

Introduction

The reason this topic was chosen is that the British role in the making of the atomic bomb has been undervalued in the literature. The science involved in making the bomb has also received far less attention than the politics and diplomacy involved in using the bomb. I have covered scientific aspects of the bomb's development, outlining significant contributions made by British scientists, especially James Chadwick who co-ordinated the group that travelled to America and made detailed technical reports. Security aspects of atomic secrets provide another avenue for research as it is obvious that the British government wished to cover up its mistakes in clearing several scientists to work on the project. Klaus Fuchs has been much discussed, and I have explored his impact on the British contribution as a whole, but the French scientists have received far less attention so I wished to outline the security services' suspicion of their activities, as well as the French scientists' achievements in the project. The atomic bomb is also highly relevant to today's world. With the problems of countries trying to acquire the bomb, despite international condemnation 'the bomb has arguably become the ultimate symbol of territorial sovereignty.'¹ The rise in terrorism, and North Korea's development of nuclear technology 'demonstrate that the nuclear has not receded as much as we would like to think.'² The Cold War period is being evaluated by historians and the birth of the Cold War came with the development of the atomic bomb, so Britain deserves due credit for her contribution to science.

¹ Thorpe, Charles (2004) 'Violence and the Scientific Vocation', *Theory, Culture and Society*, 21;59, p. 66

² Hughes, Jeff (2004) 'Deconstructing the bomb: recent perspectives on nuclear history', *British Journal of the History of Science*, 37 (4), p. 464

In tackling this question, the perception that is most controversial is the notion that Britain played little significant part in the Allied atomic programme. The secondary literature paints a picture of American dominance in ideas and production. The truth is that the development of the bomb put intellectuals to work for the service of the state on an unprecedented scale. As such, the United States can't lay sole claim to the invention. The bomb, as this thesis claims, was an international invention, but Britain played a hugely significant part in the process, not least due to the input from so many British universities in the early research. The size of America's financial input glossed over the efforts of the British team at Los Alamos, as well as the Canadians and the French scientists working in Montreal. The United States grabbed the headlines first because it was the country that dropped the bomb on Japan.

This thesis aims to challenge the perception of American dominance and inform the reader that the atomic bomb should not be labelled as 'made in the USA'. By using recently declassified material, including recollections of the important British scientists and politicians, it will be shown that Britain played a bigger role in the atomic project than the available literature gives credit for. This work does not claim to be novel in the material it covers but aims to provide a different interpretation of material already available about the atomic bomb. Recently declassified information has added to what is already known on the subject and Britain's involvement in the wartime nuclear programme.

There are a number of themes in the literature. The first important theme is the relationship between scientific progress and politics. Many politicians in Britain were hugely sceptical of unconventional weapons. An atom bomb was a unique concept and so highly technical that those in government, including Churchill, had no belief in it. Works like Andrew Pierre's

Nuclear Politics (1972)³ and Ronald Clark's *Tizard* (1965)⁴ discuss the problem of getting those in authority to understand the gravity of the situation, especially in an effort to acquire funding for early experiments, where cost was not unduly prohibitive. Henry Tizard⁵ believed the bomb to be unworkable due to the complicated principles of physics involved in its design.

The controversial theme is that the bomb should be labelled as American and that Britain played no important role in its development. There are accounts that gloss over British involvement such as *Dawn Over Zero* (1977)⁶ by William L. Laurence. This focuses on the American progress to the bomb and hardly mentions British involvement at all. Another example is James F. Byrnes⁷ account *Speaking Frankly* (1947).⁸ Byrnes argued the Manhattan Project was Roosevelt's own success that 'had been undertaken and carried out to a conclusion solely because of his vision and courage in the days when the effort seemed hopeless.'⁹ Byrnes briefly mentions Churchill's involvement but doesn't give any mention to the British scientists' role. According to *Atom Harvest* by Leonard Bertin, any Americans that are aware of British involvement in the bomb 'rate such contributions meagrely when striking a balance'¹⁰ between the American and British efforts. Perhaps the most overtly anti-British account is the one

³ Pierre, *A Nuclear Politics*, London, Oxford University Press, 1972

⁴ Clark, R. W *Tizard*, London, Methuen and Co, 1965

⁵ Henry Tizard was born in Kent. He studied chemistry at Magdalen College, Oxford. Tizard became assistant controller of experiments and research for the RAF. He returned to Oxford and became a Reader in Thermodynamics. He left to become assistant secretary for the Department of Scientific and Industrial Research. In the 1930s and 1940s, he became increasingly involved as an adviser to the British Government in the scientific aspects of air defence, especially radar.

⁶ Laurence, W.L *Dawn Over Zero*, Connecticut, Greenwood Press, 1977

⁷ James. F. Byrnes was an apprentice to a lawyer and pursued a legal career, becoming a member of the bar in 1903. He went into politics, becoming a member of the U. S House of Representatives from 1911-1925. During the Second World War, Byrnes was a confidant of Roosevelt and served as director of economic stabilization from 1942-1943 and director of war mobilization from 1943-1945. He was President Truman's Secretary of State from 1945-1947. He was an influential figure in American foreign policy. Byrnes later became Governor of South Carolina from 1951-1955.

⁸ Byrnes, J. F *Speaking Frankly*, New York and London, Harper and Brothers, 1947

⁹ Byrnes, J. F *Speaking Frankly*, London, Harper and Brothers Publishers, 1947, p. 259

¹⁰ Bertin, L *Atom Harvest*, London, Secker and Warburg, 1955, p. 20

written by Leslie Groves,¹¹ *Now It Can Be Told* (1963)¹² where British help was deemed unnecessary and unimportant to the completion of the project. Groves said ‘the contribution of the British was helpful but not vital. Their work at Los Alamos was of high quality but their numbers were too small to enable them to play a major role.’¹³ James B. Conant in *My Several Lives: Memoirs of a Social Inventor* (1970)¹⁴ argued that the development of the atomic bomb ‘might well be called the Bush-Groves project’¹⁵ and stated that he’d not had significant input on atomic discussions with the British, giving the credit for these discussions to Vannevar Bush.

There are few accounts that tell the story from an international perspective. One of these is Robert Jungk’s classic account *Brighter Than 1000 Suns* (1958)¹⁶ which was well received and attained a wide readership. It is an intriguing account because Jungk gathered together first hand recollections of atomic research from the most important scientists on the project. These scientists came from all over the world; America, Germany, France, Britain, Russia, Hungary and Italy.

¹¹ Leslie. R. Groves studied at the University of Washington and the Massachusetts Institute of Technology. He took courses at the Engineers School in Virginia from 1918-1920. He was attached to the Officer of the Chief of Engineers in 1931, becoming a Captain in 1934. Groves graduated from the Army War College in 1939. He became director of the Manhattan Project in September 1942, overseeing all parts of the work and continued to lead the atomic establishment created in wartime until January 1947.

¹² Groves, L.R *Now It Can Be Told: the story of the Manhattan Project*, London, Andre Deutsch, 1963

¹³ Groves, L.R *Now It Can Be Told: The Story of the Manhattan Project*, London, Andre Deutsch, 1963, p.408

¹⁴ Conant, J.B *My Several Lives: Memoirs of a Social Inventor*, New York and London, Harper and Row, 1970

¹⁵ Conant, J.B *My Several Lives: Memoirs of a Social Inventor*, New York and London, Harper and Row 1970, p. 288

¹⁶ Jungk, R *Brighter Than 1000 Suns*, London, Gollancz and Hart-Davis, 1958

The official historian of the British Atomic Energy Authority, Margaret Gowing, has written several works on British atomic research. *Britain and Atomic Energy 1939-1945* (1964)¹⁷ which aimed to show just how much help the British scientists gave, is the most comprehensive work about British involvement specifically. This thesis aims to take forward Gowing's argument that British involvement was essential in the making of the atomic bomb and update her ideas with recently declassified documents.

Richard Rhodes' Pulitzer Prize winning work *The Making of the Atomic Bomb* (1986)¹⁸ which focuses on the full story of the atom bomb, includes the research done in many important countries, primarily the U. S. This work is good as an overall account of atomic history and goes back to the discovery of radioactivity. Rhodes' narrative makes the book highly readable as well as informative. More modern accounts have included James Hershberg's biography of *James. B Conant* (1993)¹⁹ which details American nuclear developments in wartime as well as Conant's own role in the American atomic programme and his disdainful attitude towards the British team.

Hiroshima and Nagasaki have been thoroughly researched and the legacy of the atomic bomb has been written of in hundreds of books and papers. The medical effects are harrowing no matter which account you read. Just a few examples include: *We of Nagasaki* (1951)²⁰ by Takagi

¹⁷ Gowing, M *Britain and Atomic Energy 1939-1945*, London, Macmillan, 1964

¹⁸ Rhodes, R *The Making of the Atomic Bomb*, London, Simon and Schuster, 1986

¹⁹ Hershberg, J *James B Conant: Harvard to Hiroshima*, Stanford, Stanford University Press, 1993

²⁰ Nagai, T *We of Nagasaki*, London, Harborough Publishing, 1951

Nagai, *Shadows of Hiroshima* (1983)²¹ by Wilfred Burchett, *Hotspots: The Legacy of Hiroshima and Nagasaki* (1995)²² by Sue Roff and *Children of the Ashes* (1959)²³ by Robert Jungk.

If the subject of atomic bombs becomes unbearably dispiriting, an amusing little book provides some light relief. Chas Newkey-Burden has written *Nuclear Paranoia* (2003)²⁴ which is a pocket guide about the influence of nuclear weapons on the media, public perception and society. The book talks about the representation of nuclear weapons in film, radio and television. It takes a pop at the politicians of Britain and America and makes fun of the famously derisory 'Protect and Survive' public information campaign created by the British Government. The title *Nuclear Paranoia* emphasises atomic weapons as tools to create fear. This is an important point because fear is easy to manipulate and using people's fear is a means of control, hence the importance of atomic weapons in world affairs.

In the more recent historiography, atomic diplomacy is a major theme with Rhodes' *The Making of the Atomic Bomb* and Gar Alperovitz' *The Decision to Use the Atomic Bomb and the Architecture of an American Myth* (1995)²⁵, both emphasising the bomb as a tool to remove the Russians from Asia. Uranium played an increasing part in diplomacy with supplies being hoarded at the end of the Second World War and the start of the Cold War. Two works that deal with this subject in detail are *The Deadly Element: The Story of Uranium* (1980)²⁶ by Lennard Bickel and *The Politics of Uranium* (1981)²⁷ by Norman Moss. These accounts argue that the U. S

²¹ Burchett, W *Shadows of Hiroshima*, London, Verso, 1983

²² Roff, S. R *Hotspots: The Legacy of Hiroshima and Nagasaki*, London, Cassell, 1995

²³ Jungk, R *Children of the Ashes*, Middlesex, Penguin, 1959

²⁴ Newkey-Burden, C *Nuclear Paranoia*, Harpenden, Pocket Essentials, 2003

²⁵ Alperovitz, G *The Decision to use the Atomic Bomb and the Architecture of an American Myth*, London, Fontana, 1996

²⁶ Bickel, L *The Deadly Element: The Story of Uranium*, London, Macmillan, 1980

²⁷ Moss, N *The Politics of Uranium*, London, Andre Deutsch, 1981

military had factored uranium supplies into their decisions on foreign policy due to their increasing reliance on fission weapons in the Cold War and their desire to keep a nuclear monopoly. The futility of trying to keep nuclear weapons a secret during the Second World War is also discussed at length.

Germany's attempts to make a nuclear weapon are also well documented, as is the elementary nature of her nuclear research during the war in comparison with the Allies'. The difference in Germany's atomic programme came from the decision-makers who did not commit to the project. The Farm Hall Transcripts²⁸ are also discussed showing the German scientists' incredulity at the news of Hiroshima. Just some of these numerous works include *Science and the Swastika* (2001)²⁹ by Adrian Weale, *Hitler's Uranium Club* (1996)³⁰ by Jeremy Bernstein and *Nazi Science: Myth, Truth and the German Atomic Bomb* (1995)³¹ by Mark Walker.

The nature of the relationship between American and British teams has come across as shaky in the literature. Andrew Pierre's *Nuclear Politics* discusses how Britain was reliant on a sense of American good faith to keep their programme a joint effort after the war. This was emphasised by the reliance of the two countries on the secret agreements between Roosevelt and Churchill which were left to collapse after the war, no doubt in part due to Roosevelt's untimely death. The tense nature of the relationship between the two countries comes out more in the primary

²⁸ The Farm Hall Transcripts were recordings of the interned German scientists that the Allies had captured at the end of the war. They were brought back to Britain and interned at Farm Hall for six months. The recordings were done in secret and it seems the German scientists were genuinely unaware they were under surveillance. The transcripts were a revealing insight into the differences between the German scientists and their motives for working on the German atomic bomb project.

²⁹ Weale, A *Science and the Swastika*, London, Channel Four Books, 2001

³⁰ Bernstein, J *Hitler's Uranium Club: The Secret Recordings at Farm Hall*, London, New York, American Institute of Physics, 1996

³¹ Walker, M *Nazi Science: Myth, Truth and the German Atomic Bomb*, New York and London, Plenum Press, 1995

documents from the period. Much more can be said about the suspicions of the Americans towards the British and the two teams' tricky wartime relationship while at Los Alamos. This is especially apparent when reading letters and reports discussing supplies of raw material for weapons and the sharing of technical information.

As for the spies a controversial argument outlined in Goodman and Pincher's article *Research Note: Clement Attlee, Percy Sillitoe and the Security Aspects of the Fuchs Case*. (2005) is that M.I.5 was in the pay of the Soviet Union and the Director General, Percy Sillitoe, deliberately let British Soviet spies such as Klaus Fuchs be cleared to work on atomic research. This would have obvious benefits for the Soviet Union's atomic programme. Sillitoe's public denial of Fuchs' Communist activities is highlighted in this article. Much more can be said about the questionable actions of M.I.5 and the apparent laxity of the British Intelligence Service during the war after examining the primary documents on the Fuchs and Alan Nunn May spy cases. M.I.5 didn't do its homework before clearing these two to travel to the U.S.

A notable gap in the literature also exists when considering the technical help Britain gave to the Americans while they worked at Los Alamos. The one good albeit short account comes from Ferenc Morton Szasz, who wrote *British Scientists and the Manhattan Project: The Los Alamos Years* (1992)³². More can be said about the frantic pace at which the teams worked to get the bomb ready on time. Chadwick's correspondence is especially interesting here.

Individual figures from the British team don't feature as heavily in the literature. There is a well written and detailed account about the life of James Chadwick including his contribution to the

³² Szasz, F.M *British Scientists and the Manhattan Project: The Los Alamos Years*, New York, St Martin's Press, 1992

bomb project called *The Neutron and the Bomb* (1997)³³ by Andrew Brown. It is inevitable that Klaus Fuchs attracted writers for the wrong reasons. *Klaus Fuchs, Atom Spy* (1987)³⁴ by R. C Williams and *The Atom Bomb Spies* (1980)³⁵ by H. Montgomery-Hyde both discuss the Fuchs case in relation to the Soviet Union's atomic bomb project in the early Cold War.

However, a number of controversial Americans have many volumes written on them. The most notable one is Robert Oppenheimer. He became a political pariah after the Second World War due to his left wing connections and was accused of being disloyal to the United States during the McCarthyite furore. *American Prometheus: the triumph and tragedy of J. Robert Oppenheimer* (2005)³⁶ by Kai Bird and Martin J. Sherwin states that Oppenheimer was already under surveillance when he was director of the Manhattan Project. His security trial and subsequent fall from grace in U. S politics are competently discussed in *The Ruin of J. Robert Oppenheimer and the Birth of the Modern Arms Race* (2005)³⁷ by Priscilla McMillan.

This thesis probably ties in best with Rhodes' account in the sense that it accepts nuclear weapons could not be made by one country. The story of atomic energy is many layered and so many different nations including France, Germany, Italy, Hungary, America and Britain have played crucial roles in its development that no one country could possibly take full responsibility for the invention. This is especially true when considering the early research into the atom, where the cost for experiments was not excessive. Several teams in different

³³ Brown, A *The Neutron and the Bomb: An Autobiography of Sir James Chadwick*, London, Oxford, Oxford University Press, 1997

³⁴ Williams, R.C *Klaus Fuchs, Atom Spy*, Massachusetts and London, Harvard University Press, 1987

³⁵ Montgomery-Hyde, H *The Atom Bomb Spies*, London, Hamish Hamilton, 1980

³⁶ Bird, K and Sherwin, M.J *American Prometheus: the triumph and tragedy of J. Robert Oppenheimer*, New York, Vintage Books, 2006

³⁷ McMillan, P *The Ruin of J. Robert Oppenheimer and the Birth of the Modern Arms Race*, London, Viking Penguin, 2005

countries had realised releasing atomic energy in a weapon could be theoretically possible before the might of American finance took over the running of the operation. This thesis also follows up the work Gowing has done in arguing Britain's importance in nuclear research by using recently declassified evidence to take her work forward, especially in the technical assistance Britain gave in the run up to the bombing of Hiroshima and also the effect of the spy cases on the British Secret Service. The primary documents give a better insight into the fragile nature of the American and British programme at Los Alamos, showing the deep suspicions the Americans and the British had of each other's motives for developing atomic energy.