

The bomb—the end of the world?



COULD THE FIRST A BOMB SET OFF A CHAIN REACTION THAT WOULD BLOW UP THE EARTH? NOBODY KNEW.

end of the world?

By PEARL S. BUCK



One Nobel Prize winner interviews another to take you behind the scenes of the most dramatic true adventure of our times

THE MOST IMPORTANT THING that faces us all today is the atom. On the one hand it threatens us with annihilation; on the other it holds out the promise of a life of plenty, surpassing our wildest dreams. How did we get into this desperate situation? Is it within our power to choose between the alternatives? If so, how do we proceed and what do we do?

Haunted by these questions, as everyone must be, I decided to seek out the man who, it seems to me, is best equipped to answer them. He is Dr. Arthur Holly Compton, winner of a Nobel Prize, Chancellor of Washington University, and a former director of the Manhattan Project, which developed the first atomic bomb. In a very real sense he is the father of the new age that both terrifies and exhilarates us.

I found him in his office at Washington University, in St. Louis, Missouri.

He is a handsome man, with the tall, strong frame of an athlete, still vigorous though no longer young. He has a nobly shaped head, the hair is white but plentiful, and the profile bold. A small clipped mustache is above lips of extraordinary sensitivity, the eyes are deep blue and set beneath straight brows.

His hands, clasped on the desk, were large and strong, the hands of a workman. I knew that here was a scientist who worked not only with his brilliant brain but with his hands to make the tools he needed.

I had read—and he modestly confirmed it—

that he had forged the metals and glass for the first neon sign. The company, which was his employer in those days of his first jobs, saw no use for the strange new light and could not believe that it would be a commercial success. Another company with more imagination put it on the market, and today neon light glitters everywhere in the world.

"You supervised the making of the bomb," I said. "You even helped to make it. And you had, more than anyone else, perhaps, the responsibility for deciding to kill thousands of people in one great flash of fire. Was it necessary to do this?"

Outside the window a maple tree flamed with red and yellow leaves. Students, boys and girls, were sauntering across the campus. The room was flooded with pale, autumn sunlight. And yet, a shadow had settled on Arthur Compton's face. Watching him, I recalled, with a feeling of incongruity, that the family background of this man who had opened the Pandora's box of nuclear weapons was not unlike my own.

We are both children of Presbyterian ministers. His childhood home, like mine, was imbued with the atmosphere of Christian teaching and the practical application thereof. There was more than a strain of pacifism, too. His family on his mother's side came of a pacifist Mennonite sect, related to the Calvinists and the Quakers.

It was to the son of such parents, then, that I put my questions this fine fall morning, to the

man and the scientist, a Christian man, a great scientist. What were the crises of mind and spirit through which he passed from the first inception of the bomb until the decision to use it?

Step by step, he began to outline for me the development of the atomic project. In September, 1941, he said, it became apparent to American scientists, and others in exile from many countries, that nuclear energy might have wartime significance. The foreign scientists reported that the Nazis were experimenting with nuclear energy for use in the war. This being true, there remained only one choice—the United States must develop the energy first.

Practical, vigorous, amazingly efficient, the forces of science, industry and government were assembled. Great centers were built in three widely separated areas of the country. Scientists were appointed for specific tasks in Oak Ridge and Los Alamos. At Hanford on the Columbia River, industry built its immense factories for mass production of the precious material.

Each day's work included decisions of terrifying magnitude. After it was known that atomic explosion by fission was possible, there was the question of control. At the tremendous heat necessary—the heat that generates the eternal fires of the stars and the sun—the radiant heat that transmutes one metal into another, how could the explosion be controlled?

Even after control was proved practical at Stagg Field, Chicago, (Continued on page 11)

ILLUSTRATED BY FRANK GOLDEN

Oppenheimer's voice on the phone was anxious—he had to see Compton right away

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under the direction of Italy's Enrico Fermi, there arose the supreme crisis in regard to the possible consequences of such an explosion out in the open.

To me, this is the most dramatic moment in the most dramatic story of mankind. Here is the story of that moment:

One certain week end in July of that year Arthur Compton, on his doctor's advice, went to his summer home at Otsego, Michigan, for a few days rest. He had been inhumanly busy. For two years, experimental data had been collected from various university laboratories.

Now it was necessary to devise and build atomic bombs based on that data. Someone must be found who could head up this tremendous task, someone not only of the highest scientific qualifications, but someone who had such administrative skill and human understanding that he could gather together a group of temperamental top-level scientists and keep them working in contentment and cooperation, although this work must be done in some remote place far from the relief of usual social relaxation and contacts.

Compton decided upon Robert Oppenheimer as the man, and General Leslie Groves, who headed the Manhattan Project, decided upon Los Alamos, New Mexico, as the place. Oppenheimer accepted the assignment and proceeded with his usual brilliance and efficiency.

With all this done—on that warm July evening as he drove toward Otsego Lake—Arthur Compton looked forward to a few days rest and calm. His wife and son were with him as he followed the quiet road to the local store where, in their absence, the keys to their house were kept. As he entered the store the telephone was ringing urgently. It was a call for Arthur Compton.

He lifted the receiver and heard Oppenheimer's anxious voice. He and his fellows had found something very disturbing—dangerously disturbing... No, it could not be mentioned over the telephone. How soon could he see Compton?... Yes, immediately, without an hour's delay... He could not come by plane. Scientists essential to the making of the atomic bomb were forbidden by government orders to travel by plane. It would have to be by train...

"I'll never forget that morning," Arthur Compton said.

He met Oppenheimer after a sleepless night. The morning was beautiful and calm, the sky clear, the sunshine warm. Oppenheimer's message had to be delivered where no one except Compton could hear. The safest place was outdoors, and they drove down to the beach by the lake. There he listened to Oppenheimer's story. Briefly, it was that the scientists under his leadership had discovered the possibility of nuclear fusion (as distinguished from simple fission). In other words, the principle of the hydrogen bomb.

It was the supreme danger, tremendous and unknown, much worse than atomic explosion.

"Hydrogen nuclei," Arthur Compton explained to me, "are unstable, and they can combine into helium nuclei with a large release of energy, as they do on the sun. To set off such a reaction would require a very high temperature, but might not the enormously high temperature of the atomic bomb be just what was needed to explode hydrogen?"

"And if hydrogen, what about the hydrogen in



While Karl Compton (right) worked to invade Japan brother Arthur faced a terrible decision.

sea water? Might not the explosion of the atomic bomb set off an explosion of the ocean itself? Nor was this all that Oppenheimer feared. The nitrogen in the air is also unstable, though in less degree. Might not it, too, be set off by an atomic explosion in the atmosphere?"

"The earth would be vaporized," I said.

"Exactly," Compton said, and with what gravity! "It would be the ultimate catastrophe. Better to accept the slavery of the Nazis than to run the chance of drawing the final curtain on mankind!"

The two scientists talked together for a long time that morning by the lake. Never before had men faced such a terrifying decision. They agreed at last that they could only proceed with the project while continuing to explore the potential danger. Oppenheimer and his team must go on with their calculations. Unless they found a firm and sure conclusion that atomic bombs would not explode the air or the sea, the bombs must not be made.

The work went on. During the next three months scientists in secret conference discussed the dangers of fusion but without agreement. Again Compton took the lead in the final decision. If, after calculation, he said, it were proved that the chances were more than approximately three in



Oppenheimer and Gen. Groves on the spot at Alamogordo where "we caught a big fish."



Robert Oppenheimer's "team" had to figure the risks before the A-bomb could be dropped.

one million that the earth would be vaporized by the atomic explosion, he would not proceed with the project. Calculation proved the figures slightly less—and the project continued.

Two years later the first all-or-nothing test was made in Alamogordo, New Mexico. On the morning of the 16th of July, 1945, Chicago newspapers reported the explosion of a vast munitions dump in the desert of New Mexico with extraordinary light effects. That night Compton had a telephone call from Oppenheimer.

"You'll be interested to know that we caught a very big fish," he said.

Proof that Arthur Compton had made the right decision back in 1943.

Meanwhile, the need for another decision had arisen in regard to the dropping of the atomic bomb itself. It was the end of May, 1945. Germany had surrendered. President Roosevelt had died. The war with Japan was at its crisis and centered in the struggle for Okinawa. The Japanese were fighting desperately, beaten but unwilling to acknowledge it.

"Our problem," Arthur Compton told me, "was to bring the war to a close as quickly as we could and thus save the maximum number of lives."

The danger was that a group of fanatical militarists in Japan would insist upon fighting to the end and thus force an American invasion. They had convinced their people that the invasion would be brutally cruel and that the invaders would try to destroy the entire populace. By this means, they hoped to induce a suicidal resistance. It was conservatively estimated that two million Japanese and one million Americans would die if there were an invasion.

Anticipating such an invasion, Compton's brother, the late Karl Compton, then President of the Massachusetts Institute of Technology, went to Manila as Director of the Field Service of OSRD (Office of Scientific Research and Development) and set up a branch of the Radiation Laboratory there to supply and service the radar equipment needed for the invasion and the occupation, a period estimated at 18 months. The date for the landing on the island of Kyushu was set for November 1.

Kyushu! The name brought back happy memories to me. I had spent many months on that beautiful Japanese island. The city of Nagasaki was as familiar to me as my home town. High in the mountains, which make a backdrop for the city, I had lived near the hot springs of Unzen.

"I am glad that I had not to make the decision to bomb that lovely place," I told Arthur Compton.

Looking at me with somber eyes he said, "Don't think it was an easy decision for anyone..."

NEXT WEEK: The bomb — did we have to drop it?