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By Hartmut Sommerschuh
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The hunt for the bomb

Eighty years ago, the US Air Force bombed the city of Oranienburg. Their target: the Nazi nuclear program

Hartmut Sommerschuh is an author living in Potsdam. From November 1989 to 2016, he was editor-in-chief and editor of the environmental television series "Ozon," which was initially broadcast on *German Television* (*DFF*) and subsequently on *East German Broadcasting Brandenburg* (*ORB*) and *RBB* .

The race for the atomic bomb between the Russians and Americans was already part of the Cold War. It began in the small town of Oranienburg, north of Berlin, on the Havel River. Its bombing on March 15, 1945, including 4,000 long-delay bombs by the 8th US Air Force, was unprecedented in the history of war. It targeted the Auer Works, which processed uranium for the Nazi atomic research program. Nothing was to fall into the hands of the Red Army. That failed. But more than 250 unexploded bombs still keep the city on edge.

When the B-17 bombers of the 8th US Air Force were being loaded with incendiary and high-explosive bombs at night on March 15, 1945, at an airfield in central England, the 3rd Air Division received a special cargo: 4,000 long-duration, vane-fuse bombs. During the

drop, the wind spun a rod ever further into the tail, crushing an ampoule of acetone. This disintegrated a celluloid ring holding the firing pin. Depending on their size, the bombs would take hours or days to explode. Even the pilots didn't know the reason or their true target. Their mission orders were Oranienburg loading station, "M/Y: Marshalling Yard." Not the Auer factory next door.

The Auer Works

Company founder Carl Auer von Welsbach discovered the luminous power of heated, weakly radioactive salts and developed the mantle for gas lanterns and later, light bulbs. With his involvement, the Berliner Gasglühlicht-Gesellschaft, later Auer-Gesellschaft, was founded in Berlin in 1892. The Osram brand also traces its origins to him. In 1903, parts of production were relocated to Oranienburg, where chemical plants had already existed since 1820. The Auer plant for "rare earths" was built.

The residents were amazed when huge quantities of sand arrived by ship and rail – monazite sand from India and Brazil. Thorium nitrate and cerium nitrate were extracted from it for the mantles. A gas flame made the salts glow. Large quantities of sand initially remained as waste. Until scientists commissioned by management discovered other rare earth elements: neodymium, samarium, and radioactive substances such as uranium oxide. Successful products were created: anti-glare eyeglass lenses, cancer cures, and the radioactive toothpaste "Doramad."

In 1927, Nikolaus Riehl, born in Saint Petersburg as the son of a Siemens engineer, joined Auer. He had received his doctorate under Lise Meitner and Otto Hahn and was interested in radioactive substances and the mesothorium discovered by Otto Hahn. His particular passion was luminescent substances.

Riehl developed self-luminous paints, X-ray screens, and the well-known fluorescent tube. Between 1926 and 1928, the Auer Works, with 900 well-trained skilled workers, was Oranienburg's largest company. In 1934, the company became part of Degussa AG in Frankfurt am Main. Until then, its main shareholders had been the Jewish banker and entrepreneur Leopold Koppel and his son Albert. After the "Aryanization," the Third Reich's melting furnaces of the "German Gold and Silver Refining Institute" (Degussa) also processed the dental gold of murdered Jews. The subsidiary Degesch ("German Society for Pest Control") supplied Zyklon B for the gas chambers.

As early as 1936, when the "Four-Year Plan" was adopted, the actual goal appeared in secret memoranda: "The German economy must be fit for war within four years." For the Auer

Works, this marked the start of research and production of the new "VM37" people's gas mask. Its tightness was measured using radioactive indicators from Riehl's laboratory and even tested on Oranienburg schoolchildren, as Hans Biereigel, local historian and former director of the Sachsenhausen/Oranienburg National Memorial, discovered.

After the outbreak of the war, female concentration camp inmates from Sachsenhausen, Russian forced laborers, and prisoners of war worked for gas mask production at the Oranienburg-based "Auer-Gesellschaft AG Berlin, Schutzhaftlager Werk II-Oranienburg." They lived next door behind barbed wire in hastily erected barracks without the protective bunkers that existed beneath the factory buildings. Gas masks were exported as far away as Ankara. Armaments contracts accounted for 80 to 90 percent of Auer-Werke's sales from 1942 onwards.

The uranium project

On December 17, 1938, Otto Hahn discovered nuclear fission at the Kaiser Wilhelm Institute in Berlin-Dahlem. After irradiating uranium with neutrons, his assistant Fritz Strassmann discovered fission products such as barium, which could only have been created artificially. Hahn's colleague Lise Meitner, who, as a Jew, had already emigrated to Sweden that summer, and her nephew Otto Frisch, a physicist under Niels Bohr in Copenhagen, offered a theoretical interpretation of the process in a correspondence with Hahn in January 1939: Apparently, atomic nuclei "burst," "split," when bombarded with neutrons. This fission of uranium nuclei became the prerequisite for both civilian and military applications. While leading physicists dreamed of the peaceful use of nuclear fission in a "uranium machine," the Army High Command decided on its own research project, the "Uranium Project"—after all, nuclear physics promised entirely "new explosives."

Nikolaus Riehl, who became director of the "Scientific Center" at Auer-Werke after his habilitation in 1938, saw the production of "purest uranium" as a key task. Degussa's metallurgical experience provided good conditions for "converting uranium into the metallic state."

Riehl was among the first scientists to write to the Army Ordnance Office with hopeful insights into the discovery. As early as September 1939, a meeting between scientists and military personnel took place in Berlin-Dahlem. The Auer Works was asked whether they could provide several tons of uranium compounds from their reserves. The factory management immediately commissioned the construction of a production facility for uranium oxide under Riehl's direction, and later also for the smelting of uranium metal. By the end of

1940, 240 kilograms of high-purity uranium metal were ready for testing. The research association, led by the Reich Research Council, included the Auer Works, the Kaiser Wilhelm Institutes, companies such as Siemens, AEG, and the Reichspost. The first reactor tests took place from 1940 in Gottow under the direction of nuclear physicist Kurt Diebner, in Berlin-Dahlem under Werner Heisenberg, and at the Institute of Physical Chemistry at the University of Hamburg under Paul Harteck.

At the Gottow Chemical-Physical Testing Facility south of Berlin, Kurt Diebner attempted to develop a "working" nuclear reactor. He and his team conducted several series of experiments using a neutron source, metallic uranium cubes, paraffin, and heavy water. The uranium came from the Auer Works, and the heavy water from the Vemork plant of Norsk-Hydro in Wehrmacht-occupied Norway. However, until the end of the war, no chain reaction was achieved. The quantity of uranium cubes for the three reactor sites and a chain reaction was insufficient; Heisenberg, Diebner, and Harteck constantly argued over the small quantities.

Since the occupation of Czechoslovakia in March 1939, Auer also sourced its uranium ore from the Sankt-Joachimsthal (Jáchymov) mine. After the occupation of Belgium, 1,100 tons of ore came from Katanga in the Belgian Congo. After the invasion of France in 1940, the Auer company also took over the Alsatian "Institute for Rare Earths" (Société de Terres Rares), and thus France's entire thorium reserves.

By then, the news of nuclear fission had long been around. The Danish quantum physicist Niels Bohr announced Hahn's discovery as early as January 1939 at the Fifth Conference on Theoretical Physics in Washington, D.C. On August 2, Einstein signed a letter to U.S. President Franklin D. Roosevelt in which he pointed out the consequences of the discovered nuclear fission, the potential construction of atomic bombs.

In the Soviet Union, after the German invasion, Stalin felt compelled to respond to the Americans' advanced bombing project and rumors of a German atomic project. In 1943, he agreed to resume his own atomic program, under the direction of physicist Igor Kurchatov.

Breach of secret?

At the beginning of July 1942, the 25-year-old Soviet doctor Galina Romanova was deported to Germany with 107 other doctors for forced labor. At the end of 1942, she was sent to the "Eastern Workers Camp" at Plant II in Oranienburg to care for her fellow countrymen. There, she heard from the young women in various departments about the secrets surrounding "Plant I," where only selected, predominantly German skilled workers worked. Access was strictly

forbidden. Uranium oxide production took place there. Romanova passed her information on to the illegal resistance group "European Union," led by Georg Groscurth and Robert Havemann. Both were chemists at the Kaiser Wilhelm Institute for Physical Chemistry in Berlin.

Groscurth, now the director of the Moabit Hospital, secretly provided Galina Romanova, who was allowed to travel freely on the S-Bahn, with medication. After the resistance group was betrayed, he was executed in Brandenburg in May 1944. Galina Romanova was executed after many days of torture on November 3, 1944, in Berlin-Plötzensee. Whether their information reached the Americans or the Russians is unknown. But Reich Justice Minister Otto Georg Thierack ordered the Gestapo to keep "the Romanova affair" strictly secret.

Oranienburg experienced two air raids in 1944, and five shortly before the end of the war. With more than 20,000 bombs dropped, it was one of the most heavily bombed small German towns.

The Heinkel factory built Göring's infamous bombers here; it housed the headquarters, the main material depot, and the SS vehicle fleet, as well as an airfield. Bunkers were built at the Auer factory, and another factory was built in Berlin-Grünau, which produced uranium metal in four vacuum melting furnaces starting in late 1944.

Due to the air raids on Berlin in 1943, research director Nikolas Riehl retreated with his family and other colleagues, including Erwin Klinge, Günter Wirths, and Karl Zimmer, to Kagar near Rheinsberg. There, he lived in a single-family home and continued experimenting in a water mill in neighboring Zechlin, producing uranium cubes from powder at a melting temperature of 1,100 degrees Celsius. The ultimate goal, as Riehl's notes state, was to melt "purest" uranium metal from uranium oxide.

Race with the Soviets

After the founding of the American Manhattan Project to build an atomic bomb, the Oak Ridge National Laboratory was established in Tennessee for the production of enriched uranium – one of 37 secret facilities. More than 150,000 people worked directly or indirectly on the atomic project under the strictest secrecy. Its chief, General Leslie Groves, sent uniformed agents to France during the Normandy landings. Under the secret service name "Alsos," they were to spy on whether a German nuclear program existed. Colonel Boris Pash was in military command.

At the end of August 1944, the Allies reached Paris. Alsos's team encountered the physicist Frédéric Joliot-Curie in his university laboratory. After winning the Nobel Prize in Chemistry

in 1935 for the discovery of artificially generated radioactivity, Frédéric and his wife Irène had almost discovered nuclear fission themselves during further experiments. After the Wehrmacht occupation in June 1940, Frédéric remained alone in the city. German nuclear physicists led by Kurt Diebner confiscated his half-finished cyclotron, demanding the results. But as supporters of the French Resistance, he and his wife had destroyed many documents or smuggled them to London.

On August 29, Frédéric Joliot-Curie was flown to London by Alsos's team to report on the German uranium project. To avoid supporting the American bombing plans, he didn't reveal any scientific details. He did, however, reveal the names of the Germans who had worked in his laboratory: Erich Schumann, Walther Bothe, Kurt Diebner, Abraham Esau, and others.

At the beginning of September, Alsos's people found evidence of uranium deliveries from the Belgian Congo to the Auer works in Oranienburg in the Brussels office of the Belgian uranium producer "Union Minière du Haut-Katanga." At the beginning of November, the Swiss chemist Ernst Nagelstein recounted in Paris what he had heard from a friend in Berlin: Otto Hahn was building a bomb using metallic thorium or uranium from the Auer works.

The Soviet Union was similarly aware of this. On November 15, 1944, a report by the Soviet military intelligence agency GRU stated: "The Germans are about to conduct tests of a new secret weapon with great destructive power. Test explosions of bombs of unusual design are being prepared in Thuringia under the strictest secrecy."

When Strasbourg was captured at the end of November, Boris Pash and his Alsos men searched the university in vain for the physicist Carl Friedrich von Weizsäcker, who had fled. But they found files and letters. From these, they concluded that Germany did not yet possess a bomb.

Now there was a problem for Manhattan chief General Leslie Groves. Oranienburg lay in the future Soviet occupation zone. The Anglo-American troops were just attempting to cross the

Rhine, while the Red Army had been stationed along a 500-kilometer front along the Oder since February. This was the reason why Groves reacted. After summarizing all of Alsos's reports in mid-February 1945, "he sent an emissary to General Spaatz, the Supreme Commander of the Strategic Air Forces in Europe, and asked him to destroy the Auer factories so they would not fall into Russian hands."[1]

The attack

March 15, 1945, was a Thursday. For the first time, the management of the Auer Works had declared a "coal day," as Oranienburg regional historian Hans Biereigel has discovered. Production had been curtailed due to a shortage of fuel. All of the approximately 6,000 German factory employees, who usually came from Berlin, Nauen, Birkenwerder, and other places, were instructed to help build tank traps and trenches in their hometowns that day. Only the female concentration camp prisoners and forced laborers at Plant II were not given the day off. They remained unprotected.

At 1 p.m., *BBC London* broadcast news in German. It ended with a warning: "Attention, attention. The population of Oranienburg is requested to leave the town immediately. It is being bombed."

The 1,350 bombers of the 8th US Air Force, which had taken off from England that morning, were already approaching. They separated near Haldensleben, north of Magdeburg. Half flew straight ahead to the Wehrmacht High Command in Zossen as a diversion. The entire 3rd Air Division and part of the 1st Air Division swung northwest toward Oranienburg, carrying 4,000 long-duration bombs.

At 2:50 p.m., the first bombs fell on the city. Further groups of bombers followed at intervals of three minutes. As the company fire brigade shuttled between Plant I and Plant II, it suffered a direct hit. Within 50 minutes, almost 2,000 people died, half of them concentration camp prisoners and forced laborers, including those working at Plant II of the Auer Works. For days, the long-lasting fuse bombs exploded, hampering firefighting efforts. Concentration camp prisoners, in particular, were forced to defuse unexploded bombs with the most primitive tools.

What the Americans didn't know: The Soviet intelligence chief had been receiving a report on the status of US activities since February 28, 1945, and was also informed about an incident in Ohrdruf, Thuringia. There, Kurt Diebner, who had moved with all his equipment from Gottow in Brandenburg to Stadtilm in Thuringia, had detonated a bomb of an unknown type on March 4, 1945. A bright column of light, according to an eyewitness, "expanded

upwards like a tree." A report from the Soviet military intelligence agency GRU to Stalin stated: "Trees were felled from the center of the explosion to a distance of 500 to 600 meters. (...) Prisoners of war who were in the center of the explosion were killed, and often no trace of them remained." What exploded there, perhaps a dirty bomb containing some uranium and a lot of explosives, remains unclear and disputed to this day.

Intelligence chief Lavrentiy Beria suggested sending key nuclear physicists to Germany, dressed in military uniforms so they could issue orders. With the advancing Soviet army, they found patents, documents, and laboratory equipment in Oranienburg at the end of April 1945. They also found treasures in Kagar, Zechlin, and Thuringia. They collected a total of 330 tons of various uranium compounds and seven tons of metallic uranium. While the Americans discovered over 1,000 tons of pure uranium in Staßfurt, Saxony-Anhalt, and the experimental reactor of Werner Heisenberg and Carl Friedrich von Weizsäcker in a beer cellar in Haigerloch, Baden-Württemberg.

The most important catch

Two Soviet physics professors in uniforms with the rank of "colonel" brought Nikolaus Riehl from Kagar to Berlin-Friedrichshagen, where Lavrentiy Beria's deputy, Avraami Zavenyagin, once Minister of Mining and later Minister of Atomic Energy, led the interrogations and investigations. Riehl was twice taken to the destroyed Auer Works, where everything still usable was dismantled. Finally, in early June 1945, he arrived in the Soviet Union with his family and 300 other scientists. Among them was the group led by electronics specialist Manfred von Ardenne.

After weeks of searching for a suitable location, a new uranium production facility was built under Nikolaus Riehl's direction 70 kilometers south of Moscow in an empty munitions factory at "Electric Steelworks No. 12." In the difficult process of procuring equipment and materials in the war-torn Soviet Union, he was often only helped by ministerial and intelligence orders. Despite government pressure, it became a success story for Riehl. As he writes in his 1988 book "Ten Years in the Golden Cage," the production of "several tons of reactor-pure uranium" in the form of spherical pellets was already achieved by early 1946. In December 1946, the first experimental nuclear reactor, "F1," on the outskirts of Moscow, went "critical" for the first time, fed with everything that had been found in Oranienburg and other locations. On August 29, 1949, the first Soviet atomic bomb was detonated.

When fuel element production was going well in 1950, Atomic Energy Minister Savenyagin appointed Nikolaus Riehl as scientific director of a new institute for isotope research in

Sungul in the Urals. It wasn't until 1955, after many application difficulties, that Riehl and his family returned to Germany—bearing the Order of Stalin, the Order of Lenin, and the title of "Hero of Socialist Labor." He went to the Institute of Technical Physics at the Munich University of Applied Sciences, co-developed the research reactor in Garching, and became director of the Laboratory of Technical Physics at the Munich University of Applied Sciences.

It was not without reason that Truman gave his consent to the dropping of the atomic bomb on July 25, 1945, while at the Potsdam Conference with Churchill and Stalin. Earlier, Leslie Groves had told a British scientist: "The real purpose of the atomic bomb is to suppress our main enemy, the Russians."

UXOs

Using boreholes, magnetic probes, and radar waves, the Munitions Recovery Service continues to search the city of Oranienburg, street by street, meter by meter. Allied aerial photographs have been helpful since 1997, and a report by Cottbus-based contaminated site expert Wolfgang Spyra has been available since 2008. At the time, he suspected there were more than 300 unexploded bombs, ready to explode at any moment.

They usually penetrated the soft Oranienburg soil at an angle, followed a circular trajectory in the depths, and landed with the tip pointing upward. This meant that the acetone did not hit the firing pin's retaining ring, but instead ran backward and evaporated unpredictably. Since 1977, there have been six self-detonations. Two hundred bombs have been defused in the GDR, over 230 since the fall of the Berlin Wall. When a bomb with an acid fuse suddenly detonated on its own in Göttingen in 2010, one hour before it was due to be defused, two bomb disposal experts and their assistant were killed. A sad reminder.

Because Oranienburg's burden, as well as its experience in bomb searches and defusing, is unique in Germany, the state of Brandenburg declared it a "model region" in 2019. Every year, the city must set aside approximately four million euros for bomb searches. The costs of lowering the groundwater level, which is often necessary, alone are immense. There have been repeated unsuccessful petitions for the federal government to contribute more to the costs. Now Oranienburg is trying to attract more attention as a "center of excellence."

Notes:

1 Air warfare expert Helmut Schnatz and economic historian Rainer Karlsch (»Hitler's Bomb«, 2005; »Pros and Cons of Hitler's Bomb«, 2007) first wrote about this in 1998 in the journal for art and culture in mining, *Der Anschnitt (The Cut)*. This quote is from an

interview with Helmut Schnatz in the RBB television program »*OZON* «: »The Secret of the Bombing of Oranienburg« on March 26, 2012.