The Bugle Call Rag

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Up and Atom

by John K. Ottley Jr.

FDR Goes Fission

Q: Did the rush to build American nuclear weapons for World War II begin immediately after U.S. President Franklin Delano Roosevelt got a letter from Albert Einstein reporting on Germany's progress in splitting the atom?

A: Einstein neither wrote the letter nor gave it to Roosevelt. It was written on 02 Aug 39 by Leo Szilard[1], a native Hungarian physicist living in the U.S. since 1938. Einstein signed it.

Alexander Sachs, (left) chief of the economic research division, National Recovery Administration, hand-delivered the letter to Roosevelt on 11 Oct 39. He insisted on reading it aloud so the President wouldn't just shove it aside.

Q: Did Roosevelt immediately grasp the letter's significance?

A: No. FDR tried to brush off Sachs. He said the letter was interesting but nuclear fission wasn't something he needed to deal with right away.

Sachs must have spoken with Einstein at length before delivering the letter because he knew its utmost importance. Desperately, he asked to discuss it further with the President the following morning. Roosevelt reluctantly agreed.

The President, alone in his wheelchair at breakfast, said, "OK, Alex, what bright idea do you have for me this time and how long do you need to explain it?"

Sachs told him that Napoleon had casually dismissed Robert Fulton's notion of steam-powered ships. This indifference, Sachs said, led to the emperor's defeat at Trafalgar.

Roosevelt replied, "So, you want to be sure the Nazis don't blow us up?"

Sachs nodded. FDR summoned his senior aide, Brigadier General Edwin Martin "Pa" Watson, and said, "This (letter) requires action."

Q: Had anyone approached the U.S. government about nuclear energy prior to that letter?

A: In March, 1939, Szilard (left), with Eugene Wigner[2] and Italian-American physicist Enrico Fermi, arranged a meeting with Admiral Stanford Caldwell Hooper, technical assistant to Admiral Harold Rainsford "Betty" Stark, Chief of Naval Operations. Fermi turned Hooper off by lecturing him on neutron physics instead of discussing weapons. The meeting went nowhere. This may have prompted Szilard to get Einstein to sign the letter to Roosevelt, giving it more weight.

Q: Was the Szilard-Einstein letter all it took to get the Manhattan Project underway?

[1]Conceived the idea of nuclear chain reaction in 1933, and, with Enrico Fermi, patented the idea of a nuclear reactor in 1934.

[2]An Hungarian expert in theoretical physics. Shared the 1963 Novel Prize in physics.

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Inside this issue:

This Month in History

April 2, 1792 - Congress established the first U.S. Mint at Philadelphia.

April 3, 1948 - President Harry S. Truman signed the European Recovery Program, better known as the Marshall Plan, intended to stop the spread of Communism and restore the economies of European countries devastated by World War II.

April 4, 1949 - Twelve nations signed the treaty creating NATO, the North Atlantic Treaty Organization. The nations united for common military defense against the threat of expansion by Soviet Russia into Western Europe.

April 6, 1917 - Following a vote by Congress approving a declaration of war, the U.S. entered World War I in Europe.

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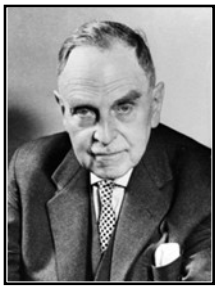
A: No. Dawdling began. Roosevelt created an *ad hoc* Uranium Committee, chaired by Lyman James Briggs, director of the National Bureau of Standards. As if scientists didn't already know many of the answers, the committee was to check into nuclear fission and make recommendations.

Progress was slow. One member complained, "It feels like we are swimming in syrup". Briggs was not well, More time was lost as he underwent an operation. The committee did not grasp potential military uses of nuclear fission.

Q: While the committee plodded, did Germany get ahead of us?



A: In December, 1938, German chemist Otto Hahn[3] (right) bombarded uranium with neutrons. Together with associates Lise Meitner and Friedrich Wilhelm "Fritz" Strassmann, he observed that barium emerged as a byproduct. Also, an enormous amount of energy was created in the process.

The three scientists knew they'd done something big, but apparently didn't fully understand what. In 1939, they used the term "uranium fission" in a scientific paper—possibly its first appearance in print.

Szilard and Fermi at once saw the military possibilities of the Hahn group's experiment. They didn't conceive of a nuclear bomb at that point. Their thought was to sail a nuclear reactor to enemy shores and detonate it remotely.

Q: Where did Hahn get the idea of bombarding uranium?

A: Most likely from Frederic and Irene Joliot-Curie who, in 1933, shot alpha particles into aluminum foil near Paris. The foil became radioactive.

Q: Had anyone thought of an atomic bomb?

A: In his 1923 best seller, *The ABC of Atoms*, Bertrand Russell wrote that atom splitting would lead to powerful bombs. It was a central theme in *Wings over Europe*, a 1928 Broadway play by Robert Nichols and Maurice Browne.

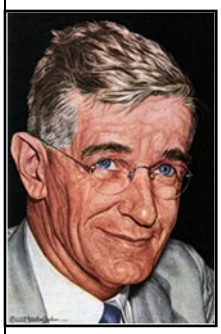
Of course, this is somewhat like assuming that we learned everything we need to know about space exploration after reading the Flash Gordon comic strip.

Q: Did the Uranium Committee finally get into high gear and recommend development of a nuclear weapon?

A: In his 39 years in civil service, Briggs had learned not to make decisions rashly. The committee finally concluded that nuclear fission needed further study and the government should throw money at it. It arranged a $6,000 grant to Columbia University for Fermi to conduct experiments.

Q: Did the 10 May 40 fall of France to Germany convince FDR that the U.S. would be drawn into WWII and thus prompt him to give the go-ahead on a nuclear bomb?

A: By no means. He opted for still more study. On 12 Jun 40, the President formed a National Defense Research Committee (NDRC). He appointed as chair



Vannevar Bush[4] (left), president of the Carnegie Institution in DC. NDRC would have broad authority to look into science and technology to meet wartime needs.

Bush was dismayed. Since the U.S. wasn't at war, nobody seemed to be taking nuclear fission seriously. Many scientists familiar with it showed more interest in how fission might affect power generation and medical research.

Q: While this was going on, did Germany move briskly ahead with nuclear weapons development?

A: Sort of. In 1922, Union Miniere (UM), a Belgian company, began mining uranium in the Congo, By 1926, it had a monopoly on the world's supply. Most of it was refined by UM at Olen, Belgium. German scientists got access to some of that uranium.

[3]Won the Nobel Prize for Chemistry in 1944.
[4]Later led the team which built a reactor at the University of Chicago. It went critical 02 Dec 42 achieving the first sustained nuclear reaction.
[5]The Pearl Harbor raid was six months away.

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Germany invaded Norway 09 Apr 40, eventually taking over Norsk Hydro at Vemork (left). It was the first commercial plant capable of producing heavy water as a byproduct of fertilizer.

Heavy water contains deuterium and is important as a neutron moderator in nuclear fission.

This convinced Britain that Germany was serious about making an atomic bomb.

Q: Did England have the necessary resources to produce atomic weapons?

A: Barely, if at all. The UK began a modest atomic energy program, but didn't get very far with it due to technical complexity and cost.

In April, 1940, two German refugees living in England—Otto Robert Frisch and Rudolph Ernst Peierls—stated that a "superbomb" could be made by separating Uranium 235 from less fissionable—and more abundant--Uranium 238. They claimed it would have the explosive power of thousands of tons of TNT.

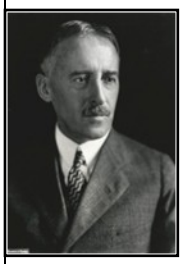
To explore this hypothesis, England created the Military Application of Uranium Detonation Committee (MAUD) under the cover of the Air Ministry.[6]

MAUD concluded that Frisch and Peierls indeed were onto something huge and, in July, 1941, advised British Prime Minister Winston Spencer Churchill that a bomb of "unprecedented violence" would be feasible. It could be made from U-235 or plutonium[7] and produced in as little as two years. Britain, however, couldn't afford it. Its economy already was stretched wafer thin by conventional weapons expenditures.

MAUD established liaison with Briggs in early 1941. It sent NRDC a copy of its report to Churchill. Bush saw possibilities he'd never considered. On 09 Oct 41, he met with Roosevelt and Vice President Henry Agard Wallace to alert them that making a nuclear bomb would cost millions.[8] This time—almost two years after the Szilard-Einstein letter--Roosevelt got it. He went all in. If a nuclear bomb was to be built, we needed to do it first. It was one of his presidency's most memorable decisions.

Q: Did this decision prod Roosevelt to more aggressive action?

A: FDR formed a new organization, the Top Policy Group, which was to have technical supervision of the bomb project. On 28 Jun 41, the group was renamed Section 1 (S-1) of the Office of Scientific Research and Development (OSRD). It was headed by Bush. Membership, although restricted in the interest of secrecy, included Wallace[9], War Secretary Henry Lewis Stimson (left), Army Chief of Staff George Catlett Marshall, and James Bryant Conant, president of Harvard and chairman of NRDC.



The S-1 group met 19 Dec 41—12 days after Pearl Harbor—and charged the Army Corps of Engineers with building facilities to develop the bomb.

Q: Did the Corps of Engineers create a new engineer district for the project?

A: Chief of Engineers, MG Eugene Reybold created a new engineer district for the project and selected COL James Creel Marshall to head it. Marshall set up shop at 270 Broadway in New York City.

Engineer districts usually are named for a city within their geographic boundaries. This project was to be nationwide in scope, so Marshall named it "Manhattan Engineering District". The original project codename was "Development of Substitute Materials", but later was changed to "Manhattan Project".

Q: How did COL Leslie Richard Groves, Jr., (right) enter the picture?

A: Groves commanded the Corps's Construction Division and had supervised building the Pentagon. He worked closely with James Marshall at the Manhattan Project's beginning.

[6]The British nuclear program was code-named Tube Alloy.
[7]First produced on 14 Dec 40 by firing deuterium into U-238. Made into useful quantities by the Manhattan Project.
[8]Bush originally thought NRDC would need to spend $167,000.
[9]Ironically, Wallace was fully in on nuclear developments whereas his successor, Vice President Harry S. Truman, was told nothing about nuclear weapons development.

Up and Atom—To Be Continued in the May BCR

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Next Meeting — April 12, 2018

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	EC	6	6
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

April Speaker:

Al Alberghini (PC)

Topic:

"The long and rocky road from Muzzle loaders to the 1903 Springfield Rifle "

Teasers:

What really happened to Custers Rifles?

Why was the Trapdoor rifle ever produced?

Was the Mauser, K98 the first?

How was the Springfield 1903, designed built, tested and in production in less than 5 yrs.

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