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Don't let that crybaby in here again

Steven Shapin

- *In the Shadow of the Bomb: Oppenheimer, Bethe and the Moral Responsibility of the Scientist* by S.S. Schweber
- *Atomic Fragments: A Daughter's Questions* by Mary Palevsky

The rhetorical yield from the first atomic explosion was low – only one entry for the *Oxford Dictionary of Quotations*. When the plutonium bomb exploded on the Jornada del Muerto near Alamogordo, New Mexico, on 16 July 1945, Robert Oppenheimer, the Scientific Director of Los Alamos, remembered the line from the *Bhagavad Gita* where Vishnu says: 'Now I am become Death, the destroyer of worlds.' One other remark deserves to be immortalised, which Oppenheimer himself later judged the best thing said at the time. When the blast subsided, the physicist Kenneth Bainbridge, in charge of the test, turned to Oppenheimer and declared: 'Now we're all sons of bitches.'

In general, however, the test was a rhetorical dud. After the physicist Samuel Allison had counted off 'two, one, zero, NOW,' a general standing by commented: 'What a wonderful thing that you could count backwards at a time like this!' Allison recalled saying to himself: 'Still alive, no atmospheric ignition.' The chemist George Kistiakowsky rushed up to Oppenheimer to remind him of a bet they'd struck on the outcome: 'Oppie, you owe me ten dollars.' General Leslie Groves, the overall Director of the Manhattan Project, immediately appreciated the military significance of what he'd just seen: 'The bang must certainly have been a pretty big one . . . The war's over.'

For the most part, if the scientists and engineers said anything comprehensible when the bomb went off, it was in the golly, gosh, wow vein. Some were too busy making calculations of explosive yield

to say much; others were gobsmacked at the colour, light and sound. The physicist Ed McMillan later wrote that 'the immediate reaction of the watchers was one of awe rather than excitement. After some minutes of silence, a few people made remarks like: "Well, it worked."' Indeed, Oppenheimer's brother Frank thought that's what Robert actually said as soon as the atomic thunder permitted intelligible speech: 'It worked.'

That sounds about right: the scientists and engineers had spent over two years trying to make an atomic bomb that worked and the test was all about seeing whether they'd managed it. With the benefit of hindsight, one expects floods of anguished reflection on the consequences of what they had done, but it wasn't like that for most of them. The moral and political reflections came later, if they came at all. Oppenheimer agonised publicly more than anyone else: the physicists, he famously confessed, 'have known sin; and this is a knowledge they cannot lose'. Against some opposition from his scientific colleagues, he had insisted that the bomb be used on a Japanese civilian target, but, several months after Hiroshima and Nagasaki, he said to President Truman: 'I feel we have blood on our hands.' 'Never mind,' Truman replied, 'it'll all come out in the wash,' whereupon the President instructed his lieutenants: 'Don't let that crybaby in here again.' Oppenheimer's agonising continued to the end of his life, and some of it focused on the question of why there had been so little agonising at the time. 'When you see something that is technically sweet, you go ahead and do it and you argue about what to do about it only after you have had your technical success,' he admitted in 1954. 'That's the way it was with the atomic bomb.'

Silvan Schweber and Mary Palevsky each worry about the gap between moral ideals and moral realities among the scientists who brought the Atomic Age into being and who lived with its postwar consequences. Both are moralists and both have personal reasons for their inquiries. Schweber is a physicist-turned-historian of science who studied in the 1950s at Cornell with Hans Bethe, the Director of the Theoretical Division at wartime Los Alamos. *In the Shadow of the Bomb* is a spin-off from a larger biography of his teacher in progress. It is an extended hymn of praise to Bethe's 'integrity' in handling

postwar entanglements between science and the military and McCarthy-era tensions surrounding science and politics, and it contrasts Bethe's exemplary conduct with Oppenheimer's moral ambiguity. Palevsky's father was a relatively low-level electrical engineer at Los Alamos, helping to build the trigger mechanism for the bomb. His subsequent misgivings about Hiroshima and weapons work formed part of his daughter's 'moral legacy'. *Atomic Fragments* is a loosely connected set of interviews with surviving Manhattan Project scientists, exploring their moral and political sensibilities, both at Los Alamos and afterwards. What did they think they were doing when they built the bomb and what did they subsequently think about it?

One immediate consequence of Hiroshima was the transformation of American atomic scientists, and especially the physicists, into courtiers of the State. The Manhattan Project had accustomed some of them to smooth passage through the corridors of power. When the war ended, the great majority could not wait to return to academic research, but for them nothing was ever going to be the same again. Two billion dollars had bought America the bomb, and America reckoned the money very well spent. The Los Alamos physicists had signed on to build a few atomic bombs, but the Government now wanted many of them, and Edward Teller began his public agitation for vast resources to construct the 'Super' – the hydrogen bomb. The Japanese had been defeated, but General Groves was reported as saying in March 1944 that the real purpose in building the bomb was to subdue the Soviets, and in 1954 he repeated that claim in public. The Cold War was a cash bonanza for American physicists, but, for some, it was also a moral and political dilemma.

Although Oppenheimer returned to his academic position within months of Hiroshima, his role as a leading government adviser on weapons research was just beginning. He sat on Pentagon committees and he became chairman of the General Advisory Committee (GAC) of the Atomic Energy Commission that recommended the course nuclear weapons research should take. And it is in part to that compromised insider's position that Schweber ascribes Oppenheimer's moral inferiority to Bethe. Security guards

were posted outside his office at the Princeton Institute for Advanced Study. When he received a phone call that concerned classified matters, visitors were required to leave the room. It was a display of power and privilege that Oppenheimer was widely seen to enjoy – as long as it lasted. By contrast, Bethe's engagement with Government weapons work was oblique and intermittent. Unlike his Los Alamos superior, he maintained his commitment to original research, and, that, as Schweber says (four times), provided Bethe with 'the anchor of his integrity'.

In spite of Schweber's clear preference for Bethe over Oppenheimer, the moral differences are more plausibly seen as adjacent shades of grey. Oppenheimer's GAC opposed a crash programme to develop the H-bomb – though not the bomb itself – and it was partly because of this opposition that the aptly named Gray Board was convened in 1954 to withdraw his security clearance. After Truman's 1950 decision to go ahead with the crash programme, regulations had prevented Oppenheimer from speaking publicly on the subject, a silence that later caused him 'profound anguish': 'What are we to make of a civilisation which has always regarded ethics as an essential part of human life [and] which has not been able to talk about killing almost everybody, except in prudential and game-theoretic terms?'

Bethe, who was then only a consultant at Los Alamos, could and did say what he believed: 'The bomb is no longer a weapon of war but a means of extermination of whole populations. Its use would be a betrayal of all standards of morality and of Christian civilisation itself.' It would, he said, be a 'terrible error' to make a fusion weapon. However, he was able to overcome his scruples to the extent of working intensively on developing this same weapon, rationalising his position by arguing that if such weapons were indeed feasible, the Soviets, too, would have them. The balance of terror needed to be preserved. Wartime weapons work was, in Bethe's view, morally quite different from peacetime work, and the outbreak of the Korean War helped him to change his mind. It was a business he undertook, he says, hoping the thing would not be technically possible – a claim that his fellow Manhattan Project physicist Herbert York now finds

'somewhat naive'. In any case, 'if I didn't work on the bomb somebody else would,' and – a recurrent sentiment among morally sensitive atomic scientists – 'If I were around Los Alamos I might still be a force for disarmament.' This rationalisation, Bethe wrote years later, 'seemed quite logical', but 'sometimes', he conceded, 'I wish I were more consistent an idealist . . . I still have the feeling I have done the wrong thing. But I have done it.'

Similarly, despite Schweber's attempt to put the very best face on Bethe's response to McCarthyite attacks on left-wing, internationalist and pacifist academics, no scientist who had the weight to counter these attacks comes out of the episode with their reputation untarnished. Oppenheimer, evidently seeking to save his own skin, denounced his own graduate students, dismaying some of his former Los Alamos colleagues, including Bethe. When Bethe himself was put to the test by an assault on his Cornell colleague, Philip Morrison, he sprang to Morrison's defence, though it was perhaps less daunting for Bethe to stand up to a university committee of inquiry than it was for Oppenheimer to face down the rampaging House Committee on Un-American Activities. And, while Bethe's defence of his colleague was both spirited and effective, it was not unalloyed. He told Cornell's acting president that he had been 'annoyed' by Morrison's 'charitable attitude' to disarmament measures favoured by the Soviet Union and agreed with the university administration that restraints be placed on his political utterances.

Another consequence of Hiroshima was that some of the Manhattan Project scientists became public moralists, with all the strains this put on their role as courtiers of the Atomic State. The motives for their moralising were both personal and technical. First, they felt that they possessed unique knowledge about the weapons they had created, what these weapons could do, what was likely to come next and what effects they would have on both political structures and military strategies. Fearing that their political masters, and the public, understood the new realities badly or not at all, some scientists took it on themselves to moralise not just about what to do in a world of nuclear weapons but about the nature of moral action in such a world. Secondly, they had brought these terrible weapons into being,

and, while some were not wracked by crises of conscience, others were. They wanted to say in public why they had done it, and why it was the right, or at least an excusable, thing to do.

Believing, as many at Los Alamos did, that the bomb had been constructed to save Western civilisation and Enlightenment values from the Nazis, Oppenheimer struggled to come to terms with the threats to those same values posed by a triumphant science itself. Born into a scientific generation sharing a faith that (as Schweber writes) 'scientific knowledge is good and apolitical, that it should be open and shared, and that it will lead to progress', the scientists had helped to make a world which shook their own faith.

Oppenheimer's moralising took a more philosophical turn than that of any of the others. He worried about the consequences for an open society of what science had created: 'The atomic bomb, born of a way of life, fostered throughout the centuries, in which the role of coercion was perhaps reduced more completely than in any other human activity, and which owed its whole success and its very existence to the possibility of open discussion and free inquiry, appeared in a strange paradox, at once a secret, and an unparalleled instrument of coercion.' And he worried about the social consequences of a misplaced faith in the scope and certainty of scientific knowledge: 'Perhaps only a malignant end can follow the systematic belief that all communities are one community; that all truth is one truth; that all experience is compatible with all other; that total knowledge is possible.' Oppenheimer warned the public against craven acceptance of what scientists delivered in domains outside their expertise: 'Science is not all of the life of reason; it is a part of it . . . The study of physics, and I think my colleagues in the other sciences will let me speak for them, too, does not make philosopher-kings. It has not, until now, made kings. It almost never makes fit philosophers.'

The Manhattan Project scientists are dying off. The youngest survivors are well into their eighties: Bethe is 94. They have been hauled over the moral coals many times, and they're not about to be taken by surprise now. Palevsky's approach is earnest and deferential. She doesn't succeed in getting the scientists she interviewed to say

much they haven't said many times before. In his first interview, Bethe had prepared two handwritten sheets of paper, listing the main arguments he wanted to make and the order in which he wanted to make them. He cared about the judgment of history and was well prepared to help write it. Yet, for all the *Sophie's World* naivety and breathlessness of Palevsky's engagement with her interviewees, *Atomic Fragments* succeeds (better than Schweber's more professional and intellectually ambitious book) in recovering the shape and texture of a live moral dilemma, with all its ambiguities and incoherences.

Palevsky asks the atomic scientists why they built this terrible weapon and how they felt about its use on Japanese cities. For every ethical objection she raises, most of her subjects point to equally cherished principles that approved their actions or pragmatic constraints that explained them. She never changes her mind but, by the end of the book, is left without any clear and coherent principles to justify her conviction that the thing was wrong.

Why did you agree to join the Manhattan Project? A Nazi bomb would have meant the destruction of all open and tolerant societies; the original idea was not to use the bomb, but to prevent the Germans from using theirs. Why did you not stop when it became clear by the end of 1944 that there was no Nazi bomb? The promised United Nations – the object of so much hope for an enduring peace – needed to know that such a weapon existed and what its terrors were. When, after the original test, the saintly Niels Bohr asked, 'Was it big enough?', that's what he meant. Why did so many of you approve Hiroshima? The demonstration-use, proposed by the dissident Franck Report of June 1945, might fizzle, with disastrous results for the Pacific war; even if such a test succeeded, Hirohito might not be told of it; the atomic bombing of live targets could alone establish adequate grounds for unconditional surrender; the cost in Japanese and Allied casualties would be much higher if the bomb was not used; and, for some, Soviet involvement in the Japanese war had to be cut short and the Communists shown the extent of American power. Why did you not express more vigorously whatever qualms you felt about how the bomb might be used? It was not our place to do so. Scientists

are responsible for conducting inquiry, not for how the results of their inquiry are used. In a democratic society, following orders is legitimate and virtuous: by what right would scientists presume to dictate to their democratically elected masters? Even if it's harder to resist Hitler's commands than Roosevelt's, comparisons with 'following orders' in authoritarian regimes are odious.

Not all the scientists believed all those things, but most professed a fervent belief in some of them. Among the physicists, only the Englishman Joseph Rotblat left Los Alamos when the failure of the German nuclear programme became clear, later writing: 'I saw the destruction of Hiroshima as a wanton, barbaric act, and it made me very angry.' The experimental physicist Robert Wilson came to regret that he hadn't followed Rotblat, but few others said they felt anything like the same. Several subsequently swore off weapons work – among them, Wilson, Rotblat, Morrison and Victor Weisskopf – but most continued to be happily watered by the torrents of dollars that so fundamentally transformed the nature of physics research in the postwar decades.

In the main, the atomic scientists saw no need to apologise. York – who has spent much of his postwar career working for nuclear disarmament – plausibly complains about the condescension of hindsight history: 'The first thing you knew about World War Two is how it came out. And that's the last thing I knew about World War Two . . . The first thing you knew about the atomic bomb is that we used it to kill a lot of people in Hiroshima. And that's the last thing I knew about the atomic bomb.' As you reconstruct the fog of uncertainty that shrouded wartime weapons research, so you find it harder to establish the grounds for blaming individuals who did that research, varying as they did in their motives, their influence and their knowledge. If you think that it would have been better had nuclear weapons not been developed and used, you will not find it easy credibly to point the finger of blame at any individual scientist or group of scientists.

Nevertheless, there's something else about the experience of working on the Manhattan Project that is as disturbing as it is understandable and even attractive. For many of the scientists, it was the most

enormous fun. They said so themselves and they said it repeatedly. Bethe wrote that, for all of its scientific inhabitants, Los Alamos 'was really the great time of their lives'. The English physicist James Tuck called it 'a golden time'. All the great men were there; all happy to be in each other's company; all united in an urgent common cause that broke down the artificial disciplinary boundaries that existed in the academy. The problems were interesting; the funding was inexhaustible. They were, Teller announced, 'one big, happy family'. After Hiroshima, when Oppenheimer left Los Alamos to return to Berkeley, the scientific staff formally thanked him for the wonderful time they'd had: 'We drew much more satisfaction from our work than our consciences ought to have allowed us.' They were having so much fun that some regarded the fence around the place not as something that kept its inhabitants in, but as a barrier to stop others from joining them. It was that fun – that total absorption in the elaborately funded 'technically sweet' – which kept potential moral reflectiveness in check.

For the most élite scientists there were also the seductions and pleasures of power. The physicist Isidor Rabi marked the change in his friend Oppenheimer after the first test: 'His walk was like *High Noon* – I think it's the best I could describe it – this kind of strut. He'd done it.' It was a power which could not only coexist with moral anguish, but was fed and displayed by it. The mathematician Stanislaw Ulam wrote that Oppenheimer 'perhaps . . . exaggerated his role when he saw himself as "Prince of Darkness, the destroyer of Universes". Johnny von Neumann used to say: "Some people profess guilt to claim credit for the sin."' But the real guilt did not concern the deed itself. The guilt – such as it was – came from the keen pleasure felt in committing it.

Steven Shapin teaches at Harvard and has written several books on the history of early modern science. His next will be *The Life of Science: A Moral History of a Late Modern Vocation*.

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