

BOOK REVIEWS

Nuclear Reactions. By Adam Ganz. A 45-minute radio drama based on the Farm Hall Transcripts. Performed on the BBC Radio Afternoon Theater 15 June 2010. Producer Eoin O. Callaghan. © Adam Ganz. The play may be streamed or downloaded from the URL* <http://www.rhul.ac.uk/mediaarts/news/nuclearreactions.aspx>

Well before the end of World War II, one of our lecturers at University College, London, was teaching us about nuclear chemistry and mentioned nuclear fission, a fact that had been discovered by Otto Hahn and Lise Meitner in Germany in 1939 but was quickly hushed up once war had been declared. It became clear that the fission produced more neutrons than the number needed to cause it, and that therefore a chain reaction could be started which also would produce a significant amount of energy. If, the lecturer commented, such a system could be incorporated in a bomb, an explosive of vastly greater energy could be harnessed than anything known until then. At the moment he mentioned it, a powerful detonation caused by a mine went off at the end of the pier in Aberystwyth, Wales, a seaside resort to which UCL's chemistry department had been evacuated for the duration of the war.

In August 1945 nuclear bombs were dropped on Hiroshima and Nagasaki killing tens of thousands of Japanese civilians. President Harry Truman announced it to the world. I wandered the streets of London in a daze, wondering if I wanted to spend the rest of my life pursuing a discipline that could be used to cause such vast suffering.

We soon learned that the American “Manhattan Project,” as it became known, had been initiated through a letter signed by Albert Einstein in 1939 and carried by his friends to President Roosevelt informing him of the likelihood that Nazi Germany was developing such a weapon and that it was imperative that the Allies create it first. *Nuclear Reactions* begins with a different document, one drafted by Otto Robert Frisch and Rudolf Peierls in England a few months later which calculated that the “critical mass” could be quite small and could be delivered by plane rather than having to be of the mammoth size assumed until then.

How close did Germany come to producing a nuclear weapon? Did some of its nuclear scientists try to slow down the effort? If Hitler had the bomb would he have used it—on London?

As World War II was ending, the Allies asked the Dutch-American physicist Samuel Goudsmit to head a search which has become known as Alsos (Hellenic for Grove, the name of the military head Leslie M. Grove of the Manhattan Project) for the key German scientists who might have been involved in the German nuclear project, in order to intern them. It is generally believed that one concern was to prevent them from falling into Soviet hands. At least ten were found and were taken to Farm Hall near Cambridge, England, where they were treated very well—and were bugged. British Intelligence officers listened to and recorded their conversations, among them the father of Adam Ganz, who last year created a BBC

radio play *Nuclear Reactions* which was aired on June 15, 2010. Ganz is a filmmaker on the faculty of Royal Holloway, University of London. His father, a philologist, was rounded up and put in a concentration camp after the 1938 Kristallnacht, but managed to flee Germany before the war started and after the war became a professor at Oxford and an authority on Jacob Grimm. During the war he was briefly interned by the British but then recruited for British Intelligence. Among the Farm Hall inhabitants, from July 1945 to January 1946, were Werner Heisenberg, Carl Friedrich von Weizsäcker, Otto Hahn, Walther Gerlach, Max von Laue, and Kurt Diebner. Most of the recorded conversations were in German. They were made public and translated but we do not know if other parts were withheld. Here is an excerpt:

Diebner: I wonder whether there are microphones installed here.

Heisenberg: Microphones installed? (*laughing*) Oh no, they're not as cute as all that. I don't think they know the real Gestapo methods; they're a bit old fashioned in that respect.

In the play the two secret listeners are of opposite sex, the woman a charming young person who says she had been a student in Göttingen before the war. In reality both listeners were male but it was suggested to Ganz that the change would make it easier to follow the conversations. At one point she asks if torture would be used but was told the British wouldn't resort to that, and they were confident sufficient information would be gained without. During their internment they were at times visited by British scientists, among them P. M. S. Blackett with whom some of them had had cordial relations before the war. One question they asked him was whether it was true that Faraday was confronted with the possible use of poison gases such as chlorine as a weapon of war.

Von Weizsäcker: Is it true what they say about Faraday and poison gas?

Blackett: Yes it's absolutely true. He was asked if it would be possible to develop poison gas for the British in the Crimean War. He said it was perfectly possible, but he was damned if he was going to do it. He meant it literally of course; he wasn't the type to swear. Very religious man.

The play begins in the plane carrying the internees to England and there already the worry about their personal future (whether they would be considered war criminals) and the future of Germany (whether agrarian or allowed to re-industrialize) surfaces.

The play records the BBC announcement of the dropping of the Hiroshima bomb on 6 August 1945,

an event that caused considerable surprise among the Germans. They had not expected it for several years and found it hard to fathom that the Allies had mobilized 180,000 individuals for the bomb's development. They decided that Hitler would never have agreed to a project of such magnitude when success was by no means certain and he was looking for quick results. In retrospect it is almost amusing to think that President Roosevelt agreed to launch the Manhattan Project because he was convinced by Einstein and others of the imminence of a German nuclear weapon.

In November 1945, The Swedish Academy announced the award of the 1944 chemistry Nobel Prize to Otto Hahn. Not knowing his whereabouts they could not congratulate him. He learned about it from the announcement in the British press. His fellow Farm Hall inmates, as can be heard in the play, celebrated the occasion with speeches, toasts, and song, and he was encouraged to write to the Academy that he accepted the award but could not attend the festivities. He received the award from the Swedish King in 1946. Lise Meitner is mentioned. She worked with Hahn in Berlin on bombarding uranium with neutrons in the hope of creating transuranic elements but had to leave—first to Holland and then Sweden—because of her Austrian Jewish background. Hahn wrote to her that he had found barium in the experiment and she (together with Frisch) was the first correctly to interpret the result as due to fission, the splitting of the uranium atom behaving as a liquid drop. There has been much criticism that she did not share in the Nobel Prize—or receive her own.

Neither Hahn nor von Laue had anything to do with the Nazi atomic weapon project. Von Laue, who had received the physics Nobel Prize in 1914 for his work on X-ray diffraction by crystals, had made his anti-Nazi views known during the war but was left alone perhaps because of his fame. It is reported that the creation and use of the nuclear weapon depressed Hahn greatly. But it seems he recovered his sense of humor. He collected some cartoons relating to the nuclear announcement—both English and German—and Adam Ganz sent a copy of the set to this reviewer. Here are descriptions of five of them:

-The first shows two very disappointed little boys in a shop selling chemistry sets. Big sign: Sorry NO uranium.

-A mother to her little girl who just heard about the bomb on the radio: "It's a new kind of bomb, darling, for the benefit of mankind."

-Wife to her lazy husband lounging on the sofa: "Now if science could only find a way to split you and release your energy."

-The beginnings of nuclear splitting: Adam in the Garden of Eden trying to crack a coconut between two rocks.

-German nuclear scientist after Hiroshima: "I'd feel better if I had taken over dad's herring shop."

In January 1946 the Farm Hall residents were allowed to resume civilian life in Germany. Some of them later made major contributions to the rebuilding of German science and to its reintegration into the world scientific community.

This play no doubt will be of intense interest to those who remember that period and the news at the time of

the Farm Hall internments. Given the recent Japanese Fukushima-Daiichi triple catastrophe, the promise and hazards of nuclear energy have once again become of current interest, and I imagine that a presentation of some of the earliest beginnings of the human nuclear experiment will be widely welcomed.

Theodor Benfey, Benfeyo@bellsouth.net

* Should this prove difficult and you would like a CD mailed to you from London, please email MediaArts@rhul.ac.uk, with Nuclear Reactions CD in the heading; or write Department of Media Arts (Nuclear Reactions CD), Royal Holloway University of London TW20 0EX, UK. Be sure to send your mailing address including your country.

Radioactive: Marie & Pierre Curie, A Tale of Love and Fallout, Lauren Redniss, It Books (HarperCollins), New York, 2010, 208 pp, ISBN 978-0-06-135132-7, \$29.99.

Even before opening *Radioactive: Marie & Pierre Curie, A Tale of Love and Fallout* its title and cover tell you that you are about to engage with a unique text. The words Radioactive and Fallout viscerally evoke the dangers of the nuclear age that began, in part, with the Curies' discoveries, while metaphorically encapsulating the mystique and passion of the life that they had together. The cover art foretells the visual nature of the text to come—a luminescent, almost tactile, graphic biography.

Opening the book confirms the inklings of intrigue promised by the cover. From the red ghostliness of the flyleaf and the blue chemical wash of the title pages it becomes immediately apparent that Lauren Redniss has individually crafted each page to evocatively reiterate the book's "radioactive" themes; thematics that include the Curies' discovery of radioactive elements, their and their culture's fascination with these element's extraordinary properties, the curative and destructive nature of nuclear radiation, as well as the Curies' personal and professional loves and losses. Yet, even before reading any of the text, it calls out to be looked at—perused, like a beautiful coffee-table book. One particularly striking visual aspect

of the book is the use of cyanotype printing, a method some readers will be familiar with from grade-school projects using blue "sunlight" paper. As Redniss explains at the end of the book, using this chemical process has multiple resonances with the text's narrative. It captures "what Marie Curie called radium's spontaneous luminosity," mimics the "photographic imaging that was central to the discovery of X-rays and radioactivity," and, in its production of Prussian blue upon exposure of the paper to sunlight, yields a compound that is a "safe and effective treatment for internal contamination by radioactive cesium and radioactive thallium" (pg. 199).

The story of Marie Curie's life has been told many times before, so it is not the telling, but the way it is told that matters. Unlike Barbara Goldsmith's *Obsessive Genius*, which seeks to reveal the truth behind the myth of Madame Curie, Redniss revels in the imaginative space generated by Marie and Pierre's lives and work. Linking together science, spiritualism, desire and death, Redniss's history of the Curies is a book unlike any other that I have read; fragmentary, associative, and compressed, she creates a lyrically combusive whole. This is an artistic rendering of the Curie's lives and not a comprehensive biography. The narrative, although chronological, is held together in a loose web of information, quotes, images and asides that reinforce the visual and cultural power