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Thoughts on Making the Bomb

by John Lamperti

I recently finished reading Martin Sherwin and Kai Bird's monumental *American Prometheus: The Triumph and Tragedy of J. Robert Oppenheimer*.[1] It's an admirable book, although I think the title might better have been *American Faust*. (No less than Freeman Dyson said Oppenheimer made a "Faustian bargain."[2]) There have been many books about Oppenheimer and the atomic bomb project in general; I've read some but not all of them. This one seems to be definitive. Everything we need to know is there – and it's a fascinating read.

Two things struck me especially, and neither was directly about Oppenheimer. One was the ideological rigidity, and the blindness, of the crowd of Army and FBI "security" operatives who dogged Oppenheimer and the whole Manhattan Project from the beginning. To a man (no women are mentioned) they were obsessed with the pre-war leftist politics of many of the scientists, which they found *highly* suspicious and probably indicative of disloyalty. But while these agents were hounding leftists and "premature anti-fascists" (as supporters of the Spanish Republic were called) at Los Alamos and elsewhere and finding little or nothing, real spies were sending real scientific information to the USSR under their noses, apparently unsuspected. If the "security" people, especially Lt. Col. Boris Pash of Army Counter–Intelligence, had been given free rein, Oppenheimer and many others (but not the actual spies!) would have been banished from the Project and the "Trinity" test, as well as the bombings of Hiroshima and Nagasaki, might never have happened.

Pash was a remarkable figure. Born in 1900 in the U.S. but of Russian parentage, he fought with the White (counterrevolutionary) forces in the 1918–1920 Soviet civil war and remained a fanatical anti-Communist. Unable to have Oppenheimer removed from his leadership role, he focused special attention on four of his students whom in 1943 he wanted to kidnap, torture for information and then murder. The FBI dissuaded him from this activity, but he was able to have all four excluded from the bomb project even though Oppenheimer and Lawrence wanted some of them, at least, at Los Alamos.

I wonder if these men, especially Pash, ever came to understand what they had almost done. As it was, "security" hampered the project and undoubtedly slowed it down, but did not stop it. Too bad it didn't, in my opinion, but that was presumably not their purpose.

General Groves offered an interesting contradiction. On one hand, he astutely insisted that Oppenheimer must be the director at Los Alamos, and overruled Pash and others in demanding that Oppie receive his security clearance in spite of his leftwing past; in this Groves had the support of Lt. Col. John Lansdale, his security aide for the Manhattan Project and a much more realistic analyst than Pash. On the other hand, Groves wanted to enforce a policy of extreme compartmentalization, with each person knowing only his or her

own job and as little as possible about the project as a whole. Had he succeeded in this, the bomb's completion would again have been delayed. Oppenheimer and others fought back hard, insisting that science couldn't be done that way. They were partly successful and achieved considerable openness, at least within Los Alamos itself.

My second, and much more positive, revelation was learning about the remarkable foresight and integrity of two men who saw beyond the (as it turned out) false urgency and genuine fascination of making the bomb. I am thinking of physicists Isidor Rabi and Joseph Rotblat. Certainly there were others – Leo Szilard, and, at Los Alamos, Robert Wilson, come first to my mind – but these two especially impressed me.

For many years I have pondered the moral and political questions that followed in the wake of the Manhattan Project. Should the bombs have been dropped on Japanese cities? Was it correct to develop the hydrogen fusion bomb – Edward Teller's "Super"? Could the nuclear arms race with the USSR have been avoided, or at least moderated? Looking much further ahead, couldn't negotiations have avoided the deployment of destabilizing MIRVed missiles? For all these questions, different – and, I believe, better – answers than the ones actually adopted were certainly possible. Moreover, in each case there were knowledge-able people making forceful arguments for a different policy *at the time*. Without any benefit of hindsight, they worked for an approach that would diminish, instead of raising, the U.S. dependence on and investment in nuclear weapons. It was conceivable each time that another course might have been followed.

The one exception, and it's an enormous one, came at the very beginning. Knowing by around 1940 that a nuclear fission bomb might be possible, and aware that the same knowledge was certainly present in Germany, should the Western Allies, the U.S. and Great Britain in particular, have undertaken to actually make the weapon first? I think a strong case can be made, *with hindsight*, that it would have been better if we had not done so. But only with hindsight! I don't see how that decision could have been justified in 1940 or 41 – and neither did Einstein or Szilard, or any well-informed Western physicist as far as I know. At that time it seemed likely that Germany had a nuclear program well under way, a truly frightening possibility. Einstein in particular, because of his knowledge of Hitler's Germany and the nightmare image of a world in which that nation had an atomic monopoly, reversed the pacifism of a lifetime to encourage the U.S. government to take its first steps toward the bomb. If the Allies had nuclear weapons also, then perhaps they would never be used. Who could choose to do otherwise?

Isidor Rabi probably came as close as anyone to making that choice.

Rabi was strongly anti-Nazi, and had plunged eagerly into war work at the MIT "Radiation Laboratory." That name might suggest nuclear physics, but in fact the "Rad Lab" was devoted to developing radar, in many forms. Perhaps Rabi's main reason in refusing Oppenheimer's offer to make him associate director at Los Alamos was that he wanted to help defeat Germany. "I thought it over, and turned him down. I said, 'I'm very serious about this war. We could lose it with insufficient radar.' "[3]

The radar work was vital to the war actually being fought; the Manhattan project seemed a long shot at best. Oppenheimer's attempts, partially successful, to recruit Rad Lab physicists

for the bomb project must to some extent have lengthened the war against Nazi Germany. Robert Bacher was one of those who agreed to move, but earlier he had commented that many at the Lab thought it was crazy "to take people off radar and put them on this fool's project out there." Again with hindsight, that was absolutely correct – and Rabi saw it at the time. He visited Los Alamos and did some consulting there, but kept up his vital work at the MIT lab where he was associate director under Lee DuBridge. Radar was essential to winning the war; the atomic bomb was not.

Rabi had other reasons to refuse the move to Los Alamos. His wife did not want to go and they thought it would be bad for their children. Moreover, Rabi did not like the idea of using an atomic bomb: "I was *strongly* opposed to bombing ever since 1933 when I saw those pictures of the Japanese bombing that suburb of Shanghai. You drop a bomb and it falls on the just and the unjust..."[4] Radar systems developed at the Rad Lab were effective against enemy aircraft and U-boats, but Rabi acknowledged that his radar work also contributed to bombing German cities. His opposition to bombing was not consistent: "I didn't mind so much bombing Germans because they were Nazis." (Well, some of them were.) Rabi also accepted the atomic bombings of Hiroshima and Nagasaki as helping to end the war quickly, but he knew that Japan had been defeated without them. He saw all along that it was radar and not the bomb that would play an essential role, and he acted on that belief.

In 1944 Rabi received the physics Nobel Prize for scientific work he had done before the war.

Next, Joseph Rotblat.

Like many, if not most, of the senior scientists working on the atomic bomb project, Rotblat believed the bomb should be built by the Allies to ensure that such weapons would *not* be used. If the Nazis obtained the weapon, perhaps the Western allies could deter its use if they were able to threaten retaliation. There was no other justification for the project, but that was enough. On this basis Rotblat resolved the strong moral dilemma with which he'd struggled and decided that it was necessary to go ahead.

Rotblat moved from his native Poland to England shortly before the German invasion, with a fellowship for research in physics. He subsequently took part in the exploratory nuclear program there, and then, as part of the British scientific delegation, joined the Manhattan Project itself. Rotblat arrived at the Los Alamos laboratory around the beginning of 1944. "As soon as I came to Los Alamos," Rotblat told an interviewer many years later, "I realized that my fear about the Germans making the bomb was ungrounded, because I could see the enormous effort which was required by the Americans... everything that you wanted was put into the effort. Even so, I could see that it was still far away... [I saw that] Hitler was going to be defeated... and that Hitler wouldn't have [the bomb] in any case." Toward the end of 1944, U.S. intelligence learned for certain through the ALSOS project that there was no chance of a German atomic bomb.[5] The ALSOS findings were not shared with the Los Alamos scientists, but the conclusion became generally understood. Rotblat then "decided that my presence there was no longer justified, and I resigned and went back to England." He was the only scientist to leave the project on moral grounds.

Robert Wilson shared Rotblat's initial misgivings, but he too decided it was necessary for the Allies to have the bomb first, in order to deter Germany's use of nuclear weapons. A relatively young man with a Quaker, pacifist background, by 1944 Wilson was head of the experimental physics division at Los Alamos. He was one of many who worried about the bomb's meaning for society, and took the lead in organizing formal discussions about "The impact of the gadget on civilization," as one such meeting was called. Oppenheimer himself attended most of these meetings, and argued with his customary eloquence that the bomb project should continue even when Germany was defeated. His main argument was that the bomb had to be used publically, since the world needed to know of its terrible danger in order to find ways to counter it. Wilson allowed himself to be persuaded, and went on working at Los Alamos. He says he often argued with Oppenheimer, insisting that the bomb should be demonstrated in an uninhabited area rather than dropped on cities, and he was intensely depressed by the news of Hiroshima.[6]

Reflecting years later, Wilson was far from certain that he had done the right thing by continuing. "Nobody slowed up a bit after VE day," he recalled. "In terms of all I believed in," he said, "I'd like to have stopped. I can't understand why I didn't." But "it was not in the air."[7]

Wilson said he didn't know anyone who did stop work; he was unaware that Joseph Rotblat had done just that. Twenty-five years later Wilson was even more explicit. In a commemoration of the Trinity test, he wrote "I have often wondered why it was that the defeat of Germany in 1945 did not cause me to reexamine my involvement with the war and with nuclear bombs in particular. The thought never occurred o me. Nor, to my knowledge, did any of my friends raise any such question on that occasion. Surely, it seems that among those hundreds of scientists at Los Alamos, it might have been expected that at least one would have left. I regret now that I did not do so."[8] Of course one – exactly – did leave.

At least in 1945, it was not surprising that Wilson didn't know about Rotblat's principled departure from the bomb project. One did not simply walk away from Los Alamos in those years, and Rotblat had to apply for permission to leave. When he did that, he discovered that "security" had fabricated an elaborate fiction casting him as a spy planning to defect to the USSR! His spy dossier contained a molehill of fact: Rotblat had made a number of unreported visits to a woman friend in Santa Fe. To this apparently highly suspicious behavior a number of pure fabrications were added, including meetings that never took place and invented plans to parachute into his native Poland carrying secrets of the work on the bomb. Again, while the security agents were elaborating this fantasy they had no clues about the real espionage taking place at Los Alamos and elsewhere.[9]

Fortunately Rotblat was able to document the falsity of their scenario, proving that he could not have been at the made-up meetings while "confessing" to the totally innocent visits with his friend. He was then allowed to leave – but only on condition that he conceal the true reason and say his departure was due to purely personal (family) concerns. Perhaps he was lucky they let him go at all! As a final gratuitous injury, a crate with old scientific notes, books, and other personal possessions was stolen from the Washington, D.C. to New York train on which he was traveling, presumably by government agents. Rotblat also had to promise to have no further contact with his ex-colleagues after leaving Los Alamos on December 8, 1944, and so eight months later the news of Hiroshima's destruction came to him as a bitter surprise.

The moral dilemma posed by the bomb was in one sense even starker than Rotblat and Wilson had at first realized. While they and other scientists began working on the project motivated by the fear of a German atomic bomb and believing the project's purpose was deterrence only, that was not at all the case for the military and political leaders who would, in the end, make the vital decisions about its use. One indication: physicist Samuel Goudsmit was the scientific leader of ALSOS. In his memoir of the mission, Goudsmit wrote, "It was not until some time after [the capture of] Strasbourg that the full significance of our discovery dawned on me." Talking with the "mysterious major," a representative of General Leslie Groves assigned to closely accompany him during the mission, he remarked "Isn't it wonderful that the Germans have no atom bomb? Now we won't have to use ours." The major's answer took him by surprise. "Of course you understand, Sam," he said, "if we have such a weapon, we are going to use it." That took place early in 1945.[10]

In late 1944 Joseph Rotblat didn't know about Goudsmit's mission, but he had already received a different ominous lesson, this one from General Groves himself: "At a private dinner, when I was at Los Alamos in March 1944, [Groves] said at that time to us, 'You realize, of course, that the whole purpose of the Project is to subdue the Russians.' And I remember the words to this day, because of the great shock which this gave me."[11]

Events proved the "mysterious major" right, and arguably Groves as well. Many of the Manhattan Project scientists, including some of the most distinguished – but not J. Robert Oppenheimer – tried hard to prevent the use of the bombs on Japanese cities. In the end the opposing scientists' opinions had no influence on the decision to go ahead. Much has been written about the reasons for using the bomb on the defeated Japanese, but Groves' comment was in line with the thinking of President Truman's Secretary of State James Byrnes and undoubtedly played some part in the decision. In any case, the atomic bomb did not actually figure in winning the war against the Axis, although it became a major factor in the Cold War that was to follow.

After the war:

In 1949 the General Advisory Committee (GAC) of the Atomic Energy Commission (AEC) was asked for its advice on trying to make the "super" (hydrogen fusion) bomb. Many leading Manhattan scientists including **Isador Rabi** were members of the GAC, which was chaired by Oppenheimer. After serious debate the committee unanimously recommended against a crash program for the super, concluding that an all-out effort would be wrong "at the present moment." In an addendum starting "We believe a super bomb should never be produced" seven members of the GAC – all except Isador Rabi and Enrico Fermi – were clearer about their opposition, arguing that even if "the Russians" developed and used such a weapon, "our large stock of atomic bombs" would be sufficient for reprisals.

In their own addendum, Rabi and Fermi were even stronger in their rejection of the super bomb, calling its effect "almost one of genocide" and concluding "It is necessarily an evil thing considered in any light." They added an important dimension by calling on the U.S. President to tell the world the United States believes developing such a weapon is "wrong on fundamental ethical principles" and to invite all nations "to join us in a solemn pledge not to proceed" in its development. They pointed out that even without "control machinery" any tests of a super bomb could be detected, and added, agreeing with the GAC majority, that

our stockpile of atomic [fission] bombs would be enough for military retaliation against "another power" using a "super." Rabi later commented that he and Fermi thought a world conference should have been called in an attempt to stop research on thermonuclear weapons.[12] Once again, the path not taken.

The considered advice of the GAC was rejected, and U.S. work on developing and testing hydrogen weapons went forward. Predictably, the Soviet Union followed suit.

Part V of *American Prometheus* recounts the disgraceful 1954 hearing, in reality a kangaroo court, in which Oppenheimer appealed the revocation of his security clearance. The accusations against him mostly rehashed old issues including his prewar leftism and some foolish interactions with security personnel, but they included one new item, his lack of enthusiasm for the hydrogen bomb; this may have been the most important charge. Along with many other leading scientists Isador Rabi appeared as a witness for Oppenheimer, and once again he got it right, showing both common sense and decency. Naturally Rabi defended the GAC's conclusions about the super, but he also spoke as a character witness. Here is some of his testimony:

> The suspension of the clearance of Dr. Oppenheimer was a very unfortunate thing and should not have been done. In other words, there he was; he is a consultant, and if you don't want to consult the guy, you don't consult him, period... So it didn't seem to me the sort of thing that called for this kind of proceeding... against a man who has accomplished what Dr. Oppenheimer has accomplished. There is a real positive record... we have the A-bomb and a whole series of [deleted], what more do you want, mermaids? This is just a tremendous achievement. If at the end of that road is this kind of hearing, which can't help but be humiliating, I thought it was a pretty bad show. I still think so.

A number of Oppenheimer's friends and colleagues had given him the sound advice to have nothing to do with the rigged hearings. Among them was Albert Einstein, whose opinion was clear: "The problem was simple. All Oppenheimer needed to do was go to Washington, tell the officials that they were fools, and then go home." Even after initially deciding to take part in the hope of restoring his clearance and his credibility as a government advisor, Oppenheimer probably should have walked out when he and his attorney saw how outrageously the proceedings were stacked against him; Joe Volpe, the former general counsel of the A.E.C., advised him to do just that. But he stayed, and the hearings did him great harm in almost every respect.

Because of the biased nature of the hearing and the "hysteria of the times,"[13] the denial of Oppenheimer's appeal was inevitable. The only surprise was that one member of the board dissented; the vote was 2 to 1 against him.

Robert Wilson had a distinguished career in physics, and in 1967 became the first director of the proposed National Accelerator Laboratory, later named Fermilab. Called upon to justify the multimillion-dollar budget at Congressional hearings, Wilson's testimony is worth remembering. Perhaps remarkably, he stated clearly that the lab had nothing to do with "national security." Instead, he said,

> It has only to do with the respect with which we regard one another, the dignity of men, our love of culture. It has to do with: Are we good painters, good sculptors, great poets? I mean all the things we really venerate in our country and are patriotic about. It has nothing to do directly with defending our country except to make it worth defending.[14]

Finally, **Joseph Rotblat** had an extraordinary post-WWII career.[15] He returned to England after leaving Los Alamos, and in 1950 became a professor of physics at London University, the position he held until becoming emeritus professor in 1976. He did no further work on any sort of weapons, switching his research area to applications of nuclear physics in medicine.

But from the beginning in 1946, Rotblat had another career: working for peace. He joined other British physicists in organizing the British Atomic Scientists Association whose purpose was public education and rational discussion of nuclear-related issues, comparable to the Federation of Atomic Scientists in the U.S. He helped found the Campaign for Nuclear Disarmament in 1958. And he was instrumental in launching the Einstein-Russell Manifesto in 1955, signed by Einstein shortly before his death as well as by nine other leading scientists (not including Oppenheimer). The Manifesto begins:

> In the tragic situation which confronts humanity, we feel that scientists should assemble in conference to appraise the perils that have arisen as a result of the development of weapons of mass destruction, and to discuss a resolution in the spirit of the appended draft.

Undoubtedly Rotblat's greatest contribution was the Pugwash movement, which he co-founded with Bertrand Russell and with the support of Canadian industrialist Cyrus Eaton. It began in 1957 with an international conference held in Pugwash, Nova Scotia[16] attended by scientists from both sides of the divided world. (Oppenheimer was invited to take part but did not accept.) That initial meeting was followed by annual conferences until the present time. The purpose of the movement, known formally as The Pugwash Conferences on Science and World Affairs, was to seek the peaceful resolution of conflicts through dialogue and mutual understanding, its "main objective" being "the elimination of all weapons of mass destruction (nuclear, chemical and biological) and of war as a social institution to settle international disputes." The conferences were attended by scientists from many countries, very much including the USSR, and surely contributed to the arms-control measures and the uneasy peace between the superpowers which lasted until the end of the Cold War period.

In 1995 Joseph Rotblat, together with the Pugwash Conferences, was awarded the Nobel Peace Prize. His Nobel lecture includes these words, quoting the Manifesto of 1955:

> What we are advocating in Pugwash, a war-free world, will be seen by many as a Utopian dream. It is not Utopian. There already exist in the world large regions... within which war is inconceivable. What is needed is to extend these to cover the world's major powers.

In any case, we have no choice. The alternative is unacceptable. Let me quote the last passage of the Russell-Einstein Manifesto:

We appeal, as human beings, to human beings: Remember your humanity and forget the rest. If you can do so, the way lies open for a new paradise; if you cannot, there lies before you the risk of universal death.

And Rotblat concluded by repeating that theme: Above all, remember your humanity.

Notes:

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[1] New York: Alfred A. Knopf, 2005.

[2] "The Day After Trinity: J. Robert Oppenheimer & the atomic bomb," a film by Jon Else, 1980.

[3] Richard Rhodes, *The Making of the Atomic Bomb* [New York: Simon & Schuster, 1986], page 452, quoted in B&S on page 212.

[4] John S. Rigden, *Rabi: Scientist and Citizen* [New York, Basic Books, 1987], page 152.

[5] ALSOS was a scientific/military group that closely followed the Allied invasion of Europe in order to learn the state of German nuclear research and their progress, if any, toward an atomic bomb.

[6] Interviewed in "The Day After Trinity."

[7] Ibid.

[8] "The Conscience of a Physicist," *Bulletin of the Atomic Scientists XXII,* no. 6, June 1070, pp 30–34. The issue is devoted to reflections written for the 25th anniversary of the Trinity test.

[9] Ironically, this story is told in a book about real spies: Joseph Albright and Marcia Kunstel, *Bombshell: The Secret Story of America's Unknown Atomic Spy Conspiracy*, [New York: Times Books, 1997], pages 100-103.

[10] Samuel Goudsmit, *ALSOS* [Los Angeles/San Francisco, Tomash, 1983], page 76. Goudsmit never identifies the "mysterious major" in his book; he was a Groves intelligence aide named Robert Furman.

[11] Interview with Joseph Rotblat, on the web

[12] *Rabi: Scientist and Citizen,* pp 204–207.

[13] Words of Col. John Lansdale, who testified for Oppenheimer at the hearings and was firmly convinced of his loyalty.

[14] Robert R. Wilson, testimony to the Joint Committee on Atomic Energy, U.S. Congress, April 17, 1969.

[15] See Andrew Brown, *Keeper of the Nuclear Conscience: The Life and Work of Joseph Rotblat* [Oxford University Press, 2012].

[16] Eaton was born in the town of Pugwash, and so chose it for that first meeting.