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## Tracking Julius Rosenberg's Lesser Known Associates

Steven T. Usdin

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**Like 9/11, the most important government failure in the cases of Rosenberg, Barr, and Sarant, was one of imagination.**

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A fresh look at the case of Julius Rosenberg, executed in 1953 for conspiracy to commit espionage, in the light of new information about two of his lesser known associates, Joel Barr and Alfred Sarant, reveals disturbing parallels to some contemporary intelligence issues.

The National Commission on Terrorist Attacks Upon the United States, also known as the 9/11 Commission, concluded in 2004 that the “most important failure” that left America vulnerable to attack was “one of imagination.” The cases of Rosenberg, Barr, and Sarant demonstrate that the responses of the Federal Bureau of Investigation and the US Army to communist penetration during World War II were characterized by a similar lack of imagination. The FBI aggressively identified communists who held sensitive positions in government, including jobs that afforded communists routine access to classified military information. But the Bureau and the army treated communists as potential subversives, not as spies acting on behalf of the Soviet Union.

The 9/11 Commission also highlighted the lack of coordination between intelligence and law enforcement agencies. The Rosenberg case involved a similar breakdown, primarily between the army and the FBI on

the one hand and civilian defense contractors on the other. The leakage to the USSR of vast amounts of data about highly sensitive technologies would not have occurred if counterintelligence agencies had had the imagination to conceive of massive Soviet espionage against industrial targets undertaken by American citizens or had taken seriously the vetting procedures for granting access to classified information.

In contrast to Rosenberg, Barr and Sarant evaded detection and slipped out of the United States. Their subsequent careers behind the Iron Curtain, where they became pioneers of Soviet high technology, are evocative of another contemporary concern: the transfer of trained personnel from the former Soviet Union to rogue states.

### The Rosenberg Ring

Joel Barr was one of the original members of a group of engineers—civilian employees of the US military and its contractors—whom Julius Rosenberg recruited to spy for the Soviet Union. From the time they joined the Young Communist League in 1936, Barr and Rosenberg viewed the United States government as a fascist regime little better than Nazi Germany.

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Later, Barr recruited Alfred Sarant, the only known member of the Rosenberg ring who was neither Jewish nor a graduate of City College of New York. Barr and Sarant were talented electrical engineers who found technical advances in radar and electronics as compelling and important as class struggle. This dual set of interests made them remarkably successful, first as spies for the USSR and later as senior figures in the Soviet defense industry.

Controversy over the value of the atomic secrets that Rosenberg helped transmit to the USSR has obscured the tremendous value of the information about conventional weapons systems that he and his comrades stole. They provided detailed specifications for some of the most important military technologies developed

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during World War II and, in the process, helped the Soviet Union lay the foundation for a defense industry that maintained rough parity with the United States throughout the Cold War.

Barr, Sarant, and Rosenberg held low-level positions during World War II helping to design manufacturing processes and performing quality assurance inspections. In contrast to more senior scientists and engineers, who typically were aware of the details of only a few specific projects and who were subject to intense security precau-

tions, the Rosenberg group had jobs that provided unfettered access to a wide range of sensitive technologies.

Military security officials attempted to compartmentalize R&D—for example by assigning the design of the various components in a weapons system to teams at different institutions. At some point, however, all the pieces had to be assembled and tested by people who understood how they fit together and what they were supposed to do. As manufacturing engineers, Barr and Sarant were exactly at that point. In order to help design and optimize manufacturing processes, they had to comprehend the basic principles underlying a particular weapon and to have detailed knowledge of all of its components. Men assigned to figure out how to mass produce advanced technologies were in an excellent position to teach the Soviets how to do the same.

Because practical “how-to” experience from related projects was often relevant to their own work, manufacturing engineers were encouraged to study weapons systems that they were not specifically assigned to work on. Barr and the other engineers working in his department “had complete freedom of the plant and were permitted to go into any other sections,” one of his former supervisors at Western Electric later told the FBI.<sup>1</sup>



Joel Barr (left) and Alfred Sarant in Greenwich Village, New York, in 1944. (From Barr's personal papers, courtesy of the author. Photographer unknown.)

<sup>1</sup> Declassified FBI file, serial 65-159392-120, available in FBI Reading Room, Washington, DC.

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Barr and Sarant worked on, or had access to, detailed specifications for most of the US air- and ground-based radars; the Norden bombsight; analog fire-control computers; friend-or-foe identification systems; and a variety of other technologies. Working from a makeshift microfilm studio in a Greenwich Village apartment, they copied and turned over to Soviet intelligence more than 9,000 pages of secret documents relating to more than 100 weapons programs during World War II, according to Alexander Feklisov, one of their case officers.<sup>2</sup> In addition to Feklisov's memoir, some details of the secrets Barr and Sarant stole are mentioned in the "Venona" decrypts, decoded diplomatic cable traffic between Moscow and Soviet intelligence officers in New York. For example, a December 1944 cable noted that Sarant had "handed over 17 authentic drawings" of the AN/APQ-7 radar.<sup>3</sup>

According to Feklisov, Barr turned over blueprints for the SCR-584, a microwave radar system designed at MIT's radiation lab that the army hailed as one of the most important technological breakthroughs of the war. He also passed plans for the M-9 gun director, an analog computer that predicted a moving object's future position based on radar input

and then automatically aimed and fired artillery.<sup>4</sup>

While the Rosenberg group's technology transfer probably did not have a decisive impact during World War II—the USSR had great difficulty keeping up with the demand for basic weapons systems and was in a poor position to absorb high technology—it was extraordinarily useful in the immediate postwar period when Russia quickly brought its armaments up to American levels of sophistication.

Much of the information Barr and Sarant borrowed from Western Electric's filing cabinets ended up in the hands of Adm. Axel Berg, the man Stalin assigned during World War II to create a Soviet radar industry. Detailed information about American R&D helped Berg take Soviet radar production from zero in 1940 to a level in 1955 that equaled or exceeded the United States' output in quantity and capabilities.<sup>5</sup> Russian radar bore a striking resemblance to American designs, particularly the radar sets manufactured at Western Electric. In 1949, for example, the USSR started mass-producing

replicas of the SCR-584, as well as clones of the AN/APQ-13 radar, a close cousin of the AN/APQ-7.

In conjunction with the technology of the US proximity fuse—which Rosenberg literally wrapped up and delivered to Feklisov as a Christmas present in 1944—upgraded Soviet versions of the SCR-584 and M-9 allowed Moscow to shoot down Francis Gary Powers' U-2 plane over Sverdlovsk on May Day 1960.

In addition to data on radars, analog computers, and the proximity fuse, the Rosenberg group turned over a treasure trove of secret information about jet engine design and radio and computing technologies. The group's total contribution amounted to over 20,000 pages of technical documents, plus the entire 12,000-page design manual for the first US jet fighter, the P-80 "Shooting Star."<sup>6</sup> In addition to designs for specific weapons systems, the data gave Soviet scientists and planners invaluable insights into America's development strategies. In technology development, information about a rival's mistakes and dead ends is almost as valuable as details of its accomplishments.

### Flawed Counterintelligence

The success of Barr and his comrades in gaining access to highly classified information and

<sup>2</sup> Alexander Feklisov, *The Man Behind the Rosenbergs* (New York: Enigma Books, 2001), 136.

<sup>3</sup> Venona decrypt 1749-50, New York to Moscow, 13 December 1944. Available at [http://www.nsa.gov/venona/releases/13\\_Dec\\_1944\\_RI\\_p2.gif](http://www.nsa.gov/venona/releases/13_Dec_1944_RI_p2.gif).

<sup>4</sup> Feklisov, 135.

<sup>5</sup> "The Electronics Industry in the USSR," CIA, SC RR 101, 1 June 1955 (declassified 24 January 2001): 7–11, 25–28.

<sup>6</sup> Feklisov, 160.

communicating it to the KGB was not the result of cunning tradecraft. They were amateurs working under the loose oversight of professional intelligence officers who struggled to impose minimal discipline. Their ability to operate unmolested can only be attributed to stunningly incompetent and uncoordinated American counterintelligence. The FBI and the army had identified Barr, Sarant, Rosenberg, and other members of their group as communists and potential spies years before they were put out of business. Basic security measures, such as requiring that defense contractors check the references of applicants for sensitive jobs, would have neutralized Barr and his comrades early in their espionage careers.

The army's Signal Corps Laboratories hired Barr as an electrical engineer in July 1940; Rosenberg signed on with the corps as a junior engineer two months later. Some time in 1941, they started funneling military technology secrets to the USSR through a longtime Soviet operative, Jacob Golos. At the time, Golos was well known to the FBI.

In March 1940, the Justice Department indicted Golos, whom it had identified as the source of forged passports for communist party officials and Soviet agents, for failing to register as a foreign agent. As part of a deal that shielded other party members from prosecution, Golos pled guilty, paid a \$500 fine, and received a four-month suspended sentence. The attorney general publicly accused him of

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being a Russian spy and the FBI briefly put him under surveillance. The attention did not prevent Golos from personally meeting with Rosenberg and running an extensive espionage network, or from helping coordinate the August 1940 assassination in Mexico of Lev Trotsky, Lenin's second in command and ardent foe of Stalin.<sup>7</sup>

In addition to failing to keep its eyes on Golos, the FBI and its counterparts in army counterintelligence made poor use of information that could have shut down Rosenberg's operation long before any important secrets were stolen. The FBI had an active program to identify and weed out communists in government, especially those with access to sensitive or classified information. In the spring of 1941, the Bureau gave the army a dossier on Rosenberg. His wife, Ethel, had signed a nominating petition for Peter Cacchione, a communist candidate for New York City Council, and the Rosenbergs had shared an apartment with a couple who were open members of the Communist Party of the United States

(CPUSA). The army immediately moved to fire Rosenberg from his position as an inspector in military weapons plants, but his histrionic defense convinced a civil service review panel that the charges were untrue. Rosenberg, who had headed a Young Communist League chapter at college, claimed he had no connection to or sympathy for communism.

A few months later, following up on signatures on the nominating petitions that led to Ethel Rosenberg, the FBI discovered that Barr's ex-roommate and fellow Signal Corps engineer Samuel Sack was a communist. The roommate was fired, but neither the army nor the FBI made enquiries about his close associates.

The FBI finally caught up with Barr in December 1941, matching his signature on a Cacchione nominating petition to one on his civil service application. On 23 February 1942, the Signal Corps fired Barr and placed his name on a list of undesirable employees who were ineligible for employment by the army. More than 100 of Barr's colleagues at the Signal Corps laboratory signed petitions requesting that the army reconsider the action; many of them scratched their names off or ripped up the petitions when they learned that he had been fired because he was a communist.<sup>8</sup>

<sup>7</sup> Elizabeth Bentley, *Out of Bondage* (London: Rupert Hart-Davis, 1952), 87–88.

<sup>8</sup> Executive Sessions of the Senate Permanent Subcommittee on Investigations of the Committee on Government Operations, Vol. 3, (Washington: Government Printing Office, 2003), 2801.

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Up to this point, Barr had provided little information to the KGB. Being fired from the Signal Corps should have been the end of Barr's careers in military electronics and as a Soviet spy. And it would have been, if the FBI, army, or military contractors had implemented even rudimentary procedures for vetting individuals who had access to classified information.

Within two weeks of his termination, Barr applied for work at Western Electric, one of the Signal Corps' major suppliers. The company failed to contact the Signal Corps to confirm Barr's claim that he had voluntarily quit to seek a better position. Less than a month after the army fired him, Barr began working at Western Electric on airborne radar systems that incorporated some of the most highly classified sensitive technologies in the American arsenal.

Although the army had apparently forgotten about Barr, paperwork on his case drifted through the FBI for months. Headquarters was sufficiently concerned to ask the New York field office to consider placing him on a list of individuals targeted for custodial detention. New York responded to Washington's inquiries with a flurry of correspondence, but it never put a shoe on the ground or lifted a telephone receiver to investigate Barr. In July 1942, when the FBI's New York field office suspended its investigation of Barr, the FBI did not have a clue that he was working at Western Electric.

### Clues Continually Ignored

Barr was not the only spy to fall through the cracks in the FBI's pursuit of potential subversives. In March 1944, the FBI obtained copies of the New York County Committee of the CPUSA's membership records, probably through an illegal burglary. The records included the names of Rosenberg, Barr, and Sarant, along with their addresses and party aliases. Quick action on this intelligence would have prevented the group from making some of its most important contributions to the USSR, including the SCR-584 radar, proximity fuse, and P-80 designs, all of which were passed after March 1944.

Rosenberg was finally fired in February 1945, 11 months after the FBI received unambiguous evidence of his communist party membership. As with Barr, however, termination as a security risk did not have a detrimental effect on Rosenberg's career. Putting out the word that his dismissal was motivated by anti-semitism, Rosenberg was almost immediately hired by Emerson Radio and Phonograph Corporation. Ironically, this was the firm from which Rosenberg, working as a Signal Corps inspector, had stolen the proximity fuse.

Worried that the FBI might have Rosenberg under surveillance, Soviet intelligence quickly moved to isolate him. It need not have worried: Neither the Army nor the FBI made any effort to track Rosenberg's activities after he was fired.

Barr's past finally caught up with him more than five years after the FBI first identified him as a security risk and three years after it received definite information that he was a communist party member. In June 1947, a security official at Sperry Gyroscope Company, which hired Barr in October 1946 to work on a classified missile defense project, contacted the FBI to ask about a security clearance for their new employee. The Bureau quickly noted that he had been fired from the army as a subversive and that he was on a list of communist party members. Nonetheless, it spent months collecting documents from the army, interviewing Barr's neighbors, and peering into his bank accounts. In the first week of October 1947, the Bureau sent a summary of its investigation to Sperry, which fired him a week later.

The FBI's success in finally ending Barr's espionage career was marred by its failure to exploit the leads generated by his case. The Bureau treated Barr as a security risk but did not seriously investigate the possibility that he was a Soviet spy. On his job application, which Sperry had turned over to the FBI, Barr had listed three personal references. FBI agents interviewed two of

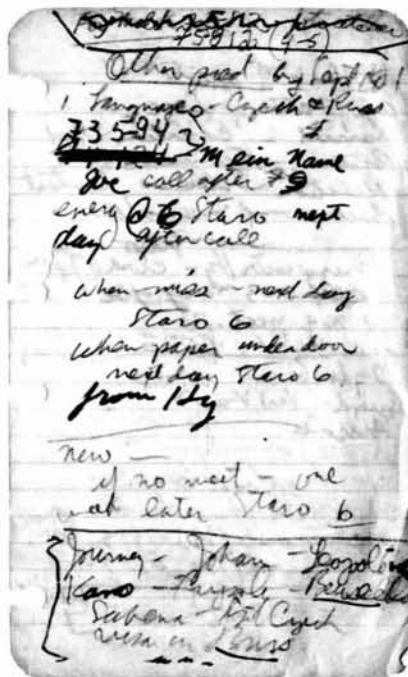
them, but inexplicably ignored the third: Julius Rosenberg. If the agents who reviewed Barr's file had looked, they would have seen that the Bureau had an extensive file on Rosenberg.

The FBI turned its attention to Barr again in the summer of 1948, when it investigated the possibility that he was the engineer described in Venona decrypts as "Liberal" (the code-name was actually assigned to Rosenberg). After learning from Barr's mother that he was studying electronics in Sweden, the FBI asked the CIA to locate him and monitored the Barr family correspondence. Barr wrote a letter to his mother when he moved to Paris to study music, and the FBI obtained his address from the envelope.

Meanwhile, the Venona decrypts sparked investigations that culminated in the arrests in December 1949 and February 1950, respectively, of atomic spy Klaus Fuchs and his courier, Harry Gold. Gold provided information that led the FBI to David Greenglass, who fingered his brother-in-law, Julius Rosenberg. The spy network unraveled.

### Evading Capture

The day after Greenglass's arrest was announced in American newspapers, the Soviets sent Barr from Paris to Prague. On his arrival in the Czech capital, the KGB cloaked Barr in a new identity. For the next four decades he was known as "Joseph



Joel Barr's notebook page with description of the KGB's procedures for arranging covert meetings in Prague. Notes at the bottom refer to his cover story, including reminder to say he received a Czech visa in Brussels. (From Barr's personal papers, photographed by the author.)

Berg," the son of Jewish immigrants to South Africa. The name was a KGB joke: Joe Berg from Joburg. But Barr took it seriously. His wife, whom he met in Czechoslovakia, did not learn that he had been born in America until 20 years after their marriage.<sup>9</sup> The Russians continued to act as if Barr was in a hostile environment, meeting with him clandestinely and keeping the Czech authorities in the dark about his real identity.

<sup>9</sup> Author's interview with Barr's ex-wife, Vera Bergova, August 2002.

On 17 July 1950, in an effort to substantiate his assertions to the FBI that Julius Rosenberg was the head of an espionage ring, Greenglass recalled a conversation in which his brother-in-law urged him to flee with his wife and their children to Mexico, where the Russians would arrange their safe transport to Czechoslovakia. Greenglass said that when he expressed incredulity that anyone under FBI investigation could get out of the United States, Julius replied: "Oh, they let other people out who are more important than you are...they let Barr out, Joel Barr, and he was a member of our espionage ring."<sup>10</sup> Greenglass's statement lit a fire under the FBI's dormant investigation of Barr, prompting it to attempt to determine if the US government could lay its hands on him.

On 25 July, a week after Julius Rosenberg was taken into custody, the FBI sent an urgent message to the US legal attaché in Paris requesting that he track down Barr. The attaché visited Barr's last known address and quickly learned that he was a month too late.

Two weeks after the FBI arrested Greenglass, army security agency cryptanalysts gave their FBI liaison a more complete version of a previously decrypted 5 May 1944 KGB cable. The new version filled in critical blanks in previous iterations, for the first time

<sup>10</sup> David Greenglass's 17 July 1950 statement to the FBI.

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identifying Sarant in clear text as an espionage recruit. Prompted by the cable, as well as an investigation of Barr that revealed his friendship with Sarant, two FBI agents knocked on Sarant's door on the afternoon of 19 July 1950. He agreed to answer the agents' questions and allowed them to search his house.

During the intense weeklong interrogation that followed, Sarant denied that he was a spy. Correctly surmising that the FBI planned to arrest him, Sarant slipped through its surveillance and crossed the Mexican border in the company of his next-door neighbor's wife, Carol Dayton. The couple eluded Mexican police and contacted Polish intelligence officers in Mexico City. Acting on Soviet orders, the Poles hid Sarant and Dayton for six months before smuggling them across the border to Guatemala, where they boarded a cargo ship headed to Casablanca. The couple took another ship to Spain, where they were put on a flight to Warsaw. Given the new name "Staros," they were stashed in a luxury apartment in Warsaw for six months, before being reunited with Barr in Moscow.<sup>11</sup>

In a move that undoubtedly saved their lives, after six weeks in Moscow, Barr, Sarant, and Dayton were sent to Prague. They rode out some of the most

<sup>11</sup> Author's interviews with Carol Dayton, April 1992, and her daughter, Kristina Staros, October 2003.

dangerous years of Stalinist paranoia in the relative safety of Czechoslovakia.

**Dedicating Their Talents to  
Moscow**

While Barr had recruited Sarant into espionage and was viewed by their American friends as the dominant figure in the partnership, the roles were reversed behind the Iron Curtain. Sarant became the front man and leader for the rest of his life.

Barr had already learned Czech and Sarant picked up the language quickly. They were put in charge of a team of 30 engineers at a military R&D institute. Overcoming difficult technical obstacles—basic electronic components were unavailable, so they had to make their own—as well as the distrust of security officials who thought they were foreign spies, Barr and Sarant designed and built a prototype of a computerized anti-aircraft weapon.<sup>12</sup> Based on designs they

<sup>12</sup> Documents obtained by the author from the Czech Ministry of Interior archives describe several investigations of Barr and Sarant that were squelched by the personal intervention of Antonin Novotny, the First Secretary of the Central Committee of the Communist Party of Czechoslovakia, suggesting that the KGB worked behind the scenes to protect its agents.

had worked with in the United States, they created an analog computer that received input from radar and controlled the aiming and firing of artillery. The system, with some minor improvements, was still defending Czechoslovakian air space as late as the 1980s, according to Barr.

Impressed by their accomplishments, the head of the Soviet State Committee on Aviation Technology, Pyotr V. Dementyev, recruited Sarant and Barr to apply their talents for the benefit of the USSR.<sup>13</sup> They moved with their families to Leningrad in January 1956. Sarant and Barr quickly learned enough Russian to operate without translators. Placed in charge of a secret laboratory that was identified on official correspondence by a fictitious mailbox address, they were given a free hand to recruit employees. The laboratory's first project was commissioned by Adm. Berg, the man who had received information that Barr and Sarant had stolen from Western Electric during World War II. They designed a critical component for the radar that tracked the first Sputnik and subsequent satellites. In February 1958, Sarant and Barr were awarded the Order of the Red Banner, one of the Soviet Union's most prestigious medals.

<sup>13</sup> Henry Eric Firdman, *Decision-Making in the Soviet Microelectronics Industry: The Leningrad Design Bureau, a Case Study* (Falls Church, VA: Delphic Associates, 1985), 2, and interview with Firdman, a former employee of Sarant and Barr, April 2003.



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### Microelectronics

The two men then turned their attention to designing and building microelectronic components, primarily for military applications. Their work won rave reviews from Andrei Tupolev, the Soviet Union's leading aircraft designer.<sup>14</sup>

An evangelist for microelectronics, Sarant lectured at universities and made presentations to government and party officials starting in the late 1950s. He predicted the development and widespread adoption of digital computers and the integration of electronic intelligence into every aspect of modern life. Public discussion of cybernetics had been banned under Stalin, and there was still a great deal of skepticism among Soviet scientists about the value of computers. The Soviet computer establishment advocated the construction of complex, room-sized behemoths, not the small, mass-produced, easily programmable machines Sarant envisioned.<sup>15</sup>

In July 1959, Sarant and Barr attracted attention at the highest levels of the Soviet military when they completed a working prototype of a digital computer based on off-the-shelf components, including germanium

transistors. The UM-1, intended as an airborne computer to control navigation and weapons systems, was small enough to fit on a kitchen table, was light enough for one person to lift, and required about the same power as a light bulb. Dmitri Ustinov (then chairman of the Military-Industrial Commission and later defense minister), the head of the Soviet Air Force, and other top military officers visited Sarant for demonstrations of the UM-1.

Although the UM-1 was never put into production, it helped Sarant secure personal backing from Ustinov, who for decades was second only to premiers Nikita Khrushchev and Leonid Brezhnev regarding military industry

issues. Support from Ustinov and his network, combined with Sarant and Barr's continuing ability to deliver impressive technological accomplishments, fueled a meteoric ascent through the ranks of industry that would have been extraordinary for Russians and was unprecedented for foreigners.

The two Americans received the ultimate stamp of approval on 4 May 1962 when Khrushchev visited their design bureau. Sarant showed the Soviet leader how his team assembled tiny electronic components and demonstrated a new computer, the UM-2. Sarant lectured Khrushchev on the potential for microelectronics—a word he had introduced into the Russian language—to transform industry. The new science would make it possible for networks of military satellites to spy on the United States, for the USSR to protect



Khrushchev's May 1962 visit to Design Bureau Number 2. Joseph Berg is standing to the Soviet leader's left, wearing glasses. (From Barr's personal papers, photographer unknown.)

<sup>14</sup> L. L. Kerber, *Stalin's Aviation Gulag: A Memoir of Andrei Tupolev and the Purge Era* (Washington, DC: Smithsonian, 1996), 250–51, 253.

<sup>15</sup> The Soviet campaign against cybernetics is described in Slava Gerovitch, *From Newspeak To Cyberspeak: A History of Soviet Cybernetics* (Cambridge, MA: MIT Press, 2002).

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**Khrushchev agreed on the spot. A new research city was turned over to Sarant.**

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itself with anti-missile defenses, and for Moscow to attack its enemies with high-precision bombing, Sarant promised. His words were carefully calibrated to reinforce Khrushchev's belief that technological advances, such as missiles, would make it possible to sharply reduce the size and cost of the USSR's standing army.

At the end of Khrushchev's visit, Sarant pitched an idea that he, Barr, and some of their sponsors had been dreaming and scheming over for months. The USSR could leap ahead of the West by creating a massive Center for Microelectronics, Sarant said. It would be located in a city dedicated to the new technology and have links to

institutes and factories throughout the Soviet Union. Modeled on Bell Laboratories, but hundreds of times larger, the center would embody all of the virtues that Sarant and Barr imagined set the communist system apart from capitalism: Through central planning and the concentration of resources for the pursuit of national priorities, not profits, the USSR would create technologies that its capitalist rivals could only dream of.<sup>16</sup>

Khrushchev agreed on the spot. A new city that was already under construction on the outskirts of Moscow was turned over to Sarant. He was made a Soviet citizen and Khrushchev personally signed papers inducting him into the communist party.

Sarant drove the first symbolic stake into the ground at an August 1962 ceremony marking the start of construction work on the scientific center, the heart of the new city of Zelenograd (Greentown). From the beginning, the project did not work out as Sarant and Barr had hoped. The idea of putting foreigners in charge of a massive, high-profile project was unacceptable to powerful party bosses; Sarant reluctantly had to accept a position as second in command. Although he was bitterly disappointed, the position put him in charge of institutes at Zelenograd employing over 20,000 researchers with advanced degrees. Even if progress was not as rapid or dramatic as the Americans had hoped, the enterprises at Zelenograd quickly made significant advances in Soviet technology, especially in the design and manufacturing of semiconductors, primarily for military applications.

In addition to their roles at Zelenograd, Sarant and Barr retained control over a design bureau in Leningrad. Their team created a computer, the UM-1NKh, which became a mainstay of civilian industry. The UM-1NKh was promoted as a major advance in the



Joseph Berg's Communist Party booklet, noting his birth in 1917, acceptance into the party in 1966, monthly salary, and payment of party dues. His base salary in 1974 was 650 rubles, more than a deputy minister's, while bonuses boosted it to an average of 837 rubles, an enormous sum when many engineers were paid less than 200 rubles. (Photo by Anton Berg, with permission.)

<sup>16</sup> Author's interview with Joel Barr, April 1992.

glossy propaganda magazine *Soviet Union*, although the identities of its designers were carefully hidden. The computer also received favorable reviews in an American technical journal and in a classified CIA report that ranked it among the “most important” special purpose computers disclosed in Soviet open publications.<sup>17</sup> It earned “Staros” and “Berg” the State Prize, formerly called the Stalin Prize, the second-highest award in the Soviet Union.

### Sudden Eclipse

Technical success did not shield the ambitious foreigners from the harsh realities of Soviet politics. Sarant and Barr’s fall from grace, precipitated by the ouster of their champion, Nikita Khrushchev, was even quicker and more spectacular than their ascent. Within months of Khrushchev’s forced retirement, powerful men whom Sarant and Barr had antagonized struck back. Accused of everything from wasting scarce resources to participating in a Zionist anti-Soviet conspiracy, the American engineers feared that they might end their days in prison. Instead, Sarant was fired as scientific director of the Center for Microelectronics, but he and Barr were permitted to return to their design bureau in Leningrad.

<sup>17</sup> “Computers In Communist Countries: Production, Requirements and Technology,” CIA, CSI-2001-00001, 14 February 1966 (declassified 24 January 2001).

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**Barr and Sarant’s fall from grace . . . was even more spectacular than their ascent.**

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Tainted by association with the disgraced Soviet leader, the two men battled with the Leningrad communist party bureaucracy to maintain their autonomy and access to resources. They hung onto their positions by producing a stream of valuable technical achievements, ranging from an innovative memory technology to new computer designs, including some that were recognized on both sides of the Iron Curtain. *Soviet Cybernetics Review*, a Rand Corporation journal, described one of their computers as “the first Soviet production computer that can be fairly characterized as well engineered. It may not be up to Western standards, but it easily surpasses anything else known to be currently available in the Soviet Union for process control automation.”<sup>18</sup>

### Turning to the Navy

Sarant and Barr’s team modified their UM-2 computer, which was originally designed for use on military airplanes and in spacecraft, for the unique needs of the Soviet Navy, creating the *Uzel* (Knot) fire-control computer system. Sarant demonstrated the *Uzel* in early 1973 to a group of admirals during a trial run in the Baltic

<sup>18</sup> Wade Holland and Willis Ware, “K-200: Space Computer or Engineering Oddity?” *Soviet Cybernetics Review* 2, no. 3 (May 1972): 13–18.

Sea of the navy’s newest, most advanced submarine design. The first digital computer installed onboard a Soviet submarine, the *Uzel* correlated information from sonar, engines, and sensors to plot the craft’s location, as well as the locations of a half dozen potential targets, on a green display. Like the analog computer that Sarant and Barr had developed for the Czech Army, the *Uzel* aimed torpedoes based on the predicted path of targets.<sup>19</sup>

Project 641B, or Tango class, submarines were the largest diesel-electric submarines ever built. Coated with sonar-absorbing tiles, the 60-man craft were designed to hunt NATO submarines, particularly to defend the USSR’s home waters, or “bastions,” areas in the Barents and Okhotsk seas where the Soviet Navy stationed nuclear-missile-equipped submarines.

Although the Project 641Bs have all been retired, the *Uzel* lives on inside a newer generation of submarines dubbed Kilo class by NATO. Like the 1970s-era computers on NASA’s space shuttles, Russia has maintained the *Uzel* into the 21st century, upgrading the software while retaining the original hardware design.

<sup>19</sup> Author’s interview with Joel Barr, April 1992; “Russian Command and Weapon Control Systems,” *Jane’s Naval Weapon Systems*, 16 December 2003; and Adm. Yu. V. Alekseev and Yu. P. Blinov, Dr Sc (techn.), *Korabelnye Avtomatizirovannye Sistemy Upravleniya* (Ship Automated Control Systems), (publication of the Russian Navy, undated), accessed at: <http://www.navy.ru/science/rv7.htm>.

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**The *Izvestia* obituary lauded him . . . but did not, of course, mention that he was an American.**

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Uzels can be found today lurking under the Indian Ocean, the Mediterranean and Black Seas, and the Pacific and Atlantic Oceans in the fleets of a half-dozen navies, including those of several potential adversaries of the United States. If Iran decides to send oil tankers to the bottom of the Persian Gulf, if Chinese submarines attack Taiwanese destroyers, or if India opts to scuttle Pakistani cargo ships, the torpedoes will probably be aimed by Uzels. Each of these nations, along with Poland, Algeria, and Romania, has purchased Kilo-class submarines equipped with Uzel fire-control systems from the Soviet Union or Russia.

### Final Years

The Uzel was Sarant and Barr's last major success, and, along with Zelenograd, is the longest-lasting legacy of their careers in Soviet industry. In 1972, a few months before the Uzel passed the Red Navy's final tests and was accepted for use, their operation was merged into a huge conglomerate. Unable to tolerate his reduced stature, Sarant quit in May 1973. He moved to Vladivostok to serve as the head a new

artificial intelligence institute that was part of the Soviet Academy of Sciences. Barr remained in Leningrad, where he continued to receive a salary on par with a deputy minister but he had few official duties.

When Sarant died in March 1979 from a massive heart attack, *Izvestia* lauded him as “a tireless scientist, a talented organizer who for many years gave all his strength and bright talent to the development of Soviet science and technology.” The obituary noted that he “made a large contribution to the establishment and the development of domestic microelectronics.” It did not, of course, mention that he was an American.

Barr rose to prominence in the Soviet electronics industry again in the 1980s when officials at Zelenograd agreed to support development of his proposed innovative integrated circuit manufacturing technology.

Funding for the project dried up as the Soviet Union fell apart, however, and Barr decided to look in an unlikely place for investors: the United States.

Barr returned to the United States in October 1990, traveling as Joseph Berg on a Soviet passport. To his astonishment, neither the FBI nor any other government agency approached him or took any apparent interest. Barr was even more surprised when he returned a year later to receive a new US passport and Social Security Administration benefits. He divided the remaining years of his life between Russia and the United States.

In April 1992, Barr voted in the New York primary election for Jerry Brown. Four years later, using his Soviet name, he cast a ballot in Leningrad for Gennadii Zhuganov, the communist party presidential candidate.

Joel Barr remained an ardent communist. He died in a Moscow hospital of complications from a throat infection on 1 August 1998.