said, for research and for the procurement of space capsules for Project Mercury, NASA's manned-satellite program.

Behind the cut are arguments put forth by Representative Albert Thomas (D-Tex.), a member of the House of Representatives' Appropriation Committee. Thomas has commented that the space agency has "more money than they can spend wisely." He also suggested that NASA should not be rushed in its activities.

After the House action was taken, T. Keith Glennan, administrator of NASA, issued a statement saying that the recommendations of the committee imperiled American leadership in space research. "We cannot win this race," he said, "without all-out support from Congress." Congress itself had set the goal of leadership in space, he continued, by enacting the legislation that created NASA. According to an agency spokesman, the cuts would have a critical effect on the research and development programs which form the core of NASA's activities. In addition to slowing the man-in-space program, the spokesman said, the cuts would force curtailment of new tracking-range plans, slow down the schedule of satellite and space-probe shots, and delay development of more powerful boosters and vehicles of advanced design.

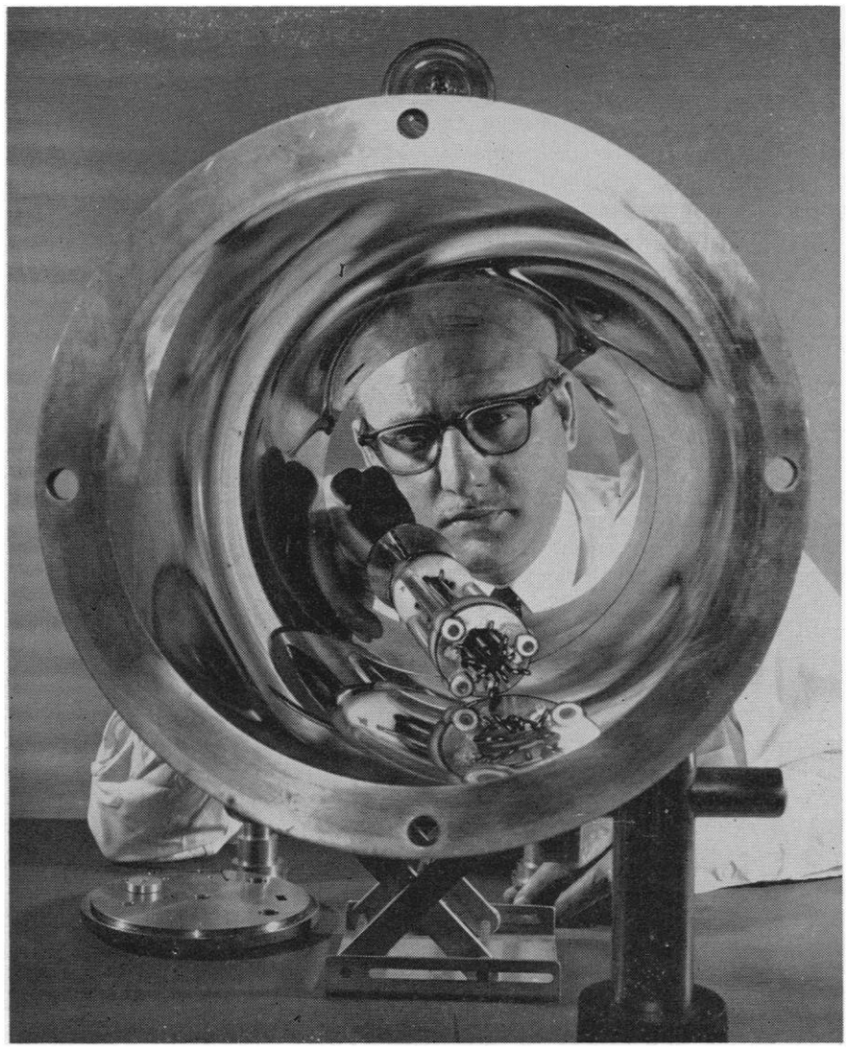
Agency officials are hoping for a restoration of the cuts by the Senate, which also has to pass on NASA's request for funds. Even full restoration by the Senate, however, would probably not wholly offset the action of the House,

because the House and Senate appropriations will have to be reconciled by compromise. It is unlikely that the House will reverse itself and finally allow the full amount in this compromise. Most usually the final appropriation figure falls between the upper and lower limits set by each chamber.

Atomic Clock To Orbit

A 30-pound atomic clock to be carried in an orbiting satellite is being developed, to give Einstein's general theory of relativity "the most searching check of its 43 years." The prototype of the clock is now under construction at the Hughes Aircraft Company's research laboratories at Culver City, Calif., under a $200,000 development contract from the National Aeronautics and Space Administration. The clock will be accurate to within 3 seconds in 100 billion; this means an error of no more than 3 seconds in 3171 years. NASA has given similar contracts to the National Bureau of Standards and to Massachusetts Institute of Technology for other types of very precise clocks. Any actual satellite-clock launching is probably several years away, NASA said.

Before the launching, the atomic clock would be synchronized with another clock on the ground. The satellite would then orbit, at an altitude, for example, of 8000 miles, traveling about 18,000 miles an hour. The orbiting clock would generate a highly stable current with a frequency of 24,000 megacycles per second. By means of electronic circuits the rate of these oscillations would be reduced to a rate at which precise laboratory measurements could be conveniently made. The "ticks" would be transmitted by radio for comparison with data from the clock on the ground.



Harold Lyons, inventor of the first atomic clock, examines the tubular core of another model which is to be put into orbit around the earth to check Einstein's general theory of relativity.

Administration Reaffirms Stand on Nuclear Plane

The Administration has rejected proposals for early construction of a flying model of a nuclear-powered aircraft. The proposals, which had been examined in the past, were brought up for review at the insistence of members of the Joint Congressional Committee on Atomic Energy, who cited the propaganda advantages of building such a plane before the Soviet Union does. In rejecting the "fly early" proposals the Administration indicated that efforts would be concentrated on development of more advanced reactor fuel elements for the reactor-jet-engine combination that will eventually power the craft.

The decision reflects the Adminstration's belief that more research is needed before an adequately performing power plant can be developed for the plane. This point has recently been stressed by White House science advisers and Pentagon officials. In his last speech before leaving office, James Killian, chairman of the President's Science Advisory Committee, spoke of the need for careful preliminary work before continuing the nuclear plane project. Herbert York, research chief of the Department of Defense, said in testimony before a House committee that he believed the over-all cost of developing such a plane would be at least $10 billion. It has been estimated that approximately $1 billion has been spent on the project over the past 13 years.

Members of the Joint Congressional Committee on Atomic Energy described the Administration's move as a "backward step" that will postpone the first flight of a nuclear airplane by at least 2 years. Representative Melvin Price (D-Ill.), chairman of the Atomic Energy Research subcommittee, announced that public hearings would be held next month on the Administration's "lack of decision" on the controversial project.

Scientists in the News

WARREN WEAVER, vice president for the natural and medical sciences of the Rockefeller Foundation, will retire on 1 August. At that time he will become vice president of the Alfred P. Sloan Foundation. He will continue his activities on the National Science Board, on the National Advisory Cancer Council, on the Council for Library Resources, as vice chairman of the Health Research Council of the City of New