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How the CIA Missed Stalin's Bomb

Dissecting Soviet Analysis, 1946-50

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When the CIA's Office of Reports and Estimates (ORE) was finally organized out of existence in late 1950, many were eager to dance on its grave. In its brief existence, ORE had managed to isolate itself bureaucratically from virtually the entire defense and foreign policy establishment and estrange itself from the nascent Intelligence Community. It had been the subject of repeated investigations, all of which condemned its performance almost without reservation.[1]

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Although many reasons were cited for reorganizing the CIA's analytical structure, the failure to accurately predict the Soviet Union's explosion of its first atomic bomb in 1949 was foremost among the specific points mentioned. In view of the importance attached to this failure, it is worth examining it in some detail. What exactly did ORE say about the Soviet atomic energy program? What evidence was available, and how did ORE make use of this material? Although there is no denying the CIA's failure in this regard, perhaps the most interesting element of its judgment concerning the Soviet atomic bomb is the intellectual context in which it was made.

ORE's Mission

Strictly speaking, ORE's primary function was not intelligence research, but correlation and evaluation of intelligence coming in from diverse sources. As conceived, ORE sat at the peak of an intelligence pyramid and was responsible for “national” judgments based on analyses from the “departmental” intelligence services located below it in the pyramid. The resulting products were the reports commonly known as intelligence “estimates”—finished analyses that drew upon the resources of the entire Intelligence Community. The idea, of course, was to prevent the lack of communication and coordination of intelligence that was believed to have led to disaster at Pearl Harbor in 1941. The effect was to implant an analytical concept that focused more on the broad national-level perspective than developments in specific fields.

Supposedly, individual topics of “national concern”—that is, subjects that transcended the more focused interests of specific departmental agencies—were granted “exceptions” to this general rule. The Soviet atomic bomb certainly fit into this latter category. Intelligence on Soviet atomic research was made the responsibility of the Nuclear Energy Group in the Scientific Branch of ORE, whose mandate included providing the Atomic Energy Commission with relevant intelligence and serving as its point of contact with the intelligence agencies of the US government.[2] Thus, ORE was responsible for producing the Intelligence Community's best judgment on when the Soviet Union would first produce an atomic bomb.

Earliest Prediction

The Intelligence Community's first judgment on Soviet atomic capability was made very early in the Cold War. It appeared on 31 October 1946 in one paragraph of ORE 3/1, a short, but wide-ranging estimate on the progress of a number of Soviet weapons programs. Although ORE had very little evidence on which to base its analysis, it made a fairly definitive judgment:

It is probable that the capability of the USSR to develop weapons based on atomic energy will be limited to the possible development of an atomic bomb to

the stage of production at some time between 1950 and 1953. On this assumption, a quantity of such bombs could be produced and stockpiled by 1956.[3]

The projection contained in ORE 3/1 persisted, without major alteration, until 29 August 1949 when the first Soviet nuclear test—"Joe-1"—put an end to speculation. In the nearly three years between the appearances of ORE 3/1 and Joe-1, ORE revisited the question on a regular basis and refined the judgment, but the principal effect was to increase the weighting toward 1953. In other words, with analysis, ORE's projections became more precise but less accurate. In 1946, a simple date range of 1950–53 had been identified. On 15 December 1947, a memorandum by ORE reported, ". . . it is doubtful that the Russians can produce a bomb before 1953 and almost certain they cannot produce one before 1951. A probable date cannot be estimated."[4] Over the winter of 1947/48, CIA analysts became both more confident—and more wrong-headed—in their judgment, so that, by 1 July 1948, "the earliest possible date" was being identified as mid-1950, with mid-1953 given as "the most probable date."[5] The same projection last appeared in a report disseminated on 24 August 1949, five days before the Soviets exploded their first atomic bomb.[6]

Analytic Approach

Judgments concerning the progress of the Soviet nuclear program were always heavily caveated, with the assumptions driving the analysis carefully laid out. In ORE 3/1, for example, the CIA's drafters explicitly cautioned their readership against relying too heavily on the judgments contained in the estimate:

Any [attempt to estimate Soviet production capacity over the next 10 years] is at best educated guesswork. An estimate of capabilities 10 years hence obviously cannot be based on evidence, but only on a projection from known facts in the light of past experience and reasonable conjecture. The estimates herein are derived from the current estimate of existing Soviet scientific and industrial capabilities, taking into account the past performance of Soviet and of Soviet-controlled German scientists and technicians, our own past experience, and estimates of our own capabilities for future development and production.[7]

Three elements in this paragraph stand out as the analytical themes defining ORE's judgments about the Soviet nuclear program for the next

five years: first, “estimate[s] of existing Soviet scientific and industrial capabilities; second, “the past performance of Soviet and of Soviet-controlled German scientists and technicians;” and last, “our own”—that is, US— “past experience, and estimates of our own capabilities for future development and production.” The first two of these may be taken to comprise the evidentiary base from which ORE pieced together a picture of the Soviet nuclear program. The third—US experience—provided the framework that ORE used to shape the picture as it emerged.

This approach was not a good fit. The pieces of the Soviet nuclear puzzle had to be tugged and stretched to fit. Many pieces were never found. In the end, US experience, however valid it might be from a scientific or technological point of view, did not offer a valid timeline for Soviet nuclear development. It failed to allow for whatever benefits the Soviets derived from information made public after the war,[8] from espionage,[9] from the input from captured and “immigrant” German scientists, and from the incalculable advantage they had in knowing with absolute certainty that the thing could be made to work! In retrospect, it seems that ORE's failure to accurately predict the advent of the Soviet atomic bomb was due less to any particular shortcoming than a general failure to piece everything together.

Players

The intelligence analysts in ORE responsible for tracking the Soviet atomic bomb program were nuclear physicists and engineers, many of whom came to the CIA from the Foreign Intelligence Section (FIS) of the “Manhattan District”—code for the US wartime atomic project. They began with the optimistic notion that it would be possible to track the Soviet nuclear program directly, using published papers, supplemented when necessary by material from clandestine sources.

It very quickly became apparent that Soviet security measures made relying on open sources impossible. Located deep inside the country, Soviet nuclear weapons facilities were directly managed by the MVD, the Ministry for Internal Affairs (later absorbed by the KGB). Open discussion of Moscow's capabilities in fields related to atomic energy had ceased with the outbreak of World War II; therefore, Soviet progress in nuclear physics

had to be judged on the basis of what was known of prewar capabilities. With Stalin's decision to push for an atomic bomb in 1945, the MVD imposed increasingly stringent security measures. Although the Soviets continued to publish research results in many fields through the early postwar years and classified reports occasionally filtered out to the West, by March 1948 CIA field reporting was claiming that no useful scientific information of any kind was coming out of the Soviet Union.[10]

Faced with a dearth of detailed information on the Soviet atomic energy program, ORE analysts focused on programmatic factors—such as broad measurements of industrial capacity; resource commitments and limitations; and the location and size of the facilities involved—as a means of backing into a measure of Soviet progress in atomic energy.

The Uranium Variable

The availability of uranium ore was an obvious point of departure for analysis of Soviet atomic prospects. Necessary for nuclear weapons production, uranium was measurable (or so it was thought) from known geologic factors. The lack of high-grade uranium ore in the Soviet Union was seen by many scientists to be a principal factor handicapping Moscow's atomic-energy program.[11] And indeed it was. The United States was blessed, if that is the word, with a near-monopoly of high-grade uranium ore—defined as ore with a uranium content of 50 percent or greater. The Soviet Union had no sources that even approached that quality; it had to make do with ore that often had a uranium content of as little as 1– 2 percent. To keep high-grade ore out of Soviet hands, the Anglo-American Combined Development Trust quickly brought uranium sources outside the United States under its control. In addition, after April 1946, comprehensive restrictions were placed on all equipment that might conceivably be used in uranium production under the auspices of the Coordinating Committee for Multilateral Export Controls (COCOM).

Moscow's lack of high-grade ore, combined with the clampdown on exports of related equipment to the USSR, convinced Western analysts that they had bottled the Soviet nuclear genie. A report dated 1 June 1947 shows ORE confidence that the Soviets had, at best, only a small pilot reactor going, a feat that matched the progress achieved by the United

States in December 1942. Extrapolating from the US experience, the analysts concluded that a Soviet atomic bomb was at least three years away.[12]

A report, disseminated on 17 March 1948, was based heavily on the assumption that COCOM controls were working. Analysts judged that atomic energy plants in the Soviet Union were running close to capacity because of shortages of the necessary laboratory and experimental equipment.[13] Belief that commercial isolation and the consequent inability to draw on overseas sources of supply would slow the Soviet nuclear program probably accounts for ORE's judgments during 1947–48 that the first Soviet bomb test would slip to 1953 or beyond.

The CIA had, in truth, only a very narrow body of evidence upon which to base its estimates of Soviet uranium reserves, a fact that gradually became apparent over the summer of 1948. “New evidence” came to hand suggesting that earlier estimates of the Soviet Union's atomic production potential might be too low. Citing “further discussion with geological consultants, further literature studies,” and “new information from the field,” a CIA memorandum for the president reported that “Soviet reserves of uranium were higher than previously supposed.”[14] Even so, six months later the Agency reported that “the available information does not allow a reappraisal of previous estimates.”[15] ORE did, however, boost its estimate of the Soviets' capacity to expand their nuclear stockpile.[16]

The best that the CIA could do by 24 August 1949—five days before Joe-1—was to conclude that the Soviets were developing “various means” of exploiting low-grade uranium ores, “but it [was] impossible to estimate on what scale.”[17]

Role of German Scientists

Tapping into Soviet efforts to exploit the German atomic scientific capabilities at their disposal proved to be a productive vein of intelligence.[18] At the end of the war, the Americans had scored a major prize by rounding up Werner Heisenberg and his team of German nuclear specialists—in the ALSOS operation—but a significant number of German scientists found themselves, by design or by chance, in territory under Soviet control. In June 1945, British intelligence reported that Nikolaus

Riehl of the Auergesellschaft—a manufacturer of uranium metal in the Third Reich—had left Germany along with six coworkers. By August, according to reporting, Nobel laureate Gustav Hertz and Adolf Thiessen had joined Riehl, and 18 others were waiting in a Soviet camp to join them. At this time, Western intelligence was still seeking physical chemist Max Vollmer, cyclotron expert Manfred von Ardenne, and radiation biophysicist Hans Born, all of whom were eventually discovered in the Soviet Union.

Initially, Soviet control over the Germans was slack. By February 1946, the US Strategic Services Unit was able to report that Hertz and Thiessen, along with Vollmer and Ardenne, had established a research facility at or near Sukhumi, on the eastern shore of the Black Sea.[19] Later that same year, German physicist Adolf Krebs walked across the inter-Berlin border to the Western Zone, having just returned from a job interview with Riehl in the Soviet Union. Krebs reported that he had been taken to Elektrostal, a new complex 40 miles east of Moscow, where Riehl and the Auergesellschaft team were “segregating uranium on a production scale using a new process, which utilized electric furnaces.”[20]

Incredibly, after discussing uranium production, Krebs was allowed to return to East Germany. Sensing that his liberty might be short lived, he immediately decamped for the West. Lending credibility to Krebs's reporting, a late 1946 search of files on Elektrostal produced a 1945 report that three 10-ton carloads of uranium ore had been shipped there from the uranium mines near Joachimstal in Czechoslovakia, the principal source of uranium ore for the Third Reich.[21] Krebs also reported that Hertz's group, Ardenne, and Thiessen were working on isotope isolation at Sukhumi. He confirmed that Vollmer was working on heavy water production and that a Dr. Patzschke, former director of the Joachimstal mines, was prospecting for uranium ore near Tashkent.[22]

After four more German physicists returning from job interviews in the Soviet Union turned up in the West, MVD security cracked down. Western intelligence was still able to monitor the location—if not the research progress—of German scientists in the Soviet Union through intercepted letters written to their families in East Germany. Although heavily censored, the letters yielded some useful information. In 1946, for example, Riehl's team was identified after they wrote letters home using the same post office box in Moscow. Then, on 7 October 1946, Riehl wrote a letter to his former secretary in the Auergesellschaft, postmarked Elektrostal.[23] In 1951, biophysicist Hans Born was finally located in the Soviet Union through a letter written home by one of his colleagues.

None of this material provided any direct information on Soviet progress in the development of atomic energy, but it gave some indication of the scale and scope of the Soviet research effort and suggested that the Soviets had been able to jump-start their program after World War II using German expertise. Since Heisenberg had been on the verge of building a bomb when the Americans captured him, this ought to have given intelligence analysts an appreciation for the expertise upon which the Soviets were able to draw.[24] In fact, however, analysts judged that Moscow's lack of high-grade uranium ore negated any advantage the Soviet Union might have gained from “recruiting” German scientists at the end of World War II or from espionage against US atomic programs. This opinion was shared by the British Joint Intelligence Committee (JIC), which forecast a Soviet atomic bomb by January 1951, a judgment based primarily on the limited availability of weapons-grade uranium.[25]

What Was Missed

ORE's confidence in its judgments concerning the Soviets' limited access to high-grade uranium ore derived from their basis in seemingly incontrovertible scientific data from prewar geologic surveys— not, as Pavel Sudoplatov has suggested, from any Soviet program of deception.[26] That confidence, nonetheless, was misplaced. By 1946, the Soviets were exploiting sources of uranium in the Ural Mountains that, if they did not approach the richness of the deposits in North America, were certainly usable for their purposes.[27] Western intelligence analysts had no direct evidence that these deposits existed.[28]

Analysts did have some indirect evidence from another German source; however, the significance of this information was not readily appreciated. In December 1946, a chemical engineer from the former I. G. Farben complex near Bitterfeld (southeast of Berlin) reported that the plant had started producing 500 kilograms per day of distilled metallic calcium. Boxes of this pure calcium were trucked everyday to Berlin, thence onward to Zaporozhe on the Dnieper River in the Soviet Union.

In mid-January 1947, further reporting from Bitterfeld showed that the plant was shipping the phenomenal quantity of 30 tons of distilled metallic calcium per month—at the time, total US production of calcium

was 3–5 tons per year.[29] Research had shown that exceptionally pure calcium could be used to separate uranium metal from uranium ore.[30] There could be no non-nuclear use for so much calcium in such a pure form. The nuclear connection was confirmed in mid-1947, when a source at Bitterfeld produced shipping manifests that showed three rail cars loaded with distilled calcium leaving for Riehl's uranium production plant at Elektrostal on 26 July 1947.[31] Later that year, CIA analysis of samples of Bitterfeld-produced calcium confirmed that it was suitable for uranium production.

Calculations based on the consumption of distilled calcium showed that the Soviets could be producing as much as 60 tons of uranium metal per month—far more than was believed possible from identified Soviet uranium reserves. Such was the confidence in the available measures of their reserves, however, that it was these figures that prevailed in ORE analysis. On 1 June 1947, the periodic “Summary Report of the Russian Nuclear Energy Program” reported

[the] indication from metallic calcium production . . . appears to be the construction of two plutonium producing reactors . . . with 500 megawatts [of total power] . . . particularly significant [is] that a project of this size cannot be supported by the estimated reserves of uranium ore available to the Russians . . . 514 tons uranium oxide already available and 2200 tons of uranium in reserves . . . . The best information indicates that this program is not proceeding well, and in fact uranium metal appears to have been produced in insufficient quantity to operate more than a very small pilot reactor, such as that first operated in this country in December 1942. Thus, if it is assumed in the worst case that Russian progress from this date will proceed at a rate comparable to that of the American project . . . then to produce a single bomb, January 1950 represents the absolute lower limit.[32]

In retrospect, it seems incredible that ORE should have paid so little attention to information such as that coming out of Bitterfeld. The reporting was timely, detailed, and derived from a source with excellent access that was undeniably compatible with the kind of data he was providing. Moreover, it was corroborated by wartime aerial photographs of the Bitterfeld complex, in which photo-interpreters could not only identify the facility used to manufacture calcium, but also verify the production data provided by the source inside the complex.[33]

Setting the Failure in Context

Henry S. Lowenhaupt, an Agency scientist during these years, attributes ORE's failure to exploit the Bitterfeld intelligence to hubris. Another explanation might derive from the backgrounds of the analysts involved. Most of them came from the scientific community where hard data reigned, possibly leaving them unused to using the “softer” information from covert sources.

On 29 September 1949, Willard Machle, assistant director for scientific intelligence, complained to CIA Director Hillenkoetter about “the almost total failure of conventional intelligence in estimating Soviet development of an atomic bomb.” He made it clear that by “conventional intelligence” he in fact meant “estimates of domestic USSR supply of uranium ore . . . predicated entirely on geologic reasoning [from prewar data].” In other words, in his view, it was not the overall intelligence *process*—with its focus on collection—that had failed to warn of the Soviet atomic bomb, but intelligence *analysis*—the ability to assemble, integrate, and derive meaning from the full range of information collected.[34] The Dulles-Jackson-Correa Committee, convened to investigate ORE in early 1949, pointed to this broader problem when, nine months *before* Joe-1, it indicted ORE for “lack of coordination” in scientific intelligence.[35]

Yet another consideration is that perhaps ORE simply was not paying sufficient attention to the nuclear issue. Looking at the analytical record, it is striking how little finished intelligence was actually produced on atomic energy. Of the approximately 80 estimates written by ORE between 1946 and 1949, not one is devoted to the subject.[36] The record shows that ORE was consumed by broader questions of Soviet national capabilities and intentions, which frequently were perceived to be of more immediate concern. Moreover, beginning in 1948, ORE was preoccupied with events unfolding in Germany and Central Europe. The US-USSR confrontation in Germany, which escalated into the Berlin blockade, and worry about a possible communist electoral victory in Italy were the problems that predominated in analyses prepared during this period.

Moreover, the Agency's broad interpretation of Soviet intentions in the late 1940s may have had a subtle effect on the attention devoted to analysis of atomic matters. A CIA historian has observed that, despite “numerous alarming reports about Soviet behavior . . . coming in from nearly all corners of the globe, . . . the most consistent— and perhaps the most

important theme of CIA analysis in this period . . . was that Soviet moves, no matter how menacing they might appear in isolation, were unlikely to lead to an attack against the West."[37] This message was controversial and contributed to ORE's bureaucratic isolation. ORE's judgment has since been vindicated—recent research shows it to have been timely, accurate, and useful in restraining Western responses to Soviet provocations. The historian concludes that ORE's role in calming Western nerves "must be considered [its] most important contribution in those early, fearful years of the Cold War."[38]

Twisted metal, vitrified concrete, a grassy crater, and residual radiation were the only remains in 1992 of the first Soviet atomic explosion.

But being right about the big picture in hindsight provided no salvation at the time. ORE was doomed, not only by failing to predict the timing of Stalin's bomb, but also by its subsequent failure to anticipate the outbreak of the Korean War. The departure of Director Hillenkoetter at the end of 1950 signaled the complete transformation of the CIA's analytical structure. The Directorate of Intelligence that emerged proved more durable and better able to cope with the complexities of Cold War intelligence analysis.

[1]Woodrow J. Kuhns, *Assessing the Soviet Threat: The Early Cold War Years* (Washington, DC: Center for the Study of Intelligence, 1997), 27.

[2]Arthur B. Darling, *The Central Intelligence Agency: An Instrument of Government, to 1950* (University Park: Pennsylvania State University Press, 1990), 165.

[3] *ORE 3/1, "Soviet Capabilities for the Development and Production of Certain Types of Weapons and Equipment," 31 October 1946: 1.*

[4]CIA Memorandum, Director of Central Intelligence Hillenkoetter to Senator B. B. Hickenlooper *et al*., "Status of Russian Atomic Energy Project," 15 December 1947, *Foreign Relations of the United States* [hereafter *FRUS*], 1947, vol. I: 905.

[5]CIA Memorandum, DCI R. H. Hillenkoetter to Senator Bourke B. Hickenlooper, "Status of USSR Atomic Energy Project," *Management of Officially Released Information* [hereafter *MORI*] 136351, January 1949.

[6]OSI/SR-10/49/1, "Status of the U.S.S.R. Atomic Energy Project," *MORI* 2319524, August 1949: 1.

[7] *ORE 3/1: 1.*

[8]From such publications as Henry DeWolf Smyth's *Atomic Energy for Military Purposes: The Official Report on the Development of the Atomic Bomb under the Auspices of the United States Government, 1940–1945* (Princeton, NJ: Princeton University Press, 1945).

[9]ORE did not believe that the Soviets had derived any benefit from their penetration of the US Manhattan Project, a view sustained through at least 1950. CIA/SCI-2/50, "Semi-Annual Estimate of the Status of the Soviet Atomic Energy Program," *MORI* 23201, 10 July 1950: 1.

[10]Information Report, "Progress in Atomic Energy Research," *MORI* 24821, 17 March 1948. See also Oleg A. Bukharin, "The Cold War Atomic Intelligence Game, 1945–70," *Studies in Intelligence* 48, no. 2 at HTTP://www.cia.gov/csi/studies/vol48no2/article01.html.

[11]Charles A. Ziegler, "Intelligence Assessments of Soviet Atomic capability, 1945-1949: Myths, Monopolies and *Maskirovka*," *Intelligence and National Security* (1997): 5.

[12]Henry S. Lowenhaupt, "On the Soviet Nuclear Scent," *Studies in Intelligence* (1967): 24.

[13]*MORI* 24821.

[14]CIA Memorandum for the President, "Estimate of the Status of the Russian Atomic Energy Project," *MORI* 9261, 6 July 1948.

[15]*MORI* 13635.

[16]*MORI* 9261.

[17]*MORI* 23195: 1.

[18]What follows draws heavily upon memoirs written by ORE veteran Henry S. Lowenhaupt, in the form of two articles for *Studies in Intelligence*: "On the Soviet Nuclear Scent" (1967) and "Chasing Bitterfeld Calcium" (1973). The source material for these two articles is not available.

[19]Lowenhaupt, "On the Soviet Nuclear Scent," *Studies in Intelligence* (1967), *MORI* 113786: 14–15.

[20]*Ibid*., 23.

[21]Lowenhaupt, "Chasing Bitterfeld Calcium," *Studies in Intelligence* (1973), *MORI* 113976: 24.

[22]*MORI* 113786: 17.

[23]*Ibid*., 23.

[24]*Ibid*., 13.

[25]JIC (48) 9 (0) (Final), "Russian Interests, Intentions and Capabilities," 23 July 1948, L/WS/1/1173, IOLR; reproduced in Richard J. Aldrich, ed.;

Espionage, Security, and Intelligence in Britain, 1945-1970 (Manchester and New York: Manchester University Press, 1998), 76–77.

[26]Pavel Sudoplatov, *Special Tasks* (Boston: Little, Brown and Co., 1995), 198–99.

[27]Ziegler, 15–16.

[28]They did know that the Soviets were looking, from the intelligence reports on the activities of Dr. Patzschke, formerly of the Joachimstal mines.

[29]*MORI* 113976: 21–22.

[30]The use of nondistilled calcium leaves impurities that decrease the metal's effectiveness for reactor use, which is why the United States reduced uranium metal using magnesium.

[31]*MORI* 113976: 25.

[32] Ibid., 24

[33]*Ibid.*

[34]Memorandum, Assistant Director for Scientific Intelligence (Machle) to Director of Central Intelligence Hillenkoetter, 29 September 1949; *FRUS*, *1945–1950: Emergence of the Intelligence Establishment* (Washington, DC: Government Printing Office, 1996), 1012.

[35]*Ibid*., 905.

[36]ORE's single, coordinated judgment on 31 October 1946 was part of a larger estimate on Soviet weapons programs in general.

[37]Kuhns, 15.

[38]*Ibid*, 28.

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