
China's Role in the Chemical and Biological Disarmament Regimes

ERIC CRODDY

*Eric Croddy is a Senior Research Associate at the Chemical and Biological Weapons Nonproliferation Program, Center for Nonproliferation Studies, Monterey Institute of International Studies. He is the author of **Chemical and Biological Warfare: A Comprehensive Survey for the Concerned Citizen** (New York: Copernicus Books, 2001).*

Modern China has been linked with the proliferation of nuclear, chemical, and missile weapons technology to states of proliferation concern, and its compliance with arms control and disarmament is seen as key to the effectiveness of weapons of mass destruction (WMD) nonproliferation efforts.¹ In this context, the answer to Gerald Segal's question, "Does China really matter?" is most definitely, "Yes."² In the realm of chemical and biological weapons (CBW), Beijing's role is closely linked to its view of the multilateral disarmament regimes for CBW, namely the Chemical Weapons Convention (CWC) and the Biological and Toxin Weapons Convention (BWC), and of related multilateral export control efforts. These views, in turn, depend on how CBW figure in China's tactical and strategic posture, which includes a declared nuclear weapons (NW) capability and a strategic missile force. Where CBW proliferation is concerned, the key question today is not whether China matters, but whether the Chinese government is serious about eliminating both chemical and biological weapons—it maintains it never developed the latter—and preventing the proliferation of CBW-related technology. China has been an active participant (at least in the last two decades) in both chemical and biological disarmament and arms control negotiations. Outwardly at

least—and with considerable diplomatic effort—China broadcasts its commitment to both the CWC and the BWC.

Few unclassified publications analyze the role that CBW have played in Chinese military strategy, nor is much information available on Beijing's approach to negotiating CBW disarmament treaties. This is not surprising: China is an extremely difficult subject for study where sensitive military matters are concerned. A 1998 report by Dr. Bates Gill, *Case Study 6: People's Republic of China*, published by the Chemical and Biological Arms Control Institute, was the first to seriously address the issue of China and CBW proliferation. This article, while asking some intriguing questions, had no references to the Chinese literature on the subject of CBW itself. Gill concluded that

given China's overall industrial capacity, China probably has the capability of producing CBW agents and may have weaponized this capability. At present, however, neither open-source information nor broader contextual analysis can confidently confirm that China has an offensive CBW program or would seriously contemplate activating that option for use in wartime.³

Of the few Chinese books written on the subject of arms control within recent years, Major General Pan

Zhenqiang's, *International Disarmament and Arms Control*, probably best reflects basic attitudes and beliefs among security analysts and members of the Chinese arms control community.⁴ For the book's chapters on chemical and biological arms control, Major General Pan enlisted contributions from Yu Zhongzhou, a chemical weapons (CW) specialist, and Li Yimin, a biological weapons (BW) specialist. In a conversation with the author in spring 2001, General Pan indicated that his book was already out of date when it was published in 1996. Even so, *International Disarmament and Arms Control* appears to provide an accurate reflection of how Chinese decisionmakers currently view CBW disarmament issues. Other writings that have appeared before or since do not contradict the assertions or attitudes found in Pan's volume. More recently, Dr. Liu Huaqiu, a leading Chinese scholar, edited an encyclopedic volume on arms control.⁵ The two chapters on CBW arms control, largely written by Yu Zhongzhou, Li Weimin (CW), and Li Yimin (BW), provide more detail on China's role in negotiation and compliance issues, but for the most part are largely derivative of Pan's earlier volume.

Drawing on these two books, as well as a variety of other Chinese written sources and interviews with government officials and academics in the People's Republic of China (PRC) and Taiwan, this article examines what is known of past Chinese activities involving CBW and China's current involvement in the CBW disarmament regimes. The article concludes with some policy recommendations for the U.S. government.

CHINA AND CHEMICAL WEAPONS

History of Chinese Interest in Chemical Warfare

China's involvement with chemical warfare preceded the founding of the People's Republic in 1949. With the advances in modern chemical industry and the birth of organic chemistry in the late 19th century, it was probably inevitable that CW would appear on the battlefields of World War I. During the 1920s, the Chinese warlords Zhao Hengti, Cao Kun, Feng Yuxiang, and Zhang Zuolin all expressed interest in purchasing or enlisting European firms to help manufacture CW agents. Zhang Zuolin reportedly contracted with the German firm Witte for the construction of a CW production facility, in Shenyang, and hired Russian and German chemical engineers to oversee the manufacture of mustard, phosgene, and chlorine. Zhao Hengti also took delivery of a relatively small ship-

ment of "gas producing shells" in August 1921. The warlord Wu Peifu, however, condemned CW as "inhumane."⁶

Despite repeated clashes among warring factions during China's turbulent Republican period, there are no confirmed reports of chemical warfare during this period in China's history. There is also no evidence that the Soviet Union assisted the armies of the Kuomintang (Nationalists) or the Chinese Communist Party (CCP) with CW-related training or equipment. It is quite possible, however, that knowledge gained by Soviet-German cooperation in CW technology from the 1920s to the early 1930s may have found its way into Chinese hands.

The first use of CW in Asia is believed to have taken place in 1930 in Wushe, a mountainous area in central Taiwan. Defeated by the Japanese in 1895, China's Manchu rulers were forced to cede the provincial island of Taiwan to Japan. During Japan's colonization of the island, brutal pacification campaigns were waged against local indigenous groups, particularly during the years 1910-1914.⁷ Local tribes, including those in Wushe, revolted against the Japanese. Historians believe that in 1930, Japan used chloracetophenone (CN)⁸ while crushing the rebellion led by tribal leader Mona Rudo.⁹ This particular engagement might have been part of the experimental use of CW by the Japanese on Taiwan between 1930 and 1941.¹⁰ After Japan's surrender in 1945, the Kuomintang Garrison Command took control of former Japanese military facilities, including a "large chemical weapons facility in northern Taiwan."¹¹ It is not known what stocks of CW were found when Nationalist soldiers arrived at the plant.

Beginning in 1937, the Japanese army employed a wide range of CW agents during its invasion of China. Quoting an "authoritative Soviet source," a Chinese book by People's Liberation Army (PLA) specialists in chemical defense claims that "during its war in China, the Japanese army had prepared 25% of their artillery shells to be chemical munitions, while 30% of its aerial ordnance was chemical bombs."¹² Another source tallies 10,000 deaths and 80,000 wounded as a result of Japanese CW use.¹³ According to a third source, from July 18, 1937, to May 8, 1945, Japan carried out 1,059 chemical attacks in China, including the use of the CW agents diphenylchloroarsine, diphenylcyanoarsine, chloracetophenone (CN), chloropicrin, hydrogen cyanide, phosgene, mustard, and lewisite.¹⁴

While it is difficult to evaluate the extent of Japanese use of CW in China, it would appear that mainland sources exaggerate the overall importance of such warfare in

Japan's success against Kuomintang armies during this period. Japanese soldiers, especially those serving in China, were highly disciplined, well equipped, ruthless, and had a well-organized command structure. The latter qualities did not exist among the Chinese resistance, which was already fractured by a rivalry between the Kuomintang (KMT) forces led by Chiang Kaishek and the CCP forces led by Mao Zedong. While the use of CW might have assisted the Japanese in some battles, it is difficult to conclude that it played a decisive role in the Sino-Japanese war of 1937-1945. Although the Chinese are bitterly indignant over Japan's use of CW, they also place some of the obloquy on the United States. One Chinese source notes that despite President Roosevelt's warning to Japan in 1942 concerning their use of such weapons against China, the United States never took measures to retaliate in kind.¹⁵

From 1940 to 1945, Kaishek and the KMT operated a Chemical Warfare Center in the city of Naqi, located at the junction of the Yungning and Yangtze rivers. The elite First Chemical Shock Division was headquartered here, commanded by a major general and under direct control of General Yu Dai Wei, Chief of Ordnance in Chungking. There was also the American Chinese Chemical Command (along the lines of the U.S. Chemical Warfare Service) in Kunming under the command of Brigadier General John Middleton.¹⁶ In 1943, the 1st regiment of the KMT was moved to Ramgarh Training Center, Bihar Province, India, and was commanded by General Hsieh, with training provided by U.S. Army Chemical Corps officers. The KMT 3rd Regiment also operated as a chemical mortar unit in 1945.¹⁷ The fate of these CW units after World War II and the Chinese Communist takeover in 1949 is unknown. But CW and equipment abandoned by the Japanese, and munitions that may have been provided to the Nationalists by the United States, fell into the hands of the Chinese Communists in 1949.¹⁸

The charge that the United States employed CW during the Korean War of 1950-1953 is now rarely mentioned outside of China.¹⁹ Today, however, it appears to be an article of faith among the Chinese military that U.S. armed forces used both biological and chemical weapons during that conflict. A 1997 mainland Chinese book charges that the U.S. military used CW against Sino-Korean forces on more than 200 occasions, and it lists the following CW agents by name: mustard, cyanide (presumably hydrogen cyanide), chloropicrin, and chloroacetophenone (CN).²⁰ It may be no coincidence that the same CW agents were used by Japan against China during World War II.²¹

One gets the sense that, when looking back to the Korean War, Chinese leaders often make oblique references to the CW allegations. For example, current PRC Chairman Jiang Zemin has stated that during the Korean War, "the United States threw in nearly two million troops, and except for nuclear, employed all of the most advanced weapons."²² An article in the October 2000 issue of *China National Defense Journal (Zhongguo Guofangbao)* used essentially the same language: "except for nuclear weapons, all modern weapons were used."²³ In Korean War retrospectives intended for Chinese consumption, one finds that the CW charges are repeated with specifics. Among other books on the topic, *International Disarmament and Arms Control*, published in 1996 by the Chinese National Defense University Press, also mentions the use of CW during the Korean War: "Since the end of WWI, chemical weapons have been frequently used throughout regional and armed conflicts. Among the more important of these were...in the 1950s, when the United States used them against North Korea, and in the 1960-70s, the United States against Vietnam. . . ."²⁴

Another book published by the People's Liberation Army Press claims that in 1950-1953,

the United States Army, having gotten involved in the Korean War, used chemical weapons more than 200 times, causing close to 2,000 chemical casualties for the Sino-Korean Army. Among the relatively large-scale attacks involved the use of phosgene against the Nampo city of Korea. Poison gas bombs dropped by American B-29 bombers on May 6, 1951, gassed up to 1,379 and killed 480 people. From February 1952 to June 1953, American use of chemical agents exceeded a hundred occasions and comprised some 17 different types of agents, such as mustard, lewisite, phosgene, hydrocyanic acid, among others, and irritating agents (*cijiji*)....²⁵

China first made formal charges of U.S. chemical warfare during the Korean War on March 5, 1951. The "Report on U.S. Crimes in Korea," compiled by a Communist front organization, the International Association of Democratic Lawyers, claimed that the United States used CW between May 1951 and January 1952. The UN ambassador from the Soviet Union, Jakob Malik, repeated similar charges in February 1952. But when the International Scientific Commission—a group of Sinophile scientists, leftists, Marxists, and other Maoist fellow travelers—reported on the biological warfare (BW) allegations in 1952,

no mention was made of chemical warfare in Korea or China.²⁶ According to Milton Leitenberg,

There was never much question that there was no validity to the 1951 charges of chemical weapons use, and they were not repeated during the period of the major BW allegations in 1952. Those in the West who professed to believe the BW allegations into the 1960s and 1970s never mentioned the early accompanying allegations of chemical weapons use.²⁷

Perhaps the most dramatic testimony contradicting the Chinese CW allegations comes from the Soviet archives. Lt. Gen. V. N. Razuvaev, who had served as Soviet Ambassador to North Korea and military advisor to the Korean People's Army, wrote the following to Levrenti Beria on April 18, 1953:

[T]he Chinese . . . wrote that the Americans were using poison gas in the course of the [Korean] war. However, my examinations into this question did not give positive results. For example, on April 10, 1953, the general commanding the Eastern Front reported to Kim Il Sung that 10-12 persons were poisoned in a tunnel by an American chemical missile. Our investigation established that these deaths were caused by poisoning from carbonic acid gas [i.e., carbon dioxide] [released into] the tunnel, which had no ventilation, after the explosion of an ordinary large caliber shell.²⁸

In retrospect, it is possible that Chinese military leaders believed that the UN forces were employing chemical warfare. The Chinese People's Volunteer Forces (CPVF) faced intense air bombardments by U.S. fighter and bomber aircraft later in the Korean War, as well as U.S. ordnance, such as napalm and artillery. In addition to the immediate effects of these attacks, the off-gases from air-delivered bombs were no doubt responsible for respiratory distress and pulmonary edema among Chinese soldiers, symptoms that are largely indistinguishable from those of CW that damage the lungs. For example, highly toxic nitrous oxide (NOx) compounds are routinely formed following the detonation of high explosives such as TNT. For the purposes of propaganda against the "imperialist aggressor," it may have made sense for Chinese officials to blame the deaths of thousands of ill-equipped Chinese soldiers on CW.

In sum, there is no evidence that the UN forces of any country employed CW during the Korean War. Even so,

the Chinese military continues to maintain this historical fiction, perhaps as a politico-bureaucratic measure to justify expenditures in CW defense.²⁹ Keeping the CW myth alive might also help to divert attention away from the fact that China lost so many troops while only achieving a return to the *status quo ante bellum*—a somewhat lackluster result.³⁰

The fact that Chinese military authors continue to allege U.S. chemical warfare during the Korean War may also be partly the result of a resurgence of nationalist sentiment in the PRC. Particularly in 1995-1996, jingoist and xenophobic articles, speeches, and public statements were evident when PLA military chiefs, opposed to what they perceived as President Jiang Zemin's overly conciliatory policy toward Taiwan, conducted military exercises and missile tests off the coast of Taiwan. According to one analyst, "Uncle Sam was the bogey man in ideological sessions in party and government offices, factories, farms and colleges. On a diplomatic and political plain, the U.S. government was held responsible for keeping China dis-united or otherwise preventing the nation from gaining its rightful place in the sun."³¹ The modern political climate in China might have made it easier for PLA officers to promote the belief that the United States was willing to resort to CBW during the Korean War. Nevertheless, dismissing such attitudes as mere propaganda does not explain why the CCP and the leaders of the PLA appear to be convinced of the veracity of the allegations.

PLA officers writing on chemical warfare also allege that the United States used more than just tear gas and herbicides during the Vietnam War. In particular, they contend that the United States made extensive use of BZ, a hallucinogenic incapacitating agent, which was allegedly delivered using M44 and M43 chemical munitions.³² In one of the purported attacks, BZ incapacitated an entire platoon of North Vietnamese Army (NVA) troops, who were subsequently killed with bayonets with the exception of one NVA soldier, who survived to report the massacre.³³ Such allegations, however, appear to be unfounded.³⁴ Also of interest is the fact that the PRC takes credit for having given the North Vietnamese training in CW defense and protective gear during the Vietnam War.³⁵

Chinese and Taiwanese security specialists are interested in whether or not Vietnam attacked China with CW during the 1979 border war that Deng Xiaoping claimed was meant to "teach the Vietnamese a lesson."³⁶ To date, though, no solid evidence supports allegations of chemical warfare in the 1979 conflict. There have also been

rumors that CW was used in some fashion during a brief but violent clash between the Chinese and Soviet military forces in 1969, since referred to as the Zhenbao (Damansky) Island incident. Nevertheless, such reports are currently discounted in China.³⁷

Past Chinese CW Activity

Although the Chinese government has declared past CW activity to the Organization for the Prohibition of Chemical Weapons (OPCW) in The Hague, Netherlands, it has not made this information public. In 1999, a member of the Chinese delegation to the OPCW told the author that the PRC had declared three former CW production facilities (CWPFs). Most recently, the official listing of China's CWPFs indicates only two.³⁸ This discrepancy is difficult to explain. By all accounts, however, the production plants have since been destroyed.

Researchers at the Beijing Institute for Chemical Defense report in the *Journal of Chemical Defence (Fanghua Xuebao)* that although China was among those countries that possessed CWPFs, "these were for production of small quantities for defensive purposes, or production had stopped and facilities have been destroyed."³⁹ One would infer, therefore, that China formerly had CWPFs that were dismantled before the declaration was submitted. PRC Ministry of Foreign Affairs (MFA) officials claim that China's former CWPFs were only pilot facilities.⁴⁰ Similarly, Chinese CW expert Yu Zhongzhou states that "Four countries once possessed chemical weapons production facilities, France, Japan, England, and China (China's being experimental facilities)."⁴¹

There is little doubt that China possessed CW in the past, although the types and quantities of the agents are unknown. It seems likely that the Chinese military sought to develop the same compounds that Japan had used during its wartime invasion of China, including blister agents, such as mustard and lewisite. Two Chinese CW defense experts reported that "mustard can also work with mixtures of other CW agents for combined effect. For example, mustard and lewisite will not lower their toxicities, but will increase their capabilities in winter."⁴² From the perspective of a possible ground-war scenario, the Chinese have been concerned about the extremely cold temperatures along their borders with Kazakhstan and India. Defense against a combination of mustard and lewisite would be particularly important in such an environment.

Current CW Capabilities

A recent U.S. Department of Defense (DOD) report, *Proliferation: Threat and Response* (January 2001), states the following with regard to China and CW:

Beijing is believed to have an advanced chemical warfare program including research and development, production, and weaponization capabilities. . . . While China claims it possesses no chemical agent inventory, it is believed to possess a moderate inventory of traditional agents. . . . Even though China has ratified the CWC, made its declaration, and subjected its declared chemical weapons facilities to inspections, we believe that Beijing has not acknowledged the full extent of its chemical weapons program.⁴³

The report adds that China possesses "a wide variety of potential delivery systems for chemical agents, including cannon artillery, multiple rocket launchers, mortars, land mines, aerial bombs, SRBMs (short-range ballistic missiles), and MRBMs (medium-range ballistic missiles)."⁴⁴

At the same time, no other evidence in the open literature suggests that the PLA possesses CW (beyond what remained behind after Japan's invasion of China), or that the Chinese military is prepared to use them offensively. Considering the poor quality of CW defense training, the mismatch of chemical protective gear, and the generally low technical level of the PLA, it is unlikely that the Chinese military could conduct large-scale offensive CW operations.⁴⁵

Because of the limitations imposed by geographical and technological factors, China has never been well-equipped to use CW offensively. Although it is not difficult to find sources on Chinese CW defense, one is struck by their anachronistic tone. Chinese authors dwell on the experience of the Japanese invasion of China (1937-1945) and the myth that the United States engaged in CBW during the Korean War. China has an established system of CW defense, including a cadre of chemical defense specialists supplied with decontamination equipment, modest detection capabilities, and protective suits. But Chinese CW defense materiel and methods are dated, bulky, and best suited to defending against an unlikely land invasion from China's western and southern borders.

Despite its efforts to acquire modern military capabilities, the PRC is still a poor and backward country, with a

(1999) per capita income of \$707.⁴⁶ (This figure pales in comparison with South Korea, Taiwan, Malaysia, and other developing states in the region.) One finds constant reminders of this economic weakness in Chinese military newspapers, where photographs show PLA soldiers in uniform working in various enterprises, especially in the agricultural sector, such as raising eggs, planting trees, or harvesting crops. In addition to demands for ideological education and other non-technical training, little room is left for wide-scale training in advanced fighting tactics, especially for something as intensive and specialized as offensive CBW. China has long found it difficult to equip its armed forces with enough live bullets for training or flight time for jet fighter pilots. Rather than employing advanced technology and modern materiel, both of which are in short supply, the Chinese military relies on its ability to throw more ground troops (of which there is no shortage) at the enemy. In many ways, it appears that the Chinese military has remained in a Korean War mindset, especially with regard to CW defense. This fact may help answer why China continues to perpetuate the false allegations about U.S. use of CW during the Korean War.

Suppose, for the sake of argument, that despite current Chinese protestations to the contrary, the PLA stockpiles significant quantities of CW agents that have been weaponized onto a variety of platforms. In addition to the ordnance mentioned above, China could also disseminate CW agents via its Sukhoi-27 fighters/bombers and other aircraft.⁴⁷ What would be the ramifications of such a capability?

First, Chinese SRBMS and MRBMs generally have ranges falling between 300 kilometers (km) and 600 km. The Sukhoi-27 aircraft, produced by China under Russian license, has a maximum range of 1,500 km.⁴⁸ (These aircraft could theoretically be adapted for use off aircraft carriers,⁴⁹ but the PRC does not have this type of vessel in its naval inventory.⁵⁰) Given the absence of chemically-armed, long-range intercontinental ballistic missiles (ICBMs) in the current PRC arsenal (such as the CSS-3, DF-31, or CSS-4), Chinese CW would not pose a direct threat to the continental United States, at least for now. Since the Hong-6 bomber aircraft has a range of only 3,100 km, the continental United States remains out of practical reach from hypothetical Chinese CW.

Regionally deployed U.S. military forces in Japan, South Korea, and Okinawa, while within the nominal range of Chinese ballistic missiles, would likely have more to fear from nuclear warheads than from CW. While chemical

warheads may have a larger “footprint” than conventional weapons, they are not comparable to nuclear devices in terms of destructiveness and area coverage. Finally, if the PLA truly believes that using CW would “be just like releasing the evil spirits from Pandora’s box, eventually slipping towards the abyss of nuclear war,” it is unlikely that the Chinese would use CW in a future conflict with Taiwan and/or the United States.⁵¹ The fact that Chinese missiles do not have high accuracy further reinforces this view.

The military effectiveness of chemically-armed ballistic missiles is also questionable. During World War II, the German *Wehrmacht* decided against developing chemical warheads for its V-1 cruise missile and V-2 ballistic rocket, because “[t]he field of dispersion was too wide, and the carrying capacity of the individual projectile was too small, so that with the very low rate of fire it would not have been possible to gas any considerable area. Hence only locally restricted and relatively small danger zones with gas coverage could have been created.”⁵² It is likely that China, knowing the limited number of missiles in its inventory and the modest accuracy of their guidance systems, would evaluate the applicability of CW in a similar manner.

As far as Taiwan is concerned, the threat from conventional warheads on missiles is real enough. The recent buildup of missiles in Fujian Province serves as a means of intimidation.⁵³ Might China consider using CW agents against Taiwan, perhaps in a preparatory attack as a prelude to an invasion? With 100 miles separating Taiwan from the mainland, only chemical ordnance delivered by aircraft or missiles would immediately reach Taipei, Kaohsiung, or other key targets. China does not have a demonstrated capability to airlift or move land-based artillery systems within range of Taiwan by amphibious assault. But if China were to decide to employ CW against Taiwan, Chinese military strategists would have to consider the response from the United States, including the possibility of a massive U.S. retaliatory strike.

For China, only continental land war options are amenable to offensive CW. Here, multiple launch rocket systems (MLRS) provide more effective chemical delivery platforms, as well as artillery cannon, especially in the 155mm caliber. With the fall of the Soviet empire, China faces only a potential chemical threat from India, mainly in the harsh region along the Sino-Indian border.⁵⁴ Even in the unlikely event of a major land war in Asia, the PLA would probably rely on land mine dispersal systems for

area denial,⁵⁵ obviating the need for persistent CW agents. Furthermore, as noted earlier, a cursory look at a training video of PLA troops deployed in mock CW environments reveals more style than substance. Relying on truck-mounted decontamination systems and uncomfortable rubber protective suits, it is not clear that the PLA can operate effectively in a chemical environment, either offensively or defensively.⁵⁶ The only offensive activities that Chinese chemical defense personnel seem to perform in military exercises are the application of obscurant smokes and the use of man-portable flamethrowers and white-phosphorus smoke mortars, all legal forms of warfare. (The use of flamethrowers, for example, remains a vital part of Chinese military exercises, probably due to their extensive use by the PLA during the 1962 Indian border conflict and the Sino-Vietnam war of 1979⁵⁷).

China has taken an active interest in binary CW, which contain two relatively harmless chemicals that react during a munition's flight to the target to yield a lethal agent. In 1990, a Western analyst wrote that China believed binary munitions possessed characteristics that were well suited for a people's war under modern conditions (i.e., greater safety in production, storage, and delivery; extended shelf life; and capacity for "surprise and deception").⁵⁸ According to a Chinese military source, "[d]ue to the similarities with civilian uses for chemical industrial products, one can now sufficiently develop and produce chemical weapons on the sly. Truly a new type of chemical weapon, binary weapons will gradually follow a trend towards replacing unitary chemical munitions."⁵⁹

The drawbacks of binary weapons, as far as Chinese CW defense specialists are concerned, are that the components only achieve a limited yield of nerve agent (the U.S. 155 mm binary shell had a 70 percent yield), and the reaction between difluor and the alcohol components usually takes about eight to ten seconds to complete.⁶⁰ The latter constraint can limit the use of binaries in direct-fire weapons such as the MLRS, although certainly most large-caliber howitzers and gliding bombs would be largely unaffected. Furthermore, side-reactant byproducts of binary mixing form distinctive smelling, halogenated compounds and thus make detection by the enemy much easier.⁶¹ According to Dr. Anthony Tu, the Chinese also considered mass production of binary munitions to be prohibitively expensive. Two published diagrams suggest the Chinese at one time investigated such weapons, although it is unknown if the PLA ever developed a prototype.⁶²

Finally, recent interest in non-lethal warfare has led to Chinese writings on this and related developments, mostly based on research performed in the United States and elsewhere. The Intelligence Division of the Beijing Military Medical Institute (*Junshi Yixue Kexueyuan Qingbaosuo*), in a recent issue of *People's Military Surgeon (Renmin Junyi)*, claimed that "in order to secure its superpower role in the post Cold War era," the United States "developed and/or is developing the following non-lethal weapons: Anti-personnel weapons. This category includes supersonic and subsonic weapons, noise weapons, chemical calmatives, stimulants, [and] vomitives. . . ."⁶³ Along these lines, an article in China's *National Defense Journal (Zhongguo Guofangbao)* mentions the potent incapacitating compound, EA3834, one of the many hallucinatory drugs the United States once researched as possible CW agents.⁶⁴

China's CW Threat Assessment

With the end of the Cold War and the entry into force of the CWC in 1997, it would appear that China has come to evaluate chemical threats in a different light than in the past. For example, China considers India to pose the most immediate threat to its borders, despite the fact that the United States and Russia still possess the largest stockpiles of chemical munitions and bulk CW agents—approximately 70,000 tons between them (although both countries are working to destroy these stockpiles in accordance with their CWC obligations).

Dr. Chen Jisheng of the Institute for Chemical Defense, a distinguished Chinese expert on CBW, has categorized different countries in terms of their CBW status. The number one category, "country with a policy of domination," is occupied by the United States. Chen writes,

[t]he United States has the most powerful chemical and biological weapons stores [*zhubei*] in the world, as well as the strongest developmental and industrial base capacity. . . . The United States also has systematically had the most complete, long-term chemical weapons strategic development and national policy, as well as developing strategy and policies with a foothold to strive towards the control and domination of the state of future CB weapons development trends of the entire world, and having a steering influence upon the status of global CB weapons.⁶⁵

For Chinese CW specialists, doubts remained in 1999 as to the fate of the U.S.-held stocks of the hallucinogenic incapacitant BZ. They noted that the United States had not yet provided the full declarations concerning its past activities with and purported destruction of BZ.⁶⁶

Before the dissolution of the Soviet empire, China faced a significant CW threat along its borders from the Soviet Union, which was understood to have integrated CW into its military doctrine.⁶⁷ In 1988, Chinese arms control expert Dr. Liu Huaqiu noted that although relations with Moscow were beginning to improve, China still faced “the same Soviet military threat as Western Europe: the fast-moving armored thrust. The Soviet Union has [in 1988] fifty-three divisions in the Far Eastern Theater, comprising seven tank divisions, forty-five motor rifle (MR) divisions, and one airborne division. In the Central Asia Military District (MD) there are one tank and six MR divisions; in the Siberian MD there are six MR divisions; in the Transbaikal MD there are two tank and eight MR divisions, in the Far East MD there are two tank, twenty-two MR, and one airborne division.”⁶⁸

A significant force multiplier for the Soviet Red Army would have been chemical warfare. During the 1987 Soviet CW exhibition in Shikhany, a range of munitions and delivery systems was put on display as an exercise in transparency.⁶⁹ According to Chinese CW expert Yu Yongzhou, the Shikhany exhibition attracted over 130 people from various delegations, including some 50 journalists. Numerous types of Soviet CW were on display, including “ten types of artillery and rocket shells; two types of strategic missile warheads; six types of aerial bombs and spraying devices; and one type of chemical hand grenade.”⁷⁰ After witnessing the panoply of CW on display at Shikhany, it is possible that the Chinese military may have reevaluated the threat from the East.

Since the breakup of the Soviet Union in 1991, the perceived threat has diminished. According to Chen Jisheng, Russia still possesses “a very large stockpile and technical base, but currently has shut down basic research and development.” Dr. Chen and his colleagues are more concerned about India, described as having “on the eve of signing the CWC, made a crash production of chemical weapons, striving for the position of being a ‘chemical weapons possessor state.’”⁷¹ In a report on regional CW threats to China, Chinese defense writers Zhang Naishu, Yuan Junfeng, and Xiong Yuxiang noted that India possesses five CW production and storage facilities and a stockpile of 1,000 agent tons, “making India the third larg-

est chemical weapons possessor after the United States and Russia.”⁷² Other Chinese CW defense researchers from the PLA Chemical Defense and Engineering Command Academy, Wu Guoqing and Zhou Chengxi, claim that the Indian CW stockpile consists mainly of mustard. They also note that India has 122mm and 212mm MLRS, both platforms well suited for chemical ordnance.⁷³

The perceived CW threat from Taiwan is not mentioned often in Chinese defense writings. In a recent book published in China, a vague reference is made to the “Taiwan Province Chemical Corps” in a caption for a photograph.⁷⁴ But at least one recent publication called on China to step up its intelligence capabilities, with an emphasis on “Taiwanese NBC developments, researching ways to assure CW protection in warfare with Taiwan, including as well obscurant smoke and flame-thrower support, etc.”⁷⁵

Chinese Chemical Defense Doctrine

In published papers, Chinese military strategists emphasize preparedness for chemical or nuclear warfare by means of special fortifications, improvised masks, and utilizing reconnaissance to detect CW use by the enemy.⁷⁶ For example, Li Guang and Xie Deming write in the Chinese *Journal of Chemical Defence* that, “[w]ith our tried and true nuclear force in the background, no enemy would dare think lightly of using nuclear or chemical weapons [against us].”⁷⁷ The response to an enemy that would use CW, according to Chinese CW defense strategists, would generally run along these lines:

The best way is to destroy the enemy’s CW capability or at least degrade it, causing the other side to be unable to carry out their offensive plan—this is an aggressive defense to ensure one’s survival. On the battlefield, after ascertaining the placement of enemy chemical weapons, including firing lines, command and control systems, and ordnance depots, every command level officer is to quickly and decisively destroy them by use of organized artillery, air power, and other assets.⁷⁸

According to Dr. Tu, the Academy of Chemical Defense (*Fanghua Yanjiuyuan*) in Beijing is charged with chemical defense training. It offers a four-year curriculum and graduates some 4,000 commissioned chemical defense officers each year.⁷⁹ This number appears extremely high, but considering that these cadres are responsible for CW defense training throughout the entire PLA,

which totals around 2.8 million troops,⁸⁰ it may not be that far-fetched after all.

Recently, China has developed a domestic preparedness capability to address large-scale public exposures to hazardous materials, including CW terrorism. Rapid response detachments have been organized to handle chemical disasters, accidental or otherwise. At the level of militia training, a military high school in Qingdao demonstrated students' knowledge of civil defense, including dispersal of gases, first aid, and radiological dosimetry.⁸¹ Because of domestic government embargoes on most Chinese news events, particularly those that involve disasters or terrorism, it is difficult to determine what led to the recent government decision to deploy special units for hazardous material events. In 1993, however, a dangerous chemical fire in Shenzhen necessitated the expertise of a special "anti-chemical warfare medicine" unit.⁸² Since then, among other local fire and emergency response divisions, hazardous material (hazmat) teams have been deployed with the mission of cleaning up toxic chemical spills.⁸³ The March 1995 nerve agent attack in the Tokyo subway and recent crime reports involving poisonings, terrorism, and other threats to Chinese government and society might have also spurred authorities to look at appropriate measures to combat chemical terrorism.

CHINA AND BIOLOGICAL WEAPONS

During the years 1931-1945, Japan pursued a BW program and conducted BW field tests against Chinese military and civilian targets. Much has already been written about the gruesome experiments conducted in China during World War II by General Ishii Shiro and his Unit 731, as well as other specialized detachments.⁸⁴

According to some Japanese estimates, including from former members of the Japanese Imperial Army, the total number of Chinese killed by military use of BW was about 21,000 people, most of these from cholera.⁸⁵ (This figure does not include the more than 3,000 Chinese, Korean, and other prisoners of war who died in Japanese BW experiments.) Chinese estimates are much greater. According to Dr. Liu Huaqiu, "[d]uring Japan's invasion of China, BW was carried out among 20 or more provinces and cities in China, killing more than 200,000 Chinese people."⁸⁶ Other Chinese scholars have concluded that "at least 270,000 Chinese soldiers and civilians were killed as a result of Japanese germ warfare between 1933 and 1945."⁸⁷ But no hard evidence supports such a high figure, nor is it likely that Japanese BW activities were

responsible for every occurrence of plague or other infectious disease during that period. Plague has been endemic to China since 1894, and during wartime outbreaks of infectious diseases are common.

The Korean War and Allegations of BW

With regard to future arms control agreements and intelligence assessments, it is significant that the Chinese government continues to believe that the United States employed BW during the Korean War. There is ample evidence, however, that the Chinese Communists and North Korean operatives manufactured evidence of U.S. BW in the Korean War.⁸⁸

On April 30, 1951, China claimed that "the American forces are using Chinese People's Volunteers as guinea pigs for their bacteriological experiments."⁸⁹ The infamous history of Japanese BW activity in China, coupled with the fact that the United States gave amnesty to General Ishii in return for information about his human experiments with BW agents, were linked in Chinese propaganda to the Korean War allegations.⁹⁰ Zhou Enlai's official statement included Japanese co-conspirators:

In its machinations to undermine world peace and prepare for world war, American imperialism first employed Shiro Ishii, Jiro Wakamatsu, Masajo Kitano, and other Japanese bacteriological war criminals, whose hands have long been stained with the blood of the Chinese and Korean people, to carry out on the Korean battlefield experiments and manufacture of various types of lethal bacteria. Hundreds and thousands of the captured personnel of the Korean People's Army and the Chinese People's Volunteers have been victims of experiments with these bacteriological weapons.⁹¹

Allegations that the United States conducted biological warfare during the Korean War seem to be accepted as fact within the PLA today.⁹² A book on BW printed by the PRC National Defense Press, for example, devotes considerable space to the issue. Despite a lack of solid evidence and recent proof of outright fabrication in collusion with North Korea,⁹³ it would appear that the charges are ingrained in the Chinese political-military leadership. The recent book alleging U.S. use of BW by Stephen Endicott and Edward Hagerman,⁹⁴ as well as the claims of Joseph Needham, may have also given the impression that there is "Western" support for the allegations.

Military conflicts often lead to breakdowns in public health and the spread of infectious disease, and China during the Korean War was no exception. Chinese BW defense during the Korean War would be more accurately described as general hygiene measures, originally promoted as a mass movement in the 1950s. While the Chinese public was repeatedly told of American BW attacks, the CCP probably used the propaganda to promote simple measures to fight infectious disease.⁹⁵ In North Korea, according to U.S. medical officers who were captured as POWs, “The bacteriological warfare propaganda was directed primarily toward the civilian population. The town governments enforced clean-up programs, mass immunizations, boiling of clothes and in some cases dusting individuals, presumably with a lousicide.”⁹⁶

When the armistice negotiations became stalemated over the issue of returned POWs in November 1951, the Chinese saw no prospect for a resolution favorable to their terms. According to Albert Cowdry, “It was in this winter of discontent that the Communist powers suddenly revived the charges of germ warfare and, with the backing of the Soviet Union, launched a worldwide propaganda campaign keyed to the issue.”⁹⁷ On February 24, 1952, Chinese Prime Minister Zhou Enlai and North Korean Minister for Foreign Affairs Pak Hen Yen protested to the United Nations that the United States, while retreating southward across the 38th Parallel from December 1950 to January 1951, had disseminated smallpox virus in Pyongyang, Kwangwon Province, South Hamkyong Province, Hwanghae Province, and several other areas.⁹⁸ This allegation alone suggests that the Chinese allegations were contrived, for the United States never developed smallpox as a standardized BW agent. In a recent history of the U.S. BW program, Ed Regis makes the following observation:

The American bombers, according to various statements issued by the Chinese Communists and North Koreans, were scattering an absolutely incredible assortment of disease carriers upon their lands: paper envelopes, straw, grain cornstalks, bean stalks, medical goods, cloth, candy, dead branches, leaves, manure clumps, crystals, yellow powder, contaminated meat, earthworms, frogs, birds, gray mice, rabbits, foxes, dead pigs, toilet paper, and infected pancakes. Practically the only item the United States was not charged with dropping was the single weapon that it would shortly standardize for

battlefield use [August 1952], the M33/*Brucella* combination.⁹⁹

Just days before Zhou Enlai’s protests in February 1952 that U.S. BW activities had extended into Chinese territory, a vaccine program was initiated to stem the spread of infectious disease in China. At that time, some 38,000 cases of smallpox, influenza, pneumonia, measles, and relapsing fever were recorded in Shandong, Hebei, and Anhui provinces. (For local consumption, the Chinese government media attributed the epidemics to low precipitation and related environmental factors during the previous months.)¹⁰⁰ As the BW propaganda campaign went into full gear, purported germ-laden insects were targeted in a countrywide public health campaign. In April 1952, a Western observer reported having seen schoolchildren in Qingdao wearing surgical masks and carrying fly swatters and bottles. Whereas civilians were previously laggard in lining up for inoculations, the germ warfare drumbeat encouraged a high turnout among the public. Considering the Chinese government’s monopolistic control over media and popular culture, it is quite likely that most Chinese simply believed the propaganda. The Communist authorities did, however, go to some lengths to deceive the International Scientific Commission, a group that was quite credulous to begin with.¹⁰¹

Between the perceived exigencies of the Chinese propaganda campaign, including creating an atmosphere where armistice talks could be influenced to its political advantage and the hygienic effects of a mass movement to rid China of disease vectors, it makes sense that the authorities stressed insect vectors rather than more sophisticated (and realistic) means of BW agent delivery. Nor would this be the last time that the Chinese masses were exhorted to rid themselves of pests. During the Great Leap Forward (1958-1961), for example, citizens were ordered to eliminate grain-grabbing sparrows and other birds and did so by frightening them with metal pans, spoons, and other noisemaking devices. (While this “Death to Sparrows” campaign was successful in killing off thousands of birds from fatigue, it led to increased insects and parasitical organisms because of the loss of their natural predators.)

A U.S. Army intelligence report from 1956 had this to say concerning China’s military training in the 1950s: “It is noted that despite the propaganda on BW during this period, the Communist Chinese stressed anti-chemical and anti-atomic warfare and training. Very little training was conducted in BW until after the armistice.”¹⁰²

Today, while railing against the U.S. “venomous plot” to use BW, the Chinese look back on the Korean War with pride, having been able to “crush biological warfare” and defeat such U.S. efforts. In a recent article, Kung Fangui writes, “The U.S. invaders not only failed to reach their military objectives when conducting BW, but also met with embarrassing failure on the political front.”¹⁰³ When one considers that the Chinese remember the Opium War of the 1840s as if it happened yesterday, such historical precedents—however false—can exert significant influence on PRC policy decisions. Similar conspiracy-type allegations in China have persisted into the 1990s. For example, one Chinese book on BW alleges that the outbreaks of Ebola hemorrhagic fever in Zaire were the result of deliberate BW experimentation.¹⁰⁴

Allegations of BW Activity in Xinjiang Province

Ken Alibek, formerly the first deputy director of the Soviet/Russian Biopreparat BW complex, suggests in his book *Biohazard* that an outbreak of hemorrhagic fever in Xinjiang province near Lop Nor was the result of Chinese offensive BW research. “Intelligence sources,” he writes, “found evidence of two epidemics of hemorrhagic fever in this area in the late 1980s, where these diseases were previously unknown. Our analysts concluded that they were caused by an accident in a lab where Chinese scientists were weaponizing viral diseases.”¹⁰⁵ It is possible that the alleged outbreak of hemorrhagic fever in Xinjiang province was referenced in a 1994 newspaper article describing the PLA’s Anti-biological Warfare Unit:

At one time, the public health division of the PLA General Department circulated a notice saying that there had been an outbreak of endemic hemorrhagic fever in a certain place. Its major means of infection were rats and their fleas. In order to thoroughly study the various means of transmission at the source of the outbreak, assistant research fellow Shao Xin’er took a special trip to the place where most rats were found. He had to catch over 100 rats each day and experiment with them in the heat of the day. In the end, he caught 5,949 rats, and his research results won a PLA Science and Technology Award.¹⁰⁶

A Taiwanese source told the author that he was convinced that a Chinese BW facility of some sort existed in Xinjiang province, not far from the nuclear testing ground at Lop Nor.¹⁰⁷ Nevertheless, it is important to note that a

variant of Crimean-Congo hemorrhagic fever occasionally causes natural epidemics in northeastern China, where a significant outbreak occurred in 1968.¹⁰⁸ As for the outbreak in the late 1980s mentioned in Alibek’s book, a researcher at the Shijiazhuang-based Institute of Military Medicine told the author that he and his colleagues had never heard of that particular outbreak.¹⁰⁹

Assessing Chinese BW Capabilities

If Chinese writings on CW are scanty, even less information is available on biological weapons. A book on the subject with the imprimatur of PRC Defense Minister Chi Haotian states categorically that “China has never manufactured nor possessed biological weapons.”¹¹⁰ According to a 2001 report by the U.S. Department of Defense, however, “China continues to maintain some elements of an offensive biological warfare program it is believed to have started in the 1950s...China is believed to possess an offensive biological warfare capability based on technology developed prior to its accession to the [BWC] in 1984.”¹¹¹

China has conducted a considerable amount of ostensibly defensive research on potential BW agents, including the causative agents of tularemia, Q fever, plague, anthrax, eastern equine encephalitis, and psittacosis, among others.¹¹² China also possesses the technology to mass produce most traditional BW agents, including the causative agents of anthrax, tularemia, and botulism. Finally, the PRC has expertise in aerobiology and reportedly conducts laboratory scale aerosolization experiments with microorganisms.¹¹³ Nevertheless, one cannot assess accurately from open sources whether China has the technology for the efficient delivery of BW agents or whether it has conducted any field testing with animals in the past.

The PRC claims that it has no maximum containment (Biosafety Level 4) laboratories for work with extremely contagious and virulent organisms.¹¹⁴ Although this statement may be true, most BW agents can be studied and manufactured at lower levels of containment. Of the scientific literature that China reports in its confidence-building declarations under the BWC, the only citations of interest deal with public health-related research on biological aerosols and scientific review articles on staphylococcal toxins. The remaining citations consist of typical infectious disease reporting and epidemiological studies on hepatitis, hemorrhagic fever with renal syndrome, and insect abatement programs. The PRC has also declared

several facilities as having a “national defensive biological warfare R&D program.”

In December 1994, the Hong Kong daily *Ming Pao* reported on the PLA “Anti-Biological Warfare Unit,” stationed at an undisclosed location in northern China. Its official name is the “Military Medical Research Institute of the Beijing Military Region,” or simply the “Institute of Military Medicine” (*Beijing Junqu Junshi Yixue Yanjiusuo*).¹¹⁵ Fu Genming, the head of the Anti-Biological Warfare Unit in 1994, said, “[t]he PLA does not have an offensive ‘biological warfare unit’ or ‘bacteriological warfare unit.’ But it does have an anti-biological warfare unit. All of our research is open to the whole world. It is an angel of world peace and health for mankind.” It should be noted, however, that the Institute of Military Medicine is not listed in the PRC confidence-building declarations under the BWC. The facilities supporting this unit, as described in the article, are potentially dual-use (i.e., have both civilian and potential military applications):

The research institute looks like a sanatorium or a villa. Inside is a mysterious animal kingdom. Its laboratories are sealed by layers of glass. Its workers are servicemen whose entire bodies are covered in white protective clothing with only their eyes uncovered. Affixed on some glass doors is the warning “Deadly Bacteria Laboratory.” It is reported that the harm done by a leak of any drop of bacteria from there would be no less than that caused by a nuclear leak. The section for flies and mosquitoes is a room with the highest classification in the whole building. In this air-conditioned room, tens of thousands of deadly insects live on quality milk bran and fresh animal blood.¹¹⁶

A Taiwanese source claims that the institutes in the PRC, as listed in Table 1, are involved in offensive BW activity, although the accuracy of the information is difficult to assess.

It should be noted that the PRC has a significant dual-use industrial base for biological products. In 1994, China claimed that it was capable of manufacturing over 1.2 billion doses of vaccines, making it the “largest vaccine-producing nation.”¹¹⁷ According to the U.S. Central Intelligence Agency (CIA), the Changchun Pneumatic Components Corp makes 1,000-liter batch lyophilizers (freeze-driers), and the Beijing Institute of Chemical Metallurgy and the Balian Institute of Chemical Physics may manufacture fermenters.¹¹⁸

Assuming that China has stockpiled or can produce quantities of weaponized BW agents, its strategic delivery systems are even more limited than those for CW. Modern Chinese cruise missiles could theoretically deliver both chemical and biological agents, but no evidence in the open literature suggests that China has actively pursued this option.¹¹⁹ One platform that China might consider for BW agent delivery includes the use of unmanned aerial vehicles (UAVs), which have in the past been modified for this purpose by the United States in the 1960s and more recently by Iraq. Nevertheless, although some modern Chinese-produced UAVs have the capacity needed for delivery of biological weapons—including the Chang Hong 1 (65 kg), NAI Soar Bird (30 kg), ASN 206 (50 kg), and the Xian ASN 104-5 models (30 kg)¹²⁰—no evidence indicates that China has pursued UAVs for more than reconnaissance operations.

Chinese Biological Defense

The earliest systematic efforts at BW defense by the PLA were the sanitation/anti-plague units formed in 1952 during the involvement of the Chinese People’s Volunteer Army in Korea. At the same time, educational campaigns to rid disease-carrying pests were conducted. Combined with experience of the supposed BW casualties treated during the Korean War, “a great victory was achieved in anti-bacterial warfare.”¹²¹

While building a formal curriculum in biological defense, the PLA continued work in anti-plague research, and in 1954 delegations and students visited the Soviet Union for training in microbiology and infectious disease. (China declared that its BW defense program was initiated officially in 1958.¹²²) Perhaps in tandem with the fervent anti-pest campaigns carried out during the Great Leap Forward, a national epidemiological research project took place in 1958-1961, led by the Military Medical Science University and sanitation units from every military region, down to individual cadres. By 1984, the Military Medical Science University was awarding Master of Science degrees in the field of BW defense.¹²³ Some specialized equipment has also been fielded to counter the BW threat to PLA troops, including aerosol samplers and BW agent sampling kits in unspecified numbers.

Even today, China’s BW defense emphasizes ridding an affected area of infected insects and vermin, on the assumption that modern armies would employ these crude methods of delivery. Although the use of insects as BW agent vectors is theoretically possible, it is not practical

Table 1: Alleged PRC Biological Warfare Research Organizations¹²⁴

Factory appellation	Location	Production details	Notes
Yan'an Bacteriological Factory	Yan'an, Xishan	Four types of bacteriological bombs: <ul style="list-style-type: none"> • Smoke-type bacteria bomb [may refer to aerosol] • Paper canister type, bacteriological container • Malignant <i>shayan</i> bacteria¹²⁵ grenade • Tetanus bacteria bomb 	Potentially one of the larger scale biological research and production sites
Dalian Biological Products Factory	Dalian	<ul style="list-style-type: none"> • Tetanus/cholera mix vaccine • Diphtheria vaccine. • Rabies virus vaccine • Tetanus vaccine [toxoid] • Typhus vaccine • ABC vaccines 	Potentially one of the larger scale biological research and production sites
Changchun Biological Products Factory	Changchun	Cultivation and experimentation of various BW agents	Potentially one of the larger scale biological research and production sites
Wuhan Biological Products Factory	Wuchang	Cultivation of various BW agents	
Chongqing Biological Products Factory	Chongqing	Research and cultivation of various BW agents	
Kunming Biological Products Factory	Kunming	Research and cultivation of various BW agents	
Beijing Biological Products Factory	Beijing	Cultivation and research in various bacteria	
Central Biological Products Testing Laboratory	Beijing	Liquid vaccines, testing of antimicrobial products in sera and bacteriological products	
BW agent production facility [unnamed]	Shenyang	Cultivation of various BW agents	
BW agent production facility [unnamed]	Shanghai	Cultivation of various BW agents	
BW agent production facility [unnamed]	Lanzhou	Cultivation of various BW agents	
BW agent production facility [unnamed]	Guangzhou	Cultivation of various BW agents	

by any modern standard and can be seen as a throwback to the Japanese biological warfare during WWII as well as the Korean War allegations. For example, to foil enemy attacks with disease-infected insects or rats, a PLA handbook on BW suggests using simple brooms and nets and burying contaminated debris.¹²⁶ Another military publication emphasizes the importance of “insect intelligence,” where unusual concentrations of flies, fleas, etc., can point to evidence of biological warfare.¹²⁷ Li Yimin writes, “BW

agent aerosols can be effective over very large areas, while scattered insect vectors can achieve effects over smaller regions. Therefore, aerosolized BW agents are primarily used nowadays.”¹²⁸

CHINA AND CBW ARMS CONTROL

Because of years of diplomatic isolation following the 1949 Communist takeover of China, the internal chaos

resulting from the Great Leap Forward (1958-1961), and the Cultural Revolution (1966-1976), China's active participation in multilateral arms control is a recent development. The change is all the more remarkable considering that during the 1970s, Beijing disparaged and refused to participate in arms control treaties. Chinese arms control experts now acknowledge that if the PRC received short shrift in past disarmament agreements, it had only itself to blame "because we weren't at the negotiating table." Moreover, "only by our active participation can we better unite together the common struggle of the broader Third World."¹²⁹

The death of Mao Zedong in 1976 and the rehabilitation of Deng Xiaoping to unquestioned CCP leadership cleared a path for China to pursue a more active role in foreign affairs.¹³⁰ After decades of boycotting multilateral arms control negotiations, China sent a delegation to the Conference on Disarmament in 1980 and participated in the negotiation of the CWC. On March 21, 1986, China announced "Nine Propositions on Arms Control and Disarmament." This document focused mostly on NW and the U.S.-Soviet arms race, but the seventh proposition mentioned the need for "an early conclusion to an international agreement on a comprehensive ban on chemical weapons and their complete destruction." The ninth proposition emphasized China's desire that neither the United States nor the Soviet Union be the sole military superpowers, and that the security interests of other countries not be harmed by the disarmament process:

9) As disarmament affects the security interests of every nation, it cannot be solely done by means of a monopoly held by a superpower minority, and the disarmament agreements they make amongst themselves ought not to harm the interests of other countries. Every nation on earth, no matter if it is great or small, with a weak or strong military capability, should enjoy equal rights when it comes to participating and deciding upon matters concerning disarmament.¹³¹

Along with the fall of the Soviet Union, the 1990s also heralded a shift in Chinese military thinking. The impressive results of the U.S.-led campaign during the 1991 Persian Gulf War persuaded Chinese officials of the need to modernize the PLA. Along with a new emphasis among Chinese military strategists on the high-tech "revolution in military affairs," was a growing realization that CW were

becoming obsolete. Major General Pan Zhenqiang and his colleagues wrote in 1996,

in today's 'war without battle lines,' the traditional use of chemical weapons against large groups of soldiers is increasingly unsuitable for the new shape of warfare. The traditional military value of chemical weapons has faded, and modernity has given up on chemical warfare... [creating the] basis for the complete and total treaty ban on chemical weapons.¹³²

Although Chinese military and defense analysts do not minimize the effects of CW, a strong current in PLA thinking views CW as a thing of the past. This perceived obsolescence led the Chinese leadership to decide that it could live without CW and at the same time obtain the security and economic dividends that would accrue from Chinese participation in the CWC. Since China has never been adept in the art and science of chemical warfare, if potential adversaries eliminate their own arms, Beijing will achieve an improved strategic position. Moreover, in line with Deng Xiaoping's "Four Modernizations" program, which gave first priority to the development of the Chinese economy, joining the CWC was considered critical to maintain the growth and diversification of the chemical industry. Pan *et al.* stated that China "concluded that the [CWC] met the requirements of our security and national interests. It will assist in a peaceful and stable world, benefiting our concentrated strength in furthering economic construction."¹³³

The 1991 breakup of the Soviet Union produced another seismic shift in China's perception of its own security and the value of participating in multilateral disarmament regimes, such as the CWC. On this topic, Pan *et al.* wrote that

when the Warsaw Pact forces and the Soviet Union dissolved, symbolizing the thorough end to the bipolar structure of the opposing United States and Soviet Union, the world entered a transitional period of a multipolar and newly established international strategic system. In this situation, the shape of international disarmament and arms control also went through a sea change. Arms control matters now went beyond the dictate of a U.S.-Soviet relationship, creating a wider domain of an international political and military struggle.¹³⁴

China's Approach to Arms Control

Despite its rapid economic modernization, China remains in an ideological time warp. For the first time since the 1949 revolution, China is now seeing real economic growth, actively promoting the development of a "capitalist-socialist" system, and adopting modern technology. These shifts are resulting in an overall improvement in the livelihood of its citizens. At the same time, the PRC leadership remains highly sensitive to real or perceived slights to its national aspirations and dignity. In 1999, Michael Swaine and Iain Johnston observed that "overall Chinese views and behavior toward both conventional and unconventional weapons development are motivated primarily by a relatively hard realpolitik, state-centered, balance-of-power calculus centered on maintaining and increasing China's relative economic, technological, and military power."¹³⁵ Little has happened since then to change this view. China still regards the United States as the number one "hegemon" and believes that Washington is making every effort to keep China and other developing countries at a security and economic disadvantage.

In the arms control field, China adheres to an ideologically driven approach, in which the negotiation of disarmament agreements is part of a Marxist "struggle" among nations for security and dominance. This Chinese attitude shown in writings on arms control and disarmament is similar to that of Clausewitz, but in reverse. According to Major General Pan, "the arms control struggle is, during peacetime, an important route for a nation to realize military strategic goals."¹³⁶ In general, the Chinese government places more weight on the status of its bilateral relationships than on formal treaties. For example, because China and Russia have reached a rapprochement, PRC officials downplay or even deny the compelling evidence of Soviet/Russian violations of the BWC. Similarly, China's long-standing relationship with North Korea means that, despite U.S. assessments that Pyongyang has a significant CW capability, China makes little mention of these activities. In contrast, the Chinese military views India—a regional rival—as a potential CW threat.

Perhaps the most startling assessment on the part of the Chinese is a belief that the United States maintains an offensive CBW research and development program. Despite all evidence to the contrary, Chinese writings and officials commenting on the subject demand further proof that the United States has renounced these weapons. No doubt a major driver behind this mindset is the perception of Chinese security policymakers that the overall se-

curity objective of the United States is regional, if not global, hegemony. Decrying the "double standards" used in Western nonproliferation policies toward Iraq, North Korea, and South Asia, researchers Xia Zhiqiang and Wang Xiaochen wrote the following in the *Journal of Chemical Defence*:

Several big powers in the West, hitting the signal buttons at the relevant international organizations, utilize international non-proliferation regimes, especially their imperfect inspection mechanisms, and brazenly interfere with the internal affairs of other countries using weapons inspections as a pretense. At every turn, they use military force or the threat of same to do so, bringing about a great fracture in the normal order of international society.¹³⁷

With regard to U.S. plans for a national missile defense (NMD), a development that China has linked to other ongoing arms control negotiations including the BWC protocol,¹³⁸ Ambassador Sha Zukang of the Disarmament and Arms Control Department of the PRC MFA wrote, "[t]he real motive of the U.S. Government is to make use of the country's unrivalled economic and technological might to grab the strategic high ground for the 21st century in both the scientific and military fields, so as to break the existing global strategic balance, seek absolute security for itself, and realize its ambition for world domination."¹³⁹

Given this background of distrust towards the West (especially the United States), one might wonder why China pursues arms control negotiations at all. Perhaps to answer that question, Pan and his co-authors explain,

[o]ne cannot take the fate of our national security and pin hopes on some disarmament and arms control negotiations and agreements. However, on the other hand, regardless of whether or not negotiations are successful, active participation in this struggle is beneficial for promoting our independence, freedom, and defensive posture, as well as being good for gaining sympathetic public opinion, uniting the broad majority.¹⁴⁰

Chinese experts in the field of disarmament studies have noted the lack of an arms control tradition in Asia.¹⁴¹ Academic research in the PRC on arms control is also a relatively new development. Major General Pan and his colleagues write that:

Disarmament and arms control is a struggle with a very strong technological aspect to it, and Western academic circles have a strong suit worth drawing a lesson from, namely, that they emphasize very much the combination of social and natural sciences when conducting research on matters concerning disarmament and arms control. This is a research approach that pays attention to the combination of both qualitative and quantitative analysis. In our [China's] national academic circles, they are beginning to try this approach, with some departments taking social science research specialists and inviting together specialists in the natural sciences (weapons development) to carry out related research, with positive results.¹⁴²

At the same time, China plans to chart an independent course with regard to arms control. "While there are many Western so-called arms control theories," Pan and his colleagues assert, "they are all serving their security interests, and actually are not really compatible with ours."¹⁴³ The Chinese experts perceive Western disarmament initiatives as a strategy to subvert China's interests. "In many situations," they write, "Western countries are clearly setting out from their own interests, using several unequal and unreasonable measures or agreements to put pressure on us."¹⁴⁴ Although the environment for arms control has improved somewhat for China, they add, "...the United States, as head of the Western nations, is scheming under the pretense of 'cooperation,' making some security mechanisms that are unequal and imbalanced in terms of security interests."¹⁴⁵

Especially in terms of military-related information, Chinese ideologues view transparency only as a means to hurt countries that are not of equal power status. The PRC jealously controls information relating to military capabilities and trade. For example, whereas the former Soviet Union and the United States have both revealed a great deal of information about their CW stockpiles, China remains opaque with respect to its past CW program, however limited it may have been. Although the tendency to suppress bad news may be a legacy of Maoist times, China's general feeling of technical inferiority contributes to its lack of transparency. Peng Qingyuan articulated the position of the Chinese government that transparency measures "must not have harmful effects." The PRC is reluctant to reveal its military strengths—or alternatively, its relative weaknesses—for to release such information

would only benefit its adversaries. Nowhere is this tendency more obvious than in the militarily sensitive area of CBW.

China and the CWC

China signed the Geneva Protocol banning the use in war of CBW on August 24, 1929. After the 1949 Communist revolution, China reaffirmed its commitment to the Geneva Protocol on July 13, 1952.¹⁴⁶ The protocol did not, however, prohibit the production or stockpiling of CW, a ban that was only achieved under the 1993 CWC. During the CWC negotiations from the late 1980s through the fall of 1992, China often adopted policy stances that "reflected its fear of manipulation by foreigners and its desire to preserve its independence."¹⁴⁷

Although the CWC is one of the most complex disarmament treaties ever negotiated, its basic precepts are simple. Signatories to the CWC agree not to develop, produce, otherwise acquire, stockpile or retain CW, or transfer, directly or indirectly, CW to anyone; not to use CW; not to engage in any military preparations to use CW; and not to assist, encourage, or induce, in any way, anyone to engage in any activity prohibited to a state party. Even if a toxic chemical is not explicitly listed in the CWC, its use as a weapon is prohibited. The CWC does allow for the production of small amounts of CW agents for the purposes of defensive research and monitors the production of chemicals that are dual-use.

The CWC also requires that each state party destroy all CW stockpiles and production facilities, as well as any CW it abandoned on the territory of another member state. China is one of those countries where abandoned CW are to be destroyed by the responsible state party, namely Japan. China's demand that Japan bear the responsibility for this task was one of Beijing's key objectives during the CWC negotiations.

According to Major General Pan, the CWC was the starting point for China to become actively involved in multilateral arms control.¹⁴⁸ China began participating in CWC negotiations in 1980 and made important contributions toward reaching agreement, including:

- inclusion of a "prohibition of use" in the CWC. During the negotiations, the Western and Eastern Group countries saw no need to repeat the ban on use contained in the Geneva Protocol. China argued, however, that because the Geneva Protocol was flawed, that there was a need to include a categorical prohibition on use in the CWC.

- challenge inspections. China and other developing countries approved of the need for an international verification system including challenge inspections, but they opposed their being overly intrusive. Thanks to the efforts of China and other countries, the CWC established a balanced mechanism by which a request for a challenge inspection could be denied, while retaining the right to impose sanctions against a country that abused the challenge mechanism.
- abandoned CW. China prevailed in its view that the responsibility for destroying abandoned CW rests with the country that left them on the territory of another state.
- the concept of “equivalent stockpile weight,” a proposition intended to solve the problem of comparing the threat posed by different CW agent types. Other members of the CD praised this solution as a “conceptual breakthrough.”¹⁴⁹

As indicated, another key provision of the CWC concerns challenge inspections. In addition to a system of routine inspections of declared facilities, any member state can request a challenge inspection of any facility—declared or undeclared—on the territory of another member state, with the aim of clarifying and resolving questions related to possible non-compliance with the treaty provisions.¹⁵⁰ When it came to negotiating the terms of challenge inspections, the PRC demonstrated its traditional reluctance to allow the possible compromise of sensitive internal information, fearing that Western or other powers might gain access to its military or commercial secrets.¹⁵¹ To this end, the developing countries (with China in the lead) resisted procedures for challenge inspections proposed by Western countries that they believed were too intrusive. According to a Chinese account:

During the negotiations, the Western developed countries, viewing challenge inspections as a means to better enable them to be the world’s policeman, actively strengthened the power [*quanli*] of the challenge inspections and limited the rights of the inspected state. They tried hard to establish a challenge inspection mechanism, taking liberties with the rights of the Convention, and used it to do as they pleased in terms of initiating challenge inspections. China conducted a resolute boycott against this. We considered that making appropriate and effective challenge inspections was necessary for the Convention to have teeth, but they ought not to harm the national security interests of the

states parties by turning them into a means by which the great powers could wantonly infringe on the sovereignty of other nations.¹⁵²

Another provision of the CWC ensures that declarations submitted to the treaty organization, the OPCW, will be kept secret. Indeed, China has insisted that no part of its declarations can be made public without its permission, and only OPCW officials with a high security clearance can have access to the information.

Although China signed the CWC in January 1993, Beijing did not ratify the treaty until December 1996.¹⁵³ Despite efforts on the part of the Chinese delegation to restrict the intrusiveness of the inspection mechanisms, PRC MFA officials believe that they are still too far-reaching.¹⁵⁴ Other Chinese CBW experts, such as Dr. Chen Jisheng,¹⁵⁵ are guardedly optimistic about the effectiveness of the CWC and the future of CW nonproliferation. He claims, however, that the treaty is being implemented unfairly with respect to the developing world:

Although the CWC is a reflection of the developing trend towards world peace, at the same time it is also a product of U.S. plans to codify and control the posture of world CB weaponry. There have already appeared these manifestations:

- The restrictive force of the CWC towards different countries, weak or strong, is imbalanced, while having a miniscule controlling effect upon the United States.
- The CWC allows for a new, legal avenue for Western countries to carry out counterproliferation policy and interference [in the internal affairs of other countries].
- The CWC further widens the imbalanced state of strong versus weak nations in terms of CB weapons and other development capabilities.
- Signs are not yet visible that the major CW states are really serious about implementing the treaty.
- It is yet to be demonstrated that the CWC can be relied on over a period of time to root out and destroy the threat of CW.¹⁵⁶

Chinese Compliance with the CWC

At least insofar as the OPCW is concerned, China has complied with the declaration requirements, including past and present CW activities, both offensive and defensive.¹⁵⁷ Compiling the chemical industry data for the CWC declarations did pose a challenge to the Chinese government. Swaine and Johnston write,

China has stressed its difficulties in complying with various disclosures required within 30 days of the treaty's entering into force (e.g., to disclose all chemical production, and in some cases use, of chemicals that fall into three schedules). Gathering this data is hampered by the sheer number of labs and other chemical facilities that the Chinese must guarantee will act in compliance with the treaty, and by China's lack of experience in preparing for on-site inspections and the type of technologies that can be used to minimize intrusion.¹⁵⁸

Several PRC ministries and departments are involved in implementing the CWC, including declarations and domestic legislation for export controls: the MFA, the State Economic and Trade Commission, the Ministry of National Defense, the Legislative Affairs Office of the State Council, the State Administration for Industry and Commerce, and the economic and trade committees (economic committees) of each province, autonomous region, and municipality, among others.¹⁵⁹ The Chinese national authorities charged with implementing the CWC, including import/export licensing, are based throughout China on a provincial/municipality basis. For example, Yunnan province and Shanghai (a city of 13 million people) both have CWC implementation offices.¹⁶⁰

A fully accredited reference laboratory for CWC implementation exists at the PLA's Institute for Chemical Defense in Beijing.¹⁶¹ In order to qualify to become a CWC reference laboratory, institute technicians participated in a challenging test to determine the presence of unknown chemicals in different sample media. The institute's journal, *Chemical Defense Research (Fanghua Yanjiu)*, noted that "all of our comrades in the analytical chemistry laboratory, with the honor of the nation and the military in mind, came together, struggled with all of their might...to ensure that the testing duties were satisfactorily completed."¹⁶² While this is a self-serving account, the Chemical Defense Institute does appear to be a competent organization with a relatively young technical staff. (Many of the scientists and technicians reach fairly high levels of responsibility by their early or mid-30s.) There has also been a push in the institute to utilize a system of rewards and competition, increasing opportunities for staff initiative. Other institute responsibilities besides those of CW defense and technical verification include reliability testing for military equipment in the field under a variety of environmental conditions.¹⁶³

As far as can be determined from open sources, China has complied with the provisions of the CWC since its ratification in late 1996. In January 2001, however, DOD claimed that "Beijing has not acknowledged the full extent of its chemical weapons program."¹⁶⁴ If this assessment is true, then the U.S. government should request a challenge inspection under the CWC.

Abandoned CW in China

During the CWC negotiations, the PRC pressed Japan to accept responsibility for the destruction of CW abandoned on Chinese territory during the Sino-Japanese War of 1937-1945. The Chinese government claims that at the end of the war, Japan buried many of its unused chemical munitions, and that China was not immediately aware of their presence.¹⁶⁵ Since then, however, numerous Chinese civilians have accidentally encountered chemical munitions abandoned by Japan. According to the Chinese government, approximately 2,000 people have been injured to varying degrees since 1953, and the figure is still increasing.¹⁶⁶

Of greater relevance to the issue of Chinese CWC compliance are the activities Beijing says it performed before April 1997, when the CWC entered into force. According to Dr. Deng Hongmei and Peter Evans, by early 1997 China had

already destroyed 10 tons of chemical agent and destroyed or preliminarily treated 300,000 munitions. When resources were not available to destroy the weapons, they were merely collected and stored. . . . In 1959 to 1960, blister agents from over 200,000 munitions in Shangzi, Heilongjiang Province, were drained and moved to Meihekou, Jilin Province, where they await destruction in two tanks that hold a total of 74 tons of a mustard and lewisite mixture.¹⁶⁷

From an arms control perspective, the draining and storage of CW agents complicates the verification of possession and may explain the rumors that China has been playing fast and loose with declarations of former CW activity. For example, why did China run the risk of exposing more personnel to toxic agents by storing over 70 tons of mustard and lewisite? Perhaps retaining evidence of Japanese abandoned CW use was more important, from both a political and financial perspective, than taking the final step of destroying the remaining agents. (A Chinese nuclear arms control expert told the author that the Chinese government considered utilizing a nuclear explosive

test to destroy a significant quantity of abandoned CW, but concluded that it was not worth the political costs.¹⁶⁸)

In May 1999, after six years of negotiations, the Japanese government accepted responsibility for the destruction of its abandoned CW and signed an agreement with China. Nevertheless, differences over the scope of the problem remain. Japan estimates that 679,000 chemical munitions remain on Chinese soil,¹⁶⁹ whereas China contends that Japan abandoned some 2,000,000 chemical munitions (the actual number may be somewhere in between).¹⁷⁰ Japan is obliged by the CWC to complete the CW removal and destruction by 2007, although this deadline may not be met.¹⁷¹ Recently, at a site in Beian, Heilongjiang Province, a team of Japanese and Chinese removed 733 mustard agent shells and 154 containing “agents that induce nausea”¹⁷² (probably diphenylcyanoarsine¹⁷³).

CHINA AND THE BWC

The 1972 BWC bans “microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes,” and “weapons, equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict.” The BWC was opened for signature on April 10, 1972, and both the United States and the Soviet Union ratified it in 1975.

China refused to join the BWC in 1972, considering the treaty to discriminate against developing countries. That same year, Chinese BW expert Li Yimin notes, “Taiwanese authorities misappropriated China’s name” when Taiwan signed the BWC on April 10, 1972.¹⁷⁴ In 1984, China finally acceded to the BWC with a few conditions: China considered the BWC to be legally binding only with respect to other states parties and would not be bound in the event that other states violated the Convention.

Signaling that China’s support for the BWC was not enthusiastic, in October 1997, Ambassador Sha said that the original BWC was a “fraud of sham disarmament,” and that it was merely a pretext to exclude other nations from economic and technological exchange.¹⁷⁵

In the fall of 1994, an Ad Hoc Group was formed to draft a compliance protocol to strengthen the BWC. The motivating factor for the PRC to be involved in the BWC protocol negotiations, among other things, includes the assurance that its potential rivals, such as the United States

and Japan, have no offensive BW. If China can be reasonably certain that its opponents have indeed destroyed completely or foregone BW, its strategic position would be favorably enhanced. China also views biotechnology as crucial to its future, making participation in the BWC regime desirable from the standpoint of industrial technology.

If the Chinese are less than sanguine about getting a fair deal in the BWC protocol negotiations, it does not help that China’s experts on the issue appear convinced that the United States maintains an offensive BW research program. Major General Pan and his colleagues write that “the U.S. announced that it was giving up development of offensive biological weapons in 1969, but it continued to carry out biological weapons research,”¹⁷⁶ and that the United States “maintained a latent capability in biological warfare by carrying out biological defense research at the U.S. Army Research Institute of Infectious Diseases (USAMRIID).”¹⁷⁷ A representative from the Chinese MFA Arms Control and Disarmament Department was of the view that “defensive BW research can easily be offensive,” and unless the United States was completely transparent about all of its facilities, China was not prepared to make further concessions on the BWC protocol. When told that the United States had renounced and destroyed its offensive BW program, the official replied that his experts told him otherwise.¹⁷⁸

One possible source of this erroneous information may have been Chen Jisheng, of the Institute for Chemical Defense, Beijing. In the journal *Chemical Defense Research*, Chen made the following allegation:

The United States policy management system at the highest levels has yet to change with regard to CB [chemical and biological] weapons. There has yet to be seen a decline in financial support and R&D [research and development]. In November 1998, Hans Mark,¹⁷⁹ the U.S. DOD Research and Engineering director, looking 20 years into the future, discussed the matter of important weapons research. He pointed out that the United States needs to research offensive biological and chemical weapons, to vanquish [*zhansheng*] those who would use chemical and biological weapons in future wars against the United States and its allies.¹⁸⁰

When asked about this alleged statement in April 2001, Dr. Mark looked through past news articles to see what could have led to this conclusion, but he could find none.¹⁸¹

In fact, Chen Jisheng, an experienced translator of English documents into Chinese, deliberately misconstrued a statement quoted by Dr. Mark in November 1998 in *Jane's Defence Weekly*, a publication routinely monitored by the Beijing Institute for Chemical Defense.¹⁸² Other articles making similar charges have appeared in less formal but still influential military papers such as *People's Armed Forces (Renmin Jundui)*. One writer asserted that "researchers in the United States have already developed several genetic weapons that have value for actual warfare."¹⁸³

While the United States continues to perform BW research, sometimes involving the use of actual pathogens, such activities involve small quantities and are undertaken for defensive purposes only. Recent accounts have also shown efforts by the U.S. government to duplicate possible routes by which states or terrorists might develop BW, including the use of former Soviet BW technology and weapon designs.¹⁸⁴ However, there is no basis for the conclusion that the United States maintains an offensive BW stockpile, and certainly no evidence of its development of "several genetic weapons that have value for actual warfare."

Another point of contention involves past BW work by the former Soviet Union. The author asked both MFA officials and Chinese arms control scholars about their reaction to the revelation that the Soviet Union had possessed the world's largest offensive BW program, and that the weapons could have targeted Chinese cities. The response from the MFA was that the claims were merely allegations. They would not concede that there was good evidence that the Soviet Union had weaponized and stockpiled the causative agents of smallpox, anthrax, and tularaemia.¹⁸⁵

With regard to the dismissive attitude on the part of Chinese, a Beijing-based arms control scholar made the following observation: because Russia and China have significantly repaired their once hostile relationship since 1991, there is not much need for the PRC to focus on the former Soviet BW threat.¹⁸⁶ This attitude is consistent with the general Chinese theme of focusing on the relationship and its perceived strategic threats, not the weapons, as noted earlier.

At the same time, the Chinese seem to believe U.S. intelligence reports that during the late 1970s and early 1980s, Soviet-backed governments in Laos and Vietnam used mycotoxins or some other form of biological toxin against Hmong resistance forces and the Khmer Rouge.

If the "Yellow Rain" episode is not entirely accepted by Chinese CBW experts, they certainly show less skepticism towards the story than their Western counterparts.¹⁸⁷ This attitude could be explained by the fact that China saw Vietnam as a client of the former Soviet Union and, therefore, as a more direct threat to its interests.

BWC Protocol Negotiations

The Chinese government considers the BWC to be fundamentally flawed, in part because the treaty does not explicitly prohibit the use of BW. Although this prohibition can be inferred from the 1925 Geneva Protocol, China does not consider it sufficient. MFA officials have also expressed the view that BWC verification is a nearly hopeless enterprise.¹⁸⁸ This opinion is held by Li Yimin, who writes: "because technology in the life sciences is constantly developing, even more so in the case of biotechnology, one cannot separate peaceful uses and military use; offensive biological research and defensive BW research developments can neither be distinguishable. BW verification continues to increase in terms of its complexity and level of difficulty, to the point where on many levels there is no way to verify."¹⁸⁹

The idea of intrusive inspections also presents resistance on the part of the PRC. One commentator noted that "official PRC statements enthusiastically endorse strengthening the BWC, but negotiators in the Ad Hoc Group have opposed intrusive inspection measures and legally binding disclosures of past activity as part of a verification protocol."¹⁹⁰ Pan and his colleagues point out that the Chinese government would not favor revealing much of what it considers sensitive information.¹⁹¹

Chinese arms control experts believe that although it is too late to reduce the intrusiveness of the CWC, even more attention will be paid to a future BWC protocol with respect to preventing "abusive inspection measures."¹⁹² In addition to the problems posed by intrusive inspections and transparency, China has not relented in its complaint that the BWC is "discriminatory." Recently China and Iran rejected the chairman's text of a BWC protocol, claiming that it promoted an unfair export control regime.¹⁹³

CHINA AND CBW EXPORT CONTROLS

According to the CWC, no member state may assist another state in developing or producing CW. Because of the growing importance and capabilities of the Chinese chemical industry, the potential for the proliferation of dual-

use precursors and technology is of concern. But making the case that the Chinese government or other entities have materially and knowingly assisted foreign governments to produce CW—a clear breach of the CWC—is exceedingly difficult.

In January 2001, DOD made vague claims about Chinese proliferation activity during the 1990s, notably China's trading in "chemical precursor production technology and equipment" to Iran.¹⁹⁴ Another report in March 1997 alleged that Ukraine had sold China 500 tons of sarin from former Soviet stocks, in addition to chemical protection equipment.¹⁹⁵ The Ukrainian Ministry of Defense denied the story. These cases remain a source of suspicion in the West and acrimony on the part of China, which considers allegations of proliferation activity as overzealous interference by the United States. In one episode that rankles the Chinese government to this day,¹⁹⁶ through diplomatic pressure the United States—acting on apparently reliable intelligence that a Chinese cargo ship called the *Yin He* (Milky Way) was carrying CW agent precursors to Iran—forced the vessel to submit to an inspection in August 1993. The ship was a container vessel owned by the Guangzhou Ocean Shipping Company, with regular stops in Singapore, Jakarta, Dubai, Damman, and Kuwait.¹⁹⁷ U.S. intelligence suspected that the *Yin He* was carrying two mustard precursors, thionyl chloride and thiodiglycol.¹⁹⁸ After a stand-off, the United States and China agreed to an inspection by U.S., Saudi, and Chinese officials at the Saudi port of Damman. After a search of some of the 24 containers on board the ship, no chemical precursors were found.¹⁹⁹

Afterward, the Chinese Foreign Ministry complained that the *Yin He* had been forced to stay adrift on the high seas for more than 20 days, with its crew suffering from a shortage of fresh water. China indignantly concluded that "the results of the exhaustive inspection at the Damman Port show that the truth has been brought to the light of day, and the United States, which was the sole maker of the *Yin He* incident, has ended up with its own failure."²⁰⁰ The *Yin He* episode, writes Yu Zhongzhou, "aroused a strong reaction from international public opinion, especially Asian and other regional news media outlets, which condemned the United States government for violating the rights of other countries."²⁰¹

The Chinese government has always maintained that the *Yin He* had no chemical precursors destined for Iran, and that the ship was carrying only stationery, tools, hardware, and machine parts.²⁰² Four years later, the U.S. State Department suggested that it still believed in the in-

telligence that sparked the *Yin He* incident. During congressional testimony, Deputy Assistant Secretary of State for Nonproliferation Robert Einhorn said the United States had information that certain goods were intended to be loaded on board that ship, and so we assumed that they were. And we vigorously demarched the Chinese government at the time. And, you know, at several ports of call and in the Persian Gulf there was somewhat of a stand-off actually among U.S. and Chinese vessels there in the Gulf. But finally we worked out diplomatically a procedure whereby the vessel would go to shore and be inspected. And that's in fact what happened. And as it turned out... the goods were not on board that ship... But we think our initial information was correct, that the goods were intended to be on board that ship... And I think the Chinese scored what turned out to be a big propaganda victory on this after the inspection. But we think our intelligence community had done a good job in that case, and it's one of these cases where the Chinese, you know, lucked out. But it shows, I think, that the U.S. is prepared to take very vigorous steps to interdict supplies of sensitive goods and to try to enforce, as best as we can, these international norms.²⁰³

When asked by Senator Durbin if there were other incidents in which the United States had "verified the delivery of such materials from China to Iran and Pakistan," Einhorn replied: "Yes."²⁰⁴

Aside from speculation by an unnamed U.S. official that the Chinese government deliberately goaded the United States into precipitous action, thereby causing a major foreign policy embarrassment for the new Clinton administration, nothing has since emerged to clarify the *Yin He* affair.²⁰⁵ The Chinese government remains indignant over the episode.²⁰⁶

Chinese Export Controls and the CWC

Parties to the CWC are enjoined to enact domestic legislation that controls the exports of chemicals that could be used to produce CW. In the wake of the *Yin He* affair, China claimed to have already enacted such legislation as early as 1990.²⁰⁷ The Chinese government noted with regard to chemical precursors and export controls in September 1993 that China already had "clear and definite regulations on banning and restricting chemicals of this

category.”²⁰⁸ That claim notwithstanding, on December 27, 1995, China enacted Regulations on the Administration of Controlled Chemicals, which established regulations for the chemical industry management bureaus in provincial, municipal, and autonomous regions. In China today, chemicals for export are classified into four separate categories, mirroring the schedules of chemicals in the CWC. The first category of chemicals are those that can be directly used as CW agents (comparable to Schedule 1 of the CWC); the second are those that can be used as precursors for CW (Schedule 2), and the third category are those that are important for CW agent precursor production but are used in large quantities by commercial industry (Schedule 3). The fourth category includes discrete organic chemicals, including those chemicals containing phosphorus, sulfur, or fluorine.²⁰⁹

Chinese chemical export regulations specifically name certain compounds that could be used in “producing chemical weapons,” which are to be monitored and strictly controlled when being shipped to a foreign country or for transshipment to third party. Such regulations were available at least by 1997 in a chemical trade handbook published in the PRC. This handbook goes on to state that all military dual-use chemicals, even if not explicitly listed, must be reported to the chemical export department and approved for shipment.²¹⁰

In 1996, months after China formally enacted chemical export legislation pursuant to the CWC, the CIA determined that China was supplying Iran with key-turn CW factories. Among the items that China was allegedly providing to Iran’s CW program were glass-lined vessels and air filtration equipment used to manufacture highly toxic and corrosive chemicals.²¹¹ On November 21, 1996, Bill Gertz of the *Washington Times* cited a CIA report that China had shipped 400 tons of chemicals, including a compound “used in production of nerve agents—and another chemical used in producing riot control agents and tear gas [sic].”²¹² On the following day, a PRC MFA spokesman said that the report was “purely fictitious and made out of ulterior motives.”

During the April 1997 congressional testimony by Robert Einhorn, he stated the following with regard to China’s export laws and CWC compliance:

We... welcome China’s adoption in December 1995 of its chemical export control regulation and the supplement to that regulation issued in March [1997]. We are deeply concerned, however, by the discrepancy between these posi-

tive steps and substantial information available to us that various Chinese entities have transferred chemical precursors, chemical production equipment, and production technology to Iran, which we expect will use them in its chemical weapons program, one of the most active in the world today. These dual-use chemical-related transfers to Iran’s CW program indicate that, at a minimum, China’s chemical export controls are not operating effectively enough to ensure compliance with China’s prospective CWC obligation not to assist anyone in any way to acquire chemical weapons.²¹³

On May 21, 1997, a month after Einhorn’s testimony, the State Department issued sanctions against five Chinese nationals, two Chinese companies, and a Hong Kong trading company for “knowingly and materially contributing to Iran’s chemical weapons program.” (The sanctions were issued pursuant to the Chemical and Biological Weapons Control and Warfare Elimination Act of 1991.²¹⁴) The Nanjing-based Jiangsu Yongli Chemical Engineering and Technology Import and Export Corporation was named as an offender in the sanctions. China rejected the allegations, claiming that its export control laws were strictly enforced.²¹⁵ But a 1999 CIA evaluation of the U.S. action also noted that the U.S. sanctions had been imposed on seven Chinese entities for “knowingly and materially contributing to Iran’s CW program.”²¹⁶

Another allegation against China concerned an April 1998 shipment from China to Iran of phosphorus pentasulfide, a key precursor for VX nerve agent.²¹⁷ The London *Sunday Telegraph* reported in May 1998 that 500 tons of phosphorus pentasulfide had been shipped to Iran via a Chinese-owned front company in Hong Kong, known as Norinco (China North Industries Corporation).²¹⁸ In June 2001, the State Department imposed sanctions yet again on the Jiangsu Yongli Chemical Engineering and Technology Import and Export Corporation. In this instance, the government invoked the Iran Nonproliferation Act of 2000 covering any proliferation activity since January 1, 1999.²¹⁹ It is not clear what dual-use items were involved in this recent case.²²⁰ In January 2002, the United States again imposed sanctions against Chinese entities under the Iran Nonproliferation Act for transfers to Iran of items controlled by the Australia Group.²²¹

Most recently, in its report to the U.S. Congress on the Acquisition of Technology Related to Weapons of Mass

Destruction and Advanced Conventional Weapons for the Period January 1-June 30, 2001, the CIA, in reviewing Chinese CBW related exports, declared:

Prior to the reporting period, Chinese firms had supplied dual-use CW-related production equipment and technology to Iran. The U.S. sanctions imposed in May 1997 on seven Chinese entities for knowingly and materially contributing to Iran's CW program remain in effect. Evidence during the current reporting period shows Iran continues to seek such assistance from Chinese entities.²²²

China and the Australia Group

In April 1984, when it became clear that Iraq was using CW in its war against Iran, and that Iraq had obtained precursors and equipment from Western companies, a number of exporting countries saw the need to address the problem of CW proliferation. The first meeting of what became known as the Australia Group (AG) was held in Brussels a year later. In 1990, the member countries also began to address the proliferation of BW and related technology.

The AG is an informal arrangement that now includes 32 countries (China not among them). It has no legally binding mission, but seeks to exchange information and harmonize the members' national export controls with regard to exports of dual-use technology. According to the AG guidelines, the harmonization measures should be practical, effective in impeding the production of CBW, reasonably easy and economical to implement, and should not impede the normal trade of materials and equipment used for legitimate purposes.²²³ In addition to a list of 54 chemical precursors, the AG agrees on types of chemical and biological production equipment that should be monitored for export, such as reaction vessels, corrosion-resistant reactors of significant volume, specialized filling equipment, valves, and distillation columns. Bacteria, viruses, toxins and genetically modified organisms with military potential are included in an "export control core list." The AG has specified that "an export is denied only if there is particular concern about potential diversion for CBW purposes."²²⁴

China now leads a campaign to dismantle the AG, claiming the organization is inimical to not only its own interests, but to those of developing countries.²²⁵ According to current Chinese Ambassador to the Conference on Dis-

armament and former director of the arms control branch of the MFA, Sha Zukang,

The existence of the 'Australia Group' means that, at this moment, there are two parallel export control mechanisms in the field of chemical trade. This inevitably causes confusion and disputes in what would otherwise be normal trade activities, results in a de facto imbalance in the rights enjoyed by individual States Parties [to the CWC], undercuts the authority of the Convention, discourages the participation of more countries in the Convention's regime, and compromises its universality.²²⁶

This has been the standard line from the Chinese government with regard to the AG for several years now, although it neglects to explain why China and other developing states do not simply apply to join the group. In fact, China's objection to the AG may be part of a larger agenda. According to one Western CW analyst, once China accomplishes its goal of dissolving the AG, it will aim to weaken other export control regimes on dual-use technologies, including nuclear.²²⁷

TAIWAN AND CBW ARMS CONTROL

Taiwan and CBW

Today, Taiwan is often listed as a country suspected of possessing both chemical and biological weapons.²²⁸ There is a palpable degree of frustration among Taiwanese officials and academics that as Taiwan has become more isolated internationally, it continues to show up on the CBW proliferation list with other "countries of concern." It would appear that Taiwan's inclusion in the CW club has been based largely on testimony provided by the director of U.S. Naval Intelligence, Rear Admiral Thomas Brooks, in 1988. At that time, Brooks named Taiwan, along with Iraq, Iran, China, North Korea, Burma, India, Pakistan, Syria, Israel, Egypt, Ethiopia and Libya, as having a CW program. In 1989, he reported that Taiwan might already have an operational CW capability.²²⁹

While acknowledging the production of small quantities of CW agent for defense research purposes, Taiwanese authorities have consistently denied possessing offensive CW. In 1997, for example, Taiwanese Defense Minister Chiang Chung-ling declared that the "National Armed Forces had to proceed with the research and development of defensive biochemical weapons," but modi-

fied his remarks later to emphasize that he meant “development of protective equipment against nuclear, biological, and chemical weapons.”²³⁰

In May 1999, the Taiwanese Ministry of National Defense (MND) stated that “we will by no means manufacture and nor will we own chemical weapons.” Following a news story that former East German CW experts were advising the PRC military on how to employ CW against Taiwan-held islands near the Fujian province coast, Taiwan’s Chief of the General Staff, General Tang Yao-ming, stated, “The military will abide by the country’s consistent policy and comply with international treaties [and] will by no means own, produce, nor use nuclear and bio-chemical weapons. Regarding bio-chemical preparedness, the military would only engage in the development of protection equipment and protection training programs.”²³¹ A Taiwanese chemist told the author that even if Taiwan possessed CW, which he doubts, it would not know how to use them. From the Taiwanese perspective, there is little room for error on a small island, with few large beaches for counterattacks using CW agents. Most importantly, apart from systems such as the Green Bee (Ching Feng)—a weapon system that appears to be inactive²³²—Taiwan does not possess long-range missiles capable of significant chemical delivery.²³³ However, some Taiwanese artillery systems, such as multiple launch rocket systems and large caliber howitzers (155 mm) are suitable for significant chemical delivery under certain circumstances.

Taiwan does engage in chemical defense activities. During heightened tensions between Taiwan and the PRC in 1995-1996, Taiwanese soldiers on outlying islands close to mainland China were observed wearing chemical defense gear.²³⁴ The MND conducts chemical defense research and development at the Chung-Shan Institute of Science and Technology, Chemical Systems Research Division.²³⁵ In December 2000, Taiwan’s Vice Minister of National Defense, Sun Tao-yu, announced that this institute would be incorporated into a future Military Procurement Bureau, which would also include the General Headquarters.²³⁶

Even less clear are Taiwanese efforts, if any, to acquire a biological warfare capability. In 1997, the U.S. Arms Control and Disarmament Agency (now subsumed within the U.S. State Department) wrote: “Evidence indicating a BW program is not sufficient to determine if Taiwan is engaged in activities prohibited by the BWC.”²³⁷ A recent report from the Canadian Security and Intelligence

Bureau claimed that Taiwan has developed three dozen types of bacteria, apparently for weaponization. The Vice Minister of National Defense, Sun Tao-yu, called this allegation “absolutely wrong.”²³⁸

During discussions in 1999 and 2001 with Taiwanese academics and government officials from the defense intelligence bureaus, the author was told that Taiwan is not particularly concerned about possible CBW threats from mainland China. Taiwanese defense planners are far more concerned about Chinese conventional attacks, particularly from missiles, and nuclear arms. Perhaps in the minds of these Taiwanese security analysts was a startling statement by China’s chief arms control negotiator, Ambassador Sha. When asked in August 1996 whether China would maintain its no-first use policy with regard to NW, he was quoted as having said that “as far as Taiwan is concerned, it is a province of China not a state. So the policy of no first use does not apply.”²³⁹ The Chinese MFA later retracted this remark.

The 1997 Foot and Mouth Disease Outbreak

In a June 1999 investigative report, a U.S. newspaper intimated that the 1997 outbreak in Taiwan of foot and mouth disease (FMD), which affects cattle and pigs but not humans, could have resulted from mainland Chinese sabotage.²⁴⁰ The world’s largest known outbreak of FMD, it caused more than \$5 billion in damage to the Taiwanese pig farming industry, which will probably never recover to its pre-1997 levels of production and export.²⁴¹ At the time, most accounts concluded that the FMD outbreak was accidental, a consensus also reached in the Taiwan agricultural community:

The outbreak of FMD in Taiwan was caused by the introduction of virus through either the smuggling of goods or related agricultural products. As a consequence, the defense against such smuggling is of great importance... It was finally determined by means of analysis in foreign research institute(s) that the FMD outbreak was absolutely the same as that in the mainland, thus proving that infection was brought into Taiwan from the PRC. It was completely because of smuggling meat products across the boundary that caused great economic losses to Taiwan amounting to 1 percent of (1997)’s [GNP].²⁴²

Since 1999, more details have emerged about the 1997 FMD outbreak in Taiwan. Western governments, including the United States and Canada, suspected initially that

mainland Chinese operatives had caused the outbreak. One of the factors that led to this theory was genetic typing of the virus, which suggested that the FMD outbreak could have been triggered by a virus obtained at a PRC-based laboratory. Nevertheless, it now appears that the 1997 FMD outbreak in Taiwan was of natural origin, for two reasons. First, before 1987, smuggling could result in the death penalty; but since martial law was lifted in 1987, such draconian laws no longer exist, except perhaps for drugs and illegal weapons. As a result, smuggling of products from the PRC to Taiwan has steadily increased. In 1999, the Taiwanese authorities seized some 1,000 tons of meat products smuggled into Taiwan from the PRC, including pig stomachs and intestines, and this may represent only ten percent of the total volume. The meat products also include live animals. (The extent of smuggling of meat products from the PRC to Taiwan during the 1990s is so great that it is surprising that a serious FMD outbreak did not happen earlier).

Second, unofficial reports from Chinese veterinarians suggest that epidemics of animal disease are out of control in the PRC, although mainland officials put a different public face on the situation. The PRC has claimed to be FMD-free since 1999. Any information about FMD is classified in China, and FMD itself is coded "disease no. 5" (*wu hao bing*) in official discourse. However, when Taiwanese pig producers visited the PRC recently, FMD was to be found to be endemic in Guangdong, Shanghai, and Fujian provinces. This observation strengthens the probability that FMD virus was transmitted accidentally from the mainland to Taiwan in smuggled meat products.

Taiwan and the CWC

Because Taiwan is not internationally recognized as a state, it is not eligible to become a party to the CWC. As a result, Taiwan is subject to CWC restrictions on trade in chemicals with non-states parties. (While officially the OPCW considers Taiwan a part of China, there do not appear to be any allowances made for excluding Taiwan from any of its obligations or possible liabilities under the CWC.) In 1995, a member of the Taiwanese government made official inquiries as to the effect of the CWC trade restrictions on the Taiwanese chemical industry. Over the next six years, the Industrial Technology Research Institute, the analytical and development arm of the Taiwanese Ministry of Economic Affairs, has briefed government and industry officials about the purpose of the CWC and its implications for Taiwan's chemical industry and secu-

rity. The Ministry of Economic Affairs subsequently decided to conform voluntarily to the CWC guidelines.

As of today, however, the role of Taiwan and its participatory status in the OPCW are still unclear. Because Taiwan has not been permitted to accede to the CWC, it has been unwilling to allow OPCW inspections until the matter of its participation has been resolved. Taiwanese officials insist, however, that the country complies strictly with the CWC, including export controls on chemical precursors.²⁴³ The Taiwanese chemical industry and government have jointly developed domestic legislation consistent with the Convention. The Taiwan Industrial Development Bureau of the Ministry of Economic Affairs has also published a number of handbooks and brochures on the CWC and compliance by its chemical industry.²⁴⁴

Because Taiwan's chemical industry ranks eleventh in world production, studies were performed to examine the effect of CWC trade restrictions on Schedule 2 chemicals. Taiwanese analysts demonstrated that the Schedule 2 chemical restrictions would impose a cost of only \$1-2 million on Taiwan's industry. So rather than incur more costs, the pharmaceutical manufacturer simply stopped the affected production line. Nevertheless, trade in Schedule 3 chemicals, many of which are widely used by industry, may also be restricted by 2004. Such restrictions would have a significant impact on Taiwan, producing losses estimated at about \$2 billion.²⁴⁵ In 1999, the United States offered technology to help Taiwan avoid CWC restrictions by transferring 14 chemical production technologies to the island. In this way, domestic production of chemicals that would otherwise be restricted from imports could continue. One idea involved transferring entire plants and technology to Taiwan to convert raw phosphates into phosphorus trichloride, but this process was not found to be economically viable.²⁴⁶ On one hand, this technology transfer is an understandable measure to prevent economic hardship for Taiwan, as it cannot legally become a member of the OPCW. However, this could also be construed as attempts to evade the spirit if not letter of the CWC.

Representatives of the Taiwanese chemical industry believe that if Taiwan can participate in some manner in the CWC, the MND, perhaps at the vice-minister level, would be willing to compromise on future inspections. The future role of Taiwan in the CWC might be that of a participating observer. But although the Taiwanese government has sent letters to the External Relations department at the OPCW, it has not yet received a response.²⁴⁷ To date, no officials from either the OPCW or the U.S. gov-

ernment will talk openly about the current or future role of Taiwan in the CWC, because of China's political sensitivity about Taiwan's ambiguous status as a *de facto* state. With this basic reality firmly in place, Taiwan believes that only the United States can push for a solution to this problem. Other countries, including Germany and Japan, have offered their sympathy but not outright support.²⁴⁸

Taiwan's strategy at this point is to participate in the CWC in whatever way it can, using international economic forums to state its case. Taiwan's main industry research organization attempted to attend or observe AG meetings as a non-governmental (NGO),²⁴⁹ but the AG refused permission, due to sensitivities concerning China. Since, as noted above, the Taiwanese chemical industry is ranked eleventh in the world, a mechanism needs to be devised whereby Taiwan will not be penalized by restrictions on imports and exports of Schedule 3 chemicals.

Taiwan's participation in the CWC would offer security assurances that could benefit cross-strait relations and confidence-building. For such a venture to succeed, however, only China and the United States can initiate the process, as other countries are either uninterested or intimidated by the political fallout. The role of NGOs may be helpful in this regard, as was recently suggested by Dr. Yuan Yi of the Institute for International Relations at the Taiwan National Chengchi University. In such a concept, representatives of parties concerned would meet to find practical and politically acceptable solutions to the problem of Taiwan and its participation in the CWC.

CONCLUSIONS

China regards the United States as the number one "hegemonic power" and believes that America is making every attempt to keep China and other developing countries at a disadvantage. So long as this worldview persists on the part of the Chinese government, Beijing and Washington will continue to be at loggerheads over arms control and nonproliferation policy. Despite the relatively successful implementation of the CWC, the negotiations for a BWC verification protocol bogged down, in part because of policy differences between China and the United States over export controls—a subject where differences in viewpoints with China and other developing countries contributed to the U.S. decision to withdraw from the protocol negotiations in late 2001.

An overriding principle that guides Chinese assessments of arms control treaties, particularly the CWC and BWC,

is the notion of "fairness," through which China seeks to avert any situation that might place it at a disadvantage. Hence the many Chinese references to a need for "mutual respect," "equanimity," and "evenhandedness" when discussing international arms control negotiations. But there is also a strategic evaluation of the arms control process, which China fears will benefit only a few major powers at the expense of all other states. As Chinese President Jiang Zemin stated in 1999 before the Conference on Disarmament in Geneva, "Disarmament should not be a device by which strong nations control weaker ones, and even more so should not bring about superior weaponry being held by a minority, leading to the unilateral seeking of a superior security position."²⁵⁰

The problem with this approach is that it leads to a zero-sum game in which China, as a developing country, always finds itself in an inferior position vis-à-vis the West. As a consequence, for some years to come, China is destined to continue viewing arms control agreements as "discriminatory," pitting the developed countries of the North against the developing countries of the South. The Chinese view efforts by the United States to stem NW proliferation, for example, as follows:

Western nations, in the name of nuclear non-proliferation, are...applying various and unreasonable constraints upon developing countries' peaceful utilization of nuclear energy, and the development of international nuclear cooperation. Chinese import and export of nuclear materials and equipment that have peaceful uses receive unwarranted restrictions. How to deal with these kinds of unequal and unfair aspects of arms control, and maintain our country's national interests is a new problem that must be met squarely on.²⁵¹

If China views international arms agreements merely as mechanisms by which it will be taken advantage of, or which will cause it to lose out in the area of technology transfer, one must consider how seriously Beijing will take its responsibilities to prevent the proliferation of CBW. Furthermore, until the topics of concern to the Chinese government are adequately addressed, it is hard to imagine that Beijing will share a common interest with Washington with regard to preventing the proliferation of CBW technologies.

Perhaps most problematic, both China and the United States continue to accuse each other of possessing offensive CBW capabilities in violation of international law.

What can be done to resolve these mutual suspicions? And how should the two countries address the troubling fact that China still appears to believe the allegations of U.S. use of BW during the Korean War—allegations unsupported by evidence. Although the Korean War ended nearly 50 years ago, the need clearly exists to resolve this distant, yet still important matter. Until these allegations have been set aside, it is unlikely that the Chinese will believe any future U.S. declarations on past or present BW-related activities.

Efforts by the World Health Organization to detect and contain natural outbreaks of infectious disease demonstrate the potential benefits of establishing an international network of centers for disease surveillance, both in animals and in humans. International cooperation in such a venture could significantly reduce disease threats to public health and national economies. Still, transparency in disease reporting is a hard sell for China. This is apparent in official Chinese pronouncements claiming that China is free of FMD, when in fact the disease can be found in several Chinese provinces.²⁵² If China is unwilling to be open about animal diseases, such as FMD, what chance is there for transparency in more sensitive areas of human illnesses and BW-related activity?

Implications for U.S. Policy

Aside from the wider goal of maintaining security in the East Asian region, U.S. and PRC strategic interests are increasingly in conflict. Whether it is U.S. support for Taiwan, China's trade in sensitive technologies with Iran, U.S. support for Israel (the PRC supports the Palestinian cause), human rights, or NMD, the policy differences between the two countries makes cooperation all the more difficult. Having decided that Western-led arms control initiatives are inherently antagonistic to Chinese interests, and resenting U.S. hegemony, China has and will continue to drive a hard bargain when it comes to CBW disarmament.

Nevertheless, from an international policy perspective it makes sense for the United States and other developed countries to remain engaged with China, encouraging it to be a positive force for CBW nonproliferation. How can this goal be accomplished? Washington should attempt to engage Beijing in an effort to clarify a number of unresolved issues over alleged CBW capabilities on both sides. Resolving suspicions of clandestine CBW development is easier said than done, since it is nearly impossible to prove a negative. As a confidence-building effort, however, Chi-

nese military scientists might be invited to visit the U.S. Army Medical Research Institute of Infectious Disease (USAMRIID) and the U.S. Army Medical Research Institute for Chemical Defense (USAMRICD). The U.S. side could seek to make reciprocal visits to the Beijing Institute of Chemical Defense and the Institute of Military Medicine departments in Beijing, Shijiazhuang, and other cities that conduct BW defense research. Anything less than a series of reciprocal visits would not be worth the time, effort, and expense.

In addition, the *Yin He* affair needs to be clarified. China often raises this episode when protesting against U.S. actions that Beijing perceives as unfair. Given the importance of the *Yin He* incident in shaping how Chinese officials view the CBW nonproliferation regime, a frank discussion might open the way to a common understanding on nonproliferation issues in general. If there is more to the story than has appeared in the press, as Robert Einhorn hinted in his congressional testimony, perhaps now is the time for a full airing of what both governments knew or did not know about what the *Yin He* was carrying in 1993.

Finally, Chinese analysts, such as Major General Pan, continue to claim that the United States conducted biological warfare during the Korean War.²⁵³ For this reason, a common understanding of what happened during the Korean War must be clarified and resolved between the two countries. Beyond the basic need for historical accuracy—an abstract ideal held in great regard by both the Western and Chinese cultural traditions—an honest dialogue on the Korean War may promote more frank and direct discussions between the United States and China on other CBW-related issues.

¹ Michael D. Swaine and Alastair Iain Johnston, "China and Arms Control Institutions," in Elizabeth Economy and Michel Oksenberg, eds., *China Joins the World: Progress and Prospects* (New York: Council on Foreign Relations Press, 1999), p. 90.

² Gerald Segal (d. 1999), "Does China Really Matter?" *Foreign Affairs* (September/October 1999), p. 24.

³ Bates Gill, *Case Study 6: People's Republic of China*, The Deterrence Series: Chemical and Biological Weapons and Deterrence (Alexandria, VA: Chemical and Biological Arms Control Institute, 1998).

⁴ Pan Zhenqiang, ed., *Guoji Caijun yu Junbei Kongzhi* [International Disarmament and Arms Control] (Beijing: National Defense University Press, 1996).

⁵ Liu Huaqiu, ed., *Arms Control and Disarmament Handbook* (Beijing: National Defense Industry Press, December 2000).

⁶ Benjamin Garrett, "The Chinese Warlords' Chemical Arms Race," *ASA Newsletter*, No. 98-4, August 14, 1998, p. 16.

⁷ Alliance of Taiwan Aborigines, "Report of Alliance of Taiwan Aborigines Presentation to the United Nations Working Group on Indigenous Populations, from 19th to 30th of July [1993]," Center for World Indigenous Studies, Olympia, Washington, <<http://www.cwis.org>>.

⁸ Chloroacetophenone (CN) is the active ingredient in Mace™, and while usually considered a riot control agent, like any other toxic chemical is regarded a chemical weapon by the Chemical Weapons Convention (CWC) when used in warfare. World War I contemporaries considered CN more toxic than chloropicrin. See Augustin M. Prentiss, *Chemicals in War* (New York: McGraw-Hill Book Company, Inc., 1937), p. 145.

⁹ A Japanese scholar, Kira Yoshie, reported in a book published in 1992 that it was plausible that the Japanese had the capability to use gas warfare at Wushe. See Anonymous, “*Taiwan Wenhua Xueyuan Zhuban ‘Wushe Shirjian Yanjiuhui’*” [Taiwan Cultural Institute Organizes ‘Study Group on the Wushe Incident’], *Baifenzhibai Taiwanren Guandian* [The 100 Percent Taiwanese Viewpoint], no. 1868 (2000). The author thanks Dr. Anthony Tu for calling this article to his attention.

¹⁰ Maria Haug, “Historical Chemical Weapons Sites in the Asia-Pacific Region,” Bonn International Centre for Conversion, February 21, 2002, <<http://www.bicc.de/weapons/chemweap/asiapac/taiwan.html>>.

¹¹ John Pike, “Taiwan, Chemical Weapons,” Federation of American Scientists (FAS), August 24, 1999, <<http://www.fas.org/nuke/guide/taiwan/cw/>>.

¹² Lu Lu Qiang and Yang Qingzhen, eds., *Wuqi yu zhanzheng jishi congshu* [Weapons and Warfare Reference Series] #14: *Huaxue Wuqi yu Zhanzheng* [Chemical Weapons and Warfare] (Beijing: Guofang Gongye Chubanshe [National Defense Industry Press], 1997), p. 97.

¹³ Deng Hongmei and Peter O’Meara Evans, “Social and Environmental Aspects of Abandoned Chemical Weapons in China,” *Nonproliferation Review* 4 (Spring-Summer 1997), p. 102.

¹⁴ Haug, February 21, 2002.

¹⁵ Lu and Yang, eds., *Huaxue wuqi yu zhanzheng*, p. 101.

¹⁶ U.S. Army Forces, Far East, Chemical Office, *Status of Chemical, Biological and Radiological Warfare, Communist China*, Department of the Army, Washington, DC, April 5, 1956, p. 7.

¹⁷ *Ibid.*, p. 8.

¹⁸ *Ibid.*, p. 10.

¹⁹ Milton Leitenberg, “Resolution of the Korean War Biological Warfare Allegations,” *Critical Reviews in Microbiology* 24:3 (1998), p. 175. Rumors have surfaced in the U.S. veterans community that sarin was used in the Korean War, and similar allegations were also published in the Russian newspaper *Trud*. See “*Khimicheskaya ‘Bomba’ vot-vot Vzorvetsaya*” [“Chemical Bombs Are About to Detonate”], no. 18, February 1994, p. 2. The author is grateful to Marina Voronova for bringing this to his attention.

²⁰ Lu and Yang, eds., *Huaxue wuqi yu zhanzheng*, pp. 128-35.

²¹ Haug, February 21, 2002.

²² Jiang Zemin’s speech on the 50th anniversary of the Korean War, *Renmin Jundui* [People’s Military], October 24, 2000, p. 1. A *Qishi* [Seeking Truth through Facts] article written as a Korean War 50th anniversary perspective by Defense Minister Chi Haotian and General Zhang Wannian—arguably the two most important military officials in the PRC—makes no mention of CBW during the Korean War. Zhang Wannian and Chi Haotian, “*Weida de Shengli, Baogui de Caifu*,” [“Great Victory, Valuable Asset,”]; *Qishi*, No. 21, November 2000, p. 21. *Qishi* is a civilian Chinese Communist Party propaganda organ and may reflect political sensitivities about the issue.

²³ Liu Yushu and Zeng Ruilin, *Zhongguo Guofangbao* [China’s National Defense] (Beijing), October 20, 2000, p. 1.

²⁴ Pan, *Guoji Caijun yu Junbei Kongzhi*, p. 152.

²⁵ Cheng Shuiting and Shi Zhiyuan, *Huaxue Wuqi* [Chemical Weapons] (Beijing: PLA Press, 1999), Ch. 1.

²⁶ Leitenberg, p. 175.

²⁷ *Ibid.*

²⁸ Translated by Kathryn Weathersby, “Deceiving the Deceivers: Moscow, Beijing, Pyongyang, and the Allegations of Bacterial Weapons Use in Korea,” CWIHP Dossier No. 1, Cold War International History Project, Woodrow Wilson International Center for Scholars, March 1999, <<http://cwihip.si.edu>>. See also Milton Leitenberg, “New Evidence on the Korean War,” Cold War International History Project, Woodrow Wilson International Center for Scholars, March 1999, <<http://cwihip.si.edu>>.

²⁹ Yu Zhongzhou recently wrote that “During the Korean War (1950-1953), the United States used chemicals (*du*) against Chinese and Korean military forces on over 200 occasions, causing over 2,000 casualties. Chemicals were also used against civilians on four occasions, causing 1,250 poisonings, close to

500 of those perishing as a result.” In Liu, ed., *Arms Control and Disarmament Handbook*, p. 320.

³⁰ For example, the *People’s Daily* [Renmin Ribao] opined that, “From 1945 to 1990 was the so-called ‘Cold War’ period, during which the United States militarily should be seen as a loser. In the Korean War the United States was defeated for the first time, in the Vietnam War the United States lost terribly, and the ‘Bay of Pigs’ landing was another military defeat among smaller ones.” Huang Qing, “Doubts on the ‘American Century,’” *Renmin Ribao* (Beijing), January 19, 2000, p. 6, translated in FBIS Document FTS20000122000096. General Bi Hao, the Chengdu military regional commander during the 1995-1996 Taiwan strait crisis, was also quoted as saying with regard to the U.S. Naval fleet that was sent in response: “It’s no big deal. China and the U.S. have fought once or twice before. It’s the U.S. that has always ended up the loser.” Presumably, he was referring to the Korean and Vietnam Wars.

³¹ Willy Wo-Lap Lam, *The Era of Jiang Zemin*, (New York: Prentice Hall, 1999), p. 270.

³² Lu and Yang, eds., *Huaxue wuqi yu zhanzheng*, pp. 123-4.

³³ *Ibid.*, p. 124.

³⁴ In a 1999 phone interview, Maj. Gen. John Singlaub told the author that only CS (riot control agent) was used in Vietnam.

³⁵ Lu and Yang, eds., *Huaxue wuqi yu zhanzheng*, p. 144.

³⁶ I was asked a question regarding the use of Vietnamese CW during this conflict during a visit to Taipei in 1999; Dr. Anthony T. Tu recalls similar questions being asked of him by PLA specialists in nuclear, biological, and chemical (NBC) defense several years ago. Dr. Anthony T. Tu, personal communication with author, March 2001, Colorado, United States.

³⁷ Tu, March 2001.

³⁸ According to the OPCW, CWPFs declared worldwide as of May 2001 included: Bosnia and Herzegovina and the Federal Republic of Yugoslavia each declared the same facility (one total); China: 2; France: 6; India: 3; Iran: 2; Japan: 1; Russian Federation: 24; UK: 8; US: 13; South Korea: 1.

³⁹ Ji Xueren, Yu Yifeng, and Wen Jian, “1998 Nian Huaxue Caijun Xingshi Fenxi” [“An Analysis of the Situation with Regard to Chemical Disarmament in 1998”], *Fanghua Xuebao* [Journal of Chemical Defence] 9 (February 1999), p. 65.

⁴⁰ Ministry of Foreign Affairs (MFA) officials, interviews with author, Beijing, China, March 2001.

⁴¹ Yu Zhongzhou in Liu, ed., *Arms Control and Disarmament Handbook*, p. 325.

⁴² Shuiting and Zhiyuan, p. 14.

⁴³ U.S. Department of Defense (DOD), Office of the Secretary of Defense, *Proliferation: Threat and Response*, January 2001, p. 15., <<http://www.defenselink.mil/pubs/ptr20010110.pdf>>.

⁴⁴ *Ibid.*

⁴⁵ From various photographs and video of Chinese training exercises, it is apparent that Chinese CW defenses are not conducted at a level that would inspire much confidence. See, for example, video *Duhai Denglu Dayanxi* [Large-scale Amphibious Exercises] (1996-1999), sold by a subsidiary video enterprise of the PLA, Beijing.

⁴⁶ Asia-Pacific Economic Cooperation (APEC), *Economy Report*, 2000.

⁴⁷ Shuiting and Zhiyuan, p. 45.

⁴⁸ For the range of the Su-27, see “Aviation Top 100: Sukhoi Su-27 Flanker,” *CombatAircraft.com*, <<http://www.combataircraft.com/aircraft/fsu27.asp>>. See also Frank Moore, “China’s Military Capabilities,” IDDS Policy Studies No. 2, June 2000, <<http://www.idds.org/chinasmil.html>>. Moore notes, “IDDS estimates that the inventory of Chinese combat aircraft on 1 January 2000 includes the following: 1900 J-6/MiG-19 (all roles and models: fighter, reconnaissance, trainer); 720 J-7/MiG-21 (all roles and models: fighter, reconnaissance, trainer); 222 J-8I/II/III; 55 J-11/Su-27SK; 440 Q-5 (modified MiG-19); 307 H-5/Il-28; and 142 H-6/Tu-16. Small numbers of JH-7s (fewer than 12) and K-8s (10-15) may also be in service.”

⁴⁹ Yefim Gordon and Dmitriy Komissarov, “Two-seat Naval ‘Flanker,’” *World Airpower Journal* 39 (Winter 1999), pp. 20-21.

⁵⁰ The Ukrainian *Varyag* is reportedly becoming a casino/hotel off Macao.

⁵¹ Lu and Yang, eds., *Huaxue wuqi yu zhanzheng*, p. 232.

⁵² Herman Ochsner, *History of German Chemical Warfare in World War II, Part I* (Washington, D.C.: Office Chief of Chemical Corps, 1949), p. 35.

⁵³ See Michael R. Gordon, “China Buildup Has Taiwan on Edge,” *New York*

Times, April 8, 2001, p. 1: "American intelligence officials estimate that there are about 300 CSS-6 and CSS-7 missiles, which have the range to blanket the island. Taiwanese military officials put the number of missiles higher, at 400 or more. The main targets would be Taiwan's radars, command posts, airfields, ports, fuel depots and power plants."

⁵⁴ Wu Guoqing and Zhou Chengxi, "Environment and Countermeasures in Chemical Defense in a Border Counterattack Campaign in the Cold Mountainous Regions," *Fanghua Xuebao* 9 (June 2000), pp. 39-44.

⁵⁵ Video footage, *Zhongguo Jundui [China's Military]* (Beijing: PLA Press, 1999). This particular video footage was taken probably sometime around 1996. A version of this mine dispersal system can also be seen at the Military Museum in Beijing, China.

⁵⁶ Videos of amphibious training exercises were obtained from the PLA Press bookstore and Military Museum gift shop in Beijing, China, with footage dating from 1996-1999. Out of some 8 hours of military training and other documentary footage, only a few minutes showed any NBC defense training. See *Zhongguo Jundui 1-4*; and *Duhai Denglu Daxiaixi 1* (Beijing: PLA Press, 1999).

⁵⁷ Zhu Weiming, ed., *Big Dictionary of Nuclear, Chemical and Biological Protection* (Shanghai: Shanghai Dictionary Publishing, 2000), pp. 894-6.

⁵⁸ Rosita Dellios, *Modern Chinese Defense Policy* (New York: St. Martin's Press, 1990), p. 69.

⁵⁹ Shuiting and Zhiyuan, p. 38.

⁶⁰ Lu and Yang, eds., *Huaxue wuqi yu zhanzheng*, p. 167.

⁶¹ *Ibid.*, p. 174.

⁶² *Ibid.*, pp. 173, 175.

⁶³ Li Peijin and Liu Jie of the Beijing PLA Electronic Technology Academy [*Jiefangjun Dianzi Jishu Xueyuan*], "Status of Non-Lethal Weapons Research by Foreign Powers and Countermeasures," *Renmin Junyi, [People's Military]* 43, December 28, 2000, pp. 691-2, in FBIS CPP20010212000147, February 12, 2001.

⁶⁴ Zheng Zhengbing and Yang Qingzhao, "'Rendao Wuqi' bu Rendao" [Humane Weapons are Not Humane], *Zhongguo Guofangbao*, January 1, 2001, p. 3.

⁶⁵ Chen Jisheng, "Ershiyi Shiji Huasheng Wuqi ji Junkong Fazhan Fenxi," ["Analysis of Chemical and Biological Weapons in the 21st Century and Arms Control Developments"], *Fanghua Yanjiu [Chemical Defense Research]* 1, 2000, p. 45.

⁶⁶ Xia Zhiqiang and Wang Xiaochen, "Review of Progress of the Chemical Weapons Convention," *Fanghua Xuebao* 9 (December 1999), p. 71.

⁶⁷ Bates Gill, *Case Study 6: People's Republic of China*, p. 42.

⁶⁸ Liu Huaqiu, *China and the Neutron Bomb*, Occasional Paper, Center for International Security and Arms Control, Stanford University, 1988, p. 24.

⁶⁹ Photographs of selected Soviet chemical ordnance can be found in the 1997 book on CW. See Lu and Yang, eds., *Huaxue wuqi yu zhanzheng*. Hand grenade devices were described by Lang Zongheng as being CS (tear agent) type canisters in Lang Zongheng, *Specter of Terrorism: Historical Development of Chemical and Biological Weapons [Kongbu de Jingling—Shenghua Wuqi Famingshi]* (Beijing: PLA Press, 1999), inside photographs.

⁷⁰ Yu Zhongzhou in Liu, ed., *Arms Control and Disarmament Handbook*, p. 345.

⁷¹ Chen, "Ershiyi Shiji Huasheng Wuqi ji Junkong Fazhan Fenxi," pp. 44-48.

⁷² Authors Zhang Naishu and Yuan Junfeng are based in Xinjiang; Xiong Yuxiang is from the 17th instruction unit, Chemical Defense Engineering Command, Beijing, China. See "View from the Perspective of Xinjiang's Unique Environment, Constructing a Suitable Training System for Chemical Defense," *Fanghua Xuebao* 9 (March 2000), p. 43.

⁷³ Guoqing and Chengxi, "Environment and Countermeasures in Chemical Defense," p. 40.

⁷⁴ Lang Zongheng and Yu Youchun, *The 'Great Demons' of Mass Destruction [Shashangli Juda de 'Mowang']*, (Beijing: National Defense Technology University Press, 2000), p. 258.

⁷⁵ Han Dongjun, concluding remarks from a speech delivered at the ICD, in *Fanghua Xuebao* 9 (June 2000), p. 5.

⁷⁶ Shuiting and Zhiyuan, p. 97.

⁷⁷ Li Guang and Xie Deming, "Nuclear and Chemical Defense Problems while Counterattacking in the Cold Plateau Frontier Region," *Fanghua Xuebao* 9 (March 2000), p. 30.

⁷⁸ Shuiting and Zhiyuan, p. 97.

⁷⁹ Anthony T. Tu and Naohide Inoue, *Kagaku-Seibutsu Heiki Gairon [Chemical and Biological Weapons Survey]* (Tokyo: Jiho Press, 2000), p. 7.

⁸⁰ Bates Gill and Michael O' Hanlon, "China's Hollow Military," *National Interest* 56 (Summer 1999), <http://www.brook.edu/views/articles/ohanlon/1999natint_sum.htm>.

⁸¹ *Zhongguo Guofangbao*, November 24, 2000, p. 2.

⁸² Wu Zhiyun and Liu Ming: "China Has A 'Special Unit' Against Poison Gas: About the Anti-Chemical Warfare Medicine Special Unit of the Chinese Academy of Military Medical Science," *Jiefangjun Bao [PLA Daily]*, September 13, 2000, p. 10, in FBIS CPP20000914000057 (September 14, 2000).

⁸³ Song Taiping and Yang Xiuyun, "Ruhe Yingdui Kongxi, Shenzhen Zhengzai Zhubei" ["How Shenzhen is Prepared for Aerial Attack"], *Zhongguo Guofangbao*, December 18, 2000, p. 2.

⁸⁴ Yu Xinhua and Yang Qingzhen, eds., *Wuqi yu zhanzheng jishi congshu #13: Shengwu Wuqi yu Zhanzheng [Biological Weapons and Warfare]* (Beijing: Guofang Gongye Chubanshe, August 1997), p. 87.

⁸⁵ Hal Gold, *Unit 731 Testimony* (Tokyo: Yenbooks, 1996), p. 249.

⁸⁶ Liao Yunchang in Liu, ed., *Arms Control and Disarmament Handbook*, p. 368.

⁸⁷ Shi Hua, "PRC: Scholar Reveals Germ War During Japan's 'Aggression' in 1930s, 1940s," *Beijing Daily*, Internet (English) version, February 24, 2001, in FBIS, Document ID: CPP20010224000024 (February 24, 2001).

⁸⁸ Leitenberg, "Resolution of the Korean War Biological Warfare Allegations," pp. 169-94.

⁸⁹ *Ibid.*, p. 174.

⁹⁰ Not only did the United States gain little worthwhile knowledge from the deal, but some of the worst Japanese war criminals went unpunished. Ishii, for example, was never put on trial and died decades later of natural causes.

⁹¹ "Statement by Chou En-Lai," in *Stop U.S. Germ Warfare! Part 1* (Peiking: The Chinese People's Committee for World Peace, 1952), p. 6.

⁹² At the Military Museum in Beijing, the Korean War section includes a small panel of photographs and a remnant of what is purported to be a biological agent munition. In fact, the bomb was a rusted propaganda leaflet canister photographed elsewhere.

⁹³ Leitenberg, "Resolution of the Korean War Biological Warfare Allegations," pp. 169-94.

⁹⁴ Stephen Endicott and Edward Hagerman, *The United States and Biological Warfare: Secrets from the Early Cold War and Korea* (Bloomington, IN: Indiana University Press, 1999).

⁹⁵ Albert E. Cowdry, "'Germ Warfare' and Public Health in the Korean Conflict," *Journal of the History of Medicine and Allied Sciences* 39 (April 1984), pp. 153-172.

⁹⁶ *Ibid.*

⁹⁷ *Ibid.*, p. 163.

⁹⁸ John Ellis Van Courtland Moon, "Biological Warfare Allegations: The Korean War Case," *Annals of the New York Academy of Sciences* 666 (1992), p. 55.

⁹⁹ Ed Regis, *The Biology of Doom* (New York: Henry Holt and Company, 1999), p. 147.

¹⁰⁰ *Ibid.*, p. 164.

¹⁰¹ Cowdry, "'Germ Warfare' and Public Health," p. 166.

¹⁰² U.S. Army Forces, Far East, Chemical Office, *Status of Chemical, Biological and Radiological Warfare*, p. 1.

¹⁰³ Kung Fangui, "Fencui Xijunzhan" ["Smashing Bacteriological Warfare"], *Renmin Jundui [People's Military]*, October 19, 2000, p. 3.

¹⁰⁴ Yu and Yang, eds., *Shengwu Wuqi yu Zhanzheng*, p. vii.

¹⁰⁵ Ken Alibek, *Biohazard* (New York: Random House, 1999), p. 273.

¹⁰⁶ Wong Mei, "Biological Army Unit Does Research in Bacteriological Warfare, Making Profit of 1 Million Yuan Each Year," *Ming Pao* (Hong Kong daily with no English translation), December 27, 1994, p. A4, in JPRS-TAC-95-001.

¹⁰⁷ Academics in Taipei, Taiwan, conversation following Cross-Strait Interflow Prospect Foundation roundtable, fall 1999.

¹⁰⁸ Yen Yu-Chen et al., "Characteristics of Crimean-Congo Hemorrhagic [sic] Fever Virus (Xinjiang Strain) in China," *American Journal of Tropical Medicine and Hygiene* 34:6, p. 1169. Dr. Robert Shope assisted with the publication of this article and seems to concur with the possibility of a natural outbreak.

- CCHF is very unique, he reports, and requires a BL-4 laboratory (at least in the West).
- ¹⁰⁹ Researcher at the Shijiazhuang-based Institute of Military Medicine, letter to the author, dated May 10, 2001.
- ¹¹⁰ Yu and Yang, eds., *Shengwu Wuqi yu Zhanzheng*, p. viii.
- ¹¹¹ U.S. DOD, *Proliferation: Threat and Response*, p. 15.
- ¹¹² Zhu Kewen, Gao Zixian, and Gong Chun, eds., *Zhongguo Junshi Yixueshi* (Beijing: Renmin Junyi Chubanshe, 1996), p. 521.
- ¹¹³ Chinese publications offer complete reviews of BW agents and their applicability to warfare. For one example, see Yu Shurong and Jin Renjie, eds., *Fangshengwuzhan Yixue [Anti-Biological Warfare Medicine]* (Shanghai: Shanghai Kexue Jishu Chubanshe [Shanghai Science and Technology Publishing], 1986), pp. 6, 11.
- ¹¹⁴ Chinese Biological and Toxins Weapons Convention (BWC) declarations for 1996, Conference on Disarmament, Geneva, Switzerland.
- ¹¹⁵ The author received a letter from a researcher at the Institute of Military Medicine, Beijing Military Region [Shijiazhuang], who described the institution as one that focuses on studying infectious disease.
- ¹¹⁶ Wong, "Biological Army Unit Does Research."
- ¹¹⁷ Zheng Lingqiao, "China Becomes World's Largest Vaccine-Producing Nation," *Jian Kang Bao* [Health Report], April 26, 1994, in JPRS-CST-94-014.
- ¹¹⁸ "Albright Warns of Chinese BW," *Iran Brief*, February 5, 1997, p. 10.
- ¹¹⁹ Bates Gill, *Case Study 6: People's Republic of China*, p. 32.
- ¹²⁰ Kenneth Munson, ed., *Jane's Unmanned Aerial Vehicles and Targets*, Issue 15 (Surrey, UK: Jane's Information Group, December 2000), pp. 20-25.
- ¹²¹ Zhu, Gao, and Gong, eds., *Zhongguo Junshi Yixueshi*, p. 516.
- ¹²² Table by Li Yimin in Liu, ed., *Arms Control and Disarmament Handbook*, p. 363.
- ¹²³ Zhu, Gao, and Gong, eds., *Zhongguo Junshi Yixueshi*, p. 517.
- ¹²⁴ This table was provided to the author by a security specialist in Taipei, April 2001.
- ¹²⁵ The significance of *Shayan* is not clear.
- ¹²⁶ Yu and Yang, eds., *Shengwu Wuqi yu Zhanzheng*, p. 280.
- ¹²⁷ Chen Ningqing, "*Shengwu Wuqi de Fanghu*" [Defense Against Biological Weapons], in *Hai, Lu, Kongtian* [For Ship, Armour, Aircraft, Spacecraft & Weaponry] (March-February 2001), p. 33.
- ¹²⁸ See Liu, ed., *Arms Control and Disarmament Handbook*. Except for the addition of two characters for "toxin," this paragraph is a word-for-word repetition from Pan, *Guoji Caijun yu Junbei Kongzhi*, p. 180.
- ¹²⁹ Pan, *Guoji Caijun yu Junbei Kongzhi*, p. 411.
- ¹³⁰ *Ibid.*
- ¹³¹ Entry by Zhao Jingceng in Liu, ed., 2000, pp. 65-6.
- ¹³² Pan, *Guoji Caijun yu Junbei Kongzhi*, p. 177.
- ¹³³ *Ibid.*, pp. 433-4.
- ¹³⁴ *Ibid.*, p. 61.
- ¹³⁵ Swaine and Johnston, p. 92.
- ¹³⁶ Pan, *Guoji Caijun yu Junbei Kongzhi*, p. 6.
- ¹³⁷ Shen Fangwu, "*Qianxi Guoji Fangkuosuan Jizhi*" [An Overview of International Nonproliferation Mechanisms], *Fanghua Xuebao* 9 (February 1999), pp. 71-74.
- ¹³⁸ John Pomfret, "China Threatens Arms Control Collapse; Top Negotiator Says Missile Defense Puts Treaties at Risk," *Washington Post*, July 14, 2000, p. A1.
- ¹³⁹ Ambassador Sha Zukang, "US Missile Defence Plans: China's View," *Disarmament Diplomacy* (January/February 2000), No. 43, <<http://www.acronym.org.uk/43usnm.htm>>.
- ¹⁴⁰ Pan, *Guoji Caijun yu Junbei Kongzhi*, p. 11.
- ¹⁴¹ "Liu Huaqiu and Zheng Hua, who work for the Program on Arms Control and Disarmament at China's Defense Science and Technology Information Center, emphasize Asia's lack of tradition in arms control and disarmament as an impediment to nonproliferation," in *Aviation Week and Space Technology* 147, August 4, 1997, p. 46.
- ¹⁴² Pan, *Guoji Caijun yu Junbei Kongzhi*, pp. 11-12.
- ¹⁴³ *Ibid.*, p. 11.
- ¹⁴⁴ *Ibid.*, p. 424.
- ¹⁴⁵ *Ibid.*, p. 75.
- ¹⁴⁶ Li Weimin in Liu, ed., *Arms Control and Disarmament Handbook*, p. 328.
- ¹⁴⁷ Swaine and Johnston, p. 111.
- ¹⁴⁸ Meeting at the Chinese National Defense University in Beijing, March 2001.
- ¹⁴⁹ Yu Zhongzhou in Liu, ed., *Arms Control and Disarmament Handbook*, p. 323.
- ¹⁵⁰ See Organization for the Prohibition of Chemical Weapons, <<http://www.opcw.nl>>.
- ¹⁵¹ *Ibid.*
- ¹⁵² Pan, *Guoji Caijun yu Junbei Kongzhi*, p. 167.
- ¹⁵³ Swaine and Johnston, pp. 92, 111.
- ¹⁵⁴ Foreign Ministry Affairs officials, meeting with author, Beijing, China, March 2001.
- ¹⁵⁵ Chen Jisheng graduated in chemistry at Tsinghua University in 1953 and was formerly the nominal director of the Research Institute of Pharmaceutical Chemistry, P. O. Box 1044, Beijing, China, 102205. Dr. Anthony T. Tu reports that Dr. Chen has retired.
- ¹⁵⁶ Chen, "21 *Shiji Huasheng Wuqi ji Junkong Fazhan Fenxi*," p. 46.
- ¹⁵⁷ For the current view of the United States government on Chinese compliance, see text accompanying note 111.
- ¹⁵⁸ Swaine and Johnston, p. 111.
- ¹⁵⁹ Xinhua Domestic Service, January 16, 2001.
- ¹⁶⁰ As of 2000, Wu Tingman was director of the Shanghai CWC Implementation Office; Hubei province has its implementation office established at the Hubei Provincial Petrochemical Industry Bureau; Chongqing, which is becoming yet another mega-city, has its implementation office in the Chief Director, Pan Jikui, Chongqing Chemical Industry Bureau, etc.
- ¹⁶¹ Sun Mei, Liu Jingjin, and Zhu Zhen'ai, "Overview of the Testing of Samples for the Seventh in Standards for the OPCW," *Fanghua Yanjiu* 3 (2000), p. 25.
- ¹⁶² *Ibid.*, p. 27.
- ¹⁶³ Wang Zijiu and Chen Xuefeng, "Cao Gangchuan Buchang Shicha Woyuan Yisuo," [Chief Cao Gangchuan Inspects Our Academy-Institute], *Fanghua Yanjiu* 1 (2000), p. 3 (inside cover).
- ¹⁶⁴ U.S. DOD, Office of the Secretary of Defense, *Proliferation: Threat and Response*, p. 15.
- ¹⁶⁵ Deng and Evans, p. 102.
- ¹⁶⁶ Sha Zukang, "Next Steps," *OPCW Synthesis* (May 2000), p. 13.
- ¹⁶⁷ Deng and Evans, p. 104.
- ¹⁶⁸ Chinese nuclear arms control expert, discussion with the author, Beijing, China, March 2001.
- ¹⁶⁹ Usually rounded up to 700,000. Ji Xueren, Yu Yifeng and Wen Jian, "1998 *Nian Huaxue Caijun Xingshi Fenxi*," ["Analysis of the Situation with Regard to Chemical Disarmament: 1998"] *Fanghua Xuebao* (February 1999), p. 70.
- ¹⁷⁰ "Japan, PRC Draft Deal on Chemical Weapons Cleanup," Tokyo Kyodo news service (English version), May 7, 1999, transcribed in FBIS Document ID FTS19990507000725 (May 7, 1999).
- ¹⁷¹ "Japan May Miss Deadline for Removing Chemical Arms in China," Jiji Press Ticker Service, November 6, 1998.
- ¹⁷² "Japan Ends Chemical Weapon Removal in China's Beian," Tokyo Kyodo news service (English version), September 27, 2000, transcribed in FBIS Document ID JPP200092700099 (September 27, 2000).
- ¹⁷³ Abandoned CW found in Nanjing included a substantial amount of diphenylcyanoarsine. Francois Tremblay, "China's Chemical Weapons Cleanup," *Chemical & Engineering News* 75 (June 2, 1997), p. 30.
- ¹⁷⁴ In Liu, ed., *Arms Control and Disarmament Handbook*, p. 360.
- ¹⁷⁵ James H. Lewis III, *Handshake with the Dragon: Engaging China in the Biological Weapons Convention*, Masters thesis, Naval Postgraduate School, Monterey, California, June 1998, pp. 47-48.
- ¹⁷⁶ Pan, *Guoji Caijun yu Junbei Kongzhi*, p. 52.
- ¹⁷⁷ *Ibid.*, p. 182.
- ¹⁷⁸ Representative from the Chinese MFA Arms Control and Disarmament Department, meeting with author, Beijing, China, April 2001.
- ¹⁷⁹ Bryan Bender, "Step Up Weapons Research, Urges DoD's Chief Scientist," *Jane's Defence Weekly* 30, November 11, 1998, p. 14.
- ¹⁸⁰ Chen, "*Ershiyi Shiji Huasheng Wuqi ji Junkong Fazhan Fenxi*," p. 44.
- ¹⁸¹ Dr. Mark Hans, letter to author, dated April 26, 2001.
- ¹⁸² The original English quote was: "'We need to look at new weapons, especially for troops in the field, that will be needed 20 years down the road,' Hans Mark, the DoD's director of defense research and engineering (DDR&E), said on 4 November. . . He believes that electromagnetic guns 'could very well be a

decisive weapon' in the future, capable of defeating the gamut of armored vehicles, including those with explosive reactive armour, with dramatically faster muzzle velocities." In Bender, "Step Up Weapons Research," p. 14.

¹⁸³ Bian Hongxing, "Bi Hedan Gengkepa de Jiyin Wuqi" ["Even More Frightening than Nuclear Bombs: Genetic Weapons"], *Renmin Jundui*, March 8, 2001, p. 4.

¹⁸⁴ Judith Miller, Stephen Engelberg, and William Broad, *Germ: Biological Weapons and America's Secret War* (New York: Simon & Schuster, 2001), pp. 295-298.

¹⁸⁵ Chinese MFA officials, April 2001.

¹⁸⁶ *Ibid.*

¹⁸⁷ See Liao Yunchang's entry in Liu, ed., *Arms Control and Disarmament Handbook*, December 2000, pp. 369-370.

¹⁸⁸ Chinese MFA officials, April 2001.

¹⁸⁹ Li Yimin, in Liu, ed., *Arms Control and Disarmament Handbook*, December 2000, p. 358.

¹⁹⁰ Lewis, *Handshake with the Dragon*, p. 48.

¹⁹¹ Pan, *Guoji Caijun yu Junbei Kongzhi*, p. 194.

¹⁹² *Ibid.*, p. 193.

¹⁹³ "China, Iran Oppose Ban on Biological Weapons," UPI news service, May 9, 2001.

¹⁹⁴ U.S. DOD, Office of the Secretary of Defense, *Proliferation: Threat and Response*, p. 18.

¹⁹⁵ "Special Dispatch: China Reportedly Purchases 500 Tonnes of Sarin Toxin from Ukraine for Secret Manufacture of Chemical Weapons in Preparations Against Taiwan," *Ping Huo Jih Bao [The Apple]* (Hong Kong), March 3, 1997, translated in FBIS-CHI-97-062.

¹⁹⁶ The *Yin He* episode has been included in a list of Chinese grievances, which also include the bombing of the Chinese embassy in Belgrade in 1999 and the surveillance aircraft incident in April 2001, all mentioned together in Chinese government leaning publications. See, for example, Shan Min, "Clues Gradually Emerge on US 'Strategic War' against China," *Ta Kung Pao [Da Gong Bao]*, no English translation, May 1, 2001, translated in FBIS CPP20010501000056 (May 1, 2001).

¹⁹⁷ Liu Yegang, "The Whole Story of the 'Yinhe' Incident," Beijing Xinhua news service, September 5, 1993, translated in JPRS-TND-93-029, p. 4.

¹⁹⁸ Thionyl chloride is produced at the Shanghai Pudong, Shanghai Caowang, and Chongqing chemical factories. See *Huagong Chanpin Guoji Maoyi Wushi Shouce [Handbook on Practices in Chemical Engineering and Their Products in International Trade]* (Beijing: Huaxue Gongye Chubanshe, July 1997), p. 234.

¹⁹⁹ Patrick E. Tyler, "No Chemical Arms Aboard China Ship," *New York Times*, September 6, 1993, p. 4.

²⁰⁰ *Ibid.*

²⁰¹ Yu Zhongzhou in Liu, ed., *Arms Control and Disarmament Handbook*, p. 351.

²⁰² *Ibid.*

²⁰³ Testimony by Robert Einhorn, Deputy Assistant Secretary of State for Nonproliferation, before the Senate Governmental Affairs Committee, International Security, Proliferation, and Federal Services Subcommittee, *Regarding Weapons Proliferation in China*, April 10, 1997.

²⁰⁴ *Ibid.*

²⁰⁵ Tyler, p. 4.

²⁰⁶ Li Daguang, "Economic Security in View of 'Yinhe' Incident," *Xiandai Junshi [Conmilit]*, No. 255, April 11, 1998, pp. 27-28, translated in FBIS Document ID FTS19980507000373 (May 7, 1998).

²⁰⁷ Liu Yegang, "The Whole Story of the 'Yinhe' Incident," *Beijing Xinhua*, September 5, 1993, p. 4.

²⁰⁸ *Ibid.* (emphasis added).

²⁰⁹ Yu Zhongzhou in Liu, ed., *Arms Control and Disarmament Handbook*, p. 332.

²¹⁰ *Huagong Chanpin Guoji Maoyi Wushi Shouce*, p. 20.

²¹¹ R. Jeffrey Smith, "Chinese Firms Supply Iran with Gas Factories, US Says," *Washington Post*, March 8, 1996, p. A26.

²¹² Bill Gertz, "China Sold Iran Missile Technology," *Washington Times*, November 21, 1996, p. A14.

²¹³ Einhorn, Testimony before the U.S. Senate, April 10, 1997.

²¹⁴ "US Imposes CW Sanctions against Chinese Entities," Statement by State

Department spokesman Nicholas Burns, May 22, 1997, <<http://www.fas.org/news/china/1997/chinacw.htm>>. The names of the Chinese citizens were Liao Minglong, Tian Yi, Chen Qingchang (aka Q.C. Chen), Pan Yongming, Shao Xingsheng; the Chinese companies named were Nanjing Chemical Industries Group and the Jiangsu Yongli Chemical Engineering and Technology Import and Export Corporation. The Hong Kong company named was Cheong Yee Limited.

²¹⁵ "China Clamps Down on its CW Tradings," *Jane's Defence Weekly*, January 7, 1998, p. 5. Although the *Yin He* affair received considerable attention, the 1997 allegations are not found in Liu Huaqiu's new book on arms control, *Arms Control and Disarmament Handbook*.

²¹⁶ U.S. Central Intelligence Agency, *Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 July Through 31 December 1999* (Washington DC: U.S. Government Printing Office, August 2000), <http://www.cia.gov/cia/publications/bian/bian_aug2000.htm>.

²¹⁷ Phosphorus pentasulfide is the starting material for the organophosphate pesticides bensulide, fonofos, thiazopyr, among others. Thomas A. Unger, *Pesticide Synthesis Handbook* (Park Ridge, New Jersey: Noyes Publications, 1996), p. 1045.

²¹⁸ *Renmin Ribao*, June 15, 1998 (mainland edition).

²¹⁹ Iran Nonproliferation Act of 2000, P.L. 106-178. See *Federal Register* 66, No. 123, June 26, 2001 (notices). This includes a wide variety of proliferation-related items that would be actionable, including nuclear, chemical, biological, and missile-related technologies. While the Australia Group lists were to be applied, the law also includes items "if they were United States goods, services, or technology prohibited for export to Iran because of their potential for a material contribution to the development of nuclear, biological, or chemical weapons, or of ballistic missile" programs.

²²⁰ Telephone interview with State Department official, Office of Chemical, Biological and Missile Nonproliferation, June 27, 2001.

²²¹ U.S. Department of State Press Release, "China—Nonproliferation Sanctions Imposed on Chinese Entities," January 25, 2002, <<http://usinfo.state.gov/topical/pol/arms/02012503.htm>>; and *Federal Register* 67, No. 16, January 24, 2002.

²²² U.S. CIA, *Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 January Through 30 June 2001* (Washington, DC: U.S. Government Printing Office, January 2002), <http://www.cia.gov/cia/publications/bian/bian_jan_2002.htm>.

²²³ "Export Licensing Measures on Materials Used in the Manufacture of Chemical and Biological Weapons," Australia Group document, May 1999.

²²⁴ *Ibid.*

²²⁵ *Ibid.*

²²⁶ Sha, "Next Steps," p. 13.

²²⁷ Western analyst (name withheld upon request), interview with author, Zurich, Switzerland, March 2001.

²²⁸ See for example William K. Rashbaum, "Terror Master Sought Chem Arms," *Daily News* (New York), November 19, 1998, p. 6; and "Defense Ministry Denies Developing Weapons of Mass Destruction Claim," *Taipei Times*, December 17, 2000, <<http://www.taipetimes.com/news/2000/12/17/story/0000065853>>.

²²⁹ Tony Banks, "Fighting to Stem the Tide," *Jane's Defence Weekly* 14, No. 2, July 14, 1990, p. 51.

²³⁰ "Military Spokesman Denies Chemical Weapon Development," *Tzu-Li Wan-Pao [Evening Independent]* (Taipei), September 23, 1997, p. 4, in FBIS FTS19970930000795 (September 30, 1997).

²³¹ "Taiwan Pledges Not to Manufacture, Use Chemical Weapons," Agence France Presse, April 12, 2000, <<http://taiwansecurity.org/AFP/AFP-041200.htm>>.

²³² "Taiwan: Missile Profile," *Risk Report* 4 (November-December 1998), Wisconsin Project, <<http://www.wisconsinproject.org/countries/taiwan/missiles.html>>.

²³³ Analyst from the Chemical and Material Industry Intelligence Division, Industrial Technology Research Institute, interview with author, Taipei, Taiwan, April 2001.

²³⁴ Ian Johnson, "Taiwan Tries to Stand Tall; But Residents Rush to Secure Property; Some Prepare to Flee," *Baltimore Sun*, March 9, 1996, p. 1.

²³⁵ See the website for the Chung-Shan Institute of Science and Technology,

Chemical Systems Research Division, <<http://www.csistdup.org>>.

²³⁶ Rashbaum, "Terror Master Sought Chem Arms," p. 6; and "Defense Ministry Denies Developing Weapons of Mass Destruction Claim," *Taipei Times*.

²³⁷ U.S. Arms Control and Disarmament Agency, *Adherence to and Compliance with Arms Control Agreements: 1997 Annual Report to Congress*, <<http://www.acda.gov/reports/annual/com.p.97.htm>>.

²³⁸ See, for example, Rashbaum, "Terror Master Sought Chem Arms," p. 6; and "Defense Ministry Denies Developing Weapons of Mass Destruction Claim," *Taipei Times*.

²³⁹ Bates Gill, *Case Study 6: People's Republic of China*, p. 28.

²⁴⁰ Steve Goldstein, "U.S. Could Face New Terror Tactic: Agricultural Warfare," *Philadelphia Inquirer*, June 22, 1999, p. 1.

²⁴¹ Dr. Yang Pingzheng, Deputy Director, Pig Research Institute, interview with author, Taipei, Taiwan, April 2001.

²⁴² Fang Ch'ing Ch'uan, "T'song Koutiyi T'an Yangchu Chengt'se" ["Policy with Regard to Raising Swine Since Foot and Mouth Disease"], *Nongmu Hsunkan [Livestock Magazine]*, No. 1265, September 25, 1999, p. 43.

²⁴³ "Taiwan Denies Permission for UN Arms Inspection Group," *Agence France Presse*, May 12, 1999.

²⁴⁴ These include the following publications: *The Implementation of Chemical Weapons Convention in Taiwan, R.O.C.*, September 2000 (12 page, full-sized brochure); *Plan for Strategic Implementation of [the] Chemical Weapons Convention, 2000* (12 page bulletin); and a six volume set of introductory handbooks on the CWC, totaling approximately 600 pages.

²⁴⁵ There are four or five companies in Taiwan dealing with these chemicals, including phosgene, HCN (primarily as a by product of acrylonitrile production), ethanalamine, and a large volume of phosphorus trichloride, which is used to manufacture fine chemicals, flame retardants, pesticides, etc. Jack C. Chang, Ph.D., interview with author, Chemical and Material Industry Intelligence Division, Industrial Technology Research Institute, Taipei, Taiwan, April 2001.

²⁴⁶ "Mei Yizhuan Taiwan 14 Xiang Huaxuepin Jishu," Taiwan News Service, June 23, 1999.

²⁴⁷ The head of the OPCW External Affairs department at the time was Huang Yu, a mainland Chinese.

²⁴⁸ Taiwanese analysts from the Chemical and Material Industry Intelligence Division Industrial Technology Research Institute, interview with author, Taipei, Taiwan, April 2001.

²⁴⁹ *Ibid.*

²⁵⁰ Entry by Chao Jingceng, in Liu, ed., *Arms Control and Disarmament Handbook*, p. 67.

²⁵¹ Pan, *Guoji Caijun yu Junbei Kongzhi*, p. 424.

²⁵² *Xinhua* reported: "China has about 700 million pigs and 300 million heads of cattle and sheep. Its Ministry of Agriculture has confirmed that the country is free of FMD." See "Chinese Scientists Claim Developing Vaccine for Foot-and-Mouth Disease for Pigs," *Beijing Xinhua*, March 21, 2001, transcribed in FBIS CPP20010321000106 (March 21, 2001).

²⁵³ *Ibid.*, p. 184.