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Unit 731 and the Japanese Imperial Army's Biological Warfare Program

Keiichi Tsuneishi

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By Tsuneishi Keiichi

Translated by John Junkerman

[*Japan's Unit 731 remains central to the fiercely contested China-Japan controversy over war crimes and war memory, and to the international debate on science and ethics. With a staff of more than 10,000, including many of Japan's top medical scientists, 731 and its affiliated units conducted human experiments, including vivisection, on Chinese and other victims in Manchukuo and throughout China between 1933 and 1945. The experiments tested, among other things, the lethality of biological weapons and sought to determine the ability of the human body to survive in the face of various pathogens and in conditions such as extreme cold.*

Tsuneishi Keiichi is Japan's leading specialist on biowarfare. His voluminous studies conducted over thirty years in Japan, China, the United States and Europe, have provided core material for all writing hitherto on the Ishii Network. In the following careful resumé essay, he concentrates on organization and function, omitting much of the horrific detail covered elsewhere. Drawing on Japanese military records, this study documents the deaths of 850 victims in the years up to 1943, the largest number infected with plague, cholera, and epidemic hemorrhagic fever. It also makes use of American records and interviews.

Unit 731 not only conducted tests but also led the way in waging biological warfare on numerous occasions throughout the war, the best documented being attacks on Ningbo and throughout Zhejiang province. As in the case of the Nanjing Massacre and the "comfort women," casualty figures remain contested. The figure of 3,000 persons exterminated at Pingfan, the major experiment site of the Ishii Network, is widely accepted among specialists for the period ending in 1945. The post-surrender destruction by the Japanese authorities both of the research sites and the military documents, has made precise casualty estimates difficult.

As Tsuneishi documents, attacks in Zhejiang resulted in more than 10,000 Japanese military casualties including the death of 1,700 Japanese soldiers, revealing the difficulty of waging effective biowarfare. No estimate is provided here of Chinese deaths. a reminder of contemporary practice in providing only American body counts in Iraq, but also of the difficulty of establishing Chinese casualties.

Japan's grim experiment with biowarfare pales in comparison with the estimated 10-30 million Chinese who died as a result of war and associated conditions of famine in the years 1931-45. But the findings of Ishii and his colleagues were important enough for American authorities to grant immunity from prosecution in exchange for evidence of the research findings of Unit 731. The 731 scientists, who were evacuated to Japan prior to the defeat, continued their careers as eminent figures in the postwar medical and scientific establishment. ms]

The Ishii Network

Unit 731 was the common name of a secret unit of Japan's Manchuria-based Kwantung Army whose official name was the Epidemic Prevention and Water Supply Department. [1] The leader of the unit was Ishii Shiro, who held the rank of lieutenant general at the end of World War II. The unit epitomized the extensive organization for the development of biological weapons within the imperial army, which was referred to, beginning in the late 1930s, as the Ishii Network.

The network itself was based at the Epidemic Prevention Research Laboratory, established in 1932 at the Japanese Army Military Medical School in Tokyo. Unit 731 was the first of several secret, detached units created as extensions of the research lab; the units served as field laboratories and test sites for developing biological weapons, culminating in the experimental use of biological weapons on Chinese cities. The trial use of these weapons on urban populations was a direct violation of the 1925 Geneva Protocol, which outlawed the use of biological and chemical weapons in war. It was also understood by those involved that the use of human subjects in laboratory and test site experiments was inhumane. This was why it was deemed necessary to establish Unit 731 and the other secret units.

Lt. General Ishii Shiro

The Epidemic Prevention Research Laboratory was created under the initiative of Ishii Shiro after he returned from two years of field study of American and European research facilities. It was set up, with the approval of top-level army authorities, as a facility to develop biological weapons. It is said that Ishii first became convinced of the need to develop biological weapons with the signing of the Geneva Protocol in 1925.

The biological weapons Ishii sought to develop had humans as their target, and Unit 731 was established with this goal in mind. In order to produce biological weapons as quickly as possible, Ishii considered it essential to have a human experimentation site at the disposal of his research laboratory. Japan had occupied northeastern China and in 1932 the puppet state of Manchukuo was established. Within this "safe zone," Ishii set up what was called the Togo Unit, based in the village of Beiyinhe, about 100 kilometers south of Harbin. Human experimentation began there in the fall of 1933. The Togo Unit was a secret unit under the vice chief of staff of the Kwantung Army. It was set up to determine whether it was possible to conduct human experiments in northeastern China, and if it was possible, whether the experiments would produce useful results.

The launching of this feasibility study reflects the deliberate nature of Ishii as the organizer of the research, and you could say it was marked with his character. All of those involved in this research and development were military doctors, but they all used false names. At this stage, the scale of the project involved about ten doctors, along with a staff of about one hundred.

The Inauguration of Unit 731

Unit 731 was officially established in 1936. Its establishment is reflected in a memo dated April 23, 1936, entitled "Opinion Regarding the Reinforcement of Military Forces in Manchuria," from the chief of staff of the Kwantung Army to the vice minister of the Ministry of War (contained in the Ministry of War Journal for the army in Manchuria, Rikuman Mitsu-dainikki). Under the heading "Establishment and Expansion of the Kwantung Army Epidemic Prevention Department," the memo states that the department will be "newly established" in 1936 and "one part of the department will be expanded in fiscal 1938." This is the oldest official document concerning Unit 731 that has been found to date.

In addition to inaugurating Unit 731, this memo also laid the foundation for establishing two other units. It called for the establishment of an additional biological weapons development unit, independent of Ishii's unit, which was called the Kwantung Army Military Horse Epidemic Prevention Workshop (later referred to as Manchuria Unit 100), and for preparations to set up a chemical weapons development unit called the Kwantung Army Technical Testing Department (later referred to as Manchuria Unit 516).

Several months later, the memo's recommendations were approved by Emperor Hirohito, the two units were established, and preparations began for creating the Testing Department. The Ministry of War Journal for May 21, 1936 recorded this development under the heading. "Imperial Hearing on Military Force Improvement Consequent upon Budget Approval." The journal noted: "Units concerned with epidemic prevention: One unit each is established for epidemic prevention among humans and horses."

Having been officially established, Unit 731 moved its facilities from Beiyinhe to a newly established laboratory at a hospital in Harbin. This laboratory served as a front-line headquarters while the unit's permanent facilities were being built in Pingfan, outside of the city of Harbin. These facilities were completed and capable of conducting research in the fall of 1939, after the hostilities at Nomonhan (on the border between Manchuria and Mongolia) had ended.

With the construction of the Pingfan facilities, the primary research staff changed in composition from the military doctors of the Togo Unit to private-sector medical researchers affiliated with universities and other institutions. The first group to be posted to the unit was a team of eight assistant professors and instructors from Kyoto Imperial University in the spring of 1938. The group consisted of two bacteriologists, three pathologists, two physiologists, and one researcher specializing in experiments using animals. Within a year, a second group had arrived at the facility, and the research staff had expanded considerably. The prominence of researchers in pathology and physiology in the development of biological weapons reflected the need for specialized judgment in assessing the results of human experimentation.

The Unit 731 Building Reconstructed as a Museum at Pingfan

With the expansion of the war front throughout China after 1937, sister units affiliated with Unit 731 were established in major Chinese cities. These units were also called Epidemic Prevention and Water Supply Departments. (Unit 1855 was established in Beijing on February 9, 1938; Unit 1644 in Nanjing on April 18, 1939; and Unit 8604 in Guangzhou on April 8, 1939). Later, after Japan occupied Singapore a similar unit (Unit 9420) was established there on March 26, 1942. These affiliates comprised the scope of the Ishii network through the end of the war. As of the end of 1939 (that is, before the establishment of the Singapore unit), the network had a total staff of 10,045, of which 4,898 were assigned to the core units in Tokyo and Pingfan.

Human Experimentation

Human experimentation took place at all of the units of the Ishii network, but it was conducted systematically by Unit 731 and Unit 1644. Of these two, there are extant reports from a US Army survey of human experimentation by Unit 731, so the general outline of its program is known.

Exterior remains of Unit 731 at Pingfan

The following table was compiled from two sources: a report to US occupation authorities dated December 12, 1947 by Edwin Hill and Joseph Victor, concerning human experimentation by Unit 731 and related facilities; and a list of specimens brought back to Japan by a Unit 731 pathologist in July 1943. Aside from Ishii and another unit leader, Kitano Masaji, the names of individual researchers do not appear; they are identified as military personnel (M, primarily military doctors), (C) civilian technicians conducting research within the military, and (PT) part-time researchers working outside of the military.

The number of specimens reflects the number of subjects who died as a result of human experimentation as of July 1943. Consequently, the total number of victims of human experimentation at the time of Japan's surrender two years later would be higher than these figures. The figures also do not include victims of germ bomb tests at the Anda field test site or from other experiments.

Subject Researcher Total Specimens Medically Usable Specimens

anthrax M 36 31
botulinus Ishii 2 0
brucellosis Ishii, M, C, M 3 1
CO poisoning 1 0
cholera C, C 135 50
dysentery M, M, PT, PT, M 21 12
glanders Ishii, C 22 20
meningitis Ishii, C 5 1
mustard gas 16 16
plague Ishii, C, M, C 180 42
plague (from the Shinkyo [Changchun] epidemic) 66 64
poison 2 0
salmonella M, C 14 11
Songo (epidemic hemorrhagic fever) C, Kitano, C 101 52
smallpox Ishii, C 4 2
streptococcus 3 1
suicide 30 11
tetanus Ishii, PT, C 32 14
tick encephalitis C, Kitano 2 1
tsutsugamushi (scrub typhus) C 2 0
tuberculosis C, Ishii 82 41
typhoid C, C 63 22
typhus C, M, C, Kitano, C 26 9
vaccine 2 2
Total 850 403

Technicians who were civilian employees of the army were treated as officers. The status of civilian employees ranged from infantry-class to general-class, but technicians were treated as lieutenants and above. Ranking below the technicians were operators, clerks, and staff. For the most part, the Ishii network took on university researchers as technicians. The part-time researchers were part-time employees of the Military Medical School Epidemic Prevention Research Laboratory; they were professors at Tokyo and Kyoto imperial universities who were contracted to perform research in their own laboratories. In short, a large number of civilian researchers were mobilized.

Biological Warfare Trials

For the most part, the use of the biological weapons developed by the Ishii network amounted to field trials.

The first of these trials took place during the Nomonhan Incident in 1939. In August, toward the end of the hostilities, pathogens that cause gastrointestinal disease were placed in the Holsten River, a tributary of the Halha River that the Soviet Army used as its source of water. It is not clear how many Soviet soldiers suffered from this attack, but it is thought that casualties were not widespread. This was because the typhoid bacillus and the other pathogens that were used lose their infectivity when placed in water. This fact was known to Ishii's group. It is thought that they nonetheless carried out the attack because they wanted to conduct a field test of biological weapons in combat. While there were likely few Soviet casualties, at least one Japanese soldier became infected when he spilled liquid from a drum filled with contaminated water while dumping it into the river. He died of typhoid fever at an army hospital in Hailar.

During the following year, 1940, larger scale field trials were conducted in central China, using biological weapons dropped from airplanes. The pathogens were cultivated by Unit 731 and shipped to Unit 1644 in Nanjing, which served as the forward base for the attacks, which continued until 1942. During the first two years, these attacks were carried out in cities along the Chang River. Of these, the large-scale attack on the city of Ningbo on October 27, 1940 is well documented and has also been thoroughly investigated by the Chinese.

The attack took place at 7 a.m. from heavy bombers flying a low-altitude run at 200 meters. The bombers dropped fleas, grain, and strips of cotton on the streets in the center of the city. The fleas were infected with the plague. They had ingested blood from plague-infected rats and were called "plague fleas." The plague bacteria were not dissipated directly, as it was considered more effective to infect the carrier fleas and release them, in order to target a specific area with a focused attack. It was also expected that the bacteria would live longer in the bodies of the fleas. The fleas were dropped with grain and cotton to ensure that they reached the target area, and it was also thought that the cotton would absorb some of the shock of impact on the ground.

The first death was recorded on the fourth day, October 30, and casualties increased rapidly in the days that followed. By November 2, it was clear that the disease was an epidemic, and the area was sealed off as disease-contaminated. The next day, it was determined that the disease was the plague. By then 37 deaths had been reported. The quarantine imposed on the area slowed the spread of the epidemic.

The plague epidemic ended on December 2 with the death of the last two victims. Deaths totaled 106 people. These figures were reported in a survey, conducted by two Ningbo researchers and published in March 1994 by Dongnan University Press. This historical account of the epidemic tracked down all of the victims and listed them by name, and it is thus a very valuable document.

This attack, killing more than one hundred people, was the most lethal in this series of attacks on Chinese cities. However, when one considers that the attack was carried out by heavy bombers on a risky low-altitude run, these results have to be considered a military failure.

There were two primary reasons for this failure. First, the bacteria used was so infectious that it immediately set off alarms among its victims. Second, the effort suffered from exaggerated expectations of the ability to artificially spark an epidemic. In February 1941 Ishii reported to his superior officer, Lt. Gen. Kajitsuka Ryuji, chief of the medical department of the Kwantung Army: "It is not as easy as some people think, and as I once thought, to deliberately spread infectious disease. While infectious disease spreads readily in natural circumstances, numerous obstacles are encountered when artificially spreading infection, and sometimes great pains must be taken to overcome these." [2] It was expected that pathogens dropped in a densely populated area like Ningbo would quickly spread person to person, but these expectations were betrayed.

Great Failures

In November 1940, the month after the attack on Ningbo, the Chinese began to take countermeasures in response to biological warfare attacks on urban populations. On November 28, the central Chinese city of Jinhua suffered an attack. The result was a failure. According to a Chinese Ministry

of Health document, “At the time that the plague epidemics were continuing in Ningbo and its vicinity, three Japanese airplanes flew over Jinhua and dropped a large number of small granules the size of small shrimp eggs. These strange objects were gathered and examined at a local hospital. . . . They showed the physical characteristics of the bacteria that cause the plague. In any case, the plague did not break out in Jinhua and as far as this town was concerned the Japanese experiment in germ warfare ended in failure.”

No effort was made to collect the material dropped from the airplanes on Ningbo, but one month later the objects dropped on Junhua were gathered and analyzed. There had been rapid progress in securing evidence in response to the attacks. It is also likely that townspeople were warned to stay inside their houses. As a result, the Japanese experiment was deemed a failure.

Biological weapons are not only useful as potent means of war; their use can also be accompanied by an important element of strategic disinformation, if it is claimed that the enemy itself used them, or if it is implied that they were used in retaliation. In this sense, when biological weapons are used, one tactic is to cause confusion as to whether they were used or not, but if the enemy deems the trial uses a failure, the tactic itself fails decisively.

Nonetheless, the trial use of biological weapons on central Chinese cities continued in the fall of 1941. One of the targets was the city of Changde, about 1000 kilometers east of Shanghai in the Chinese interior. The Chinese applied the lessons they learned the previous year and were able to keep casualties in the single digits. Thus the results of the trials through the end of 1941 indicated that dropping plague fleas from airplanes as a means of attacking urban areas was quite ineffective.

Beginning in 1942, Japan began dropping pathogens from airplanes into battlefield zones, on a scale that amounted to a combat operation. In April, Japan launched the Zhejiang campaign. In this campaign, Ishii and company carried out massive biological weapons attacks. Cholera bacteria was the main pathogen employed, and the attacks resulted in more than 10,000 casualties. It has also been reported that some victims contracted dysentery and the plague. More than 1700 soldiers died, mostly from cholera. This would have been considered a great success for the Ishii group, but for the fact that all of the victims were Japanese soldiers.

A Japanese medic captured by American forces at the end of 1944 described the casualties among the Japanese army during his interrogation: “When Japanese troops overran an area in which a [biological weapons] attack had been made during the Chekiang [Zhejiang] campaign in 1942, casualties upward from 10,000 resulted within a very brief period of time. Diseases were particularly cholera, but also dysentery and pest [bubonic plague]. Victims were usually rushed to hospitals in rear. … Statistics which POW saw at Water Supply and Purification Dept Hq at Nanking showed more than 1,700 dead, chiefly from cholera; POW believes that actual deaths were considerably higher, ‘it being a common practice to pare down unpleasant figures.’” [3]

A New Type of Bomb

After the 1942 failure, the Japanese army general staff lost all confidence in the efficacy of biological weapons. The pressure was on to find a new approach that would ensure the safety of friendly troops and deliver a more reliable, more devastating blow to the enemy.

The new approach developed was to pack the pathogens in bombs or shells, which would be dropped from airplanes or delivered by artillery. This would satisfy both of the requirements, to deliver massive carnage while maintaining the safety of the attacking troops. At the same time, the only way to prevent disasters like that of the Zhejiang campaign was to improve communication among the troops.

Two hurdles confronted the effort to load bombs with pathogens. The first was the need to keep the pathogens alive for long periods of time. The second was the need to develop a bomb made of materials that would break apart upon impact using little or no explosives; this would prevent the pathogen from being destroyed by heat. Alternatively, if a bombshell could not be made of fragile material, a pathogen that could withstand the heat of an explosion would have to be selected. When a bomb or a shell lands, people do not immediately gather at the point of impact, so it was necessary to convey the pathogen from that spot to wherever people were. Again a live host like a plague flea that would physically carry the pathogen and infect people was considered the best solution to this problem.

A bacteria bomb using the plague bacteria was developed to satisfy most of these requirements. The bomb used plague fleas packed in a shell casing of unglazed pottery made from diatomaceous earth (a soft, sedimentary rock containing the shells of microscopic algae). This same material was used in a water filter that Ishii had developed and patented. As this bomb would break apart using minimal explosive, it was expected that the plague fleas inside would survive the heat and scatter in all directions, to bite people and spread the disease. This bomb, called the Ishii bacterial bomb, was perfected by the end of 1944. In the beginning of 1945, the collection of rats went into high gear, and Unit 731 went to work cultivating fleas to be infected with the plague.

Japan’s Defeat

The main force of Unit 731 left the unit headquarters by train soon after the Japanese surrender and returned to Japan between the end of August and early September 1945. Some members of the unit and officers of the Kwantung Army were captured by the Soviet military. Twelve of these POWs were tried by the Soviet Union at a war crimes trial in Khabarovsk in December 1949. In addition to members of Unit 731, officers of the Kwantung Army and the army’s chief medical officer were also charged as responsible parties. All of those charged were given prison sentences ranging from two to twenty-five years, but aside from one man who committed suicide just before returning to Japan, all had been repatriated by 1956. The record of the Khabarovsk trial was published in 1950 as Materials on the Trial of Former Servicemen of the Japanese Army Charged with Manufacturing and Employing Bacteriological Weapons (Foreign Languages Publishing House, Moscow).

On the other hand, not one of the members of Unit 731 who returned to Japan was tried as a war criminal. Instead, the American military began investigating the unit in September 1945, and unit officers were asked to provide information about their wartime research, not as evidence of war crimes, but for the purpose of scientific data gathering. In other words, they were granted immunity from prosecution in exchange for supplying their research data. The American investigation continued through the end of 1947 and resulted in four separate reports. The investigation took place in two phases.

The first phase resulted in the Sanders Report (dated November 1, 1945) and the Thompson Report (dated May 31, 1946). These two reports contained information on the unit’s bacteria bombs, but did not address the subject of human experimentation or the trial use of biological weapons. Kitano Masaji, who was in Shanghai at the time of Japan’s surrender, was interrogated in January 1946, but he was instructed by Lt. Gen. Arisue Seizo, the Japanese chief of intelligence, that he should not talk about “human experimentation and biological weapons trials,” Kitano later told this writer. In other words, until that time, these two subjects had been effectively concealed.

4. Body disposal at Unit 731

However, at the end of 1946, American authorities received notice from the Soviets that they intended to try cases involving human experimentation and biological warfare. Ishii and others were interrogated again, and they confirmed the general content of the Soviet claims. The American investigation began anew, headed by new investigators. Two additional reports were produced: the Fell Report (dated June 20, 1947) and the Hill and Victor Report (dated December 12, 1947). These documents described the human experiments conducted by Unit 731 and its related units, based primarily on the interrogation of researchers involved in the experiments.

The Hill and Victor Report concludes with the following evaluation: "Evidence gathered in this investigation has greatly supplemented and amplified previous aspects of this field. It represents data which have been obtained by Japanese scientists at the expenditure of many millions of dollars and years of work. Information had accrued with respect to human susceptibility to those diseases as indicated by specific infectious doses of bacteria. Such information could not be obtained in our own laboratories because of scruples attached to human experimentation."

The above account makes clear the nature of the crimes committed by the Ishii Unit. At the same, it is necessary to question the responsibility of the American forces who provided immunity from prosecution in exchange for the product of these crimes.

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