He was ever ready to support organizations devoted to the history of medicine and science. In the years of his retirement he was president of the British Society for the History of Science (1946–49) and of the International Society for the History of Science (1947–1950). The pursuit of his studies brought him many opportunities for travel. In the 1930's he lectured at Johns Hopkins—where he was later offered, but declined, the professorship of the history of medicine—and Philadelphia, and was for a year visiting professor at the University of California. A distinction that gave him particular pleasure was the honorary D.Sc. confered upon him by the University of Oxford in 1957. In 1953 his colleagues combined to honor him with a two-volume collection of historical essays—*Science, Medicine and History*.

Such were the outward manifestations of his erudition and experience, but what of the nature of the man himself? Of this it is difficult to write, for one of the penalties of living to an advanced age is that few, if any, contemporaries survive to recall one's early years. In character as well as in learning he was a man of parts, but the quality that many of his friends will best remember is his sense of humor, gentle and never malicious. Gentleness was, indeed, a quality that one quickly recognized, though one soon found it was a mistake to confuse this with lack of determination. He was, as he liked to proclaim, a man of peace, but if he set his heart on something he was always ready to try a different approach if the first one failed. More often than not his persuasiveness and tenacity carried the day. Again, behind a scholarly detachment from the mundane routine of daily life there lurked a mind astute enough where it had to deal with larger practical problems; one felt that while perhaps he could not boil an egg yet he was alive enough to the realities of any project of scholarship on which he had set his heart, whether on his own account or—more often—that of others. He was, indeed, always ready to help others, especially younger men, both in professional advancement or personal problems. This side of his character found many opportunities for expression during the German persecution of Jewish scholars in the 1930's. Himself the son of the rabbi of the West End Synagogue in London, his sympathy was at once aroused by the plight of refugees. Those of his coreligionists who escaped from the terror and made their way to England found him ever helpful to those shocked and bereaved by the foul excesses of the Nazi regime; to those whose interests lay within his own field he offered practical aid in rebuilding shattered careers. He played an important part in founding the Society for the Protection of Science and Learning.

Although his main interest was in the history of science, medicine, and technology his erudition extended far beyond this. He had a particular interest in the history of the Jewish race and religion and the relationship of the latter to Christianity. The *Legacy of Israel*, of which he was joint editor with E. R. Bevan in 1927, was an important, practical manifestation of this interest. He had a lifelong interest in biology and during the last war set up a teaching laboratory in his house at Par for the benefit of schools that had been evacuated to the West of England. In conversation there were few subjects to which he could not contribute something, always modestly, whatever the company. One had to be nimble-witted indeed to keep up with him even when he was in his eighties; as a young man he must have been formidable indeed. The world of learning is the poorer for his passing; one can only be thankful that he was spared for so long to make his outstanding contribution to it.

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Science in the News

Nixon and Kennedy on the Geneva Test Ban Talks, Disarmament; Conferees Await Election Outcome

The Geneva test ban negotiations became front-page political news last week. The negotiations did not immediately become a campaign issue, much to the relief of official Washington, but nevertheless the seeds of controversy were planted, and the situation may be quite different by the time this appears.

The Vice President announced that if elected he would move immediately to bring the two-year-old talks to a climax. In a speech he said had the approval of the White House, Nixon said that the day after the election he would ask President Eisenhower to send Henry Cabot Lodge to Geneva "with a view to resolving this question by February 1." "I would have Mr. Khrushchev understand that if, at the end of the 80-day period—by February 1—there is no progress, the United States will be prepared to detonate atomic devices necessary to advance our peaceful technology. . . . Further, I would have him understand that if an agreement is not signed within a reasonable period after February 1, the United States will have no alternative but to resume underground testing of atomic weapons."

Nixon said that if an agreement was in sight by 1 February (presumably if substantial agreement had been reached on the critical question of inspection rights) he would meet with Khrushchev and Macmillan "to make the final agreement at the summit." He said that he had no intention of breaking off the negotiations themselves, but that the unpoliced moratorium on testing that has been in force since the negotiations began in 1958 could not be continued much longer "without seriously jeopardizing the very objective towards which we hoped the Geneva negotiations would point—peace and human survival."

Nixon said that we have no assurance that the Russians have been obey-

ing the pledged moratorium on testing over the past two years and that, in the absence of some real indication that the Russians are prepared to accept an adequate system of controls and inspection, the United States cannot afford to continue the moratorium much longer. "During these two years of negotiation, we have not detonated any nuclear devices and the Soviets know that we have not. However, during the same period the Soviets have fired at least one large underground explosion and several small ones. They state that these have not been nuclear shots—simply high explosives. We have no way of knowing whether this is the fact. Nor will the Soviets permit us—or the United Nations, or neutral nations—to make an inspection. . . . The history of weapons development is such that it requires only between three and four years to complete a new breakthrough. Two years of this time has passed, as the United States has worked earnestly for this positive step toward eliminating the war threat to all humanity. Where has this left us? We have no agreement. There is reason to believe the Soviets may have used the time to attempt to overtake us. We cannot prolong the risk much longer."

Nixon said that if the Russians are serious about their professed desire to reach agreement on an adequate control system there is no reason that the agreement could not be substantially worked out in the 80 days between mid-November and 1 February. "We must resolve this issue now," he said. "We must never allow the Soviets, by deceit, to make America second in nuclear technology. We must act now to break this Soviet filibuster against peace and the security of the free nations."

Kennedy's Position

Nixon's proposal was similar to the position taken by Kennedy several weeks ago in reply to an open letter from Thomas E. Murray, a former member of the Atomic Energy Commission, asking both candidates to endorse an immediate resumption of underground weapon tests. "If elected," Kennedy said, "I will direct vigorous negotiations, in accordance with my personal instructions on policy, in the hope of concluding a realistic and effective agreement. . . . I intend to prescribe a reasonable but definite time limit within which to determine whether significant progress is being made. At the beginning of the period, I would direct the Atomic Energy Commission to proceed with preliminary preparations for underground tests.

"If, within the period," Kennedy said, "the Russians remain unwilling to accept a realistic and effective agreement, then the world will know who is to blame. The prompt resumption of underground tests to develop peaceful uses of atomic energy, research in the field of seismic technology, and improvement of nuclear weapons should then be considered, as may appear appropriate in the situation then existing."

Thus both candidates say that they would press the Russians to show that they are prepared to make the concessions on control and inspection necessary for an agreement; neither has committed himself to resumption of weapon testing at any specific date. (Nixon's proposal commits him to a resumption shortly after 1 February of the tests involving peaceful uses of nuclear explosions—Project Plowshare—but not to an immediate resumption of weapon tests.) Nevertheless, Nixon, in a part of his address which does not seem to have been widely reported in the press, was highly critical of Kennedy's proposal. His criticism raises the possibility that the negotiations could become a major issue in the last days of the campaign should Nixon choose to press his attack.

Nixon's Criticism

"My opponent," said Nixon, ". . . would want, even at this late date, to continue or reopen negotiations with the Soviets with new negotiators and new instructions. . . . He is saying, in effect, that the negotiations of the past two years have not been sufficiently vigorous and that [the negotiators'] instructions have not been adequate to the task. He is proposing a course of action which would delay any possible resolution of this vital matter for much too long—far beyond any margin of safety—since he is proposing to handle the matter with new men and new instructions.

"The delay, and Senator Kennedy's reasons for it, are both unacceptable. I say to him that it is impossible to imply in truth that these negotiations could have been pursued with greater vigor or sincerity on the part of Ambassador Wadsworth and our career negotiators and our top scientists. I say to him that no instructions would have produced agreement to date, except and unless we had been willing to sacrifice the principle of adequate inspection. The only major obstacle to an atomic test agreement has been, and is now, the Soviet refusal to accept adequate inspection. Clearly, then," Nixon said, "the only 'new policy instructions' through which the United States could remove this obstacle would entail surrender on this point. The security of the United States, and of the entire free world, simply will not permit either such a surrender or the indefinite continuation of the present moratorium entirely without inspection."

Nixon said he was referring to the position Kennedy had taken in his reply to Murray's open letter. "The people of the United States, like millions of people all over the world," Kennedy had said, "are anxiously hoping for an effective and realistic agreement outlawing nuclear tests—which means an agreement that is not dependent on faith alone, but one enforceable through an effective system of international inspection and control. . . . It is possible that our negotiators, who have earnestly tried to negotiate a realistic and effective test ban, have exhausted every avenue of agreement, but since I have neither taken part in the negotiations, nor had personal reports from the negotiators, who are not representatives chosen by me, I lack personal assurance of the futility of further discussion which alone would persuade me to urge the abandonment of so high an objective." It is not clear whom Nixon was quoting when he referred to the "new policy instructions" he said Kennedy planned. Kennedy did not use the phrase.

Difference in Attitude

Although Nixon's attack on Kennedy's position seemed a little contrived, there was a detectable difference of tone in the two men's statements on the question, and the difference is one that shows up whenever the candidates discuss the problems of the test ban and of disarmament generally. Nixon, in the few public statements he has made, normally begins by agreeing that the objective is important, but devotes himself mainly to warning of the danger of agreeing to anything without secure controls and inspection rights. This was the pattern in his statement on the test ban, and in his reply to the request of the *Bulletin*

of Atomic Scientists that both candidates give their views on the Geneva conference.

"There is no question as to our desire to enter into a disarmament agreement," Nixon said. "The problem is securing an agreement that is enforceable—because an agreement without adequate inspection provisions, which one party might honor and the other might not, would seriously and perhaps fatally increase rather than reduce the risk of war. . . . The road to war is paved with agreements based solely on mutual trust."

Kennedy, too, warns of the pitfalls of inadequately policed agreements. In his reply in the *Bulletin of the Atomic Scientists,* he went further and said that American forces, both conventional and nuclear, must be strengthened in order to increase world stability. But he differs from Nixon both in being less quick to place the entire blame for the lack of progress on the Russians and in talking much more of the necessity of pursuing disarmament. He has repeatedly criticized the Administration for not making what he regards as a sufficiently strenuous effort to see what can be done about disarmament. "Here is a gap as serious as the missile gap," said Kennedy, "the gap between America's incredible inventiveness for destruction and our inadequate inventiveness for peace. We prepare for the battlefield, but not for the bargaining table. We pour our talent and funds into a feverish race for arms supremacy, by-passing almost entirely the quest for arms control."

"I do not say," Kennedy went on, "that we should rely simply on trust in any agreement. Certainly we need an inspection system which is as reliable and thorough as modern science and technology can devise. However, even with such a system, there will be risks. Peace programs involve risks as do arms programs, but the risks of arms are even more dangerous. Those who talk about the risks and dangers of any arms control proposal ought to weigh—in the scales of national security—the risks and dangers inherent in our present course."

A Complex Problem

The whole problem of the test ban is one that is almost impossible for anyone outside the very highest circles of the Administration to assess. Nixon referred, in his statement, to the "obvious" need for a "foolproof" inspection system. If he meant this literally, then there will be no test ban agreement. The scientific testimony at the hearings of the Joint Congressional Committee on Atomic Energy last spring (*Science*, 29 April) made it clear that not even the most ardent supporters of a test ban claim that any inspection system possible in the immediate future could be described as foolproof.

The problem is not to decide whether the inspection system is going to be foolproof. Everyone knows it will not be. Any agreement will involve risks. The problem is to evaluate the risks. The temptations of a government to cheat on a test ban agreement depend on how important the expected gains from clandestine testing are compared to the risk of being caught at it, which would not only largely destroy the cheating nation's carefully built up "image" as a peace-loving nation, but eliminate for a long time the possibility of reaching agreement on other areas of disarmament. No nation, after all, could accept disarmament agreements based, as they must be, on less-than-foolproof controls, with a nation which had already demonstrated its readiness to cheat on such agreements.

To evaluate the risks one must have access to top secret assessments of the possibilities for advances in nuclear technology, to top secret military assessments of the significance of such advances, to other top secret assessments of the ability of our intelligence agencies to gather information that, combined with what can be learned through the formal inspection system, would offer a reasonably good chance to detect any violation of the agreement and a good probability that at least one of a series of such violations would be detected.

Other information needed relates to the state of Soviet nuclear technology and to expert evaluations of Soviet intentions as demonstrated by their negotiators at Geneva and the attitude of leading Soviet officials. An assessment must be made of the degree of risk the United States should accept in order to make some progress toward stopping the spread of atomic weapons and toward making some progress in slowing down the arms race.

The outcome of all this evaluation will be a decision based on a balancing of the risks one way or the other. It is a difficult decision for the President and the few others who have access to all the relevant information, which is far from as complete as they would like it to be. It is just not possible for anyone outside the very highest circles of the Administration to make a well-founded, firm decision on just what we should do about the Geneva talks.

The situation may well be that both sides are convinced that a test ban is in their mutual interest but that the talks will fail nevertheless because the Russians cannot bring themselves to accept the degree of inspection and control that would lower the American risk of accepting less than foolproof controls to an acceptable level.

Meanwhile, at Geneva, the negotiations entered their third year last week with everyone simply marking time until the election is decided. A. M. Rosenthal reported in the New York *Times*: "The United States delegation is not in a position to make any major moves until the elections are over. The British delegation is waiting for the United States. The Soviet Union's delegation has been relaxing for weeks, making it quite clear that it thinks nothing of any importance will happen until the United States elects a President."

The conferees have agreed on a good deal of the legal framework of a treaty that would provide inspection and controls to police a ban on underground nuclear explosions large enough to stand a reasonably good chance of being detected and identified by existing methods. The treaty would be accompanied by an unpoliced moratorium on smaller tests (those which would register below 4.75 on the seismic scale of earthquake magnitudes) and by an international research program to develop a system for policing the smaller tests.

But no agreement has been reached on either the length of the unpoliced moratorium on the smaller tests or on the more critical question of exactly what inspection rights the rival powers will hold. Nor has agreement been reached on a system of carrying out the trial underground explosions of nuclear devices which the West feels must be a necessary part of the research program to improve detection methods.

All that is being done at Geneva now is for both sides to exchange accusations over who is to blame for the long delay in working out answers to all these questions.—H.M.