

## The Soviet Biological Weapons Program

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It is generally believed that the Soviet Union had the largest, most extensive biological weapons (BW) program of any country. The highly secret program, which was expanded on the basis of a decision taken in 1973 by the Central Committee of the Soviet Communist Party, continued until at least March 1992, when Russia's President Boris Yeltsin acknowledged a delay in his country's implementation of the 1972 Biological Weapons Convention (BWC).<sup>1</sup> The following month he issued a decree on the implementation of Russia's treaty commitments with regard to chemical and biological weapons (CBW).<sup>2</sup> However, questions continue to be raised regarding the fate of the former Soviet BW program institutions, structures, and personnel.

An authoritative and comprehensive account of the post–World War II Soviet BW program based on archival documents and oral histories by participants has never been published. However, significant works have been produced, including memoirs, academic studies, and partially or entirely declassified intelligence assessments.<sup>3</sup>

The program also reportedly involved the development and fielding of both tactical and strategic BW systems.<sup>4</sup> Estimates of the number of people employed by the program at its height are generally put at between 25,000 and 60,000. It is unclear whether and how the estimates include support staff and the criteria by which military personnel are counted.<sup>5</sup> Concerns and uncertainty also persist about the lack of authoritative, detailed information on the organization of the program, the nature and type of work carried out, and how the structure and work changed after the collapse of the Soviet Union.

### Assessing the Program

There is no authoritative and comprehensive account of the Soviet BW program based on oral histories and a systematic study of primary, including archival, documents. Such an account would describe the evolution of people, organizations, activities, and policies and would indicate how official policies and programs were actually implemented. Such an account would also describe the motivations of the Soviet government in its decision to pursue an offensive BW program after it had signed the BWC in 1972.

Two key participants in the Soviet BW program, Kanatjan Baizakovich Alibekov (who later changed his name to Ken Alibek) and Igor Valeryanovich Domaradsky, have published accounts of their work.<sup>6</sup> A third important participant, Vladimir Artemovich Pasechnik, defected to the UK in 1989 and provided much reliable information during his debriefing.<sup>7</sup> However, little of this information is publicly available. A fourth knowledgeable participant who has apparently provided BW-related information is V. S. Koshcheev, a former head of the Third Main Directorate of the Soviet Union's Ministry of Health who now lives in the US.

Some Russian and Soviet journal articles may, in some cases, be viewed as "official" or otherwise authoritative. The discussion of Soviet or Russian activities is almost always confined to those related to defensive aspects, usually vaccine development.<sup>8</sup> Information on vaccine work, including the names of the individuals and institutions involved, is probably reliable. At least three other factors are notable in published Soviet and Russian works on CBW-related matters. One is the emphasis on the external CBW threat to the country. Second, there is little or no discussion about Soviet offensive BW work (in contrast to chemical weapons-related activities, about which there is greater openness).<sup>9</sup> Finally, discussion of BW is sometimes confined to activities in other countries.

Articles have been published in Soviet scientific journals on basic and applied research that has potential offensive BW applications.<sup>10</sup> In such cases, no firm conclusions may be drawn in the absence of information that reveals intent. The consequent uncertainty is reflected in the declassified sections of intelligence estimates by other countries.

Analyses and discussions of civil defense and military doctrine have also been studied, including information that indicates the views of mili-

tary planners on the role of BW in military doctrine.<sup>11</sup> The US has devoted more resources than any other country since the end of World War II to determine the nature and status of the Soviet BW program. Partially declassified intelligence assessments are available for much of this period.

## **Origins and Development of the Program**

### *Origins*

Soviet interest in BW dates to at least 1928, when Yakov Moiseevich Fishman, the head of the Military Chemical Directorate of the Worker-Peasant Red Army, prepared a report on BW.<sup>12</sup> By the time World War II began, the Soviet Union appears to have developed and tested a variety of BW systems, including aerosol generators and frangible air bombs.<sup>13</sup> Outside assessments generally appear to conclude, however, that any Soviet BW program was limited in scope at the end of World War II and that any production of BW occurred on a small scale.

After the war, the Soviet BW establishment underwent further development and expansion. For example, secret laboratories were reportedly established and attached to most universities and technical institutes.<sup>14</sup> In 1957 the possible use of new types of weapons began to be “actively” discussed by the Soviet Communist Party Central Committee.<sup>15</sup> The so-called Problem No. 5 dates to at least the 1950s and, according to some sources, to the end of World War II. The term was initially used to refer to developing defenses against BW. Its use was apparently ended in 1992, when the Russian CBW defense establishment was reorganized.

In the 1960s Soviet scientists expressed increased concern about the growing backwardness of Soviet science, including fundamental research in experimental and theoretical biology, by writing to the Council of Ministers and the Soviet Communist Party Central Committee. They also cited the country’s inability to produce or otherwise obtain modern laboratory equipment, so that they were not always able to replicate experiments conducted abroad.<sup>16</sup>

In order to give biology sufficient political support to overcome these problems, some academicians and Soviet officials argued for increasing support for the biological sciences in terms of their military significance,

including the need not to fall behind the West in the field of BW.<sup>17</sup> According to Domaradsky, Yuri A. Ovchinnikov (a molecular biologist and Academician of the Soviet Academy of Sciences) and V. M. Zhdanov (a virologist and member of the Soviet Academy of Medical Sciences) argued that the Soviet military's BW capabilities had been hindered by Trofim Lysenko's scientifically unfounded views regarding genetic inheritance. This argument was decisive in persuading the Central Committee to reorganize and increase financial and political support for the biological sciences. As part of this effort, the Soviet government decided that civilian expertise had to be effectively incorporated into the military's BW-related work.<sup>18</sup>

In 1963 or 1964 the Anti-Plague Department was also reorganized and integrated into Problem No. 5 projects.<sup>19</sup> Other institutes involved in BW-related work (offensive or defensive) included the Institute of Physical Chemistry (Chernogolovka), the Institute of Bio-Organic Chemistry (Pushchino), the Institute of Biochemistry and Physiology of Microorganisms, the Scientific Research Institute of Biological Experiments in Chemical Compounds, the Institute of Highly Pure Biological Preparations (Leningrad), the Institute of Immunology (Soviet Ministry of Health), the N. F. Gamaleya Institute of Microbiology and Epidemiology, the D. I. Ivanovsky Institute of Microbiology, and various other Academy of Medical Sciences and Ministry of Health facilities.

In 1963 the Soviet Communist Party Central Committee issued a decision to strengthen the biological sciences and their practical application. In February 1966 the Soviet Council of Ministers took a decision to strengthen the country's biological sciences. The Main Directorate of the Microbiology Industry (Glavmikrobioprom) was established under the Council of Ministers to implement the decision.<sup>20</sup>

By the 1970s an expanded and more capable civilian-military structure was put into place as a result of the 1973 Central Committee decision to expand the Soviet BW program. This system was coordinated by the Inter-Agency Scientific-Technical Council on Problems of Molecular Biology and Molecular Genetics.<sup>21</sup> The council, which was established in 1973,<sup>22</sup> consisted of representatives of the Soviet Communist Party's Department of Science; the leadership of military-scientific production facilities (NPOs); the leadership of Glavmikrobioprom; and leading microbiologists, virologists, geneticists, and molecular biologists from the Soviet

Academy of Sciences and the Soviet Academy of Medical Sciences. The council was answerable to the State Committee on Science and Technology and the Presidium of the Soviet Academy of Sciences. It established and carried through a number of scientific programs that were viewed by the Soviets in terms of their utility in strengthening the country's military capabilities.<sup>23</sup> The council drafted the agenda for scientific research work



**Figure 6.1** Major sites involved in the USSR BW program.

on BW and coordinated work plans among the various government ministries and took decisions by consensus. The decisions had to be informally approved by the Military Industrial Commission. The council was reorganized in 1975 partly because of decision-making problems, which in turn were related to the fact that its members lacked the appropriate background or knowledge required to oversee a BW program.<sup>24</sup> This entity appears to have been the main mechanism by which scientific research directions were considered and developed and the necessary resources identified and directed toward BW-related activities.

In the 1970s the Military-Industrial Commission of the USSR Council of Ministers Commission on the Problem of Providing for the Development through Fundamental [Scientific] Research of New Types of Biological Weapons<sup>25</sup> also played a major role in linking the scientific community with BW work. Soviet Academician Ovchinnikov played a key role in these efforts. In the early 1970s, Ovchinnikov served as vice president of the Soviet Academy of Sciences and as a consultant to the Military-Industrial Commission.<sup>26</sup>

The Soviet Union signed the BWC in 1972 following the Convention's opening for signature and ratified the treaty in 1975. That year the Soviet Communist Party Central Committee issued a resolution on the creation of advanced military technology, which in turn required measures to be taken to strengthen basic and applied scientific research.<sup>27</sup> The following year a decision was taken by the Politburo to expand the country's BW program on the basis of a proposal made by the 15th Directorate of the Ministry of Defense (MOD).<sup>28</sup>

### *Structure*

Broadly speaking, the Soviet BW program of the 1970s and 1980s consisted of a military component, a political component, and a civilian component. The military component was largely controlled by the 15th Directorate, established in 1973 and first headed by Colonel General Efim Ivanovich Smirnov.<sup>29</sup> From 1985 to 1989 the directorate was headed by V. A. Lebedinsky, and from 1989 until its abolition in 1992 by Lieutenant General Valentin Evstigneev. The 15th Directorate was abolished on 3 January 1992 by an MOD decree (no. 3), and the Directorate of Biological Defense was established within a Directorate of Radiological, Chemi-

cal, and Biological Defense Forces Command.<sup>30</sup> A limited number of personnel with BW-related expertise also began work in the Presidential Committee on Problems of the Chemical and Biological Weapon Conventions, established by Yeltsin in 1992.<sup>31</sup> The committee was established at least partly in response to problems associated with the Russian Federation's compliance with the BWC. In May 1999 the committee and its responsibilities were taken over by the newly established Munitions Agency. In 2004 the Munitions Agency was incorporated into the Federal Agency on Industry (which is subordinate to the Ministry of Industry and Energy).<sup>32</sup>

Key political bodies involved in the Soviet BW program included the Central Committee of the Soviet Communist Party, the Politburo, and the Council of Ministers. Perhaps the key body on BW matters within the Central Committee was the Defense Department (not to be confused with the Ministry of Defense).<sup>33</sup> A variety of ministries participated in the program, including the KGB, the Ministry of Agriculture, the Ministry of Chemical Industry, the Ministry of External Trade, the Ministry of Health, and the Ministry of Internal Affairs. Military officers played an influential role, holding seats in the Politburo and Central Committee. Scientific expertise, including that related to BW, was provided by the Science Department of the Soviet Communist Party Central Committee, while the Military-Industrial Commission was answerable to the Council of Ministers.

Numerous civilian scientific and technical bodies, including the Soviet Academy of Sciences, the Soviet Academy of Medical Sciences, the Ministry of Health, the Anti-Plague Department institutes, and university departments were also directly or indirectly involved.

The major BW field-test facility was Vozrozdniye Island, located in the Aral Sea. This island was identified as the location for the Bacteriological Institute and Proving Ground for Bacteriological Weapons by the 1951 Hirsch Report.<sup>34</sup> A 1965 CIA analysis of whether the island had a BW test facility found that the evidence, while suggestive, was inconclusive.<sup>35</sup> Today the island is the focus of some US cooperative threat reduction program funding.

There were four key research facilities: the All-Union Scientific Research Institute of Applied Microbiology (at Obolensk, near Moscow); NPO "Vector" (in Kol'stovo, Novosibirsk Region; later renamed the State

Research Center of Virology and Biotechnology [Vector]); the Institute of Experimental Hygiene (Kirov, now called Vyatka); and the Institute of Microbiology of the Ministry of Defense of the Russian Federation (Zagorsk, now Sergeev-Posad).

BW production and storage facilities included those of the Main Directorate for Biological Preparations (Biopreparat) at Berdsk, Omutninsk, Sverdlovsk (now Ekaterinburg), and Stepnogorsk.<sup>36</sup> A decision appears to have been taken after the 1979 anthrax outbreak in Sverdlovsk to replace a storage facility at the MOD's Scientific Research Institute of Bacteriology (Military Compound 19, located at Sverdlovsk) with a new facility at Stepnogorsk, Kazakhstan.<sup>37</sup>

The Sverdlovsk facility appears to date to 1949, when a scientific research facility was established in the city on the grounds of an infantry training school. In 1951 work on developing materials and methods for defending against botulinum toxin was carried out at this location. In 1960 the facility was renamed the Military-Technical Scientific Research Institute of the Ministry of Defense of the USSR. The institute developed production methods for a variety of botulinum antitoxins that were later transferred to the Ministry of Health. It also worked on the prevention and treatment of anthrax, including the development and preparation of anthrax vaccines. In 1974 the institute was renamed the Scientific Research Institute of Bacterial Vaccine Preparations of the Ministry of Defense of the USSR. In 1986 the facility was transferred to Military Epidemiology's section of the MOD's Scientific Research Institute of Microbiology. In 1995 the Sverdlovsk facility was renamed the Center for Military-Technical Problems of Biological Defense (and continued to remain a part of the Scientific Research Institute of Microbiology).<sup>38</sup>

Starting in the 1950s, the Sverdlovsk center developed mathematical techniques for modeling the behavior of BW agents in the field,<sup>39</sup> the persistency of aerosols, the effectiveness of re-aerosolization, and ways to maximize human survival in a BW-contaminated environment. The facility also produced a handbook describing the behavior of BW agents, which is reportedly widely used within the Federal Border Service, the Federal Security Service, the MOD, the Ministry of Emergency Situations, and the Ministry of Internal Affairs.<sup>40</sup> It has also developed anthrax vaccines, botulinum antitoxins, and allergens for the detection of meli-



oidosis.<sup>41</sup> It is unclear, however, whether this facility was part of Military Compound 19 and, if not, how the research facility and the military compound might have been connected.

### *Biopreparat*

In 1972 the Politburo authorized the creation of the Ministry of Medicobiological Industry (MinMedBioProm), which became the Main Directorate for Biological Preparations, also known as Biopreparat. Biopreparat was also the general name given to the civilian component (but directed by the military) of the Soviet BW program after 1972. Biopreparat initially consisted of at least six scientific production organizations: Biomash, BiosynteZ, Enzym, FarmPribor, Progress, and Vector.<sup>42</sup> Most of the Biopreparat personnel were initially military personnel. As a rule, the Soviet military occupied the leadership positions. Vsevolod Ivanovich Ogarkov was the first head of Biopreparat. In 1979 General Yuri Tikhonovich Kalinin replaced him.<sup>43</sup> Following the end of the Soviet Union, Kalinin became chairman of the newly established joint-stock company Biopreparat, a position he held until at least the late 1990s.<sup>44</sup>

Biopreparat, which was sometimes referred to by its postal box address (A-1063) and sometimes referred to as Ogarkov's System, or The System, appears to have had at least 20 main locations. US and UK intelligence were reportedly aware of the existence of Biopreparat before Pasechnik's defection.<sup>45</sup> A number of Biopreparat facilities had been flagged in previous Western intelligence estimates; however, its scale and scope were not properly appreciated until after Pasechnik's information became available.

One of the key Biopreparat facilities was the All-Union Institute of Highly Pure Biological Preparations, founded in Leningrad in 1974. It eventually consisted of three sites and employed approximately 3,500 people. The institute initially focused on developing lethal and debilitating strains of tularemia, respectively. However, it eventually focused on weaponizing *Yersinia pestis*. By 1987 the facility reportedly had a manufacturing capacity of approximately 200 kilograms per week. The dried plague strain that was weaponized was referred to as Weapon of Special Designation One.<sup>46</sup>

Another Biopreparat facility, NPO "Vector," was established in 1974 as

the All-Union Research Institute of Molecular Biology and is officially under the control of the Russian Federation Ministry of Health. Vector's areas of BW expertise during the Soviet period included Ebola virus, Lassa virus, Marburg virus, and variola virus.<sup>47</sup>

### Defensive and Offensive Activities

The Soviet Union carried out R&D on the full range of traditional agents. According to Ken Alibek, the major R&D included work on *Bacillus anthracis*, *Brucella spp.*, Ebola virus and Marburg virus, Junin virus, Lassa virus, Machupo virus, (equine) encephalitides, *Burkholderia mallei*, *Burkholderia pseudomallei*, *Yersinia pestis*, variola virus, and *Francisella tularensis*.<sup>48</sup> The Soviet program also addressed the problems of detection, prevention, and treatment, as well as all major elements associated with the identification, evaluation, and testing of agents for possible eventual large-scale production, storage, or weaponization.

Once an agent became designated as a "military strain" it might be produced for long-term storage (such as freeze-dried *Bacillus anthracis* spores) or be produced on a regular basis to replenish aging stocks as they became less virulent over time (for example, *Yersinia pestis*). It is uncertain how agents were selected for screening and the process by which they were then selected for more extensive laboratory work and testing in order to be eventually filled into weapons.

The USSR placed great emphasis on the principle of maintaining large standby production capacity in case of national emergency. A part of the effort to maintain such a capacity was to ensure ease of convertibility of civilian facilities to military production.

### Research Activities

Soviet research activities in the biological area fell into two major categories: basic research with either offensive or defensive applications, and applied work for offensive or defensive purposes.<sup>49</sup>

Determining whether published research indicates an offensive or defensive program can be problematic. For example, some have pointed to research on enhancing the virulence of pathogens and developing antibiotic resistant strains as evidence for an offensive BW program. Additional

context is generally required, as some such work may be done for defensive purposes.

### *Defensive Activities*

Much of the open Soviet BW-related work conducted before and during World War II was on vaccine development. Attention was also devoted to securing domestic production capacities for antibiotics, including penicillin and streptomycin. In 1946 a group that included A. F. Kopylov, N. N. Ginsburg, and M. M. Faibich was awarded the USSR State Prize for developing a penicillin production method. During World War II, the Scientific Research Institute of Epidemiology and Hygiene of the Red Army, presently located at Vyatka (formerly Kirov), worked on the development and production of vaccines against anthrax, plague, and tularemia. In 1945 institute researchers M. M. Faibich, I. A. Chalisov, and R. V. Karneev were awarded the USSR State Prize for developing a dried live plague vaccine, partly based on an EB strain obtained from the Pasteur Institute in 1936. The institute workers N. N. Ginsburg and A. L. Tamarin were awarded the USSR State Prize in 1945 for developing and producing an anthrax vaccine. The first Soviet live anthrax vaccine was created on the basis of work done by N. N. Ginsburg, who isolated an avirulent, highly immunogenic strain called STI-1 in 1940.<sup>50</sup>

The Soviets used aerosol immunization for both humans and animals.<sup>51</sup> Soviet scientists developed aerosolized vaccinations for a variety of agents, including *Bacillus anthracis*.<sup>52</sup> They also developed vaccines to be delivered orally and through skin creams. From 1962 to 1973 the Kirov institute workers, including P. A. Katyrev, V. I. Ogarkov, Yu. S. Pisarevsky, Valentin Ivanovich Evstigneev, V. V. Simonov, and N. Yu. Polonskaya, developed an inhalation method for vaccinating against pneumonic plague “using a small-sized particle aerosol of a rehydrated culture of an EV *Yersinia pestis* vaccine strain.”<sup>53</sup> Whereas the use of aerosolized vaccines in the West has been limited (although there has been recent interest), the Soviets reportedly vaccinated animals using helicopter-borne aerosols in Kazakhstan and other areas of the former Soviet Central Asian republics. At least some of the field trials for these vaccination campaigns were carried out at Stepnogorsk, a facility where BW-related work (such as vaccine production) was carried out.<sup>54</sup>

A semiofficial history of the Directorate for Radiological, Chemical, and Biological Defense Forces states that the “start of work in the USA in the area of offensive biological weapons strengthened the apprehension of the Government of the USSR with regard to their possible employment.” According to the history, the Scientific Research Institute of Sanitation of the MOD was therefore established in Zagorsk, incorporating a previously existing institute belonging to the Ministry of Health. In the 1960s and 1970s this facility developed mass vaccination techniques (apparently an aerosol vaccine) against smallpox. In the 1970s the facility developed a live oral smallpox vaccine. The oral vaccine work was carried out under the direction of A. A. Vorobyev and V. A. Lebedinsky. Vaccines in tablet form were also developed against Venezuelan equine encephalitis (VEE). In 1986 this facility was transferred to the virology section of the MOD’s Scientific Research Institute of Microbiology. The Zagorsk facility was renamed the Virology Center in 1995.<sup>55</sup>

### *Offensive Activities*

Soviet scientists conducted BW-related research on a wide variety of anti-personnel, antiplant, and antilivestock agents. They reportedly weaponized and produced on a large scale a number of agents, including *Bacillus anthracis*, Marburg virus, *Yersinia pestis*, and variola virus. According to Alibek, the Soviet Union had four “major” *Bacillus anthracis* production facilities, located at Kurgan, Penza, Sverdlovsk, and Stepnogorsk.<sup>56</sup>

A significant amount of attention was devoted to manipulating the genetic properties of bacteria and viruses, including the transfer or modification of peptides to destroy the immune system,<sup>57</sup> attempts to genetically modify pathogens to induce the production of endorphins, and the transfer and modification of genes for lethal factors into other bacteria or viruses as part of attempts to create genetically engineered pathogens. Research was also carried out on the mechanisms by which autoimmunity could be induced.<sup>58</sup> In the 1980s Obolensk scientists reportedly genetically modified *Legionella* by inserting genes that triggered autoimmune responses against myelin.<sup>59</sup> When tested on laboratory animals, the altered organism caused brain damage and paralysis and proved nearly 100 percent lethal.<sup>60</sup>

Biopreparat worked to develop pathogenic strains that were resistant

to multiple types of antibiotics. It also carried out work on modifying the antigenic structures of bacteria and viruses to evade the body's immune system. The System attempted to obtain strains that were resistant to multiple types of antibiotic treatment and did not lose their virulence in the process. Domaradsky promoted the "binary concept," in which two or more strains were employed simultaneously. One strain of *F. tularensis*, for example, would be developed primarily for its antibiotic resistance, while another strain would be developed primarily for the retention of its virulence. The concept was reportedly used as a basis for developing a plague strain resistant to approximately 10 antibiotics.<sup>61</sup> It is not clear whether this concept was adopted as MOD policy or was instead applied in a more ad hoc manner by low- or mid-level personnel, such as scientific research staff.

At least two projects to genetically engineer variola virus have been reported, one by combining it with VEE virus, and one by combining it with Ebola virus. There is disagreement among intelligence analysts and others about whether such work was actually carried out, as well as about its technical feasibility.<sup>62</sup>

In 1988 Nikolai Ustinov, a Vector employee, accidentally injected himself with Marburg virus and died approximately three weeks later. His blood was used to grow a strain of the virus called Variant U that was subsequently weaponized.<sup>63</sup> It also appears that field tests of variola virus on Vozrozdniye Island resulted in at least three civilian smallpox deaths in Aralsk in 1971.<sup>64</sup>

## **Evaluations and Understanding of the Program**

### *Intelligence*

The sources of information available to outside intelligence organizations on the Soviet BW program included U-2 airplane overflights of Soviet territory,<sup>65</sup> interviews with defectors and other individuals with firsthand contact with the Soviets, World War II German assessments, reviews of the scientific published literature, and statements on military doctrine. The US understanding of Soviet BW following World War II and through the 1960s appears to have been largely speculative and uncertain (see Chapter 2). US assessments were based partly on the requirements devel-

oped for the US BW program and on perceived US vulnerabilities. The US was also concerned about possible BW sabotage operations on its territory. In addition, the US and, to a lesser extent, other countries have systematically collected information by, among other things, talking with individuals formerly associated with the Soviet BW program.

There appears to have been no positive proof until the 1970s that the Soviets had an offensive BW program. The 1979 anthrax deaths in Sverdlovsk strongly suggested an offensive Soviet program. Pasechnik's defection was perhaps the most significant event, convincing skeptics in the US and the UK. The information he provided showed that the Soviet offensive BW program was continuing on a large scale, in contravention of the BWC. He also described work meant to make BW agents resistant to environmental stresses and medical treatment. For example, he reportedly described a powdered form of antibiotic-resistant *Yersinia pestis* strain produced for filling warheads. He maintained that the USSR had a 20-ton stockpile of *Yersinia pestis* and was periodically replenishing it. He also confirmed that Vozrozhdeniye Island had been used for large-scale field testing of BW agents.<sup>66</sup>

A 1965 CIA study concluded that there was "no firm evidence of an offensive Soviet BW program." At the time, however, a presumption existed within US intelligence that the Soviets had such a program. This presumption was based partly on the fact that the USSR was undertaking defensive measures and partly on a belief that it was logical for the USSR to have an offensive program in view of a range of factors, including Japan's possession of an offensive BW program during World War II and the widely known US commitment to BW. US intelligence was forced to rely on indirect methods to try to determine whether the Soviet Union had an offensive BW program. The CIA study noted: "Analysts have used speculation, analogy, and parallels with other nations' BW research, development, and practice in recent times and in the historical past. They have analyzed Soviet, Satellite, and Chinese propaganda charges of US germ warfare for clues as to the Communists' sophistication and familiarity with BW hardware and agents." Indirect methods included a literature review of "military-related activity in the field of biology and medicine, all technical publications which appeared to be censored by security considerations, and all biomedical studies which did not jibe with Soviet public health requirements as we know them."<sup>67</sup>

A major consequence of the then recent availability of overhead imagery (the first U-2 overflight was carried out in 1957) appears to have been a renewed focus on Vozrodeniye Island, which had been identified as a BW facility in the 1951 Hirsch Report on the basis of information developed by the German military before and during World War II. Partly for this reason, the island was the “foremost suspect as a biological warfare center.”<sup>68</sup>

Several factors drew attention to the question of Soviet compliance with the BWC starting in the 1970s, in particular a suspicious anthrax outbreak in Sverdlovsk in April and May 1979 that resulted in the deaths of at least 64 people, allegations made primarily by the US that the Soviet Union was using mycotoxins (“yellow rain”) in Afghanistan and Southeast Asia (see Chapter 13), the 1989 defection of Pasechnik to the UK, and the information provided by Alibek to the US starting in 1992.

Almost immediately after the signing of the BWC, the CIA and Defense Intelligence Agency reportedly concluded that satellite imagery indicated that the Soviets were not dismantling their offensive BW program.<sup>69</sup> According to former Secretary of Defense Melvin Laird, the US did not raise the issue with the Soviets, in part because nuclear arms control issues were seen as more important. Apparently there was also disagreement among US government officials as to the degree of certainty necessary before a perceived noncompliance issue should be raised and whether broader national interests were not better served through a more gradual approach to seeking clarification.<sup>70</sup>

Beginning in 1975 Arkady Shevchenko, a senior Soviet diplomat and member of the Soviet delegation to the UN in New York City, began providing information to the US, including information that the Soviet Union was violating the BWC.<sup>71</sup>

The names of many of the major Soviet BW facilities were correctly identified between World War II and the mid-1970s. For example, Vozrodeniye Island, Gorodomlya (located at Seliger Lake), and Sverdlovsk were identified in the Hirsch Report as having known or likely BW facilities. In August 1975 the CIA reportedly leaked information that “questionable activities” were occurring at Kirov, Zagorsk, and Sverdlovsk. The identities of three then recently established sites—Berdsk, Omutninsk, and Pokrov—were also disclosed.<sup>72</sup>

Partly on the basis of satellite thermal imaging that showed the war-

heads were refrigerated, in 1988 US intelligence tentatively concluded that the Soviet Union had mounted BW warheads on intercontinental ballistic missiles. Between 1984 and 1988 the US reportedly issued six *démarches* against the Soviet Union on BW. The first three featured concerns about activities at Zagorsk; the rest concerned the 1979 Sverdlovsk anthrax outbreak.<sup>73</sup>

The Sverdlovsk outbreak, together with the yellow rain allegations, provided a major impetus toward the decision by the Second Review Conference in 1986 to agree on annual data exchanges, including outbreaks of infectious diseases and “similar occurrences caused by toxins that appear to deviate from the normal pattern . . . of occurrence,” to serve as a confidence-building measure (CBM).<sup>74</sup>

### *The Trilateral Process*

Pasechnik’s 1989 defection provided the main impetus for a series of secret meetings among UK, US, and Soviet officials to clarify the status of Soviet compliance with the BWC. The information he provided was key to the identification and selection of Soviet sites the UK and US wished to discuss with Soviet authorities and to visit.

This trilateral process consisted of preliminary informal discussions and visits, discussions and visits within the framework of the Trilateral Agreement, formalized in 1992, and follow-up discussions that began in mid-1994 and effectively ended in 1996, when, according to a former UK official and BW technical expert involved in the process, a letter from Russian Foreign Minister Evgeni Primakov to US Secretary of State Warren Christopher went unanswered for lack of a “collective resolve” by the parties to try to continue to overcome the unresolved issues.<sup>75</sup> In other words, the participants saw no further utility in continuing the process.

In January 1991 US and UK teams were allowed to visit the Institute of Immunology (Chekhov), the Institute of Applied Microbiology (Obolensk), the Institute of Molecular Biology (Kol’tsovo), and the Institute of Highly Pure Preparations (Leningrad).<sup>76</sup> Among the important discoveries made at the Obolensk facility were an explosive containment chamber, extensive physical security and biosecurity measures, and a large-scale fermentation capacity.<sup>77</sup> The most significant event during the visit at Kol’tsovo was the admission by a worker that the facility was doing



variola virus work. Among other things, the Soviet Union had not declared to the World Health Organization that it was doing variola virus work at this facility.

In Moscow on 10–11 September 1992 a joint UK-US mission discussed BW matters, including the nature of activities at the St. Petersburg Institute of Highly Pure Biological Preparations. On 14 September 1992 the three parties issued the Joint Statement on Biological Weapons by the Governments of the United Kingdom, the United States and the Russian Federation (10–11 September 1992) (Trilateral Agreement), in which the states reiterated their commitment to the BWC and agreed to host reciprocal visits at selected facilities in order to enhance confidence in treaty compliance.<sup>78</sup>

Under the terms of the agreement, Russia “confirmed the termination of offensive research, the dismantlement of experimental technological lines for the production of biological agents, and the closure of the biological weapons testing facility [apparently Vozrozhdeniye Island].” It also agreed to reduce the number of personnel “involved in biological programmes” by half, to reduce “military biological research” by 30 percent, and to dissolve the MOD department responsible for the offensive BW program (15th Directorate). The agreement stated that access to nonmilitary biological sites would be “subject to the need to respect proprietary information on the basis of agreed principles” and that access to any military biological facility would be carried out on a reciprocal basis and be “subject to the need to respect confidential information on the basis of agreed principles.” It did, however, also state that access to military and nonmilitary biological facilities would include “unrestricted access.”<sup>79</sup>

A set of US government talking points about the agreement stated that Russia had again admitted during discussions held in Moscow on 10–11 September 1992 that it had violated the BWC. The points emphasized that an elaborate and extensive “cover story” was “in many respects still functioning.”<sup>80</sup>

In 1993–94 there was a second round of trilateral visits to the All-Russian Scientific Research Institute of Veterinary Virology and Microbiology (in or near Pokrov), the Chemical Plant (Berds, near Novosibirsk), the Chemical Plant (Omutninsk), and the All-Union Scientific Research Institute of Microbiology (Obolensk).<sup>81</sup> At Pokrov the visiting team viewed hardened underground bunkers capable of holding several hundred

thousand chicken eggs.<sup>82</sup> At Berdsk the visiting team reportedly saw 4 operational 64,000-liter fermenters and an uncompleted building capable of holding 40 64,000-liter fermenters. When the team visited Obolensk in January 1994, it noted that the previously inspected explosive test chamber had been removed.<sup>83</sup>

The trilateral process had a number of consequences. According to Alibek, the UK-US visits resulted in a Soviet decision to develop a “completely new type of mobile biological weapon facility.”<sup>84</sup> Some offensive work at some facilities was curtailed or suspended. One result of Pasechnik’s defection was that Kalinin ordered all offensive work at the Leningrad facility to be halted and incriminating evidence removed or destroyed.

The US (and UK) did not publicly discuss the Soviet BW program during the trilateral process (except for periodic references to yellow rain and Sverdlovsk) because they believed that quiet diplomacy would be more effective in promoting transparency and appropriate follow-up steps. The process remains suspended.

### *BWC Data Exchanges*

On 8–26 September 1986 the Second Review Conference of the States Parties to the BWC agreed to submit annual, politically binding data exchanges on biological-related information to serve as CBMs. On 9–27 September 1991 the Third Review Conference agreed that information would be provided in additional areas, including “past offensive and/or defensive biological research development programmes.” The Soviet Union (and then the Russian Federation) has submitted information every year since late 1987, when the first exchange of information and data occurred.

The quality and completeness of Russia’s CBMs have been questioned, especially with respect to past programs. The US publicly criticized the Soviet Union’s submission in 1991 during the Third Review Conference of the States Parties to the BWC.<sup>85</sup> And the British ambassador to Russia, Sir Rodric Braithwaite, and James F. Collins (the deputy chief of mission at the US embassy in Moscow) reportedly warned Yeltsin in 1992 to “reveal the full extent of the former Soviet biological weapons program or face public denunciation” at the UN.<sup>86</sup> In June of that year Russia report-

edly showed a draft declaration to the US listing 4 (Kirov, Sverdlovsk, Vozrozdniye Island, and Zagorsk)<sup>87</sup> of 20 facilities the US and UK knew or suspected of having been involved in producing or stockpiling BW.<sup>88</sup> No mention was made of the Sverdlovsk *Bacillus anthracis* leak (which some Russian officials have still periodically maintained was a natural disease outbreak) or Soviet work with hemorrhagic fever viruses.<sup>89</sup> A second list was reportedly provided to the US by Russia,<sup>90</sup> which unnamed US government sources characterized as “marginally better.” US and UK officials told the Russians, however, that if the data were submitted to the UN as a CBM declaration, they would publicly “attack it as seriously inaccurate”;<sup>91</sup> among other things, neither of the drafts provided a “detailed account of the allegedly extensive work with mycotoxins.”<sup>92</sup> A third and final draft was also judged inadequate by the US and UK:<sup>93</sup> among other omissions, like the previous two drafts it failed to acknowledge stockpiling of BW.<sup>94</sup>

In 1992 Russia declared that the Soviet Union (and then Russia) had had an offensive BW program from 1946 to March 1992; that the Soviet Union had begun a program in the late 1940s to develop BW for retaliatory purposes; that work had been carried out with *Bacillus anthracis*, *Francisella tularensis*, *Brucella spp.*, *Yersinia pestis*, VEE virus, *Rickettsia sp.*, and *Coxiella burnetii* at facilities located in Kirov, Sverdlovsk, and Zagorsk in the 1950s; that models of BW-filled air bombs and rockets had been tested at Vozrozdniye Island; and that work had been done to determine the threat posed by *Burkholderia mallei* and *Burkholderia pseudomallei*. In addition, “In the late 1960s, industrial facilities with storage capabilities were, by a government decision, established in Glavmikrobioprom for the production of medicinal and other protective preparations, which could also be used for the preparation of biological agents during a crisis.” Although “investigations with dangerous pathogens” were carried out in 1982 and 1983 at Glavmikrobioprom (at Kol'tsovo, Obolensk, Chekhov, and Leningrad), the declaration stated that an insufficient level of “scientific-methodological level of work” and a lack of equipment and reagents “did not permit practical significant results in the military field.” Russia also declared that a multistep review of the “military biological program” had been begun before the Second Review Conference (held in 1986). Finally, Russia stated that it had not stockpiled BW.<sup>95</sup> In short, the declaration described work that was essentially defensive, or at worst prepara-

tory for a possible full-scale offensive program. There was no clear or straightforward admission of offensive work, in contrast to the declarations provided by, for example, the UK and US. Since 1992, Russia has declared that it has no changes to make on this part of the declaration.

### **Rationale for the Program and BWC Violations**

Before the BWC was opened for signature in 1972, the Soviet Union most often gave the following three reasons for pursuing a BW program: the US agreement at the end of World War II not to prosecute participants in Japan's BW program, in exchange for BW information; alleged US use of BW against North Korea during the Korean War; and a more general charge that the US was an aggressive "imperialist" country intent on dominating the world.<sup>96</sup>

Soviet threat perceptions were heightened by Japan's World War II BW program.<sup>97</sup> However, the extent to which the threat was perceived as being actual rather than a justification for strengthening Soviet BW-related capabilities is unclear. On 25–30 December 1949, in Khabarovsk (USSR), Soviet authorities tried 12 Japanese military personnel for "preparing and employing" BW.<sup>98</sup> The case was based in part on Japanese BW documents and materials captured by Soviet forces in Manchuria. A commission of experts was assembled to evaluate these materials and to provide testimony at the trial. The commission was headed by Nikolai Nikolae-vich Zhukov-Verezhnikov, a key figure in the postwar Soviet BW program.<sup>99</sup> It is unclear whether or how Zhukov-Verezhnikov's postwar experience on the commission influenced his later views.

It has also been suggested that the Soviet Union did not wish to give up its offensive BW program after 1972 because the military found attractive the possibility of eliminating the personnel of factories, research facilities, and the like located deep in an enemy's heartland, far from actual combat, while preserving intact the infrastructure and equipment. It is also possible that the military simply did not wish to lose part or most of its existing BW establishment. Another factor in the decision to violate the BWC may have been the close personal ties enjoyed by key supporters of maintaining the program (such as Zhukov-Verezhnikov and Smirnov) with those at the highest levels in government. Smirnov, who was still head of the 15th Directorate at the time, was reportedly a close friend of

Leonid Brezhnev.<sup>100</sup> Another rationale for the BW program reportedly given to Gorbachev by the Soviet military was to help counter the military threat posed by China.<sup>101</sup>

Shevchenko's memoirs provide some insight into both the decision-making process and possible reasons why the USSR wished to retain an offensive BW program. Shevchenko, referring to personal discussions with Soviet Ministry of Defense officials, said that in the early 1970s the military was strongly opposed to any arms control or disarmament agreement on chemical or biological weapons partly because such agreements "could reveal the extent of the development of these weapons and would show Soviet readiness for their eventual use." Shevchenko has said that General Aleksei A. Gryzlov informed him that Defense Minister Andrei Grechko had instructed the Soviet military not to stop production of BW. Shevchenko also believes that the Politburo must have known about this directive.<sup>102</sup>

Some sections of the Soviet government appear not to have believed that the US had in fact abandoned its offensive BW program. This skepticism may have stemmed in part from the deception programs reportedly run by the US in the 1960s and 1970s to encourage Soviet research into unproductive, costly research directions in CBW.<sup>103</sup>

When considering the rationale for the post-BWC offensive BW program, it is also important to take into account the role played by compartmentalization of activities and information—both information specific to the work and more general information regarding the outside world. According to Pasechnik, workers in The System were, depending on their level of security classification, given one of four "legends." The first-level, "open legend" denied there was a BW program. The second-level, "closed legend" acknowledged BW work but said it was defensive. The third-level legend involved providing limited information about some aspects of offensive work. Finally, individuals cleared for the fourth-level legend were permitted to know the true nature and scope of the program.<sup>104</sup>

A lack of outside information probably facilitated the justification for carrying on an offensive program. Many of those involved in the program were apparently unaware of the BWC's existence. The charge that the US used BW against North Korea has appeared in some official and semi-official Russian-language publications,<sup>105</sup> and Chinese and North Korean

government officials continue to make it (see Chapters 2, 4, and 13).<sup>106</sup> Finally, participants have noted that most scientists focused on the technical aspects of their work, giving little, if any, thought to possible moral or legal considerations.<sup>107</sup>

### **Biology-Related Developments**

Since the early 1990s, a number of European countries and the US have implemented cooperative R&D programs with facilities and personnel previously involved in the Soviet BW program to help ensure that the latter remain employed in work for peaceful purposes. The bulk of such assistance has been provided by the US within the framework of the 1991 Nunn-Lugar Cooperative Threat Reduction Program and, since 2002, the Group of Eight (G8) Global Partnership against the Spread of Weapons and Materials of Mass Destruction. Assistance is also provided through the International Science and Technology Center (ISTC) program, established in November 1992 by the European Union, Japan, Russia, and the US.<sup>108</sup> Some European assistance is provided within the framework of Technical Assistance for the Commonwealth of Independent States (TACIS), an EU program that will be ended by 2007.<sup>109</sup> Such programs have provided greater transparency on former BW-related activities. Many of the outside cooperative efforts are directed toward cataloging and securing pathogenic strains at all biological facilities in the former Soviet Union.

### **Russian Developments and Programs**

In the 1990s the Russian government undertook a number of measures to preserve or strengthen the country's biological sciences (for example, domestic production of high-quality laboratory and diagnostic equipment, vaccines, and medicines) and to improve defensive capabilities against CBW attacks, including actions by nonstate actors (often described in the context of the international "war on terrorism"). Some of these efforts have featured cooperative projects between Russian ministries and scientific research establishments. Associations have also been established involving the participation of both state and private (or semiprivate) entities. For example, the Russian Federation Ministry of Science and Technologies has proposed cooperation projects with Minis-

try of Defense scientific research bodies in the fields of biotechnology and genetics.<sup>110</sup> The Russian Ministry of Industry, Science, and Technology has several projects designed to promote high-tech research in Russia.<sup>111</sup> Some of the financial support for these projects comes from government-funded venture funds, including the A. V. Bortnik Fund (also known as the Foundation for Assistance to Small Innovative Enterprises, or FASIE) and the Russian Fund for Technological Development.<sup>112</sup>

The Russian government has identified a wide range of areas and goals for improving defenses against BW. These include promoting comprehensive, integrated legal statutes; supporting biological monitoring facilities and infrastructure; maintaining reference strains for diagnostic, treatment, and research purposes; clearly delineating institutional areas of responsibility; maintaining and enhancing international cooperation; protecting human, plant, and animal life; implementing measures to meet a perceived bioterrorist threat; and developing and maintaining modern detection equipment and detection systems infrastructure. Valentin Evstigneev, now a retired lieutenant general of the armed forces medical service and the current first deputy director general of the joint-stock company Biopreparat, has argued that such a system be controlled by the State Committee on Problems of Biosecurity and by the Biotechnology and Security Agency. They would oversee industrial facilities, laboratories, medical facilities, and scientific research organizations at the national, regional, and local levels. The extent to which this plan has actually been implemented is not clear. However, the Center for Special Laboratory Diagnosis and Treatment has been established at the Russian Federation MOD's Virology Center (part of the Scientific Research Institute of Microbiology) as part of such an effort.<sup>113</sup> Reportedly the institute is currently working on the further development of anthrax and plague vaccines, antianthrax immunoglobulin, diagnostics, and sanitation measures for the Russian armed forces and civilian population.<sup>114</sup>

### **Unresolved Concerns**

Concerns persist about a continued lack of responsiveness by Russian officials to requests by other governments for clarification regarding the fate of the former Soviet program,<sup>115</sup> the fact that a number of high-level officials in the current Russian CBW defense establishment are known or

suspected to have been a part of the Soviet BW program, and the fact that outside access to several Soviet BW military R&D facilities has never been allowed. There is also continued concern that individuals formerly involved in the Soviet BW program could be recruited by countries believed to be interested in pursuing illicit BW programs.

There are five military facilities to which outside access has been either sharply limited or disallowed: the Center for Military-Technical Problems of Anti-Bacteriological Defense (Ekaterinburg, formerly Sverdlovsk), the Center for Virology (Sergeev-Posad, formerly Zagorsk), the Scientific Research Institute of Microbiology (Vyatka), the Scientific Research Institute of Military Medicine (St. Petersburg), and a facility located in Strizhi, near Kirov (Kirov-200). (According to Russian officials, the Strizhi facility is no longer under the control of the Russian MOD.)

Several countries have also expressed concern about residual capacity. The 2001 US assessment of the former Soviet BW program states:

serious concerns remain about Russia's offensive biological warfare capabilities and the status of some elements of the offensive biological warfare capability inherited from the FSU [former Soviet Union] . . . Many of the key research and production facilities have taken severe cuts in funding and personnel. However, some key components of the former Soviet program may remain largely intact and may support a possible future mobilization capability for the production of biological agents and delivery systems . . . work outside the scope of the legitimate biological defense may be occurring . . . the United States continues to receive unconfirmed reports of some ongoing offensive biological warfare activities.<sup>116</sup>

Part of the concern about a standby capacity relates to a Soviet government decree that reportedly reorganized Biopreparat as a civilian organization, but also instructed that Biopreparat was "to organize the necessary work to keep all of its facilities prepared for further manufacture and development."<sup>117</sup> More generally, maintaining a standby production capacity and the option of converting civilian to military production were major goals in Soviet military planning. According to a former researcher in the Soviet BW program, at least some of the offensive BW research results were preserved. He has also said that research published by former



colleagues is not of the highest quality, a fact that suggests that they are continuing to carry out classified research.<sup>118</sup>

On 4 March 2003 a US Department of State official testified to Congress: “We believe, based on available evidence, that Russia continues to maintain an offensive biological weapons program.”<sup>119</sup> In 2004 a US Department of Defense official estimated that approximately 40 institutes that were formerly part of the Soviet BW program still exist.<sup>120</sup>

It is unclear how much specific information the US, UK, and others have about recent or current Russian activities that cause concern. The Russian government is generally reluctant to discuss the former Soviet offensive program and subsequent developments, feeling that further discussion would result in no benefit to the Russians and might prove embarrassing.

## **Conclusion**

Further changes in the political and scientific leadership in Russia are necessary before a more definitive account of the Soviet BW program and its legacy can be produced.<sup>121</sup> A sign that such changes have occurred would be the publication of studies on offensive aspects of the Soviet BW program by Russian scholars. (Almost all published scholarly works on the Soviet BW program have been produced by people living outside Russia.) International perceptions of Russian activities in the biological sciences will inevitably change and evolve with time, perhaps someday resulting in an international climate that facilitates disclosures about past activities.