

BLAYLOCK'S BOMB:

How a Small BC City Helped Create the World's First Weapon of Mass Destruction

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FOUR YEARS INTO THE SECOND World War, the citizens of Trail, British Columbia, a small city with a large smelter in the mountainous West Kootenay region near the United States border, were, like most of the world, totally unaware of the possibility of creating an atomic bomb. Trail's industrial workforce, employees of the Consolidated Mining and Smelting Company of Canada (CM&S Company), were home-front producers of war materials destined for Allied forces on the battlefields of Europe. They, along with the rest of humanity, would have seen the creation of such a bomb as pure science fiction fantasy invented by the likes of British novelist H.G. Wells.¹ They were understandably preoccupied with the life-and-death necessity of ensuring an Allied victory against the Nazis, Italian fascists, and the Japanese. It was no secret that, as it had done in the previous world conflict, their employer was supplying much of the lead, zinc, and now fertilizer that Britain needed to prosecute the war.² What Trailites did not know was that they were for a short time indispensable in the creation of the world's first weapon of mass destruction.

¹ H.G. Wells, *The Shape of Things to Come* (London: Penguin, 2005) and *The World Set Free* (London: Macmillan and Co., 1914). Both allude to nuclear war.

² Lance H. Whittaker, "All Is Not Gold: A Story of the Discovery, Production and Processing of the Mineral, Chemical and Power Resources of the Kootenay District of the Province of British Columbia and of the Lives of the Men Who Developed and Exploited Those Resources," unpublished manuscript commissioned by S.G. Blaylock, Trail, BC, 1945, claims that, throughout the war, the company "supplied the British Empire with fifty per cent of its lead and zinc at an estimated saving to the Imperial Government of over \$100 million" (272). See also Al King, *Red Bait!: Struggles of a Mine Mill Local* (Vancouver: Kingbird Publishing, 1998), 43. Surprisingly, it was a claim that did not merit mention in military historian J.L. Granatstein's "Arming the Nation: Canada's Industrial War Effort, 1939-1945," a paper prepared for the Canadian Council of Chief Executives and presented at its roundtable on foreign policy and defence, Canadian War Museum, 27 May 2005.



Figure 1. Buck Ryan comes to Trail. A cartoonist from the *London Daily Mirror* visited the smelter city in late 1945 to gather information about the P9 tower for his powerful cartoon strip. He published thirteen strips in 1946. Permission for use granted by the *London Daily Mirror*.



Figure 2. Trail smelter circa 1934. The original smelter was built in the mid-1890s by F. Augustus Heize, one of the Butte, Montana, copper kings. *Source:* Trail Historical Society.

Canada's role in supplying essential metals to the British, as well as high-grade uranium to the Americans, is well known today, but the secret production of heavy water at a highly classified enterprise in Trail from 1943 to the mid-1950s and its role in the building of the atomic bomb remains in the shadows of wartime history. The man behind that enterprise, known only by the code name "Project 9" (P9), was Selwyn Gwilym Blaylock, one of Canada's celebrated mining and smelting industrialists. A man of influence in BC business circles, often heard speaking at Board of Trade and Chamber of Commerce meetings, Blaylock was almost as secretive about his personal life as he was about the deal he quietly made with the US Army to build P9. Although he couldn't have known it at the time, Blaylock's decision occurred just before the dawn of the nuclear age. What did he know in 1942 and how much did the people of

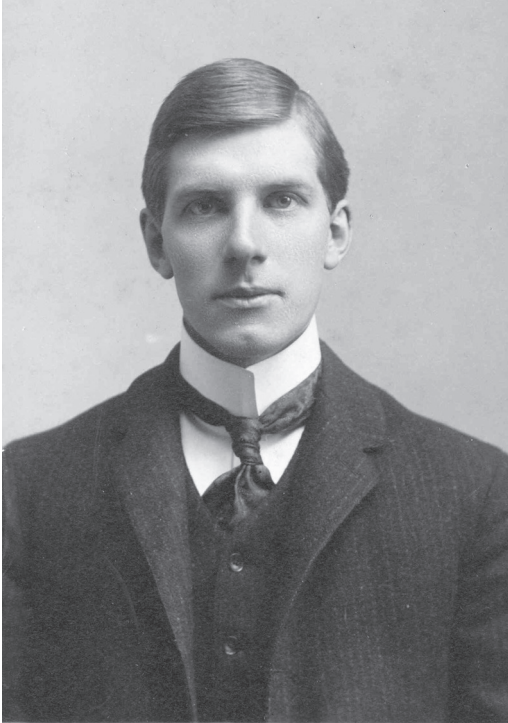


Figure 3. Selwyn G. Blaylock arrived at Trail in the late 1890s at age 20 to work in the company's assay office. Source: Trail Historical Society.

Trail know of the purpose of the clandestine P9 tower overlooking their homes? What did the highly profitable project portend for the future of a nascent BC business community and the larger Canadian corporate one that, like those of other Western nations, would seek to learn how they might benefit from the new nuclear technology? How did governments address questions about how nuclear things were to be treated in a post-bomb future? How does P9 fit into the ongoing scholarly debate about nuclear power and the fears still generated by the possibility of a nuclear holocaust?

In the pantheon of nuclear literature, some of the answers can be found in the works of recent historians concerned with nuclear issues as they have evolved to shape today's nuclear world. P₉, as I show, played a small role in creating that world and introduced Trailites to it. The political, environmental, and moral aspects of the bomb are subjects covered by several academic and popular historians, some more critical than others.³ Notable is the work of historian Gabrielle Hecht, whose many studies illuminate the political and international trade issues raised by what she calls "nuclearity." Her studies illustrate the geopolitics of relationships between the nuclear West and developing countries where, for example, uranium is mined.⁴ Others, such as British historian Jonathan Hogg, define the "nuclear culture" that emerged in the wake of the 1945 nuclear blasts.⁵ Still others inform the academic debate around memories and recollections of the bomb's physical and psychic devastation and how it rippled far beyond Japan.⁶ In Trail we see these effects at a psychosocio-economic level as citizens became aware of P₉'s nuclear role.

Much also has been written about the technical details of atomic bomb production, the use of heavy water in facilitating that production, and the international political concerns that arose as a result.⁷ Some histories of atomic programs in the United States, Britain, and Canada allude to Trail's production of heavy water,⁸ yet Canada's participation

³ See Oliver Stone and Peter Kuznick, *The Untold History of the United States* (New York: Gallery Books, 2012); Cynthia C. Kelly, *The Manhattan Project: The Birth of the Atomic Bomb in the Words of Its Creators, Eyewitnesses, and Historians* (New York: Black Dog and Leventhal, 2007); Michael Amrine, *The Great Decision: The Secret History of the Atomic Bomb* (New York: J.P. Putnam's Sons, 1959); and Michele Stenehjem Gerber, *On the Home Front: The Cold War Legacy of the Hanford Nuclear Site* (Lincoln: University of Nebraska Press, 1992).

⁴ Gabrielle Hecht, "A Cosmogram for Nuclear Things," *Isis* 98 (2007): 100–8; G. Hecht, *Being Nuclear: Africans and the Global Uranium Trade* (Cambridge, MA: MIT Press, 2012); *The Radiance of France: Nuclear Power and National Identity after World War II* (Cambridge, MA: MIT Press, 2009); and "The Power of Nuclear Things," *Technology and Culture* 51, 1 (2010): 1–30, among other titles. The latter explains her concept of "nuclearity" in terms of world nuclear trade in uranium and how nuclear and non-nuclear nations interact. Itty Abraham, "Ambivalence of Nuclear Histories," *Osiris* 21.1 (2006): 49–65, is particularly concerned with how immediate postwar "discourse of 'control'" has "narrowed the gaze of nuclear historians."

⁵ Jonathan Hogg, "'The Family That Feared Tomorrow': British Nuclear Culture and Individual Experience in the Late 1950s," *British Journal for the History of Science* 45, 4 (2012): 535–49. See also Hogg and Christoph Laucht, "Introduction: British Nuclear Culture," *British Journal for the History of Science* 45, 4 (2012): 479–93.

⁶ Michael J. Hogan, ed., *Hiroshima in History and Memory* (Cambridge, MA: Cambridge University Press, 1996) includes essays on collective memory and the bomb.

⁷ Of the many studies focused on the making of the bomb, Richard Rhodes, *The Making of the Atomic Bomb* (New York: Simon and Schuster, 1986) is among the most thorough and readable, but Rhodes makes no mention of Trail's heavy water plant.

⁸ Robert Bothwell, *Nucleus: The History of Atomic Energy of Canada Limited* (Toronto: University of Toronto Press, 1988); Margaret Gowing, *Britain and Atomic Energy, 1939–1945* (London: Macmillan, 1964); and Richard G. Hewlett and Oscar E. Anderson Jr. *The New World,*

and the details of Trail's role have often been downplayed, dismissed, or overlooked by many writers and historians.⁹ Canadians played "only a minor role in the design and production" of the atomic bomb, argue W.A.B. Douglas and Brereton Greenhous in their history of the war.¹⁰ C.P. Stacey agrees that Canada played a "comparatively small role in the more-than-epoch-making international drama of atomic energy."¹¹ Brian L. Villa highlights Trail's role in his essay on atomic collaboration, noting that, "curiously enough, only one component [of the American bomb development program] was left to be built outside of the United States, the heavy water plant at Trail."¹²

Neither heavy water nor Canada's part in creating the atomic bomb appear to have been of interest to American military historians. Recent histories of the war include sections on the use of atomic bombs against Japan but provide little background on Canada's role.¹³ Perhaps more surprising is the absence of its mention in Jack Granatstein's *Canada's War*.¹⁴ Also surprising is that Desmond Morton's Canadian military history notes that the bombs were dropped but makes no connection to Trail, although he acknowledges some Canadian "nuclear expertise."¹⁵ Even more surprising is that Prime Minister William Lyon Mackenzie King also seemed unaware of Trail's part. In his diaries, he mentions the bomb as "appalling" and warns of change that "will be wrought

1939-1946 (University Park: Pennsylvania State University Press, 1962). All discuss the Trail heavy water plant but the authors quickly relegate it to a minor corner while the battle over control of nuclear secrets took centre stage. One study, however, devotes considerably more content to the Trail heavy water plant: Per F. Dahl, *Heavy Water and the Wartime Race for Nuclear Energy* (Bristol, UK: Institute of Physics, 1999).

⁹ Several American histories chose simply to strike Trail's contribution entirely from the historical record. Bruce Hevly and John M. Findlay, eds., *The Atomic West* (Seattle: University of Washington Press, 1998) make no mention of it in chapters discussing the Hanford Engineer Works, where the plutonium for the Trinity and Nagasaki bombs was produced. Hanford stands only a few hours south of Trail in Washington State. Note that the Hiroshima bomb was exploded with a uranium (U235) device.

¹⁰ W.A.B. Douglas and Brereton Greenhous, *Out of the Shadows: Canada in the Second World War* (Toronto: Oxford University Press, 1977), 230.

¹¹ C.P. Stacey, *Canada and the Age of Conflict*, Vol. 2: *A History of Canadian External Policies* (Toronto: University of Toronto Press, 1981), 412.

¹² Brian L. Villa, "Alliance Politics and Atomic Collaboration, 1941-1945," in *The Second World War as a National Experience*, ed. Sidney Aster (Ottawa: Canadian Committee for the History of the Second World War, 1981), 150.

¹³ Antony Beevor, *The Second World War* (New York: Little, Brown and Company, 2012); Max Hastings, *Inferno: The World at War, 1939-1945* (New York: Alfred A. Knopf, 2011).

¹⁴ J.L. Granatstein, *Canada's War: The Politics of the Mackenzie King Government, 1939-1945* (Toronto: Oxford University Press, 1975).

¹⁵ Desmond Morton, *A Military History of Canada: From Champlain to Kosovo* (Toronto: McClelland and Stewart, 1999), 224-25.

through the discovery of the atomic bomb.”¹⁶ But the prime minister seemed satisfied to allow his wartime minister of munitions and supply, the redoubtable Clarence Decatur Howe, to handle the testy issues surrounding atomic bomb programs, including the P₉ connection.¹⁷

In spite of the mass of post-bomb literature, then, the task of explaining how Trail’s heavy water plant came about and the significance it holds in understanding Allied wartime strategy and Cold War thinking remains an obscure topic addressed by only a few historians.¹⁸ It also remains to be seen how much the considerations mentioned above entered the tense wartime atmosphere that must have pervaded the lives of company president Blaylock and others in Trail. P₉’s heavy water was, at one secret historical moment, at the cusp of Canada’s nascent nuclear program and bears examination for what it reveals about the “political and historical context within which decisions are made to develop nuclear programs.” In studying that context, nuclear historian Itty Abraham argues, “it is possible to get closer to understanding the desire for, likelihood of potential use and possibility of international control of nuclear weapons.”¹⁹

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Although many historians have seemed reluctant to give Trail its due where the bomb is concerned, the *Trail Daily Times* was less shy about it. In August 1945, in the weeks after this epochal event, it proudly offered a front-page report on the city’s role. Although details about the bombs that were dropped on Hiroshima and Nagasaki on 6 and 9 August, respectively, remained an official secret, the *Times* started to unravel the mystery when its story, headlined “Trail Helped in Atomic Bomb,”

¹⁶ William Lyon Mackenzie King, *Diaries*, entries for 9 and 10 August 1945, http://www.collectionscanada.gc.ca/king/053201/05320130207_e.html. For a fuller discussion of the prime minister’s views on the bomb, see Gregory A. Johnson, “An Apocalyptic Moment: Mackenzie King and the Bomb,” in *Uncertain Horizons: Canadians and Their World in 1945*, ed. Greg Donaghy, 101–12 (Ottawa: Canadian Committee for the History of the Second World War, 1997), <http://auspace.athabascau.ca/bitstream/2149/1712/1/An%20apocalyptic%20moment.pdf>.

¹⁷ Howe’s role and that of many others involved in negotiating the uses of heavy water is thoroughly explored in James Eayrs, *In Defence of Canada: Peacemaking and Deterrence* (Toronto: University of Toronto Press, 1972); C.P. Stacey, *Arms, Men and Governments: The War Policies of Canada, 1939–1945* (Ottawa: Queen’s Printer, 1970); and, Wilfrid Eggleston, *Canada’s Nuclear Story* (Toronto: Clarke, Irwin and Co., 1965).

¹⁸ Craig D. Andrews, “Cominco and the Manhattan Project,” *BC Studies* 11 (1971): 51–62, provides the only in-depth study of the business arrangement that led to the creation of Trail’s plant. Andrews’s findings are used extensively in other writings, including Jeremy Mouat, *The Business of Power: Hydro-Electricity in Southeastern British Columbia 1897–1997* (Victoria, BC: Sono Nis Press, 1997), 118–26.

¹⁹ Abraham, “Ambivalence”, 7.

appeared on 13 August 1945. It was the first time twelve thousand Trailites became aware that the smelter had produced heavy water that could be “used to control the release of energy in the bomb.”²⁰ Thus Trail citizens learned of the CM&S Company’s role in building the bomb barely a week after “Little Boy” (fifteen kilotons) was dropped on Hiroshima and only a few days after “Fat Man” (twenty-one kilotons) fell on the smaller industrial city of Nagasaki.²¹ It was their first glimpse of the deadly role the heavy water plant may have played, but it was only a tiny glimpse, and, as we shall see, it also may have left a false impression about P9’s actual role.

Trail’s daily newspaper, basing its initial coverage on C.D. Howe’s official “Statement on the Atomic Bomb” of 6 August 1945, reported that “further details of Trail’s part in this gigantic discovery are shrouded in secrecy,” and wartime censors ensured that it stayed secret by refusing to supply more information. Still, it must have seemed remarkable that Howe’s statement failed to even mention the heavy water plant. Canada cannot claim to have played as significant a role as did the other countries, Howe explained, but it has “guaranteed us a front line position in the scientific advance that lies ahead.” When he complimented the work of nuclear scientists at the Montreal Laboratory, perhaps the minister was including the CM&S Company staff members who were assigned to work there.²² Astonishingly, the minister also avoided mentioning Blaylock and those who designed and operated P9, and he made no comment on the planned use of its heavy water.

In the weeks following the bombings, the *Times* coverage followed the pattern set by larger newspapers, such as Canadian Lord Beaverbrook’s London *Daily Express*, which graphically depicted the horrors of the bomb, portraying it as “a ‘monster’ threatening the world.”²³ Other than such sensational reports, however, and the Trail paper’s premature boast of Trail’s bomb role, the details about P9 were still relatively unknown to its readers in 1945. The plant’s product and its potentially destructive contribution would remain unspoken as the postwar period unfolded and

²⁰ “Trail Helped in Atomic Bomb,” *Trail Daily Times* (hereafter *TDT*), 13 August 1945.

²¹ Death toll estimates vary widely, ranging from 480,000 to 200,000.

²² C.D. Howe, “Statement on the Atomic Bomb,” 6 August 1945, copy issued under the Canadian Access to Information Act from secret files at the Department of Foreign Affairs, Ottawa.

²³ Adrian Bingham, “‘The Monster’? The British Popular Press and Nuclear Culture, 1945–early 1960s,” *British Journal for the History of Science* 45, 4 (2012): 610, notes that, in August 1945, the press also willingly cooperated with governments and the military establishment in maintaining the “veil of secrecy” regarding the bombings, but not to the degree that has been assumed. There was willingness at some papers, though not at the *Times*, “to criticize the policies and question the competence of governments and the military” (612).

full prosperity began to return to the small BC city. The *Times* further advised its readers not to get too upset about the frightening power of the new bomb, a warning that only served to heighten paranoia around the new weapon.²⁴

In the immediate atomic afterglow, world leaders issued public statements urging Japan to surrender and attempted to turn the world's attention to the potential peaceful uses of the new energy source. Winston Churchill, who had by then been replaced by Labour leader Clement Attlee as British prime minister, released a statement lauding the bomb and noting that Canada's "contribution was most valuable."²⁵ Others also hailed the bomb as a way to end all wars. US president Harry S. Truman, for example, said it would help maintain world peace, but he made no reference to Trail or, more puzzlingly, even to Canada's role in the \$2 billion enterprise he dubbed "the greatest scientific gamble in history."²⁶ His secretary of war, Henry Stimson, perhaps was including Trail when he noted that "certain other manufacturing plants much smaller in scale are located in the United States and Canada for essential production."²⁷ In Ottawa, Howe's statement also talked of peace, and he encouraged Canadians to take pride in the Canadian scientists who had been involved in "one of the major scientific advances in history."²⁸

Debate soon after the bombs exploded would focus on assuaging growing public fears and easing global tension, but it would also move quickly to questions of how to establish international control over nuclear power.²⁹ Who would benefit from the lucrative trade in nuclear arms and nuclear energy generation? One day after Hiroshima, a *Times* article perceptively weighed the options and asked if the bomb was a "rainbow of peace" or a "sign of global suicide."³⁰ It might have given Trailites pause to consider their city's possible part in the Japanese bombings. It might also have sparked curiosity about what exactly heavy water was

²⁴ "Public Jitters over Perils of Atomic Bomb Not Justified," *TDT*, 9 August 1945.

²⁵ "Churchill Acclaims Atomic Bomb," *TDT*, 16 August 1945. See also Winston Churchill, "Statement on the Atomic Bomb," *New York Times*, 6 August 1945, <http://www.ibiblio.org/pha/policy/1945/1945-08-06c.html>, in which he briefly mentions heavy water in reference to a plant in Vemork, Norway, where the Nazis had secured a heavy water plant.

²⁶ Harry S. Truman, "Statement on the Atomic Bomb," Washington, DC, 6 August 1945, "Army press notes," box 4, Eben A. Ayers Papers, <http://www.pbs.org/wgbh/americanexperience/features/primary-resources/truman-hiroshima/>.

²⁷ Henry Stimson, "Statement on the Atomic Bomb," Washington, DC, 6 August 1945, NuclearFiles.org, Project of the Nuclear Age Peace Foundation, http://www.nuclearfiles.org/menu/library/correspondence/stimson-henry/corr_stimson_1945-08-06.htm.

²⁸ Howe, "Statement."

²⁹ *Ibid.*; Abraham, "Ambivalence," 4.

³⁰ "New Atomic Bomb Viewed Two Ways," *TDT*, 7 August 1945.

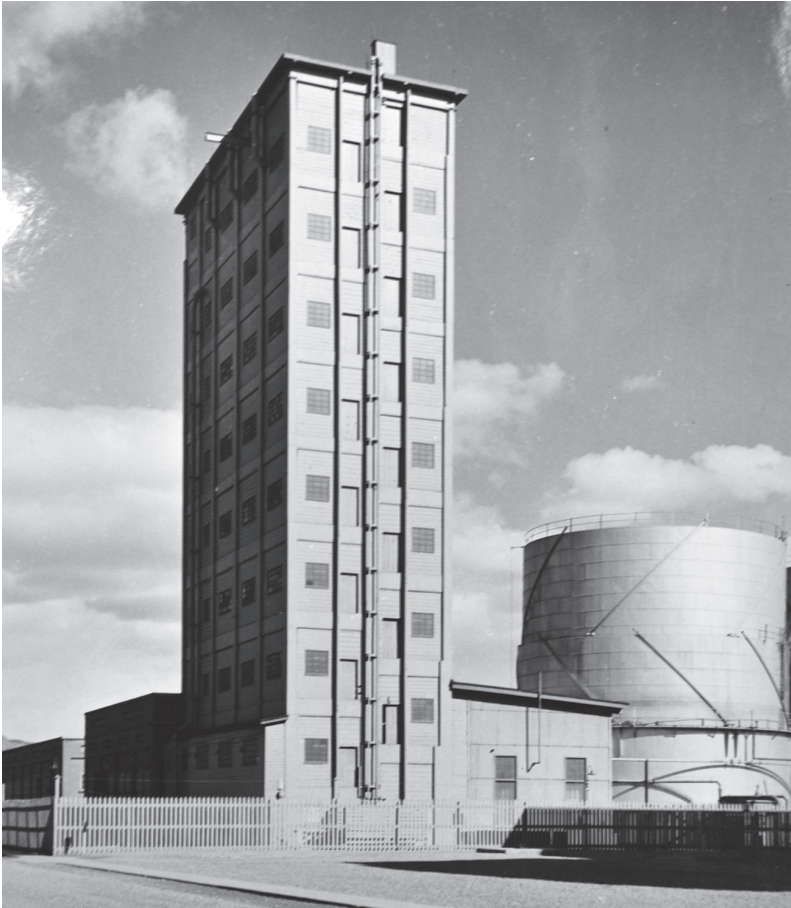


Figure 4. The P9 tower was completed in 1943 as depicted in a CM&S Company brochure. *Source:* Teck Cominco Ltd. Archives, Trail, BC.

and how Blaylock had managed to arrange the profitable – and covert – production of it in their backyard.

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After decades of being shrouded in mystery, interest in the looming grey P9 tower in Warfield, British Columbia, situated about a kilometre north of the Trail smelter, was revived in 1971 when Selkirk College historian Craig Andrews turned his attention to the previously overlooked wartime curiosity. He uncovered documents in Cominco's archives that provided details on Blaylock's negotiations with the US Army to produce six tons (about 5.5 tonnes) of heavy water in the P9

plant's first year of operation. Among the correspondence was a secret letter sent to Blaylock by the National Research Council of Canada on 22 February 1941.³¹ "This innocent-sounding note," Andrews wrote, "was to launch the company into one of the most remarkable projects of its long history, involvement in the Manhattan Project, the giant engineering undertaking which was to bring forth, in the summer of 1945, the atomic bomb."³²

Initially, not much happened. The Military Application of Uranium Detonation (MAUD) Committee, formed in the United Kingdom in 1939 to study "the feasibility of making an atomic bomb," reported in the summer of 1941 that it was indeed possible.³³ At that point, with Pearl Harbor still in the future and the United States not yet in the war, President Franklin D. Roosevelt created the Office of Scientific Research and Development (OSRD) to work with the MAUD group to establish ground rules for the critical project. As a British ally, Canada was drawn into this joint British-American initiative. Dr. Hugh Taylor, a British-born American physicist assigned by the OSRD to find suitable places to produce heavy water, then thought to be vital in bomb production, wrote to Blaylock in June 1941 to suggest that he visit the Trail smelter to see about building a heavy water plant there.³⁴ At first Blaylock said no. He would need to examine the costs involved.

Blaylock was not new to wartime work. During the First World War, he and the CM&S Company (later renamed Cominco) had energized the BC economy through the production of materials for use in munitions manufacturing. By the 1920s, the Trail smelter had become the largest non-ferrous metal works in the world, and Blaylock had overseen an ingenious process to refine zinc in a much faster and better way than had ever been found. It meant that soldiers could have an endless supply of rifle shells, their casings made from brass of which Blaylock's zinc was a key ingredient. Share profits rose accordingly and continued to flow throughout the Second World War, with Blaylock steadily transforming the CM&S into a juggernaut driving the provincial economy. A review

³¹ O. Maass to S.G. Blaylock, 22 February 1941, *Project 9 – Basis of Agreement, Feb. 1941 to June 1942* or *P. 9 B. of A. 1941-1942*, as cited in Andrews, "Cominco," 52. Note that researchers require permission from Cominco to gain access to the company's protected files held at the BC Archives in Victoria.

³² Andrews, "Cominco," 51.

³³ Stacey, *Arms*, 55, notes that the MAUD report states that "the scheme for a uranium bomb is practicable and likely to lead to decisive results in the war."

³⁴ Hugh Taylor to Blaylock, 21 June 1941, *P. 9, B. of A., 1941-1942* as cited in Andrews, "Cominco," 53.

of wartime company annual reports reveals the growing profits, but they betray no secrets regarding P9.³⁵

Blaylock studied the Taylor proposal sceptically. Whatever he agreed to do would have to “produce heavy water at a profit, or at least not at a loss.”³⁶ Then, on 23 July 1942, Taylor made Blaylock an offer: two thousand pounds (907 kilograms) of D₂O (heavy water) to be delivered in one year.³⁷ Still Blaylock was reluctant. He calculated that the US offer not only failed to include the cost of shipping the cargo but also failed to include royalties.³⁸ Blaylock wrote back to Taylor, saying “we are not prepared to take any loss in this connection,” but he left the door open.³⁹ High-level talks continued, with Blaylock insisting that “if the job was to be done the US Government must come up with the cash.”⁴⁰ Finally, he invited Taylor to Trail after assuring him that the company would proceed with the project if “we get real cooperation.”⁴¹

When Taylor visited the smelter city on 5–8 January 1942, almost exactly one month after Pearl Harbor and the US declaration of war, he and Blaylock settled most of their differences. At long last they agreed to start the project, “a happy moment for Taylor the scientist and Blaylock the businessman,” as Andrews notes.⁴² The deal was that the company would not profit from the heavy water production but at war’s end the plant would belong to it.⁴³ The US government agreed to build P9 at a cost of between \$1 million and \$5 million with the actual cost running to \$2.8 million for the first year’s operation, an enormous sum in those days.⁴⁴ Before the deal went ahead, however, Blaylock wrote to Minister Howe with further questions cloaked in secrecy. Howe wrote back to say that it was “unnecessary for Blaylock to play secret-agent any longer.”⁴⁵ He then gave him a free hand to negotiate, and, on 1 August 1942, the company president signed the initial contract. Soon the Americans called

³⁵ H. Fargey, “A Chronological Record of Outstanding Events in the History of the Consolidated Mining and Smelting Company of Canada, Limited,” unpublished, Trail, BC, January 1949, notes that, through the six war years, net profits never dropped below the \$9 million-plus mark and that dividends ran from \$6.5 million to \$8.1 million.

³⁶ Andrews, “Cominco,” 53.

³⁷ Taylor to Blaylock, 23 July 1941, P. 9, *B. of A., 1941–1942*, as cited in Andrews, “Cominco,” 53.

³⁸ *Ibid.*, 54.

³⁹ Blaylock to Taylor, 5 August 1941, P. 9, *B. of A., 1941–1942*, as cited in Andrews, “Cominco,” 55.

⁴⁰ Andrews, “Cominco,” 57.

⁴¹ *Ibid.*

⁴² *Ibid.*

⁴³ *Ibid.*

⁴⁴ Sidney Aster, ed. *The Second World War as a National Experience* (Ottawa: Canadian Committee for the History of the Second World War, 1981), 152.

⁴⁵ Andrews, “Cominco,” 59.

for extensive security measures and a “curtain of secrecy began to fall as [the CM&S Company] moved into the Atomic Era.”⁴⁶

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For the “consummate businessman” with a reluctant board of directors, the heavy water project clearly had to be “a business enterprise.”⁴⁷ That was Blaylock’s strength: he knew how to make profits for shareholders, and, over his many years as a top manager in Trail, he had manoeuvred his company into a position of importance as a generator of goods to increase wealth in the provincial economy. As the war proceeded, technical innovations continued under Blaylock and profits steadily increased. To furnish Allies with needed war materials, the company opened new mines at Hazelton and Salmo to produce tungsten, a metal used to manufacture armour-piercing shells, and it continued production of coal at its Alberta mines as well as reopening its coal operations at Corbin, British Columbia. It also operated a mine at Pinchi Lake to meet the need for mercury, which was used in bomb detonators.⁴⁸ The CM&S also refined its tin production process at Kimberley in 1942, thus providing another valuable wartime item.⁴⁹ Added to these valued materials, the heavy water plant would finally begin in earnest.⁵⁰

Blaylock and his company were now junior partners in an enterprise that would, as one historian boldly quipped, involve “changing the

⁴⁶ *Ibid.*, 58.

⁴⁷ *Ibid.*, 61–62. See also “Two Trail Men Named for Work on Atomic Bomb,” *TDT*, 13 August 1945. Blaylock not only signed the contract with the US War Office but also went on to loan two of his employees to the National Research Council’s Montreal Laboratory to assist with the “experimental and development work of atomic energy.” J.R. “Nelly” Mills was in the company’s assay office and, later, its research department in Trail. C.H. “Harry” Simpkinson also worked in the assay office, later becoming a shift boss in the sulphate plant and a testing engineer in the ammonia division. Both men were highly qualified. Mills was the chemical supervisor with Alberta Nitrogen Products Ltd. and a fellow in the Chemical Institute of Canada. Simpkinson had previously worked for the Deloro Smelting and Refining Company and International Nickel Company. The *Times* article provided no further details as to the specific role the men played in building the bomb.

⁴⁸ “Cominco Ltd.,” *Gale Directory*.

⁴⁹ “Historic Summary of Cominco,” prepared by Cominco Ltd., Vancouver, BC, April 1979, 3. See also, “Sullivan Mine Aids Tin Supply,” *TDT*, 24 July 1942.

⁵⁰ Dahl, *Heavy Water*, 179, explains that parts of the Trail heavy water operation were built by several organizations. He names E.B. Badger and Sons; the Harshaw Chemical Co.; Stone and Webster; and Stuart Oxygen of San Francisco, along with several universities. He also notes that “Standard Oil Development Company was responsible for the basic design of the entire heavy water plant under the direction of E.V. Murphree and F.T. Barr, and Cominco naturally took responsibility for the adaptation of their hydrogen plant to the heavy-water operation.”

history of the world.”⁵¹ Not only had Blaylock increased his company's value to the BC economy, but he had also added new infrastructure and prospects to the provincial energy industry. Dams on the Kootenay River, especially the one constructed at Brilliant, British Columbia, during the war, would supply other industrial needs as well as ensuring that the energy-hungry P9 tower remained productive.⁵² For example, the extra energy supply would allow the company to develop a magnesium powder plant at Trail to produce a light metal ideal for aircraft construction.⁵³ Further indication of the importance of Blaylock's company to the economy and the war effort was the increased production of sulphuric acid and other chemicals for the P9 project. Near the end of the war, the company president would modestly report that all war plants, including P9, were showing “very satisfactory” results.⁵⁴ Thanks to tax concessions on “metals needed for the war effort,” the company's bottom line was ever more impressive.⁵⁵ With heavy water production, that line was enhanced substantially.

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The race to be the first nation to develop the atomic bomb rose to fever pitch in the early 1940s when it became evident, thanks to concerned scientists like Albert Einstein, Leo Szilard, and others, that Hitler had nuclear scientists working on a German bomb. Knowing that the Nazis would most certainly use these “extremely powerful bombs” if they got them first, Allied leaders intensified support for atomic development at a furious new pace.⁵⁶ They were keenly aware, as some scientists had advised, that if the Nazis got the bomb “the war [would] be over in a few weeks.”⁵⁷ This knowledge and the fear that it engendered led Allied

⁵¹ Aster, *Second World War*, 140.

⁵² Mouat, *Business of Power*, 131. See Matthew Evenden, *Fish versus Power: An Environmental History of the Fraser River* (Cambridge, MA: Cambridge University Press, 2007) for a discussion of the development of dams in British Columbia, including the sixteen that were constructed along the Columbia River that flows past Trail. Early on, Blaylock saw the profit potential of building power dams in the Kootenays.

⁵³ “Work on Brilliant Dam Will Be Rushed,” *TDT*, 24 April 1942.

⁵⁴ “C.M.&S. Reports on Its Operations during 1944,” *TDT*, 12 April 1945; and “C.M.&S. Reports Profits of \$7,790,080,” *TDT*, 12 April 1945.

⁵⁵ “Base Metals to Get Tax Concession,” *TDT*, 30 April 1942.

⁵⁶ Albert Einstein to President Franklin D. Roosevelt, 2 August 1939, <http://www.atomicarchive.com/Docs/Begin/Einstein.shtml>.

⁵⁷ Aster, *Second World War*, 141, citing James B. Conant, “A History of the Development of the Atomic Bomb,” unpublished MS. OSRD M1393, S1, Bush-Conant Folder, National Archives of the US and at <http://www.paperlessarchives.com/wwii-vannevar-bush-atomic-bomb.html>.

politicians, strategists, and scientists to take action, and Trail's ability to produce heavy water placed it in the running to find the fastest way to beat the Nazis to the bomb.

Heavy water, or deuterium oxide (D₂O), also known as hydrogen oxide, is called a moderator in nuclear science terminology because it has the capacity to slow or moderate the speed of fast neutrons and allow fissionable uranium (U₂₃₅ atoms) to be separated from the inert U₂₃₈ atoms, thus causing a chain reaction that could produce an explosion. Heavy water could also serve as a moderator in the production of another fissionable substance, plutonium.⁵⁸ A nuclear chain reaction occurs when a moderator succeeds and the nuclear pile, or reactor, "goes critical." For the non-scientist today, and to those who worked at the P₉ tower in the 1940s, it is difficult to conjure up an exact mental picture of what heavy water actually does in the making of an atomic bomb.⁵⁹ Even so, it was becoming evident that the heavy water that would be produced at Trail was critically important to the war effort for the Allies had learned that the Nazis had commandeered the only other operational heavy water source in existence at the Norsk Hydro Plant in Vemork, Norway, not far from Oslo. Frightening even in hindsight, Hitler may have had the horrifying new weapon first had it not been for several commando attacks launched by the British along with the courageous efforts of Norwegian resistance fighters.⁶⁰ Thus the eyes of the nuclear science community fell on Trail as the most likely place to supply what Vemork might have provided to the Nazi bomb makers.

Columbia University chemist Harold C. Urey's discovery of heavy water in 1931 had led to his winning the Nobel Prize in 1934, but it also set off an intense search for ways to use heavy water to create the most powerful energy release in history. The complicated story of heavy water and its role in weapons production is full of intrigue, involving a member of the famed Curie family and noted scientists of various nationalities, some of whom had managed to escape the Nazi killing machine. Blaylock had known about the Urey discovery by the mid-1930s and was quick to

⁵⁸ George C. Laurence, "Canada's Participation in Atomic Energy Development," *Bulletin of Atomic Scientists*, November 1947, 325-28, provides a remarkably clear explanation of the process. Heavy water, he explains, acted to stop or slow U₂₃₈ atoms from absorbing or "quenching" the U₂₃₅ atoms. He notes that "an explosion is only possible if the neutrons thrown out by the bursting of U₂₃₅ atoms reach other U₂₃₅ atoms causing them to burst in turn, so the disintegration spreads from atom to atom until the whole mass flies apart violently" (325).

⁵⁹ For a detailed description of atomic fission and Canada's role in atomic bomb research, see also "Canada's Role in Atomic Bomb Drama," C.D. Howe press release Part 1, issued by Canada's Department of Reconstruction, Ottawa, 13 August 1945.

⁶⁰ Mouat, *Business of Power*, 125, citing Martin Gilbert, *Second World War* (London: Weidenfeld and Nicolson, 1989).

call on his company chemists to explore the properties of heavy water. Indeed, it was another Blaylock scientific innovation that brought the US Army to his door.

In response to a 1937 International Joint Commission (IJC) order, Blaylock had installed a pollution control system that involved building an ammonia plant at Warfield. The IJC had long noted the company's pollution of the Columbia River Valley and, consequently, the farmland across the border in Washington State's Stevens County.⁶¹ The ammonia plant, built in 1929-30, was designed to recover the sulphur dioxide gases that were emitted into the atmosphere and turn them into highly profitable fertilizer products that were later marketed around the world under the name "Elephant Brand."⁶² The new plant was also getting orders from the federal government for "considerable quantities of ordnance-grade ammonium nitrate" for military use.⁶³ Significantly, the process included an electrolytic hydrogen plant – and heavy water could be drawn from electrolytic hydrogen.⁶⁴ As it happened, then, Blaylock's ingenuity in responding to the IJC pollution complaint also led indirectly to the establishment of the secretive P9 plant.

As noted above, the process of reaching agreement on the building of the plant was fraught with frustrating delays, but there were other delays as well as Canada became fully engaged in the risky business of atomic research, or what Canadian war historian C.P. Stacey refers to as "a matter so pregnant with significance for humanity's future."⁶⁵ Eventually, Canada would act as a referee from the sidelines in what became an international atomic sparring match between the United Kingdom and the United States.

* * *

While Blaylock was negotiating with Taylor, other aspects of Canada's role in developing the bomb were afoot far to the east, and they ultimately involved the highest authorities in the land. These developments involved

⁶¹ Several studies have examined the pollution issue raised by the IJC. Among others, see Gerald F. Hess, "The Trail Smelter, the Columbia River and the Extraterritorial Application of CERCLA," *Georgetown International Environmental Law Review* (2005) 18: 1-56.

⁶² "The Cominco Story: Chemicals and Fertilizers Division," *Canadian Mining Journal* 75 (1954): 131-393, offers a detailed account of the pollution control measures taken, 287-312.

⁶³ Mouat, *Business of Power*, 119, citing "Cominco Story," 287.

⁶⁴ See A.G. Dickinson, "Utilization of Electric Power at the Metal and Fertilizer Plants, Trail, BC," *Engineering Journal* 20, 9 (1937): 718-24.

⁶⁵ Stacey, *Arms*, 514.

the other essential requirement needed to make the bomb – uranium. Quite simply, without it and a moderator such as heavy water, there could be no nuclear fission and therefore no bomb. Canada was one of two countries on earth where uranium could be found in sufficient quantities to supply the bomb scientists. The other was in the Belgian Congo, where the Union Minière du Haut Katanga was producing comparatively low-grade ore.⁶⁶ To get at the richer and closer Canadian source, the Americans had to go through the American-born Howe, whose role in the process would soon earn him the disapproval of no less a wartime figure than Churchill himself. But first a brief recap of the uranium acquisition story.

Canadian prospector Gilbert Labine first discovered uranium in the Great Bear Lake region of the Northwest Territories in 1930. Three years later Labine, the managing director of Eldorado Gold Mines Limited, established a refinery at Port Hope, Ontario, to produce the uranium that would eventually be used to make the bomb. Prime Minister Mackenzie King got wind of the uranium find and quickly assigned Howe to take steps to acquire Eldorado.⁶⁷ Then, more complications occurred. As defence historian Stacey recounts, Churchill had initially snubbed Roosevelt when the president approached him in October 1941 about collaborating on atomic bomb research. At that point, Churchill was not convinced that the Allies needed the new weapon and was inclined to rely on conventional bombs. On 8 December 1941, however, the Americans entered the war, and renewed efforts were made to join forces. While Churchill and Roosevelt mulled over their positions, Canada, though perhaps not seen as a major player, had established a slight head start in atomic research. In fact, since 1940 it had been involved in atomic research with scientist George C. Laurence's nuclear fission experiments at the National Research Council in Ottawa. But the Anglo-American collaboration constituted the main research playing field, and the possibility of Canadian participation was unclear. On 15 June 1942, however, Mackenzie King learned of the atomic research project and, by mid-August, agreed that the British should move their atomic bomb research team, the Directorate of Tube Alloys, to Montreal to provide a safe research venue far away from Nazi spies and possible bombardments.

Historically, it would also put them in good scientific company for it was at nearby McGill University that Lord Rutherford had worked on the

⁶⁶ Aster, *Second World War*, 143. Hecht, "Power," explores the new "uranium from Africa" developments revealing the geopolitical struggles surrounding the so-called "yellowcake" (i.e., uranium refined for use as reactor fuel) that emanates from Nigeria and Namibia today.

⁶⁷ Stacey, *Arms*, 516.

theory of radioactivity that initially fostered the scientific world's interest in atomic research.⁶⁸ It would also put the team in closer proximity to the American bomb scientists, the better to exchange scientific information. However, the Americans were suspicious of the move, and this suspicion proved a great hindrance to the Montreal team. Concerned that the British team was mostly non-British, in January 1943 the Americans cut off the exchange of information to the British and Canadian scientists in Montreal.

By April 1943, the Tube Alloys group was at a standstill. Desperately in need of heavy water and uranium, it sought assistance directly from Howe. Howe turned to Labine, with whom he was friendly, and made the request for uranium. There was only one problem: Labine had sold it all to the Americans and they at first refused to provide any to the Montreal scientists. It was the same story with Canadian heavy water from Trail: the Americans owned it and they were not about to lose any of the precious substance to the Anglo-Canadian team unless they agreed to work closely with DuPont chemical company engineers who were now key players in the American atomic project.⁶⁹

How had it come about that the Americans controlled all the available materials? As we have seen, they acquired the heavy water through the US War Office's agreement with Blaylock to build the P₉ tower in Trail. As the plant was being constructed in spring 1943, they also obtained "a monopoly of the Canadian uranium output for the immediate future" by signing a contract with Eldorado. It was at this time that Churchill is said to have muttered that Howe "had sold the British Empire down the river."⁷⁰ According to Stacey, Howe "had no technical understanding of what was going on and no real idea of how much material would be required for a serious atomic operation." He may only have become aware of the Trail heavy water negotiation in August 1942, shortly before Blaylock had raised issues that caused him to delay signing that contract.⁷¹

While it sounds like the Americans greedily bought up the franchise on atomic bomb research, Stacey and others argue that it was more complicated. Historian Brian Villa, for example, suggests that they had plenty of uranium from the Congo and endless funds to build plants as well as much-prized scientific advice from European scientists: "It

⁶⁸ Lord (Ernest) Rutherford, who worked at nearby McGill University for a time starting in 1898, had been honoured with the Nobel Prize in 1908 for his discovery.

⁶⁹ Most histories of the nuclear industry include sections on the debates about how the bomb would be developed, who would become key players, and how the Americans eventually came to dominate the field during the 1940s.

⁷⁰ Stacey, *Arms*, 518.

⁷¹ *Ibid.*, 521.

would appear that the Americans had all the cards they needed without recourse to desperate measures.”⁷² Villa further argues that “the charge that the Americans kept secret their deal with Consolidated Mining and Smelting for the heavy water plant until after it was consummated seems unfounded.”⁷³ Canadian defence historian James Eayrs also argues that the Americans had grown increasingly suspicious that Britain was more interested in the civilian application of nuclear energy “and that her leaders were looking beyond the bomb to postwar industrial use.”⁷⁴ The Americans had their eye sharply focused on the atomic bomb and were unwilling to engage with the Tube Alloys on any scientific information that would shift attention elsewhere.

In any event, the Americans soon had the clear lead in bomb research, and National Research Council president C.J. (Dean) Mackenzie recognized the fact in time to help broker the peace that, on 19 August 1943, led to Roosevelt and Churchill signing the Quebec Agreement.⁷⁵ The two groups would pool resources and brain power, would never use the bomb against each other, and would obtain consent from each other before using it on anyone else.⁷⁶ Villa credits Mackenzie’s “skillful diplomacy under impossible conditions” with resolving the Anglo-American wrangle in 1942 and thus bringing the teams together again as collaborators.⁷⁷ The agreement also called for a Combined Policy Committee of six members, with Howe representing Canada. Though Canada had not been a signatory to the Quebec pact, the British had given up one of their seats to make room for the Canadian representative. It was during this period of internecine squabbles, which had burned up so much precious time, that the existence of the Trail location had come to the attention of Urey and his Princeton colleague Taylor. As noted earlier, the British-born Taylor had already forged an agreement with Blaylock to produce heavy water, but events were already overtaking the Trail plant. In the heat of battle on the atomic research front – what Truman dubbed “the battle of the laboratories” – the Americans were waiting for no one.⁷⁸

⁷² Aster, *Second World War*, 145.

⁷³ *Ibid.*, 146.

⁷⁴ Eayrs, *Defence of Canada*, 268.

⁷⁵ C.J. Mackenzie is referred to as “Dean” Mackenzie by many historians, a title he acquired at the end of the First World War when he served as dean of engineering at the University of Saskatchewan. For a short biography, see the Canadian Nuclear Safety Commission website, <http://nuclearsafety.gc.ca/eng/about/past/past-presidents/chalmers-mackenzie.cfm>.

⁷⁶ Eggleston, *Canada’s Nuclear Story*, 87, and others.

⁷⁷ Aster, *Second World War*, 153.

⁷⁸ Truman, “Statement.”

As historian Per F. Dahl explains in his history of heavy water, nuclear scientist Enrico Fermi's success with regard to building the first Chicago reactor (CP-1) in early December 1942 had already shifted the American focus away from Trail. General Leslie Groves, in command of the Manhattan Project with Dr. Robert Oppenheimer as its scientific leader, had decided that graphite was the better and speedier option. Coupled with technical problems, the P9 plant became a low priority in Groves's mind as well as that of OSRD head Vannevar Bush.⁷⁹ With unlimited spending authority, the general had already moved to the graphite option that would become available with the building of the Hanford Engineer Works at Richland, Washington. However, Dahl argues that the Trail product "was prudently retained as a potential backup for graphite as a neutron moderator."⁸⁰ Nuclear historian Wilfrid Eggleston also entered the graphite versus heavy water debate, arguing that, with a \$2.8 million investment in the Trail plant and another \$14.5 million to construct plants in West Virginia, Indiana, and Alabama, the United States continued to be seriously interested in heavy-water production. But major production quotas would not be achieved quickly. "If the United States' production of plutonium had been compelled to wait until heavy-water reactors were available," Eggleston wrote in his history of Canada's nuclear program, "no plutonium bombs, such as those exploded at Alamogordo [New Mexico] and over Nagasaki, would have been ready for use until long after August 1945." The Hanford plant beat the clock just barely with its production of enough plutonium for two bombs.⁸¹

As preparations were under way to drop the bombs in early August and Howe and Dean Mackenzie scrambled to prepare press releases, Mackenzie King pondered the impact of the bomb.⁸² "It appals me to think of what may be involved in even attempting its use," he wrote in his diary entry of 4 August 1945, adding,

It makes one very sad at heart to think of the loss of life that it will occasion among innocent people as well as those that are guilty. It can only be justified through the knowledge that for one life destroyed, it

⁷⁹ Dahl, *Heavy Water*, 180.

⁸⁰ *Ibid.*, 178.

⁸¹ Eggleston, *Canada's Nuclear Story*, 49-50.

⁸² Secret correspondence between Norman Robertson, Mackenzie King's under-secretary of state, and Thomas Stone at the Canadian Embassy in Washington, DC, 9-14 August 1945, describes the panicked situation regarding Howe's public announcement. Copies may be obtained through the Canadian Access to Information Act.

may save hundreds of thousands and bring this terrible war quickly to a close.⁸³

He didn't seem concerned that Canada's heavy water had not been used; rather, his thoughts shifted to what the bombings meant: "We now see what might have come to the British people had German scientists won the race."⁸⁴

* * *

Sworn to secrecy, most of the citizens and smelter workers of Trail didn't know, or perhaps didn't want to know, what was going on at P9. As a company historian noted, "the manufacture of heavy water at Trail was not even guessed by the townspeople even after Hiroshima and Nagasaki."⁸⁵ Indeed, the CM&S Company's protected archives reveal that those associated with the project were regularly reminded to "exercise the greatest precaution" regarding any discussions about P9.⁸⁶ In 2008, Marc Marcolin, a former Cominco top manager and one-time Trail mayor who worked on P9, recalled that the workers "knew what we were producing, but we didn't know what it was for." He clarifies why the secret was so well kept in Trail:

The heavy water was collected in big stainless steel drums and every Wednesday ... they'd come and pick it up ... And this was done by a colonel in the US Army. And I asked him once, I says where does this stuff go to. And he taught me a lesson ... If it's secret, you just know what you need to know and you don't try and find ... something else. Where [it's going] to or what it's for. Because if there's a leak, they can't come back to you and say look, you knew what happened. You can get into a lot of trouble just because you know something.⁸⁷

As Marcolin recalled, he and his colleagues found out about heavy water's role in the war only after the atomic bomb exploded. "We weren't told officially," he said, "and we wouldn't talk about it to others until it

⁸³ Eayrs, *Defence of Canada*, 275.

⁸⁴ *Ibid.*, 276.

⁸⁵ Whittaker, "All Is Not Gold," 275.

⁸⁶ "Safeguarding Information," circular dated 15 March 1943, sent to Dr. C.H. Wright from F.M. Ethridge, found in Cominco restricted files, BC Archives, Add MSS 2500, box 243, file 1, "Project 9: Sec. 900, Organization and operating instructions, Report Nos. 1-11, 130-24, 26, 1942-1956."

⁸⁷ Marc Marcolin, interview conducted by Greg Nesteroff, Trail Historical Society, Trail, BC, 19 February 2008.

appeared in the paper.” People were curious about it, of course, but there were no information leaks that Marcolin remembered: “It certainly wasn’t in the *Trail Times*.”⁸⁸ Perhaps the code of silence in Trail had something to do with an undated memo that came from CM&S general manager John Buchanan, warning that, “in order to avoid embarrassment and suspicion and for the protection of the employees, all conversations in the plant must be in the English language. Failure to observe this regulation will result in instant dismissal.”⁸⁹ Italian smelter workers, probably a majority at the time, hardly needed the warning for they had sworn allegiance to Canada, and to Blaylock, when the war began.

As Trail began to shift into postwar mode, local concerns turned to the continuing shortages of sugar, meat, gas, and other staple goods, but citizens weren’t allowed to forget the bomb. The *Times* continued to allay public fears about a nuclear holocaust with regular reports on the benefits of atomic research. In May 1947, it again turned its editorial attention to P9. In this case it was about an article that had appeared in the *London Daily Mail*. “Here, from a Canadian city of which you may never have heard, is the story of a secret kept by thousands,” wrote Jean Stannett in the daily’s “Commonwealth Column.” The *Times* apparently learned of the story from Stannett’s Trail pen pal Beatrice Cose and republished it. “How did this city with the greatest non-ferrous metallurgical plants in the Empire come to play a part in the making of these weapons of death?” Stannett asked. The columnist was surprised at how well Trailites kept the secret:

Visitors asked about the tower, but Trailites merely shrugged their shoulders. It was something of a game to them to keep their secret, although they were as much in the dark about the whole affair as anyone. When a visitor mentioned the tower, which stood out like a sore thumb on the horizon, citizens would turn and quietly query, “what tower, I see no tower.”⁹⁰

That June the *Trail Times* once again cribbed from a British newspaper in a report on how well the CM&S Company was guarding the atomic secret. After reading a *London Daily Express* report, “Editors throughout the country immediately sharpened their pencils and Trail was stormed

⁸⁸ Ibid.

⁸⁹ Memorandum, issued by CM&S Company general manager John Buchanan, Trail, BC, n.d. Copy located at Blaylock Mansion private collection, Nelson, BC. The warning was clearly addressed to the Italian and other southern European workers at the smelter, many of whom would, at times, have communicated in their mother language.

⁹⁰ “Trail’s Atomic Secret: Thousands Couldn’t See ‘Heavy Water’ Tower,” *TDT*, 23 May 1947.

with queries.” But the company remained silent, as did General A.G.L. McNaughton, head of Canada’s Atomic Energy Control Board.⁹¹

British-born Ernie Mason, the man Blaylock had made chief design engineer for P₉, remembered bomb day well. Like Marcolin he was unaware of P₉’s significance. “Not until the day they dropped the bomb did I know what it was used for,” he told the *Times* in 1990. He recalled a Colonel Rogers from the Hanford atomic plant telling him what he’d been working on.⁹² He “went grey” when he heard it. “Somebody whispered in my ear about what we were doing: ‘It’s something that’s equivalent to 20,000 tons of TNT,’” Mason said. There has been speculation that some of the “brighter Cominco scientists” knew that “a bomb was possible through atomic fission,”⁹³ but Mason wasn’t among them, according to his friend Jim Jensen, an American chemical engineer for Stuart Oxygen in San Francisco.⁹⁴

In recognition of his contribution to heavy water production, Mason got a certificate from US secretary of war Henry Stimson.⁹⁵ It was similar to the one sent to CM&S Company employee George H. McKay that said he had “participated in work essential to the production of the Atomic Bomb, thereby contributing to the successful conclusion of World War II.”⁹⁶ Harry Simpkinson, a chemical engineer and assistant superintendent in the company’s hydrogen plant, also received a certificate of appreciation.⁹⁷ Despite working at the Montreal Laboratory in the 1940s,

⁹¹ “The World Wonders: But Talk of Heavy Water is Taboo,” *TDT*, 13 June 1947.

⁹² Lieutenant Colonel Benjamin T. Rogers was deputy area engineer and chief of construction at Hanford Engineer Works. See “Eleven Ghosts’ Left at Hanford; Richland Folk Still Won’t Talk Much,” *Spokane Daily Chronicle*, 7 August 1945.

⁹³ Andrews, “Cominco,” 58, quoting J.H. Salter, CM&S Company vice-president, Western Region, 8 July 1970.

⁹⁴ Oral history interview with James Henry Jensen, “Chemical and Metallurgical Process Engineer: Making Deuterium, Extracting Salines and Base and Heavy Metals, 1938–1990s,” chap. 4, Stuart Oxygen Company, 1940–1942, section entitled “Planning for the Heavy Water Plant at Trail, British Columbia.” See interview conducted by Eleanor Swent in 1992 for Western Mining in the Twentieth Century Oral History Series, Regional Oral History Office, Bancroft Library, University of California, Berkeley, 1993, <http://oskicat.berkeley.edu/record=b11015783~S1>, 26.

⁹⁵ “Connection to Manhattan Project Kept Secret from Design Engineer – Canadian Link to Atomic Bomb Faces Wrecking Ball,” *The Canadian Press*, Vancouver, 1 September 2004.

⁹⁶ Copy of certificate issued to George H. McKay, 6 August 1945, the same day the atomic bomb was dropped on Hiroshima. Copy located at Blaylock Mansion, Nelson, BC.

⁹⁷ Simpkinson was listed in “Scientists Who Probed Atomic Secrets: Research Work Carried on in Canada by Distinguished Group,” press release, Part 2, issued by Canada’s Department of Reconstruction, Ottawa, 13 August 1945. Also listed was J.R. “Nelly” Mills, who worked with Simpkinson in the company’s assay office and later its research department in Trail. A third West Kootenay person, J.W. Ozeroff of Shore Acres near Trail, was also listed among the scientists on the Montreal Laboratory staff. Ozeroff is pictured with other scientists in George C. Laurence, “Early Years of Nuclear Energy Research in Canada,” Institute

and thus being close to inside scientific speculations about the bomb, he recalled being as much in the dark as everyone else with regard to P9's purpose. "We presumed something involving nuclear physics was afoot," he remembered: "We knew it concerned munitions or bombs. We were making something secret, and we weren't supposed to talk about it."⁹⁸ Speaking to a reporter years later, Simpkinson confided, "I'm not very proud of it."⁹⁹

Further appreciation for the company's P9 work came from the US Atomic Energy Commission's general manager K.E. Fields. "Your pioneering efforts in construction and operating the first electrolytic heavy water plant on this continent," he wrote, have "contributed significantly to the history of progress in the development and application of atomic energy both for our common defense and security and for peaceful purposes here and abroad."¹⁰⁰ These were kind words and high praise indeed, but in the end the role of the P9 tower was somewhat anti-climactic.

* * *

The enforced secrecy surrounding Warfield's P9 tower and its purported role with regard to the bomb left the public open to many misconceptions and rumours about what actually occurred in Trail more than seventy years ago. The P9 operation was never seriously threatened with enemy infiltration and was never truly vulnerable to attack. Certainly it could have been, if German and Japanese intelligence had revealed the purpose of the plant. Also vulnerable was the Hanford plant at Richland, Washington, about 480 kilometres southwest of Trail, where the plutonium for two of the bombs was produced. As heavy water historian Per F. Dahl convincingly argues, despite the enthusiasm of heavy water advocates such as founder Urey, graphite was to be used as the moderator at

of Electrical and Electronics Engineers (IEEE Canada) website, 6, http://www.ieee.ca/millennium/nuclear_power/NuclEnerg.PDF. Laurence lists Ozeroff, who was apparently seconded from the University of British Columbia, among the scientists who developed "an electronic device called a 'kick sorter' for counting atomic particles and distinguishing between those of different speeds" (ii) and "the construction of Geiger counters and of 'boron chambers' for the measurement of the flow of neutrons" (12).

⁹⁸ Bernice Gargus and Les Merson, "Project 9 – Trail's 'Heavy' Contribution to the Atomic Age," *W Magazine*, Selkirk College, Castlegar, BC, undated, 55, 27.

⁹⁹ *Ibid.*, 55.

¹⁰⁰ "Postscript to Project 9," *Cominco Magazine*, November 1956, 5.

Hanford.¹⁰¹ Even the sceptical James B. Conant, the Harvard University president who served as chairman of the US National Defense Research Committee during the war, was won over to the graphite side. “It is disappointing to all of us that the work at Trail has proved to be so slow,” he wrote to Urey, “and it is very fortunate that we did not abandon the carbon [i.e., graphite] route as some advocated a year ago with the assumption that the Trail program would live up to the optimistic hopes of those who were concerned with it.”¹⁰² As Dahl noted, “The success of CP-1 ... confirmed the decision of General [Leslie] Groves ... to go with graphite in lieu of deuterium.”¹⁰³ Thus ended the short-lived role of the P₉ tower in the business of creating the world’s first weapon of mass destruction. Despite the claims in the *Times* and elsewhere, the heavy water produced in Trail was not used in the Hiroshima and Nagasaki bombs – or in any other.

Though it was mothballed as a source of heavy water for wartime use, the P₉ tower was part of what historian Jeremy Mouat calls “a watershed in the making of the contemporary world.” He adds that, “for better or worse, the nuclear age was dawning, and the production of heavy water had a small but significant part at this early stage.”¹⁰⁴ When the war ended and the atomic smoke cleared, the P₉ plant would again make a contribution. As Dean Mackenzie had optimistically stated during the war:

Canada has a unique opportunity to become intimately associated in a project which is not only of the greatest immediate military importance, but which may revolutionize the future world in the same degree as did the invention of the steam engine and the discovery of electricity.¹⁰⁵

His prediction proved accurate for, in the postwar period, Trail’s heavy water would be instrumental in the founding of the Chalk River project in Ontario, which “launched both Britain and Canada successfully into the atomic age.”¹⁰⁶ Until the mid-1950s Trail’s heavy water was a critical factor in Canada’s becoming one of the world’s exporters of nuclear energy

¹⁰¹ The Hiroshima bomb used highly enriched uranium 235 in what is known as a “gun-type” bomb. It was more unpredictable than plutonium and had never been used in tests. See “Weapons Basics,” NuclearFiles.org, Project of the Nuclear Peace Age Foundation, <http://www.nuclearfiles.org/menu/key-issues/nuclear-weapons/basics/weapons-basics.htm#how>.

¹⁰² Dahl, *Heavy Water*, 181, citing correspondence between Conant and Urey, 7 April 1943.

¹⁰³ *Ibid.*, 180.

¹⁰⁴ Mouat, *Business of Power*, 124.

¹⁰⁵ Stacey, *Arms*, 526.

¹⁰⁶ *Ibid.*, 528.

through its CANDU reactor, a development that not everyone viewed positively. Indeed, the Canadian Council for Nuclear Responsibility has long been a critic of the program.¹⁰⁷

* * *

Perhaps the biggest and still unsolved mystery is not whether or not Trail's heavy water was used in the bomb but, rather, whether Blaylock knew that the CM&S Company's P₉ plant was being groomed to supply the Manhattan Project. There is no clear evidence that Blaylock



Figure 5. An official company photograph of Blaylock near the zenith of his career. He died on 19 November 1945. Source: Trail Historical Society.

was aware of what P₉ would contribute to the atomic bomb programs or that his heavy water might have become an essential component in the bombs that devastated Japan in August 1945.¹⁰⁸

Blaylock died on 19 November 1945, about three months after Fat Man and Little Boy had been dropped, blasting the world into the nuclear age. He never wrote his memoirs and was never interviewed about his wartime work. However, we must bear in mind that Blaylock had a long and impressive history of munitions production covering two world wars and must have been aware of many wartime secrets through his contacts

in Ottawa and in the US military establishment. Also, Blaylock had cultivated a reputation as a war booster, an industrial leader who would

¹⁰⁷ Gordon Edwards, "Canada and the First Atomic Bombs," Canadian Council for Nuclear Responsibility, Toronto, 9 June 1998, http://www.ccnr.org/opinion_ge.html, notes that "for twenty years after Hiroshima, Canada sold plutonium produced in Chalk River reactors to the American military to help defray the cost of nuclear research. And when Canada gave India a clone of the NRX reactor, India used it to produce plutonium for its first A-Bomb test in 1974."

¹⁰⁸ Andrews, "Cominco," 61-62; Mouat, *Business of Power*, 123, argues that Blaylock had no qualms about assisting the Americans to make the bombs.

do anything to assure an Allied victory. Most important, his own education and business background, and his connections to the research community, should prompt a reopening of the question. Consider the following.

Although he had already graduated, Blaylock would have been aware that Lord Rutherford had joined the McGill University faculty in 1898 and he would have known about the work of the respected chemist and Nobel laureate. “Blaylock kept abreast of Rutherford’s discoveries including the nuclear nature of the atom in 1911,” contends William C. Leith, who worked with P9 designer Ernie Mason, and he would have known about “the transmutation of elements in 1919, which pioneered nuclear research towards the atomic bomb.”¹⁰⁹ Calling Blaylock “a brilliant chemist, a practical inventor, and an astute executive,” Leith further argues that he would have followed the scientific discussions about nuclear possibilities. As an avid wartime industrialist and a corporate leader with an eye for business advantages, he would have seen the military and postwar potential of nuclear energy. “Blaylock knew the difference between fission and fusion,” Leith argues, and he “talked privately about the theoretical conditions for the release of nuclear fusion energy by the disassociation of heavy water (deuterium), in electrolytic hydrogen cells, with the observation that ‘fusion energy could meet future energy needs.’” As early as 1932, according to Leith, “Blaylock kick-started Cominco’s heavy water research.”

Also worth considering, the secrecy imposed on P9 may not have fully extended to the company president. Blaylock didn’t walk into decisions unaware of their possible consequences. His entire history with the company points to a decision-making style that weighed all aspects of a scientific development before advising the company to invest in it. True, the US military could be persuasive, especially when it concerned military requirements and especially about the bomb, but Blaylock wasn’t easily intimidated, as evidenced by his initial rejection of the US proposal.

The CM&S president also must have known about the Einstein letters, written with assistance from Leo Szilard, who, with fellow nuclear scientist Enrico Fermi, had originally revealed the feasibility of producing the bomb. Einstein wanted to warn decision makers of the terrible consequences of this discovery, which “would also lead to the

¹⁰⁹ William C. Leith, “Cominco’s Blaylock Was a Nuclear Pioneer: Fusion Energy from Heavy Water in Electrolytic Cells,” privately published paper, Trail, BC, 10 November 2003. Leith was a smelter employee in summer 1942 who later earned a doctoral degree at McGill University, after which he worked as a research associate professor in nuclear engineering at the University of Washington before returning to Trail to work with Cominco’s engineering division.

construction of ... extremely powerful bombs.”¹¹⁰ On 17 July 1945, with the war against Japan virtually won and fearing Einstein’s earlier warning would go unheeded, Szilard issued a petition, urging President Truman not to use the bomb and to bring “the unloosened forces of destruction under control.”¹¹¹ The petition was signed by Szilard and sixty-nine other scientists, but in April 1945 Blaylock had been forced by ill health to retire from the CM&S Company presidency and might not have been healthy enough to have studied the scientists’ anti-bomb arguments.¹¹²

While there is some reason to doubt that the CM&S Company president remained ignorant of the potential role of heavy water in developing the bomb, what he could not have known was that the United States would actually drop it on Japan. According to Eayrs, only three Canadians “knew beforehand when and where the bombs would fall”: Mackenzie King, C.D. Howe, and Dean Mackenzie.¹¹³ Even though he had displayed an exemplary loyalty to the Allied war effort, Blaylock apparently was not to be a member of that exclusive group. Would he have shied away from P9 had he known of its purpose? The record, including material found in the company’s protected files, provides no answer to that question.

Today Blaylock is lauded for his achievements in the mining and smelting field and his innovative methods regarding labour-management systems. The Canadian Institute of Mining and Metallurgy sings Blaylock’s praises the loudest, showering its 1934–35 president with many accolades and noting that he “devoted a working lifetime to mines and minerals and left a number of monuments to his effectiveness.”¹¹⁴ In 1948, the institute created the Selwyn G. Blaylock Medal to be awarded to a promising young mining innovator. He is also quietly recognized by insiders for his role in the building of the bomb. In fact, on the front page of the website of the Manhattan Project Heritage Preservation

¹¹⁰ Albert Einstein to Franklin Roosevelt, 2 August 1939. This and other related letters are found in the Franklin D. Roosevelt Library and Museum, <http://www.fdrlibrary.marist.edu/archives/pdfs/docsworldwar.pdf>

¹¹¹ “A Petition to the President of the United States,” signed by Leo Szilard and sixty-nine others who worked at the Metallurgical Laboratory in Chicago, 17 July 1945, US National Archives, RG 77, Records of the Chief of Engineers, Manhattan Engineer District, Harrison-Bundy File, fol. 76.

¹¹² R.E. Stavert, President, CM&S Company Fortieth Annual Report for year ending 31 December 1945, confirms that Blaylock retired from the presidency in April 1945 due to ill health.

¹¹³ Eayrs, *Defence of Canada*, 274.

¹¹⁴ “Selwyn Gwilym Blaylock (1879–1945) Inducted in 1990,” http://mininghalloffame.ca/inductees/a-c/selwyn_gwilym_blaylock/

Association he is shown as a twenty-year-old McGill graduate about to start his long career with the CM&S Company.¹¹⁵

* * *

In January 1954, the Atomic Energy Control Board (AECB) at Chalk River, Ontario, further lifted the P₉ veil of secrecy. Acting on the recommendation of the sixth international declassification conference that had met the previous April, the AECB revealed the open secret that Trail had been involved in the project to build the atomic bomb.¹¹⁶ In 1955, P₉ was shut down for good when the Atomic Energy Commission (AEC) ended its contract with the CM&S Company, now Cominco. The P₉ tower, considered “outmoded and costly,” had long ago outlived its usefulness to the atomic weapons program, but half a century later it still hung mysteriously over the giant smelter and the village of Tadanac, where company managers lived.¹¹⁷ A 2004 news report called the P₉ tower “an ominous presence” and a “structure that casts a shadow over the town.” The article further dubbed it “a relic of a bygone era that has been little more than an expansive birdhouse for half a century.”¹¹⁸ In 2008, Teck, the multinational corporation that had purchased the smelter in the 1990s, decided to destroy the multi-storey building and erase that piece of local and world history.

After the bombs had fallen, Dean Mackenzie was asked if he didn’t feel a “twinge of guilt ... on learning that the apparatus which he had helped create had done its job of killing and maiming a quarter of a million people.” The head of Canada’s bomb research program replied that he didn’t feel “anything special.” Perhaps he was speaking for all of wartime Canada when he added: “You must remember we were all out for blood at that particular time. I didn’t have to ponder the rights or wrongs of the bomb. It wasn’t our baby in Canada.”¹¹⁹ But did the people of Trail have reason to feel guilt over the role of the P₉ plant?

¹¹⁵ “Project ‘g’ – Heavy-Water (Deuterium) Production,” Manhattan Project Heritage Preservation Association, Inc., <http://www.mphpa.org/classic/CP/Canada/CM&S/CM&S-or.htm>, a site dedicated to “Preserving, Exhibiting, Interpreting and Teaching the History of the Manhattan Project.”

¹¹⁶ “Trail’s Heavy Water Atom Role Is Revealed,” *TDT*, 30 January 1954, reprinted in *100 Years of Trail History*, *TDT*, 12 December 2000, 55.

¹¹⁷ Gargus and Merson, “Trail’s ‘Heavy’ Contribution,” 55, also cite a *Vancouver Province* report agreeing that production had become too costly.

¹¹⁸ “Connection to Manhattan Project kKept Secret from Design Engineer – Canadian Link to Atomic Bomb Faces Wrecking Ball,” *The Canadian Press*, Vancouver, 1 September 2004.

¹¹⁹ Eayrs, *Defence of Canada*, 276.



Figure 6. Buck Ryan gets his man. Permission for use granted by the *London Daily Mirror*.

Doug Jones, long-time president (now retired) of Local 480 of the United Steel Workers (usw), does not think so, but he remembers being puzzled at how people could forget so quickly. As a company fireman, he would visit the P9 tower when he made his safety rounds to check the sprinkler systems. “We used to just cringe when we went in there,” he remembered: “People don’t talk about it much, but the city was put in the limelight because of that tower.” Once the war ended and the bombs were dropped, “people understood what was going on here.”¹²⁰ In 2004, he visited the site of the Hiroshima bombing and vividly recalls touring the A-bomb museum with an American colleague. It was an emotional experience for both of them, and, at the end of the tour, the colleague lingered inside the museum. When Jones went in search of him, he was sitting on a bench quietly crying. “How could we have done this?” he asked Jones who placated him, saying that it was a different time and that their generation could not be held accountable for such wartime actions. Then he told the colleague about Trail making heavy water and how it was nearly used in the bombs.

The experience and the questions raised by these historical events demand more research as well as analyses that go beyond the official accounts of governments and the military leadership. Today scholars seek new answers to questions that were perhaps buried in the postwar rush to maintain control of the power of the atom. Some of those answers are to be found in local histories associated with the bomb. In her revelatory exposé of international trade in uranium, Hecht argues that nuclear historians need to take a “transnational approach fully grounded in local and regional histories, however fractured and fragmented.”¹²¹ The history of P9 is a small part of the larger history that moved the world

¹²⁰ Videotaped interview with Doug Jones, conducted by the author, Trail, BC, 10 March 2011.

¹²¹ Hecht, “Power,” 29.

into a new era of uncertain modernity, one fraught with fear and guilt over past atrocities perpetrated in the name of power and greed.

Military historians explain that, in wartime, people's human values can be altered to cope with life-and-death situations. The enemy becomes a force to defeat by any means. Fear nurtured by propaganda can allow people to justify almost any act, and the euphoria of victory can be supplanted by remorse over the devastation wrought upon other humans. For the people of Trail, and those who worked in the P9 tower, there seems little justification for such remorse. The heavy water they produced was not used in the production of the bombs, as we have seen, and, as historian Stacey notes: "Few Canadians are likely to regret that it was too late to contribute to the bombs that went down on Hiroshima and Nagasaki."¹²² Doug Jones and other citizens of the smelter city would no doubt agree with that assertion, but, as he poignantly notes "there are still people dying from the radiation" that the world's first atomic weapons left in their wake.¹²³

¹²² Stacey, *Arms*, 528.

¹²³ Jones interview.