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ARMY SERVICE FORCES
Camp Detrick
Frederick, Maryland

# REPORT

# ON

# JAPANESE BIOLOGICAL WARFARE (BW) ACTIVITIES

By

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# P R E F A C E

The investigation reported herein was made over the period from 11 January 1946 to 11 March 1946 in accordance with paragraph 1, Movement Orders, Shipment OO-Tokyo-AU, letter AGPO-A-O, 201 Thompson, Arvo T., (21 December 1946), The Adjutant General's Office, Washington 25, D. C., dated 26 December 1945.

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# S U M M A R Y

## JAPANESE BIOLOGICAL WARFARE (BW) ACTIVITIES

1. Extensive investigations in both the offensive and defensive phases of BW were conducted by the Japanese as a military activity. Japanese Naval interest in BW appears to have been limited to the defensive aspects.

2. BW research and development by the Japanese Army was influenced and directed mainly by Lt. Gen. Shiro Ishii. While Ishii maintained that no official directive existed for the prosecution of this activity and that it was conducted as a phase of military preventive medicine, it is evident from the progress that was made that BW research and development in all its phases was conducted on a large scale, and was officially sanctioned and supported by the highest military authority.

3. Alleged acts of BW sabotage by the Russians and Chinese with the necessity for development of defensive measures against such incidents were the reasons advanced by Ishii for Japanese committment to BW activity. Development of BW as an offensive weapon was never contemplated, he emphasized.

4. The Pingfan installation, located near Harbin, Manchuria, was the principal BW research and development center. Work in this field was also carried on in the Army Medical College in Tokyo. BW being a military activity and highly classified for security reasons, civilian scientists and facilities of civilian research institutes were not utilized for this activity.

5. The causative agents of typhoid and paratyphoid fevers, cholera, dysentery, anthrax, glanders, plague, tetanus and gas gangrene as well as filterable viruses and rickettsiae were considered as possible BW agents. Organisms for field trials were limited to nonpathogenic agents and to two agents pathogenic for both man and animals, B. anthracis (anthrax) and M. malleomyces (glanders).

6. Methods of dissemination of BW agents investigated by the Japanese included bombs, artillery shells, spray from aircraft, and sabotage. By far, the principal effort to develop an effective means of dissemination of infectious agents was devoted to bomb development. Nine aircraft bombs had been developed and tested for this purpose by 1940. They included bombs designed for ground contamination, production of infectious clouds, and fragmentation munitions for production of casualties by wound infection.

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7. Only a few preliminary experiments were conducted employing modified artillery shells as a BW munition. Dissemination by this means was considered impractical. The same conclusion was reached concerning aircraft sprays after a few preliminary experiments.

8. The Ha bomb and the Type 50 Uji bomb were considered to be the most effective of the munitions developed at Pingfan. While both bombs had several major defects, Ishii believed that, by correction of these defects and further improvement of these bombs by ordnance experts, they could be made into efficient BW munitions.

9. Intensification of measures in preventive medicine and water purification were considered by the Japanese as the most effective defense against BW. Fixed and mobile epidemic prevention and water purification units were responsible for the detection, prevention, and control of outbreaks of infectious diseases in the field. The Military Police (Kempei), in an auxiliary capacity, served as an intelligence organization for the surveillance of possible BW incidents, the collection of evidence, and the apprehension of saboteurs.

10. While definite progress had been made in offensive BW development, at no time was Japan in a position to employ BW as a practical weapon.

## CONCLUSIONS

It is the opinion of the investigating officer that:

1. The information regarding Japanese BW activities obtained from presumably independent sources was consistent to the point where it seems that the informants had been instructed as to the amount and nature of information that was to be divulged under interrogation.

2. All information was presumably furnished from memory since all records are said to have been destroyed in accordance with directives of the Japanese Army. Yet, some of the information, especially sketches of the bombs, was in such detail as to question the contention that all documentary evidence had been destroyed.

3. It was evident throughout the interrogations that it was the desire of the Japanese to minimize the extent of their activities in BW, especially the effort devoted to offensive research and development.

4. Failure to fully utilize Japanese scientific capability by restriction of BW research and development to the military with lack of cooperation between the military services precluded progress toward development of BW into a practical weapon.

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5. Had a practical BW weapon been achieved, it is unlikely that Japan would have resorted to its use because of fear retaliation by means of chemical warfare. Insofar as could be learned, Japan had no information of American activity in BW.

# REPORT ON JAPANESE BIOLOGICAL WARFARE ACTIVITIES

## 1. INTRODUCTION.

The initial investigation of Japanese Biological Warfare (BW) activities was made by Lt. Col. Murray Sanders and Lt. Harry Youngs of the Chemical Warfare Service as a part of the scientific and intelligence survey of Japan conducted by the Scientific and Technical Advisory Section, United States Army Forces, Pacific, during September and October 1945. Report of this investigation is contained in Volume 5, BIOLOGICAL WARFARE, 1 November 1945.

Subsequently, additional personnel associated with this activity became available for interrogation and were interviewed in Japan by personnel from WDIT Section, G-2, GHQ, AFPAC, and from the Chemical Warfare Service. The principal persons interviewed were Lt. Gen. Shiro Ishii and Lt. Gen. Masaji Kitano, former directors of the organization responsible for Japanese biological warfare research and development.

This report pertains mainly to the interrogation of Gen. Ishii and to the information obtained from him. Interrogation of Gen. Kitano and other persons did not add to this information but confirmed, in general, that obtained from Gen. Ishii. Only minor discrepancies were found in the information obtained from persons interviewed individually.

No documentary evidence of Japanese research and development in this field was found during the course of the investigation. All persons interviewed were consistent in their statements that such records had been destroyed, because of their top secret classification, in accordance with existing Army directives. The information obtained was, therefore, presumably from the memory of those interviewed.

Lt. Gen. Shiro Ishii, under whose influence biological warfare research was initiated and prosecuted in Japan, became available for interrogation in Tokyo on 17 January 1946. His whereabouts since the cessation of hostilities had been unknown until CIC sources located him in seclusion at his country home in Chiba prefecture. Upon request from the Counter Intelligence Corps, GHQ, AFPAC, to the Japanese Government, Ishii was returned to his residence in Tokyo. Ishii, suffering from chronic cholecystitis and dysentery, was permitted to remain at his Tokyo residence where all interviews were conducted.

Interrogation of Ishii was conducted at intervals over the period from 22 January to 25 February 1946 by direct interviews through interpreters and by means of questionnaires. On the subject of BW research and development, Ishii's replies to questions were guarded, concise and often evasive. On the subject of preventive medical research, water supply and purification, Ishii spoke freely. It was apparent throughout the interviews that he desired

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to emphasize the activities pertaining to preventive medicine, water purification and supply, and to minimize the BW aspects of the organization he directed: The Kwantung Army Boeki Kyusui Bu*.

2. <u>PERSONAL AND MILITARY HISTORY OF LT. GEN. SHIRO ISHII</u>.

In response to a request for his personal history and military experience, Gen. Ishii gave the following information:

Born: 25 June 1892.

December 1920: Graduated from the Medical Department of Kyoto Imperial University.

20 January 1921 - 9 April 1921: Military training as a probational Officer, 3rd Infantry Regiment, Imperial Guard Division.

9 April 1921: Surgeon--1st Lieutenant attached to 3rd Imperial Guard Infantry.

1 August 1922: Attached to Tokyo 1st Army Hospital.

20 August 1924: Surgeon--Captain.

April 1924 - April 1926: Post graduate studies in bacteriology, serology, preventive medicine and pathology at Kyoto Imperial University.

1 April 1926: Attached to Kyoto Army Hospital.

April 1928 - April 1930: Went abroad for a tour of inspection and study visiting Singapore, Ceylong, Egypt, Greece, Turkey, Italy, France, Switzerland, Germany, Australia, Hungary, Czechoslovakia, Belgium, Holland, Denmark, Sweden, Norway, Finland, Poland, Soviet Russia, Estonia, Latvia, East Prussia, The United States, Canada and Hawaii.

1 August 1930: Surgeon--Major Instructor at the Army Medical College.

1 August 1935: Surgeon--Lieutenant Colonel.

1 August 1936: Chief of Kwantung Army Boeki Kyusui Bu.

1 March 1938: Surgeon--Colonel.

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* The literal translation of Boeki Kyusui Bu is, "Anti-epidemic Water Supply and Purification Department."

1 August 1940: Chief of Kwantung Army Boeki Kyusui Bu and instructor at the Army Medical College.

1 March 1941: Surgeon--Major General.

1 August 1942: Chief of 1st Army Medical Department.

1 August 1943: Instructor at the Army Medical College.

1 March 1945: Surgeon--Lieutenant General, Chief of Kwantung Army Boeki Kyusui Bu.

1 December 1945: Entered the First Reserves.

3. STIMULUS FOR JAPANESE BW RESEARCH AND DEVELOPMENT.

Throughout the interrogations Ishii maintained that no official directive existed for initiation and conduct of the Japanese BW research and development program. Ishii further declared that he himself was responsible for Japanese interest in BW and that it was largely under his influence that investigation of the offensive phases of BW was conducted in order to prepare an adequate defense against possible enemy BW attack. Since the mission of the Boeki Kyusui Bu was the prevention and control of epidemic diseases and the supply of pure water, he reasoned that development of measures for defense against BW attack was a logical responsibility of his department.

According to Ishii, incidents leading to Japanese investigation of BW potentialities were: numerous instances of poisoning and contamination of wells during the Sino-Japanese conflict; rumors of Russian activity in the field of BW; reports by Manchurian police of the capture of Soviet spies with ampules containing typhus, cholera and anthrax organisms; sabotage of the Japanese Army horse-drawn transport during the building of the Heian-Kokko railway with the loss of 2,000 horses from anthrax; and articles on BW appearing in foreign literature.

Ishii believed that the contamination of wells in the China theater was perpetrated by Chinese guerillas under Russian influence. Personnel from his organization examined over 1,000 wells following an outbreak of cholera resulting in 6,000 deaths among Japanese soldiers in the Shanghai area. Of the wells examined, three were found to be grossly polluted with cholera organisms. Since the investigation was made by competent bacteriologists and the actual bacterial containers were recovered on the scene, Ishii was convinced that this was a deliberate act by saboteurs and not contamination resulting from natural drainage into the wells.

When the Japanese captured the Nanking area, Ishii claimed additional instances were found of contamination of wells with cholera organisms.

Wells marked in Chinese characters "Good Water" were found contaminated whereas wells marked "Bad Water" were found potable.

In reference to foreign literature on BW, Ishii mentioned German articles and the article on "Bacterial Warfare" by Major Leon A. Fox, M.C., U.S. Army. Ishii considered these articles to be fantastic and not based on scientific facts.

Apprehension of Russian activities and intent in the field of BW and the necessity for development of defensive measures against this threat, as well as against the numerous Communist inspired acts of BW sabotage in the Chinese and Manchurian theaters of operation, were the principal reasons advanced by Ishii for Japanese committment to BW activity. He repeatedly emphasized that it was not the Japanese objective to develop BW as an offensive weapon; nor had they ever contemplated initiation of this method of warfare.

4. <u>ORGANIZATION AND ALLOCATION OF THE BOEKI KYUSUI BU.</u>

The initial agency for the prevention and control of infectious diseases in the Japanese Army was, according to Ishii, the Department of Field Prevention of Diseases, established shortly after the Russo-Japanese War. The outbreak of the Sino-Japanese War increased the field of activity of this agency until it embraced an area from the Russo-Manchurian border to the north and Hainan Island to the south. It was concerned with infectious diseases prevalent in the cold northern regions as well as with numerous tropical maladies of the Orient. No uniform method of water purification or supply existed in the Army. Soldiers would not follow instructions regarding the boiling of drinking water; consequently epidemics of waterborne diseases were of frequent occurrence.

The existing field sanitary agency was considered inadequate for the prevention and control of the infectious diseases being encountered in the different operational areas of the Japanese Army. Apprehension of enemy employment of bacteria and poison (as had been encountered in the poisoning and contamination of wells) with the necessity for development of counter measures, further stressed the need for reorganization of the field sanitary agencies.

The Department of Field Prevention of Disease was inactivated and the Boeki Kyusui Bu was organized. According to Ishii, the main objective of this department was the "prevention of diseases coming through water channel."

The Boeki Kyusui Bu was comprised of fixed and mobile units located throughout the overseas theaters of operation as well as in Japan proper.

By July 1938, five Fixed Boeki Kyusui Bu (BKB) installations were established in the overseas theater as follows:

a. Kwantung Army BKB (Harbin)

b. North China Army BKB (Peking)

c. Central China Army BKB (Nanking)

d. Southern China Army BKB (Canton)

e. Southern Army BKB (Singapore)

The fixed BKB installations were assigned to Army groups and were under the direct control of the Army group commander; i.e., Commanding General of the Kwantung Armies.

The mobile BKB consisted of Field BKB and Divisional BKB in the overseas theaters and Divisional BKB and Army District BKB in Japan proper. Like the fixed installations of the Water Supply and Purification Department, the mobile units were assigned to and under direct control of their respective organization commanders. By July, 1938, eighteen (18) Divisional BKB had been organized and were in operation with their respective divisions in the field. Additional mobile units were established as the sphere of activity of the Japanese Army increased. Units of the Water Supply and Purification Department were independent of the Medical Department, the latter department serving only in an advisory capacity to the respective military commanders on medical matters.

5. <u>DUTIES OF THE BOEKI KYUSUI BU.</u>

The following duties and responsibilities were assigned to the units of the Water Supply and Purification Department:

a. <u>Fixed BKB</u>: Research in prevention of epidemic diseases and water supply; production and supply of biological products; production, repair and supply of materials and equipment for epidemic prevention and water supply; execution and guidance on measures for epidemic prevention and water supply; education in epidemic prevention and water supply; physical and chemical examinations; and hospitalization and treatment of patients suffering from infectious diseases.

b. <u>Field BKB</u>: Patrolling for prevention of epidemics and reconnaissance of sources of water; execution and guidance on epidemic prevention measures; examination of water and detection of poison; disinfection and medical examination; purification and supply of water; repair of sanitary water filters; research on epidemic prevention and supply of purified water.

c. <u>Divisional BKB</u>: Divisional units had the same responsibilities as had the field units aside from research and education.

Whenever outbreaks of communicable diseases could not be controlled, or when unusual diseases or incidents were encountered by the field and divisional units in areas for which they were responsible, personnel and equipment from the fixed installations were dispatched to deal with the situation.

6. THE KWANTUNG ARMY BOEKI KYUSUI BU.

The Kwantung Army Water Supply and Purification Department, directed by Gen. Ishii from the time of its activation in 1936 until the close of the war, was the agency responsible for prosecution of the Japanese BW research and development program. Except for an interval from August 1942 to March 1945 when Gen Masaji Kitano relieved Ishii as Chief of the Department, the BW activities of this organization were controlled directly by Ishii who was responsible, apparently, only to the Japanese High Command. On matters pertaining solely to preventive medicine and water supply and purification, he was the subordinate to the Kwantung Army commander. On the conduct of BW activities, Ishii evidently had a free hand. Ishii said that the subject of BW was considered so highly secret that formal reports were not submitted.

In response to a question concerning the reasons for his relief as Chief of the Kwantung organization, Ishii stated that it was for the purpose of qualifying him for promotion to Lieutenant General which required field service duty with an Army. He further remarked that, in his opinion, his assignment as Surgeon-General of the 1st Army was made because "higher-ups" did not want him to continue BW research. In any event, the major developments of this research had been completed by the end of 1942, and, due to Ishii's influence, the research continued, to some degree at least, under Gen. Kitano.

Regarding the relationship of the Kwantung Army Boeki Kyusui Bu with the other water supply and purification departments and units, Ishii was emphatic in his statements that he was not the commander of the overall Boeki Kyusui Bu organization of the Japanese Army and, therefore, he had no knowledge of the activity of the departments of the other armies.

Ishii maintained that no official directive had been given by the War Ministry and that no specific appropriations had been granted for BW work. Funds appropriated for research on preventive medicine and water purification were used for BW research. Ishii estimated this diversion of funds for BW research to be about 1 to 2 percent of the appropriation. (Note: From another source it was learned that the yearly budget for preventive medicine research was approximately 6 million Yen). His estimate, however, is not in conformity with a later admission in which Ishii stated that about 20 percent of the research was devoted to BW.

Throughout the interrogation Ishii endeavored to leave the impression that BW research was conducted only on a very small scale and as a part of the research in preventive medicine and water purification. He repeatedly emphasized that offensive aspects of BW were investigated for

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the sole purpose of determing BW potentialities in order to learn what defensive measures were necessary from the standpoint of epidemic prevention and water purification.

All persons questioned on the subject were consistent in their replies that the Emperor was uninformed of the Japanese BW activity. Ishii's response to the query was that "BW is inhumane and advocating such a method of warfare would defile the virtue and benevolence of the Emporer." Ishii further stated that had the Emperor been informed of this activity he would have prohibited the work.

Regardless of Ishii's contention that BW research was only a minor phase of the activities of the Kwantung Army Water Supply and Purification Department and that it was conducted without official directive, from the scope of the research and the progress that was made, it is evident that BW research and development in all its phases was conducted on a large scale, was officially sanctioned, and was supported by the highest military authority.

a. Organization of the Kwantung Army Boeki Kyusui Bu.

As outlined by Gen. Ishii, the Kwantung Army Water Supply and Purification Department consisted of a headquarters and five branch departments all located in Manchuria. The headquarters was further divided into six sections or departments designated as the General Affairs Department, First Department, Second Department, Third Department, Fourth Department and the Materials Department. With the exception of the Third Department, which was located in Harbin, the headquarters departments were located at Pingfan (Heibo*), the main research installation about 24 kilometers south of Harbin. (See Supplement 1). The branch departments were located at Botanko, Rinko, Songo, Hairaru and Dairen.

At the height of its activities, personnel of the Kwantung Army Water Supply and Purification Department numbered over 2,500 individuals. Personnel included medical officers, pharmacists, hygienic officers, technical officers, engineers, instructors, medical non-commissioned officers and soldiers, fiscal personnel and civilian employees. (See Supplement 2a. for Table of Organization as submitted by Lt. Gen. Kitano).

b. Duties of the Kwantung Army Boeki Kyusui Bu.

An outline of the duties of the several headquarters sections or departments and branch departments of the Kwantung organization as submitted by Gen. Ishii is given in Supplement 2b. In brief, the General Affairs Department of headquarters was responsible for the over-all administration. The First Department was concerned with fundamental research in preventive medicine. The Second Department was concerned with epidemiological

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* In Chinese the installation is called "Pingfan," the Japanese name is "Heibo."

research and was responsible for execution of measures for prevention of epidemics. The Third Department was responsible for research on matters pertaining to water supply and purification, manufacture and maintenance of water supply equipment and execution of measures for water supply and purification. The Fourth Department was responsible for vaccine and serum production. In addition to the usual supply functions, the Materials Department was responsible for the propagation and supply of all small experimental animals.

The various Branch Departments were responsible for the execution of measures for prevention of epidemics and the supply of purified water in their respective areas. The Dairin Branch was also concerned with research pertaining to improvement of vaccines, serums and diagnostic agents.

7. THE PINGFAN (HEIBO) INSTALLATION.

The Pingfan installation of the Kwantung Boeki Kyusui Bu, located about 24 kilometers south of Harbin, Manchuria, was the principal Japanese BW research center. While Gen. Ishii contended that the primary purpose of the installation was field preventive medicine as it applied to the Kwantung Armies, it is evident, from the extensive investigations and developments that were made in the field of BW, that considerable effort was devoted to this latter activity as a part of the preventive medicine program and for the purpose of development of a BW weapon. Construction of the installation was begun about in 1937, for by that time BW field trials were underway and the first BW munitions had been developed. A small research laboratory in Harbin (See Supplements 3a and 3b for plan) was utilized for the initial investigations prior to completion of the Pingfan Installation. Upon completion of Pingfan, the Harbin laboratory was used mainly for the manufacture and repair of water purification equipment. Gen. Ishii had developed a diatomite tube-type water filter which was adopted by the Japanese Army as standard equipment for field use, and facilities at the Harbin laboratory for baking the diatomite filters were also used for manufacture of the porcelain cases of the Uji-type BW bombs.

An idea of the extent of the facilities at Pingfan for preventive medicine and BW research may be obtained from the sketch of the installation submitted by Ishii (Supplement 3c). (A similar sketch, Supplement 3d, supposedly drawn from memory, was obtained from Gen. Kitano). The installation was self-sufficient to the extent of raising most of its food requirements and experimental animals. Extensive laboratories were provided for research, production of biological products, and for manufacture and repair of equipment. Within the closely guarded walled installation, a separate area was provided for plague research. An attached air base provided air transport for personnel and equipment and aircraft for BW field trials. The installation contained a school for instruction of officers and enlisted personnel in field sanitation regulations, preventive medicine, water purification and supply. Instruction was by lectures, demonstrations and practical exercises.

Undoubtedly, a certain amount of indoctrination in BW, at least from the defensive standpoint, must have been given the students. This, however, was denied by Ishii who said that BW development had not reached the stage where instruction of personnel in this field was warranted. A hospital for the examination and treatment of Pingfan personnel and their dependents was also provided. An outline of the research conducted at Pingfan was furnished by Ishii (Supplement 3e).

BW investigation was not conducted by a fixed group of personnel at Pingfan, Ishii said. Personnel from the various departments were temporarily assigned to a particular project or experiment, and once the project, or a particular phase of it, was completed the assigned personnel were disbanded and returned to their respective duties. Aside from a few key individuals, personnel assigned to a project were not fully informed of the nature of the work or purpose of the investigation. This procedure, Ishii admitted, did not promote progress of the work, but was necessary for security reasons.

8. OFFENSIVE BW ACTIVITIES.

a. Organisms Studied: The causative agents of typhoid and paratyphoid fevers, cholera, dysentery, anthrax, glanders, plague, tetanus and gas gangrene, as well as filterable viruses and rickettsiae were investigated from a BW standpoint. Organisms used in field trials with munitions, Ishii said, were limited to the noninfectious agents, B. subtilis and B. prodigiosus, and agents infectious for animals, B. anthracis and M. malleomyces (glanders). Only a single field experiment had been carried out with glanders, Ishii maintained. (The nature of this experiment could not be learned). Because of the danger of infection and a glanders casualty, further experiments were abandoned and work on this agent was limited to efforts toward development of an immunizing agent and a curative ointment. Ishii denied that field experiments had been carried out with P. pestis. Fear of retroactivity and possible spread by rodents were reasons given by Ishii for confining plague investigations to the laboratory.

On being requested for his opinion as to the organisms he considered most effective offensively, Ishii said that he could only conjecture and that the effectiveness of a particular agent was dependent on the climate and the sanitary measures in force in the area concerned.

b. Mass Production of Organisms: A culture cabinet invented by Ishii for mass production of organisms for vaccine purposes was the means of production of bacterial agents for BW field trials. The cabinet consisted of a duralumin box with double doors containing a series of trays for surface growth of organisms on solid medium. The trays could be automatically layered with medium to a uniform depth by simply pouring the melted medium through a covered opening in the door. The trays were inoculated by a swab and the growth harvested by scraping with a small metal rake. For mass production, a series of 30 to 40 of the cabinets were employed.

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With the assistance of technicians from a nearby Japanese military hospital, Ishii gave a demonstration of the use of the culture cabinet. Using seven liters of melted standard agar medium, one cabinet was automatically layered to a depth of 9 millimeters in each tray by laying the cabinet down, pouring the medium through the opening in the door and then raising the cabinet upright. A second cabinet, inoculated with B. coli beforehand, was harvested, yielding about 160 grams of wet surface culture.

Use of this cabinet enabled production greatly exceeding that possible by employment of standard laboratory apparatus. According to Ishii, the cabinet was developed primarily to meet the increasing demands for various vaccines required by the Japanese Armies in the field. At no time were bacterial agents produced and stored in quantity nor available for possible tactical employment.

c. Methods of Dissemination: Methods of dispersion of BW agents investigated at Pingfan included: (1) bombs; (2) artillery shells; (3) dispersion by spray from aircraft. By far the principal effort to develop an effective means of dissemination of infective agents was devoted to BW bombs. A few preliminary experiments were conducted with modified artillery shells and dissemination by spray from aircraft.

(1) Bombs: By 1940, nine (9) aircraft bombs designed for dissemination of bacterial agents had been developed and tested in the field. They included bombs designed for ground contamination, production of infectious clouds, and fragmentation munitions for production of casualties through wound infections caused by contaminated bomb fragments and shrapnel. The earliest munitions were modified chemical warfare bombs. Later bomb developments were of original design and included porcelain and glass case bombs exploded by primacord and a gas expulsion spray bomb.

The bombs, Ishii said, were all developed and manufactured in facilities at the Pingfan installation and the laboratory in Harbin by personnel of his organization without the assistance of regular ordnance personnel. He admitted that more progress in munitions development could have been made had they had the cooperation of bomb specialists. Bombs that were later modified for BW munitions, explosives, and fuzes were obtained by requisition through regular supply channels. One of the main defects of all the bombs developed at Pingfan was the faulty fuzes which, Ishii said, were all modified, obsolete, artillery shell fuzes.

Ishii emphasized that the bombs were experimental models produced in quantities sufficient only to prove their practicability and to determine the measures necessary for defense against like weapons. The following bomb production data furnished by Ishii are surprising in view of his contentions:

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| Bomb | Approximate Production | Year Made |
|---|---|---|
| I | 300 | 1937 |
| Ro | 300 | 1937 |
| Ha | 500 | 1938 |
| Ni | 200 | 1939 |
| Old Type Uji | 300 | 1938 |
| Type 50 Uji | 500 | 1940-1941 |
| Type 100 Uji | 300 | 1940-1942 |
| Ga | 50 | 1940 |
| U | 20 | 1939 |

Ishii was uncertain as to the number of bombs expended in field trials. He inferred that only a small number of trials were conducted with each bomb and that the remaining bombs were destroyed prior to the Japanese evacuation of Pingfan. From the fact that the first munition was developed and tested in 1937, it is evident that the Japanese activities in the field of BW were well underway prior to this date.

Ishii denied the existence of a "mother and daughter" radio bomb and the Mark 7 bomb mentioned in other reports of Japanese activities. Munitions development did not continue much beyond 1942, for, by 1943, Ishii said, the scarcity of materials began to be felt. By 1944, due to lack of materials and transfer of personnel to the battle fronts, the Pingfan installation had reached a "stifled condition".

The Ha bomb and the Type 50 Uji bomb were considered by Ishii to be the most promising of the munitions developed at Pingfan. By correction of existing defects and further improvement by ordnance experts, he felt that these two bombs could be made into efficient munitions.

When questioned as to where samples of the munitions could be found, Ishii said that all the remaining bombs and the entire Pingfan installation, along with everything of intelligence value, had been destroyed prior to advance of the Russians into the Harbin area. (Note: Entry into the Harbin area for the purpose of verification of Ishii's statements was not possible because of Russian occupation). Since no records, blue prints, photographs or samples of the original bombs could be obtained, Ishii was requested to furnish sketches of the munitions drawn from memory. Reproductions of drawings made from sketches of the bombs submitted by Ishii are attached. (Supplements 4a, 4b, 4c, 4d, 4e, 4f, and 4g).

At several points during the interrogation, when pressed for details, Ishii retorted that, as the director of an organization as extensive as the Kwantung Army Water Supply and Purification Department whose time was occupied largely by administrative matters, he could not be expected to be familiar with minute technical details. The detailed bomb sketches and other technical information obtained from Ishii, however, indicate an amazing familiarity with detailed technical data. It leads one to question the contention that all records pertaining to BW research and development were destroyed. In all probability, much of the information Ishii presented was compiled with the assistance of his former associates at Pingfan, several of whom were present in Tokyo and vicinity at the time. He had ample opportunity to consult his former associates since the interrogations were intermittent and much of the information was presented by charts and written answers to questionnaires.

(a) I Bomb. The I Bomb, a 20kg modified gas bomb with a capacity of 2 liters, was perhaps the first munition developed for the dissemination of a bacterial liquid payload. Explosion of the bomb head upon impact with the ground blew out the tail with ejection of the liquid fill. The bomb was tested during 1937-1938 by static and drop trials from aircraft. For the trials, the bomb was filled to about 70 per cent capacity with 0.1 per cent fuchsin, 2 to 5 per cent starch solution, or noninfectious agents. A rectangular grid 100 x 500 meters, with either test papers or Petri dishes, depending upon the fill, placed at 20 meter intervals, was used for assessment of dispersion. In winter, a background of snow was used as a means of evaluating the effective area of dispersion of the bomb contents. With a wind velocity of 5 meters per second, an area of dispersion 10-15 x 100-150 meters resulted in case of static explosion. When dropped from aircraft, the bomb buried itself before exploding, resulting in a deep funnel-shaped crater with little effective dispersion of the contents. Depth of the crater depended on the height of release. Dropped from an altitude of 1,000 meters, a crater 0.5-1 meter in depth resulted; from 2,000 meters a crater 1-1.5 meters in depth resulted; a 4,000 meter drop caused a crater 2.5-3 meters in depth. Because of the tendency to bury itself before detonation, its small capacity and large percentage of duds, the I Bomb was considered unsatisfactory and was discarded.

(b) Ro Bomb. The Ro bomb, in size and appearance, was similar to the I bomb. The head was of novel design containing front and rear compartments. Upon contact with the ground, the front compartment exploded throwing the bomb proper 10 to 15 meters into the air. The rear compartment then exploded blowing out the tail and ejecting the contents. The bomb fill for the trials was the same as in case of the I bomb, and it was tested on a similar grid. In static trials an area of dispersion 20-30 x 200-300 meters resulted. Results in drop trials were about the same as with the I bomb. The percentage of duds was greater than in case of the I bomb, largely due to the same defective fuzes. For the same reasons as in case of the I bomb, the Ro bomb was not considered worthy of further improvement and was discarded.

(c) Ha Bomb. The 40kg Ha bomb was a fragmentation bomb designed for destructive effect by projection of bomb fragments and shrapnel contaminated with anthrax spores. The bomb was double walled, having a central burster tube surrounded by an iron fragmentation wall 10 millimeters in thickness, and a payload chamber between the wall and the steel bomb case. The payload chamber was of 700 cubic centimeters capacity and contained about 1,500 steel pellets to augment the destructive effects of the bomb fragments. The payload chamber and the steel pellets were coated with a bakelite varnish to prevent corrosion. Armed with nose and tail impact fuzes and containing 3 kilograms of TNT in the nose and tail compartments and central burster tube, the bomb exploded upon impact scattering bomb fragments, shrapnel and anthrax spores at high velocity in a horizontal direction.

Field trials of the Ha bomb were made during 1938 and 1939. Dye solutions and organisms were used as fill for the static tests. Size, distribution and penetrating power of the bomb fragments and shrapnel were determined by using a grid consisting of upright board targets arranged in concentric circles from the point of bomb burst. Test animals were distributed in like pattern. In winter, fragmentation distribution was determined by recovery of particles from the frozen, icy ground. Fragments and shrapnel were projected for distances of 400 to 500 meters with a density of about one fragment or shrapnel per square meter within a radius of 50 meters. Bomb fragments and shrapnel were recovered and examined for viability of attached organisms. Drop trials were made from aircraft for the purpose of determing bomb function and percentage of duds.

Additional fragmentation studies were made by burying the bomb in sand to a depth of 5 meters. The bomb was then exploded electrically and the sand screened to estimate the size of the resulting fragments. Approximately 10 per cent of the recovered fragments weighed from 1 to 3 grams, 20 per cent from 3 to 5 grams, 25 per cent from 5 to 10 grams, 40 per cent from 10 to 15 grams, and 5 per cent were over 15 grams.

The Ha bomb had several defects. It was considered too complex for mass production. The thin bomb case was soldered to the head and tail sections and would not withstand the shock of handling and transportation. Leakage of the bacterial contents often occurred, with danger of infection to the bomb handlers. Suspension of the bomb in aircraft was difficult because the shape of the bomb varied from that of standard aircraft bombs. The heavy explosive charge destroyed from 40 to 65 per cent of the organisms. Regardless of its defects the Ha bomb was considered promising. Ishii believed that, with correction of the defects and further development by bomb experts, the Ha bomb could be made into an efficient munition.

(d) Ni Bomb. The 50kg Ni bomb was of the same general design as the Ha bomb. The bomb body was about 100 millimeters longer, and it had a payload capacity of 1 liter. The explosive charge, however, was only 50 per cent of that used in the Ha bomb. Due to the smaller explosive charge, bacterial survival was greater, but the penetrating force of the bomb fragments and area of dispersion was not as great. Results from tests of the bomb in 1939 were considered to be "rather good," and the bomb was deemed worthy of further development.

(e) U Bomb. The 30kg U bomb was designed to spray liquids by means of compressed air at a predetermined altitude. The bomb had a detachable nose covering a spray head. It was equipped with impact nose fuzes, a delay tail fuze and a self-timing tail mechanism which operated upon release from the airplane. Action of the self-timer allowed the central burster tube to move forward separating the detachable nose from the spray head. The forward motion of the central burster tube also caused release of the compressed air with spraying of the bomb contents through the spray head. Upon reaching the ground, the bomb itself exploded. Only 20 rounds of this bomb were manufactured, Ishii said, and no field experiments were conducted aside from tests to determine bomb function. Because of leakage of the contents, defective fuzes, inaccurate timing mechanism, and because of its complicated structure the U bomb was not considered worth further development and was discarded.

(f) Old Type Uji Bomb. By 1938, the trend in Japanese BW munitions development was towards bombs of simpler design, greater capacity, and requiring a minimum of explosive for fragmentation and dispersion of the viable bacterial contents. This objective was not specifically expressed by Ishii but it is concluded from his criticisms of the earlier munitions and from a consideration of succeeding bomb development. From steel case bombs employing a heavy charge of TNT and black powder, with resultant destructive effect on the payload, later effort was devoted to design and development of ceramic and glass case bombs using primacord or primacord and a minimum of TNT as the explosive charge.

The porcelain case Uji bomb was the result of this trend in bomb development. The original model, designated by Ishii as the "Old Type Uji" bomb, weighed 25 kilograms and had a capacity of approximately 10 liters. The exterior of the porcelain case contained longitudinal grooves to accommodate the explosive of 4 meters of primacord. The bomb was filled through an opening in the nose stoppered by a metal screw cap. A celluloid fin assembly was strapped to the base of the bomb. Equipped with a time fuze in the tail, the bomb was designed to explode in the air at a set altitude with fragmentation of the porcelain case and dispersion of the contents. The porcelain fragments had little penetrating force, but were difficult to detect on the ground. The bomb was tested in 1938 on a field layout much the same as for the I, Ro, and Ha bombs using dye or starch solutions and suspensions of nonpathogenic organisms. In static tests, exploded at a height of 15 meters, an area of dispersion 20-30 by 500-600 meters resulted with a wind velocity of 5 meters per second. In drop tests, areas of dispersion 20-30 by 600-700 meters resulted when the bomb was exploded at altitudes of 200 to 300 meters. Particle size of the disseminated liquid contents ranged from "droplets the size of rain drops, and larger drops due to aggregation, to particles 50 microns in diameter."

[redacted]

Defects of the Old Type Uji bomb were numerous, Ishii said. The porcelain case would not stand rough handling. Leakage of the contents occurred at the union of the metal filling plug and the porcelain case. Weight and dimensions of the bomb were not uniform, contributing to poor trajectory. The bomb was filled to 70 per cent capacity to allow for expansion of contents and the void space caused tumbling of the bomb. The porcelain fins warped during warm weather adding to poor trajectory, became brittle in cold weather, and often became detached in flight. The fuze was faulty and height of burst could not be controlled with any degree of accuracy. Capacity of the bomb was considered satisfactory and the detrimental effect of metal on the bacterial contents was eliminated by use of the porcelain case. The bomb, however, was not considered worthy of further development.

(g) Ga Bomb. The 35 kg Ga bomb was an experimental glass case model of the Old Type Uji bomb. Spiral instead of longitudinal grooves contained the explosive of primacord. Only 20 rounds of this model were manufactured. It had much the same defects as the Old Type Uji bomb and after a few preliminary trials was discarded.

(h) Type 50 Uji Bomb. The 25kg, 10 liters, Type 50 Uji bomb was an improved model of the Uji series of bombs. The nose contained an impact, delay fuze and a bursting tube with 500 grams of TNT. A time fuze in the tail set off the 4 meters of primacord exploding the bomb at a height of 200 to 300 meters. In case the tail fuze and the primacord failed to function, explosion of the bomb with dispersion of the contents was insured upon impact by the explosive train in the nose.

Approximately 500 rounds of this model were manufactured in 1940 and 1941, and extensive field trials were conducted during the period 1940 to 1942. The bomb was tested by static explosion and drop tests from aircraft. For the initial tests the bomb was filled with dye solution and suspensions of nonpathogenic organisms. Later trials were conducted using a suspension of anthrax spores as the payload. The suspension had a concentration of 50 to 100 milligrams of spores per cubic centimeter of liquid. A field layout of test papers or Petri dishes, depending upon the fill, was used for assessment of dispersion. In case of the anthrax trials, large animals including oxen, horses, goats and sheep were used as test animals.

In the drop tests with a wind velocity of 5 meters per second and explosion of the bomb at an altitude of 200 to 300 meters, areas of dispersion 40-60 by 600-800 meters were attained.

Static explosion of the bomb at a height of 15 meters with the same wind velocity gave an area of dispersion approximately 20-30 by 500-600 meters. For the anthrax trials, the bomb was statically

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exploded at a height of 15 meters. Animals were then allowed to graze for one or two hours downwind of the explosion over the contaminated ground. Infection, followed by death from anthrax, resulted in almost 70 per cent of the horses and 90 per cent of the sheep allowed to graze over the contaminated ground.

While the Type 50 Uji bomb still had some of the defects of the old model, it was considered more efficient. With correction of these defects and further development in the hands of experts, Ishii felt that the Type 50 Uji bomb could be made into an effective BW munition.

(i) Type 100 Uji Bomb. The 50kg Type 100 Uji bomb was a larger model of the Type 50. This bomb had a payload capacity of approximately 25 liters. As explosive, approximately 12 meters of primacord was used. 300 rounds were manufactured and extensive trials were conducted in much the same manner as with the Type 50 during the period 1940 to 1942. Because of its size and possibility of breakage in handling, this model was not considered as practical as the Type 50.

(2) Artillery Shells. Two types of artillery shells were investigated as a means of dissemination of BW agents. A standard gas shell, designated as the "H" shell, and a shrapnel shell, the "B" shell, were tested in the desert near Hairal. The shells were charged with dye solutions or a suspension of B. prodigiosus in bouillon of a concentration of 200 to 500 milligrams per cubic centimeter. The shells were fired from a distance of 3,000 meters at a target 500 meters square consisting of white test papers or Petri dishes arranged at 20 meter intervals. For tests of the "B" shell, board targets arranged at intervals of 20 meters over an area 500 meters square were used to determine hits. One of the main objectives of the trials was to determine survival of bacteria when dispersed by shell. Since few direct hits on the targets were obtained, Ishii said, no conclusive data resulted and dissemination by this means was considered impractical.

(3) Spray from Aircraft. Ishii stated that about 10 trials had been made in the vicinity of Pingfan for the purpose of evaluating the efficiency of dispersion of agents by spraying from aircraft. The airplane used was equipped with a compressed air tank and a separate tank for the spray liquid. Compressed air released into the spray tank forced the spray liquid out into the air through a duct near the tail of the airplane. Solutions of dyes and suspensions of nonpathogenic organisms were used as test liquids. The dyes employed were 0.1 per cent solutions of fuchsin or anilin red. B. subtilis and B. prodigiosus were used as test organisms. For detection of the colored solutions sprayed from the airplane, a grid of white test papers placed at 50 meter intervals over an area 1,000 meters square was used. Petri dishes with standard agar medium were arranged in like manner for the detection of organisms. Particle size and density were calculated from the test papers by means of a scaled lense or standard test

papers were used for comparison. The concentration of organisms resulting from the spray was estimated by examination of the Petri dishes after incubation in the laboratory.

Release of the spray from altitudes under 500 meters gave detectable results. The diameter of the particles resulting from the spray ranged from 3 millimeters to 50 microns. No organisms were recovered when the spray was released from altitudes over 3,000 meters. Considerable difficulty was experienced with operation of the spray mechanism. On one occasion the compressed air tank burst, injuring the operator. According to Ishii, results from the spray trials were considered unsatisfactory and this method of dissemination was concluded to be inefficient and of no possible operational value.

(4) Sabotage. It is apparent from the frequent references by the Japanese to contamination of wells by the enemy, and from the extensive measures that were instituted for purification of water in the field, that dissemination of infectious agents by saboteurs was seriously considered from both the offensive and defensive standpoint. Ishii inferred that sabotage was perhaps the most effective means of employment of BW. Training of personnel in this activity, as has been mentioned in intelligence reports, was denied.

The only specific information obtained on sabotage activity was learned from Lt. Col. Ryoichi Naito, a former associate of Ishii, who had been concerned with the BW research conducted at the Army Medical College in Tokyo. Ishii maintained that BW investigations at this institution had been limited to defensive investigations in preventive medicine. However, Naito stated that while there was no distinct demarcation between the BW and preventive medical research conducted at the Army Medical College, investigations that had offensive BW implications were carried on. One phase of BW research, Naito stated, was the search for a stable poison that could be used for the sabotage of foodstuffs. Most of this work was concentrated on the thermostabile "fugu toxin" obtained from the livers of "blow-fish". Attempts were made to concentrate this toxin to a lethal dosage of 1 gamma for mice. In a comparable dosage for man, it was calculated that the toxin could be employed practically in sabotage activity. This degree of concentration was not obtained, and further efforts were interrupted by the B-29 raids of November 1944 and ceased altogether with destruction, by fire, of the Army Medical College in April, 1945.

9. DEFENSIVE BW ACTIVITIES.

Augmentation and intensification of measures for preventive medicine and water purification were deemed to be the most effective defense against BW. The widely distributed fixed and mobile units of the Boeki

Kyusui Bu were alerted and responsible for the detection, prevention and control of natural outbreaks of infectious diseases as well as diseases of possible enemy introduction. Research in preventive medicine and the production of vaccines, serums and other therapeutic agents at the Pingfan installation and at the Army Medical College were intensified as a means of BW defense. Instruction of medical personnel in preventive medicine pertaining to the defensive aspects of BW was likewise an activity at both institutions.

As a defense against the potentialities of BW munitions revealed by the offensive experimentation at Pingfan, Ishii said that the following measures were developed:

a. Protection by lying down and taking advantage of low ground or objects.

b. Iron helmets and bullet-proof jackets.

c. Reinforced cellophane wrappers and paper wrappers varnished with persimmon juice as a covering for the entire body.

d. Protective clothing of thin, rubberized silk and regular Army gas masks.

e. Protective ointment. Requested for further information on protective ointments, Ishii replied that an ointment effective against the glanders organism had been developed having the following formula:

| | |
|---|---|
| Mercuric oxycyanate........... | 0.1 |
| Starch........................ | 7.0 |
| Tragacanth powder............. | 2.0 |
| Medicated soap................ | 1.0 |
| Glycerine..................... | 1.0 |
| Water......................... | 100.0 |

f. Mobile field disinfection cars:

(1) Car "A" for ground disinfection.

(2) Car "B" for disinfection of personnel and clothing.

g. Mobile field laboratory cars for detection and diagnosis.

h. Airplanes for transportation of epidemiological units, equipment and supplies, and for early evacuation of patients.

i. Provision of hospital trains and ships.

j. Increased production of vaccines, serums, and other therapeutic agents including marfanil and penicillin.

k. Early diagnosis and treatment of infectious diseases.

l. Enforcement of preventive innoculation throughout the Army.

As a further defensive measure, liaison was maintained between the Military Police (Kempei) and the Boeki Kyusui Bu. In an auxiliary capacity, the military police served as an intelligence network for the surveillance of possible BW incidents, collection of evidence, and the apprehension of saboteurs. Since the personnel of this organization had no professional training, they were given basic instruction in elementary bacteriology and epidemiology by personnel from the Boeki Kyusui Bu. Instruction included the symptomatology of the more common diseases, manner of their spread, and emergency control measures. They were taught not to place undue emphasis; yet not to overlook seemingly unimportant incidents. Prompt reports were to be submitted to their immediate commanders who in turn would report to the headquarters of the nearest Boeki Kyusui Bu where appropriate action would be taken.

10. NAVAL INTEREST IN BW.

References in captured Japanese documents to a naval Mark 7 bacterial bomb and to special pay for naval personnel engaged in hazardous duty including BW research implied possible naval activity in BW. No evidence supporting this indication was found. The existance of a naval Mark 7 bomb was denied by all Army and Navy personnel who were interviewed.

Adm. Shigetaro Shimada, Minister of the Navy from October 1941 to July 1944, was questioned regarding the document issued by his office listing special pay for BW duty. He denied naval activity in BW and explained the BW reference in the document as having been inserted "by personnel responsible for drafting Navy regulations who possibly imagined BW with an eye to the future." The reference may have originated, Shimada said, in the Office of the Surgeon General of the Navy. Shimada considered BW as impracticable and an ineffective weapon in naval warfare.

It is evident that no cooperation existed between the Army and Navy on BW research. Furthermore, no evidence was found that independent research in this field was conducted by the Navy. Shimada's statements indicate that the Japanese Navy at least had an interest in BW from the defensive standpoint, and that liaison in this phase of BW may have existed between the Surgeons General of the Army and Navy.

11. REASONS FOR LACK OF PROGRESS IN OFFENSIVE BW DEVELOPMENT.

Regardless of the intensive offensive BW investigations conducted at the Pingfan installation, at no time was Japan prepared to employ BW as a practical weapon. Reasons given by Ishii for lack of progress in offensive BW development were, in substance, the following:

a. The primary motive for Japanese BW research was defensive.

b. No official directive existed for BW research, consequently, the necessary funds, personnel and equipment were not available.

c. Lack of competent technical personnel. Only meager compensation was available for casualties from BW research. This field was, therefore, not attractive to qualified investigators.

d. Scientific advisory committees were not available for consultation because of the lack of competent personnel.

e. Lack of essential materials in Japan.

f. Lack of support by the High Command. The importance of science was not recognized. They (personnel in high command) were not capable of impartial judgment and did not respect scientists, therefore, misapprehension and superstition prevailed over scientific facts.

g. Anti-espionage was impossible and Japan feared retaliation.

12. PRACTICABILITY OF BW.

Conclusions as to the practicability of BW expressed by Ishii and others were:

a. The practicability of BW as an offensive weapon remains to be demonstrated.

b. Because of the instability of BW agents and the many essential conditions necessary for the successful initiation of an epidemic, the effective employment of BW on a large scale is doubtful.

c. BW might be effective on a small scale as a means of sabotage.

d. Defense against BW is possible by development of appropriate measures in preventive medicine.

e. Use of BW would not be necessary in a war being won by other weapons and effective use of it could not be made in defeat.

f. BW is not a decisive weapon, at the most, it could be but an auxiliary weapon.

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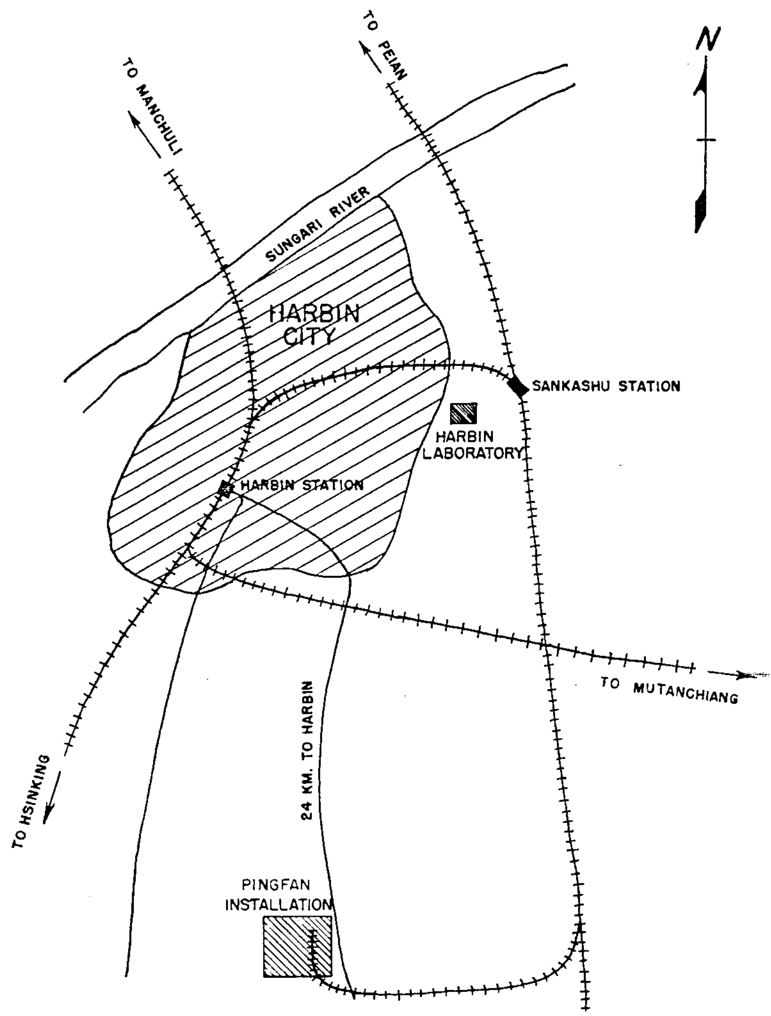


SUPPLEMENT I

E DIVISION – CAMP DETRICK
FREDERICK, MD.

**SKETCH OF**
**HARBIN AREA**

DRAWN FROM SKETCH SUBMITTED BY
LT. GEN. MASAJI KITANO

**CWS**

SCALE- *NONE* | DATE- *4-25-46* | DRAWN BY- *E. T. S.*

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Supplement 2a

## TABLE OF ORGANIZATION OF KWANTUNG ARMY BOEKI KYUSUI BU

| | | |
|---|---|---|
| Central Office (Headquarters)........... | Director | - Lt. or Major General (Medical) |
| General Affairs Section........... | Chief | - Full or Lt. Colonel (Medical) |
| 1st Section...................... | Chief | - Major General or Colonel (Medical) |
| 2nd Section...................... | Chief | - Full or Lt. Colonel (Medical) |
| 3rd Section...................... | Chief | - Full or Lt. Colonel (Medical) |
| 4th Section...................... | Chief | - Full or Lt. Colonel (Pharmacologist or Medical) |
| Dairen Detached Office............ | Chief | - Engineer or Surgeon |

Branch Offices:

| | | |
|---|---|---|
| Botanko Branch.................... | Chief | - Major or Lt. Colonel (Medical) |
| Rinko Branch...................... | Chief | - Major or Lt. Colonel (Medical) |
| Songo Branch...................... | Chief | - Major or Lt. Colonel (Medical) |
| Khairalu Branch................... | Chief | - Major or Lt. Colonel |

The personnel of the Headquarters and each branch office is as follows:

Personnel of the Headquarters:

| | |
|---|---|
| Army Surgeon........................ | 35 |
| Pharmacologist...................... | 18 |
| Hygienic officers............about | 25 |
| Technical officers...........about | 10 |
| Fiscal officers..................... | 5 |
| Engineers....................about | 30 |
| Army Instructors.................... | 3 |
| Interpreters........................ | 1 |
| N.C.O........................about | 100 |
| Assistant-engineer.................. | 150 |
| Medical soldiers and other employees | Some |

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Supplement 2a

Personnel of the branch offices:

| | | |
|---|---|---|
| Army Surgeon | | 1 |
| Pharmacologist | | 1 |
| Hygienic officer | | 1 |
| Fiscal officers | | 1 |
| N.C.O. | about | 10 |
| Assistant-engineer | about | 10 |
| Medical soldiers | | 400 |
| Civilian employees | | Some |

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Supplement 2b

OUTLINE OF DUTIES OF KWANTUNG ARMY BOEKI KYUSUI BU

I. General Affairs Department.

A. Planning and Control.

B. Business Affairs.

C. Personnel.

D. Intendance.

E. Transportation and Communication.

F. Supervision of Buildings.

G. Medical Affairs.

II. First Department.

A. Investigation and research with regard to the prevention and treating of various infectious diseases.

B. Physical and chemical tests of all kinds.

C. Research relating to the improvement of preventative innoculation liquids, serums for medical treatment, etc.

D. Fundamental research relative to prevention of epidemics.

III. Second Department.

A. Research relative to the execution of measures for the prevention of epidemics.

B. Experiments on materials for the prevention of epidemics.

C. Execution of measures for the prevention of epidemics.

D. Guidance for the prevention of epidemics.

E. Rapid transportation of materials and personnel connected with the prevention of epidemics.

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IV. Third Department.

A. Experiments relating to the improvement of water supply equipment.

B. Execution of measures for water supply.

C. Guidance for the supply of purified water.

D. Manufacture and repair of equipment for water supply.

E. Disinfection.

V. Fourth Department.

A. The manufacture of preventative innoculation liquids, serums for medical treatment, etc.

B. Culture medical experiments.

VI. Materials Department.

A. Custody and supply of materials for the prevention of epidemics, water supply and experiments.

B. Research on preventative medicines.

C. Manufacture of preventative medicines.

D. Propagation and supply of small animals for experimental use.

VII. Branch Departments.

A. Execution and guidance in measures for the prevention of epidemics and water supply in the areas of their responsibility.

B. Investigations relating to the prevention of epidemics and the supply of purified water in the areas of their responsibility.

C. Minor repairs in epidemic prevention and water supply equipment.

VIII. Dairen Branch.

A. Research relating to the improvement of preventive innoculation solutions, serums for diagnosis and treatment, etc.

[redacted]

Supplement 2b

B. Manufacture and supply of the above mentioned solutions, serums, etc.

C. Research in pathogenic bacteria.

D. Execution of measures for the prevention of epidemics in the areas of their responsibility.

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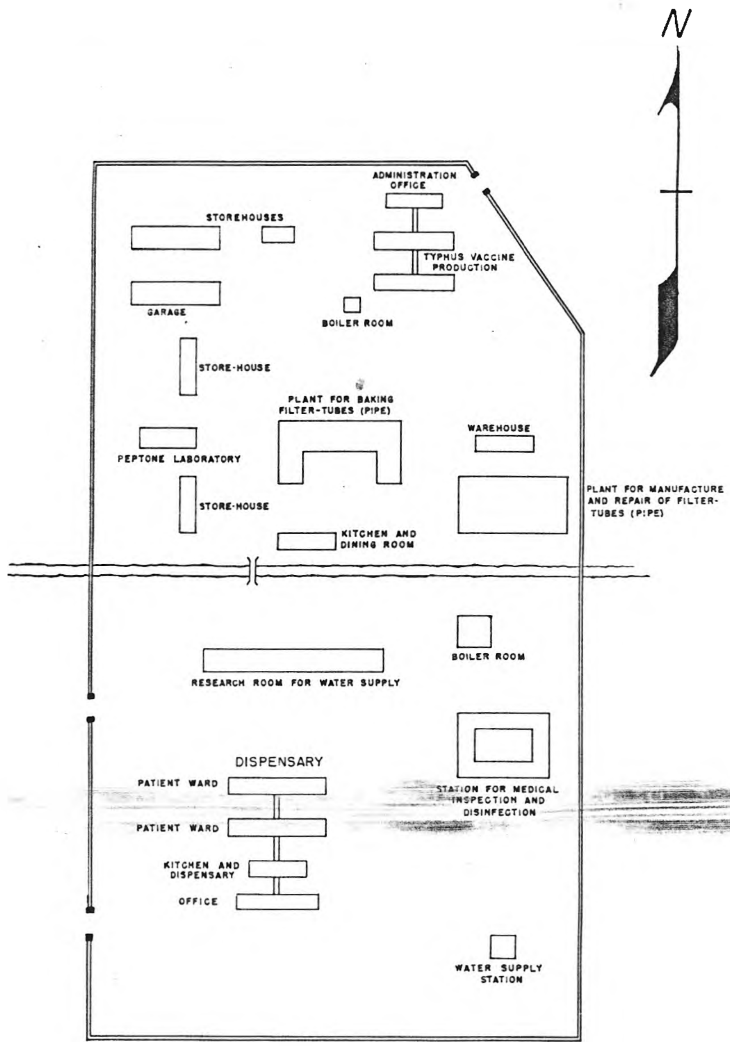


SUPPLEMENT 3 A

| | |
|---|---|
| E DIVISION — CAMP DETRICK<br>FREDERICK, MD. | |
| **PLAN OF<br>HARBIN RESEARCH LABORATORY**<br>DRAWN FROM SKETCH SUBMITTED BY<br>LT. GEN. SHIRO ISHII | **CWS** |
| SCALE–*NO SCALE* \| DATE – *4-24-46* | DRAWN BY– *E.T.S.* |

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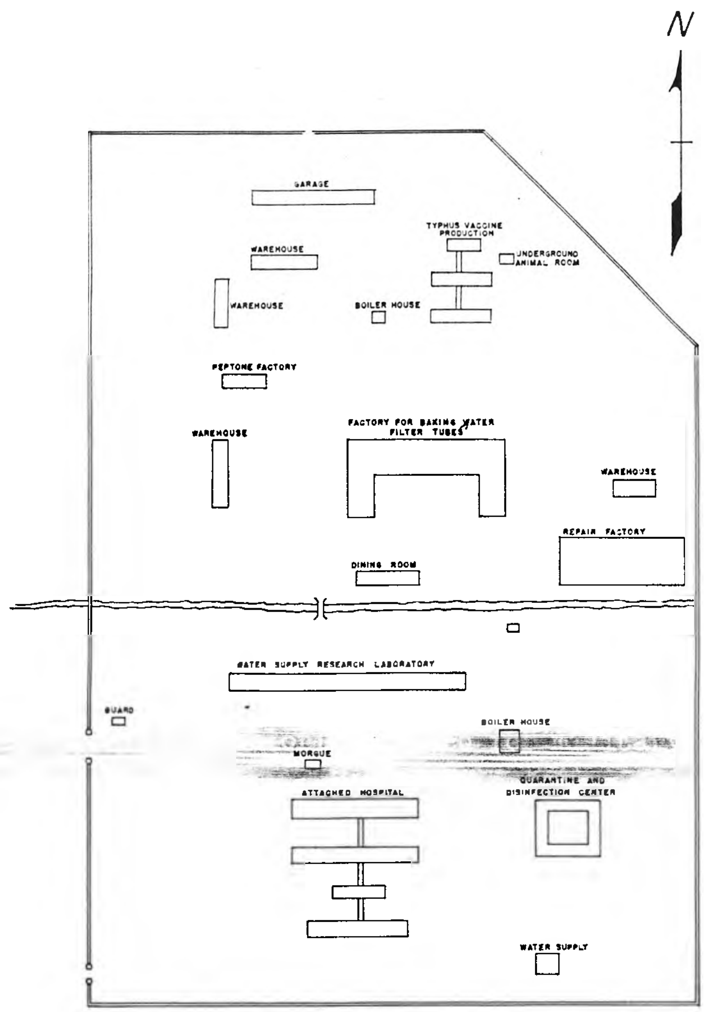


SUPPLEMENT 3 B

E DIVISION — CAMP DETRICK
FREDERICK, MD.

**PLAN OF**
**HARBIN RESEARCH LABORATORY**

DRAWN FROM SKETCH SUBMITTED BY
LT. GEN. MASAJI KITANO

**CWS**

SCALE— *NO SCALE* | DATE— *4-24-46* | DRAWN BY— *E T S.*

[redacted]

Supplement 3e

# OUTLINE OF WORK CONDUCTED BY THE PINGFAN INSTITUTE

## I. RESEARCH IN PREVENTIVE MEDICINE:

1. Improvement of Vaccines: Typhoid and paratyphoid, dysentery, cholera, plague, whooping cough, epidemic cerebrospinal meningitis and gonococcus vaccines.

2. Research in Anatoxins: Gas gangrene, tetanus, diptheria and scarlet fever anatoxins.

3. Improvement of Curative Sera: Gas gangrene, tetanus, scarlet fever, erysipelas, diptheria, dysentery, streptococcus, staphlococcus, pneumonia, epidemic cerebrospinal meningitis and plague sera.

4. Measures for Promotion of the Health of Soldiers: Research pertaining to food, rest, sleep and supply of water in Japanese barracks.

5. Prevention of Tuberculosis:

   a. Relationship between food, rest, sleep, supply of water and calories needed ~~for military~~ work.

   b. Preventive inoculation.

   c. Quarantine and disinfection.

6. Research in Rickettsial and Virus Vaccines: Typhus (R.prowazeki), Manchurian fever (R.manchuriae), epidemic hemorrhagic fever, forest tick encephalitis, rabies and small pox vaccines.

7. Vitamin Research.

8. Desiccation Research: Methods for desiccation and storage in the dried state of preventive and curative sera, diagnostic agents and blood plasma.

9. Propagation of Small Animals for Research: Mice, rats, marmots, rabbits and goats.

10. Research in Environmental Hygiene.

11. Research in Self-Supply of Foodstuffs for Members of the Institute.

12. Research in Preventive Methods of Anthrax and Glanders.

Supplement 3e

II. RESEARCH IN DIAGNOSTICS:

1. Research in the Drying and Supply of Diagnostic Agents.

2. Research in Long Period Storage of Diagnostic Sera in the Dried State.

3. Diagnostic Allergic Antigens: Tuberculin, plague, tularemia, Dick and Schick test antigens.

4. Serological Identification.

5. Methods for Diagnosis of Anthrax and Glanders.

III. RESEARCH IN THERAPEUTICS:

1. Surgical Treatment: Early extirpation of the lymphatic glands in pest and anthrax.

2. Internal Treatment: Radical cure of typhoid and paratyphoid carriers.

3. Chemical Treatment: Marfanil, sulforivanol, penicillin.

4. Radical Cure of Patients with Virus Infections: Epidemic hemorrhagic fever, forest tick encephalitis.

5. Serum Therapy: Typhoid, pest, anthrax, dysentery.

6. Research in Effectiveness of Dried Blood Plasma for Field Transfusion: Effectiveness as applied to members of the unit and their families.

7. Physical Treatment: Projection of X-Ray on the spleen for serum sickness.

8. Vaccine Therapy of Typhus.

9. Treatment of Anthrax and Glanders.

IV. RESEARCH IN FIELD DISINFECTION:

1. Methods for field disinfection.

2. Disinfection agents.

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3. Field disinfection cars for ground disinfection.

4. Field disinfection cars for clothing and personnel.

5. Research in field germ detection cars.

6. Research in prevention and quarantine railway trains and ships.

7. Research in the use of airplanes for disinfection.

V. <u>RESEARCH IN DRUGS AND CHEMICALS:</u>

1. Synthesis of marfanil and sulforivanol.

2. Penicillin production.

3. Extraction of asparagin for Sauton's medium.

4. Extraction of vitamin C from "Yama-hamanasu."

5. Use of birch oil extract for insecticide.

6. Synthesis of vitamin $B_1$ and $B_2$.

7. Peptone research.

8. Preparation of meat essence from wild silkworm pupae.

9. Refining of industrial ammonium sulphate for concentration of diptheria toxin.

10. Preparation of pepsin and pancreatin.

11. Fuel for automobiles from birch oil.

12. Substitute fuel from lignite for automobiles.

13. Manufacture of alcohol from resources in Manchuria.

14. Elimination of gum-like matter from cold-proof lubricating oil (a mixture of bean-oil and castor-oil) when alcohol is used as aircraft oil. Preventable by using 80% alcohol and 20% gasoline, or, 80% alcohol and 20% pine root oil.

15. Research in chlorine test paper.

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Supplement 3e

VI. RESEARCH IN SUBSTITUTES FOR CLOTHES AND FOOD:

1. Use of Manchurian wild silkworm for clothing substitute.
2. Food substitutes from Manchurian resources.
3. Cold storage of vegetables.
4. Edible grass as substitutes for vegetables.
5. Edible grass as substitutes for vegetable feeds of small animals.

VII. RESEARCH IN FIELD SUPPLY OF PURIFIED WATER:

1. Cold-proof equipment for sanitary filtering apparatus.
2. Decreasing weight and volume of sanitary filtering apparatus.
3. Substitutes for aluminum and iron in filtering apparatus.
4. Mass production of diatomite filtering apparatus.
5. Methods for determination of disinfection of water in the field.
6. Detection of poison in water.
7. Softening of hard water.
8. Elimination of iron in water filtering tubes.
9. Improvement of methods for washing water filtering equipment.
10. Transporting of small-sized filtering apparatus by dogs.
11. Supply of purified water in bags dropped from aircraft.
12. Methods for increasing capacity of diatomite filtering tubes.

VIII. RESEARCH IN TRANSPORTATION:

1. Air transport of personnel and materials for preventive medicine.
2. Evacuation of patients with infectious diseases by airplane.
3. Research in cold-proof hygiene.

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Supplement 3e

IX. RESEARCH IN PREVENTIVE MEDICINE APPLICABLE TO DEFENSE AGAINST BOMBS AND SPRAY FROM AIRCRAFT:

1. Defensive measures against experimental bombs manufactured by the institute.

2. Research in dissemination by spray and measures for defense.

X. MANUFACTURE:

1. Vaccines:

a. Dried vaccine.

b. Plague vaccine.

c. Typhoid and paratyphoid vaccine.

d. Gas gangrene vaccine.

e. Tetanus vaccine.

f. Cholera vaccine.

g. Dysentery vaccine.

h. Scarlet fever vaccine.

i. Whooping cough vaccine.

j. Diptheria vaccine.

k. Eruptive typhus vaccine.

(1) Vaccine prepared from eggs.

(2) Vaccine prepared from white rat lungs.

(3) Vaccine prepared from wild squirrel lungs.

2. Curative Sera:

a. Gas gangrene serum.

b. Tetanus serum.

[redacted]

[redacted]



c. Diptheria serum.

d. Dysentery serum.

e. Streptococcus serum.

f. Staphlococcus serum.

g. Erysipelas curative serum.

h. Pneumonia curative serum.

i. Epidemic cerebrospinal meningitis curative serum.

j. Plague curative serum.

3. Diagnostic Antigens:

a. Typhoid.

b. Paratyphoid.

c. Eruptive typhus.

d. Tuberculin.

4. Diagnostic Sera:

a. Diagnostic serum for typhoid fever.

b. Diagnostic serum for paratyphoid.

c. Diagnostic serum for all types of dysentery.

d. Diagnostic serum for all types of cholera.

e. Diagnostic serum for epidemic cerebrospinal meningitis.

f. Diagnostic serum for pneumonia.

g. Salmonella factor serum.

5. Materials for Filtering Apparatus:

a. Filtering apparatus (B).

b. Filtering apparatus (C).

[redacted]

[redacted]



c. Filtering apparatus (D).

d. Filtering apparatus parts.

e. Water filtering tubes.

6. Drugs:

a. Peptone.

b. Meat essence.

c. Magotin.

d. Marfanil.

e. Penicillin.

f. Birch oil.

7. Repair of Water Filtering Apparatus:

8. Tentative Manufacture of Bombs:

a. I Bomb.

b. Ro Bomb.

c. Ha Bomb.

d. Ni Bomb.

e. U Bomb.

f. Uji Bomb (Old Type).

g. Uji Bomb (Type 50).

h. Uji Bomb (Type 100).

i. Ga Bomb.

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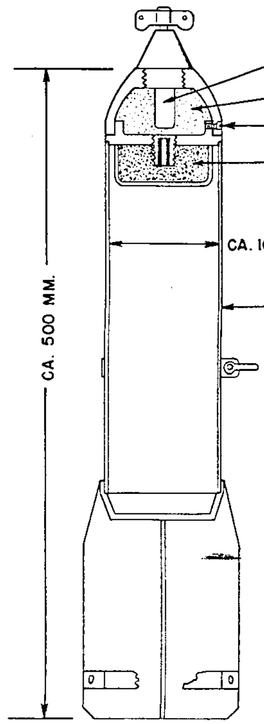


PRODUCTION: APPROXIMATELY 300 ROUNDS IN 1937

WEIGHT: 20 KG.

CAPACITY: 2 LITERS

FUZE: TYPE-YEAR 12 "TOKA SHUPATSU"

EXPLOSIVE: APPROX. 30 GRAMS BLACK POWDER,
50 GRAMS BROWN POWDER (TNT)

SUPPLEMENT 4 A

| | |
|---|---|
| E DIVISION - CAMP DETRICK<br>FREDERICK, MD. | |
| I BOMB<br>EXPERIMENTAL BOMB FOR BACTERIAL LIQUID<br>DRAWN FROM SKETCH SUBMITTED BY LT. GEN. SHIRO ISHII | CWS |
| SCALE- NONE \| DATE- 4-30-46 | DRAWN BY- E. T. S. |

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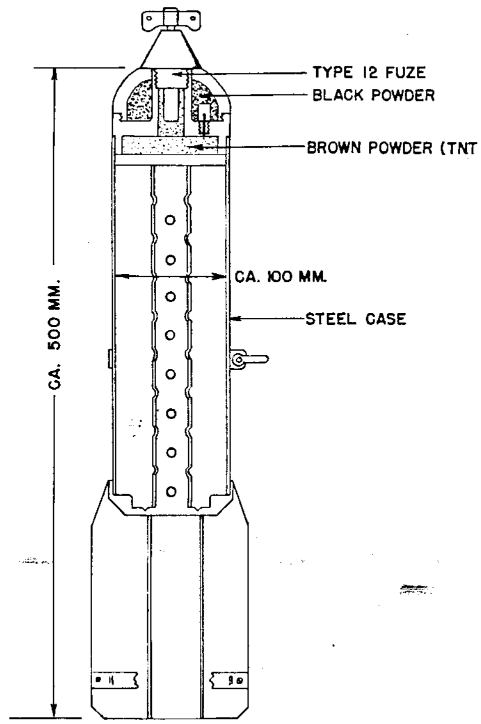


PRODUCTION: 300 ROUNDS IN 1937
WEIGHT: 20 KG.
CAPACITY: 2 LITERS
FUZE: TYPE-YEAR 12 "TOKA SHUPATSU"
EXPLOSIVE: APPROX. 30 GRAMS BLACK POWDER,
40 GRAMS BROWN POWDER (TNT)

SUPPLEMENT 4 B

| | | |
|---|---|---|
| E DIVISION - CAMP DETRICK<br>FREDERICK, MD. | | |
| RO BOMB<br>EXPERIMENTAL BOMB<br>FOR BACTERIAL LIQUID<br>DRAWN FROM SKETCH SUBMITTED BY<br>LT. GEN. SHIRO ISHII | | CWS |
| SCALE- *NONE* | DATE- *4-30-46* | DRAWN BY- *E.T.S.* |

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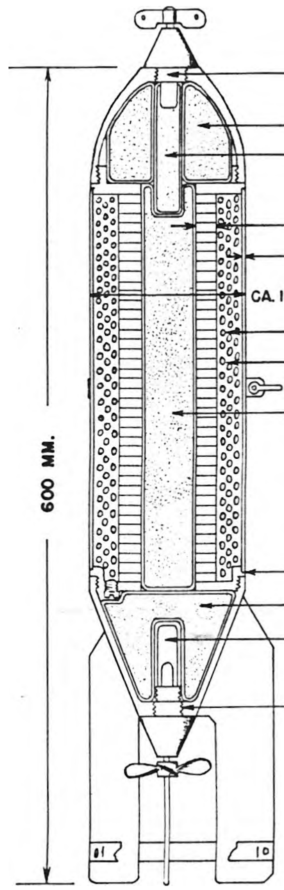


PRODUCTION: 300 ROUNDS IN 1938
WEIGHT: 40 KG.
CAPACITY: 700 CC. BACTERIAL FLUID - 1500 STEEL PELLETS
FUZES: TYPE-YEAR 12 "TOKA SHUNPATSU"
EXPLOSIVE: APPROX. 3 KG. BROWN POWDER (TNT)

SUPPLEMENT 4C

E DIVISION - CAMP DETRICK
FREDERICK, MD.

HA BOMB
EXPERIMENTAL FRAGMENTATION
BOMB FOR ANTHRAX

DRAWN FROM SKETCH SUBMITTED BY
LT. GEN. SHIRO ISHII

CWS

SCALE- NONE | DATE- 5-1-46 | DRAWN BY- E.T.S.

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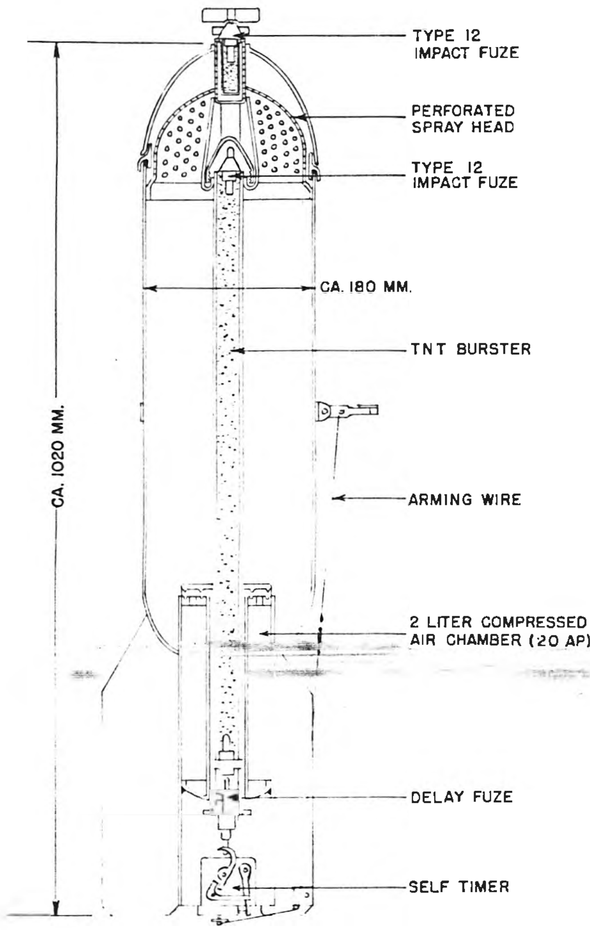


PRODUCTION: 20 ROUNDS IN 1939
WEIGHT: 30 KG.
CAPACITY: APPROXIMATELY 25 LITERS
FUZES: YEAR 12 "TOKA SHUPATSU" AND 3 SECOND
DELAY TAIL FUZE
EXPLOSIVE: 400 GRAMS BROWN POWDER (TNT)

SUPPLEMENT 4 D

E DIVISION – CAMP DETRICK
FREDERICK, MD.

**U BOMB**
EXPERIMENTAL SPRAY TYPE BOMB

DRAWN FROM SKETCH SUBMITTED BY
LT. GEN. SHIRO ISHII

**CWS**

SCALE- *NONE* | DATE- *4 - 29 - 46* | DRAWN BY- *E.T.S.*

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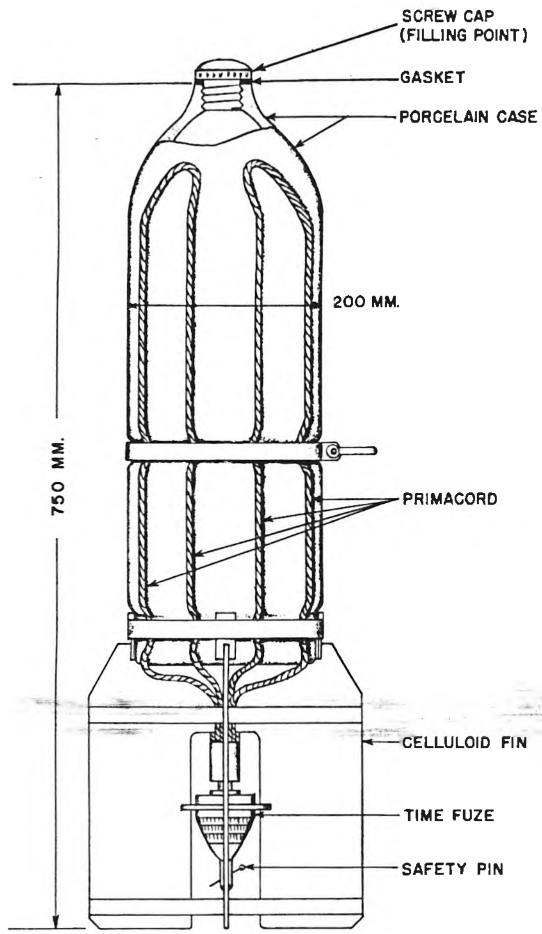


PRODUCTION: APPROXIMATELY 300 ROUNDS IN 1939

WEIGHT: 25 KG.

CAPACITY: APPROXIMATELY 18 LITERS

FUZE: TIME FUZE (REMODELED FROM TYPE-YEAR FIVE COMPLEX FUZE FOR ARTILLERY SHELL)

EXPLOSIVE: APPROXIMATELY 4 METERS PRIMACORD

SUPPLEMENT 4 E

| | |
|---|---|
| E DIVISION — CAMP DETRICK<br>FREDERICK, MD. | |
| **OLD TYPE UJI BOMB**<br>PORCELAIN EXPERIMENTAL BOMB FOR BACTERIAL LIQUID<br>DRAWN FROM SKETCH SUBMITTED BY LT. GEN. SHIRO ISHII | **CWS** |
| SCALE- *NONE*   DATE- *4-26-46* | DRAWN BY- *E. T. S.* |

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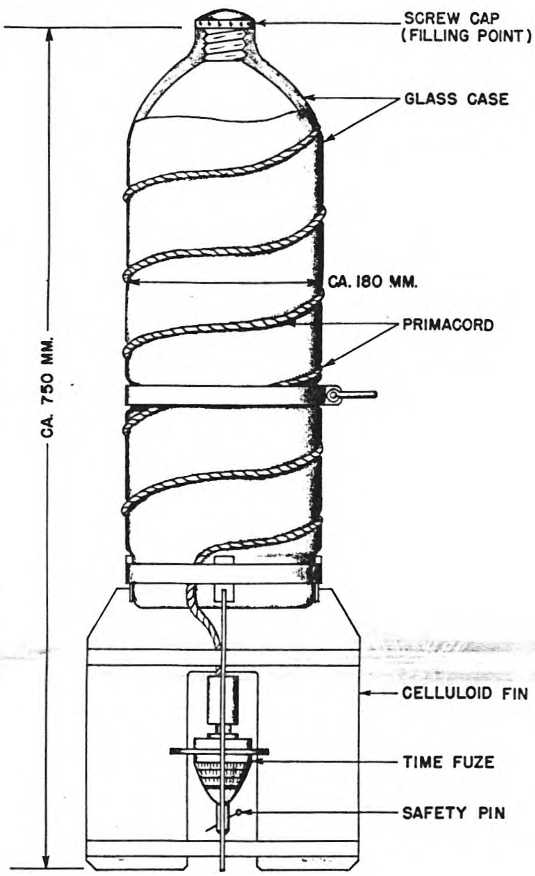


PRODUCTION: 50 ROUNDS IN 1940

WEIGHT: 35 KG.

CAPACITY: APPROXIMATELY 18 LITERS

FUZE: TIME FUZE (REMODELED TYPE YEAR-FIVE COMPLEX FUZE FOR ARTILLERY SHELL)

EXPLOSIVE: APPROXIMATELY 3.5 METERS PRIMACORD

SUPPLEMENT 4 F

| E DIVISION – CAMP DETRICK FREDERICK, MD. | |
|---|---|
| **GA BOMB**<br>EXPERIMENTAL GLASS BOMB FOR BACTERIAL LIQUID<br>DRAWN FROM SKETCH SUBMITTED BY LT. GEN. SHIRO ISHII | **CWS** |

SCALE- *NONE* DATE- *4-29-46* DRAWN BY- *E. T. S.*

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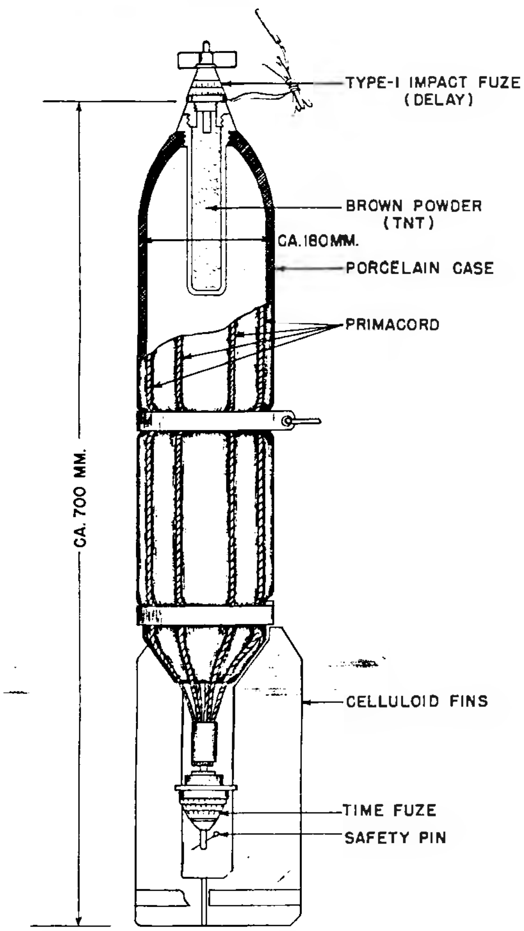


TYPE 50

PRODUCTION: APPROXIMATELY 500 ROUNDS 1940-1942
WEIGHT: 25 KG. CAPACITY: APPROXIMATELY 10 LITERS
FUZE: NOSE FUZE-TYPE I IMPACT (DELAY)
TAIL FUZE- TIME FUZE (REMODELED FROM TYPE YEAR 5 COMPLEX FUZE FOR ARTILLERY SHELL)
EXPLOSIVE: APPROXIMATELY 4 METERS PRIMACORD AND 500 GRAMS TNT.

TYPE 100 (SAME DESIGN)

PRODUCTION: 300 ROUNDS 1940-1942
LENGTH: APPROX. 1600 MM. WIDTH: APPROX. 300 MM.
WEIGHT: 50 KG. CAPACITY: APPROX. 25 LITERS
FUZES: (SAME)
EXPLOSIVE: APPROX. 12 METERS PRIMACORD AND 500 GRAMS TNT.

SUPPLEMENT 4 G

| | | |
|---|---|---|
| E DIVISION-CAMP DETRICK FREDERICK, MD. | | |
| TYPE 50 UJI BOMB<br>IMPROVED PORCELAIN EXPERIMENTAL BOMB FOR BACTERIAL LIQUID<br>DRAWN FROM SKETCH SUBMITTED BY LT. GEN. SHIRO ISHII | | CWS |
| SCALE- *NONE* | DATE- *4-26-46* | DRAWN BY- *E.T.S.* |

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