NS/rk

U. S. NAVAL TECHNICAL MISSION TO JAPAN
CARE OF FLEET POST OFFICE
SAN FRANCISCO, CALIFORNIA

1 November 1946

DECLASSIFIED

RESTRICTED

From: Chief, U.S. Naval Technical Mission to Japan.
To : Chief of Naval Operations.

Subject: Summary Report, U.S. Naval Technical Mission to Japan.

Reference: (a)"Intelligence Targets Japan" (DNI) of 4 Sept. 1945.

Enclosures:
(A) Historical Narrative of U.S. Naval Technical Mission to Japan.
(B) Index of NAVTECHJAP Reports.
(C) Compilation of Summaries of NAVTECHJAP Reports.
(D) Japanese Documents Evacuated by NAVTECHJAP.
(E) Japanese Equipment Evacuated by NAVTECHJAP.

1. Subject report, summarizing the investigations conducted by the U.S. Naval Technical Mission to Japan in accordance with ref. (a) during the period 1 September 1945 to 15 March 1946 and consisting of Enclosures (A) to (E) inclusive, is submitted herewith.

2. Enclosures (D) and (E) were prepared by Lt. (jg) O.R. Wheeler, USNR, and Lt. (jg) J.E. Wray, USNR, respectively. The report was compiled by Comdr. N. Sonensheim, USN, and Chief Yeoman R.T. Bolger, USNR.

NAVY DEPARTMENT
DEC 8 1964
LIBRARY

C.G. GRIMES,
Captain, USN

RESTRICTED

SUMMARY REPORT

NOVEMBER 1946

U.S. NAVAL TECHNICAL MISSION TO JAPAN

RESTRICTED

ENCLOSURE (A)

ENCLOSURE (A)

HISTORICAL NARRATIVE OF U.S. NAVAL TECHNICAL MISSION TO JAPAN

INTRODUCTION

In the summer of 1945, when the tremendous momentum of our drive was rolling up the islands of the Pacific and bringing imminent the invasion of the Japanese homeland itself, the United States Navy established a mission to determine the position of the Japanese in the field of naval technology.

How did the design and construction of their warships compare with ours? What range and power had their guns? How heavy was their armor and what was its metallurgy? Were they ahead of us in electronics development? The Navy wanted the answers to these and a thousand other technical questions.

To obtain the desired information, investigators had to enter Japan with the occupation forces, before manufacturing plants, equipment, materials and records could be destroyed and experienced personnel dispersed.

NavTechJap, which became the abbreviated designation for the U.S. Naval Technical Mission to Japan, was established on 14 August 1945 by directive of Commander in Chief and Chief of Naval Operations. The formation of the Mission was in accordance with the provisions of the intelligence appendix contained in the plans for OPERATION BLACKLIST, which provided for the occupation of Japan. Capt. C. G. Grimes, USN, who was Fleet Intelligence Officer in Charge of Technical Intelligence for Joint Intelligence Center Pacific Ocean Areas (JICPOA), was designated Chief of the Mission.

The surrender of the Japanese in mid-August required that the basic organization be equipped and prepared to leave Pearl Harbor by 1 September 1945, approximately two weeks after the directive establishing the Mission had been issued, in order to obtain the advantages of early exploitation of targets. The nucleus of the initial organization was recruited from technical and language personnel attached to JICPOA and technical personnel flown to Pearl Harbor from various continental naval activities. This group was designated JICPOA Team No. 29 and consisted of approximately 105 officers and 84 enlisted men. It sailed from Pearl Harbor on 1 September 1945 aboard USS SHELBY (APA 105) and was part of the convoy which entered SASEBO Naval Harbor on 23 September 1945 - the initial occupation in KYUSHU.

Another group, somewhat smaller than Team 29, was organized and designated JICPOA Team No. 30. This group joined the Third Amphibious Corps in the occupation of certain areas in China. Elements of the Intelligence Groups of Commander Seventh Fleet joined at SASEBO, and on 28 September all units were consolidated as NavTechJap.

PURPOSE OF THE MISSION

The purpose of the Mission was to survey all Japanese scientific and technological developments of interest to the Navy and Marine Corps in the Japanese Islands of KYUSHU, SHIKOKU, HONSHU, HOKKAIDO; in China; and in Korea south of latitude 38°N. This involved the seizure of intelligence material, its examination and study, the interrogation of personnel, and, finally, the preparation of reports which would appraise the technological status of the Japanese Navy and Japanese industry.

INITIAL OPERATION

The Mission was ordered to enter Japan with the U.S. Marine Fifth Amphibious Corps, at SASEBO and to locate and maintain headquarters there. The pur-

pose was to associate the Mission with an area of Japan occupied by a naval unit in order that the Mission might obtain all logistic support from that organization; and to permit the Mission to furnish it intelligence services. After landing, the Mission established headquarters in buildings formerly used for workers' barracks in the SASEBO Naval Arsenal. Billeting and messing facilities for officers and men were also provided in these buildings.

While the Mission was enroute to Japan, dispatches were received from Commander Third Fleet requesting that a naval technical intelligence team be sent immediately to YOKOSUKA to exploit targets in that area. A representative of the Mission was flown from Saipan to TOKYO to consult with the Staff, Commander Third Fleet, and upon arrival of the unit in SASEBO, a team of approximately 25 officers and enlisted men left for YOKOSUKA. Shortly thereafter, a request was received from Commander Fifth Fleet (the Third Fleet having been relieved) requesting that a team enter KURE with the initial Army landing in that port. This team joined at Okinawa the convoy assembling for KURE and landed there on 7 October 1945.

Within a period of three weeks from the initial landing at SASEBO, technical intelligence teams stemming from the headquarters of the Mission at SASEBO had entered TOKYO, YOKOHAMA, YOKOSUKA, KURE, HIROSHIMA, OSAKA, NAGOYA, KYOTO, MAIZURU, MATSUJAWA, KOCHI, FUKUYAMA, OKAYAWA, NAGASAKI, KUMAMOTO, MOJI, SHIMONOSEKI, KOGOSHIMA and FUKUOKA, with or shortly after the initial landing of the Army or Marine units in these cities.

Within four weeks, technical intelligence teams were established in or within easy reach of all major industrial centers in the main Japanese Islands of KYUSHU, HONSHU, SHIKOKU and HOKKAIDO, and teams had entered China and Korea. The purpose was to fan out quickly available talent at headquarters so that qualified representatives of the Mission would be available in all parts of the Empire to evaluate targets, to interrogate Japanese naval and civilian personnel, and to report in summary form, the intelligence value of that area. A secondary purpose was to provide qualified Navy personnel in each area who could clear all naval equipment for demolition and who could when necessary instruct Army or Marine personnel in methods of demolition.

The magnitude of the task assigned to the Mission presented almost immediately two major difficulties. One was the increasing necessity for well-equipped and competent technicians to cover the vast field of Japanese naval developments. Qualified specialists and experts had already been requested from the Bureau of Ships, the Bureau of Ordnance, the Bureau of Yards and Docks and the Bureau of Medicine and Surgery. This problem was quickly solved by the immediate action of the bureaus concerned. The best officers and technicians in their respective fields were made available, and in not a few instances that personnel had a valuable knowledge of the Japanese and their language through having either been born in Japan or having lived there before the war.

The second, but none the less important difficulty confronting the Mission, was one of location. SASEBO, located on the island of KYUSHU, is in a provincial and agricultural area of Japan, as far removed from the scientific and technical centers in the vicinity of TOKYO as it is possible to be and yet remain on the main islands of the Empire. It was evident from the very beginning that this headquarters location would add to the complexities of obtaining information, make difficult the interrogation of Japanese scientists, engineers and naval officers, and would not permit adequate liaison with the Military Intelligence Section of the General Staff of the Supreme Commander for the Allied Powers. Every day the Mission attempted to operate with headquarters at SASEBO only served to prove the handicap which that location placed upon it. It was remote from all the industrial centers of Japan; communications were poor; and all intelligence units operating in the Empire, such as U.S. Strategic Bombing

Survey, the Compton-Moreland Scientific Survey, the Air Technical Intelligence Group, and the Military Intelligence Section of SCAP, had headquarters in TOKYO. The function of the Naval Technical Mission to Japan had to be correlated with the activities of these groups in order that all intelligence units could profit from the disclosures obtained by each.

The basic technical intelligence instruction from SCAP, dated 2 October 1945, directed that the Assistant Chief of Staff, G-2, coordinate and supervise the exploitation of intelligence targets in Japan and Korea. Location of headquarters in TOKYO thus became mandatory and immediate steps were taken to obtain permission to shift the headquarters of the Mission to this central location. Permission was finally granted just prior to 1 November 1945 to relocate the headquarters of the Mission in TOKYO.

At SASEBO on 29 October 1945 Commander Fifth Fleet placed USS BLACKFORD (APB-45) at the disposal of the Chief of the Mission and headquarters was moved aboard. Expeditious departure was effected and on 1 November, BLACKFORD arrived at the Shibaura Ferry Slip, Tokyo Bay.

HEADQUARTERS IN TOKYO

The relocation of the headquarters in TOKYO, besides permitting better and closer liaison with other intelligence units, improved immeasurably the effectiveness and efficiency of the Mission. Access to much intelligence information was now more readily available. Communications with investigators deployed throughout the Empire were facilitated, permitting better coordination of the activities of each team with the activities of headquarters. Billeting and messing facilities were greatly improved. At first the entire complement of officers and men was billeted aboard BLACKFORD, but increase of personnel required more facilities and an additional barracks ship, APL-46, was allocated by Commander Fifth Fleet. Subsequently, quarters were obtained for the Chief of the Mission in the Imperial Hotel in TOKYO, and for 40 senior officers in the Dai Iti Hotel, both hotels being Army billets.

All logistic support for the Mission, such as food and quarters for the overflow of officers and men billeted in TOKYO, Army winter uniforms for all personnel, and maintenance of automotive equipment were provided by the Army. The Mission could not have satisfactorily completed its work in Japan without this assistance.

The administrative offices of the Mission remained aboard BLACKFORD, but the office of the Chief of the Mission was established in the Meiji Building in the downtown section of TOKYO. The Technical Department, under whose cognizance came the responsibility for accomplishing the specific tasks of the Mission, was also established in the Meiji Building and space was allocated for conferences and interrogations. Thus the working unit was in close proximity to other intelligence units and liaison offices, an arrangement which provided a very satisfactory and efficient method of operation.

By 1 November 1945 the Mission had grown to approximately 295 officers, 125 enlisted men and 10 naval technicians. Among the officers was a delegation of approximately 23 British technical specialists and language officers, an able and experienced group which cooperated effectively on many difficult investigations. There was a constant turn-over in the personnel attached to the Mission due to the arrival of specialists and the detachment of officers

having completed their assignments.

ORGANIZATION WITHIN THE MISSION

Under the Chief, the Mission was divided into two departments, Executive and Technical. Under the Executive Officer were several assistants and section heads in charge of liaison service, administrative files, personnel, supply, transportation, communications, shipment of seized enemy material and documents, and language services. Under the officer-in-charge of the Technical Department, was an assistant officer-in-charge, and section heads in charge of the Ships, Electronics, Ordnance, Medical, Special, and Petroleum Sections, as well as the Atomic Bomb Medical Group. With necessary additions, the organization of the Technical Department closely followed that of the Foreign Department of the Office of Naval Intelligence, each having substantially the same cognizant sections.

In addition, there were two other activities in the Technical Department. One was the Progress and Reports Section which was charged with the responsibility of filing intelligence material, and with the receiving, editing, typing, and final printing of the technical reports of the Mission. This section also correlated the activities of each section to eliminate duplication and maintained progress data on the exploitation of each target so that the overall completion of the Mission's work could be predicted. It is interesting to note in passing that nearly all typists in this section, about 20 in all, were Japanese civilians. A considerable amount of drafting (some 3000 items were eventually drafted) was necessary in connection with preparation of reports, and this work was originally done largely by Japanese obtained from the Ship Construction Section of the Technical Department of the Japanese Navy Ministry.

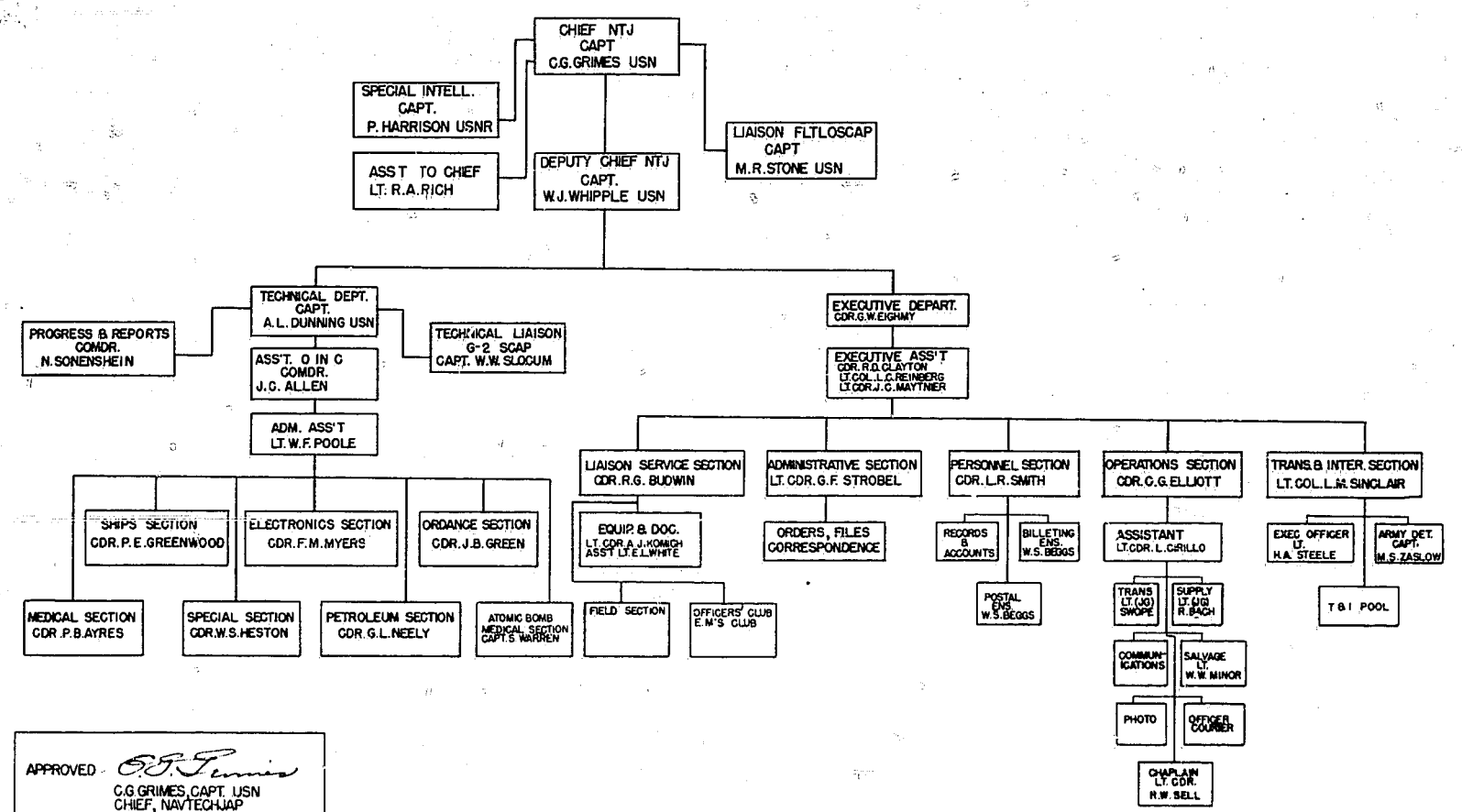
The other activity in the Technical Department was designated Technical Liaison, G-2, SCAP. Immediately on arrival of the Mission in TOKYO, an officer was detailed as NavTechJap Liaison Officer to Military Intelligence Section, G-2, SCAP. This officer attended all General Headquarters, SCAP policy-forming conferences and meetings which affected naval intelligence. He cleared all naval intelligence targets with and passed all intelligence material and information gathered by the Mission to the Military Intelligence Section, G-2. This close cooperation between the two organizations benefited both and resulted in a respect and admiration for the quality of work which both organizations were doing. It immeasurably improved the quality of the overall intelligence gathered in this area.

In addition to the Technical and Executive Departments, a separate Special Intelligence Group was maintained. This group was employed in the exploitation of such non-technical targets as were requested by higher authority, or as were left uncompleted on the departure from Japan of the U.S. Strategic Bombing Survey.

Figure 1 presents graphically the overall organization of the Mission.

On 1 November 1945, Commander Fifth Fleet ordered the Chief of the Mission to designate one officer for each Army, Corps and Division area in Japan, who, in addition to his duties with NavTechJap, would act as liaison officer from the Fifth Fleet to the Army unit. The estimated officer requirements for this liaison service was 25 senior officers. The Fifth Fleet Liaison Officers were

U. S. NAVAL TECHNICAL MISSION TO JAPAN
ORGANIZATION CHART



APPROVED C.G. Grimes
C.G.GRIMES,CAPT. USN
CHIEF, NAVTECHJAP

5

ENCLOSURE (A), continued

RESTRICTED

established to place a qualified naval officer with each Army unit who could initiate action to clear naval problems arising in the Army unit and who could make recommendations to the Army, when requested, on methods of demolition of Japanese Navy equipment. Figure 2 shows the organization of the Liaison Service.

METHOD OF APPROACH

The primary objective of the Mission was to find, investigate, examine, evaluate and report on Japanese naval equipment, documents and methods. Before the cessation of hostilities, the Office of Naval Intelligence was ready with a complete list and description of information desired by the several Bureaus of the Navy Department and the specific targets to be investigated. As early as 15 September 1945, copies of "Intelligence Targets Japan" (DNI) of 4 September 1945, a publication prepared by Chief of Naval Operations, were received by NavTechJap. That advance planning crystallizedthe objectives of the Mission and permitted it to move at once into the field with specific purposes. Copies of "Intelligence Targets Japan" were issued to all officers concerned. The book itself was divided into several sections, each having the same general designation as the name of sections comprising the Technical Department of the Mission. The sections of the book were in turn broken down with a description of each specific target designated by number. A target is usually understood to mean a definite object in a specific place, but a slightly broader definition was applied in this case. A target was understood to mean a technical "subject" regardless of where activities pertaining to it might be located within the Empire. Every piece of equipment of the same type obviously would not be investigated, but the original type and all subsequent modifications were covered. This method resulted in a comprehensive report on the development and use of the entire subject, and not just one unit or phase of the subject.

Another helpful guide was the "Report on Scientific Intelligence Survey in Japan, 1 November 1945" (the so-called "Compton-Moreland Report") summarizing the findings of a small group of scientists who, in September and October 1945, made a quick survey of the Japanese organization for scientific research and development. In fact, members of that mission, before publication of their report, gave advance suggestion to NavTechJap concerning certain fields or devices meriting immediate detailed investigation.

With "Intelligence Targets Japan" as a guide, technicians and specialists in a particular field were assigned one or more targets. The activities of the individual investigations were closely supervised and coordinated by the section heads. As requested, key Japanese naval personnel and scientists were produced by the Japanese Liaison Office for interview and interrogation. In nearly all instances one or more of the language officers assigned to NavTechJap were present at these interviews to interpret both questions and answers. Visits were then made to locations where equipment and documents could be found. When deemed advisable, documents and samples of the equipment were seized and sent to one of the four NavTechJap collection centers which had been established at SASEBO, YOKOSUKA, KURE, and KOBE, where they were prepared for shipment to the United States.

After completion of the field work, the investigators returned to TOKYO where a complete report was first written in long hand. A staff of editors processed each report to determine its completeness and acceptability. The head of the cognizant Technical Department section reviewed the report for technical and engineering accuracy. No officer or technician was permitted to return to the United States until his report had been edited and accepted. Once accepted, the report was typed by the Japanese personnel, in the Progress and Reports Section and made ready for shipment to the printer.

ENCLOSURE (A), continued

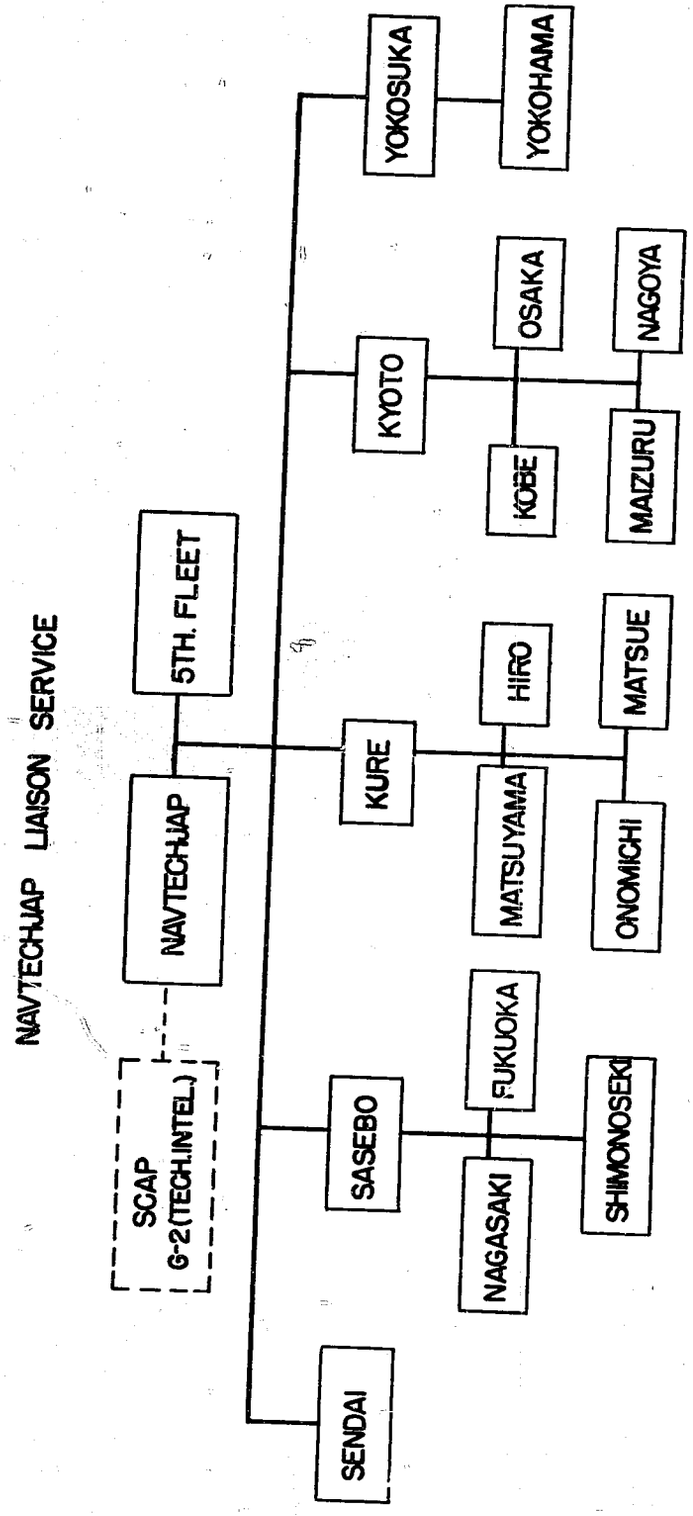


Figure 2

In many instances it was necessary to do more than simply investigate the material on hand. For example, a new model, 20-cylinder diesel engine was about fifty percent completed when Japan surrendered and all construction and development of war material stopped. The engine showed promising possibilities. The originating Japanese engineers and scientists were located and brought back to complete its construction at the expense of the Japanese government. Upon completion tests were run to determine its performance.

The search for data and equipment on Japanese petroleum research seemed hopeless, until the remains of a laboratory were discovered at OFUNA. Most of the documents, data, etc., were said to have been destroyed, but enough remained to indicate that a sizeable establishment was once in operation there. Again the Japanese engineers, draftsman, scientists and research men formerly employed in the laboratory were assembled to duplicate plans, drawings and experimental data which had been developed. Strangely enough, the Japanese scientists took considerable pride in accomplishing this work to demonstrate the extent of their advancement. The net result was a complete disclosure of Japan's petroleum research.

FINAL STAGE OF THE MISSION

By early February 1946 reports in rough form were being submitted in volume. The means for completing and printing reports were not available in Japan, and CinCPac made available the facilities of the Joint Intelligence Center, Pacific Ocean Area, to the Mission for that purpose. JICPOA was well-established in Pearl Harbor in a separate building with trained personnel and modern equipment for typing, drafting, laying-out, and printing reports. The Progress and Reports Section was, therefore, moved by plane to Pearl Harbor on 22 February 1946. Upon completion of technical investigations several weeks later, all activity of the Mission in Japan was terminated and, on 11 March 1946, the remaining personnel left the Empire and established headquarters in the JICPOA Building in Pearl Harbor. This arrangement permitted close cooperation eliminated delays, and provided the highest possible security.

Editorial work was highly important. Since there were to be nearly two hundred separate reports, uniformity in arrangement was desirable. No effort was made to standardize the author's style, though clarity of expression, accuracy of statements and figures and adequate cross-referencing were necessary if the reports were to be of value. A proper segregation of descriptive matter and tabular statistics was sought, and much material placed at the end of the reports as appendices or enclosures to avoid cluttering up the text. A summary was provided at the beginning of each report to give a quick picture to the reader not interested in detailed descriptions and figures. References were given to other NavTechJap reports on similar or related subjects or to those prepared by other activities such as USSBS, ATIG, and TLID.

NavTechJap and JICPOA worked so closely on the production of reports that the problems of one were the direct concern of the other. Difficulty in obtaining an adequate number of typists was matched by the need of capable layout personnel, and the demand for draftsmen was perhaps the hardest of all to solve. About 1 May, for instance, when all possible sail was being crowded to complete the project, NavTechJap had 10 draftsmen on this work, JICPOA furnished 5, Naval Shipyard, Pearl Harbor supplied 25, the 30th Engineer Topographical Battalion at Schofield 6, Naval Shipyard, Mare Island 35, and Naval Shipyard, San Francisco, 15.

All naval activities had common problems resulting from the loss of high-point, trained personnel and the demobilization of the Naval Reserve. But the work of the draftsman, photographer, printer, required highly specialized skill which made replacement by inexperienced personnel (even when available), a

very slow procedure. Consequently the small group of qualified personnel worked under extreme and unceasing pressure. Especial commendation is due JICPOA whose resourcefulness, untiring effort, and admirable "know-how" contributed so much to the success of the concluding phase of this Mission.

OBSERVATION AND COMMENT

It is for others to evaluate the results of the many investigations undertaken by NavTechJap. Some targets were of interest because of new, unique, or superior design by the Japanese. Other targets produced seemingly negative results which nevertheless have positive value from knowing that another nation has verified our research and conclusions, or has tried methods new to us yet which failed of accomplishment.

NavTechJap investigators, unarmed and often alone, visited scores of places in Japan, both urban and rural, and never once were molested or threatened. Usually the American was ignored, little curiosity being displayed by Japanese adults. When they were asked for information, friendliness and willing cooperation were the general rule.

Of considerable interest was the observation that the Japanese Army and Navy both deliberately spurned the scientist, whose knowledge, laboratories and research equipment might have contributed so much toward a more successful prosecution of the war by the Japanese. The scientist recognized this and felt deeply injured over the lack of confidence in his ability and his loyalty. Little organized research was carried on during the war. A corollary to this, is the fact that by such policy Japan failed, in general, to realize those tremendous and permanent scientific advances that the modern nation gains from huge wartime expenditures for research.

The common concept that the Japanese lack originality and are merely an imitative people is in need of qualification. They entered the fields of science and mechanical industry only a comparatively few years ago. The sensible thing was to engage in wholesale copying until they caught up with other countries. Had they proceeded independently in scientific research and discovery, they would always have been fifty years behind. The Japanese may be especially adept at copying but evidence of their originality and ingenuity is not lacking.

The Japanese received very little effective help from the Germans or the Italians. It is true that the Japanese I-400 type submarines were equipped with Schnorkel, but it is understood the Japanese saw a German submarine in Hong Kong and copied the Schnorkel features. A Japanese submarine crew was sent to Germany for training, but all hands were lost on the trip back. Some assistance was received from Germany pertaining to electronics, but Japan was still well behind us in the design of this equipment. Such information as the Japanese obtained was largely of a general rather than specific nature. The single important exception seems to have been the assistance given by Germany in the sonar field. Some of the Japanese equipment was almost an exact copy of captured British equipment.

At the time of the Pearl Harbor attack, Japan had a strong and well equipped navy, with ships that were of good design and rugged construction. Three of them, the battleships YAMATO and MUSASHI, and the aircraft carrier SHINANO, were the largest, and in many respects, the most powerful warships in the world. YAMATO and MUSASHI had standard displacement of 63,000 tons each (when fully loaded, 73,000 tons) and a speed of 28 knots. Their main battery, consisting of nine 46cm. (18.1-inch) guns had a maximum range of 45,000 yards. This is noteworthy in itself, since they were the largest naval guns in the world.

To match this, the largest United States battleship was the WEST VIRGINIA

of 32,400 tons standard displacement, 21 knots speed, and main battery of eight 16-inch guns.

During the latter part of the war, surface ship production was largely abandoned by the Japanese in favor of submarine production, and during 1944 they brought out the I-400 class, three huge submarines whose primary mission undoubtedly was bombing the Panama Canal and cities of the United States. They had a displacement of 5,550 tons each, a length of 400 feet, a maximum speed of 19.7 knots surfaced and 7 submerged, and cruising range of 34,000 miles at 16 knots. Eight torpedo tubes and one 5.5-inch deck gun comprised the armament. In addition, in a hangar tube (11.6 ft. diameter) on main deck, each submarine carried three bombing planes, each weighing about four tons, capable of 290 knots speed, and carrying a bomb of 0.8 tons or one 18-inch airplane torpedo.

By comparison, our largest submarine was NAUTILUS, with a displacement of 2730 tons, a length of 371 feet, a speed of 17 knots surfaced and 8.5 submerged and a cruising range of 15,000 miles. The armament consisted of eight tubes for 21-inch torpedoes and two 5-inch guns which were later replaced by 3-inch.

The Japanese developed very successfully torpedoes of three different types, using pure oxygen, air, and electricity for propulsion. There was nothing unusual about the 18-inch, air-driven torpedo, but the 21-inch electric type, with a range of 7500 yards at 30 knots, was an effective weapon because it left no wake, was easy to manufacture and hence used extensively.

In time of war persons of every nationality show unlimited courage and self-sacrifice, but never before was the willingness of the individual soldier to destroy himself so incorporated into the wartime policy of a nation. When Japan was forced to change from offensive to defensive warfare, she realized it would cost the lives of many brave men, but coolly and efficiently she devised plans and equipment which would take numerous enemy lives in exchange for each native son.

The best known of these implements of self-destruction was the Kamikaze plane, which was considered not so much a projectile carrier as the projectile itself, with a human being as part of its steering and control mechanism. The men who volunteered for this one-way ride were a select group of Japan's best pilots, and there were always more volunteers than planes.

The Baka Bomb and its human control was a variation of the same idea of death in and from the air.

On the surface of the water, it took the form of Shinyo, a small special attack boat which utilized the explosive charge in its bow by ramming the side of the intended victim. These motor boats were collected in special attack basins along the coast or carried on mother ships. Such suicide craft were manned by middle school boys of 15 and 16 years of age. It is reported that a supply of volunteer pilots was obtained because of special privileges, early responsibility, fast promotion, and the promise of a posthumous monetary award to the volunteer's parents.

Underwater opportunities for destruction stimulated the Japanese imagination. The Kaiten ("Great Undertaking") was a one-man submarine which was substantially an altered torpedo having human control and additional fuel capacity inserted between the torpedo warhead and the torpedo engine. Six Kaiten were carried on the decks of I-type submarines and connected by tubes through which the pilot could enter the torpedo and start on his journey without the submarine having to surface. These midget or suicide subs were manned by young volunteers of 18 to 20 years, attracted by much the same inducements offered the Shinyo pilots. The Japanese claimed great success in the encounters be-

tween Kaiten and enemy shipping.

The Japanese had amphibious tanks 35 feet long, that rode "piggy back" on submarines. In preparation for an attack, the submarine would surface, and, after the tank had drained, it would be boarded by a crew of one officer and six men and a landing party of 35 men. The tank would then be driven off the sub, or the later would submerge, leaving the water-borne tank ready to proceed under her own power. When the Nipponese strategy turned defensive in 1944, these sea-going tanks were modified to include torpedo cradles. Upon reaching an objective, both torpedoes would be released at short range. No attempt to return ashore for re-loading would have been made, as the expendible tank would have simply been scuttled on the spot, and the brave but hapless crew would join their honorable ancestors. (These mechanical oddities were never known to have been used operationally although about 100 were built.)

Still another, though less well-known suicide group, was the Fukuru, or "Crouching Dragons". Had the war reached the stage of repelling an amphibious landing on the shores of HONSHU, the Fukuru were prepared and equipped to walk underwater and ram an explosive bomb against the hull of an enemy landing craft. These "underwater kamikazes" wore diving suits equipped with two oxygen tanks, submarine-type air cleaning devices, and tubes for liquid food, and could operate effectively in water 50 feet deep, walk underwater more than a mile an hour, and stay underwater for ten hours. At the war's end, 4,000 Fukurus were at the YOKOSUKA Naval Base, of whom 1200 were fully trained.

Loss of much of her shipping capacity and the resulting fuel and food shortage caused Japan to give consideration to suggestions by her oceanographers that ocean currents be utlized for transportation of necessities. Since 90% of the drift bottles set adrift in the Japanese Sea off the east coast of Korea reached the northern part of HONSHU it seemed feasible to use the Kuroshio (Japan Current) for the transportation of soya beans from Manchuria and other goods from Formosa, Nansei Shoto, etc., to Japan proper. A small wooden ship of 200 tons was successfully floated from FUSAN to HONSHU. Then plans were made for floating metal drums which would drift below the surface but some in every lot would be equipped with radios, and at intervals would rise and be contacted by land stations in order that their movements could be traced. Loss of the Philippines meantime, prevented carrying out the plan.

Japan was far behind us in the field of electronics, but her experiments with a "Death Ray" may have the unique outcome of saving countless lives threatened by tuberculosis. These experiments showed a pronounced effect on the lungs of the animals tested, and further research was contemplated toward a possible cure for tuberculosis. It was noticed that higher frequencies affected the brain. The investigators realized that heat was an evident factor but were sure that frequency was important also. The frequency characteristic could be associated with the resonance dimensions of the head and body respectively. It is quite possible that Japanese or American investigators may develop treatment for tuberculosis and for certain brain disorder that will have great therapeutic value. A mass chest X-ray program for the diagnosis of tuberculosis was interruped by the war, but Japan was using an "immunization" technique that should be further investigated.

The Japanese medical officers observed that most cases of night-blindness occured with pilots having liver trouble and whose secretion of the bile was not normal. Acting on this hint, they developed a preparation named "Migozai" whose ingredients stimulate the secretion of the bile and the absorption of Vitamin A, so necessary for the retina of the eye The vision of the dark - adapted eye when taking this preparation improved from 1½ to 2 times. This means, looking at the same object, the eye can see it from twice the distance.

More notable, and certainly more far reaching, is the discovery of two drugs by Japanese who were searching for some therapeutic agent resembling

cnolrophyll, with its power of converting sunlight into energy. These were derived from neocyaine and named Koha and Shiko (meaning Rainbow Wave and Violet Light). The drugs improve general body resistance and stimulate regeneration of tissue. The Japanese have demonstrated remarkable results when used in leprosy cases. Burns and frostbite responded with gratifying acceleration, while benzine burns and boiling water burns especially, showed quick improvement.

Of considerable interest is an unusual type of hangar construction that the Japanese had developed. It was called the "Diamond Truss", from the diamond-shaped pattern formed by the intersecting arches. It is in reality a hangar made of a series of intersecting skew arches. In this novel design, the skewed arches form the longitudinal bracing of the structure in addition to taking the regular loading. The design resulted in a tremendous saving of steel. At first glance it would appear that the cost of fabrication of such an unorthodox structure,would be prohibitive, but actually, no bent plates or structural shapes were necessary and standardization on the sizes of hangars kept the steel detailing to a minimum. The entire structural frame is made up of plates and angles. To avoid complicated framing at the intersections of the arches, the top and bottom chords of the arches were cut and framed into gusset plates. This type of construction might well receive consideration by our architects and builders for any structure where large roofing areas are involved, such as hangars, garages, factory and mill buildings, armories, and gymnasia.

Petroleum was the " Achilles Heel" in the Japanese armor, and her lack of this precious fuel was the fundamental cause of her downfall. When the Japanese super-battleship YAMATO made her suicidal sortie southwest of KYUSHU in the waning months of the war, she was powered by edible refined soya bean oil. U.S. Navy planes sank the soy bean-burning warship on 7 April 1945 when she was intercepted enroute to attack American shipping at Okinawa.

Lack of oil resources kept scores of Nipponese ships lying immobile in KURE and other ports and many of her battleships and cruisers were sitting-duck targets, easily sunk by bombs and torpedoes dropped by our airmen.

Japan's efforts to find substitute fuels were frantic (and to a limited extent effective), but entirely inadequate. Until the beginning of the war, the Japanese Navy's chief source of diesel and bunker fuel was imports from California. This stockpile was exhausted in 1942 and cracked residues from Sumatra and Borneo crudes were than utilized as bunker fuels. In 1944, due to Japanese tanker losses to U.S. submarines, research and practical testing were undertaken on both diesel and boiler fuels to develop substitutes. By the spring of 1945 aircraft carriers were utilized as tankers to bring motor gasoline from Singapore to be used as charging stock in the manufacture of even more desperately needed aviation fuel.

Satisfactory diesel fuels were produced from coconut oil, hydro cracked; pressed copra oil; esterfied copra oil; and soya bean oil. Pine root oil was used too, but had a tendency to leave gummy deposits in the engine. A determined effort was made to develop an industry for converting coal into oil. but the results were comparatively insignificant. As a matter of fact, the outputs of oil from shale at FUSHAN, until 1944, exceeded the combined output from all coal conversion processes.

During the last year of the war the Japanese had considerable success with a program for producing alcohol and using alcoholic aviation fuels. For instance, they were able to produce one pound of ethyl alcohol from the fermentation of eleven pounds of sweet potatoes. This in turn necessitated vital decisions about which varieties of potatoes were best for food and which best for fuel,

and how the two should be apportioned to keep the nation alive to fight.

By the spring of 1944, the supply of cane sugar and molasses from Formosa, Java, and the Philippines was decreasing and more emphasis was placed on Manchurian grain as a raw material source of ethyl alcohol. Finally, butanol plants were converted to the production of ethyl alcohol. Thus the Japanese were converting rubber into gasoline for war purposes while in America gasoline was being converted into rubber, with the same end in view.

STATISTICS, MEASURE OF ACCOMPLISHMENT

The duration of the Mission was from 1 September 1945 to 1 November 1946.

During the existence of the Mission, 350 officers and 260 enlisted men (Army, Navy and Marines), 29 British officers and men, and 16 naval technicians, (a total of 655) reported for duty. Attached is a list of all personnel with their last known adresses.

A total of 185 separate reports comprising approximately 10,000 printed pages, were prepared and 500 copies of each were printed.

Approximately 3500 documents were seized and shipped to the Washington Document Center and the technical bureaus of the Navy Department.

Approximately 15,000 pieces of equipment were seized and shipped to the United States for laboratory investigation. The largest items were two 18.1-inch guns shipped from KURE, each 75 feet long and weighing 180 tons.

Pictures of the principal personalities associated with the Mission, and of the offices and quarters maintained follow.



Captain Clifton G. Grimes, USN
Chief, U.S. Naval Technical Mission to Japan

ENCLOSURE (A), continued

Captain Peyton Harrison, USNR
Head, Special Intelligence Section





Captain W.J. Whipple, USN
Deputy Chief

ENCLOSURE (A), continued

TECHNICAL DEPARTMENT



Captain A.L. Dunning, USN
Head, Technical Department



Captain H.W. Slocum, USNR
Technical Liaison Officer with G-2 SCAP



Commander N. Sonenshein, USN
Head, Progress & Reports Section

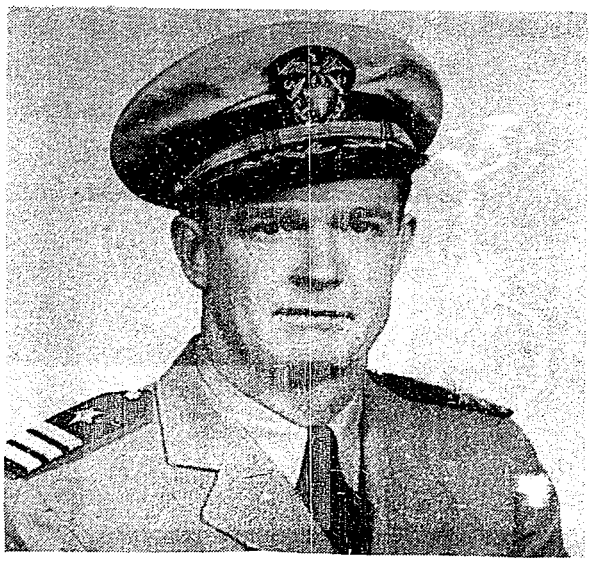
ENCLOSURE (A), continued



Commander J.C. Allen, USNR
Asst. to Head of Technical Department



Captain R.G. Bald, RN
Senior British Member



Commander J.B. Green, USNR
Head, Ordnance Section



Commander P.E. Greenwood, USN
Head, Shir Section



Commander G.L. Neely, USNR
Head, Petroleum Section



Captain Shields Warren (MC), USNR
Head, Atomic Bomb Medical Section



Commander F.M. Myers, USNR
Head, Electronics Section



Commander W.S. Heston, USNR
Head, Special Section

ENCLOSURE (A), continued

EXECUTIVE DEPARTMENT



Commander G.W. Eighmy, USNR
Head, Executive Department



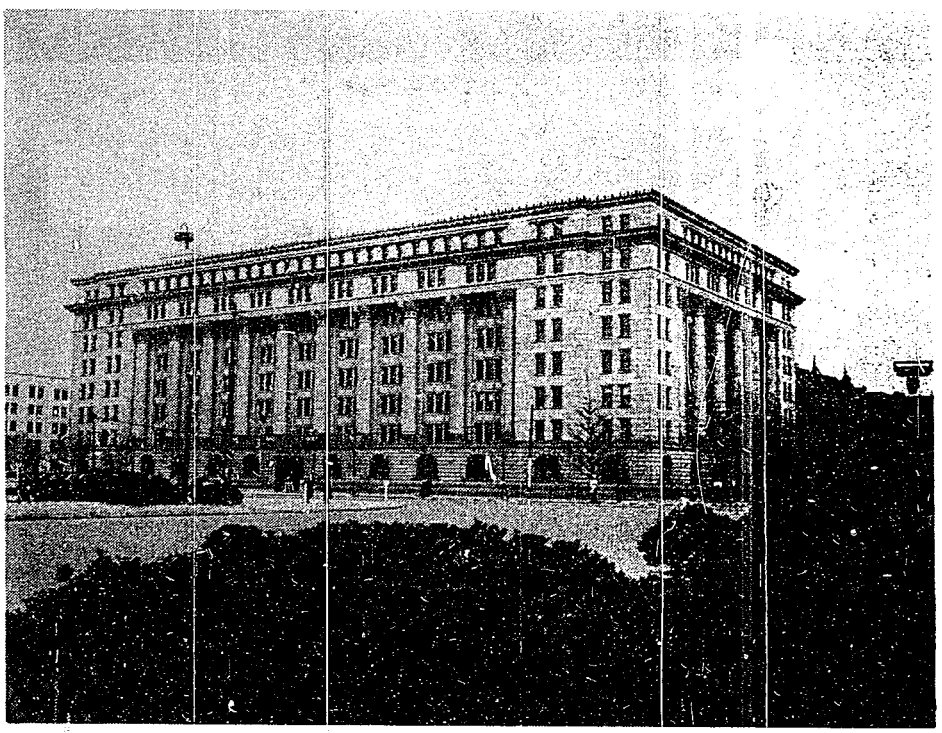
Lt. Col. L.C. Reinberg, USMC
Asst. to Head of Executive Department

ENCLOSURE (A), continued

HEADQUARTERS BUILDINGS

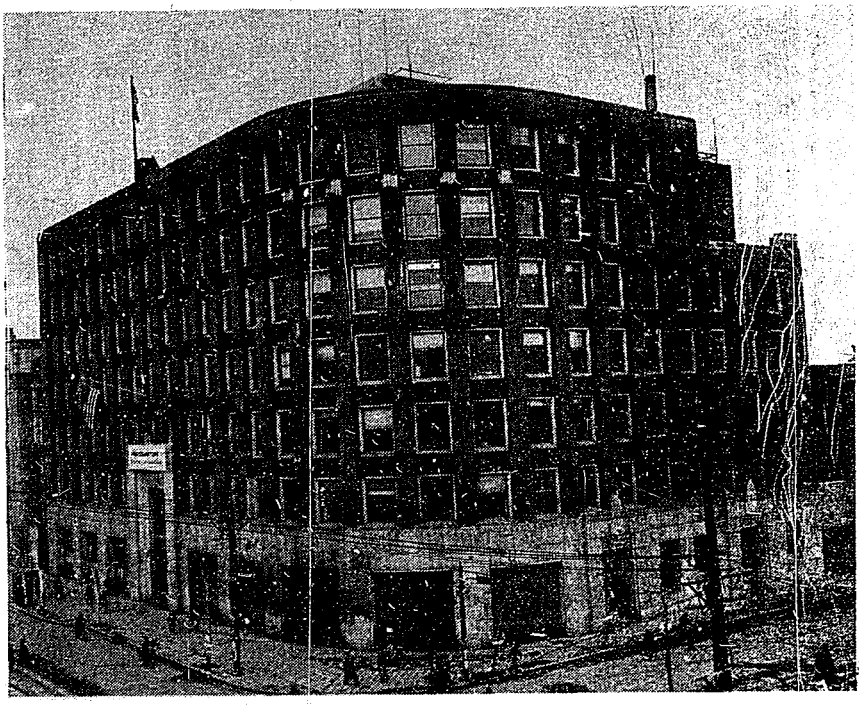


Headquarters, Sasebo



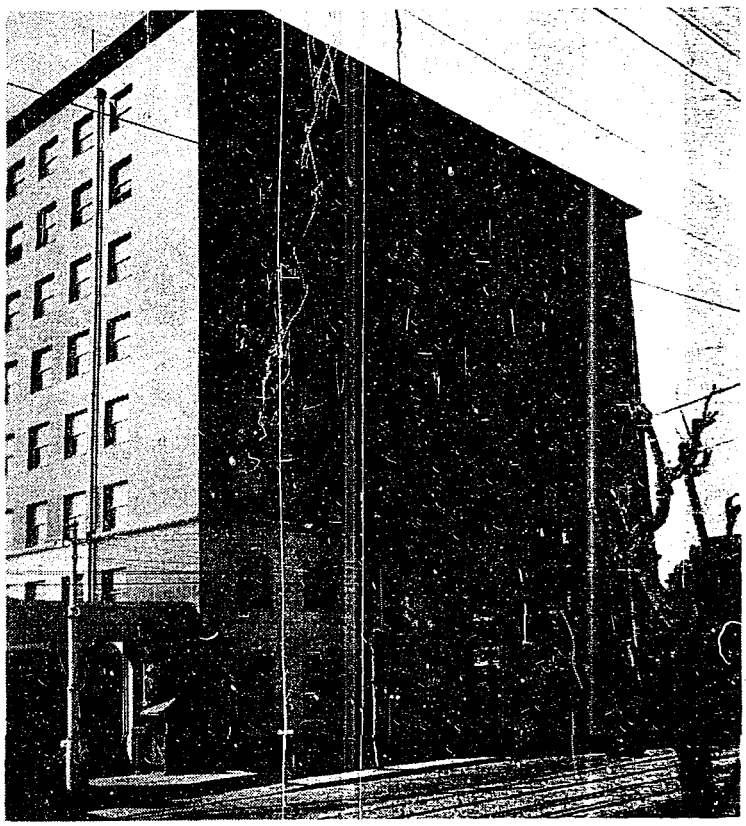
Headquarters, Tokyo
(Meiji Building)

ENCLOSURE (A), continued



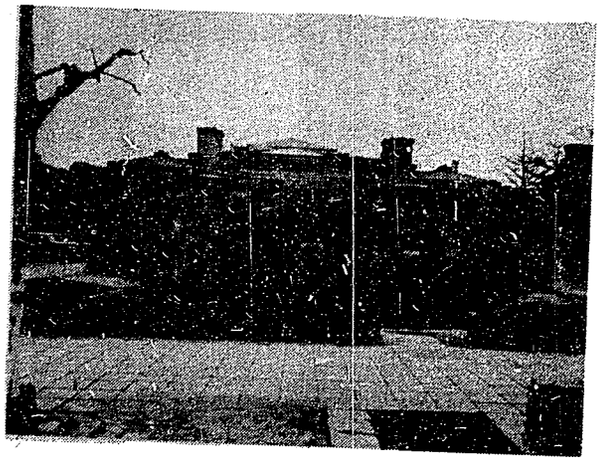
Headquarters, Nagoya

Headquarters, Osaka



ENCLOSURE (A), continued

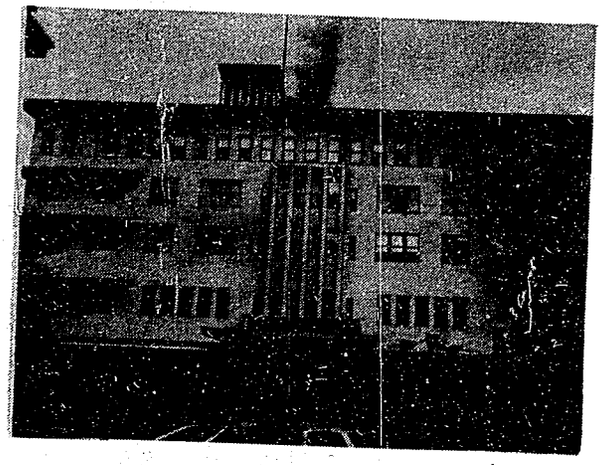
QUARTERS



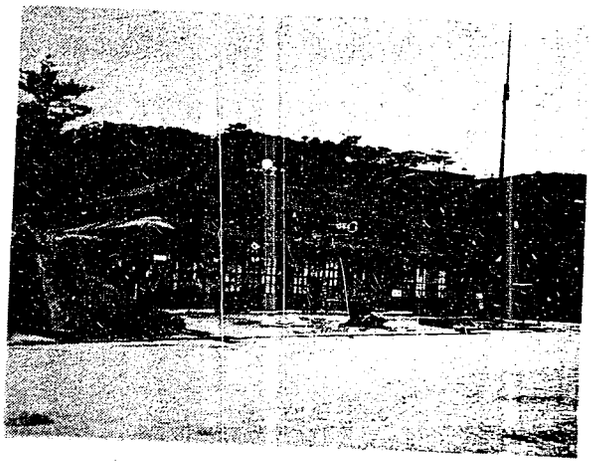
Tokyo
(Imperial Hotel)



Tokyo
(Dai Iti Hotel)



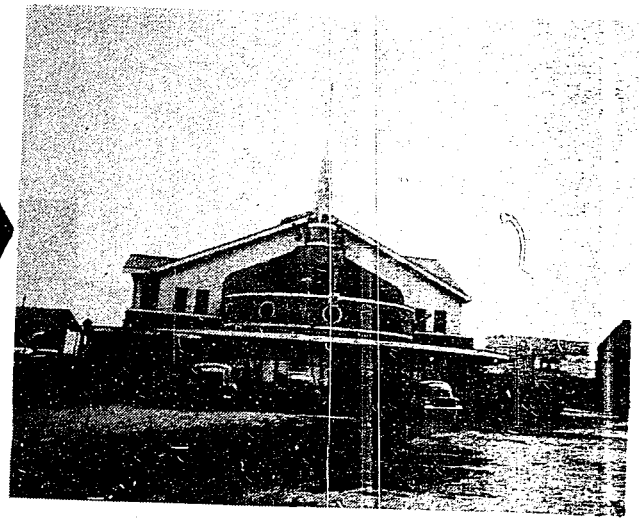
Nagoya

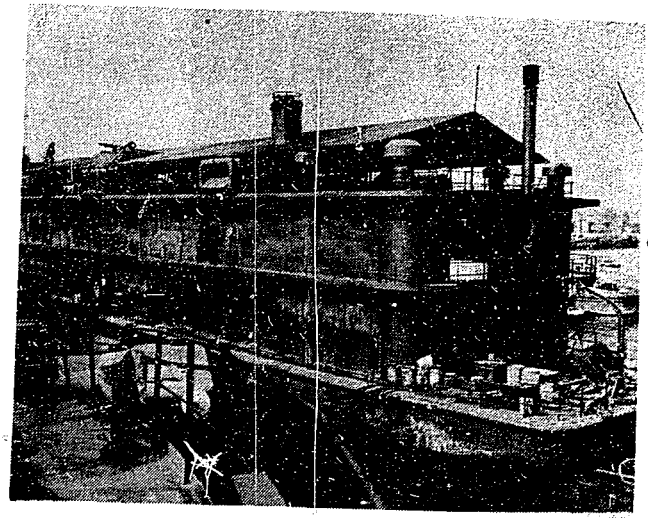


Kure

ENCLOSURE (A). continued

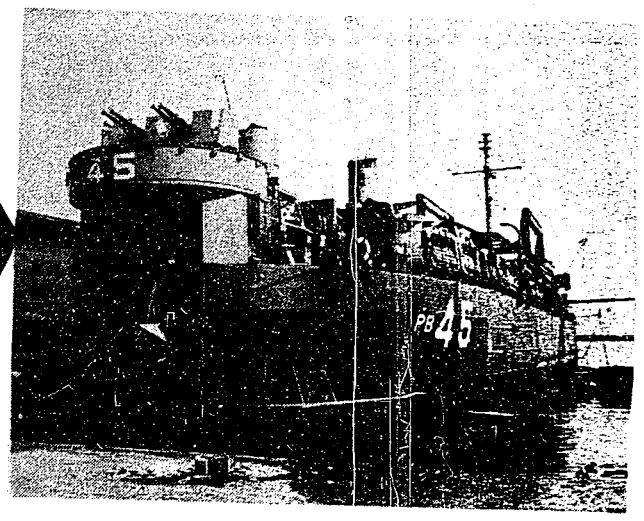
Shibaura Ferry Building
(Tokyo)





APL 46
(at Shibaura Docks)

APB 45
(at Shibsura Docks)



ENCLOSURE (A), continued

MISCELLANEOUS ACTIVITIES



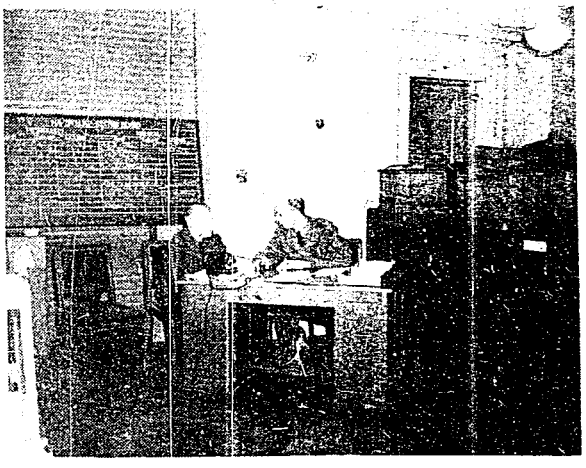
Japanese Typists & Draftsman
Progress & Reports Section
(Meiji Building)



Document Officers & Editors
Progress & Reports Section
(Meiji Building)



Technical Department Offices
(Meiji Building)



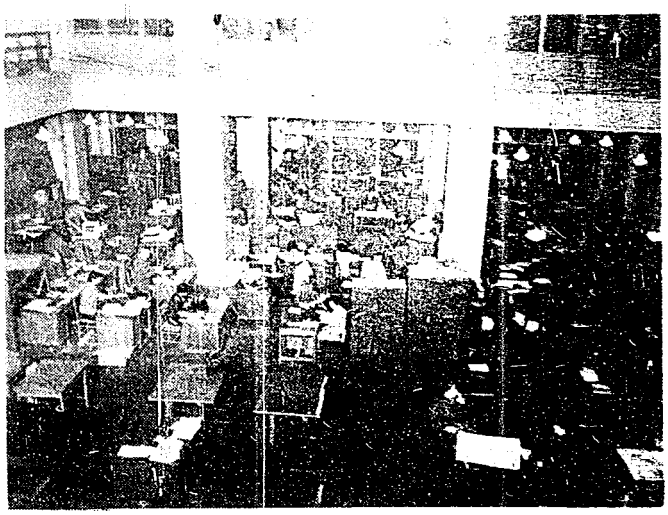
Technical Department Offices
(Meiji Building)

ENCLOSURE (A), continued



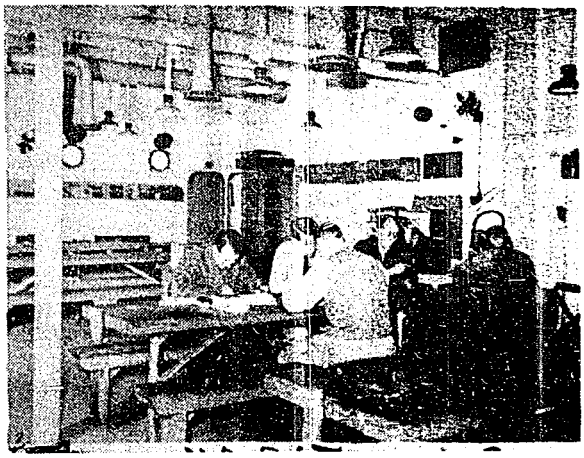


Technical Department Offices
(Meiji Building)





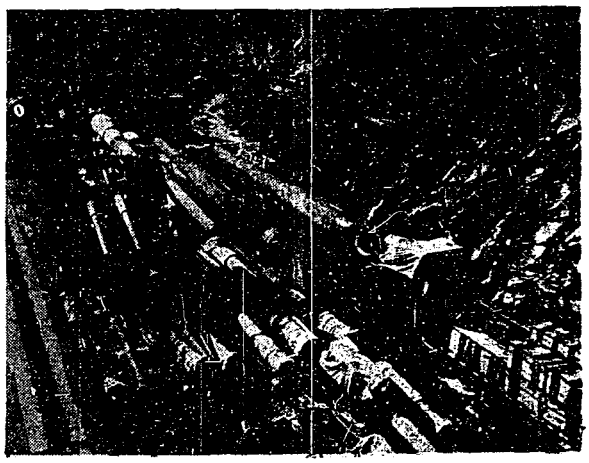
Executive Department Offices
(APB 45)



Translation Section Office
(APL 46)



Dai Ichi Building
(Tokyo)



Naval Rifles Prepared for Shipping
(Sasebo)

ENCLOSURE (A), continued

U. S. NAVAL TECHNICAL MISSION
ROSTER OF NAVAL PERSONNEL

(Officers)

Name	Rank	Serial No.	Service	Address
ADAMS, J. C.	Lt.(jg)	292290	USNR	35 South Eastfield Ave. Trenton (8), N.J.
ADELSON, T. M.	Lt.(jg)	293654	USNR	Senior Naval Officer USSBS, APO - 234
ADLER, J.	Lt.(jg)	298377	USNR	130 East 93 St. New York(28), New York
AINSWORTH, T. W.	Lt.(jg)	292208	USNR	ComFleetActivities. Navy 3923, Yokosuka
ALLEN, J. C.	Comdr.	149250	USNR	4366 Edgewood Ave. Oakland 2, Calif.
ALLEN, H. W.	Lt.	236710	USNR	Denver TB Soc. 314 14th St. Denver, Colo.
ALLMAN, W. H.	Lt.(jg)	241830	USNR	Box 103 Comdt. Navy 128, FPO. S.F. Calif.
ALTMAN, A.	Lt.	292283	USNR	1365 Morris Ave. Bronx, N.Y.
ANDERSON, D. K.	Lt.	298709	USNR	716 Clark St. Evanston, Ill.
ANDERSON, J. E.	Lt.(jg)	296486	USNR	1368 Dutton Ave. Santa Rosa, Calif.
ANDERSON, R. E.	Lt.	155417	USNR	Photo Int. Gen. Navy Yard, Wash., D.C.
ANSPACH, P. P.	Lt.(jg)	290083	USNR	1359 Bryden Road, Columbus, Ohio
ARIOLI, P. E.	Lt.	117716	USNR	c/o Hilo Photo Supply, Hilo, Hawaii
AYERS, P. B.	Lt.Comdr.	276094	USNR	10 Old Post Road, Cos Cob, Conn.
BACH, R. H.	Lt.(jg)	311247	USNR	1233 N.W. 12th Ave. Portland, Oregon
BACHMAN, M. C.	Ensign	392449	USNR	MEIU No. 1 BuOrd, Navy Dept., Wash., D.C.
BAILEY, S. W.	Lt.	222036	USNR	Interpron Two, FPO, S.F. Calif.
BALL, L. B.	Lt.(jg)	290090	USNR	c/o Navy Dept. Wash., 25, D. C.
BAUER, W. N.	Ensign	439059	USNR	MEIU No. 4, Navy 128 c/o FPO, S.F. Calif.
BARTZ, C. F.	Lt.(jg)	298376	USNR	Navy 128, Box 166, Sec, 12, FPO S.F. Calif.
BASS, W. E.	Lt.(jg)	292277	USNR	808 Green St. Danville, Virginia
BAUMAN, F. A.	Lt.(jg)	295635	USNR	USS Foulton ComCarDiv 5 FPO, S.F. Calif.
BEGGS, W. S.	Ensign	426494	USNR	BuOrd., Washington D. C.
BEMIS, E. A.	Ensign	408036	USNR	ComInPac - MACTU FPO. S.F. Calif
BILLINGS, W. M.	Ensign	402170	USNR	ComNavJap FPO. S.F. Calif.
BIRGEL, H. T.	Lt.Comdr.	279754	USNR	U.S. Hydrographic Off. Wash., (25), D. C.
BISSELL, N.	Lt.(jg)	235792	USNR	1801 Bank of AM 12th & Brdwy, Oakland, Calif.
BLACKTON, C. S.	Lt.(jg)	292292	USNR	3070 Dunleer Pl. W. Los Ang. (34), Calif.
BLACKWELL, H. L.	Lt.	186079	USNR	4 Riedesel Ave. Cambridge (38) Mass.
BLATTMAN, C.	ChPhoto	189174	USN	Interpron 1, NAS, Norfolk, Va.
BOARDMAN, T. L.	Lt.Comdr.	118719	USNR	92 Ralph Ave. White Plains, N.Y.
BOGGESS, R. R.	Lt.(jg)	292351	USNR	ComMine craftPac USS Panamint, FPO S. F. Calif.

ENCLOSURE (A), continued

(Officers)

Name	Rank	Serial No.	Service	Address
BOLLER, P. F.	Lt.(jg)	292278	USNR	1324 B. 12st, Far Rockaway, N. Y.
BONSACK, D. M.	Lt.(jg)	296487	USNR	2443-B Webster St. Berkeley (5), Calif.
BRIER, C. T.	Lt.(jg)	297758	USNR	2287 W. 22nd St. Los Ang.(7),Calif.
BROOKS, R. C.	Lt.	280094	USNR	11 States Ave. Cape Elizabeth (1) Maine
BROWN, H. P.	Lt.	103557	USNR	Brinkwood, Philadelphia(18),Pa.
BUDWIN, R. G.	Comdr.	72568	USNR	CincPac. PubInfoSec. Navy #128 FPO. S. F. Calif.
BURCHARD, J. R.	Lt.(jg)	297762	USNR	827 9th St. Boulder, Colorado
BURCHILL, P. G.	Lt.(jg)	298562	USNR	NavCommu. Anex, 3801 Nebraska Av. NW. Wash.
BURGSTAHLER, C.V.	Ensign	435122	USNR	TAIC NAS, Anacostia, D. C.
BURKS, A. W.	Lt.(jg)	297763	USNR	4425 Ashland Ave. Norwood, Ohio
BUSHNELL, D. F.	Lt.	121078	USNR	Matawan Road Old Bridge, N. J.
CANNAN, E. L.	Lt.(jg)	292350	USNR	3405 Princeton St. Dallas(5),Texas
CARLSTON, E. F.	Lt.	73124	USNR	1044 So. Edison St. Arlington, Va.
CARTER, J. L.	Ensign	442522	USNR	208 Dixie Highway, Erlanger, Ky.
CARY, O.	Lt.	236715	USNR	6 Church St. Bradford, Mass.
CHAFFIN, V. E.	Lt.(jg)	292272	USNR	107 Hearthstone Dr. Baton Rouge (12), La.
CHAMPION, W. E.	Lt.(jg)	256715	USNR	809 W. Carroll St. Macomb, Ill.
CHAPIN, R.	Ensign	438727	USNR	M.E.I.U. No. 1, BuOrd, Wash., D.C.
CHESTER, T.A.	Lt.(jg)	292273	USNR	1100 N Street, Sacramento, Calif.
CIRILLO, L.	Lt.Comdr.	260009	USNR	141 Service Ave. Sharon Pa.
CLARK, G. R.	Lt.(jg)	292205	USNR	1149 Maple Ave. Evanston. Illinois
CLAUSON, G. R.	Lt.(jg)	290161	USNR	4109 W. St. NW. Washington, D. C.
CLAYTON, R. D.	Comdr.	110883	USNR	732 Mandana Blvd. Oakland(10), Calif.
COLE, W. R.	Lt.Comdr.	289608	USNR	Lincoln University, Pa.
COLEMAN, V. S.	Comdr.	116007	USNR	32 Woodside Rd. Winchester, Mass.
CONGLETON, J. D.	Lt.(jg)	292209	USNR	1710 Latham Street, Rockford, Ill.
COOK, E. E.	Lt.(jg)	315790	USNR	1228 E. 103rd St. Seattle 55, Wash.
COOK, T. W.	Lt.	151347	USNR	1022 So. Lansing Mt. Pleasant, Mich.
COOLEY, R. A.	Comdr.	80785	USNR	2400 E. Mountain St. Pasadena, Calif.
CORDES, M. A.	Lt.	235443	USNR	RFD #2, Box 752, Edmonds, Wash.
COUGHLIN, J. R.	Lt.(jg)	257618	USNR	MEIU. No. 1 Washington, D. C.
COX, H. M.	Ensign	409247	USNR	JicPoa Box 166 Navy #128, FPO, S.F., Calif.
CRAFT, J. P.	Comdr.	73490	USN	Staff 5th Fleet, FPO., S.F., Calif.
CRAUN, E. P.	Lt.	134515	USNR	Navy Dept. Washington 25, D. C.
DALBEY, E. R.	Ensign	408824	USNR	11726 16th St. N.E. Seattle, Wash.
DANNEMILLER, J.R.	Lt.(jg)	229297	USNR	4334 Groveland Univ. Hts.(18), Ohio
DASILVA, A. L.	Lt.(jg)	292523	USNR	19 Virginia Ave. Rockville Centre, N. Y.
DAY, A. C.	Ch.Carp	202633	USNR	Navy 1170 Sec Base, FPO. S.F., Calif.
DEAN, H. G.	Lt.(jg)	292563	USNR	Apt 12B, 2 Beekman Pl. New York, N. Y.
DeBARY, W. T.	Lt.	236717	USNR	24 Church St. Northport, New York
DEXTER, J. F.	Lt.(jg)	276824	USNR	NavOrdLab Navy Yard, Wash., D. C.
DIMITROFF, G. Z.	Lt.Comdr.	239186	USNR	13-T Hillside Road Greenbelt, Md.
DOWLEY, F. H.	Lt.(jg)	298452	USNR	ATIS(WDC) GHQ APO 500 NYK Bldg
DUNBAR, J. Y.	Comdr.	132424	USNR	Bupers Washington, D. C.
DUNNING, A. L.	Capt.	61352	USN	ComNavJap FPO., S.F., Calif.

ENCLOSURE (A), continued

(Officers)

Name	Rank	Serial No.	Service	Address
DUR, P.	Lt.	122749	USNR	2708 Porter St. N.W. Wash. D. C.
DURKEE, T. E.	Lt.(jg)	307515	USNR	1901-11th Ave. Sacramento 14, Calif.
EDSON, N. W.	Comdr.	222237	USNR	ComServPac Box 28, Navy 128, S.F. Calif.
EELIS, P. R.	Lt.(jg)	312013	USNR	729 E. Henry Clay St. Milwaukee(11) Wis.
EIGHMY, G. W.	Comdr.	148786	USNR	7 Colvin Ave. Buffalo(16), N. Y.
EISNER, R. R.	Lt.(jg)	298382	USNR	180 Colony Road, New Haven, Conn.
ELLIOTT, C. G.	Comdr.	140494	USNR	1215 Home Ave. Anderson, Indiana
EMIK, L. O.	Lt.(jg)	344535	USNR	2506 S. Street Sacramento, Calif.
ENKING, W. M.	Lt.(jg)	324845	USNR	WDC(ADV) ATIS GHQ ADVON APO 500 N.Y.K.
EVANS, R. L.	Comdr.	71517	USN	3143 Key Blvd. Arlington Va.
EVERETT, C. W.	Lt.Comdr.	140495	USNR	2 Pointway Pines on Severn , Md.
FINE, S.	Lt.(jg)	318397	USNR	3558 Hildana Rd. Cleveland(20), Ohio
FINN, R. B.	Lt.(jg)	290165	USNR	26 Dorchester Rd. Buffalo, N. Y.
FISH, C. J.	Comdr.	201466	USNR	2500 Q St NW Washington, D.C.
FLINN, A. C.	Comdr.	84366	USNR	Kinzar, Lancaster Co. Pa.
FOLEY, R. J.	Capt.	61364	USN	ComSubPac Navy 128, FPO. S.F.Calif.
FOUNTAIN, J. C.	Comdr.	117507	USNR	2829 O St. NW. Washington(7) D. C.
FRANKS, E. W.	Lt.(jg)	317243	USNR	Navy Dept., Washington 25, D. C.
FULD, R.	Lt.(jg)	292532	USNR	WDC GHQ ATIS ADV APO 500
GARY, H. M.	Lt.(jg)	292627	USNR	555½ Adair Ave. Zanesville, Ohio
GEBAUER, A. A.	Lt.(jg)	323651	USNR	Akron, Colorado
GELETT, R. B.	Lt.(jg)	292524	USNR	1300 West Jackson Blvd. Chicago(7) Ill.
GEORGE, O. L.	Lt.(jg)	292777	USNR	26 Earlwood Dr. White Plains, N.Y.
GEROW, B. A.	Lt.(jg)	292624	USNR	631 21st Ave. S. F. (21), Calif.
GIBNEY, F. B.	Lt.(jg)	292625	USNR	ComNavJap, c/o FPO, S.F., Calif.
GILBERT, F. J.	Lt.(jg)	292629	USNR	11361 Isleta St. Los Ang.(24) Calif.
GILFILLAN, E. S.	Comdr.	71810	USNR	Ex-IJN NAGATO ComServDiv 102
GILLINGHAM, S. W.	Lt.	210511	USNR	TAIC NAS Anacostia, D. C.
GILMAN, P. S.	Lt.(jg)	290163	USNR	ComMinPac, USS Panamint Sasebo, Japan
GLANCY, J. J.	Lt.Comdr.	107274	USNR	1234 Earlham St. Pittsburgh(5) Pa.
GODDIN, C. S.	Lt.Comdr.	115551	USNR	1077 Beaconsfield Ave. Grosse Po. Pk. Mich.
GOLINO, C. L.	Lt.(jg)	296781	USNR	801 West Vine St. Stockton, Calif.
GREEN, J. B.	Comdr.	107356	USNR	Palmyra, Mo.(c/o A.C. Chamberlain)
GREENWOOD, P. E.	Comdr.	81069	USN	ProdDpt. U.S. NavShpYrd, Charleston S. C.
GRIMES, C. G.	Capt.	59485	USN	3203 N. Glebe Rd. Arlington, Va.
Hachenburg, R.	Lt.(jg)	292726	USNR	6655 McCallum St. Philadelphia(19) Pa.
HALPERN, S.	Lt.(jg)	292841	USNR	35 Hiawatha Road, Mattapan, Mass.
HAMILTON, C. E.	Lt.(jg)	298384	USNR	Rt. 2 Box 744 Visalia, Calif.
HAMMOND, J. W.	Capt.	79393	USNR	605 Dreams Landing Annapolis, Md.
HAND, V. L.	Lt.Comdr.	150277	USNR	Box 65 Olden, Texas

ENCLOSURE (A), continued

(Officers)

Name	Rank	Serial No.	Service	Address
HARNSBERGER, H.F.	Lt.(jg)	292782	USNR	10 Glynn Ave. Brunswich, Ga.
HARPER, C. E.	Lt.	129056	USNR	312 W. Bascawen St. Winchester, Va,
HARRISON, J. A.	Lt.	236723	USNR	223 Madison Rd. Scarsdale, N. Y.
HARRISON, P.	Capt.	17617	USNR	29 Kawanana Koa St. Honolulu, T.H.
HAWKINS, D. E.	Ensign	371623	USNR	3513 Greenbrier Drive Dallas,(5), Texas
HAY, R. A.	Lt.Comdr.	107992	USNR	1915 Chatham St. Racine, Wisconsin
HAYES, V. R.	Comdr.	81111	USN	3016 So. 16th St. Arlington, Va.
HEDDEN, W. D.	Lt.	139950	USNR	916 E. Elm St. New Albany, Indiana
HEDGECOCK, R. H.	Comdr.	81024	USN	1805 E. 16th St. Brewerton, Wash.
HELLNER, M. H.	Lt.(jg)	292787	USNR	9625 Reseda Blvd. Northridge,Calif.
HENDERSON, W.	Lt.(jg)	297455	USNR	404 E. 55th St. New York City
HENDRICKSON, R. M.	Lt.(jg)	297765	USNR	1116 Manning Dr. Los Angeles (24) Calif.
HERMAN, R. M.	Lt.Comdr.	110586	USNR	68 E. 86th St. New York, N. Y.
HESTON, W. S.	Comdr.	153634	USNR	BuOrd. Navy Dept. Washington,D. C.
HEWITT, G. C.	Lt.(jg)	292845	USNR	109 N. Sycamore Ave. Los Angeles (36), Calif.
HILL, R. D.	Lt.	140063	USNR	45 Dearborn St. Salem, Mass.
HODES, M	Lt.(jg)	203793	USNR	102 West 75th St. New York(23)N.Y.
HOLZWORTH, E. C.	Comdr.	70309	USN	1208 S. 26th St. Arlington, Va.
HORTON, H. L.	Ensign	392568	USNR	17 2nd St. Athens, Ohio
HOULIHAN, J. F.	Lt.	119735	USNR	c/o Navy Dept. Washington 25, D.C.
HUDSON, W. J.	Lt.(jg)	292838	USNR	Owings Mill, Maryland
HUGGINS, E.B.	Lt.Comdr.	167619	USNR	INT PRDS SECT SCAP APO 500
HUGHES, D. C.	Lt.(jg)	316776	USNR	ComInPac MACTU, FPO, S.F. Calif.
ISARD, M. G.	Ensign	409486	USNR	6161 N. 16th St. Philadelphia Pa.
JACKSON, A.	Capt.	59344	USNR	Navy 3930, General Delv. Shanghai, China
JACKSON, D. H.	Lt.(jg)	296813	USNR	2333 Watts Rd. Houston (5), Texas
JENKINS, C. O.	ChTorpedo.	188885	USN	674 N. Market St. Van Wert, Ohio
JOHNSON, K. W. R.	Ensign	421512	USNR	1915 North 50th St. Omaha, Nebr.
JONES, W. A.	Lt.(jg)	318320	USNR	31 Hilltop Rd. Biltmor. Forest, Asheville NC
JONES, W. G.	Lt.(jg)	292778	USNR	Navy Dept. Washington 25, D. C.
JUDAH, J. S.	Lt.(jg)	408829	USNR	USS Nereus, AS 17 FPO, S.F. Calif.
KADISH, S. H.	Lt.(jg)	292849	USNR	2290 Davidson Ave., New York(53) N. Y.
KALINOWSKI, W. G.	Lt.(jg)	309753	USN	Mcoflm Sec. Pub&PrtgOff. 14th NavDis (128)
KAPNER, S. H.	Lt.(jg)	292294	USNR	Box 103 Comdt. Navy 128 FPO, S.F. Calif.
KERR, T. W.	Ensign	425301	USNR	JicPoa Navy 128 FPO, S.F. Calif.
KIERGAN, N. B.	Comdr.	72349	USN	Navy Dept. Washington 25, D. C.
KIMBALL, S. L.	Lt.(jg)	293306	USNR	839 Simpson Ave. Salt Lake City (5), Utah
KIRTLAND, L. J.	Lt.(jg)	292851	USNR	83 Lyceum St. Geneva, New York
KLARE, W. A.	Lt.(jg)	292850	USNR	616 Poplar Dr. Falls Church, Va.
KLOVE, R. C.	Lt.	154874	USNR	Reinbeck, Iowa (c/o Dr. O.Q. Mosey)
KLUSS, W. M.	Lt.(jg)	293305	USNR	Box 103, Comdt. Navy 128 FPO, S. F. Calif.

ENCLOSURE (A), continued

(Officers)

Name	Rank	Serial No.	Service	Address
KOMICH, A. J.	Lt.Comdr.	133783	USNR	4 Wolcott Park Medford, Mass.
KOPPY, A. M.	Ensign	422952	USNR	17596 Oak Drive Detroit,(21),Mich.
KRAMER, S. P.	Lt.(jg)	296488	USNR	ComSubPac USS Nereus-A.S. 17 FPO, S. F. Calif.
LACY, P. D.	Lt.	208841	USNR	147 East 6th St. Jacksonville,Fla.
LAIR, R. B.	Capt.	62070	USN	BuShips Navy Dept. Washington,D.C.
LAMB, W. G.	Lt.	253977	USNR	BuOrd (Re 4f) Washington, D. C.
LAMOTT, K. C.	Lt.(jg)	292789	USNR	519 Gainesboro Rd. Derxel Park, Pa.
LANG, A. A.	Lt.	109332	USNR	1005 N. 6th St. Winter Haven, Fla.
LaVOIE, V. J.	Lt.(jg)	292729	USNR	148 25th St. Lewiston, Idaho
LAURENT, J. M.	Comdr.	80484	USNR	75 San Benito Way S. F.,Calif.
LAW, R. M.	Lt.	393658	USNR	JicPoa Navy 128 FPO, S.F., Calif.
LAZARE, E. L.	Lt.(jg)	324877	USNR	844 S. Masselin Ave. Los Angeles (36), Calif.
LEFKO, O. B.	Lt.(jg)	292794	USNR	Rm. 2013 AFF Annex 1, Oravelly Pt. Va.
LEHNER, P.	Lt.(jg)	298449	USNR	185 Summer St. Boston (10), Mass.
LEVIN, H. A.	Lt.(jg)	292783	USNR	c/o Navy Dept. Washington 25, D.C.
LEVINE, S. B.	Lt.(jg)	292786	USNR	41 Hamlin Rd. Newton Centre, Mass.
LEVY, M. S.	Lt.(jg)	292728	USNR	U.S. NavMilGov Navy 3247 FPO. S.F. Calif.
LORIMER, R. S.	Comdr.	61910	USNR	16th and Wood Sts. Oakland(11), Calif.
LYMAN, J. R.	Lt.Comdr.	105409	USNR	2928 Hillegass Ave. Berkeley (5), Calif.
MAINS, McD. C.	Comdr.	62669	USN(Ret)	ComNavJap, Tokyo, Japan, FPO, S. F., Calif.
MAHONEY, F. B.	Lt.(jg)	292934	USNR	3009 Claremont Ave. Berkeley (5), Calif.
MARKER, T. P.	Lt.(jg)	268540	USNR	239 S. Notre Dame Ave. So. Bend 17, Ind.
MARKSTROM, P. F.	Lt.	107976	USNR	c/o David Taylor Model Basin, Washington, D. C.
MARTIN, S. E.	Lt.(jg)	323404	USNR	WDC(Adv), ATIS GHQ ADVON APO 500 (NYK)
MATTISON, W. C.	Lt.(jg)	302066	USNR	Thurmont, Maryland
MAYTNIER, J. C.	Comdr.	168560	USNR	PO Box 785 Babbit, Nevada
MAY, H. F.	Lt.(jg)	292942	USNR	2960 Pine Ave. S. F., Calif.
MENDEL, D. H.	Lt.(jg)	292919	USNR	NTJ Box 166 Navy 128 FPO, S.F., Calif.
MERRILL, R. K.	Lt.(jg)	296336	USNR	925 Greenwood Blvd. Evanston, Ill.
MESSENGER, K.	Lt.Comdr.	139353	USNR	3776 Menlo St. San Diego, Calif.
MIDDLETON, E. R.	Ensign	385921	USNR	16 Westwood Dr. Wash. (16), D. C.
MILLER, J. E.	Lt.Comdr.	123293	USN	Ex-IJN SAKAWA, FPO, S. F., Calif.
MILLER, R. J.	Lt.	236730	USNR	1526 Buena St. Berkeley, Calif.
MILLETT, W. H.	Lt.	210484	USNR	19 Orchard St. Springfield, Vermont
MINOR, W. M.	Lt.	113134	USN	Box 895, Healdton, Okla., Calif.
MITCHELL, H. H.	Lt.(jg)	290336	USNR	W2228 Mission Ave. Spokane(12),Wash.
MONAHAN, P. R.	Lt.(jg)	292943	USNR	62 Wayne St. Worchester, Mass.
MONTGOMERY, T. S.	Lt.(jg)	317951	USNR	12 Columbus Circle Tuckanoe, N. Y.
MOORE, C. W.	Lt.Comdr.	147518	USNR	ESS,GHQ,SCAP,APO 500 S. F., Calif.
MORGAN, A. N.	Capt.	58666	USN	Navy Dept., Washington 25, D. C.

ENCLOSURE (A), continued

(Officers)

Name	Rank	Serial No.	Service	Address
MORIN, R. R.	Lt.(jg)	139040	USNR	BuOrd(Re 6a) NavDept. Wash., D. C.
MORRIS, I. I.	Ensign	426525	USNR	CominPac USS McCook (Adm 36) Sasebo, Japan
MORRISON, T. D.	Ensign	421789	USNR	4121 Crestwood Rd. Richmond, Va.
MUHEIM, H. M.	Lt.(jg)	292937	USNR	1064 S. Van Ness Ave. S. F. (10) Calif.
MULHOLLAND, M. D.	Lt.(jg)	408501	USNR	ComNavJap FPO, S. F., Calif.
MYERS, F. M.	Comdr.	194757	USNR	BuShips Elect. Div. Wash. (25) D.C.
MYERS, P. F.	Lt.(jg)	335492	USNR	198 Bristol St. Springfield(9), Mass.
MacGREGOR, R. W.	Comdr.	99522	USNR	Cedarville, Ohio
McCLELLAN, C. T.	Lt.Comdr.	63764	USNR	Demil. Unit. Fleet Act. Navy 3923 Yokosuka
McCLOSKEY, L. C.	Comdr.	49223	USNR	Flanders, New Jersey
McILWRAITH, C. G.	Comdr.	84607	USNR	CominPac FPO. S. F., Calif.
McINTOSH, G. L.	Ensign	448626	USNR	MEIU No. 4 FPO. S. F., Calif.
McKNIGHT, F. G.	Lt.(jg)	292922	USNR	1116 Liberty St. Franklyn, Pa.
McMAHON, D. J.	Ensign	409267	USNR	MEIU No. 1 FPO. S. F., Calif.
NEELEY, G. L.	Comdr.	57689	USNR	114 El Camino Real, Berkeley, Calif.
NELSON, C. J.	Lt.	292933	USNR	4354 N. Troy St. Chicago, Ill.
NOLAN, V. Jr.	Lt.(jg)	292535	USNR	c/o Navy Dept. Washington 25, D.C.
NORWOOD, J. H.	Lt.	183208	USNR	220 Stuyvesant Ave. Rye, New York
O'BRIEN, W. D.	Ensign	435250	USNR	T.A.I.C. NAS Anacosta, D. C.
OLIVER, J. B.	Lt.(jg)	292948	USNR	307 West Cambridge Ave. College Park, Ga.
ONCKEN, W. Jr.	Lt.	246218	USNR	22 W. Washington St. Densington, Md.
OXENFELDT, A. R.	Lt.(jg)	298392	USNR	276 Riverside Dr. New York(25), N.Y.
PACE, N.	Lt.Comdr.	113300	USNR	NavMedResInst. Bethesda, Md.
PALMER, R. B.	Lt.(jg)	296489	USNR	Lehigh Univ. Bethlehem, Pa.
PARKES, D. G.	Lt.(jg)	290327	USNR	3424 N.E. 29th St. Portland (12), Oregon
PEABODY, L. N.	Lt.Comdr.	55790	USNR	West Hanover, Mass. (c/o Harold Potsdam)
PEAKE, T. A.	Lt.	161487	USNR	MEIU No. 4 Navy 128 FPO, S. F., Calif.
PERRY, F. B.	Lt.(jg)	408821	USNR	974 Mill's Bldg. S.F., Calif. (c/o Thos. White)
PLEVA, L. E.	Lt.Comdr.	113375	USNR	3021 E. Norwith Ave. Cudahy, Wis.
POLHEMUS, T. W.	Lt.(jg)	296619	USNR	3337 Clay Street, S. F., Calif.
POOLE, W. F.	Lt.	238416	USNR	InTerPron Two-(Guam) FPO, S. F., Calif.
PRYOR, M. H.	Comdr.	253718	USNR	Mansfield, Ohio (c/o Barnes Mfg. Co.)
PURDY, F. T.	Lt.(jg)	292957	USNR	491 Delaware Ave. Marion, Ohio
QUALE, R. E.	Lt.(jg)	258047	USNR	Thief River Ralls, Minnesota
RACKUS, C. A.	Ensign	408505	USNR	ComMinPac, USS Panamint, FPO S.F. Calif.
RADCKUFFEM D. G	Lt.	259688	USNR	PubWksDiv. Puget Sd NavShpYd, Bremerton

ENCLOSURE (A), continued

(Officers)

Name	Rank	Serial No.	Service	Address
RAGAN, A. B.	Lt.(jg)	293091	USNR	Box 103, Comdt. Navy 128, FPO, S. F., Calif.
RAWLINSON, N. E.	Lt.	241834	USNR	1907 El Ray Dr. Whittier, Calif.
READON, W. F.	Lt.	262909	USNR	N.A.A.S. Marthas Vineyd. Hav., Mass.
REDICK, J. P.	Lt.	293093	USNR	860 12th St. Boulder, Colo.
REEVES, C. B.	Ensign	409248	USNR	ComNavJap FPO. S. F., Calif.
REUBENS, E. P.	Lt.(jg)	302420	USNR	4507 S. Capitol St. Wash. D. C.
RICCIO, G. J.	Lt.(jg)	293096	USNR	USSBS Rm. 2013, AAF Annex 1, Gravelly, Pt, Va.
RICH, R. A.	Lt.	394080	USNR	Army-Nav Liqdtn Comm. Wash. D. C.
ROLPH, H. M.	Lt.(jg)	298454	USNR	Box 590 El Campo, Texas
ROSENDALE, J. C.	Lt.(jg)	293097	USNR	Soledad, Calif. (c/o Miller's Lodge)
ROSSTON, E. W.	Lt.(jg)	290358	USNR	4823 Calif. St. S. F.,(18), Calif.
RYKOFF, R. L.	Lt.(jg)	292533	USNR	632 S. Sycamore Ave. L.A., Calif.
SACKTER, B. M.	Lt.(jg)	295632	USNR	120 Vine St. Hartford, Conn.
SANDERS, J. R.	Lt.(jg)	259319	USNR	318 E. Hurd St. Edmond, Oklahoma
SCHENKKAN, R. F.	Lt.	160646	USNR	MEIU No. 4 Navy 128 FPO, S. F., Calif.
SCHULTHEIS, S. L.	Lt.(jg)	293110	USNR	154 Beach 138th St. Rockway Beach Long Island
SCHWALM, E. E.	Lt.	137313	USNR	ComServPac Box 22 FPO. S.F.,Calif.
SELL, R. W.	Lt.Comdr.	199979	USNR	515 Cleveland St. Allentown, Pa.
SERVICE, J. H.	Capt.	62395	USNR	Houghton, Mich. (Mich. COll. Mng. & Tech.)
SEYMOUR, L. A.	Lt.(jg)	292295	USNR	3445 S. Wakefield, Arlington, Va.
SHAMP, D. J.	Lt.(jg)	311383	USNR	Ney, Ohio
SHEDD, R. G.	Lt.(jg)	292858	USNR	32nd Div. HQ(G-2 Sec) Langu. Div. APO 32
SHEEKS, G. H.	Lt.(jg)	292857	USNR	USS Nereus(AS-17) Sasebo, Japan, FPO, S. F., Calif.
SHELDON, C. D.	Ensign	409056	USNR	3207 Fremont Ave. S. Minneapolis Minn.
SHERMAN, L. B.	Lt.(jg)	291873	USNR	Nations Ford Rd. Rd. 3 Charlotte (3), N. C.
SHERMAN, P. J.	Lt.(jg)	324709	USNR	1155 Evergreen Ave. Bronx, N. Y.
SILVERMAN M.	Lt.(jg)	293106	USNR	Collins-791 E. 2nd St. Brooklyn, N. Y.
SLAVEN, F.W.	Capt.	59636	USN	217 Northwood Rd. Wardour, Annap. Md.
SLOCUM, W. W.	Capt.	24309	USNR	1016 Old Gate Rd. Wilkinsburg, Pittsburg, Pa.
SMITH, E. K.	Lt.	131096	USNR	ComServDiv 102 FPO, S. F., Calif.
SMITH, G. C.	Lt.(jg)	293105	USNR	Staff, ComNav Shore Act. Navy 3923, FPO, S. F., Calif.
SMITH, L. R.	Comdr.	137444	USNR	Civilian Safety, GHQ, SCAP, APO 500, S. F., Calif.
SMITH, R. E.	Lt.	143113	USNR	NavMedResInst. Bethesda, Md.
SNOW, E.	Lt.(jg)	298388	USNR	ComNavJap-Tokyo-FPO, S.F.,Calif.
SNYDER, P. W.	Capt.	61290	USN	ComServPac Navy 128 FPO, S. F., Calif.
SODEN, A. M.	Lt.	293104	USNR	4149 Parrish St. Philadelphia, Pa.

ENCLOSURE (A), continued

(Officers)

Name	Rank	Serial No.	Service	Address
SONENSHEIN, N.	Comdr.	81378	USN	M.I. NAVSHIPYD, Vallejo, Cal.
SPENCER, F. A.	Comdr.	105659	USNR	c/o Navy Dept. Washington 25, D.C.
SPRAGUE, S. E.	Lt.(jg)	293119	USNR	806 Brighton Pl. Ocean City, N. J.
STEELE, H. A.	Lt.	293120	USNR	706 55th St. Des Moines, Iowa
STEMPLE, D.	Lt.(jg)	293170	USNR	577 Ralph Ave., Brooklyn 33, N. Y.
STEVENS, R. D.	Lt.(jg)	293099	USNR	37 Bowers St. Nashua, N. H.
STOLZAR, D. J.	Lt.(jg)	293174	USNR	910 W. End Ave. N.Y.(25),(c/o S. Morse)
STONE, A. D.	Ensign	422114	USNR	Olathe, Kansas
STROBEL, G. F.	Lt.Comdr.	107808	USNR	6045 LaSalle Ave. Oakland, Calif.
SWOPE, L. F.	Lt.(jg)	293175	USNR	1602 State St. Harrisburg, Pa.
TABORELLI, R. V.	Lt.Comdr.	108364	USNR	105 Lee Read, Scarsdale, N. Y.
TAMBURELLO, G. B.	Lt.(jg)	293197	USNR	258 Irving Pl. Brkln(27), N. Y.
TAVE, S. M.	Lt.(jg)	293191	USNR	Ex-IJN NAGATO ComSerDiv 102, FPO, S. F., Calif.
TAYLOR, W. H.	Ensign	422141	USNR	2030 Fell St. S. F., Calif.
THAYER, J. R.	Lt.(jg)	293180	USNR	Commdt. Navy 128, FPO, S.F., Calif.
THOMPSON, M. O.	Ensign	376399	USNR	MEIU No. 4 FPO, S. F., Calif.
THORLAKSSON, N. E.	Lt.	245374	USNR	2344 Cooley Ave. Palo Alto, Calif.
THORN, C. B.	Lt.Comdr.	131209	USNR	353 Walnut St. New Orleans, La.
TRAVIS, I.	Comdr.	70791	USNR	BuOrd Washington, D. C.
TRUEX, J. E.	Lt.(jg)	293187	USNR	344 E. 46th St. New York City
TUCKER, R. B.	Lt.(jg)	293188	USNR	541 Bronx Rv. Rd. Yonkers, N. Y.
TUCKER, S.	Lt.(jg)	293199	USNR	3310 Croffut Pl. S. E. Wash., D.C.
TURNBULL, A. T.	Lt.(jg)	293184	USNR	1101 Kemp Ave. Ironton, Ohio
TURNER, C. L.	Capt.	24931	USNR	215 Dulses Dr. Clayton N. J.
VANDERSALL, S. T.	Lt.(jg)	293171	USNR	19 Danville St., W. Rosbury, (32), Mass.
VARDAC, A. N.	Lt.(jg)	292860	USNR	c/o Navy Dept. Washington 25, D.C.
WAGNER, W. H.	Lt.(jg)	291878	USNR	InterntlProscutSec. GHQ, SCAP, APO 500, S. F., Calif.
WARD, H. H.	Lt.(jg)	297128	USNR	841 Oneida St. Denver, Colo.
WARREN, S.	Comdr.	87098	USNR	DMO HQ 1stNavDis. Boston, Mass.
WATSON, I. A.	Lt.(jg)	293200	USNR	304 North Quincy St. Albuquerque, N. W.
WAY, G.	Lt.(jg)	293192	USNR	2831 Perkins L. Seattle, Wash.
WEIL, W. M.	Lt.(jg)	306738	USNR	Bldg 2 Apt 3 8230 Forest. Kansas City, Mo.
WEISSBERG, A. O.	Lt.(jg)	297196	USNR	2611 Franklin Ave. Seattle(2) Wash.
WHAN, E. W.	Lt.(jg)	293194	USNR	138 3rd St. Marimo City, Mich.
WHEELER, O. R.	Lt.(jg)	296668	USNR	502 N. Lemon, Anaheim, Calif.
WHIPPLE, W. J.	Capt.	60511	USN	Ex-IJN NAGATO FPO, S. F., Calif.
WHITE, E. L.	Lt.	144647	USNR	1101 Beacon St., Brookline, Mass.
WHITE, T. H.	Comdr.	71581	USN	531 Font Blvd. S. F., Calif.
WILLIAMS, E. A.	Lt.Comdr.	144094	USNR	Havelock, Iowa
WINEBRENNER, W. E.	Ensign	426100	USNR	USS Tloman, DM28 FPO, S.F.,Calif.
WINKLER, W. R.	Lt.(jg)	297756	USNR	2224 Iowa Ave. Cincinnati,(6),Ohio
WISE, C. J.	Lt.	245708	USNR	124 Willow St. Brooklyn(2) N. Y.
WOLAVER, J. A.	Lt.(jg)	293202	USNR	1310 Hill St. Ann Arbor Mich.
WOOD, D. G.	Lt.(jg)	293201	USNR	611 Powers Lane, Decatur, Ill.

ENCLOSURE (A), continued

(Officers)

Name	Rank	Serial No.	Service	Address
WOODS, G. H.	Lt.	260677	USNR	376 N. 3rd Ave. Phoenix, Arizona
WORDWORTH, W. W.	Lt.	211048	USNR	ComNavJap FPO, S. F., Calif.
WRAY, J. E.	Ensign	402557	USNR	2752 Bennett Ave. Evanston, Ill.
YOAS, S. E.	Lt.(jg)	293183	USNR	1626 Minturn St. Alameda, Calif.
ZIMMERMAN, N. D.	Comdr.	87591	USNR	Box 614, State College, Pa.

(Enlisted)

Name	Rate	Service No.	Service	Address
ABAJIAN, A. C.	S2c	566-07-26	USNR	ComNavJap FPO, S. F., Calif.
ABDO, D. A.	PhoM3c	560-75-72	USNR	Photo Interpron II FPO, S. F., Calif.
ADAMS, M. E.	S2c	368-87-39	USNR	ComNavJap FPO, S. F., Calif.
ADDLINGTON, D. E.	S2c	358-09-92	USNR	ComNavJap FPO, S. F., Calif.
ALEKSY, S. J.	RM2c	724-88-79	USNR	ComNavJap FPO, S. F., Calif.
ALEXANDER, M. A.	S2c	379-52-48	USNR	ComNavJap FPO, S. F., Calif.
ARNOLD, T. E.	BM1c	337-79-92	USN	Fleet Activities, Yokosuka FPO, S. F., Calif.
ASHTON, E. T.	StM2c	983-46-08	USNR	ComNavJap FPO, S. F., Calif.
BEASLEY, A	StM2c	981-78-61	USNR	USS Apl 46 ComNavJap FPO, S. F., Calif.
BELL, L.	StM2c	933-75-15	USNR	ComNavJap FPO. S. F., Calif.
BERGMAN, B. J.	Y3c	863-27-24	USNR	Gregory, S. D.
BLAGG, W.	CPhM	376-04-82	USN	ComNavJap FPO, S. F., Calif.
BOLGER, R. T.	CY	603-01-05	USNR	3973 Blaine, S. E. Wash.(19)
BOYNTON, R. S.	CRM	400-56-37	USNR	43 Burnham St. Belmont, Boston, Mass.
BOZARD, L. R.	Y2c	658-66-13	USNR	233 Green St., Norfolk, Va.
BRECKUR, G. K.	PhoM3c	940-95-52	USNR	1646 S. 3rd St. Columbus(7), Ohio
BROADSWORD, W. C.	S1c	655-83-06	USNR	1408 B St. Springfield, Oregon
BROWN, N.	StM2c	269-52-19	USNR	ComNavJap FPO, S. F., Calif.
BUCKLEY, J. M.	PhoM3c	804-20-33	USNR	Photo Interpron 2, FPO, S. F., Calif.
BUDINOFF, S.	CSK	808-32-47	USNR	25 Colonial Rd. Stamford, Conn.
BURROWS, S. A.	S1c	641-82-78	USNR	Bridgeport, Alabama
BUSH, B. M.	PhoM2c	962-46-01	USNR	2910½ Chestnut St. Toledo, Ohio
BUTLER, H. M.	PhoM3c	858-76-97	USNR	ComNavJap FPO, S. F., Calif.
CANAPARI, J.	S1c(AOM)	899-37-99	USNR	ComNavJap FPO, S. F., Calif.
CAREY, J. M.	Sp(P)1c	607-37-12	USNR	ComNavJap FPO, S. F., Calif.
CARLSON, R. F.	GM2c	628-70-50	USNR	Clifton, Kansas
CARPENTER, R. L.	Y3c	860-62-88	USNR	2534 Dean Ave. Des Moines, Iowa
CARRIER, L. A.	Y1c	603-91-28	USNR	1033 5th St. Bristol, Tenn.
CARTER, W. G.	S2c	557-81-75	USNR	ComNavJap APL-46, FPO, S. F. Calif.
CASE, K. E.	Sp(P)3c	898-76-19	USNR	45 Edwina St. Dundee, N. Y.
CASTLEMAN, A. T.	CY	640-00-42	USNR	1224 Magnolia Ave. Norfolk(8), Va.
CHIN, C. S.	S2c	909-51-64	USN	I-15A Mutt St. New York, N. Y.
CLEMENS, R. N.	S1c	799-65-94	USNR	ComServPac Box 22 MicflmGen. FPO, S. F., Calif.
CLINKENBEARD, L	Y3c	677-26-89	USNR	ComNavJap APL-46, FPO, S. F. Calif.
CODDINGTON, J. I.	CSp(X)	403-63-54	USNR	195 Knickerbocker Rd. Tenafly, N.J.

ENCLOSURE (A), continued

(Enlisted)

Name	Rate	Service No.	Service	Address
COLLINS, L. T.	PhoM1c	268-70-81	USN	Interpron 2 FPO, S. F., Calif.
CULP, S.	PhoM3c	927-42-23	USNR	c/o Navy Dept. Washington 25, D.C.
DANDURAND, G. D.	MM1c	666-85-04	USNR	8 Elizabeth St. Shrewsbury, Mass.
DANNENHAUER, F.H.	CSp(X)	650-92-48	USNR	5302 Kansas NW, Washington, D. C.
DAVIS, H., Jr.	Sp(P)1c	611-96-77	USNR	c/o Navy Dept. Washington 25, D.C.
DAVIDSON, J. D.	Y2c	249-96-97	USNR	New Alexander St. Wilkes-Barre,Pa.
DAVIES, R. L.	S2c	566-91-25	USNR	JicPoa Box 166 Comdt. Navy 128, FPO, S. F., Calif.
DAVIS, V. J.	PhoM3c	940-26-21	USNR	Photo InterPron 2 FPO, S. F. Calif.
DE BELL, L. R.	Y2c	576-98-29	USNR	JicPoa Box 166 Comdt. Navy 128, FPO, S. F., Calif.
DE LEON, W. H.	S2c	379-50-63	USNR	JicPoa Box 166 Comdt. Navy 128, FPO, S. F., Calif.
DEL PERAL, T.	S2c	[illegible]-86-24	USNR	ComNavJap APL-46, FPO, S.F., Calif.
DE MAERT ELAERE, G.L.	S1c	[illegible]-32-03	USNR	JicPoa Box 166 Comdt. Navy 128, FPO, S. F., Calif.
DEVOUS, E.	S1c(Y)	753-85-75	USNR	ComNavJap APL-46, FPO, S.F.,Calif.
DICKINSON, A. T.	S1c	322-39-15	USNR	BuOrd, Navy Dept. Washington, D.C.
DIXON, R. M.	S1c	974-55-95	USNR	BuOrd, Navy Dept. Washington, D.C.
DONAT, E.	S1c	293-92-19	USNR	MEIU No. 1, Navy Dept. Wash. 25, D. C.
DUDLEY, W. V.	S1c	941-88-83	USNR	MEIU No. 1, Navy Dept. Wash. 25, D. C.
DUNN, M. M.	S1c	269-43-23	USNR	MEIU No. 1, Navy Dept. Wash. 25, D. C.
DRUM, G. W.	PhoM2c	263-72-21	USNR	Photo Interpron 2, FPO, S.F.,Calif.
DUKE, J. S.	Y2c	650-83-79	USNR	6622 Ross St. Philadelphia, Pa.(19).
DUMETZ, A. E.	PhoM3c	354-38-10	USNR	Photo Interpron 2, FPO, S.F.,Calif.
DUNN, J. E.	S1c	714-56-79	USNR	ComNavJap APL-46, FPO, S.F.,Calif.
DURDIN, G. W.	S1c	783-70-94	USNR	ComNavJap APL-46, FPO, S.F.,Calif.
EGGLESTON, J. L.	PhoM2c	892-98-35	USNR	Interpron 2 FPO, S. F., Calif.
ENGELSTAD, L. E.	SF3c	890-18-66	USNR	5934 34th St. SW. Seattle(6),Wash.
EIDEN, J.	ETM1c	870-08-43	USNR	JicPoa Box 166, Navy 128, FPO, S. F., Calif.
ELLIOTT, M. G.	Y1c	603-18-75	USNR	219 W. 5th St. Sedalia, Mo.
ENGEWBRECHT, G.R.	PhoM1c	702-84-61	USNR	218 Fairview Ave. Park Ridge, Ill.
ERVIN, W. B.	Sp(X)2c	552-91-69	USNR	314 Duff St. Clarksburg, W. Va.
EVERY, A. H.	RT1c	386-38-65	USNR	703 S. 17th Ave. Yakima, Wash.
FLEMING, H.C.,Jr.	Y3c	305-45-02	USNR	ComMinePac Navy 128 FPO, S. F., Calif.
FRANKLIN, S. B.	PhoM2c	936-32-08	USNR	110 Hamilton Ave. Col'al Hghts, Peterbg., Va.
FRIDMAN, H. L.	CBM	403-99-06	USNR	93 Ashford Ave. Condado, Porto Rico
GADDAS, J. D.	CPhoM	411-30-75	USNR	214 W. Lincoln St. Wheato Ill.
GAIMES, G. A.	StM2c	322-52-75	USNR	ComNavJap FPO, S. F., Calif.
GALINO, M. M.	BM1c	726-10-63	USNR	801 W. Vine St. Stockton(10),Calif.
GALLO, W. F.	EM2c	712-34-83	USNR	418 DeGraw St. Brooklyn, N. Y.
GEDLINSKE, R. E.	AOM3c	868-84-54	USNR	Discharge
GRIFFIN, R. H.	AOM3c	892-51-13	USNR	ComNavJap APL-46 FPO, S.F.,Calif.
GUMPHER, J. S.	Y1c	650-81-64	USNR	Hershey Trust Co., Hershey, Pa.

ENCLOSURE (A), continued

(Enlisted)

Name	Rate	Service No.	Service	Address
HALDEMAN, M. L.	Y1c	650-06-84	USNR	114 N. Plum St. Lancaster, Pa.
HALLIER, B. B.	PhoM3c	880-93-44	USNR	c/o Navy Dept. Washington 25, D.C.
HARDING, R. L.	StM2c	970-79-16	USNR	ComNavJap APL-46 FPO, S.F., Calif.
HARMON, P. A.	S1c	765-47-56	USNR	Fleet Act. Yokosuka.
HEDLEY, J. W.	CY	311-35-69	USNR	4594 Westland St. Dearborne, Mich.
HEMPSEY, J. A.	PhoM2c	246-11-99	USNR	Photo Interpron 2 FPO, S.F.,Calif.
HOVEY, C. J.	PhoM1c	690-05-52	USN	SV-Interpron 2 FPO, S. F., Calif.
HUFF, D. O.	Y1c	623-96-33	USNR	Marcellus, Michigan
HUFF, R. W.	PhoM3c	823-42-82	USNR	Photo Interpron 2 FPO, S.F.,Calif.
KARWOSKI, V. J.	PhoM1c	600-44-71	USNR	JicPoa Box 166, Navy 128 FPO, S. F., Calif.
KERWIN, R. M.	PhoM2c	246-04-71	USNR	JicPoa Box 166, Navy 128 FPO, S.F. Calif.
KLYCE, W. H.	RT1c	845-34-30	USNR	2000 19th Ave. S Nashville, Tenn.
KRAGTORP, A. O.	GM1c	328-78-46	USN	1618 Seminary Ave. Oakland, Calif.
KUBACKI, J. J.	AOM2c	820-63-22	USN	MEIU No. 4 FPO, S. F., Calif.
LAMOREAUX, D. O.	AOM3c	559-39-75	USNR	951 25th St. Ogden, Utah.
LAUB, C.	AOM2c	927-46-47	USNR	MEIU No. 1 FPO, S. F., Calif.
LAVELLE, T. J. E.	Y1c	651-05-76	USNR	138 S. Sherman St. Wilkes-Barre,Pa.
LAWRENCE, D. B.	Y2c	658-72-49	USNR	728 Atwood Ave. Norfolk, Virginia
LICKTEIG, R. F.	Y1c	603-17-06	USNR	Cresco, Iowa
LOGAN, C.	StM2c	937-10-06	USNR	ComNavJap APL-46 FPO, S.F., Calif.
LOHNES, T. C.	PhM2c	866-58-17	USNR	c/o Navy Dept. Washington, D. C.
LOVEJOY, C. W.	S1c	804-95-88	USN	Foxcroft Road, Winchester, Mass.
McCAULEY, W. H.	PhoM3c	88138-90	USN	I-1539-B 3rd St. Santa Monica, Calif.
McCONNELL, L. F.	PhoM3c	565-90-75	USNR	Photo Interpron 2 FPO, S.F.,Calif.
McLEES, D. W.	PhoM3c	306-60-85	USNR	Photo Interpron 2 FPO, S.F.,Calif.
McMANUS, J.	PhM2c	711-16-76	USNR	NavMedSch, NatNavMedCen. Bethesda, Md.
MARKELL, R. E.	PhoM2c	852-47-72	USNR	515 Oakwood Ave. Highland Park,Ill.
MARTIN, T. D.	AMM2c	640-16-26	USNR	JicPoa Box 166, Navy 128, FPO, S. F., Calif.
MATTERN, W. P.	PhoM3c	819-52-80	USNR	Photo Interpron 2, FPO, S.F.,Calif.
MATZINGER, F. G.	S1c	937-44-26	USN	I-ComNavJap APL-46, FPO, S. F., Calif.
MAYHEW, C. F.	MN1c	311-61-92	USN	MEIU No. 1 Navy Dept. Wash.,25, D. C.
MEFFORD, R. L.	MoMM3c	313-84-62	USNR	MEIU No. 1 Navy Dept. Wash. 25, D. C.
MILEY, W. G.	SK2c	627-27-76	USNR	14 N. Meridian St. Wash., Indiana
MILLS, T. O.	S2c	953-35-71	USNR	ComNavJap APL-46 FPO, S.F. Calif.
MILSTEIN, S.	Y3c	703-84-74	USNR	3613 Glencairn Rd. Shaker Heights, Ohio
MISKY, V. P.	EM1c	360-16-40	USN	MEIU No. 4 FPO. S. F., Calif.
NEWLON, B. S.	Y3c	338-66-06	USNR	R.F.D. No.4,Hannibal, Mo.
NEWMAN, R. L.	S1c(PhoM)	909-37-53	USNR	Photo Interpron 2 FPO, S.F.,Calif.
NORDBY, R. B.	CPhoM	316-61-14	USN	c/o Navy Dept. Washington, D. C.
O'CONNELL, J. D.	S1c	314-29-12	USNR	ComNavJap FPO, S. F., Calif.
ONDERCHANIN, J.	PhoM1c	703-22-78	USNR	13464 Sunset Detroit (12), Mich.

ENCLOSURE (A), continued

(Enlisted)

Name	Rate	Service No.	Service	Address
OUELETTE, L. O.	Y1c	203-48-32	USNR	65½ Lock St. Nashua, N. H.
PADIAN, J. F.	Y1c	602-14-37	USNR	713 Arlington Ave. Govans, Md.
PAGELS, W.	ETM2c	962-59-06	USN	I-ComNavJap APL-46 FPO, S.F.,Calif.
PARKER, F. W.	S1c	935-95-99	USNR	ComNavJap APL-46 FPO, S.F., Calif.
PELTON, J. J.	S1c	762-28-11	USN	ComNavJap APL-46 FPO, S.F., Calif.
PINDER, R. A.	S1c	830-68-03	USNR	ComNavJap APL-46 FPO, S.F., Calif.
POERTNER, R. G.	AOM3c	701-80-04	USNR	3359 Sublette Ave. Dt. Louis(9), Mo.
POWER, T. L.	S2c	344-00-09	USN	Box 636 Gibbon, Nebr.
PUGH, G. R.	S2c	940-71-97	USN	I-ComNavJap APL-46 FPO, S.F., Calif.
PULIS, S. E.	ETM2c	909-33-16	USN	I-135 Prospect Ave. Pearl River, N. Y.
PUMA, J. J.	Y3c	751-13-24	USNR	59 Winchester St. Medford 55, Mass.
RANDLE, B. W.	MN1c	342-52-79	USN	MEIU No. 4 FPO, S. F., Calif.
REESE, J. H.	QM3c	711-77-42	USNR	ComNavJap APL-46 FPO, S. F.,Calif.
REID, T. V.	PhoM2c	849-84-62	USNR	RFD.-1 Box 562 Texarkana, Arkansas
REIDENAUER, P. A.	Y3c	275-36-26	USNR	8433 Oak St. New Orleans, La.
RICKABAUGH, C	S2c	923-21-39	USNR	ComServDiv 102 FPO, S. F., Calif.
RIEGER, L. E.	Y1c	610-07-41	USNR	305 West Monroe St., Bloomington Ill.
RIGBY, C. E.	S1c	251-76-44	USNR	ComNavJap APL-46 FPO, S.F.,Calif.
RISLEY, F. C.	PrtrL3c	801-11-13	USN	I-Photo Interpron 2 FPO. S. F., Calif.
RUSH, J. T.	S1c	952-69-57	USNR	c/o Navy Dept. Washington 25, D.C.
RUSSELL, J.	PhoM2c	762-24-24	USN	JicPoa Box 166 Navy 128 FPO, S. F. Calif.
RUSSELL, M. E.	PhoM3c	574-26-74	USNR	Interpron 2 FPO, S. F., Calif.
RUTHERFORD, S. F.	BM2c	385-90-06	USN	55 N. Elliott Pl. Apt. 7-d Brkly, N. Y.
RUTTY, F. M.	S1c	609-38-93	USNR	ComNavJap APL-46 FPO, S.F., Calif.
SALTZMAN, M.	PhM2c	814-86-70	USNR	NavMedSch, NatNavMedCen, Bethesda, Md.
SAMP, F. A.	MN3c	953-06-52	USNR	7433 Merkel Ave. Detroit(13),Mich.
SANDERS, N. R.	FC3c	846-35-69	USNR	3440 Wenonah Street, Baton Rouge, La.
SCHAEFFER, E.	ETM3c	814-77-24	USNR	ComDesPac, FlgAll. FPO, S. F., Calif.
SCHMOCK, G. R.	CY	611-52-66	USNR	4456 N. Campbell Ave. Chicago 25, Ill.
SEIBERLICH, A. G.	CSF	299-89-75	USN	USNTS (Salvage) Pier 88, W48thSt. NYC
SHERMAN, L.	PhM2c	412-61-40	USNR	NavMedSch, NatNavMedCen, Bethesda, Md.
SHERWOOD, W. A.	PhM3c	930-86-90	USN	I-NavMedSch, NatNavMedCen, Bethesda, Md.
SHOEMATE, E. W.	Y3c	888-09-65	USNR	Box 744 Medera, Calif.
SHUMARD, R. E.	Y1c	624-68-44	USNR	1231 S. Bermingham Pl. Tulsa,Okla.
SILVESTRINI, D.J.	S2c	247-71-27	USNR	118 W. 9th Ave. Conshohocken, Pa.
SMITH, J. C.	Y1c	658-51-19	USNR	4617 Augusta Ave. Richmond(21),Va.
SMITH, J. W.	SF3c	893-72-28	USNR	ComNavJap APL-46 FPO, S.F., Calif.
SNYDER, W. W.	RM3c	829-10-01	USNR	3 McCann St. Edgewood, Md.
STALLWORTH, W. H.	AOM2c	724-49-08	USNR	549 Poplar St. Spartanburg, S. C.
STEFANIO, J. J.	Y3c	804-29-39	USNR	64 Greenwich St. Dorchester 22, Boston, Mass.

ENCLOSURE (A), continued

(Enlisted)

Name	Rate	Service No.	Service	Address
STEWART, C. D.	PhoM3c	830-24-02	USNR	InterPron 2 FPO, S. F., Calif.
STRICKLAND, T. M.	S2c	636-56-60	USNR	ComNavJap APL-46 FPO, S. F., Calif.
STUART, H. E.	S2c	379-70-50	USNR	111 Elm St. Palo Alto, Calif.
TAYLOR, J. D.	StM2c	983-44-01	USNR	ComNavJap APL-46 FPO, S. F., Calif.
TOMPKINS, J. B.	RM3c	601-96-52	USNR	ComNavJap APL-46 FPO, S. F., Calif.
TRAUB, R. F.	PhoM3c	551-05-48	USNR	212 N.W. 34th St. Oklahoma City, Okla.
TURLEY, J. F.	FC2c	761-96-61	USNR	JicPoa Box 166 Navy 128, FPO, S.F. Calif.
VALDEZ, J. W.	S2c	225-74-39	USN	979 Aldus Street, Bronx, N. Y.
VINES, L. E.	S2c	226-75-06	USN	Lithia, Virginia
VINSON, B. C.	EM3c	659-20-45	USNR	219 E. 28th St. Norfolk (8), Va.
VOSBURGH, G.	S1c(RM)	888-98-17	USNR	ComNavJap FPO, S. F., Calif.
WADDELL, R. L.	AOM3c	959-47-88	USNR	MEIU No. 4 Pearl Harbor
WAINER, S. A.	PhoM3c	566-10-97	USNR	Photo InterPron FPO, S.F., Calif.
WALL, W. T.	StM2c	970-76-27	USNR	ComNavJap APL-46 FPO, S.F., Calif.
WEAVER, A. Q.	S1c	273-47-18	USNR	USS Blackford APB-45 FPO, S. F., Calif.
WEINERT, N. P.	Y3c	860-99-77	USNR	160 Athol Ave., Oakland, Calif.
WAYLAND, T. F.	S1c	758-23-34	USNR	ComNavJap APL-46 FPO, S.F., Calif.
WHEELER, B. J.	Y1c	659-28-16	USNR	Jarratt, Virginia
WHITAKER, J.	PhoM3c	557-23-52	USNR	InterPron 2 FPO, S. F., Calif.
WICK, R. S.	RT2c	758-20-71	USNR	983 Lincoln Ave. St. Paul, Minn.
WIGGINS, J. W.	PhoM2c	637-84-33	USNR	Douglasville, Georgia
WILDE, L. F.	PhoM1c	208-90-82	USN	4 Berkley St. West Warwick, R. I.
WILLIAMS, J.	StM2c	928-22-75	USNR	ComNavJap APL-46, FPO, S.F., Calif.
WINGENBACH, J. D.	AMM1c	600-59-75	USNR	36 Copeland Ave., Homer, N. Y.
WOBRINGER, W. J.	AOM3c	959-05-05	USNR	MEIU No. 4 Navy 128 FPO, S. F., Calif.
WOZNIAK, M. J.	S1c	944-16-20	USNR	ComNavJap APL-46 FPO, S.F., Calif.
YEATRAS, P. S.	PhM2c	835-63-48	USNR	NavMedSch, NatNavMedCen, Bethesda, Md.
YORK, W. W.	S1c	554-41-32	USNR	ComNavJap APL-46 FPO, S.F., Calif.
YOUNG, S. H.	Sp(X)1c	656-46-99	USNR	230 S. 4th St. Smithfield, N. C.
ZAMBEL, R. A.	S1c	882-01-32	USNR	c/o Navy Dept. Washington 25, D.C.

ENCLOSURE (A), continued

U. S. NAVAL TECHNICAL MISSION TO JAPAN
ROSTER OF ARMY PERSONNEL

(Officers)

Name	Rank	Serial No.	Service	Address
BALDRIDGE, R. C.	1st.Lt.	0516511	AUS	1112 W. 8th. St. Topeka, Kansas
BENNETT, A.	Capt.	022731	AUS	The Old Point Nat'l Bank, Phoebus, Ga.
BRUNER, G. W.	Major	0503399	AUS	205 Hendron St. Walsenberg, Colo.
DIETTERLE, S. L.	1st.Lt.	01114454	AUS	53 Menlo Pl. Berkley, Calif.
DIXON, S. B.	1st.Lt.	0520519	AUS	610 E. 9th St. Houston (7), Texas
DONALDSON, G. P.	Capt.	0461016	AUS	Abraham Baldwin College, Tifton, Ga.
GIGLIO, C.	2nd Lt.	0876515	AUS	1218 Leland Ave. Bronx (60), N. Y.
HALL, M. A.	Major	0370491	AUS	Ridgewood Rd. Jasper, Alabama
HORN, M. R.	1st.Lt.	0545302	AUS	Bertha, Minnesota
JORGENSEN, W.	Major	0308731	AUS	Hollywood Farm, Woodville, Wash.
KAPLAN, D. S.	1st.Lt.	0545440	AUS	Army Detachment, CincPoa HQ, FPO, S. F., Calif.
LAMB, F. W.	Capt.	0384602	AUS	Army Staff, CincPoa, FPO, S. F., Calif.
PARKER, R. R.	1st.Lt.	0532676	AUS	2213 Los Angeles Ave. Pittsburg (16), Pa.
PERKINS, L. C.	Capt.	0509114	AUS	623 Perkins Ave. Colfax, Wash.
SINCLAIR, L. M.	Lt.Col.	0334699	AUS	3720 Ivy St. DelPaso Hgts. Sacramento, Calif.
SNEIDER, R. L.	1st.Lt.	0558646	AUS	AAF Annex #2 Gravelly Pt. Wash. D. C.
TOLBERT, S. H.	Major	0570546	AUS	801 W 18th St. Vancouver, Wash.
VATCHER, W. H.	1st.Lt.	0558478	AUS	912 Beverly Dr. San Gabriel, Calif.
WEBSTER, A. G.	1st.Lt.	0558476	AUS	505 Pendleton St. Waycross, Ga.
YUDKOFF, A. S.	1st.Lt.	0558498	AUS	2501 Davidson Ave. New York 63,N.Y.
ZASLOW, M. S.	1st.Lt.	0545869	AUS	Army Detachment CincPoa HQ, FPO, S. F., Calif.

(Enlisted)

Name	Rank/Rate	Serial No.	Service	Address
AOYAMA, T.	T/3	30106403	AUS	1627-D Nuuanu Ave. Honolulu, T. H.
CAIN, E. L.	Cpl.	37401540	AUS	359 Whittier St. St. Louis, Mo.
CUELLAR, C.	T/4	39700018	AUS	2817 Macon St. Los Angeles 41, Calif.

ENCLOSURE (A), continued

(Enlisted)

Name	Rank/Rate	Serial No.	Service	Address
DANIELSON, D. D.	T/5	36950683	AUS	910 E. 62nd St. Chicago 37, Ill.
FILMER, S. H.	T/4	12144829	AUS	5 Grove St. Port Chester, N. Y.
FURUIYE, N.	T/Sgt	38083529	AUS	Rt. 1 Box 63 Lafayette, Colorado
HARADA, J. L.	T/3	39017459	AUS	1633 Nuuanu St. Honolulu, Hawaii
HEIDORN, L.	T/5	3665872	AUS	Winslow, Indiana
HIRANO, F. M.	T/3	39166325	AUS	2106 3rd. Ave. Minniapolis, Minn.
HENDON, T. S.	M/Sgt	14001684	AUS	410 W. 2nd St. Leland, Miss.
INAGAKI, G. J.	T/3	37566034	AUS	674 Wall St. Salt Lake City, Utah
ISOKANE, S.	T/3	30106672	AUS	2528 Stream Dr. Honolulu (3), T.H.
JENKINS, J. H.	T/4	13106315	AUS	413 Butternut St. N. W. Wash., D.C.
KUWAHARA, B. A.	T/3	30106642	AUS	P.O. Box 859 Honolulu(8), Hawaii
KAWAMOTO, E. T.	T/Sgt	30105395	AUS	1014 Long Lane Honolulu, Hawaii
KAWAMOTO, G.	T/3	30100326	AUS	P.O. Box 3 Volcano House Hawaii Nat. Pk., T. H.
KAWASAKI, T.	T/4	30106725	AUS	P.O. Box 370 Waipahu, Oahu, T. H.
KONOKOWSKI, D. P.	T/3	16168870	AUS	824 N. Ashland Ave. Chicago, Ill.
KOYANAGI, T.	T/3	30106676	AUS	Box G. Papaikou, Hawaii, T. H.
KRUEGER, H. J.	T/5	32721078	AUS	651 East 236th St. New York(66), N. Y.
KUBOTA, H.	T/3	30103678	AUS	130 A Bates St. Honolulu, T. H.
KUGA, F. T.	T/3	30101996	AUS	c/o Waialai Ser. Sta. Honolulu, (55), T. H.
LEONARD, R. C.	T/5	19144287	AUS	Army Detachment, CincPoa, Navy 128, FPO, S. F., Calif.
LINDSAY, W. C.	T/4	39209152	AUS	3725 NE. 37th Ave. Portland, Ore.
MAKINO, W. Y.	T/3	39019037	AUS	419 Sunset Blvd. Los Angeles, Calif.
MATSUI, J.	T/3	30106512	AUS	Waikapu, Maui, T. H.
MIYAGI, T. T.	T/4	39021104	AUS	558-B S. Hotel St. Honolulu, T. H.
MIYATA, R. M.	T/3	39168691	AUS	2030 Clarkson, St. Denver(5), Colo.
NAGATA, S.	T/4	30105431	AUS	1109 Pinkham St. Honolulu T. H.
NAGATA, N.	T/4	30106576	AUS	1423 16th Ave. Kaimuki, Hon. T. H.
NAKADA, K. Y.	T/3	30106599	AUS	Adjutant General, Washington, D.C.
NATHAN, L. H.	T/5	31354340	AUS	121 Park Dr. Boston (15), Mass.
OKA, C. D.	T/Sgt	39089420	AUS	3432 Quivas St. Denver (11), Colo.
OKADA, H. H.	T/4	30105329	AUS	938A N. Vineyard St. Hon., T. H.
OLIVER, J. A.	T/4	39530988	AUS	905 16th Ave. Longview, Wash.
ORLANS, C. A.	T/4	15307345	AUS	881 Wash. Ave. Brooklyn(25), N.Y.
OTA, K.	T/4	39002339	AUS	Adjutant General, Washington, D.C.
OTANI, J. S.	T/4	39089688	AUS	610 "N" St. Sacramento, Calif.
PLUMMER, J. F.	T/5	30334308	AUS	469 Hill St. Waterbury, Conn.
SACK, E. H.	T/5	32633564	AUS	Curling, New Foundland
SAITO, J. H.	T/3	30106518	AUS	2280-A Date St. Honolulu, T. H.
SCHLATTER, C. R.	T/5	16073640	AUS	Army Detachment, CincPoa Navy 128, FPO, S. F., Calif.

ENCLOSURE (A), continued

(Enlisted)

Name	Rank/Rate	Serial No.	Service	Address
SHIGETA, Y. J.	T/3	30106521	AUS	3734 Harding Ave. Honolulu, T.H.
SHIMAMOTO, T.	T/3	30107346	AUS	Adjutant General, Washington, D.C.
SKURNICK, J.	T/5	32815455	AUS	143 Morton Pl. Bronx (53), N.Y.C.
SPOOR, J. A.	T/Sgt	16087103	AUS	Army Detachment HQ, CincPoa Navy 128 FPO, S. F., Calif.
SWEENEY, W. C.	T/5	11057400	AUS	47 Smith St. Fitchburg, Mass.
TAMASHIRO, J. S.	T/3	30103636	AUS	P.O. Box 89, Waimea, Kauai, Hawaii
TERAO, N.	T/4	30106522	AUS	Box 185 Puunene, Maui, Hawaii
TORAKAWA, T.	T/4	39681266	AUS	P.O. Box 662 Bountiful, Utah
TSUISUI, K.	T/4	30102926	AUS	Adjutant General, Washington, D.C.
TURNBEAU, C. C.	T/sgt	38447039	AUS	4248 Pleasant St. St. Louis, Mo.
WINSTEN, H. H.	T/5	31245917	AUS	75 Central Ave. Pawtucket, R. I.
YAGI, K.	T/3	39007295	AUS	413-15 Beason Bldg., Salt Lake City, Utah
YAMAGATA, M.	T/4	30106160	AUS	P.O.Box 691, Wailuku, Maui
YAMAMOTO, B. L.	T/3	30101854	AUS	P.O.Box 185, Pearl City, Oahu,T.H.
YAMAMOTO, S. Y.	T/4	30104662	AUS	P.O.Box 58, 920 Cedar St. Holoa, Kauai, T. H.
YAMASHITA, T.	T/5	30101449	AUS	58 Cabrinaha L. Kilauea Ave. Hilo, Hawaii
YOKOYAMA, H. N.	T/3	30106582	AUS	1154A Kokohead Ave, Honolulu (26), T. H.

ENCLOSURE (A), continued

U. S. NAVAL TECHNICAL MISSION TO JAPAN
ROSTER OF MARINE PERSONNEL

(Officers)

Name	Rank/Rate	Serial No.	Service	Address
BUSHEY, R. E.	2nd.Lt.	038333	USMCR	212 E. Andover Ave. Muncie, Ind.
DAVIN, M. J.	1st.Lt.	024202	USMCR	31 Fenwood Rd. Roxbury, Mass.
GLENDINNING, J	Lt.Col.	05956	USMC	115 Howes St. Fort Collins, Colo.
GRAHAM, E. W.	1st.Lt.	036420	USMCR	Madison, Tenn.
GRAY, C. D.	Major	011123	USMCR	229 Conant Rd. Weston, Mass.
HAMILTON, P. L.	1st.Lt.	017256	USMCR	1871 Penna. Ave. Beaumont, Texas
HINKLE, T. M.	Lt.Col.	05359	USMC	3751 Edgeville Dr. Los Angeles Calif.
LEVIS, R. H.	1st.Lt.	023606	USMCR	NFA
McDANIEL, F. C.	Capt.	020330	USMCR	5107 Venus St. New Orleans(17),La.
PIERCE, J. L.	Capt.	011595	USMCR	1903 Mayflower Dr. Dallas, Texas
REINBERG, L. C.	Lt.Col.	05199	USMC	2547 Zeeland Ave. Baton Rouge, La.
RICHARDS, W. B.	1st.Lt.	017462	USMC	451 Water St. Fitchburg, Mass.
ROW, R. C.	1st.Lt.	022874	USMCR	1966 NewPort Ave. Pasadena, Calif.
SCANLON, J. A.	1st.Lt.	019634	USMCR	3125 40th Ave. S. Minneapolis,Minn.
SHEPLEY, G. A.	2nd.Lt.	037658	USMCR	620 N. Raynor Ave. Joliet, Ill.
SOPER, A. C.	Major	08017	USMCR	1441 Orchard Way, Rosemont, Pa.
STRATTON, R. Y.	Major	06741	USMC	215 Miramar St. San Clemente,Calif.
WOOD, R. M.	Lt.Col.	05822	USMC	600 S. Union St. Grand Rapids,Mich.

(Enlisted)

Name	Rank/Rate	Serial No.	Service	Address
BALUTOWSKI, T. T.	G/Sgt	264598	USMC	Hdqts. Marine Corp, Wash., D. C.
BERDINKA, E. T.	Sgt	364346	USMC	Hdqts. Marine Corp, Wash., D. C.
CAREY, W. J.	S/Sgt	439773	USMCR	2625 96th St. Corona, L.I. N. Y.
COLMAN, W. G.	Corp.	839687	USMC	658 Day Ave. S. W. Roanoke, Va.
COSTELLO, W. P.	Pfc	922643	USMC	911 5th St. N. E. Washington, D.C.
COULTER, W. K.	Sgt	864516	USMC	Hdqts Marine Corp, Wash., D. C.
FARRELL, E. W.	MGySgt	266970	USMC	7 Broad St. Lynn, Mass.
KOONCE, G. D.	G/Sgt	267285	USMC	Hdqts Marine Corp, Wash., D. C.
LAINE, C. L.	Sgt	541883	USMCR	Hdqts Marine Corp, Wash., D. C.
MORSE, H. P.	Pfc	524447	USMCR	Clover Bank Rd. Hamburg, N.Y. Rd.3
PATTERSON, G. E.	Pfc	942938	USMCR	Hdqts Marine Corp, Wash., D. C.
PLOET, I. D.	Sgt	489013	USMCR	Hdqts Marine Corp, Wash., D. C.

ENCLOSURE (A), continued

(Enlisted)

Name	Rank/Rate	Serial No.	Service	Address
ROSEMBAUM, I.	Sgt	393339	USMCR	9737 Lakepoint Ave. Detroit (24), Mich.
STOCKMAN, D. O.	Sgt	448134	USMCR	Hdqts Marine Corp, Wash., D. C.
STRAHL, M. O.	Corp.	835468	USMCR	337 McKee Pl. Apt. 5, Pittsburg (13), Pa.
TILDES, N. H.	1st.Sgt	285773	USMC	Hdqts Marine Corp, Wash., D. C.
WALSH, J. J.	Corp.	806675	USMCR	144 Seymour St. Buffalo, N. Y.
YOUMANS, J.H.	Pfc	853280	USMCR	R.F.D. 5, Portland, Maine

ENCLOSURE (A), continued

U. S. NAVAL TECHNICAL MISSION TO JAPAN
ROSTER OF BRITISH PERSONNEL

Name	Rank/Rate	Service	Address
BALD, R. G.	Captain	RN	Manor Lodge Blackwater, Hampshire, England
BARHAM, C. N. R.	Acting Comdr.	RN	c/o British Embassy, Tokyo, Japan
BROOKE, R. C. R.	Lt. Comdr.	RNVR	NOTE* 1
BULL, A. P.	Sub. Lieut.	RNVR	53 Plymouth Rd. Sheffield (7), Eng.
CATT, John	Lieut.	RNVR	British Admiralty Delegation, Wash. D. C.
CUNNINGHAME, R. R.	Lieut. (SP)	RNVR	32 Woodside R.. Winchester, Mass.
DE LACY, H.	Lieut.	RNVR	NOTE* 2
DELMAR-MORGAN, E.L.	Lt. Comdr.	RNVR	Burham-Albany-Cresent-Claygate-Surrey,
DOMAN G. R.	Comdr	RN	Ensleigh-Mutments-Lansdowne-Bath-Somerset
EDGCOMBE, S.	Lt. Comdr.	RNVR	Rose-Marie-Downderry-Cornwall, Eng.
EDWARDS, C. F.	Comdr.	RNVR	NOTE* 3
GLANVILLE, T. J.	Lt. Comdr.	RNVR	c/o British Embassy, Tokyo, Japan
GOLDSWORTHY, L. V.	Lt. Comdr.	RANVR	NOTE* 4
HANCOCK, N.	Comdr.	RN	
HEATH, S. V.	Lieut.	RNVR	Sidney Sussex College, Cambridge, Eng.
JORDAN, E. W.	Lieut.	RNVR	12 Senlac Rd., Lee, London, S.E. 12
LAVARACK, T. V.	Lt. Comdr.	RNVR	55 Park Lane, London, W. I.
MATHER, D. B.	Lt. Comdr.	RNVR	c/o British Embassy, Tokyo, Japan
MORGAN, J. R.	Lieut.	RN	9 Sion Hill, Bath, England
PAFFETT, J. A. H.	Lieut.	RNVR	British.Fleet.Mail.Off. Sydney, Australia
QUINE, J.	Lieut.	RNVR	NOTE* 5
RICHNELL, D. T.	Lt. (SP)	RNVR	c/o British Embassy, Tokyo, Japan
STEWART, A. J.	Comdr.	RN	NOTE* 6
WATT, I. B.	Lieut.	RNVR	NOTE* 7
WILKINSON, E. A.	Lieut.	RNVR	30 Green L. Thornton Heath, Surrey, Eng.

*Naval Construction Dept., Admiralty, Warminister Road, Bath Somerset, England.
*1 - Mine Design Dept. H.M.S. Vernon Portsmouth, England.
*2 - D.S.R. Admirality Whitehall, London
*3 - Fendock, Kilmacolm, Renfrewshire, Scotland.
*4 - Perth, Australia.
*5 - "AVOCA", Seasalter Beach, Whitstable, Kent, England.
*6 - Admiralty, Whitehall, London.
*7 - Admiralty, Whitehall, London.

ENCLOSURE (A), continued

(Enlisted)

Name	Rank/Rate	Service	Address
REDMAN, Richard	Able Seaman	RNVR	c/o British Embassy, Tokyo, Japan
SHEPHERD, P. W.	Royal Marine		c/o British Embassy, Tokyo, Japan
WILSON, James	Photographer	RNVR	3 Beaconsfield Crescent, Camon Hill Birmingham, England

ENCLOSURE (A), continued

U. S. NAVAL TECHNICAL MISSION TO JAPAN
ROSTER OF NAVAL TECHNICIANS

Name	Employer	Address
BOZORTH, R. M.	Bell Telephone Lab. Inc.	20 Park Rd. Millburn, N. J.
CHESTNUT, F. T.	Ajax Electrothermic Corp.	Yardley-Morrisville Rd. Yardley, Pa.
COCHRANE, S. W.	Radio Corp. of America	RR#16, Box #21, Indianapolis, Indiana
COLE, J. R.	BuShips	1223 Vermont Ave. Wash., D.C. Apt. 31
DAVIES, J. A.	Westinghouse Electric & Mfg.Co.	523 Cedar Lane Swarthmore,Pa.
ELMEN, G. W.	BuOrd	6609B Strathmore St. Chevy Chase, Md.
FLAHERTY, L. N.	BuShips	Bu of Ships, Navy Dept. Wash. D. C.
GRIFFIN, T. J.	BuShips	2812 Texas Ave. Apt. 306, Wash., D. C.
HAWK, C. O.	BuShips	514 Braddock Rd. Pittsburg (21), Pa.
MOORE, H. H.	BuOrd	718 Rock Creek Church Rd. Wash. (10),
NICKERSON, F.W.	Guided Radio Corp.	161 6th Ave. New York, N. Y.
RUPP, J. L.	National Battery Co.	285 7th St. S. F., Calif.
SANFORD, R. B.	BuOrd	6706 46th St. Chevy Chase (15. Md.
SIMPSON, J. W.	Westinghouse Electric & Mfg.Co.	508 S. Ave. Pittsburg, (21)Pa.
WILLIAMS, W. D.	General Electric Co.	17 Irving Rd. Scotia, N. Y.
WINGER, E. H.	BuShips	NavOrdLab. Navy Yard Wash., D. C.

ENCLOSURE (B)

ENCLOSURE (B)

INDEX OF NAVTECHJAP REPORTS

A list of the titles and index numbers of all NavTechJap reports follows. With each report is given a cross-reference to Enclosures (C), (D) and (E) to indicate where its summary and document and equipment data may be found.

All NavTechJap target reports are indexed in accordance with the target designations established in "Intelligence Targets Japan" (DNI) of 4 September 1945. Certain new targets were added by the Mission during the course of its investigations and the reports corresponding to them are distinguished by "(N)" being placed after the index number.

Attention is invited to the fact that "Intelligence Targets Japan" contains many duplications between and within the individual fascicles of which it is composed. In such cases the reports have been indexed under the target of paramount interest. In several cases closely allied targets have been grouped and the index numbers of the report covering them correspond to the most prominent target. In all cases clear indication is given in each report of the targets covered by it.

ENCLOSURE (B), continued

AERONAUTIC REPORTS

INDEX NUMBER	TITLE	(Page)
A-11	AIRCRAFT ARRANGEMENTS AND HANDLING FACILITIES IN JAPANESE NAVAL VESSELS	
	Summary:	72
	Documents:	313
	Equipment:	None
A-39	JAPANESE NAVAL PHOTOGRAPHY	
	Summary:	73
	Documents:	315
	Equipment:	410

DOCUMENTS AND INTELLIGENCE REPORTS

D-II E-3	JAPANESE NAVY LEAGUE	
	Summary:	74
	Documents:	315
	Equipment:	None
D-II E-8	GAKUTO KAIYO KAI-SEA STUDENTS ASSOCIATION	
	Summary:	75
	Documents:	None
	Equipment:	None

ELECTRONIC REPORTS

E-01	JAPANESE SUBMARINE AND SHIPBORNE RADAR	
	Summary:	76
	Documents:	316
	Equipment:	413
E-02	JAPANESE AIRBORNE RADAR	
	Summary:	77
	Documents:	316
	Equipment:	413
E-03	JAPANESE LAND-BASED RADAR	
	Summary:	78
	Documents:	316
	Equipment:	None
E-04	JAPANESE CENTIMETER WAVE TECHNIQUE	
	Summary:	79
	Documents:	316
	Equipment:	None

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
E-05	JAPANESE RADIO AND RADAR DIRECTION FINDERS	
	Summary:	80
	Documents:	316
	Equipment:	414
E-06	JAPANESE ANTI-RADAR COVERINGS	
	Summary:	81
	Documents:	316
	Equipment:	None
E-07	JAPANESE RADAR COUNTERMEASURES AND VISUAL SIGNAL DISPLAY EQUIPMENT	
	Summary:	82
	Documents:	316
	Equipment:	414
E-08	JAPANESE RADIO EQUIPMENT	
	Summary:	83
	Documents:	317
	Equipment:	415
E-09	JAPANESE NAVIGATIONAL AIDS	
	Summary:	84
	Documents:	317
	Equipment:	417
E-10	JAPANESE SONAR AND ASDIC	
	Summary:	85
	Documents:	317
	Equipment:	418
E-11	JAPANESE COMMUNICATION SYSTEMS	
	Summary:	86
	Documents	317
	Equipment:	None
E-12	JAPANESE EXPERIMENTAL RADAR	
	Summary:	87
	Documents:	317
	Equipment:	None
E-13	JAPANESE ELECTRONIC TUBES	
	Summary:	88
	Documents:	317
	Equipment:	418

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
E-14	JAPANESE MAGNETIC AIRBORNE DETECTOR	
	Summary:	89
	Documents:	317
	Equipment:	419
E-15	POWER SUPPLIES FOR JAPANESE ELECTRONICS	
	Summary:	90
	Documents:	317
	Equipment:	None
E-16	JAPANESE ANTENNAE	
	Summary:	91
	Documents:	317
	Equipment:	419
E-17	JAPANESE RADIO, RADAR, AND SONAR EQUIPMENT	
	Summary:	92
	Documents:	318
	Equipment:	419
E-18	JAPANESE RADIO APPARATUS CONSTRUCTION METHODS	
	Summary:	93
	Documents:	318
	Equipment:	None
E-19	JAPANESE ELECTRONIC EQUIPMENT CONSTRUCTION MATERIALS	
	Summary:	94
	Documents:	318
	Equipment:	None
E-20	JAPANESE R.F. TRANSMISSION LINES, WAVE GUIDES WAVE GUIDE FITTINGS, AND DIELECTRIC MATERIALS	
	Summary:	95
	Documents:	318
	Equipment:	None
E-22	JAPANESE RADIO FREQUENCY MEASURING TECHNIQUE	
	Summary:	96
	Documents:	318
	Equipment:	419
E-23	JAPANESE INSULATION MATERIALS	
	Summary:	97
	Documents:	318
	Equipment:	None
E-26	JAPANESE ELECTRONIC HARBOR PROTECTION EQUIPMENT	
	Summary	98
	Documents:	318
	Equipment:	420

INDEX NUMBER	TITLE	
E-28	JAPANESE ELECTRONICS - GENERAL	
		(Page)
	Summary:	99
	Documents:	318
	Equipment:	None
E-29	JAPANESE ELECTRONICS TRAINING AND OPERATING TECHNIQUES	
	Summary:	100
	Documents:	332
	Equipment:	None
E-30(N)	JAPANESE ELECTRONICS - MISCELLANEOUS	
	Summary:	101
	Documents:	332
	Equipment:	None
	MEDICAL REPORTS	
M-01	DATA RELATIVE TO LIFE IN THE JUNGLE AND ON SEA ISLANDS, AND DATA ON COMPOSITION OF INSECTICIDES	
	Summary:	102
	Documents:	332
	Equipment:	None
M-02	DENTISTRY IN THE JAPANESE ARMED FORCES	
	Summary:	103
	Documents:	333
	Equipment:	None
M-03	PODIATRY IN THE JAPANESE NAVY	
	Summary:	104
	Documents:	333
	Equipment:	None
M-04	INFORMATION RELATIVE TO VENEREAL DISEASE CONTROL IN JAPAN	
	Summary:	105
	Documents:	None
	Equipment:	None
M-05	JAPANESE BACTERIOLOGICAL WARFARE	
	Summary:	106
	Documents:	None
	Equipment:	None
M-06	AERO, SURFACE, AND SUBMARINE MEDICINE AND RESEARCH IN THE JAPANESE NAVY	
	Summary:	107
	Documents:	333
	Equipment:	None

(Equipment for all Medical target may be found on Page 421)

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
M-07	OPPORTUNITY FOR INFECTION OF NAVAL PERSONNEL WITH TUBERCULOSIS IN JAPAN	
	Summary:	108
	Documents:	None
	Equipment:	None
M-09	PREVENTIVE MEDICINE AND PUBLIC HEALTH ORGANIZATION AND FACILITIES IN THE JAPANESE NAVY	
	Summary:	109
	Documents:	None
	Equipment:	None
M-10	BACTERIOLOGY AND CHEMISTRY IN THE JAPANESE NAVY	
	Summary:	110
	Documents:	333
	Equipment:	None
M-11	GENERAL MEDICINE AND SPECIAL DISEASES IN THE JAPANESE NAVY	
	Summary:	111
	Documents:	None
	Equipment:	None
M-12	PHARMOCOLOGY AND MALARIOLOGY IN JAPAN - CIVILIAN AND NAVAL	
	Summary:	112
	Documents:	333
	Equipment:	None
M-C	JAPANESE CHEMICAL WARFARE	
	Summary:	113
	Documents:	None
	Equipment:	None
M-D	NEUROPSYCHIATRY IN THE JAPANESE ARMED FORCES	
	Summary:	114
	Documents:	None
	Equipment:	None
M-E	REHABILITATION IN THE JAPANESE NAVY	
	Summary:	115
	Documents:	None
	Equipment:	None
M-I	GENERAL MEDICAL STATISTICS, JAPANESE ARMY AND NAVY	
	Summary:	116
	Documents:	None
	Equipment:	None

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
M-AA	ORGANIZATION, ADMINISTRATION, AND FACILITIES OF THE IJN MEDICAL CORPS	
	Summary:	117
	Documents:	None
	Equipment:	None
M-AB	REFERENCES FROM THE COMMITTEE FOR THE TECHNICAL AND SCIENTIFIC SURVEY OF JAPANESE ACTIVITIES IN MEDICAL SCIENCES	
	Summary:	None
	Documents:	None
	Equipment:	None
	ORDNANCE REPORTS	
O-01-1	JAPANESE TORPEDOES AND TUBES - ARTICLE 1 - SHIP AND KAITEN TORPEDOES	
	Summary:	118
	Documents:	335
	Equipment:	421
O-01-2	JAPANESE TORPEDOES AND TUBES - ARTICLE 2 - AIRCRAFT TORPEDOES	
	Summary:	122
	Documents:	None
	Equipment:	None
O-01-3	JAPANESE TORPEDOES AND TUBES - ARTICLE 3 - ABOVE-WATER TUBES	
	Summary:	123
	Documents:	None
	Equipment:	None
O-02	JAPANESE GUIDED MISSILES	
	Summary:	124
	Documents:	None
	Equipment:	None
O-03	JAPANESE COUNTERMEASURES AND DEFENSIVE ORGANIZATION AGAINST U.S. MINES	
	Summary:	125
	Documents:	336
	Equipment:	None
O-04	JAPANESE MINES	
	Summary:	126
	Documents:	336
	Equipment:	430

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
0-05	JAPANESE NAVAL MINING ORGANIZATION AND OPERATIONAL TECHNIQUES	
	Summary:	127
	Documents:	336
	Equipment:	None
0-06	JAPANESE BOMB DISPOSAL METHODS	
	Summary:	128
	Documents:	None
	Equipment:	None
0-07	SHIP SIGNATURES AND RELATED DATA	
	Summary:	129
	Documents:	337
	Equipment:	None
0-08	JAPANESE DEPTH CHARGES	
	Summary:	130
	Documents:	None
	Equipment:	433
0-09	JAPANESE NAVAL ROCKETS	
	Summary:	131
	Documents:	337
	Equipment:	434
0-10-1	JAPANESE PROPELLANTS - ARTICLE 1 - THE USE AND MANUFACTURE OF ORTHO TOLYL URETHANE FOR STABILIZING ROCKET AND GUN PROPELLANTS	
	Summary:	132
	Documents:	None
	Equipment:	435
0-10-2	JAPANESE PROPELLANTS - ARTICLE 2 - ROCKET AND GUN PROPELLANTS, GENERAL	
	Summary:	133
	Documents:	None
	Equipment:	None
0-10-3	JAPANESE PROPELLANTS - ARTICLE 3 - RESEARCH ON NON-VOLATILE SOLVENT POWDERS	
	Summary:	134
	Documents:	None
	Equipment:	None
0-11	JAPANESE ILLUMINATING AND COLORED BURST PROJECTILES	
	Summary:	135
	Documents:	337
	Equipment:	None

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
O-12	JAPANESE PYROTECHNICS	
	Summary:	136
	Documents:	None
	Equipment:	435
O-14	JAPANESE NAVY AMMUNITION CASES FOR 50M AND LARGER CALIBER GUNS	
	Summary:	137
	Documents:	337
	Equipment:	436
O-15	JAPANESE STEEL MANUFACTURING METHODS	
	Summary:	138
	Documents:	338
	Equipment:	None
O-16	JAPANESE HEAVY ARMOR	
	Summary:	139
	Documents:	341
	Equipment:	436
O-17	JAPANESE NAVAL PROJECTILE FUZES	
	Summary:	140
	Documents:	341
	Equipment:	437
O-18	JAPANESE ORDNANCE FUZES	
	Summary:	141
	Documents:	342
	Equipment:	None
O-19	JAPANESE PROJECTILES - GENERAL TYPES	
	Summary:	142
	Documents:	343
	Equipment:	441
O-20	JAPANESE AMMUNITION PRIMERS	
	Summary:	143
	Documents:	346
	Equipment:	466
O-21	JAPANESE INTERIOR BALLISTICS	
	Summary:	144
	Documents:	347
	Equipment:	None

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
0-22	JAPANESE TRACERS	
	Summary:	145
	Documents:	348
	Equipment:	447
0-23	JAPANESE BOMBS	
	Summary:	146
	Documents:	349
	Equipment:	447
0-24	DESCRIPTION AND OPERATIONS OF JAPANESE TYPE 3 PHOTOELECTRIC FUSE	
	Summary:	147
	Documents:	353
	Equipment:	None
0-25	JAPANESE EXPLOSIVES	
	Summary:	148
	Documents:	353
	Equipment:	450
0-26	JAPANESE NAVY POWDER BAGS	
	Summary:	149
	Documents:	None
	Equipment:	None
0-27	JAPANESE INCENDIARY MIXTURES	
	Summary:	150
	Documents:	None
	Equipment:	450
0-29	JAPANESE FIRE CONTROL	
	Summary:	151
	Documents:	353
	Equipment:	451
0-30	JAPANESE ANTI-AIRCRAFT FIRE CONTROL	
	Summary:	152
	Documents:	355
	Equipment:	452
0-31	JAPANESE SURFACE AND GENERAL FIRE CONTROL	
	Summary:	153
	Documents:	356
	Equipment:	None
0-32	JAPANESE TORPEDO FIRE CONTROL	
	Summary:	154
	Documents:	356
	Equipment:	453

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
0-35	JAPANESE DEMOLITION METHODS	
	Summary:	155
	Documents:	356
	Equipment:	None
0-36-1	JAPANESE LIGHT ARMOR, ARTICLE 1	
	Summary:	156
	Documents:	357
	Equipment:	None
0-36-2	JAPANESE LIGHT ARMOR, ARTICLE 2	
	Summary:	157
	Documents:	None
	Equipment:	None
0-38	JAPANESE ORDNANCE RESEARCH, TESTING AND TRAINING	
	Summary:	158
	Documents:	357
	Equipment:	None
0-39-1	JAPANESE ORDNANCE REAEARCH, ARTICLE 1 - GUNFIRE TESTING OF BOMBS AT THE KAMEGAKUBI PROVING GROUND	
	Summary:	159
	Documents:	357
	Equipment:	453
0-39-2	JAPANESE ORDNANCE RESEARCH, ARTICLE 2 - EXPERIMENTAL RESEARCH ON SUPER HIGH VELOCITY GUNS AND PROJECTILES	
	Summary:	160
	Documents:	None
	Equipment:	None
0-39-3	JAPANESE ORDNANCE RESEARCH, ARTICLE 3 - TORPEDO MODELS	
	Summary:	161
	Documents:	None
	Equipment:	None
0-39-4	JAPANESE ORDNANCE RESEARCH, ARTICLE 4 - LABORATORY PROCEDURES	
	Summary:	162
	Documents:	None
	Equipment:	None
0-41	JAPANESE RESEARCH IN AIRBORNE ACOUSTICS AND EARTHWAVES	
	Summary:	163
	Documents:	358
	Equipment:	None

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	
O-42	JAPANESE ORDNANCE EQUIPMENT - INTERNAL RECORDERS, WAVE AND TIDE METERS, TORPEDO RECOVERY GEAR, UNDERWATER LOCATORS	(Page)
	Summary:	164
	Documents:	358
	Equipment:	None
O-44	EFFECTIVENESS OF JAPANESE AA FIRE	
	Summary:	165
	Documents:	None
	Equipment:	None
O-45(N)	JAPANESE 18" GUNS AND MOUNTS	
	Summary:	166
	Documents:	None
	Equipment:	453
O-47(N)-1	JAPANESE NAVAL GUNS AND MOUNTS, ARTICLE 1 - MOUNTS UNDER 18"	
	Summary:	167
	Documents:	359
	Equipment:	454
O-47(N)-2	JAPANESE NAVAL GUNS AND MOUNTS, ARTICLE 2 - AA MACHINE GUNS AND MOUNTS	
	Summary:	168
	Documents:	None
	Equipment:	None
O-48(N)	JAPANESE FUZE-SETTING EQUIPMENT	
	Summary:	169
	Documents:	363
	Equipment:	None
O-49(N)	JAPANESE MUZZLE BRAKES AND FLASH HIDERS	
	Summary:	170
	Documents:	363
	Equipment:	None
O-50(N)	JAPANESE SHIPBOARD ROCKET LAUNCHERS	
	Summary:	171
	Documents:	363
	Equipment:	None
O-53(N)	HYDRAULIC PUMPS IN JAPANESE NAVAL ORDNANCE	
	Summary:	172
	Documents:	364
	Equipment:	None

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
O-54(N)	JAPANESE NAVAL GUNS	
	Summary:	173
	Documents:	363
	Equipment:	None
O-55(N)	DEFENSES OF TSUSHIMA AND ENTRANCE TO SEA OF JAPAN	
	Summary:	174
	Documents:	None
	Equipment:	None
O-56(N)	JAPANESE FIELD AND AMPHIBIOUS EQUIPMENT - KYUSHU DEFENSE SYSTEMS	
	Summary:	175
	Documents:	367
	Equipment:	456
	SHIP REPORTS	
S-01-1	CHARACTERISTICS OF JAPANESE NAVAL VESSELS, ARTICLE 1 - SUBMARINES	
	Summary:	176
	Documents:	368
	Equipment:	460
S-01-2	CHARACTERISTICS OF JAPANESE NAVAL VESSELS, ARTICLE 2 - SURFACE WARSHIP MACHINERY DESIGN	
	Summary:	177
	Documents:	None
	Equipment:	None
S-01-3	CHARACTERISTICS OF JAPANESE NAVAL VESSELS, ARTICLE 3 - SURFACE WARSHIP HULL DESIGN	
	Summary:	178
	Documents:	None
	Equipment:	None
S-01-4	CHARACTERISTICS OF JAPANESE NAVAL VESSELS, ARTICLE 4 - SURFACE WARSHIP MACHINERY DESIGN (PLANS AND DOCUMENTS)	
	Summary:	179
	Documents:	None
	Equipment:	None
S-01-5	CHARACTERISTICS OF JAPANESE NAVAL VESSELS, ARTICLE 5 - SHIPBOARD ELECTRICAL EQUIPMENT	
	Summary:	180
	Documents:	None
	Equipment:	None

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
S-01-6	CHARACTERISTICS OF JAPANESE NAVAL VESSELS, ARTICLE 6 - SUBMARINES - SUPPLEMENT I	
	Summary:	183
	Documents:	None
	Equipment:	None
S-01-7	CHARACTERISTICS OF JAPANESE NAVAL VESSELS, ARTICLE 7 - SUBMARINES - SUPPLEMENT II	
	Summary:	184
	Documents:	None
	Equipment:	None
S-01-8	CHARACTERISTICS OF JAPANESE NAVAL VESSELS, ARTICLE 8 - PORTABLE GASOLINE - DRIVEN PUMP UNIT	
	Summary:	185
	Documents:	None
	Equipment:	None
S-01-9	CHARACTERISTICS OF JAPANESE NAVAL VESSELS, ARTICLE 9 - UNDERWATER PROTECTION	
	Summary:	186
	Documents:	None
	Equipment:	None
S-01-10	CHARACTERISTICS OF JAPANESE NAVAL VESSELS, ARTICLE 10 - LANDING CRAFT	
	Summary:	187
	Documents:	None
	Equipment:	None
S-01-11	CHARACTERISTICS OF JAPANESE NAVAL VESSELS, ARTICLE 11 - MAIN AND AUXILLIARY MACHINERY	
	Summary:	188
	Documents:	None
	Equipment:	None
S-01-12	CHARACTERISTICS OF JAPANESE NAVAL VESSELS, ARTICLE 12 - BOILERS AND MACHINERY	
	Summary:	189
	Documents:	None
	Equipment:	None
S-01-13	CHARACTERISTICS OF JAPANESE NAVAL VESSELS, ARTICLE 13 - GAS TURBINES	
	Summary:	190
	Documents:	None
	Equipment:	None

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
S-02	JAPANESE SUICIDE CRAFT	
	Summary:	191
	Documents:	376
	Equipment:	None
S-03	PHOTOGRAPHS OF IMPORTANT JAPANESE NAVAL UNITS AFLOAT	
	Summary:	192
	Documents:	None
	Equipment:	None
S-06-1	REPORTS OF DAMAGE TO JAPANESE WARSHIPS, ARTICLE 1 - NAGATO (BB), KATSURAGI (CV), HARUNA (BB), AOBA (CA), ISE (BB), AMAGI (CV), RYUHO (CVL), OYODO (CL), TONE (CA), HYUGA (BB), ASO (CV), SUZUTSUKI (DD)	
	Summary:	193
	Documents:	376
	Equipment:	None
S-06-2	REPORTS OF DAMAGE TO JAPANESE WARSHIPS, ARTICLE 2 - YAMATO (BB), MUSASHI (BB), TAIHO (CV), SHINANO (CV)	
	Summary:	194
	Documents:	None
	Equipment:	None
S-06-3	REPORTS OF DAMAGE TO JAPANESE WARSHIPS, ARTICLE 3 - JAPANESE RECORDS OF MAJOR WARSHIP LOSSES	
	Summary:	196
	Documents:	None
	Equipment:	None
S-11	SURVEY OF OPERABLE OR SALVABLE JAPANESE MERCHANT VESSELS	
	Summary:	197
	Documents:	None
	Equipment:	None
S-12	GENERAL ARRANGEMENT AND CAPACITY PLANS OF JAPANESE STANDARD TYPE MERCHANT SHIPS	
	Summary:	198
	Documents:	376
	Equipment:	None
S-17	JAPANESE SUBMARINE OPERATIONS	
	Summary:	199
	Documents:	None
	Equipment:	None
S-19	JAPANESE SUBMARINE EQUIPMENT	
	Summary:	200
	Documents:	377
	Equipment:	464

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
S-24	JAPANESE ANTI-SUBMARINE WARFARE	
	Summary:	201
	Documents:	None
	Equipment:	None
S-28	JAPANESE MINESWEEPING GEAR AND EQUIPMENT	
	Summary:	202
	Documents:	377
	Equipment:	464
S-37	JAPANESE DEGAUSSING	
	Summary:	203
	Documents:	None
	Equipment:	466
S-40	JAPANESE SHIPS - MISCELLANEOUS ITEMS	
	Summary:	204
	Documents:	378
	Equipment:	None
S-42	JAPANESE NAVY - DIESEL ENGINES	
	Summary:	205
	Documents:	378
	Equipment:	467
S-43	JAPANESE NAVAL VESSELS - OWN SHIPS NOISE	
	Summary:	206
	Documents:	379
	Equipment:	None
S-59	JAPANESE NAVY PAINTS	
	Summary:	207
	Documents:	380
	Equipment:	468
S-81(N)	WELDING IN JAPANESE NAVAL CONSTRUCTION	
	Summary:	208
	Documents:	380
	Equipment:	468
S-82(N)	PROVISIONS FOR MILITARY CONVERSION OF JAPANESE MERCHANT SHIPS	
	Summary:	209
	Documents:	None
	Equipment:	None
S-83(N)	JAPANESE MODEL BASINS	
	Summary:	210
	Documents:	381
	Equipment:	468

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
S-84(N)	JAPANESE DAMAGE CONTROL	
	Summary:	211
	Documents:	381
	Equipment:	468
S-91(N)	SPECIAL UNDERWATER ATTACK UNITS (FUKURYU) AND HARBOR DEFENSE MEASURES	
	Summary:	212
	Documents:	382
	Equipment:	469
S-92(N)	LEAD-ACID STORAGE BATTERIES USED BY THE JAPANESE NAVY	
	Summary:	213
	Documents:	382
	Equipment:	469
S-93(N)	TENTH MILITARY EXPERIMENTAL STATION, MUROTSU, HONSHU, JAPAN	
	Summary:	214
	Documents:	None
	Equipment:	None
S-94(N)	JAPANESE EVALUATION OF U.S. ANTI-SUBMARINE HARBOR DEFENSES	
	Summary:	215
	Documents:	None
	Equipment:	None
S-95(N)	WOODS, TEXTILES, RUBBER, AND PLASTICS USED IN JAPANESE NAVAL VESSELS	
	Summary:	216
	Documents:	None
	Equipment:	None
S-96(N)	JAPANESE DECK COVERINGS	
	Summary:	217
	Documents:	None
	Equipment:	None
S-97(N)	JAPANESE ANCHORS AND ANCHOR CHAIN	
	Summary:	218
	Documents:	None
	Equipment:	469
S-98(N)	EVALUATION OF EFFECTIVENESS OF ALLIED OFFENSIVE MINING OPERATIONS AGAINST JAPANESE SHIPPING IN CHINESE AND SOUTHWEST PACIFIC WATERS	
	Summary:	219
	Documents:	None
	Equipment:	None

ENCLOSURE (B), continued

MISCELLANEOUS REPORTS

INDEX NUMBER	TITLE	(Page)
X-01	PHYSICAL CHEMISTRY RESEARCH IN JAPAN	
	Summary:	220
	Documents:	384
	Equipment:	None
X-02-1	JAPANESE INFRA-RED DEVICES, ARTICLE 1 - CONTROL FOR GUIDED MISSILES	
	Summary:	221
	Documents:	None
	Equipment:	469
X-02-2	JAPANESE INFRA-RED DEVICES, ARTICLE 2 - HEAT LOCATER EQUIPMENT	
	Summary:	222
	Documents:	None
	Equipment:	None
X-02-3	JAPANESE INFRA-RED DEVICES, ARTICLE 3 - RESEARCH DEVELOPMENT, AND MANUFACTURE OF INFRA-RED EQUIPMENT	
	Summary:	223
	Documents:	None
	Equipment:	None
X-03	JAPANESE ULTRA-VIOLET COMMUNICATION EQUIPMENT	
	Summary:	224
	Documents:	384
	Equipment:	None
X-05	JAPANESE OPTICS	
	Summary:	225
	Documents:	384
	Equipment:	470
X-06	JAPANESE GEOPHYSICAL RESEARCH	
	Summary:	226
	Documents:	384
	Equipment:	None
X-11	JAPANESE CHEMICAL WARFARE	
	Summary:	227
	Documents:	None
	Equipment:	472
X-12	EARTHQUAKE RESISTANT CONSTRUCTION IN JAPAN	
	Summary:	228
	Documents:	385
	Equipment:	None

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
X-13-1	JAPANESE METALLURGY, ARTICLE 1 - HIGH TEMPERATURE ALLOYS FOR GAS TURBINES, ROCKET NOZZLES, AND LINES	
	Summary:	229
	Documents:	386
	Equipment:	None
X-13-2	JAPANESE METALLURGY, ARTICLE 2 - RECOVERY OF ALUMINUM FROM CLAY AND SHALE	
	Summary:	230
	Documents:	None
	Equipment:	None
X-13-3	JAPANESE METALLURGY, ARTICLE 3 - ATOMIC STRUCTURE RELATIVE TO DYNAMIC PROPERTIES	
	Summary:	231
	Documents:	None
	Equipment:	None
X-14	QUALITY OF JAPANESE ELECTRIC WIRES AND CABLES	
	Summary:	232
	Documents:	388
	Equipment:	None
X-16	JAPANESE AEROLOGY	
	Summary:	233
	Documents:	None
	Equipment:	None
X-17	JAPANESE METEOROLOGICAL INSTRUMENTS	
	Summary:	234
	Documents:	None
	Equipment:	473
X-18-1	JAPANESE HYDROGRAPHY, ARTICLE 1 - ORGANIZATION, OPERATIONS, AND METHODS	
	Summary:	235
	Documents:	388
	Equipment:	None
X-18-2	JAPANESE HYDROGRAPHY, ARTICLE 2 - WIND AND WEATHER DATA, INCLUDING HIGH ALTITUDE RADAR MAPS	
	Summary:	236
	Documents:	None
	Equipment:	None
X-18-3	JAPANESE HYDROGRAPHY, ARTICLE 3 - WARTIME ACTIVITIES OF INTERNATIONAL LATITUDE OBSERVATORY, MIZUSAWA, IWATE PREFECTURE, JAPAN	
	Summary:	237
	Documents:	None
	Equipment:	None

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
X-20	JAPANESE FUNGUS, MOISTURE-PROOFING, AND ANTIFUNGUS DATA	
	Summary:	238
	Documents:	None
	Equipment:	None
X-21	JAPANESE USE OF BALLOONS FOR BARRAGE, BOMBING, AND AEROLOGY	
	Summary:	239
	Documents:	None
	Equipment:	None
X-28-1	ATOMIC BOMBS, HIROSHIMA AND NAGASAKI, ARTICLE 1 - MEDICAL EFFECTS	
	Summary:	241
	Documents:	None
	Equipment:	478
X-28-2	ATOMIC BOMBS, HIROSHIMA AND NAGASAKI, ARTICLE 2 - MEDICAL EFFECTS, SUPPLEMENTARY STUDIES	
	Summary:	242
	Documents:	None
	Equipment:	None
X-29	BOMBING EFFECTS OF NORMAL BOMBS IN JAPAN	
	Summary:	243
	Documents:	None
	Equipment:	None
X-31	BOMBPROOF CONSTRUCTION IN JAPAN	
	Summary:	245
	Documents:	389
	Equipment:	None
X-32	CAMOUFLAGE OF JAPANESE SHIPS AND NAVAL INSTALLATIONS	
	Summary:	246
	Documents:	383
	Equipment:	478
X-33	DESIGN OF JAPANESE STRUCTURES	
	Summary:	247
	Documents:	390
	Equipment:	None
X-34(N)	MAGNETIC DEVELOPMENT IN JAPAN DURING WORLD WAR II	
	Summary:	249
	Documents:	391
	Equipment:	478

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	(Page)
X-35(N)	JAPANESE METALLURGICAL SPECIFICATIONS, IRON AND STEEL, SPECIAL STEELS, SPECIAL NON-FERROUS ALLOYS	
	Summary:	250
	Documents:	None
	Equipment:	None
X-36(N)	JAPANESE WELDING STANDARDS	
	Summary:	251
	Documents:	392
	Equipment:	None
X-37(N)	JAPANESE METHODS OF HIGH FREQUENCY INDUCTION HEATING AND MELTING	
	Summary:	252
	Documents:	None
	Equipment:	None
X-38(N)-1	JAPANESE FUEL AND LUBRICANTS, ARTICLE 1 - FUEL AND LUBRICANT TECHNOLOGY	
	Summary:	253
	Documents:	392
	Equipment:	479
X-38(N)-2	JAPANESE FUELS AND LUBRICANTS, ARTICLE 2 - NAVAL RESEARCH ON AVIATION GASOLINE	
	Summary:	254
	Documents:	None
	Equipment:	None
X-38(N)-3	JAPANESE FUELS AND LUBRICANTS, ARTICLE 3 - NAVAL RESEARCH ON ALCOHOL FUEL	
	Summary:	255
	Documents:	None
	Equipment:	None
X-38(N)-4	JAPANESE FUELS AND LUBRICANTS, ARTICLE 4 - PINE ROOT OIL PROGRAM	
	Summary:	256
	Documents:	None
	Equipment:	None
X-38(N)-5	JAPANESE FUELS AND LUBRICANTS, ARTICLE 5 - RESEARCH ON ROCKET FUELS OF THE HYDROGEN PEROXIDE-HYDRAZINE TYPE	
	Summary:	257
	Documents:	None
	Equipment:	None

ENCLOSURE (B), continued

INDEX NUMBER	TITLE	
X-38(N)-6	JAPANESE FUELS AND LUBRICANTS, ARTICLE 6 - RESEARCH ON DIESEL AND BOILER FUEL AT THE FIRST NAVAL FUEL DEPOT, OFUNA	
		(Page)
	Summary:	258
	Documents:	None
	Equipment:	None
X-38(N)-7	JAPANESE FUELS AND LUBRICANTS, ARTICLE 7 - PROGRESS IN THE SYNTHESIS OF LIQUID FUELS FROM COAL	
	Summary:	259
	Documents:	None
	Equipment:	None
X-38(N)-8	JAPANESE FUELS AND LUBRICANTS, ARTICLE 8 - NAVAL RESEARCH ON LUBRICANTS	
	Summary:	260
	Documents:	None
	Equipment:	None
X-38(N)-9	JAPANESE FUELS AND LUBRICANTS, ARTICLE 9 - FUNDAMENTAL HYDROCARBON RESEARCH	
	Summary:	261
	Documents:	None
	Equipment:	None
X-38(N)-10	JAPANESE FUELS AND LUBRICANTS, ARTICLE 10 - MISCELLANEOUS OIL TECHNOLOGY AND REFINING INSTALLATIONS	
	Summary:	262
	Documents:	None
	Equipment:	None
X-39(N)	MISCELLANEOUS REPORTS OF VARIOUS JAPANESE NAVAL RESEARCH ACTIVITIES	
	Summary:	263
	Documents:	393
	Equipment:	None
X-40(N)	OCEANOGRAPHY IN JAPAN	
	Summary:	264
	Documents:	393
	Equipment:	481
	SUMMARY REPORT	
	HISTORY OF THE MISSION	

ENCLOSURE (C)

ENCLOSURE (C)

COMPILATION OF SUMMARIES OF NAVTECHJAP REPORTS

The following pages consist of a compilation of the summary pages of all NavTechJap reports. The summaries are arranged in the same order as the listing of report titles in Enclosure (B).

Attention is invited to the fact that the summaries are, in general, very brief. However, they have been assembled here in order to present a concise, over-all evaluation of all the technical aspects of the ex-Imperial Japanese Navy.

SUMMARY

AERONAUTICS TARGETS

AIRCRAFT ARRANGEMENTS AND HANDLING FACILITIES IN JAPANESE NAVAL VESSELS

For the purpose of clarity this report is divided into two parts. Part I deals exclusively with Japanese aircraft carriers, three distinct types of which were in operation or building at the end of the war. They were: (1) large fleet carriers for operation with the Battle Fleet, (2) light fleet carriers for operation with cruiser task forces, and (3) small escort carriers with merchant ship hulls. Japanese carrier design had therefore reached the same stage as that in Allied navies.

In general, the Japanese possessed soundly designed carriers fitted with most of the aircraft facilities available in Allied ships, although development of these facilities lagged somewhat behind.

In Part II, the method of stowing and launching aircraft from seaplane carriers and other Japanese warships is reviewed. The arrangements resembled those in Allied ships of similar size and type. Notable exceptions, however, were the battleships ISE and HYUGA, the cruisers TONE and CYODO, and the submarines of the I-401 class. In all of these, aircraft handling facilities were given far more emphasis than in similar Allied types.

Well-designed seaplane carriers were constructed in recent years to fulfill a need for long distance reconnaissance over broad ocean areas. Dissatisfaction with this type and an urgent need for escort carriers led to the conversion of two of them to aircraft carriers.

SUMMARY

AERONAUTICS TARGETS

JAPANESE NAVAL PHOTOGRAPHY

Investigation of Japanese naval photography, which was under the cognizance of the Naval Department of Aeronautics, indicated that the most important phase of photography was aerial applications for photo-reconnaissance. For general aerial photographic reconnaissance, the carrier-based aircraft, MYRT, equipped with aerial cameras, was generally used at high altitudes. During the war, developments in aircraft camera design, particularly toward the use of telephoto oblique cameras, indicated that emphasis was being placed on high altitude oblique, rather than vertical, coverage for reconnaissance purposes.

Four principal types of aircraft cameras were in general naval use. Three of these four cameras were direct copies and the fourth a modification of older types of U. S. cameras. Training type aerial cameras were used successfully for torpedo attack training. Gun cameras, however, particularly in the last two years of the war, were not used extensively.

Two photographic film emulsions, aerial panchromatic and infra-red sensitive, were in general naval use. However, the aero-panchromatic film was used almost exclusively while the infra-red found only limited use, owing primarily to its poor stability.

Photographic research to develop new techniques and materials was conducted throughout the war by the Navy and the leading commercial photographic manufacturers. Investigations were made into infra-red sensitization and stability, production of a two-color film for photo-reconnaissance, high temperature development techniques, camera and equipment design improvements, and other fields. However, no outstanding new product or significant improvements of existing equipment or material were reported or observed during the war.

SUMMARY

DOCUMENTS AND INTELLIGENCE TARGETS

JAPANESE NAVY LEAGUE

This report covers the organization and operations of the Navy League of JAPAN. This organization was more tightly organized and somewhat more active than its corresponding organization in the UNITED STATES. It devoted special attention to propagandizing the Navy with the school children of JAPAN. The only branch of this organization in the UNITED STATES, located at LOS ANGELES, was well organized and had a membership of about one hundred.

SUMMARY

DOCUMENTS AND INTELLIGENCE TARGETS

GAKUTO KAIYO KAI - SEA STUDENTS ASSOCIATION

This report covers the organization and activities of the Gakuto Kaiyo Kai (Sea Students Association) which corresponds in general to the "Sea Scouts" in the United States. Prior to the organization of the Gakuto Kaiyo Kai there existed the Kaiyo Shonen Dan which was in all respects similar except that the members were as a whole younger. However, the Kaiyo Shonen Dan was so loosely organized that its activities practically died during the war. The Gakuto Kaiyo Kai was started by older group of students interested in fostering a love of the sea and a universal interest in Maritime subjects among Japanese of Middle School and College ages. The Educational Ministry is now attempting to install new interest in the Gakuto Kaiyo Kai and encourage its activities along democratic lines. A draft of its proposed organization and aims as drawn up by the Department of Physical Education of the Educational Ministry is herewith appended.

SUMMARY

ELECTRONICS TARGETS

JAPANESE SUBMARINE AND SHIPBORNE RADAR

The radars in use on Japanese ships were all of conventional design and mediocre construction. None of the production models or experimental equipments were found to have any unusual design features or any exceptionally high performance parts or components except a unique duplexing system used with the Mark 2 Model 2 radar. Only three radar models were in use on surface ships and submarines at the end of the war, Type 3 Mark 1 Model 3 and Type 2 Mark 2 Model 1 for air search and the Mark 2 Model 2 for surface search. There was no fire control radar as such in use. A modified version of the Mark 2 Model 2 radar was used for fire control as well as surface search but results were in general unsatisfactory. The radars listed above and the history of radar development, installation methods, procedures and difficulties, maintenance techniques and operational procedures are described.

Several new equipments in the test stage and intended as replacements for the Mark 2 Model 2 radar are discussed.

SUMMARY

ELECTRONICS TARGETS

JAPANESE AIRBORNE RADAR

The Japanese Navy had only three airborne radars of sufficient interest to merit detailed study. These were the Type 51, 10-centimeter pathfinder radar, the FD-2 night-fighter set on 500 Mc, and the Gyuku-3, 150 Mc, night-fighter set. None of these were in production, and the standard set in use was the Type 3, Air Mark 6, Model 4 (H-6), on 150 Mc.

There was an IFF set in development, the M-13, which was put into service on a small scale. About 600 sets were said to have been produced. The Japanese Army and Navy used different frequencies for their IFF, hence were unable to interrogate each other.

During the course of the investigation of this target, it was ascertained that the subject was being thoroughly covered by the Air Technical Intelligence Group of Far Eastern Air Forces, and to a lesser degree by the Technical Liaison and Investigation Department, Office of Chief Signal Officer. Accordingly, to avoid duplication of effort, all information discovered on airborne radar was made available to those agencies and none was uncovered which is not contained in the referenced reports of those agencies.

This report consists of schematic and block diagrams of Japanese airborne radar sets, including those mentioned above, and a chart of the characteristics of Japanese airborne radar. Details and discussion of this subject can be found in the referenced reports.

Electronic altimeters are covered in NavTechJap Report - "Japanese Navigational Aids", Index No. E-09.

SUMMARY

ELECTRONICS TARGETS

JAPANESE LAND-BASED RADAR

Japanese land-based radar is discussed in general, and a brief description of each of the more important equipments is given. Enclosures (C) to (J) are diagrams of selected sets that can be considered typical.

As shown in Enclosure (K), "Summary of Land-Based Radar," the development of the first Japanese radar was completed late in 1942. The search-light control radar was undoubtedly based on captured British equipment and the AA fire control models were designed from captured American sets. It was stated that although no equipments were direct copies of German designs, valuable assistance and suggestions were obtained from German technical personnel.

SUMMARY

ELECTRONICS TARGETS

JAPANESE CENTIMETER WAVE TECHNIQUE

A general discussion of centimeter wave technique is presented. Most of the equipment inspected and methods investigated were elementary in theory and crude in design. The reasoning of the Japanese physicists was good, but production was almost impossible. About 80% of the productive capacity for microwave equipment had been destroyed by the end of 1944, or was being decentralized to avoid destruction. In addition, skilled workers to produce such components were impossible to obtain. This, together with the lack of coordinated scientific effort, places Japanese microwave technique on a level more or less comparable to that of the Allied Nations in early 1941.

SUMMARY

ELECTRONICS TARGETS

JAPANESE RADIO AND RADAR DIRECTION FINDERS

The Japanese were as backward in radio and radar direction finding as in other branches of electronics. Direction finders, as such, were confined generally to ranges below 22 megacycles and were conventional in design, except for the Type 38 experimental land based and the Type 40 experimental shipborne equipments, which were a fair try in the direction of an instantaneous-reading visual-display type of direction finder.

The directional antennae and lobe-switching devices used with radar intercept receivers afforded a means of direction finding at VHF and the lower radar frequencies and are covered in reports on radar countermeasure. See NavTechJap report "Japanese Radar Countermeasures and Visual Signal Display Equipment", Index No. E-07, and the references listed therein.

The Japanese had portable and mobile direction finders, but no information came to light on ultra-portable types suitable for paratroopers.

SUMMARY

ELECTRONICS TARGETS

JAPANESE ANTI-RADAR COVERINGS

Japanese research in the field of anti-radar coverings was quite intense, and while several research products proved to be rather successful, according to the data presented, it was difficult to use in practice. Such information as was available is included in this report, and was obtained from the Air Technical Intelligence Group, which initiated the request for interrogations, data and samples. Reference is made to ATIG Reports #153 and #114, the latter prepared for ATIG by Dr. Wilkenson, a civilian engineer associated with that group.

The two major contributions are an anti-radar paint, the work of Major K. MANO of the Tama Technical Institute, a Japanese Army research organization, and Dr. SHIBA of the Tokyo Engineering College, and absorbing materials, in rubber, for micro-waves. This last research was conducted at the direction of the 2nd Naval Technical Institute and engineered by the Nippon Broadcasting Corporation and the Sumitomo Electric Co.

Abstracts of the reports are given for their interest value. The basic reports of ATIG should be studied for complete details.

SUMMARY

ELECTRONICS TARGETS

JAPANESE RADAR COUNTERMEASURES AND VISUAL SIGNAL DISPLAY EQUIPMENT

The Japanese had reached approximately the stage in countermeasures development that was reached in the United States in 1942. The Army took the lead in electronic jamming, although the Navy appears to have made the most effective use of "window", which was employed quite extensively by both services.

The Army and Navy had several types of intercept receivers of mediocre design, and accompanying antenna which provided a fair method of direction finding. There was nothing of intelligence value in test equipment, visual display or analyzing equipment.

Anti-jamming was understood only dimly, and there was no basic research on anti-jam circuits or techniques. The Japanese claimed some success in reading through "window" and "rope", but were helpless in the face of electronic jamming.

SUMMARY

ELECTRONICS TARGETS

JAPANESE RADIO EQUIPMENT

The study of radio equipment proved to be interesting mainly from the standpoint of comparison, in determining how far behind the United States the Japanese actually were in this field. Some ingenious uses of radio and television had been proposed, but lack of personnel and difficulties in procurement prevented proposals from being carried out.

In ranges above 100 megacycles there were only three radio systems, two of which were still in the experimental stage, and had no very remarkable features. The third, a fighter-director system, actually had been used in the Tokyo area. These three systems are described in reports referred to herein.

All available documents on radio equipment were obtained and forwarded to the Washington Document Center, and samples of such equipment as appeared worthy of further study were shipped to the Naval Research Laboratory or to appropriate Air Corps or Signal Corps laboratories.

SUMMARY

ELECTRONICS TARGETS

JAPANESE NAVIGATIONAL AIDS

Only one type of navigational aid developed by the Japanese appears to merit detailed study. This is the hyperbolic system, Tachi 39 - Taki 39, developed by the Army, but not put into use.

The Navy had one type of radio altimeter; the Army had two, one of which was unsatisfactory.

The new types of radio beacons for the Navy, still in the developmental stage, are of some interest, and a brief description is given.

Although both airborne and shipborne radar was used to some extent in navigation, no special radar navigational aids were developed, and no use was made of corner reflectors, beacon buoys, or other similar devices.

Radio direction finders are described in NavTechJap report "Japanese Radio and Radar Direction Finders", Index No. E-05, and radar direction-finding, such as it was, in NavTechJap report "Japanese Radar Countermeasures and Visual Signal Display Equipment," Index No. E-07. Underwater devices are described in NavTechJap report "Japanese Sonar and Asdic", Index No. E-10.

SUMMARY

ELECTRONICS TARGETS

JAPANESE SONAR AND ASDIC

The Japanese devoted many years prior to entry into the war to research and development of sonar equipment, notably hydrophones. The emphasis which was placed on sonar devices, both offensive and defensive weapons, is clearly shown by the lavish and often unnecessary amount of space allocated to them in the otherwise cramped quarters of Japanese ships. At sea it was customary to man the hydrophone set continuously and to operate the echoranging set at least fifteen minutes in every hour. The reliance placed on sonar apparatus even in the last months of the war is exemplified by the memorandum, dated April 1945, included as an appendix to the report.

Sonar would appear to represent one of the few fields in which generous use was made of German assistance. The influence of captured British equipment is much in evidence, notably in the adoption of the streamlined sound dome and the chemical recorder. The eventual shortage of chemically prepared paper restricted the use of the latter, but it is interesting to note that little attempt was made, in any event, to use the attack computation instruments fitted, and that they were omitted from later models.

The total lack of any advanced attack technique, and of specially designed attack instruments, is surprising in view of attention paid to the development of the detection devices themselves.

During the war a mass-production type of both hydrophone and echoranging equipment was evolved, each based on German designs, with the latter being virtually a direct copy. In addition, certain special application sets were developed, some previous to the war, and paramount among these was the successful underwater radio reception equipment using ultra-long waves. Operational messages were being passed by this system immediately prior to the attack on Pearl Harbor.

Anti-sonar measures were confined principally to the development of a sound-absorbing paint which was in operational use on all submarines at the end of the war. Considerable attention was given to methods for reducing "own ship's noise" both as an aid to listening devices and in reducing the chances of detection by enemy equipment.

Research carried out by the Army in underwater sound, with special reference to harbor defense, appeared to have been largely independent, as were Hydrographic Department surveys having specific reference to sonar water conditions.

SUMMARY

ELECTRONICS TARGETS

JAPANESE COMMUNICATION SYSTEMS

So far as the Japanese Navy is concerned, there were no unusual developments in communication systems. There was no use of television, facsimile, frequency or pulse modulation. No notable progress had been made in these fields by Army or civilian agencies, either. However, discriptions of one laboratory pulse-modulation system and one frequency-modulation link in the range 550-670 Mcs will be found in the referenced ATIG and TLID reports. A full description of a fighter-director system is contained in ATIG Report #169.

What few noteworthy features were found in Japanese communication equipment (as distinguished from systems) have been covered in NavTechJap Report - "Japanese Radio Equipment", Index No. E-08.

Close liaison was maintained with the Electronics Section of the Air Technical Intelligence Group, FEAF, and with the Technical Liaison and Investigation Department, Office of Chief Signal Officer, SCAP, to insure full coverage of this target without duplication of effort. All noteworthy points have been covered either in the reports of those agencies or in the other reports on electronic subjects made by this Mission.

SUMMARY

ELECTRONICS TARGETS

JAPANESE EXPERIMENTAL RADAR

At the end of the war Japanese experimental radar and developmental radar could be divided into four general groups.

1. 60cm conical scan
   S8A (land based)
   Mark 6, Model 1 (S8B) (land based)
   Type 3, Mark 2, Model 3 (S8) (shipborne)

2. 10cm surface search and fire control
   Mark 3, Model 2 (shipboard and land based)
   Mark 3, Model 1 (shipboard and land based)

3. Improvement of meter wave radar
   Mark 6, Model 3 (land based)
   Type 2, Mark 2 Model 1, Modification 5 (shipborne)
   Model K Simplified Radar (land based)

4. Direction of friendly craft (used with M-13 IFF)
   Mark 6, Model 2 (land based)
   TH (land based)

The general trend was to shorter pulse lengths, narrower widths, and shorter wave lengths, except for long range AA early warning. Broad band antennas and simplified circuits were under development for meter wave radars. Extensive tests were being conducted on the use of the M-13, IFF, in conjunction with suitable land based radar for direction of friendly craft. The Mark 6, Model 1 radar, a narrow beam conical scan, 60cm equipment, was originally designed for direction of friendly aircraft.

No unusual techniques or outstanding developments were found in any of the experimental radars.

Experimental airborne radar is discussed in NavTechJap Report, "Japanese Airborne Radar", Index No. E-02.

SUMMARY

ELECTRONICS TARGETS

JAPANESE ELECTRONIC TUBES

The report covers the construction of vacuum tubes, the development of substitute construction materials such as iron, a specific study of magnetrons and Osaka tubes, a compilation of data on the high power tubes used in the Japanese "Death Ray" experiments, and a new method for developing very high frequency radiations with moderate tube element dimensions.

A suggested research problem is brought out by the Japanese "Death Ray" experiments which indicate that high frequency radiations may possibly be used as a cure for tuberculosis and other lung disorders, as well as in treatment of brain disorders.

SUMMARY

ELECTRONICS TARGETS

JAPANESE MAGNETIC AIRBORNE DETECTOR

MAD research was started in June 1942 when adequate measures were needed to combat the U.S. submarine offensive. January 1943 saw the completion of the first airborne model, and tests were conducted at YOKOSUKA to determine the efficiency of MAD equipment. Detection range was 90 meters, but this was improved to 120 meters after six months work on the elimination of noise caused by eddy currents generated within the plane.

Production of the Type 3 Mark 1 MAD Equipment was started in October 1943, and the first models were delivered to the Navy six months later. In 1944, the peak production year, 465 complete installations were delivered to the Navy. Since the Army did no work in the MAD field, the Navy gave 137 sets to the Army for A/S patrols.

MAD was used in convoy escort with usually six planes flying across the bow of the group. In case of a slow convoy satisfactory coverage could be achieved with only three planes. Tactics generally were developed to conform with the supply of planes and fuel available in the theater.

SUMMARY

ELECTRONICS TARGETS

POWER SUPPLIES FOR JAPANESE ELECTRONICS

Japanese power supply component design remained static through the war years. The only marked change was a severe reduction in quality due to scarcity of required raw materials, and a decrease in the unit efficiency of a highly expanded production field.

There was a lack of integration of production design of power supply units in the overall equipment design, due to the extreme security measures taken by the Japanese Navy and Army. For example, the naval arsenal responsible for production of an electronic unit would supply specifications to a factory, often bypassing the entire engineering structure of the company. The factory would then produce and deliver the unit to the arsenal. Naval acceptance specifications were very loose and usually were left up to the factory. Later, the arsenal would incorporate the power supply unit into the final equipment. In addition, failure to remedy faults found in the field hindered coordination of equipment design.

SUMMARY

ELECTRONICS TARGETS

JAPANESE ANTENNAE

Radar antennae in use were of five principal types: mattress arrays, ladder type broad-side arrays, Yagi and Yagi arrays, horns, and parabolic reflectors. In general, mattress and ladder type broad-side arrays were used with air search radars, Yagi arrays with AA fire control and searchlight control radars, and horns with centimeter equipments. Parabolic reflectors had not come into general use at the end of the war but had been adopted for use on several pieces of new equipment.

A broad band antenna (145mc to 155mc) for use with IFF equipment is described, as is a large cylindrical antenna 19 meters high and 17 meters in diameter. RCM antennae and an antenna for underwater long wave radio reception are discussed.

RDF and airborne antennae are only summarized. Detailed descriptions and analyses are available in NavTechJap Reports, "Japanese Airborne Radar", Index No. E-02, and "Japanese Radio and Radar Direction Finders", Index No. E-05.

The antennae inspected were without exception of simple design and mediocre construction. No unusual or exceptionally high performance antennae or components were found in production model equipments or in laboratories.

SUMMARY

ELECTRONICS TARGETS

JAPANESE RADIO, RADAR, AND SONAR EQUIPMENT

In considering Japanese radio, radar and sonar components, it must be remembered that Japan was a victim of her own sense of power and superiority. All military operations prior to December 1941 were conducted largely in China, where the success of their operations convinced them of the superiority of their equipment. The need did not exist for highly specialized electronics material. Consequently, because new design was expensive and because it was evident that what was available was more than adequate, manufacturing plants continued to produce resistors, condensers, inductances, etc., in accordance with existing standards.

After operations had been well underway in the drives deep into the subtropical and tropical regions to the south, reports gradually filtered back indicating the need for specialized component design, tropicalization, and smaller and more compact equipment with better performance characteristics. Thus, in the summer and fall of 1943, Japanese engineers began the study of component design to meet the conditions existing in the field. By the end of the war no equipment to meet the new requirements had yet been produced.

The components used in communications equipments, while well-made, closely resemble those available to amateur radio in the United States in the early and middle nineteen-thirties. Frequencies above 80 megacycles were rarely used for communications. In fact, such equipment was mostly in the laboratory stage. Weight and space requirements in aircraft were not too critical, largely because they did not carry the variety of instruments found in Allied aircraft. Most communications were carried on in the HF and MHF bands.

It is felt that an examination of the equipment collected by this Mission and shipped to the Naval Research Laboratory for further study will give the best picture of the more recent developments. A complete listing of all electronics material collected is contained in NavTechJap Report - "Japanese Electronics, General" - Index No. E-28.

As with other branches of scientific endeavor in Japan, the design engineers were, in general, quite competent from a theoretical standpoint. However, their model shop work was rather mediocre, and without something definite to copy, the manufacturers were lost. The mechanical ability to produce new components from mere ideas was totally lacking. Interrogations brought forth the statement, "We could make it in the laboratory, but the manufacturers could not reproduce it." Of course, one reason was the use of young, inexperienced, unskilled labor in the plants. It was necessary for items to be extremely simple before they could even be attempted.

Also included in the NavTechJap report mentioned above is a listing of Japanese documents and technical reports on various research problems in component design, insulation products, standardization, etc. It is suggested that this list be checked and the documents procured from the Washington Document Center, should further information be desired.

SUMMARY

ELECTRONICS TARGETS

JAPANESE RADIO APPARATUS CONSTRUCTION METHODS

Construction methods for Japanese military radio and similar electronic equipment in general followed the same practices as were used in commercial equipment available before the war. As the war progressed and shortages in critical materials developed, many substitutions were made where the substitutes did not impair operation of the equipment, as is indicated by the use of plywood sub-panels, wooden cabinets, and the support of all components on ebonite, glass, or porcelain. Equipment developed and manufactured before the war was well constructed, had ample meters, and many little conveniences for adjustment and calibration. Intensive work on high altitude and pressurized equipment had not reached the production stage, nor had there been any specialized work on temperature, humidity or fungus proofing.

A collection of captured documents, listed in Enclosure (A), gives in detail Japanese reports on standardization, components, etc. It is suggested that the report be read in conjunction with related NavTechJap reports listed in reference C, since items therein will aid in obtaining a complete picture of this phase of Japanese electronics.

Japanese electronics engineers in many cases realized the need for specialized construction, but because of the lack of facilities and capacities during the closing years of the war they were unable to put their ideas into practice.

SUMMARY

ELECTRONICS TARGETS

JAPANESE ELECTRONIC EQUIPMENT CONSTRUCTION MATERIALS

In the early part of the war it was the general policy of Japanese authorities to specify standard commercial materials of the types generally available before the war for the manufacture of electronic equipment. The apparatus produced was generally of robust construction and adequately equipped with instruments for calibration and adjustment.

In time certain standard raw materials became scarce. However, substitutes were developed and included in the less critical parts of the equipment, where their use would not impair working efficiency. Examples of such substitutes were plywood, used for secondary panelling, bakelite frames for condensers, and glass, ebonite or porcelain supports for components.

Japanese technicians appear, furthermore, to have been aware of the necessity for improving on current practice and for discovering satisfactory substitutes for scarce materials required for the more important functions. A certain amount of research was accordingly carried out in various laboratories, although little of this work appears to have reached a practical stage. In any case, much of it seems to have been based upon the published reports on similar experiments performed previously in western countries.

As a result, moreover, of the strict veil of secrecy which shrouded all service operations, there was a general lack of guidance and constructive criticism on the part of the armed forces, and research workers were therefore left in the dark as to specific operational needs and requirements. There is also evidence of a distinct gap between laboratory research and actual production. This was due, apparently, to a shortage of personnel with the requisite training and experience, to difficulties caused by bomb damage, to deficiencies in essential raw materials and to an absence of directives from the armed forces, referred to above.

It was not until January 1945 that research of this nature was placed on a satisfactory basis with the founding of the Second Japanese Naval Technical Research Bureau, with the objects of coordinating experiments in design and developing substitute raw materials. In view of the vicissitudes of the Japanese Navy at that time little attention was paid to shipborne electronic equipment. Most of the work was being directed towards airborne apparatus.

As for the armed forces, it appears that although junior officers entrusted with the operation and maintenance of equipment in the field made frequent complaints, these criticisms, with relatively few exceptions, were not allowed to reach a higher level or to become the subject of impartial investigations.

It is recommended that this report be read in conjunction with the referenced NavTechJap Reports, since the comments contained therein will assist in building up a general picture of this aspect of Japanese electronics.

SUMMARY

ELECTRONICS TARGETS

JAPANESE R.F. TRANSMISSION LINES, WAVE GUIDES, WAVE GUIDE FITTINGS, AND DIELECTRIC MATERIAL

In the design and manufacture of radio frequency transmission lines, Japanese design engineers were thorough and capable from a theoretical standpoint, but lacked the mechanical skill to put their ideas into practice. Japanese manufacturing establishments were of little help; most finished products appeared crude and amateurish by U.S. standards.

This report covers Japanese naval technique in transmission lines, coaxial lines, wave guides, line fittings, duplexers, phase shifters, and kindred subjects. The use of polystyrene as dielectric material for coaxial lines is also discussed.

Theoretically, the work was good, but practically the test equipment was simple and inadequate for making the necessary precise measurements. Consequently, the Japanese never were quite certain of their results. Nothing of more than casual interest was discovered.

SUMMARY

ELECTRONICS TARGETS

RADIO FREQUENCY MEASURING TECHNIQUE

The lack of adequate test equipment and advanced measuring techniques was probably the most serious factor hampering the development of modern Japanese radar and radio frequency components.

Inspection of equipment and interrogation of technical personnel revealed only elementary methods and equipment.

Enclosure (A) is a tabular summary of the more important items of test equipment in use at the end of the war.

SUMMARY

ELECTRONICS TARGETS

JAPANESE INSULATION MATERIALS

Prior to 1943 the Japanese had no high-grade ceramic insulation material for radio frequency use. Development had been started about 1937, but was not completed until the middle of 1942.

High moisture absorption and high dielectric loss at high frequencies were found in the ceramics available prior to and in the first year and a half of the war. During 1943, several plants at SETO began large-scale production of the various forms of Japanese "Steatite."

High dielectric constant materials using titanium dioxide became available in small quantities in 1943. The dielectric constants were 80 and 100; the grade having the lower temperature coefficient had the constant of 80. A very high dielectric constant (epsilon-2000) material consisting of titanium dioxide, barium oxide, and calcium oxide was developed, but had not been put into production by the end of the war.

SUMMARY

ELECTRONICS TARGETS

JAPANESE INSULATION MATERIALS

Prior to 1943 the Japanese had no high-grade ceramic insulation material for radio frequency use. Development had been started about 1937, but was not completed until the middle of 1942.

High moisture absorption and high dielectric loss at high frequencies were found in the ceramics available prior to and in the first year and a half of the war. During 1943, several plants at SETO began large-scale production of the various forms of Japanese "Steatite."

High dielectric constant materials using titanium dioxide became available in small quantities in 1943. The dielectric constants were 80 and 100; the grade having the lower temperature coefficient had the constant of 80. A very high dielectric constant (epsilon-2000) material consisting of titanium dioxide, barium oxide, and calcium oxide was developed, but had not been put into production by the end of the war.

SUMMARY

ELECTRONICS TARGETS

JAPANESE ELECTRONICS - GENERAL

The Second Naval Technical Institute of the Imperial Japanese Navy was the organization responsible for the design, development, procurement and prototype installation of all electronic equipment for the Japanese Navy. Figure 1 shows where the Institute fitted into the Navy Ministry table of organization, and Figure 2 shows the breakdown of the Institue into its various departments and laboratories. A general decentralization of laboratories and experimental stations which follows the procedures established early in 1945, is shown on the map of Figure 3.

A list of all seized documents pertinent to electronics gives an excellent idea of the extent and detail of Japanese research. Because of the large number of documents involved, no attempt has been made to translate other than the title and general subject matter. All documents have been sent, via ATIS, to the Washington Document Center, Washington, D.C., and will be available there for detailed study should the data included with the various electronics reports prove to be insufficient.

A complete list of all equipment shipped to the United States represents those equipments found to be of more than casual interest. It is regretted that neither enough time, nor sufficient laboratory equipment was available to make detailed engineering reports while the Mission was in Japan; however, the equipment being shipped, together with the technical data, research reports, and operational and maintenance manuals, should permit as detailed an examination as may be desired by interested activities in the Navy Department in the United States.

SUMMARY

ELECTRONICS TARGETS

JAPANESE ELECTRONICS TRAINING AND OPERATING TECHNIQUES

The investigation of electronics training and operating techniques was limited to the Japanese Navy, because (a) the Navy electronics program was generally further advanced than the Army's and (b) Army electronics training has been studied by the U.S. Army Signal Corps. This study was directed principally at training techniques, since operation methods have been covered in reports describing the various items of equipment. Searches for unusual utilization techniques were included in the investigation of training.

The training programs for all personnel connected with operation or maintenance of radar (all types), radio and communications, MAD, and special applications of radar were studied. Sonar training has not been included, since it is covered in NavTechJap Report "Japanese Submarine Operations", Index No. S-17. Details of the various training programs are presented in the body of the report. The following is a summation of the general characteristics of Japanese electronics training disclosed by the study:

1. Japanese training methods were entirely conventional, and no innovations or new techniques in instruction were discovered.

2. Electronics training was handicapped by the lack of technical aptitude or background in the average Japanese.

3. Training was handicapped by the inferiority of the Japanese electronics equipment.

4. Selection methods for students and instructors were conventional and well-planned.

5. Little use was made of training devices, except for simple classroom training aids.

6. Presentation of a number of different subjects usually was made consecutively, rather than concurrently.

7. All technical training courses were divided into phases of complexity, with only the most promising graduates being allowed to progress to a more advanced course. The remainder were assigned to subordinate jobs in the field.

8. When faced with the necessity of shortening a course, the Japanese resorted to specialization on one type of equipment, or even one specific set.

9. The Navy High command did not support training activities whole-heartedly, particularly for operations of a "defensive" nature.

In general, the Navy electronics training programs were well-planned, d if adhered of, probably would have produced competent personnel. As the progressed, however, the Navy high command ordered quantity output even at expense of quality, necessitating shortening of courses, lowering of entnce requirements, and dispersal of instructor personnel. The result was a cked decline in quality of output material until, near the end of the war, y of the graduates were incompetent to perform their duties.

SUMMARY

ELECTRONICS TARGETS

JAPANESE ELECTRONICS, MISCELLANEOUS

The information contained in this report, which supplements previous reports on electronics subjects,* was obtained chiefly from three sources: (1) The Second Naval Technical Institute at KANAZAWA, YOKOHAMA, and TOKYO; (2) The Fukuoka Laboratory of the International Telecommunications Company; and (3) Tokyo Shibaura Electric Company, KAWASAKI.

Samples of Japanese equipments, in addition to those listed in NavTechJap Report, "Japanese Electronics - General," Index No. E-28, were obtained and forwarded to the Naval Research Laboratory.

A plane goniometer, Yagi antenna, wide-band antenna and an impedance bridge developed by the Fukuoka Laboratory of the International Telecommunication Company are described in the report. Information also is included on types of glasses used by the Japanese in tube production and for radio-frequency insulation.

A boraxless-glass and a two percent borax glass had been developed in an effort to conserve the supply of boron, which was very low.

---

*See NavTechJap Reports, Index Nos. E-01 to E-29.

SUMMARY

MEDICAL TARGETS

DATA RELATIVE TO LIFE IN THE JUNGLE AND ON SEA ISLANDS AND DATA ON COMPOSITION OF INSECTICIDES

The results of the exploitation of this target are extremely unsatisfactory. The information obtained, although meager, apparently represents the sum of Japanese naval knowledge on the subjects in question.

The interrogated personnel from the Central Medical Bureau down to the medical officers in the lower echelons all have reported that the Japanese Navy has not been concerned with these problems, as they did not apply to personnel afloat, and the Navy ashore was concentrated in large base installations. Some effort was made to alter rations to suit the physiological needs of personnel in cold and hot climates.

No advances were made in the development and production of new and effective insect repellants, although a research study was undertaken at the TOKYO Naval Medical School. This project is said to have failed and been discontinued with no recommendations forthcoming.

In malaria control one "new" drug was developed and used, and a research project was under way on a derivative from "coal oil." The techniques of malaria control in the field were known but the limited number of trained personnel and the lack of equipment prevented any adequate program from being instituted.

In respect to malarial therapy, considerable information is available and is presented in NavTechJap Report "Preventive Medicine and Public Health Organization and Facilities in the Japanese Navy," Index No. M-09.

The standard directions and handbooks on this target issued to Japanese naval personnel are dated from 1941 to 1943. Three newer directives and manuals were brought out within the past year.

SUMMARY

MEDICAL TARGETS

DENTISTRY IN THE JAPANESE ARMED FORCES

The practice of dentistry in the Japanese armed forces seems, for the most part, to have been in the hands of qualified personnel. Entrance requirements to the Dental Corps were adequate and the standards of teaching in the recognized dental colleges are fairly advanced. The Japanese services suffered from a grossly understaffed Dental Corps, more than from the mediocrity of the performance.

Instruments and equipment were modern, and, since the Japanese make good technicians, the dental work is probably of a creditable nature. No new techniques or drugs seem to have been employed, although substitute metals were in use for fillings. Acrylic resins were produced in JAPAN two years ago, and are in dental use.

The number of qualified oral surgeons was as insufficient in ratio to the dentists, as was the number of dental officers to personnel in the services. Both Army and Navy Dental Corps were organized within the past four years, as such, and the waste of professionally trained men inducted into the ranks is indicative of the Army's dire need of man-power, or the lack of comprehension on the part of the Medical Corps, as to the dental problems it faced in caring for an Army of some 11,000,000 men.

SUMMARY

MEDICAL TARGETS

PODIATRY IN THE JAPANESE NAVY

Podiatry, as a speciality, was not practiced in the Japanese Navy, nor was such a field recognized. No instruments were used for measuring feet and for shoe-fitting. As foot-gear was not salvaged for re-issue, the problem of re-sterilization of such was not encountered. The prevention of fungus foot infections seems to have been summed up in the instruction, "keep the feet as dry as possible". The treatment consisted of application, topically, of the various standard fungicidal solutions. No new drugs seem to have been developed, nor was X-ray therapy a standard procedure.

"March Fracture" has been recognized and some investigations into its etiology made. In short, the care of the feet in the Japanese armed forces has not received any special attention from the medical corps.

SUMMARY

MEDICAL TARGETS

INFORMATION RELATIVE TO VENEREAL DISEASE CONTROL IN JAPAN

The Japanese prostitute is neither as highly infected as expected, nor as safe as reported. Original examinations in one area showed 20 per cent syphilitic, 80 per cent suffering from gonorrhoea and 100 per cent from pediculosis pubis. In another area only eight per cent showed evidence of venereal disease.

This, however, is beginning to manifest itself in the occupation troops, and promises to become an increasing problem. The control and supervision of houses of prostitution is out of the question; and "Off Limits" signs and the Military Police constitute the main prevention. No hesitancy has been shown by our troops, or Japanese women of this professional class, in establishing relations. No public incidents or much resentment on the part of the Japanese male is expected. The provision of adequate recreation for liberty parties remains, as always, a cardinal point in the program for the prevention and control of venereal disease. The problem is expected to increase as time goes on and boredom replaces the interest and stimulation provided by a new environment.

SUMMARY

MEDICAL TARGETS

JAPANESE BACTERIOLOGICAL WARFARE

Information relative to Bacteriological Warfare was sought from all Japanese naval medical personnel contacted, at all Japanese naval hospitals visited, at the various research institutes, arsenals, naval bases, and from the Navy Medical Bureau.

The only pertinent clue obtained led to the KANAGAWA Naval Arsenal No. 2 near YOKOSUKA, where it was discovered that Comdr. HAYAKAWA, IJN, mechanical engineer and designer, had drawn up a design for a bacteriological bomb. This was in the course of early decisions as to what types of bombs should be designed and developed, and this bomb was designated "Mark VII". Experimental models were completed, and tested in TOKYO Bay in 1943, but were not further developed, produced or utilized.

The Japanese Navy seems not to have pushed laboratory researches or to have done any field experiments with bacterial cultures. All sources denied that the Navy intended to resort to bacteriological warfare, and all interrogated personnel disclaimed any knowledge of the subject.

This apparent ignorance of the subject has been fairly well substantiated by the activities of other investigating committees who have found no evidence of preparations for the use of bacteriological warfare in the Japanese Navy. It is also fairly certain that the Japanese Navy was unaware of the activities of the Japanese Army in this field.

Due to complete coverage of this field by the committees referred to in reference "C", no further exploitation of this target was attempted, in keeping with the policy laid down by the GHQ Coordinating Committee. The original sketch of the design of the Mark VII Bacteriological Bomb and the available information from the Japanese Navy appear in the report prepared by Lt. Col. M. SAUNDERS, indexed under reference "C". This report is based on all the available data obtained from the Japanese Army and civilian sources, and is considered adequate by those more competent to evaluate the subject than the writer

SUMMARY

MEDICAL TARGETS

AERO, SURFACE, AND SUBMARINE MEDICINE AND RESEARCH IN THE JAPANESE NAVY

The results of the exploitation of this target have shown that the Japanese Navy Medical Corps made more progress in the field of aviation medicine than in any other. Studies on aviation medicine were undertaken by several civilian universities, and a relatively large volume of reports and reprints of their work has been surveyed and abstracted by other U.S. investigating committees.

Japanese naval aviation medicine was sharply divided into clinical and research activities, with relatively little inter-relation. This was also true of submarine medicine. "Surface" research was not organized as such, and suffered in comparison with the progress made in the other two fields.

This report supplements the investigations carried out by the other U.S. committees in the field of aviation medicine, and should be read with them.

SUMMARY

MEDICAL TARGETS

OPPORTUNITY FOR INFECTION OF NAVAL PERSONNEL WITH TUBERCULOSIS IN JAPAN

In the exploitation of this target one of the few findings of potential value to U. S. naval medicine has been discovered in the Japanese procedure of using B.C.G. vaccine for "immunization" against tuberculosis. Statistics and records have been burned, destroyed by bombing or stored for safety in caves. Clerical personnel acquainted with the statistical situation have frequently been dispersed or have vanished, so that a careful investigation of the incidence of tuberculosis among civilians in the neighborhood of U. S. naval bases in JAPAN, would have required the attention of all the members of this section for one half the total time it has spent in exploiting all the targets directed under Fascicle M-1. Hence the information presented is admittedly not always supported by records which can be produced.

The findings by other investigating committees have been referenced, and it is felt that presently a total sum of information will be available which will permit a sufficient evaluation of the situation to make constructive recommendations.

SUMMARY

MEDICAL TARGETS

PREVENTIVE MEDICINE AND PUBLIC HEALTH ORGANIZATION AND FACILITIES IN THE JAPANESE NAVY

The public health problems incident to a large civilian population turnover have not yet become distressing in JAPAN. Interference with the water supply and distribution systems from bombing has caused gastro-intestinal epidemics of a localized and not serious nature. Venilant epidemic diseases have not appeared although the situation has potentialities fraught with danger.

A mass chest X-ray program for the diagnosis of tuberculosis was interrupted by the war, with an "immunization" technique that should be further investigated.

General chemotherapy is on the homeopathic side, and therapeutic blood substitutes have not been adequately employed or developed as demanded by the exigencies of war.

SUMMARY

MEDICAL TARGETS

BACTERIOLOGY AND CHEMISTRY IN THE JAPANESE NAVY

Questioning of Japanese naval medical personnel on the specific items requested in this target elicited negative answers. The Army Technical Medical Mission was able to contact several civilian institutions which had some research work on these subjects. The titles of papers they found are appended (Reference "C"). Work of any value for this particular target came chiefly from the Government Infectious Disease Research Institute, located in TOKYO, with Dr. MIYAGAWA in charge, which target the Army likewise has well exploited.

The information recorded in this report may be of some value, in that it is revealing, even though of a negative character.

Bacteriology in the Navy during the recent years had been of a very restricted nature. Diagnostic work was limited to the minimum necessary for physico-chemical analysis, and "infectious disease" laboratory procedures.

A few reports on research projects have been included in the references.

SUMMARY

MEDICAL TARGETS

GENERAL MEDICINE AND SPECIAL DISEASES IN THE JAPANESE NAVY

The report lists the available data on the exotic diseases, those peculiar to the Orient. The presence of the "U. S. Typhus Commission" and the "Army Committee for the Investigation of Schistosomiasis" has removed these subjects from the target list, so that, the source of information being naval, the facts reported, figures quoted, and opinions expressed, must perforce apply to the subject matter, chiefly as it has come under the cognizance of Japanese naval medical officers.

The lack of any adequate system for reporting statistics, the difficulty of communication with the mainland, and the character of the average Japanese naval medical field officer all have prevented accurate or recent figures from reaching the Naval Medical Bureau.

SUMMARY

MEDICAL TARGETS

PHARMACOLOGY AND MALARIOLOGY IN JAPAN
CIVILIAN AND NAVAL

The results of the exploitation of this target have been very uneven. Certain civilian research and reports are included as worthy of careful attention, although the drugs developed, namely "Shiko" and "Koha", were not used in naval medicine.

Naval pharmacology was fairly well standardized, and vaccines and serums employed have been listed. Those produced by the naval medical laboratories have been referenced in Enclosure (B) of "Preventive Medicine and Public Health Organization and Facilities", NavTechJap Report, Index No. M-09. Samples of drugs collected as unfamiliar are listed. Investigation of the largest chemical company producing drugs for the Navy yielded the information in Enclosure (E) of this report.

Field exploitation of naval pharmacology was relatively sterile, but as a sampling of drug stocks, the inventory (drugs only) of the Yokosuka Naval Medical Supply Depot is included as Enclosure (F).

The custom of allowing individual medical officers in the various naval hospitals to order and use a multitude of proprietary drug preparations resulted in a variety of stock in the various naval pharmacies bordering on confusion. The pertinent and interesting information on naval pharmacology is presented in the body of the report as fully as it could be obtained. To exploit civilian pharmacology would require more personnel and time than were available.

SUMMARY

MEDICAL TARGETS

JAPANESE CHEMICAL WARFARE

The exploitation of the main target, SAGAMI Navy Yard, where naval chemical warfare research and poison gas production was carried on, yielded information of as complete a nature as could be desired on the following:

1. War gases manufactured.
2. Decontaminating agents.
3. Location of storage dumps.
4. Training of Japanese naval personnel in anti-gas measures.
5. Researches and new compounds produced. (In addition to gas formulae developed, a fair substitute for ship-bottom paint was found).

The source of information was the former director of the Gas Research Laboratory, and it is felt his knowledge was exact. Repeated interrogations of all contacted medical personnel from the Bureau in TOKYO to the field medical officers has revealed a lack of familiarity with the subject, so that the knowledge gained has been very meager.

SUMMARY

MEDICAL TARGETS

NEUROPSYCHIATRY IN THE JAPANESE ARMED FORCES

An honest summation of the status of psychiatry in the Japanese armed forces, the adequacy of the psychiatric program and the results achieved in therapy of psychiatric disorders would indicate that the subject might well be passed over.

The medical personnel in the Japanese Army and Navy recognize psychiatry as an important field and one with which they are all too unfamiliar. Painfully few psychiatrists were available, for example the six civilian specialists drafted into the Navy comprised the entire trained staff. Internists were appointed as ward officers for mental wards. No psychiatric hospitals existed in the Navy, although two were organized for the Army, while patients were usually cared for in psychiatric wards in general or base hospitals.

Treatment of such cases was more on the organic than functional basis, with very little rapport being established between physician and patient.

Interrogations concerning the number and type of N.P. cases have repeatedly been answered by the reply "very few" or "less than 1%" and that "hysteria" is the common type of difficulty.

An exhaustive interrogation was prepared by the Surgeon's Office, GHQ, USAFPAC, and a copy with its reply is enclosed.

Civilian psychiatry is more advanced in JAPAN than the military, and a few physicians trained abroad have a good knowledge of the field of psychiatry as of 1939. The war-time isolation of the country, lack of exchange of scientific journals, restrictions on travel, etc. and the bending of every energy of the Japanese government to the war effort have resulted in the arrest, if not in the retardation, of the progress of this branch of medicine.

SUMMARY

MEDICAL TARGETS

REHABILITATION IN THE JAPANESE NAVY

The emergency and definitive treatment of the traumatic injuries, wounds, burns, and fractures, which have constituted the major portion of combat casualties, has been investigated. No new or improved techniques have been discovered, nor have any unique instruments or orthopedic appliances been found. The shortage of drugs and materials, together with the cessation of general medical research occasioned by the attendant necessities of the war effort, have not produced the substitutes or advances that might have been expected.

Prosthetic appliances employed in Japanese naval medicine have been covered, and are reported. There is no department in which the mechanical contrivances equal or surpass those available in the UNITED STATES.

The rehabilitation training program offered the amputees is an interesting commentary on what can be accomplished by perseverance and effort in restoring the disabled to society as useful members in spite of the lack of the many mechanical conveniences available in Western civilization.

SUMMARY

MEDICAL TARGETS

GENERAL MEDICAL STATISTICS, JAPANESE ARMY AND NAVY

The following material has been gained from interrogation and from charts submitted by various Japanese Medical Officers and Bureaus. However, evaluation of given Japanese figures must always bear in mind these factors: (1) diagnostic inaccuracies, (2) non-return of patients from war-zones to home island hospitals for the last year prior to the end of hostilities, (3) reluctance on the part of the Japanese Naval Medical Corps to submit unfavorable statistics, and (4) the poor system of statistical reporting and compilation that existed.

SUMMARY

MEDICAL TARGETS

ORGANIZATION, ADMINISTRATION, AND FACILITIES OF THE IJN MEDICAL CORPS

This report is a brief survey of the basic aspects of Japanese naval medicine. An examination of the structure of the Japanese Navy Medical Corps revealed certain similarities to the U. S. Navy Medical Corps, but these similarities did not extend to Japanese naval medical facilities. Shore facilities were, by U. S. Navy standards, both outmoded and inadequate. While many modern techniques were included in training, there was a wide disparity between training and practice. In addition, the wartime shortage of necessary medical supplies added to the difficulties.

These shortcomings also were present in shipboard installations, and were aggravated by limitations of space, refrigeration, and sanitary facilities as well as low sanitation standards. The Japanese, however, made some very good optical equipment, particularly microscope lenses.

SUMMARY

ORDNANCE TARGETS

JAPANESE TORPEDOES AND TUBES - ARTICLE 1
SHIP AND KAITEN TORPEDOES

General: Japanese ship torpedoes can be divided into three classes, the first using 100% oxygen, the second air, and the third electricity.

Oxygen Torpedoes: The details of the most important of the 100% oxygen types are as undernoted:

Type 93, Model 1, Modification 1 (destroyers)

Speed and Range	Knots	Meters	Yards
	49	20,000	22,000
	40	32,000	35,000
	36	40,000	44,000

Explosive Charge ..... 490 kg (1078 lbs)

Type 93, Model 3

Speed and Range	Knots	Meters	Yards
	49	15,000	16,400
	40	25,000	27,300
	36	30,000	32,000

Explosive Charge ..... 780 kg (1700 lbs)

Type 95, Modification 1 (submarines)

Speed and Range	Knots	Meters	Yards
	49	9000	9840
	45	12,000	13,000

Explosive Charge ..... 405 kg (891 lbs)

Type 95, Model 2

Speed and Range	Knots	Meters	Yards
	49	5500	6000
	45	7500	8200

Explosive Charge ..... 550 kg (1210 lbs)

Air Torpedoes: During the recent war Types 02, 02 Special, and 05 air torpedoes were designed, and these are the only modern air torpedoes (apart from aircraft torpedoes) used by the Japanese Navy.

The 02 and 02 Special (1942) are 18" torpedoes which very closely resemble the Type 91 aircraft torpedo, of which they are modifications. They use an eight-cylinder, two-row, radial engine of the Whitehead type. The 02 and 02 Special were designed for small submarines and motor torpedo boats.

The Type 05 (1945) is a low-speed, short range, 11" torpedo designed for small motor torpedo boats. A five-cylinder swash plate engine operating on the wet heater cycle and developing 7 hp is used. Only two models of this type were manufactured.

Electric Torpedo: The 21" Type 92 submarine electric torpedo was designed in 1932. Research was started in 1921. Owing to its ease of manufacture, the Type 92 was used extensively during the war for submarine armament. The following performance is claimed:

Speed ..... 28 to 30 knots
Range ..... 7500 yards

Development of the Use of Oxygen for Torpedoes: Japanese experimental work on the use of oxygen in torpedoes was commenced in 1917 but discontinued shortly afterward. In 1928 research was reopened, and in 1933 the first 100% oxygen torpedo (24" Type 93) was designed.

The design of all subsequent oxygen torpedoes conforms to the same general plan. The 18" Type 94 oxygen aircraft torpedo has been included in the report. The main features are:

1. Use of air or carbon tetrachloride at start of run.

2. Use of sea water as diluent. This involved the design of a "buffer" chamber to smooth the flow of sea water from the diluent pump.

3. New design of generator.

4. Special precautions to avoid contact between lubricant and high pressure oxygen.

Oxygen and Fuel Vessels: The oxygen vessel bodies of earlier types of torpedoes consisted of a forged steel body with hemispherical ends. In the Type 93, Model 1, Modification 2 and subsequent torpedoes the body and after end were forged in one piece using a 4000 ton press. The forward end is turned with a plain face joint and the cover is inserted into the body and bolted to it. A copper washer is used as jointing material, the gas pressure being used to make the joint.

The fuel vessels are of a design similar to the oxygen vessels and are screwed onto them.

Repeated pressure tests to check the safety factor were carried out on three or four vessels, the tests being repeated with each change in material.

Power Unit of the Oxygen Torpedo: The engine is of the standard Whitehead design, having two double-acting cylinders placed horizontally in line, with the reversing gear forming the connection between the two cranks. The engine has been modified in certain details to enable sea water to be used as diluent and to develop the additional power required to propel the torpedo at 50 knots.

A double-acting, single-throw reciprocating pump was added to the engine to supply sea water for displacing the fuels and for diluent in the generator, the surplus being used to cool the engine.

The engine operates on the "Rankine" cycle and has a theoretical efficiency of 13.8 percent. The actual efficiency of the propulsion system is 9.6 percent.

Naval Views on Oxygen Torpedoes: To obtain the general views of the Japanese naval officer on oxygen torpedoes, the opinions of the commanders of a first-class destroyer and a first-class submarine were sought. These officers stated that it is generally felt by the Japanese Navy that the excellence of the performance of oxygen torpedoes outweighed the disadvantages of handling and preparation. (See Enclosures (A) and (B)).

Ranging of Torpedoes: In order to test the validity of Japanese claims for the performance of their oxygen torpedoes, four 21" Type 95, Model 2 submarine torpedoes were ranged at DAINYU, near KURE. The performance claimed for this model was 49 knots to 6000 yards. In all, eight runs were made. One torpedo was lost at the end of its first run, but for the remaining seven runs an average performance of 49.2 knots to 5750 yards was obtained. The tracks of the torpedoes of which photographs were obtained were very slight.

In view of the lack of proper ranging facilities it was not considered feasible to range the Type 93, Model 1 for which a performance of 49 knots to 22,000 yards was claimed. As a result of their investigation, however, the authors are satisfied that Japanese claims for their oxygen torpedoes are justified.

Heads: Prior to 1940 the Japanese used a round-nosed head. In 1940 the Italian streamlined head was fitted to Japanese high-speed torpedoes. It is claimed that this head increased the speed by about two knots without increase of engine output. Subsequently Types 93 and 95 torpedoes were fitted with streamlined heads which were a modification of the Italian type.

The explosive filling used in all Japanese torpedo warheads consisted of a mixture of:

Trinitro-toluene	60%
Hexanitrodiphenylamine	40%

"Homing" Torpedoes: In an effort to develop a "homing" torpedo, the Japanese undertook experiments with hydrophone-equipped torpedoes designed to "home" on a sound source. Two principles were employed, one depending on the difference in sound intensity at two points, the other on phase difference. Only electric torpedoes (Type 92) were used for the experiments.

The research met with only limited success, and the experiments were finally abandoned.

Influence Firing Systems: Two magnetic influence firing pistols were developed and were known as the Type "M" and Type "OR", respectively. The development of the former type was completed in 1944 and accepted by the Navy after successful trials. The type "OR" was in the early stage of experiment. Trials had not been undertaken.

Turbine Torpedoes: About 1936, the Japanese undertook the development of a turbine torpedo to meet a Naval Staff requirement of 60 knots to 9000 yards. In 1936, after preliminary work at YOKOSUKA, the design of turbine units F1, F2, and F3 suitable for 24" torpedoes was undertaken.

Sea water was used as a diluent in the generator. Deposition of salt in the nozzles and on the blades was prevented by injecting a zinc chloride solution just before the induction ring. Zinc chloride lowers the melting point of common salt and prevents its crystallization at the temperature existing in the turbine.

The development was finally abandoned because of the technical difficulties involved in meeting further staff requirements.

Japanese Torpedo Production: Some data on the numbers of torpedoes produced from 1931 to 1945 was obtained from the U.S. Strategic Bomb Survey. It appears that no differentiation in type was made for the various diameters so that, except in the case of the Type 02, the total production cannot be split into types.

The numbers were small and quite inadequate for the services for which the torpedoes were intended.

KAITEN Torpedoes: The one-man KAITEN torpedo was developed by the Japanese to direct the torpedo onto the target and to obtain greater weight of explosive and greater range; the last at the expense of speed.

The first KAITEN was designed in 1944. In all, four types of KAITEN were designed - 1, 2, 4, and 10. Only Type 1 was used operationally.

Type 1: This was essentially based on the Type 93, Model 3 torpedo and, in fact, the Type 93 torpedo (without head) was used almost unchanged for the propulsion system of KAITEN 1. The maximum speed of this type was 30 knots with a range of 25,000 yards at this speed. Over 3000 pounds of explosive were carried in the head. The total weight was eight tons.

Type 2: KAITEN 2 was designed in 1944 to operate on hydrogen peroxide, hydrazine hydrate and kerosene, using sea water as diluent and operating on the wet heater cycle. A new engine, known as the No. 6 Engine, was designed. It was a two-row, vertical engine with eight cylinders. A special generator was designed. The KAITEN 2 was considerably larger than KAITEN 1. The following are some of its main characteristics:

Weight	18 tons
Length	50 ft
Diameter	4 ft
Horsepower	1500
Maximum speed	40 knots
Range at 40 knots	27,000 yards
Weight of explosive	3000 lbs

The KAITEN 2 never underwent sea trials, but these were about to be carried out when the war ended.

Type 4: With an adequate supply of peroxide for KAITEN 2 in doubt, work was begun on the design of KAITEN 4. This KAITEN had the same overall dimensions and weight as Type 2, but it was designed to run on oxygen. The No. 6 Engine was used in conjunction with two Type 93 torpedo generators. Carbon tetrachloride was used for safe starting.

Trials with KAITEN 4 were disappointing. The use of two Type 93 generators was not satisfactory, and the oxygen consumption was poor. Large percentages of unburnt oxygen appeared in the exhaust.

Sea trials of KAITEN 4 were unsatisfactory. The speed realized never exceeded 25 knots.

Type 10: In the main, the KAITEN 10 consisted of the Type 92 electric torpedo with a pilot's cockpit built in. It was designed for the defense of Japanese coastal waters, but it was never used in service.

SUMMARY

ORDNANCE TARGETS

JAPANESE TORPEDOES AND TUBES
ARTICLE 2 - AIRCRAFT TORPEDOES

All research on aircraft torpedoes was conducted at the First Naval Technical Arsenal, KANAZAWA, Japan. The main plant concerned with production was the Kure Naval Arsenal.

There were no remarkable features about the aircraft torpedoes in operational use during the war, with the exception of the anti-roll stabilizers. The Japanese considered this innovation of great importance in improving torpedo performance.

Wooden tail frames, similar to those used on U.S. aircraft torpedoes, were used for air stabilization.

The launching speeds and altitudes varied from 100 to 250 knots and from 50 to 1000 feet.

Type 91, Modifications 1 to 7, carrying explosive charges of 330 to 925 pounds, were used throughout the war, but an improved Type 4 aircraft torpedo was introduced in 1944. All torpedoes had a speed of 42 knots with ranges of 1600 to 2200 yards.

The Japanese experimented with rocket and jet-propelled torpedoes, but without success. Many experiments were made with gliding torpedo bombs and with anti-submarine circling torpedoes with a moderate degree of success, but none was used in service.

In 1934 the Type 94 oxygen aircraft torpedo was developed, but the use of oxygen was troublesome and dangerous, and there was no need for long range, so it was abondoned soon afterwards.

The Japanese considered their aircraft torpedoes very dependable. The chief difficulty was in mass production, which was never really attained.

SUMMARY

ORDNANCE TARGETS

JAPANESE TORPEDOES AND TUBES - ARTICLE 3
ABOVE - WATER TUBES

The latest types of torpedo tube mounts, which were used on Japanese destroyers and cruisers for the past ten years, are all modifications of the Type 92 mount. Some mounts are equipped with spray shields, depending upon their positions aboard ship. They are of ordinary construction having no special features except for the torpedo reloading facilities. The torpedoes are fired by compressed air and, in emergencies, by powder charges.

SUMMARY

ORDNANCE TARGETS

JAPANESE GUIDED MISSILES

A through investigation of Japanese guided missiles was made by the Air Technical Intelligence Group. The subject of infra-red devices for the control of guided missiles was explored by NavTechJap, and a report has been submitted under the title "Japanese Infra-Red Devices, Article 1 - Control for Guided Missiles", Index No. X-02-1.

After discussions with representatives of ATIG it was decided that its reports, which have been given a limited distribution, should be reproduced in full in this report to insure dissemination to all interested naval activities. This has been done. Further research on the part of NavTechJap was not considered necessary.

SUMMARY

ORDNANCE TARGETS

JAPANESE COUNTERMEASURES AND DEFENSIVE ORGANIZATION AGAINST U.S. MINES

A study of Japanese defense against U.S. mines shows that pre-war Japanese techniques were outmoded by new types of U.S. mines, and that little preparation had been made in this direction during the early and middle phases of the war. Consequently, the Japanese were unprepared for the large scale mining of Japanese waters by U.S. aircraft. From the beginning of the mining operations to the end of the war, a great deal of study and research were devoted to methods of defense. Though little of the research had progressed beyond the experimental stage, it is believed that the Japanese ideas were good and that inadequacies of developments were due to lack of material and poorly trained personnel.

SUMMARY

ORDNANCE TARGETS

JAPANESE MINES

The Japanese received information and assistance from the Germans in developing several types of mines. The other chief foreign source of information was captured U.S. and British mines.

The Japanese did not use sterilizers, long-delay arming devices nor any electrolytic device.

Various attempts were made to develop the induction type magnetic mine, with little success.

Only two types of microphones were developed for use in ground mines.

No pressure mine was under development, although the Japanese were much impressed by the U.S. pressure mine.

The Japanese Navy had two types of aircraft mine which could be laid in 1000 feet of water. Only one type of parachute was used for both of these mines.

There was only one type of moored anti-sweep device and no device similar to the U.S. booster-extender arrangement for use in aircraft-planted mines.

The Japanese had no moored influence mine in service, but did have three types of moored mine using the hydrostat system of depth taking.

There was an obsolete antenna mine, not used in the war.

The following types of Japanese influence mines are described in the report:

Type 0 Ship-Laid Controlled Influence Mine
Type 3, Model 1 Submarine-Laid Magnetic Mine
Type 3, Model 2 Submarine-Laid Acoustic Mine
Type 5 Magnetic Mine
Type P Mine (later called Type 3, Mk. 3, Mod. 1)
Aircraft-Laid Acoustic Mine
Magnetic Acoustic Mine

SUMMARY

ORDNANCE TARGETS

JAPANESE NAVAL MINING ORGANIZATION AND OPERATIONAL TECHNIQUES

Mining by the Japanese never became extensive during any phase of the war, probably owing to lack of equipment. Many of the mine laying vessels were lost early in the war. However, four old submarines, I-121, I-122, I-123, and I-124, were fitted for mine laying and used for planting mines around Shanghai. German mines were also planted from submarine torpedo tubes off Brisbane. Mining by aircraft was not attempted.

SUMMARY

ORDNANCE TARGETS
JAPANESE BOMB DISPOSAL METHODS

In this report an effort has been made to present the organization and the general disposal methods employed by the Japanese in bomb and projectile disposal. Enclosure (A), a report by Lt. NISHIDA, IJN, gives a general picture of the Japanese disposal work, including organization, methods of disposal, opinions of the author on the effectiveness of U. S. bombs and projectiles, and some general data as to the efficiency of U. S. bomb and projectile fuzes based on percent of unexploded ammunition recovered by the Japanese.

SUMMARY

ORDANCE TARGETS

SHIP SIGNATURES AND RELATED DATA

The object of the investigation was to obtain as much information as possible in connection with the magnetic, acoustic, and pressure signatures of Japanese ships, together with the methods used to obtain this data.

Interrogation has revealed that no serious effort had been made to obtain accurate information on this subject for mining purposes and showed also that the methods used were quite elementary.

Charts of the magnetic field in the Pacific have been obtained, but these are reported to be based on U.S. charts obtained before the war.

SUMMARY

ORDNANCE TARGETS

JAPANESE DEPTH CHARGES

The purpose of this report is to provide information about Japanese depth charges, namely influence depth charges and standard depth charge pistols.

Interrogation has revealed that only two influence depth charges were under consideration, and of these, only one was approaching finality of design.

Drawings supplied by the Japanese of depth charge pistols are included.

SUMMARY

ORDNANCE TARGETS

JAPANESE NAVAL ROCKETS

Japanese naval rockets are formidable, satisfactorily performing weapons which were developed and put into production too rapidly for much refinement. Rockets were more and more valued by the Japanese as experience increased and perhaps reached their most spectacular use in the rocket-propelled Baka suicide plane.

The Japanese methods of manufacture and quality control were rather elementary compared to American methods.

SUMMARY

ORDNANCE TARGETS

JAPANESE PROPELLANTS, ARTICLE 1 -
THE USE AND MANUFACTURE OF ORTHO TOLYL URETHANE
FOR STABILIZING ROCKET AND GUN PROPELLANTS

The reasons why the Japanese Navy adopted a new propellant powder stabilizer originated by Japanese chemists are discussed and the method of large scale manufacture is presented.

SUMMARY

ORDNANCE TARGETS

JAPANESE NAVAL PROPELLANTS - ARTICLE 2
ROCKET AND GUN PROPELLANTS - GENERAL

Aside from the excellent Japanese-developed stabilizer, ortho tolyl urethane (see article 1 of this report), there appears to be little that is unique in Japanese naval rocket and gun propellants or in their manufacture.

In the field of liquid propellants, the manufacture of 80% hydrogen peroxide was well started on a commercial scale.

SUMMARY

ORDNANCE TARGETS

JAPANESE PROPELLANTS, ARTICLE 3
RESEARCH ON NON-VOLATILE SOLVENT POWDERS

This report consists entirely of a translated Japanese document, "Research on Non-Volatile Solvent Powders for Use in Various Types of Ordnance". The Japanese report is complete in itself, being summarized at the outset of each new chapter and therefore no effort has been made to summarize the report as a whole.

SUMMARY

ORDNANCE TARGETS

JAPANESE ILLUMINATING AND COLORED BURST PROJECTILES

Starshells, which were used without parachutes by the Japanese Navy, were known by three different names, one of which was very similar to the name used for illuminating shells (with parachute). At the end of the war illuminating shells were replacing starshells, which were obsolescent.

Successful colored burst projectiles had been produced in five colors. White and black bursts are easy to produce and contain no new information. The secret of the Japanese success with other colors was their use of red phosphorous as an ingredient in the filling.

SUMMARY

ORDNANCE TARGETS

JAPANESE PYROTECHNICS

Japanese pyrotechnic design and development were examined, key Japanese personnel were interrogated, and tours of inspection were conducted in an effort to bring to light significant pyrotechnic developments.

It was found that the Japanese had made no outstanding contribution to the art and had made very limited use of pyrotechnics during the war. With the exception of the "Menace" and "Dazzle" bombs, their use of pyrotechnics was limited to the usual fields of signaling, illuminating, marking, and incendiaries.

SUMMARY

ORDNANCE TARGETS

JAPANESE NAVY AMMUNITION CASES FOR 5CM AND LARGER CALIBER GUNS

Japanese brass cartridge cases were of conventional design.

Owing to a shortage of brass supplies, experiments were carried out with steel cases. Long experiments proved that steel made by the open hearth method, which the Japanese wished to use, required particularly high grade coal and iron ore for production of the larger cases of the Model I type. Model III was designed after interruption of ore supplies from HAINAN made an alternative case essential. This type can be made of lower grade material than Model I.

No materials other than steel were tried as substitutes for brass for cartridge cases.

SUMMARY

ORDNANCE TARGETS

JAPANESE STEEL MANUFACTURING METHODS

This report deals mainly with the Japanese methods of manufacturing steel utilized in the production of common and armor piercing Navy projectiles. Japanese steel manufacturing processes were similar to those used in the United States and England, but from chemical analysis charts obtained through Japanese personnel, the pre-war steels appeared to be refined to a greater degree, the phosphorus and sulphur content being quite low. During the war, when nickel became a critical alloying element, substitute steels with little or no nickel were used. The phosphorus and sulphur content increased, indicating that the Japanese encountered difficulties in obtaining good grades of pig iron. Most of the pig iron used in the manufacture of acid open hearth steel was imported from Manchuria.

SUMMARY

ORDNANCE TARGETS

JAPANESE HEAVY ARMOR

Japanese armor for large combat vessels was patterned originally after German (Krupp) and later after English (Vickers) armor. During the war the Japanese suffered from a serious shortage of nickel and short supplies of other alloying elements to a lesser degree. Consequently, a large part of their wartime research concerned itself with trying to maintain ballistic quality with low nickel analyses of their own devising.

Face-hardened armor of about 30% chill was used for nearly all vertical protection heavier than 11". YAMATO class battleships bore 25" face-hardened turret plates. For the last ten years, Japanese face-hardened plate has been non-cemented.

Cruisers had relatively thin armor in contrast to the heavy battleships. Turret-face plates of most of the 8" cruisers were less than 2" thick.

All Japanese production armor steel was made in the acid open hearth furnace. Average sulphur and phosphorous contents each ran below 0.02%. There was a tendency toward fairly high carbon content which was never below 0.30% and usually about 0.45 to 0.50%. Tensile strengths averaged slightly above those of American armor produced during the war, but the ductility was lower, particularly the reduction of area.

Ballistic tests were conducted on a basis somewhat similar to U. S. Navy tests.

SUMMARY

ORDNANCE TARGETS

JAPANESE NAVAL PROJECTILE FUZES

It seems to be a fair criticism of Japanese naval projectile fuze design to say that until World War II the designs were usually over-elaborate yet tended to underestimate the importance of safety.

During the war, difficulties in production and the influx of scientific university graduates into ordnance fuze design appeared to influence fuze design towards greater simplification. At the same time, many problems that arose as a result of service experience and the demands of higher naval authorities were attacked and solved competently and in some cases with originality

Some German information on fuze design was available up to the beginning of World War II, and foreign influence is apparent in the clock work mechanism of the Japanese Time Mechanical Fuze and in the use in some fuzes of Schnerder, Mauser and Vickers' designs. It is suspected that their fine shutter, centrifugally operated, safety and arming device is derived from German sources.

During the war, there was little if any connection or exchange of information on fuze design between Japan and Germany.

During the last few years, projectile fuze design was devoted chiefly to the following investigations:

1. Explosive Trains

   a. Development of a detonator (primary initiator of mercury fulminate 20%, potassium perchlorate 40%, and antimony sulphide 40%).

   b. Development of non-gaseous powders for powder trains to replace black powder.

   These investigations started in 1937. A fairly comprehensive list of different powders tried is given in Enclosure (A). The barium oxide (BaO_2) mixtures were not entirely satisfactory owing to either hygroscopic characteristics or because they became fluid during combustion and were affected by centrifugal forces when in flight. Better results were obtained by covering the BaO_2 with a mixture of raw rubber, pine-resin, and pauloronia oil.

   A mixture of lead oxide (Pb_3O_4), barium chromate ($BaCrO_4$) and silicon (Si) and also No. 14 in the table in Enclosure (A) gave good results (though the former was low in calorific value). The most successful powder, however, was No. 15 in the table in Enclosure (A). It worked accurately at barometric pressures between 10mm, as measured by a mercury barometer, and 10 atmospheres.

SUMMARY

ORDNANCE TARGETS

JAPANESE ORDNANCE FUZES

In general, the Japanese were following good fundamental principles in fuze design, but they had not, in any way, produced or used fuzes of outstandingly superior characteristics. The progressively-operating centrifugal detent feature, used in many of their fuzes, and the design principles of the so-called "gaine" are worthy of very close study.

SUMMARY

ORDNANCE TARGETS

JAPANESE PROJECTILES

Common Projectiles: These are not particularly novel or interesting but show considerable variety in the methods of manufacture. Incendiary shrapnel of two types are designated Common Projectiles, Models 3 and 4.

Incendiary Shrapnel: The Japanese Navy placed great faith in the effectiveness of incendiary shrapnel as an anti-aircraft weapon. It is considered probable that they rather overestimated its value as compared to HE.

Anti-Submarine Projectiles: These projectiles appear to be the type showing the greatest originality in design. It is difficult to obtain any true picture of their effectiveness during the war.

Illuminating Projectiles: The original Japanese starshell had no parachute and was not very effective. Later illuminating projectiles are largely copies of foreign designs.

Rocket Projectiles: The shaped charge projectiles designed for use against tanks showed considerable progress. The remaining projectiles were of HE or incendiary shrapnel type.

Armor Piercing Projectiles: In the design of AP projectiles the Japanese concentrated on the possiblity of striking the enemy ship below the waterline and therefore possibly below the armor belt. To achieve this the projectiles were designed to continue an undisturbed trajectory under the water. (It is debatable whether success in this attempt will give an increased number of hits below the water level at long ranges.)

The fuze delay was adjusted to give satisfactory functioning after being initiated in striking the water and then passing through the water and the ship's side (0.4 seconds). The fire control stressed the desirability of getting short misses, and the Japanese claimed that even projectiles that missed the enemy ship would have a certain mining effect.

It would appear that, to some extent, they sacrificed the effectiveness of their AP projectiles on occasions of direct hitting (particularly against light armor) in order to achieve a doubtful hit through the water or a mining effect for which an AP projectile is singularly poorly designed.

The most recently designed Japanese AP projectiles, Type 91, were produced in calibers ranging from 15.5cm (6.1") to 46cm (18.1"). The major caliber projectiles of this design have true armor piercing caps; the medium caliber have only a small cap-head. In both sizes, the projectile is designed to have an "undisturbed underwater trajectory" by allowing the forward section to break off on water impact, leaving a flat forward surface.

The projectiles have a weight ratio, $2M/D^3$, of about 1.08 and are approximately 4.3 calibers long. The major caliber projectiles have an analysis consisting roughly of 0.50% carbon, 3.8% nickel, 0.7% chromium, and 0.5% molybdenum. The medium caliber projectiles have lower nickel and higher chromium, a concerted effort having been made to conserve nickel.

NTJ·L·0-19

SUMMARY

ORDNANCE TARGETS

JAPANESE AMMUNITION PRIMERS

Primers in the Japanese Navy were extremely numerous in variety of nomenclature but did not vary much in design. They consisted fundamentally of a component body (which contained either the electric or the percussion initiating arrangement) screwed into an outside body either smooth to fit into the vent axial in bag guns, or screwed to fit the threads in cartridge case primer holes.

The Japanese method of using the same component body was very good from the standpoint of simplifying production. This, however, was neutralized to some extent by the unnecessarily large number of different types of primers.

SUMMARY

ORDNANCE TARGETS

JAPANESE INTERIOR BALLISTICS

Japanese developments in interior ballistics and such related problems as flash, erosion, coppering and blast are herein discussed.

SUMMARY

ORDNANCE TARGETS

JAPANESE TRACERS

The investigations conducted on Japanese tracers established the following:

1. Japanese tracers were of fair quality, although quality levels and functioning requirements seemed much lower than those demanded for U.S. Navy ammunition.

2. The Japanese displayed a certain amount of cleverness in some designs, as for instance in the design of vari-colored tracers for 25mm ammunition.

3. Japanese designs and methods of closure for tracers would not be considered adequate by U.S. standards. Moisture exclusion, dependent on the seal between the cartridge case and projectile, cannot be considered sufficient, since moisture entering through a faulty primer seal could influence the tracer. Moreover, this method creates production problems because immediate assembly of case and projectile is mandatory where the loading is not done in a controlled atmosphere.

4. It is the writer's opinion that Japanese tracers did not compare favorably with those produced by the U.S. at the time the war ended; and also that the ever-increasing pressure placed on their technical staffs prevented the Japanese from making the developments of which they would have been capable if the time element had been more favorable.

SUMMARY

ORDNANCE TARGETS

JAPANESE BOMBS

Bombs are discussed according to Japanese designations, and are grouped according to Japanese classes. These are: Land Bombs; Ordinary Bombs; Special Bombs designated by Mark Numbers 1 to 33; and Practice Bombs.

The report on each bomb includes its use, history, fuzing, a list of previous reports, a list of documentary references, a general description, and a statement of the status of specimens of the bomb.

This report should be used in conjunction with the Japanese documents referred to in connection with each bomb, and with the U.S. Navy publications listed as previous reports.

SUMMARY

ORDNANCE TARGETS

DESCRIPTION AND OPERATION OF JAPANESE TYPE 3 PHOTOELECTRIC FUSE

This report concerns the Japanese Type 3 fuse which was used operationally on 250 and 800 kilogram aircraft bombs to cause detonation of bombs 18 to 45 feet above the earth. This fuse functions in daylight or dark.

Operation depends on transmitting from the fuse a beam of pulsing light which is reflected back to the fuse and activates a photoelectric cell, which, in connection with an electric circuit, causes detonation at a desired height.

The fact that this fuse is sensitive only to light pulsing within a certain frequency range and may drop for up to 30 seconds before arming makes it a formidable weapon to counter and a valuable device for exploitation in military applications if it is as reliable as claimed by Japanese naval officers.

This fuse required the development of two new vacuum tubes and appears to represent an example of an original and appreciable accomplishment by Japanese engineers.

SUMMARY

ORDNANCE TARGETS

JAPANESE EXPLOSIVES

A Japanese has written "ammunition is an organic creature which, however we make it, insists always upon his own independence, betraying sometimes our selfish expectations." Although this kind of superstition is not generally indicative of the state of knowledge of Japanese technicians, yet there appears to be little that is new in the composition or manufacture of Japanese explosives.

Some American experts have characterized the present Japanese methods of manufacture as those used in the United States between 1910 and 1930.

The Japanese used a great deal of trinitroanisol and hexanitrodiphenylamine, both of which are generally considered to be too deleterious to the workers' health for manufacture in the United States. The Japanese had not developed new methods to protect their workers but continued to manufacture trinitroanisol and hexanitrodiphenylamine.

SUMMARY

ORDNANCE TARGETS

JAPANESE NAVY POWDER BAGS

It appears that the Japanese Navy has never used or even anticipated using anything but silk for their powder bags.

The people referenced, were questioned separately in an attempt to establish the possibility of any substitute for silk being used or being investigated experimentally but they were unanimous and insistent that the Japanese Navy had very little if any interest in changing from silk.

It was stated that when JAPAN depended on purchasing guns and propellent powder abroad silk was used for the bags, and the use of waste silk for powder bags continued up to the surrender with no change anticipated or research under way.

TAKAYASU Company in GIFU Prefecture was said to be one of the biggest suppliers of silk powder bags for the Navy.

SUMMARY

ORDNANCE TARGETS

JAPANESE INCENDIARY MIXTURES

The properties, use, and chemical compositions of Japanese naval incendiary mixtures including rubber thermite, special phosphorous and explosive incendiary particles are discussed.

SUMMARY

ORDNANCE TARGETS

JAPANESE FIRE CONTROL

This report contains miscellaneous data on Japanese fire control and should be considered in connection with three other NavTechJap reports on fire control.* The data presented here are important in the fields covered by those reports.

In general, it can be said that nothing of great originality has been discovered in the items discussed in this report. To a large extent, the equipment was really simple and sometimes backward (for example, synchros). A remarkable fact is that, despite the backwardness of synchro technique, the equipment and systems in general appeared to work well.

---

*NavTechJap Reports, "Japanese Anti-Aircraft Fire Control," Index No. O-30; "Japanese Surface and General Fire Control," Index No. O-31 and "Japanese Torpedo Fire Control," Index No. O-32.

SUMMARY

ORDNANCE TARGETS

JAPANESE ANTI-AIRCRAFT FIRE CONTROL

A careful examination of all Japanese fire control systems and particularly anti-aircraft systems discloses any number of quite excellent ideas, many of them well carried out, but mostly they are in details only and not original basic conceptions. An example of the former is the simple sine wave mechanism, a description of which has been included in this report. There were no fire control systems either for long or short range based upon the "line of sight" gyro with one degree of freedom or the free gyro. The use of gyros was strictly limited to providing artificial horizons.

Based on standard principles, there were many new Japanese fire control systems such as the RAIUN, the Type III, and the BIODOBAN Type II.

In the field of short range, high angle fire control, all Japanese systems were based on the course and speed sight principles. The Japanese made very complicated course and speed systems, while admitting apparently to themselves, that the primary errors of estimation of target course, speed and range were out of all proportion to the small corrections applied for wind, drift, parallax, etc. Descriptions have been given of two of these types of course and speed sight director systems (Type 95 and Type 4 Mod. 3) but not of the remainder, some of which were simpler, as nothing of value would be gained by describing various types of outmoded systems.

The most outstanding characteristics of Japanese anti-aircraft fire control were (1) optics, (2) the limited application of power follow-ups, and (3) the use of optical methods for hand follow-ups.

The best features of the standard Japanese long range High Angle Fire Control System Type 94 are (1) careful design, (2) unity of thought, and (3) excellent layout. A visit to the aircraft carrier RYUHO at Kure Naval Base confirmed these impressions. The director both inside and out was spotlessly clean and tidy; the layout was excellent. There were no untidy cables, pipes, tubes, or excrescences. The inside of the director had polished linoleum on the false deck and was supplied with indirect lighting giving an impression of excellent cooperation between designers, manufacturers, and navy yards.

In blind firing systems and autofollowing with rate aiding, Japanese naval designers had not progressed far. Although some of their ideas were up to date, they were handicapped by the bombing of their industrial plants capable of fine precision work. As a result the accuracy of radar systems was not good enough for high angle fire, and the resulting operational practice was for the radar to put a searchlight or a group of searchlights roughly in the correct place in the sky and then to track optically in the normal manner.

SUMMARY

ORDNANCE TARGETS

JAPANESE SURFACE AND GENERAL FIRE CONTROL

The main bulk of this report concerns low angle (surface) fire control. The problem has been clearly known and understood for about twenty years. However, progress of science and perfecting of mechanisms has added improvements quite regularly during this period and will in all probability continue to do so.

Such progress is clear in American and British surface fire control. From the information obtained it is clear that the Japanese, too, have progressed with their surface fire; but, with one exception, they have dropped a little astern in the race. The one exception is the device for minimizing dispersion at long ranges. From examination of the device it appears to be far from perfect, to be unnecessarily complicated, and to have numerous weaknesses; but its potentialities were clearly demonstrated in the Leyte action in October 1944 and due credit must be given.

The lack of good radar in Japanese surface fire is offset to some extent under certain conditions by their excellently grouped salvos, and, in general, their surface fire is, there fore, not much inferior to that of other navies.

Japanese stable verticals and gyro work for fire control seem to be vastly inferior. Little thought seems to have been given to line of sight stabilization by small gyros with one degree of freedom, or to rate measurement by small gyros.

Finally, with reference to the mechanical and electro-mechanical torque amplifiers, it is difficult to judge performance from diagrams. They may be quite good, but the principles upon which they are based are all well-known, with the exception of the Aichi Clock Company's electro-mechanical servo.

For further information on synchros, wiring diagrams, and remote power control systems, reference may be made to NavTechJap Report, "Japanese Fire Control", Index No. O-29. For further information on anti-aircraft fire control, reference may be made to NavTechJap Report "Japanese Anti-Aircraft Fire Control", Index No. O-30.

SUMMARY

ORDNANCE TARGETS

JAPANESE TORPEDO FIRE CONTROL

The Japanese spent considerable effort on the design and manufacture of torpedo fire control equipment. The various units are well constructed and function with good accuracy. Their submarine torpedo data computers and auxiliary equipment are more simplified and less accurate than U.S. equipment, while above water torpedo control gear (especially for cruisers) is more complicated and is equal in merit to that of U.S. design.

The Japanese approach to the torpedo problem for above water launching is surprisingly complete and comprehensive, provision having been made for introducing into the computing unit almost every conceivable constant and variable pertaining to the problem. Torpedo fire control equipment contains the only examples of automatic inputs using electrical follow-up gear which have been found in Japanese fire control of any kind. Use has been made of slip ring follow-ups controlling a reversible motor through a magnetic-type hunter switch.

Target designation systems as well as torpedo indicating and firing panels were not well developed in submarine installations and only slightly better in destroyer and cruiser applications.

SUMMARY

ORDNANCE TARGETS

JAPANESE DEMOLITION METHODS

Japanese Army and Navy demolition stores are in general of the simplest standard kind, drawn from or closely resembling civilian demolition supplies.

The Navy had done almost no research or development of specialized demolition items. The Army had done little more. Neither branch did any work comparable to that done by such agencies as the U.S. Army Engineer Board, the U.S. Navy Demolition Research Unit, the Janet Board, the U.S. Navy Bomb and Mine Disposal Schools, or to the work of the British Combined Ops. Experimental Establishment and the Obstacle Assault Center.

What little research done by the Japanese was devoted to purely defensive projects; American and British efforts were primarily offensive -- obstacle-demolition and special attack work. The only interesting demolition research done by the Japanese was on shaped charges especially as applied to anti-invasion defense; the only interesting training at all like U.S. assault demolition courses was that of the FUKURYU suicide groups, whose mission was destruction of Allied landing craft.

The little research work done was rendered almost valueless by (a) the incompleteness (or virtual absence) of exchange of information between Japan and Germany, (b) the similar lack of free exchange between the Japanese Army and the Navy, and (c) the failure of the higher officers in both branches to appreciate, until the end of the war, the importance of the subject.

SUMMARY

ORDNANCE TARGETS

JAPANESE LIGHT ARMOR - ARTICLE 1

This report covers light armor used by the Japanese during World War II. Various data on steel armor are given, such as the types used, heat treatment, hardness, chemical composition, and ballistic requirements.

The Japanese used principally silicon-manganese-chromium electric-furnace steel of 0.2 to 0.4% carbon for aircraft armor. This armor was either homogeneous or carburized and was heat treated by quenching and tempering to a specific hardness. Ballistic tests conducted on the experimental and production armor are given.

Armor and structural steel in tanks, landing barges, and gun shields are discussed briefly.

The Japanese used safety glass and sponge rubber for protection of pilots and fuel cells, respectively, but there was no indication that materials such as aluminum alloy, magnesium alloy, nylon, silk, glass cloth, or leather were used as protection for personnel or equipment against the effects of minor caliber gunfire.

SUMMARY

ORDNANCE TARGETS

JAPANESE LIGHT ARMOR - ARTICLE 2
MANUFACTURE OF LIGHT ARMOR BY NIPPON SPECIAL STEEL CO.
OMORI, TOKYO, JAPAN

This report covers the manufacture by the Nippon Special Steel Co., OMORI, Tokyo, of 3mm to 16mm light armor (homogeneous and carburized). This armor was used as a protection against 7.7mm, 13mm and 20mm armor-piercing projectiles. Chemical composition, heat-treating methods, inspection, ballistic tests, etc., are described.

The contents of this report exemplify the manufacture of light armor by the Japanese.

SUMMARY

ORDNANCE TARGETS

JAPANESE ORDNANCE RESEARCH, TESTING, AND TRAINING

Research and developments in ordnance were directed by the Technical Department of the Japanese Navy Ministry. This report outlines the methods of this department and its relationship to other contributing units.

It was noted that most of the highly trained technical personnel received their training at the TOKYO Imperial University.

Testing was inadequate and tolerances were broad. Dynamic tests of directors and computers could not be conducted until after installation aboard ship. However, complete fire control transmission tests were conducted after investigation and the results published. A sample of such a test may be examined in NavTechJap Documents, Nos. ND21-3429 and ND21-3430, which have been forwarded to the Washington Document Center (Enclosure C).

A good gunnery school existed at YOKOSUKA and is fully described in this report.

SUMMARY

ORDNANCE TARGETS

JAPANESE ORDNANCE RESEARCH, ARTICLE 1
GUNFIRE TESTING OF BOMBS AT THE
KAMEGAKUBI PROVING GROUND

The Japanese Navy developed a technique for impact testing of aircraft bombs and components, using ordinary bomb bodies provided with an adapter, stabilizers and gas seal to fit a special smoothbore gun.

SUMMARY

ORDNANCE TARGETS

JAPANESE ORDNANCE RESEARCH - ARTICLE 2
EXPERIMENTAL RESEARCH ON SUPER HIGH VELOCITY GUNS AND PROJECTILES

The following paragraphs, quoted from a translation of a Japanese document upon which this report is based, present the opinions of the Japanese technicians who conducted experimental research on super high velocity guns and projectiles:

> Research was successful on a rifling process for barrels having a tapered section. Two experimental guns constructed on the basis of 'Gerlick's principle' were used. A projectile with a satisfactory trajectory at a muzzle velocity of 1300 m/sec was designed, but bore pressures encountered were too high. Further experimentation is necessary on the length of the barrel, since it has been proved that the bore space is too small in relation to the cartridge case volume in the present experimental guns.
>
> It was found that the rate of burning of the propellant was slow, and because of excessive muzzle pressure, it was shown to be disadvantageous to make full use of the effective propellant gas.
>
> The present propellant is 5.0 or 6.0 cord propellant. However, the firing results obtained by mixing this with a small amount of fine grain powder were found to be slightly better. There is need for a continuance of research for a more suitable propellant.
>
> The static pressure feed drag of the projectile in the barrel was measured and the energy consumed in the bore due to frictional drag determined. When these results were compared with the muzzle energy, it was found that the problem was not as important as it had first appeared to be.

SUMMARY

ORDNANCE TARGET

JAPANESE ORDNANCE RESEARCH
ARTICLE 3 - TORPEDO MODELS

All experiments with torpedo models were made at the First Naval Technical Arsenal, YOKOSUKA, Japan. A large water tunnel was constructed during the war with the intention of making detailed studies of torpedo shapes and characteristics. During the last few months of the war, some inconclusive data were obtained on lift, drag, and pitching moment using one-fifth and one-tenth scale models of torpedoes, but much time had apparently been spent testing, redesigning, and calibrating the tunnel equipment itself. For measuring the variables the principle of magnetostriction was employed.

For the study of entrance characteristics and underwater trajectories of various shapes of torpedoes, scale models of aircraft torpedoes were launched into a water tank by means of a catapult. Compressed air was used to operated the catapult, and the angle of launching was easily adjusted. The underwater trajectory of the torpedo could be observed from large windows in the side of the tank, and photographs were taken of both the air travel and underwater run. The model launcher and water tank had been in use since 1943, and many studies were made of the relations between launching velocity, angle of launching, model shape, and water trajectory.

SUMMARY

ORDNANCE TARGETS

JAPANESE ORDNANCE RESEARCH - ARTICLE 4
LABORATORY PROCEDURES

A brief description of the Japanese Naval Proving Ground is given, with references to experimental work in other localities.

In general, there appeared to be a tendency on the part of the Japanese Navy to accept laboratory results without confirmation by tests under service conditions.

SUMMARY

ORDNANCE TARGETS

JAPANESE RESEARCH IN AIRBORNE ACOUSTICS AND EARTHWAVES

Little fundamental research on airborne acoustics and earthwaves has been conducted in Japan in recent years. Research emphasis has been placed on underwater sound. Acoustic aircraft detecting equipment has remained unchanged since 1931. A sound locator used to determine the position of guns was developed in 1938 from German design; no novel applications of acoustics are evidenced in its construction or operation. Minor research on earthwaves had been started but was dropped; hence no ordnance equipment based on it has been developed. Experiments on an acoustic altimeter were conducted in 1935 but failed to lead to the development of usuable equipment. Some progress has been made in the development of an acoustic proximity fuse. Research programs dealing with propagation, attenuation, physical and physiological effects of sound were so minor in scope that there is no evidence of important information having been gained from them.

SUMMARY

ORDNANCE TARGETS

JAPANESE ORDNANCE EQUIPMENT
INTERNAL RECORDERS, WAVE AND TIDE METERS,
TORPEDO RECOVERY GEAR, UNDERWATER LOCATORS

The Japanese had no practical or adequate equipment for making wave observations. Attempts were being made to apply methods of serial photography in obtaining wave contours, but this project was terminated at the end of the war without gaining information concerning its success. Tide and current meters in use were either importations from England and the United States or direct copies of such equipment. Japanese instrumentation has been such that internal recorders were rarely used, one exception being a torpedo depth, roll, and speed recorder of standard design. No special torpedo recovery gear was noted; Japanese methods were conventional. Considerable research had been devoted to underwater locators and several types had been developed. This subject is not discussed in this report. The only information gained in this investigation is that the Japanese were using standard equipment and had developed no new or improved apparatus.

SUMMARY

ORDNANCE TARGETS

EFFECTIVENESS OF JAPANESE AA FIRE

Neither the information obtained from the Japanese Army or Navy can be considered reliable. The information from the Navy is probably more reliable than that obtained from the Army. The data from the Navy, however, is mostly from their ground batteries, since records of planes shot down by ships at sea are still more unreliable, and few figures have been quoted.

There is little doubt that the Japanese relied to a large degree on hypothetical cases for analysis, rather than practical methods with sleeve targets or the like, and it is doubtful whether much real value would have been obtained from their records if they had been available.

It can therefore be said with considerable confidence, resulting from interrogations, that their methods of analysis were greatly inferior to those existing in Allied naval establishments.

SUMMARY

ORDNANCE TARGETS

JAPANESE 18-INCH GUNS AND MOUNTS

The 46cm (18-inch) triple mount was the first large mount ever designed and produced by the Japanese which was not practically identical with the large British mounts designed prior to World War I and built for the battleship KONGO. In almost every part of the 18-inch mount a complete departure from this old design was made. For shell and powder hoists the Japanese 18-inch mount was copied, but, generally speaking, the mechanisms were unique. Compared with British and U.S. practice, (16-inch, 14-inch and 8-inch), the mount was simple in design. It had no complicated hydraulic safety interlocks and comparatively few mechanical ones. Reliance was placed on good drill to avoid accidents. Even taking into account the size of the gun, the general impression gathered is that an unduly large factor of safety had been allowed in the design of the turret machinery as a whole, resulting in a very heavy mount, the total revolving weight of one turret being 2,510 metric tons.

A very satisfactory rate of fire was obtained for a gun of this size: 1.5 rounds per minute at full elevation. A maximum range of slightly under 46,000 yds was obtained with a 3,220 lb shell.

The most interesting features of the mount were (a) the method of stowing and moving shells about the shell and shell-handling rooms using a fairly simple, but bulky and heavy mechanism; (b) the powder cage and rammer, designed to enable a full charge to be loaded by a single rammer stroke; and (c) the attachment of the elevating piston rod to the slide which was designed to avoid the necessity for a complicated slide locking gear, and to reduce the loading cycle time by cutting out the time usually required for locking and unlocking the slide.

Other mechanisms worthy of note are as follows:

1. The powder bogie and mechanism for transferring powder from the fixed to the moving structure.
2. The gunhouse shell bogie and rammer.
3. The wormless training gear, with its "coaster" gear substitute for the normal friction discs.
4. The electric cable leading-in gear.

It was stated by the Japanese that considerable attention had been paid to flashtightness throughout the turret. Although this was probably not up to U.S. and British standards, it is difficult to give a definite opinion on this point without having seen a completed turret. The performance of the turret in service was considered by the Japanese to have been very satisfactory with the exception that large quantities of lubricating oil, which the Japanese could ill afford, were required by the training and powder hoist gears. Spreads of salvos were reasonably small, (about 500 to 600 yards at maximum range). The blast effect, particularly on the bridge, was found to be very severe.

The 18-inch guns of YAMATO AND MUSASHI were used in action against aircraft and for bombardment.

SUMMARY

ORDNANCE TARGETS

JAPANESE NAVAL GUNS AND MOUNTS
ARTICLE 1 - MOUNTS UNDER 18"

As a generalization it may be said that all Japanese naval turrets and mounts are of sound and practical design and construction, but have no really outstanding features. With perhaps the exception of the 10cm/65 caliber and 8cm/60 caliber twin Type 98 high angle turret mounts, they are all old-fashioned when compared with U.S. and British standards.

Remote power contact has been used on only one type of mount - for triple 25mm machine guns where a Ward Leonard system is used. No thought whatever appears to have been given to its use on any others. The triple machine gun mount with its Ward Leonard system of remote power contact has also been adapted for use as a 28-barrel 12cm rocket launcher.

It was thought at one time that the Japanese were developing a 6 or 8-inch rapid firing gun. This is not so. The maximum rate of fire of guns above 5-inch caliber was about five rounds per minute, and no projects were in hand to improve on this. It was hoped to design a 12-inch twin turret to be fitted in an oversized cruiser, but designs were never started.

There is no evidence of any of the following features being used, or even being considered for use, by the Japanese:

1. One-stroke ramming into guns using semi-fixed ammunition.
2. Turntable structure fabricated by welding. (Some minor mounts were built with partially welded carriages.)
3. Unequally spaced training rollers.
4. Upward opening breeches (the nearest approach to this is in the center gun of the triple 6-inch turrets, where the breech, which is of the normal swing type, is opened at an angle of about 45° above the horizontal).
5. Cone-type ("hour glass") worms in elevating and training gears.
6. Screw-elevating gears.
7. Triaxial or stabilized mounts.
8. Automatic loading and feeding guns (except 40mm Bofors and below).
9. Local control by joystick. The only approach to a joystick is the control used on the triple 25mm machine gun director. (See NavTechJap Report "Japanese Fire Control", Index No. 0-29.)

There are no methods of rapidly changing the type of shell in use, other than loading one gun in a turret with one kind of shell and the other(s) with another type. The method of fire control when using barrage fire is separately reported on in NavTechJap Report Index No. 0-29. No guns larger than 5-inch caliber use fixed ammunition.

In the 14 and 16-inch turrets, all angle loading (up to 20° elevation) is used, the method adopted being identical with that on the British 15-inch turrets. In these 14 and 16-inch turrets, and also in the 18-inch turrets, the ring bulkhead is divorced from the ship's structure at armour deck level and above. Although consideration had been given to the design of a similar construction for 6 and 8-inch barbettes, to avoid deformation due to working of

SUMMARY

ORDNANCE TARGETS

JAPANESE NAVAL GUNS AND MOUNTS-ARTICLE 2
AA MACHINE GUNS AND MOUNTS

The machine gun armament used by the Japanese Navy on surface craft, submarines, land bases, and for landing forces ranged in caliber from 40mm to 7.7mm. There were no guns having exceptionally high cyclic rates or muzzle velocities. The 25mm Hotchkiss gun was by far the most important of the six service guns described in this report. The 25mm gun was employed in single, twin, and triple assemblies on practically every type of vessel, constituting a major part of the defense for air strips. The Japanese rated the 25mm gun second only to the 10cm, Type 98 for anti-aircraft defense and considered it to be only slightly less effective. The installation of 40 triple and 30 single mounts of 25mm caliber on the newer battleships and aircraft carriers demonstrates that the Japanese Navy was keeping pace with the other major navies in the policy of increasing tremendously the anti-aircraft defense. However, the development of larger, faster firing guns with more accurate control was practically negligible, in spite of the fact that the need was recognized as early as 1942.

No machine gun mounts were equipped with power drives except some of the 25mm multiple type mounts. All power driven mounts were remote controlled by the Type 95 director and modifications (Shageki Sochi) which is based upon the French "Le Prieur" mechanized sight for computing. Fire control of mounts not having power drives was accomplished by the open ring sight and tracer projectiles. All aiming or control equipment appeared to be deficient for close range attacks of modern high-speed aircraft. The "Le Prieur" sight was not calibrated for sufficiently high target speeds; but even if it had been, the power drives were of insufficient capacity to follow.

The Japanese had recognized the advantage of installing many light-weight, free-swinging mounts. However, the size of the average Japanese man was a handicap in the use of this type of mount. The Japanese had not been able to design a free swinging mount carrying more than one gun, or an easily controllable mount in the 25mm size larger than the triple style. The effectiveness of a number of director-controlled guns was considered superior to that of an equal number of manual-controlled mounts, either handwheel or free swinging types.

All machine guns covered by this report are copies of foreign designs with no radical modifications. The French influence was predominant as a result of several Japanese officers having been sent to France, where they studied designs and production methods.

The scarcity of high quality materials and machine tools prevented satisfactory mass production methods and the adoption of new designs. For example, the 40mm Bofors, which was captured in 1942 and considered a desirable addition to the armament, was not produced in time to be used in the war. Also, the few assemblies completed would not function satisfactorily.

SUMMARY

ORDNANCE TARGETS

JAPANESE FUSE-SETTING EQUIPMENT

The Japanese Navy used only one type of automatic fuse-setting machine. It was designed in 1933 and later modified to its present form. It is fitted to the breech face of the gun and the fuse is set when the round is in the loading tray being transferred to the loading position. This enables a dead time of only two seconds to be used in the computer. The machine is a very simple mechanism and, compared with most other fuse-setting machines, is light and compact. The over-all error in fuse setting is about 0.09 to 0.41 seconds of fuse time. Experiments were being carried out at the end of the war to reduce this error by use of a fuse having a plain white metal fuse-setting ring, but these experiments were not satisfactorily completed in time to use the new type of fuse. Some documents, giving details of the factors affecting the accuracy of these machines, have been collected but not yet translated. The figures given above are, therefore, liable to amendment. Had the Japanese been able to improve the accuracy of these machines they would undoubtedly have had as far back as 1934, an automatic fuse-setting machine superior to any mechanical fuse-setting machine in use by the Allies up to the end of the war.

SUMMARY

ORDNANCE TARGETS

JAPANESE MUZZLE BRAKES AND FLASH HIDERS

In 1925 the Japanese Navy developed its first muzzle brake for the 12cm gun. The device was never adopted and the whole idea of muzzle brakes was discarded because: (1) this muzzle brake was unsatisfactory, and (2) muzzle brakes in general were considered unnecessary.

The Navy again studied the problem of muzzle brakes in 1942, when, in order to make the Type 96, 25mm AA gun adaptable for aircraft use, it had to develop a means of reducing the recoil energy. Among other modifications, a muzzle brake, which experimental tests indicated could reduce the recoil energy by 35%, was installed. The completed gun, designated Type 4 25mm aircraft machine gun, was never adopted; hence the muzzle brake remained untried in service.

In 1945, the Navy designed a muzzle brake of the simple ring type, in order to permit the use of the 12cm cannon and the 12cm howitzer with the Type 97 Medium tank. The assemblies were the results of a demand for a self-propelled cannon and a self-propelled howitzer. The muzzle brake was considered satisfactory for these assemblies, which, incidentally, never were used in service. Because of the severe blast diverted towards the breech, it was considered absolutely useless for shipboard installation.

The Japanese Navy did not design a satisfactory flash hider. It did adapt the German Rheinmetal design to the Type 96 25mm AA machine gun with fairly satisfactory results, and to the Type 5(Bofors) 40mm machine gun with unsatisfactory results.

SUMMARY

ORDNANCE TARGETS

JAPANESE SHIPBOARD ROCKET LAUNCHERS

Only one of the rocket launchers used by the Japanese Navy was of any interest. It was a triple 25mm machine gun mount, remotely controlled by a Ward Leonard System, which had been modified in July 1944 to fire twenty-eight 12cm rockets, weighing 49½ pounds each, to a range of approximately 3280 feet vertically and 1640 yards on the surface.

SUMMARY

ORDNANCE TARGETS

HYDRAULIC PUMPS
IN JAPANESE NAVAL ORDNANCE

Hydraulic pump motors used in Japanese ordnance are all of conventional and well known design. They are known to the Japanese mostly as "Johnny" engines - a probable corruption of the name "Williams-Janney" engines. They have no high speed (over 1000 RPM) small or large pumps except the 3600 hp turbo direct drive, impeller type pumps used for the 18" turrets of YAMATO and MUSASHI. These pumps were designed and the prototype pump for YAMATO was built in Switzerland by Brown Boveri. Their normal speed is 3700 RPM.

All data given in this report are liable to be revised after translation of the numerous documents sent to the Washington Document Center, since a vast amount of research has been done by the Japanese in recent years, both on hydraulic engines and the fluids used as pressure media. The only fluids so far known by the author to be used in Japanese naval ordnance are: the standard mixture of distilled water and Argolene oil for 14" turrets and above, and mineral oil for 8" turrets and below.

SUMMARY

ORDNANCE TARGETS

JAPANESE NAVAL GUNS

Manufacturing and design data are given for all Japanese naval guns larger than 40mm which could be considered operational during the war.

In general, Japanese naval guns were of conventional design and construction; a 10cm (3.94 in) /65 caliber gun with a muzzle velocity of 3300 feet/second was ballistically the most advanced. In the last two years of the war, extensive use was made by the Japanese of low-nickel "substitute" steel for gun barrels.

SUMMARY

ORDNANCE TARGETS

DEFENSE OF TSUSHIMA AND ENTRANCE TO SEA OF JAPAN

The defenses of TSUSHIMA Strait and KOREA Strait are capable of interdicting casual passage of hostile shipping, but would not prevent determined naval task forces from using the straits for a combat mission or logistic support. These defenses are of sufficient strength only to support naval or air forces in the area and would affect, but not dominate, the tactical situation. The most conspicuous weakness of these defenses is lack of modern fire control and battle communications.

Ordnance material on TSUSHIMA is of old design and is, therefore, not of technical interest and is not worthy of serious study.

SUMMARY

ORDNANCE TARGETS

JAPANESE FIELD AND AMPHIBIOUS EQUIPMENT
KYUSHU DEFENSE SYSTEMS

With the increasing loss of its ships, the Japanese Navy placed more and more emphasis on ground and defensive weapons. Some ships' guns were converted to howitzers or placed on tanks. Large quantities of crude mortars of various sizes and types were manufactured. The newest amphibious tank was converted into a torpedo-launching vehicle.

Both the Japanese Army and Navy attempted to copy the United States "Bazooka" (rocket launcher) and M1 rifle. The Army version of the former was successful, but neither version of the latter proved to be a satisfactory weapon.

The Navy's 12cm multiple rocket launcher was a crude copy of the German "Nebelwerfer", and the 28-barrel, 12cm, electrically-operated, shipborne, anti-aircraft rocket-launcher proved to be the latest and most satisfactory of the Japanese types.

Although a light, crude 8cm mortar was in mass production for use by the Navy ground forces, no radically different mortars were encountered.

A mobile anti-aircraft gun, the Type 4, 75mm, was the newest of its kind in the Japanese Army. It is similar to the German Flak 41. The Type 3, 12cm anti-aircraft gun was considered effective against U.S. B-29's and hence, research which had been previously started on a newly built Type 5, 150mm anti-aircraft gun was halted.

Of the Japanese tanks inspected, the Type 3 medium tank probably posed the greatest threat to Allied armor. A Type 4 medium tank was reported, as well as a Type 5 medium tank equipped with an 88mm gun, but neither was found complete. As a whole, it may be said that Japanese armor was greatly inferior to that of the United States.

The Japanese plan for the defense of KYUSHU was characterized by rigid defense of the beaches, lack of depth, and a comparatively small reserve for counterattack.

Inspection of the Sasebo Air Defense Center revealed that it operated with moderate efficiency. Its principal defects were as follows:

1. Low performance of search radar.
2. Lack of IFF.
3. Lack of fighter direction radar and control.
4. Poorly equipped night fighters.
5. Low degree of accuracy of fire control radars.
6. Lack of automatic fire control equipment.

SUMMARY

SHIP AND RELATED TARGETS

CHARACTERISTICS OF JAPANESE NAVAL VESSELS
ARTICLE 1 - SUBMARINES

This article describes the various types of Japanese submarines used in or constructed during the war.

It has been prepared with an effort to provide the type of information which is of general interest to those involved in the design of submarines. While all classes of submarines are listed and their characteristics tabulated, the assembly of complete, detailed descriptions of the submarines has been omitted. This data can best be obtained from the plans listed in enclosure (A), from the reports of Submarine Squadrons 13 and 20, and from the plans, photographs, and information books forwarded by those activities.

The information includes a history of the development of the various classes of Japanese submarines, and comments on the more interesting types, the more interesting features, and the less interesting features. Novel installations are described where appropriate.

The article is chiefly concerned with hulls and machinery.

SUMMARY

SHIP AND RELATED TARGETS

CHARACTERISTICS OF JAPANESE NAVAL VESSELS,
ARTICLE 2 - SURFACE WARSHIP MACHINERY DESIGN

Aside from DD SHIMAKAZE, the latest destroyer and the only ship of her class, there were no really new design features in main machinery plants of major Japanese combatant surface vessels since the late thirties. Design trend was to open firerooms with doublecase boilers. There were centerline bulkheads in practically all main machinery and boiler spaces of cruisers and larger vessels.

The conventional arrangement was to group the firerooms forward of the engineroom. In all later designs the main turbines were of two general types: in battleships, two H.P.'s and two L.P.'s operating in parallel with a cruising turbine connected to one of the H.P.'s in each space through a reduction gear and jaw clutch; and in other ships, an H.P., I.P. and L.P. with a cruising turbine driven through its own gear and a jaw clutch on the outboard shafts only.

The main lubrication system supplied all main turbine auxiliaries except those too low to drain to the main sump. There was a central lubrication system for all auxiliaries in each fireroom.

Apparently a concerted effort was made to install main plants which were economical at cruising speeds even at the expense of considerable increase in weight.

There were emergency steam and exhaust connections to main lube oil pumps from adjoining spaces. Main generators were located outside the machinery spaces. There were no fuel oil booster pumps and no deaerating feed tanks.

Auxiliaries were small, compact, and accessible. Machinery spaces were not cramped. With the exception of diesel generators no equipment appeared to have given much trouble. However, the fireboxes of the few boilers open for inspection did not show evidence of heavy or prolonged steaming.

SUMMARY

SHIP AND RELATED TARGETS

CHARACTERISTICS OF JAPANESE NAVAL VESSELS - ARTICLE 3
SURFACE WARSHIP HULL DESIGN

This report discusses the procedure and methods employed in the design of Japanese warships. Specifically, Part I of the report describes the procedure used to change the requirements of the Japanese General Staff into a firm ship design. For a proper understanding of this procedure, the organization of the Navy Ministry and the Navy Technical Department is given.

Part II discusses the detailed elements of design and the method used by the Japanese to design these elements to withstand the service to which their warships were submitted.

Part III gives the characteristics of the latest design classes of the following types of vessels: battleships, aircraft carriers, cruisers, destroyers, escort vessels, and a Japanese version of a landing craft which, in size, was midway between an LST and LSM.

SUMMARY

SHIP AND RELATED TARGETS

CHARACTERISTICS OF JAPANESE NAVAL VESSELS - ARTICLE 4
SURFACE WARSHIP MACHINERY DESIGN (PLANS AND DOCUMENTS)

Piping systems and the location of the machinery were the most interesting features of Japanese warship design. Documents concerning typical ships of each warship type were studied and generally indicated the followi:

BB YAMATO: The firerooms were an outgrowth of NACHI class (CA). The ma auxiliary steam and feed systems were, however, different.

CA MOGAMI: It is probable that the piping system of this class and tha of the UNRYU class (CV) were much the same.

ATAGO class (CA): Ships of this class were much like that of NACHI clas This class moreover, indicates the gradual change that took place in Japanese cruiser machinery design.

CL OYODO: This ship, the latest Japanese CL, followed the general arra ment of six-boiler cruiser. Its main plant arrangement was very similar to AGANO class. It should be noted that OYODO had center line bulkheads in the forward boiler rooms and after enginerooms.

AGANO class (CL): The arrangements and system of this class were genera typical of other contemporary Japanese vessels. It differed but slightly from OYODO.

DD TERUTSUKI: She was typical of the latest DD design.

DD KAGERO: The machinery arrangements were very similar to TERUTSUKI class.

DD SHIMAKAZE: The machinery arrangements were much like that of TERUTSUKI class. It was an experimental type as far as the engineering plant was concerned.

MATSU class (DE): This class was the first and only class of warships t have a machinery arrangement of fireroom - engineroom - fireroom - engineroom. There was no cross connection between the high pressu sides of the main feed systems of the two boiler rooms, or the hi pressure sides of the fuel oil systems so characteristic of other Japanese vessels. The float control tank on the condensate syste was also different. Cruising turbines and connected lines were re moved after they were found to be impractical.

UNRYU class (CV): The main machinery plant was somewhat similar to OYOI but of greater horsepower. The extensive firemain system in the machinery spaces was peculiar to carriers and more like the syste of U. S. naval vessels insofar as the piping layout was concerned.

SUMMARY

SHIP AND RELATED TARGETS

CHARACTERISTICS OF JAPANESE NAVAL VESSELS - ARTICLE 4
SURFACE WARSHIP MACHINERY DESIGN (PLANS AND DOCUMENTS)

Piping systems and the location of the machinery were the most interesting features of Japanese warship design. Documents concerning typical ships of each warship type were studied and generally indicated the followi:

BB YAMATO: The firerooms were an outgrowth of NACHI class (CA). The ma auxiliary steam and feed systems were, however, different.

CA MOGAMI: It is probable that the piping system of this class and tha of the UNRYU class (CV) were much the same.

ATAGO class (CA): Ships of this class were much like that of NACHI cla This class moreover, indicates the gradual change that took place in Japanese cruiser machinery design.

CL OYODO: This ship, the latest Japanese CL, followed the general arran ment of six-boiler cruiser. Its main plant arrangement was very similar to AGANO class. It should be noted that OYODO had center line bulkheads in the forward boiler rooms and after enginerooms.

AGANO class (CL): The arrangements and system of this class were genera typical of other contemporary Japanese vessels. It differed but slightly from OYODO.

DD TERUTSUKI: She was typical of the latest DD design.

DD KAGERO: The machinery arrangements were very similar to TERUTSUKI class.

DD SHIMAKAZE: The machinery arrangements were much like that of TERUTSUKI class. It was an experimental type as far as the engineering plant was concerned.

MATSU class (DE): This class was the first and only class of warships t have a machinery arrangement of fireroom - engineroom - fireroom - engineroom. There was no cross connection between the high pressu sides of the main feed systems of the two boiler rooms, or the hi pressure sides of the fuel oil systems so characteristic of other Japanese vessels. The float control tank on the condensate syste was also different. Cruising turbines and connected lines were removed after they were found to be impractical.

UNRYU class (CV): The main machinery plant was somewhat similar to OYOI but of greater horsepower. The extensive firemain system in the machinery spaces was peculiar to carriers and more like the syste of U. S. naval vessels insofar as the piping layout was concerned.

A fire control radar for practical installation on board ship had been developed or obtained from the Germans. Search radar was in use on all combatant vessels but was about equivalent to British or U. S. search radar developed prior to 1940.

Japanese equipment for infra-red signalling and detection, and for echo ranging is considered equivalent to the best British and U. S. practice.

Japanese design tended to use steam driven equipment as much as possible: the anchor windlass is steam driven, almost all main engine auxiliaries are driven by small high speed turbines, and turbo-generator auxiliaries are largely shaft driven. The rudder, turrets, elevators in aircraft carriers, and ventilating fans are electrically operated.

The capacity of the ship's service power and plant in Japanese vessels is approximately 25% of that installed in the same class vessel in the U. S. Navy. This plant is divided into four to eight units, three-quarters of which are turbo driven and the remainder are diesel driven. The units are generally spread throughout the ship, behind armor, and are separated by watertight bulkheads. The earlier destroyer classes do not have segregated power plants; all the capacity is concentrated in one compartment.

The power system on major combatant vessels (cruisers and upward) is 220 volts D.C. with a ring main distribution system. The exceptions are the cruiser OYODO which had a 450 volt, 3 phase, A.C. ring main installation and the carrier TAIHO which had a 450 volt, 3 phase, A.C. in-line switchboard installation. Destroyers, since 1935, have been designed with a 220 volt, 3 phase, A.C. power system and an in-line switchboard distribution system. The D.C. ring main installation, copied from British practice, is difficult to maintain and vulnerable to damage. The A.C. in-line switchboard installation closely duplicates U. S. practice. Japanese Navy engineers are convinced that the moderate voltage, 3 phase, A.C. ship's service power plant with an in-line switchboard distribution system is best for combatant vessels for the following reasons:

1. Lower maintenance requirements
2. Lighter weight
3. Less vulnerable to damage
4. Commercial equipment is more readily available

Interior communication equipment is almost entirely copied from obsolete foreign design. The original intention allegedly was to install a simple I.C. system. This was not done and due to poor planning and design, there are insufficient telephone and announcing circuits while I.C. equipment of other types are more than sufficient.

Japanese vessels are equipped with less than one-half the telephones carried by similar U. S. vessels. Most of these telephones are on cumbersome and vulnerable exchange circuits. Announcing and teletalk circuits provided on Japanese vessels are less than one-quarter those provided on U. S. vessels of the same type. This voice communication is not sufficient and must be supplemented by voice tubes and runners.

Telegraph circuits are numerous and in several cases are duplicated throughout the vessel. This unquestionably results in confusing orders. Indicators on many I.C. circuits such as the rudder angle indicator are distributed liberally throughout the vessel and are located in many cases where the indication is neither useful nor necessary.

The interior communication system is not well planned.

The fire control system is elementary. The parameters of the fire control problem, obtained optically at the directors or by ship control instruments, are transmitted to plot or the turrets by selsyn circuits or by telephone. These parameters are set into the computer manually. There are no automatic inputs to the computer. The solution of the fire control problem is transmitted to the turrets from either the director or plot by a follow-the-pointer system. There is no provision for automatic control of turrets in either train or elevation. The Japanese developed only one director which could control automatically. This was used for an anti-aircraft guns only.

A stable platform was maintained manually for the range finder by means of optical viewers trained on the horizon fore and aft and athwartships.

This simple fire control system did not require a fire control switchboard and only the most elementary electrical circuits.

Japanese naval engineers were cognizant of many of the deficiencies of their vessels. Some of this knowledge is, unquestionably, hindsight. However, they seemed unable to correct speedily and thoroughly even those defects which were recognized. The factor which contributed most to their condition was insufficient production facilities. Nevertheless, full advantage was not taken of the production facilities which were available. Ship building in the Japanese Navy was not well organized and planning was incomplete. There seemed to be no authority to formulate opinion and make plans and decisions. Constant and continuous delays in adopting good practice was the result.

The Japanese Navy made little use of the skill, talent, and experience available in commercial companies. Civilian engineers were seldom consulted and never were taken into the confidence of the Navy. There seems to be no doubt that, had the Japanese Navy abandoned its policy of secrecy toward commercial companies and sought to make use of the talent and experience of the engineers in these companies, the equipment for shipboard installation would have been of better quality and would have given improved performance.

SUMMARY

CHARACTERISTICS OF JAPANESE NAVAL VESSELS
ARTICLE 6 - SUBMARINES, SUPPLEMENT I

This article is supplementary to NavTechJap Report, "Characteristics of Japanese Naval Vessels", Article I, Index No. S-01-1. The additional details supplied in this article are chiefly concerned with Japanese attempts to increase the submerged speeds of their submarines and the attempt to speed up the production of submarines by shifting to HA-201 class design.

Owing to the Japanese liberal use of technical terms, some data obtained during the basic investigation of this article does not agree completely, but as the result of cross-checking, it is felt that the data in the enclosures are the correct figures.

SUMMARY

SHIP AND RELATED TARGETS

CHARACTERISTICS OF JAPANESE NAVAL VESSELS - ARTICLE 7
SUBMARINES, SUPPLEMENT II

This report describes the various types of Japanese submarines and the noteworthy equipment installed on them. A more detailed description of the I-400 and HA-201 class submarines is given than has been provided in Articles 1 and 6 of the series on the characteristics of naval vessels. Detailed information is provided on the hull and engineering equipment.

SUMMARY

SHIP AND RELATED TARGETS

CHARACTERISTICS OF JAPANESE NAVAL VESSELS - ARTICLE 8
PORTABLE GASOLINE-DRIVEN PUMP UNIT

The portable gasoline-driven pump unit described in this report was similar in purpose to the U.S. Navy "Handy Billy" but was inferior in output and pressure and weighed substantially more. Since it represents a different approach to the same fundamental problem, it is felt that some benefits can be derived from a study of its construction.

The Japanese Navy did not consider this unit completely satisfactory but made no attempt to improve it, owing to the pressure of more important problems.

SUMMARY

SHIP AND RELATED TARGETS

CHARACTERISTICS OF JAPANESE NAVAL VESSESLS
ARTICLE 9 - UNDERWATER PROTECTION

This report is primarily concerned with experimental work done by the Japanese on underwater explosions.

In underwater side protection, the Japanese had developed empirical formulae for the thickness of protective bulkheads and bulge widths. These formulae were used with considerable confidence, since they were based on model and full scale experiments.

They had arrived at systems differing considerably from both U.S. and British with regard to methods of protection. When using liquid layers, which they considered to be the best, they placed them next to the protective bulkhead because their model experiments had shown this to be advantageous.

In some ships, such as YAMAMOTO, the air layer method was still used because the protection was essentially designed against diving shells. The bulges were then considered to be adequately strong without water layer protection.

A theory for the failure of submarine hulls, based on the relation between period of vibration of the hull and the duration of the pressure pulse, was developed. This theory was considered to have success practically, but was still some distance from the truth.

It should be noted that all charges used were of picric acid and the maximum charge against which protection had to be designed was considered about 500 kilograms.

SUMMARY

SHIP AND RELATED TARGETS

CHARACTERISTICS OF JAPANESE NAVAL VESSELS

Japanese landing craft consisted in the main of small motor propelled boats. The DAI HATSU type, a 14 meter boat with double bow and raised ramp, constituted about 85% of the total number. It was used for landing small tanks, guns, material or troops. With other variants of the type these boats were used for ferrying from transports anchored in deep water to beachheads. For a large scale landing they were carried in a DAI HATSU transport, similar to and probably used as an escort carrier at other times.

The Japanese Navy had special fast landing craft for sporadic raiding and supply purposes, viz. the NITO YUSOKAN, a fast tank landing craft capable of 22 knots which carried four DAI HATSU on the stern.

The Japanese Army had in addition a number of freak assault craft, which do not appear to have played any significant part in the late war, and have not therefore been covered.

SUMMARY

SHIP AND RELATED TARGETS

CHARACTERISTICS OF JAPANESE NAVAL VESSELS - ARTICLE 11
MAIN AND AUXILIARY MACHINERY

A review has been made of a number of blueprints of assemblies and details of the propulsion and auxiliary machinery for Japanese naval vessels.

In addition, a statement of the latest design factors has been obtained from the Fifth Section (Machinery Design) of the Technical Department of the Japanese Navy Ministry.

Except perhaps for the compact arrangement of the cylinder and nozzle block, the design of auxiliary turbines and gears does not present any advancement that is worthy of more than passing attention. Certain features such as separate pinion sleeves have been tried before in the United States and have not proved satisfactory. The general design requires more production man-hours and is more costly than are the types that are presently available in the U.S.

SUMMARY

SHIP AND RELATED TARGETS

CHARACTERISTICS OF JAPANESE NAVAL VESSELS
ARTICLE 12-BOILERS AND MACHINERY

No new or positive information of the details of design and construction of boilers and machinery was developed by this investigation. The general status of Japanese boiler and machine design was on a rather low level. What was good appeared to have been copied from United States of British design - it was not Japanese. German design influence strangely seemed to be lacking.

There was an apparent lack of knowledge of furnace and steam drying design. Wasted furnace volume was the basic reason for Japanese ships having only half the shaft power of U.S. Navy ships of similar tonnage. Inability to design boilers for dry steam delivery to the superheaters caused excessive outage for boiler and machinery repairs.

Lack of application of fuel-economy principles sharply reduced the cruising radii of ships.

The use of high-resistance air-heaters, rather than economizers, seriously hampered flank-speed running.

Automactic control was seldom used.

The lack of fool-proof equipment suggested a reluctance to use such things.

The fine arts of oil-burning were nowhere in evidence.

Design elements very often appeared to be the work of designers unskilled in operation. Evidence of lack in dual training-theory and its application seemed to crop up everywhere.

SUMMARY

SHIP AND RELATED TARGETS

CHARACTERISTICS OF JAPNESE NAVAL VESSELS
ARTICLE 13 - GAS TURBINES

The Japanese Navy attempted to design a gas turbine for PT's and similar craft. One unit which was being tested when the war ended, was actually a reaction steam turbine running at low pressure but with a high temperature fluid. Two-thirds of the total power generated was consumed in driving the rotary air compressor and the fuel pump. It had been anticipated that air in the ratio of 75 pounds of air to one pound of 18,000 BTU fuel would be taken in at 70°F, compressed to 30 psi gage, and delivered to the furnace at 300°F. The furnace was to have delivered the gases of combustion to the turbine at 30 psi gage and 1200°F. No successful runs were made.

Designing turbines and compressors always has been relatively simple but a design for a furnace which will perform economically the task assigned to it has not been developed. The Japanese were no exception. They did not succeed in developing a satisfactory furnace or burner, nor did they design the remainder of the unit with anything beyond standard textbook ideas.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE SUICIDE CRAFT

Part I - SHINYO - "Special Attack Boats"

Only Type 1, Mod. 1, and Type 5 SHINYO boats were actually used as suicide special attack boats. Types 2, 3, 6, 7, and 8 were in design and experimental stages in an endeavor to attain better performance. Type 4 was never designated because of the superstition attached to "Shi", its Japanese pronunciation, which can also mean "death".

Type 1, Mod. 1, a 5.1 meter, single-man, single engine, 23 knot, inboard motor boat, carrying a 270kg explosive charge in the bow, was later supplemented with the Type 5, designed as a "division leader". Type 5 was a 6.5 meter, two-man, two-engine, 25 knot, inboard motor boat, carrying a 270kg explosive charge in the bow, and equipped with radio.

The conclusion of the war ended the production of the successfully tested Type 8, which was an 8.0 meter, three-man, three-engine, 23 knot, inboard motor boat, designed as a "squadron leader". This non-suicide SHINYO boat was built to lead several divisions of Type 1, Mod. 1 SHINYO, each division in turn to be led by a Type 5 SHINYO. The Type 8 was not equipped with a bow charge, but instead carried two special 28cm launchable torpedoes. The Type 8, like the Type 5, was equipped with radio.

Part II - KAITEN - "Human Torpedo" or "One Man Submarine"

A KAITEN was substantially an altered torpedo, having human control and additional fuel capacity inserted between the torpedo warhead and the torpedo engine.

Only KAITEN Types 1, 2, 4, 5, 6, and 10 were projected or built; the other numbered types were never designated.

KAITEN Type 1 was an altered Mark 93, Mod. 3 torpedo. Type 6 was distinguished by a modification of the forward air flask of Type 1. Type 2 was an unsuccessful version of a KAITEN built as such, and not altered from a torpedo. It was propelled by gases of combustion formed by hydrogen peroxide, hydrogen hydrate, fuel, and cooling water. Type 4 was an unsuccessful attempt to operate the Type 2 KAITEN on conventional Japanese torpedo fuel, namely, kerosene and oxygen. Unsuccessful Type 5 merely contained a modification of the forward air flask of Type 4. Type 10 was a successful adaptation of the Mark 92 electric torpedo, but was perfected too late for mass production.

SUMMARY

SHIP AND RELATED TARGETS

PHOTOGRAPHS OF IMPORTANT JAPANESE NAVAL UNITS AFLOAT

The enclosed photographs include those ships listed in Supplementary List No. 1 Fascicle S-1 of "Inteiligence Targets Japan" (DNI) of 4 September 1945, with the following exceptions:

1. CM CHIKUZEN: Apparently no such ship exists. "CHIKUZEN" is the name of an ancient Japanese province or prefecture and as such, in naval terminology, would have only a major ship named after it. There is a merchant ship, CHIKUZEN MARU, (1150 gross tons) which is classed as a fish carrier. It is possible that this fish carrier was observed operating in mined waters and mistakenly identified as a minelayer.

2. SS I-176 Class: The Japanese designate this class of submarine as the "174" class and include numbers 174-185. All submarines of this class had been sunk in combat by November 1944.

3. Midget Submarines: Complete coverage of this subject is afforded in NavTechJap Reports, "Japanese Suicide Craft", Index No. S-02 and "Characteristics of Japanese Naval Vessels, Article 7 - Submarines - Supplement II", Index No. S-01-7.

4. CA MYOKO and CA TAKAO, both in the SINGAPORE area, were not included in this report because of their inaccessibility.

It should be noted that the designation "CV HAYATAKA (JUNYO) class" should be corrected to "JUNYO class". The Japanese designated the ship and the class "JUNYO" and did not recognize the U.S. use of "HAYATAKA". It seems that this misinterpretation arose from the fact that the characters for JUNYO (隼鷹) can also be read HAYATAKA.

U.S. Navy designation, "APD NO. 1 class" and "LSM NO. 101 class", are named by the Japanese "1st CLASS TRANSPORT" and "2nd CLASS TRANSPORT", respectively.

The above are the only exceptions or corrections noted.

SUMMARY

SHIP AND RELATED TARGETS

REPORTS OF DAMAGE TO JAPANESE WARSHIPS - ARTICLE 2
NAGATO (BB), KATSURAGI (CV), HARUNA (BB), AOBA (CA),
ISE (BB), AMAGI (CV), RYUHO (CVL), OYODO (CL),
TONE (CA), HYUGA (BB), ASO (CV), SUZUTSUKI (DD)

The damage to twelve Japanese warships is described in this report. The ships include battleships, carriers, cruisers, and one destroyer. All except one were damaged by bombs or rockets carried by U.S. carrier aircraft. No torpedoes were employed. This report, accordingly, gives what may be termed a representative picture of the resistance to bombing attack of various major types of Japanese warships, and also of the effectiveness of some types of U.S. bombs. (Rockets were a minor factor except possibly in the case of the destroyer.)

Japanese war vessels, in general, were well designed and constructed with respect to the major features which provide resistance to damage. Despite the fact that all except one of the ships described in this report were immobilized from lack of fuel (they were fully operational in all other respects), they resisted the effects of damage in a manner generally comparable to that of vessels of corresponding age belonging to other major naval powers. Damage control performance was poor by U.S. and British standards.

It is noteworthy that seven of the twelve ships described were sunk. Included are three battleships. All were sunk by bombs. The majority of the bombs which hit obviously were fuzed to detonate on impact or close to impact. While these did extensive topside damage, their effects were not fatal. On the other hand, some few bombs which hit just as obviously were fuzed so that detonation occurred well within the ship, and these, in general, were the direct cause of sinking. The effect of near misses which detonated on impact with the surface was not of direct importance, although in some cases fragment holes in the shell above the waterline permitted progressive flooding when other below waterline flooding put such holes under water. A few bombs, however, detonated well below the surface in close proximity to the hull. In every case where positive data could be obtained, these few bombs were found to have had serious effects.

Much evidence will be found in this report to emphasize that bombs must be fuzed to detonate well within the ship in case of hits, or well below the surface in case of close near misses, if damage resulting in sinking is to be inflicted.

SUMMARY

SHIP AND REALATED TARGETS

REPORTS OF DAMAGE TO JAPANESE WARSHIPS - ARTICLE 2
YAMATO (BB), MUSASHI (BB), TAIHO (CV), SHINANO (CV)

This report describes the loss of each of the four finest warships produced by the Japanese. Three of them, YAMATO (BB), MUSASHI (BB), and SHINANO (CV) were the largest, and, in many respects, the most powerful warships in the world. The fourth, TAIHO (CV), was the latest large carrier to be designed and built as a carrier by the Japanese.

YAMATO and MUSASHI comprised the YAMATO Class. SHINANO, initially, was to have been the third ship of the class. She was converted to a carrier, however, during the building period. The YAMATO Class was designed during the years 1934-37. The ships were built for world conquest, by admission of the Japanese, who were responsible for their design and construction. There were few, if any, restrictions placed on the Japanese naval constructors, who were given the simple directive to produce the most powerful warships in the world. The design was conceived more than eleven years ago, when the largest Japanese warship was NAGATO (BB)*. Under the circumstances, and considering that warship design as a science in the Japanese Navy dates back only to the last year years of World War I, the boldness of the design of the YAMATO Class is impressive. The ships, fully loaded, displaced some 73,000 tons and mounted a 46cm (18.1 inch) main battery.

YAMATO was sunk on 7 April 1945 by U.S. naval aircraft. She was struck by four bombs and at least nine torpedoes. An additional three torpedo hits were reported, but few substantiating details concerning these could be obtained from survivors. The majority of the torpedoes struck on the port side. Some 20 to 30 minutes after the last attack, YAMATO capsized. Her magazines exploded as she rolled under.

MUSASHI was sunk on 24 October 1944 also by U.S. naval aircraft. Although 16 bombs struck her, these had no important effects insofar as sinking was concerned. The Japanese reported that 21 torpedoes (including two duds) struck her, but interrogation of survivors and other Japanese naval personnel produced information from which only ten certain and four possible (but not probable) hits could be identified and located. It is considered that the ten torpedo hits, about equally divided on both sides in the forward three-quarters of her length, were sufficient to have caused her to sink. This occurred some four hours after the last and most vicious attack. She went down by the bow, capsizing when the forward flying (U.S. forecastle) deck was submerged.

On 19 June 1944, a single submarine torpedo struck TAIHO on the starboard side in way of the forward gasoline tanks. Apparently but moderately damaged, an enormous gasoline vapor explosion occurred some five hours later. Following this, progressive flooding caused her to sink bodily with a heavy starboard list. This occurred about 1½ hours after the explosion.

---

*NAGATO displaced about 43,000 tons, fully loaded, after modernization in 1935.

On 29 November 1944, SHINANO was struck by four submarine torpedoes from a single salvo. All hit on the starboard side. She was on her maiden voyage, and was not quite finished. Sealing of holes in bulkheads and decks for electric cables, pipelines, and ventilation ducts had not been completed. Progressive flooding caused her to capsize about seven hours after the attack.

Damage control performance was reasonably good in MUSASHI's case, mediocre in YAMATO's case, and conspicuously poor aboard TAIHO and SHINANO. The faith which the Japanese had in counterflooding of outboard voids to control list was proven to have been misplaced. Counterflooding measures, although reasonably well executed, were inadequate aboard YAMATO and SHINANO. Serious design errors were made in locating TAIHO's forward gasoline tanks beyond the torpedo defense system and immediately below the floor of the forward elevator pit - itself below the waterline when the ship was fully loaded.

The lingering death throes of MUSASHI, in which four hours were required for her to sink after the last attack, is an impressive demonstration that torpedo hits equally distributed on both sides of a capital ship are not as lethal as in the case where they are concentrated only on one side.

SUMMARY

SHIP AND RELATED TARGETS

REPORTS OF DAMAGE TO JAPANESE WARSHIPS - ARTICLE 3
JAPANESE RECORDS OF MAJOR WARSHIP LOSSES

This report contains a summary of Japanese major warship losses. The data contained herein are believed to be accurate, but admittedly are not complete.

Battleships, aircraft carriers, and cruisers are included. Destroyers are omitted because the Japanese records of destroyer losses were hopelessly confused and inaccurate.

SUMMARY

SHIP AND RELATED TARGETS

SURVEY OF OPERABLE OR SALVABLE
JAPANESE MERCHANT VESSELS

This report lists as completely as possible, from currently available information, names and data on Japanese merchant ships of 500 gross tons or over. These vessels are divided as follows:

1. Ships operable or in operation 289
2. Ships under repair 210
3. Ships damaged
   (a) Believed salvable 50
   (b) Salvability undetermined 64
4. Ships believed afloat, whereabouts and condition unknown .. 10

A further breakdown according to ship types and gross tonnage is as follows:

1. Gross tonnage
   (a) 500 to 1000 377
   (b) 1000 to 5000 191
   (c) over 5000 92
2. Ship type
   (a) Tankers 78
   (b) Cargo Ships 488
   (c) Passenger Ships 12
   (d) Semi Cargo Ships 56

SUMMARY

SHIP AND RELATED TARGETS

GENERAL ARRANGEMENT AND CAPACITY PLANS OF JAPANESE STANDARD TYPE MERCHANT SHIPS

The Wartime Standard Ship (Senji Hyojunsen), ranging from 500 to 10,000 gross tons, constituted the great bulk of Japanese wartime merchant ship production. For each ship-type produced in the 1942 and 1944 shipbuilding programs, as listed below, general arrangement plans, midship section plans, capacity charts, and engineroom plans have been collected and forwarded to the Washington Document Center (see Enclosure B).

1942 Program	1944 Program
A	
B	2A
C	2AT
D	2D
E	E (modified)
F (cargo)	2E
TL	2TL
TM	2TM
TS	ET (tanker)
K (ore carrier)	R*

Between the years 1939 and 1945 the Japanese Army sponsored a construction program for ten special 22 knot transports designed to carry landing craft and aircraft, eight of which were of 10,000 gross tons and two of 5,000 gross tons**. Complete plans have been assembled for the TAKATSU MARU, the KUMANO MARU, and the SETTSU MARU, as representative of this group, and also forwarded to the Washington Document Center (see Enclosure B).

---

*Refrigerator fish-carriers of 1000 gross tons. Four ships of this type were planned, but only three completed; the fourth is still under construction. Capacity charts for R-type are not available.

**Only one of the 5000 gross ton type was actually constructed.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE SUBMARINE OPERATIONS

Hampered by shortages of all kinds, assigned to a minor role with its forces dispersed in a losing war against a well-equipped enemy, the Japanese submarine force should be given credit for effort. However, in addition to its handicaps, there were several shortcomings of its own which prevented a creditable performance. Among these shortcomings were vacillating policies in building, false economy in withholding submarines for future use, failure to correct known mistakes, confusion of tactical command, poor communications, and a lack of individual caliber in many of the commanding officers. Briefly, in no particular could it be said that the Japanese submarine force excelled, while examples are many of its deficiency in strategical, tactical, research and personnel performance.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE SUBMARINE EQUIPMENT

The equipment installed in Japanese submarines, while of a practical nature, does not as a whole present any new features of which the United States Navy has not been cognizant. However, one piece of equipment of interest was the Celestial Observation Calculator. A description of the instrument and method of use is incorporated in NavTechJap Report - "Characteristics of Japanese Naval Vessels, Article 7 - Submarines - Supplement II" - Index No. S-01-7.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE ANTI-SUBMARINE WARFARE

In summarizing the Japanese anti-submarine war effort, the most striking feature is the enormous gulf between their conceptions and their accomplishments.

The high command had given consideration to almost every phase of advanced anti-submarine warefare. Improved echo-ranging equipment, influence and acoustic depth charges, deep-setting depth charge pistols, chemical recorders, ultra high frequency voice radio, surface search for escorts and aircraft, magnetic detection equipment for planes, standardized and improved doctrine and tactics, ahead thrown rockets, and joint air-surface offensive tactics - all were considered, studied, and, in many cases, successful solutions obtained and production started.

Nevertheless, the end of the war found many escorts without radar. Those equipped with radar and the improved echo-ranging equipment were unable to obtain satisfactory results. Training was practically non-existent after the first shakedown cruise. One small land-based "hunter-killer" organization existed. Depth charges with deep-setting pistols and actuated by influence or acoustic devices had been developed but were not in production. Planes and surface escorts were equipped with voice radio but were still unable to communicate due to technical difficulties.

Lack of production, the devastating inroads on their supply lines by our submarines, and the necessary allocation of production to aircraft for the final defense of the Empire, of course, affected the anti-submarine forces, but there also existed a failure on the part of the operating personnel to use what they did have to best advantage. They showed a definite lack of adaptability in utilizing improved methods.

Summing up, it may be said that the failure of the Japanese to develop an ahead thrown weapon similar to our Mark 11 Projector marked the greatest single disparity between their ASW effort and ours, and in other respects as well there remained nothing to be learned from them in any phase of anti-submarine warfare.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE MINESWEEPING GEAR AND EQUIPMENT

All Japanese questioned were satisfied that their moored mine sweeping gear left nothing to be desired. They were quite well satisfied with their magnetic gear, although this complacency can only be understood if it is assumed that they were not fully aware of the implications of gross desensitization of the M-9 mechanism, and the long interlook dead period modifications of the M-11 mechanism. There was general agreement that the sweeping of the A-3 mechanism was not much better than 50% effective, and that scarcely any of the A-5 mechanisms were swept. They considered the net sweep fairly effective for A-6 mechanisms, although very slow. In some areas it was unusable because of bottom conditions.

The Japanese considered that there was very little to criticize about the U.S. mine campaigns. It is apparent that they were overwhelmed by the magnitude of the problem rather than by technical difficulties. They estimated that at least 1000 mines fell on land, and that about 1500 prematured after laying. They stated that upon sweeping a mine, they frequently got chain countermining of two or three others, sometimes at distances as great as 15 km. On one occasion, a mine chain countermined at a distance of 2 to 3 km. with a point of land intervening. These were all believed to be A-3 mechanisms.

Judged by U.S. standards, Japanese moored minesweeping was slow, ineffective, and dangerous. There is nothing in their gear or procedure that can be followed to advantage, although some of their equipment is very good, particularly ball bearing swivels.

Japanese magnetic minesweeping was slow, clumsy, and dangerous. It would have been fairly effective if unmodified mines only had been used. It is an indication of the poverty of their resources that they were forced to use such gear. There is nothing superior in their gear or procedures in general, although in one instance (the hanger for the Type 5 or Type 2 cable) they had an article superior to the U.S. counterpart.

Japanese acoustic minesweeping was quite ineffective. In their use of mechanical or electro-mechanical acoustic gear, there is nothing we can learn to advantage. Their use of explosive acoustic sweeps, however, is in a different class. There they proceeded to do, through ignorance, what U.S. mine designers said could not be done. They had what was probably a better sweep for A-3 mechanisms then any available to U.S. sweepers. It is probable also that they could in time have extended the method to A-5 mechanisms. Their success with gear of this type should be of the greatest interest to U.S. mine and sweep designers.

In their reaction to the A-6 mechanism, the Japanese showed a quick grasp of the situation and rapidly developed a rough and ready sweep method. Their other proposed sweeps showed ingenuity and imagination. The apparent success of the pressure plate is a matter of the greatest importance and one which merits the most careful study, since similar sweeps had been proposed and discarded by the U.S.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE DEGAUSSING

The following are the principal policies which governed Japanese degaussing:

1. Only naval vessels were degaussed.
2. Ships were fitted with single-loop M-coils only, using submarine type cable on the outside of the hull.
3. Degaussing facilities existed only at the four principal naval bases of YOKOSUKA, KURE, SASEBO, and MAIZURU. There were no facilities at advanced bases.
4. After installation at one of the above bases, the M-coil was calibrated by means of magnetometers swung under the ship. Following this calibration, the magnetic condition of the ship was not checked again. The Japanese had no magnetic ranges.
5. Magnetic treatment was limited to submarines and a few destroyers and was done only at the Kure Arsenal.
6. Installation of coils was abandoned in favor of minesweeping in the early part of 1944.

Had the Japanese used multiple loop coils, deperming would have been nesessary for consistency, and the converse is also true to a lesser extent. Either or both would have required an extensive program of checking. Any consistent policy of improvement would have resulted in a very great expansion of their program which they were not prepared to undertake.

The number of engineers and officers engaged in degaussing, excluding men engaged in instrument research and degaussing coil installation, but including those engaged in primary research, administration, and all other phases of degaussing, was about eight. In addition, about twenty engineering assistants were engaged in degaussing. While Japanese degaussing was poor according to American standards, a great deal was accomplished in terms of the effort expended.

The decision in 1944, to abandon coil installation and concentrate on minesweeping, which had a greater potentiality of effectiveness, appears to have been based on good judgement.

No outstanding developments were noted in Japanese degaussing. Certain recommendations for further study are made in the report.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE SHIPS, MISCELLANEOUS ITEMS

The ten miscellaneous items listed under this target are either covered by this report or reference is made to reports of similar subject prepared by this or other intelligence agencies. Such references are included in the text of this report.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE NAVY DIESEL ENGINES

The diesel engine industry of Japan did not play as important a part in the war effort as did the American diesel engine industry. Two major reasons were:

1. The lack of ability to design suitable engines of high horsepower output.

   a. The crux of the design problem in Japan at the outbreak of the war was not so much the scarcity of trained engineers and designers, but rather the lack of originality which these designers displayed. Most of the engines adopted by the Japanese for standard use during the war had been designed eight to ten years previously and were approximate copies of European engines. Little change was made to adapt them to the tempo of modern warfare operations.

   b. With Japan almost entirely cut off from the western world, this traditional lack of originality in basic technical design proved too great an obstacle for Japanese engineers to surmount. As a result, no high speed, high output engines comparable to American models became operational, and only one experimental engine of the type ever approached successful completion. This was the ZC 707, designed by MITSUBISHI, which was completed and tested under NavTech-Jap supervision.

2. Factors limiting production:

   a. Complicated design.

   b. Inadequate knowledge of "tooling up to do the job."

   c. Inability to make the maximum use of available labor.

   d. Lack of coordination between the Army and Navy in respect to engine design, development and production.

Investigation of the closed cycle diesel engine revealed that the Japanese have been unsuccessful in experimenting on or in adapting this principle to diesel operation.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE NAVAL VESSELS - OWN SHIP'S NOISE

The Japanese investigated and attempted to minimize own ship's noise for two reasons: (a) to reduce the background noise in the hydrophones and thus increase their range, and (b) to decrease the range at which the ship could be detected by means of enemy hydrophones. This noise reduction was accomplished by mounting machinery on rubber pads, thus reducing the transmission of vibrations to the hull.

Pipelines, other than high temperature, and, in the case of small ships, main shafts also were fitted with rubber to reduce the transmission of vibrations to the hull. Although not relevant to this report, it should be noted that an additional reason for this installation of rubber was to decrease damage to the machinery of submarines caused by depth charges. One of the most common sources of noise aboard our own ships - that of axial flow ventilation fans - was not a problem to the Japanese because of their use of centrifugal fans of lower velocity. Axial flow forced draft blowers were used, however, and required treatment for noise reduction.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE NAVY PAINTS

The investigation of Japanese Navy paints has been accomplished by interrogation of personnel of the Japanese Navy and of several commercial paint manufacturers. Complete details of the manufacturing formulas for the various antifouling and anticorrosive paints used by the Japanese Navy have been obtained. Information has also been obtained, in the form of documents, that describes all aspects of the entire field of paints used by the Japanese Navy. In addition, the report includes a document containing detailed painting instructions for all parts of Japanese naval vessels. Many items of the report have been discussed with the object of comparing Japanese Navy with U.S. Navy painting practices.

SUMMARY

SHIPS AND RELATED TARGETS

WELDING IN JAPANESE NAVAL CONSTRUCTION

This report describes the use of welding in Japanese naval construction. The Japanese showed little appreciation of the real advantages to be gained by the use of welding; their lines of research, none of which were original, were aimed at increasing output rather than at improving the quality of the product. Their equipment and workmanship were poor. In fact the Japanese were years behind the U.S. and Great Britain in the development of welding.

It is considered that the report is principally negative in that it shows how little of value there is to be learned from Japanese welding.

SUMMARY

SHIP AND RELATED TARGETS

PROVISIONS FOR MILITARY CONVERSION OF JAPANESE MERCHANT SHIPS

In 1932, the Japanese Government initiated action to provide in all merchant ships of 4000 gross tons and upward, and capable of a minimum speed of 13.5 knots, structural elements necessary for their eventual conversion for military use. These elements consisted principally of structural foundations for 12cm guns to 20cm guns, two to six per ship.

Certain merchant ships were so designed and constructed that they could be converted readily to aircraft carriers, others to "LSD" type transports. The minimum height between decks of some passenger ships was specified by the Army so that horses, as well as troops, could be transported. Attachments for paravanes were built into some merchant ships.

With rare exceptions, designs of merchant ships included no special provisions for making them more capable of withstanding battle damage.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE MODEL BASINS

Japanese model testing basins are located in MEGURO, TOKYO, at the Naval Research Institute, where all naval model testing was conducted; at MEJIRO, TOKYO, at the Communications Ministry's Ship Testing Laboratory where only merchant ship testing has been conducted; and at NAGASAKI, where the Mitsubishi Heavy Industries have conducted their private work on merchant ships.

The facilities available for model testing vary greatly at these three institutions. The Navy's laboratory at MEGURO was, before being bombed and burned, quite complete as to equipment. It contained three completed basins and one under construction. There was a large propeller cavitation tunnel, a large maneuvering pond, a stability testing tank, a circulating water channel, as well as numerous wave makers, pressure testing vessels, and complete model making equipment.

At MEJIRO there are two medium size model basins, a cavitation tunnel, and the necessary equipment for making ship and propeller models.

The facilities at the Mitsubishi plant at NAGASAKI consisted of one obsolete basin and one completed in 1943.

Considerable bomb and fire damage was done to the installations at MEGURO and NAGASAKI. However, from what remains of all these facilities, it is quite apparent that the Japanese leaned heavily, in all their design, on the Germans and British. Their tanks are all quite similarly constructed and follow the Hasslar design. Their carriage and self-propulsion dynamometers were made by Kempff and Gebers. The Navy's basins at MEGURO were by far the most up-to-date, but even these were only comparable to the basin at the Washington Navy Yard.

In general, the list of current work being done at MEGURO reflected also a certain backwardness as evidenced by the elementary w[illegible] on propeller cavitation and mine sweeping gear. In direct contrast, however, was the very complete and interesting model turning test pond at MEGURO, the research on bow rudders for capital ships, and the quite extensive program on high-speed boat forms.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE DAMAGE CONTROL

Compared to American and British standards, Japanese damage control organization, training, and equipment were inferior. Although definite improvement was made during the war in all three phases of damage control, good results never were obtained.

SUMMARY

SHIP AND RELATED TARGETS

THE FUKURYU SPECIAL HARBOR DEFENSE AND UNDERWATER ATTACK UNIT - TOKYO BAY

There is no questioning the fact that the Japanese have developed self-contained diving equipment that will enable a man to work under water over eight hours in depths up to eight meters. This equipment appears to embody no new or novel idea but is merely the combination of proven elements. However, it is not known that any self-contained equipment now used in the United States permits anything near this length of continuous submersion. Further, an examination of this Japanese equipment indicates its rather crude construction and suggests that further refinements would increase the scope and flexibility of the gear.

The effectiveness of underwater combatant troops has not been demonstrated. Their operation in a medium which has such a high capacity for transmitting the effect of explosion presents an obvious hazard. The development of proven data (if not already available) as to safe distances underwater under varying conditions seems to be indicated. The Japanese were quite aware of this hazard and were doing all they could to decrease it. They were particularly afraid of a high concentration of small bombs dropped from aircraft. They were counting heavily on the element of surprise in the use of underwater combat troops.

The existence of fixed underwater torpedo installations in the hulk of sunken merchant vessels has not been absolutely established. However, enough data has been developed to indicate the possible nature of such an installation and, hence, the actual proof of their existence is not considered vital.

There are only a few technical questions unanswered in such an underwater installation. The self-contained diving equipment explained herein makes access and exit thoroughly feasable. It appears quite reasonable that men could exist for substantial periods in watertight compartments as is now done in submarines. The problem of generation of electricity or its necessity in such an installation is at present unanswered. The answers to most of the other questions appear self-evident.

It is considered that the possibility of the above methods of offense and defense deserves consideration in any future plans.

SUMMARY

SHIP AND RELATED TARGETS

LEAD-ACID STORAGE BATTERIES
USED BY THE JAPANESE NAVY

The high-underwater-speed submarine's storage battery was a two-cell glorified automobile type with multiple thin plates. It was deficient in electrolyte, separation, and sediment space. A multitude of parallel circuits were used. It was entirely undependable and was so recognized by the Japanese.

The special Mark I Type 33 designed to replace it was of the same design except that four plates were welded together and a large container was used. The apparent higher capacity was obtained by dropping the allowable end voltage on the new type from 1.72 volts to 1.50 volts per cell.

Other types of submarine batteries offered nothing of interest, being ordinary pasted-plate batteries with glass mats. They were of the thin-plate type and resembled German batteries in some respects.

The electric torpedo battery was of similar design to the small submarine battery and was deficient in the same respects.

Other types of lead-acid batteries had no distinguishing features and were of conventional design.

In design, specification, and inspection the Japanese were weak. Much of the design was copied and little experimental work was done. Basic points were missed in copying. Specifications, when set up, were not closely followed. Little materiel inspection and product testing were done.

A comparison of Japanese and American batteries can best be made on a watt hour cycle basis. Comparing the Japanese optimistic ratings and statement of life cycles against our own proven minimums of the same, the batteries for the I-Class submarines would deliver 677.6 watt hour cycles per pound of battery weight, whereas the American battery will deliver 4122 watt hour cycle per pound of battery weight. There is, therefore, a six-to-one ratio in favor of the American battery.

The unfavorable position of the Japanese battery in these comparisons is owing largely to the short life of 80 cycles versus 600 minimum for American batteries. Assumption is made that they will meet this claim, although it has been pointed out that with the construction used such life is hardly possible; furthermore, the low volume of electrolyte makes it obvious that the capacity ratings cannot be met. If these factors are taken into consideration along with average rather than minimum performance of American batteries, the ratio in favor of the latter would rise to the neighborhood of 20 to 1.

Japanese battery practice resembles American practice of 25 years ago, when it was more of an art than a science. Research work has been notably absent. The methods used have been copied.

All casting is done by hand by ladle pouring, even though the use of small grids lends itself naturally to machine casting. No new technique for producing large castings was developed, although lack of such technique is a definite handicap in submarine battery manufacture.

SUMMARY

SHIP AND RELATED TARGETS

TENTH MILITARY EXPERIMENTAL STATION
MUROTSU, HONSHU, JAPAN

The Tenth Military Experimental Station was an army establishment for the investigation of problems dealing with marine attack, supply and defense. Enclosures (B) and (C) are translations of the indexes to its reports, showing the various projects upon which it was working. The majority of these were routine problems related to small supply ships, escort and attack ships, and marine engines. These reports have not been translated, but can be found in the original documents listed in Enclosure (A). There were, however, some projects which appeared to be of special interest and it is with these that this report deals. These projects were concerned with suicide craft, midget submarines and beach defenses. Of particular interest among the beach defenses is the submersible gun mount of which three types were developed.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE EVALUATION OF U.S. ANTI-SUBMARINE HARBOR DEFENSES

There was no attempt by the Japanese to assemble and promulgate information on U. S. Anti-Submarine Harbor Defenses; hence there was no doctrine in use, the problem of attacking ships in our harbors being left to the ingenuity of the individual submarine commanders, aided in a few cases by specific information culled from air reconnaissance photographs. An amphibious tank for carrying torpedoes over our nets was developed toward the end of the war but did not see service.

SUMMARY

SHIP AND RELATED TARGETS

WOODS, TEXTILES, RUBBER, AND PLASTICS USED IN JAPANESE NAVAL VESSELS

Wood of many varieties was used extensively in Japanese naval vessels, and the workmanship in wood was very careful. Even on modern steel ships, wood was used for equipment such as furniture, shelving, and cabinets.

Textiles, rubber, and plastics in moderate amounts found essentially the same uses as in U.S. naval vessels.

Supply of certain types of wood became critical, but suitable substitutions were made. Near the end of the war, Japan's natural rubber supply was cut off, but she had not completely used up her stock-pile of rubber when the war ended.

Information concerning protective coatings is covered in NavTechJap Report "Japanese Navy Paints" - Index No. S-59.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE DECK COVERINGS

Except for linoleum, which was used extensively, the Japanese Navy used very little deck covering material of any sort. The only other material of interest was a special flight-deck composition containing a rubber base.

SUMMARY

SHIP AND RELATED TARGETS

JAPANESE ANCHORS AND ANCHOR CHAIN

Investigation of this target shows that the Japanese have made no significant advancement in design or construction of anchors or anchor chain.

SUMMARY

SHIP AND RELATED TARGETS

EVALUATION OF EFFECTIVENESS OF ALLIED OFFENSIVE MINING OPERATIONS AGAINST JAPANESE SHIPPING IN CHINESE AND SOUTHWEST PACIFIC WATERS

The mining of the Yangtze River by U. S. Forces was very successful in disrupting and delaying river traffic which was vital to the maintenance of Japanese troops in that part of China. The railroads were relied upon to replace river traffic, but facilities were not adequate to entirely replace river transportation. The closing of SHANGHAI prevented the unloading of troop transports and heavy military equipment. This shipping was re-routed to ports north of SHANGHAI, thus necessitating rail transportation south. Japanese mine sweeping facilities on the Yangtze were not able to cope with the situation.

The mining of HONGKONG caused considerable delay in shipping. However, at the time of the mining, HONGKONG was not a major base and the interruption of normal shipping procedure, while it was a nuisance, was not considered by the Japanese to have been of particular strategic importance.

The mining of SAIGON followed two weeks after a devastating bombing attack. The bomb damage to the docking facilities at SAIGON was so great that the port was never again used as a major convoy stop or supply base. The mining was considered a nuisance, but had little strategic value.

Camranh Bay was mined at the same time as SAIGON. This mining was effective in preventing the use of the bay as a convoy refuge against submarines.

The continuous mining of all ports used by the Japanese in Siam, the Malay States, SINGAPORE, and Burma created a critical supply situation which the Japanese were unable to handle. Sweeping facilities were inadequate in all areas. The Bangkok area was closed to all steel ships from the summer of 1944 to the end of the war. Maintenance of supply by junk and wooden barge was not successful because of active aerial and submarine warfare.

SUMMARY

MISCELLANEOUS TARGETS

PHYSICAL CHEMISTRY RESEARCH IN JAPAN

Chemical research in Japan has been conducted in a fashion and with facilities extraordinarily similar to those employed currently in the United States. Nothing resembling a Japanese approach to research, nor any point of view, process, or substance not previously well known in the United States, was found. There are a few Japanese chemists who would be valuable to the staff of any laboratory, but they prefer to consolidate old fields of research rather than open new ones. If they are afforded even minimum facilities for carrying on and permission to publish their results outside Japan, their annual contribution should be a small but valuable and reliable increment to the sum of knowledge.

Research was far less affected by the war in Japan than in the United States. Theoretically, the government directed research into its own channels; the practical effect was very small, however, and actually no pattern connecting the activities of one laboratory with that of other Japanese laboratories, as distinguished from laboratories outside Japan, is discernible.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE INFRA-RED DEVICES
ARTICLE 1 - CONTROL FOR GUIDED MISSILES

The Japanese heat-homing bomb was a free falling, infra-red guided, gyro stabilized missile, which was intended to be dropped from airplanes on ships at sea. The chassis consisted of a heat-sensing head, a body with two sets of mutually perpendicular wings both fore and aft, and a tail brake assembly. The heat-sensing head consisted of a rigidly attached thermopile arrangement behind which a spherical mirror was eccentrically mounted on a revolving shaft. Rotation of the mirror caused the heat-sensing head to scan a conical pattern directly in front of the missile. Sensing was amplified and transferred to the wing flaps for guiding control. Approximately 60 bombs were made and dropped in tests, but only a few actually responded to the heat control. The tests, however, did show promise and the designers were confident that they could make a successful heat-homing bomb.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE INFRA-RED DEVICES
ARTICLE 1 - CONTROL FOR GUIDED MISSILES

The Japanese heat-homing bomb was a free falling, infra-red guided, gyro stabilized missile, which was intended to be dropped from airplanes on ships at sea. The chassis consisted of a heat-sensing head, a body with two sets of mutually perpendicular wings both fore and aft, and a tail brake assembly. The heat-sensing head consisted of a rigidly attached thermopile arrangement behind which a spherical mirror was eccentrically mounted on a revolving shaft. Rotation of the mirror caused the heat-sensing head to scan a conical pattern directly in front of the missile. Sensing was amplified and transferred to the wing flaps for guiding control. Approximately 60 bombs were made and dropped in tests, but only a few actually responded to the heat control. The tests, however, did show promise and the designers were confident that they could make a successful heat-homing bomb.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE INFRA-RED DEVICES - ARTICLE 3
RESEARCH, DEVELOPMENT, AND MANUFACTURE OF INFRA-RED EQUIPMENT

The Japanese, in applying infra-red radiation to military uses, placed great emphasis on communications equipment. The Japanese Navy completed installation of infra-red communications equipment on over a hundred ships, and the Army had produced and issued portable photophones. Considerable research was done on image-forming telescopes and filtered searchlights, but these had not been applied to beach illumination, individual sniping, or to vehicle driving. No system of navigational aids was completed, although experiments were conducted on several types. Phosphor detectors, similar to the U.S. Army metascope, were under development. Several projects on heat detectors and one on a heat homing bomb were undertaken, but results were not considered satisfactory for tactical use.

This investigation indicates that the part of the spectrum to which caesium-silver-oxide photocathode image tubes are sensitive cannot be counted on for secrecy and surprise, and that other sensitive materials and other parts of the spectrum must be explored in order to provide night fighting equipment.

Japan had the potential ability to produce infra-red equipment, either as countermeasures or as offensive measures, but although many projects were undertaken and several agencies pursued quite extensive development programs, the equipment developed, with the single exception of the Navy communication devices, never attained practical value for field use, and was distinctly inferior to that of the Allies or the Germans. Technical assistance from the Germans was negligible.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE ULTRA-VIOLET COMMUNICATIONS EQUIPMENT

Considerable research had been conducted by the Japanese prior to the war on ultra violet communications equipment for the purpose of presenting photographic pictures on television screens. Reprints of the articles published on this work have been shipped to the Naval Research Laboratories through ATIS via NavTechJap Document Number ND50-5843. Specific application of ultra-violet light communications equipment to military uses was anticipated, although none but experimental models were produced. It was thought however, that two advantages could be found in such equipment. First, high intensity mercury lamp light sources could be modulated easily; second, filters could be designed to pass only the very short ultra-violet wave lengths not transmitted by normal ultra-violet light filters. Thus equipment with a high degree of security would be obtained.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE OPTICS

On the basis of study of the targets listed and examination of material left intact, the development of optics in Japan can be summarized as follows:.

1. In the past five years Japan has made a phenomenal growth in optical glass manufacture.

2. Japan has at present, fairly modern and efficient optical factories.

3. No spectacular optical developments have been made in Japan, but rather adaptions and modifications have been made of the optical systems used in German and U.S. instruments.

4. Japan has capable scientific personnel who understand modern optical requirements and are cognizant of the shortcomings in the Japanese processes of glass manufacture.

5. The Japanese exhibited a tendency toward large size (aperture) visual optical instruments, particularly in the field of binocular telescopes (80, 120, 150mm apertures). This tendency may represent a futile attempt to offset deficiencies in their radar development.

SUMMARY

JAPANESE GEOPHYSICAL RESEARCH

Japan has long been outstanding in the field of geophysics, particularly seismology. During the war years, however, shortages of material, personnel, and money combined with bombings to greatly limit instrument development and research.

The following developments in seismograph design of recent years are described and illustrated:

1. Matsuzawa Duplex Pendulum Seismograph (a new design to measure displacement of strong earthquakes).
2. Sassa Strain Seismograph (after Benioff, to measure velocity).
3. Sassa Extension Meter (to measure horizontal displacement).
4. Hagiwara Displacement Seismograph (with new type calibrating device).
5. Hagiwara Vertical Motion Seismograph (with rectangular suspension).
6. Tsuboi Clock Drive for Seismometer Drum.
7. Sassa Type "B" Prospecting Seismograph.
8. Sassa Type "C" Prospecting Seismograph.

The following tilting instruments are described and illustrated:

1. Sassa Clinograph (after Schluter).
2. Ishimoto Tiltmeter.
3. Water Level Instrument.

The geophysical principles involved in the following land mine detectors are described:

1. Seismometer Type.
2. Non-metallic Type.

The following gravity instruments are described and illustrated:

1. Tsuboi Gravity Pendulum.
2. Hasegawa Gravity Variometer.

No new magnetic, radio-activity, electrical or thermal instruments were descovered.

Japanese geophysicists have long worked toward forecasting earth disturbances. The most significant results have been obtained from tilting and magnetic anomalies, which are discussed together with other lines of research which have been followed.

The concluding portion of the report deals with views held by Japanese scientists on such theories as the state of the earth's core, isostasy, earth tides, crustal deformation and the earth's ellipsoid.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE CHEMICAL WARFARE

This report considers, first, the toxic gas filling operations at the SONE Branch of the TOKYO Second Military Arsenal, including a record of all types of munitions filled, together with estimated production figures through 1945; second, an investigation of the Dockyard Testing Laboratory, SASEBO Navy Yard, including the testing procedure for determining gas mask serviceability. The remainder of the report deals with Japanese chemical warfare material.

SUMMARY

MISCELLANEOUS TARGETS

EARTHQUAKE RESISTANT CONSTRUCTION IN JAPAN

Organized study of seismology in Japan dates from the TOKYO Bay earthquake of February 1880, which resulted in the formation of the Seismological Society. This organization, with the aid of the newly invented seismographs, continued its work over a period of about twelve years.

In 1891, after the MINO-OWARI earthquake, the Earthquake Investigation Committee was organized with financial aid from the government. The efforts of the committee were directed toward the study of applied seismology, including observations of the damage resulting from major earthquakes both at home and abroad.

The Earthquake Research Institute and the Earthquake Investigation Council were organized with increased funds from the government after the great KANTO earthquake of 1923.

Continued progress in the study of seismology and its applications to the field of construction has been encouraged by the government and the establishment of courses in geophysics and seismology at the larger universities.

The modification of the Building Law in 1924 by amendments setting up specific requirements intended to make structures more resistant to earthquake forces marked the first official efforts to mitigate the damage from such forces.

Certain standardized requirements and procedures for earthquake-resistant construction have been arrived at through extensive observations of the damage resulting from earthquakes. In addition, several important buildings have been used as field laboratories where careful measurements and observations have been taken to determine the behavior of the structures during seismic disturbances. The engineering schools have kept pace with modern methods of structural analysis and design as developed in America and Europe, and the Japanese engineer has access to a more than adequate supply of technical information on earthquake-resistant design.

This definite progress in the study and theory of earthquake-resistant construction is not reflected in the average type of construction to be seen in Japan, particularly not in dwellings and smaller structures. However, there are many examples of major structures which have been specially designed to be shock-resistant and which have successfully withstood earthquakes of major intensity with only superficial damage.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE METALLURGY - ARTICLE 2
HIGH TEMPERATURE ALLOYS FOR GAS TURBINES, ROCKET NOZZLES, AND LINES

This report covers the agencies developing high temperature metals in JAPAN and shows the state of that development in November 1945. The Japanese were severely handicapped by shortages of nickel and cobalt and were forced to rely mainly on the Cr-Mn steels as heat-resisting materials with a consequent sacrifice in some properties.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE METALLURGY - ARTICLE 2
RECOVERY OF ALUMINUM FROM CLAY AND SHALE

This report deals with production methods and technical data on "Aluminum from Clay and Shale." Each of the several processes is described and the yield from each reported. None of the processes was considered outstanding. Each was applied to the type of ore to which it was best suited. The economic and technical disadvantages of producing aluminum from clay and shale were by no means overcome by Japanese research.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE METALLURGY - ARTICLE 3
ATOMIC STRUCTURE RELATIVE TO DYNAMIC PROPERTIES

This report deals with Japanese research on the mechanism whereby the crystal lattice performs the functions which are measured as strength, ductility, and brittleness. The usual method is to observe a certain phenomenon in a crystal structure, make observations, and attempt to explain them in terms of structure of the crystal lattice. Once the measurements have been made, all such work is theoretical and subject to considerable disagreement among scientists.

SUMMARY

MISCELLANEOUS TARGETS

QUALITY OF JAPANESE ELECTRIC WIRES AND CABLES

This report evaluates the quality of Japanese electric wires and cables. In the field of conductors Japanese standards are similar to the conventional pre-war U.S. standards. The plastic-type, covered conductors (polyvinyl chlorides, etc.) have not been extensively developed by the Japanese. In the field of resistance wires no nickel was available, thus outlawing the conventional Nichrome types and forcing the substitution of inferior Fe-Cr alloys. In general, the quality of Japanese wires and cables is definitely lower than those in the UNITED STATES. Copper, although fairly high in quality, was very short in supply and high-grade conductors were used for only the most pressing applications, such as aircraft.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE AEROLOGY

The Japanese Army and Navy meteorological services have been demobilized. The new civilian organization under the supervision of the Air Weather Office of the Far Eastern Air Forces will become an integral part of the world weather service now in process of organization; conformity with the international code has been assured and the assignment of index numbers has been completed. By direction of SCAP, the General Central Meteorological Observatory and its district divisions are being restored by the Air Weather Office.

By 20 December 1945, the new organization and all of its observing stations were in operation, in spite of war damage to communications. Adequate meteorological personnel are available. In fact, the new organization can utilize the services of only about one-fourth of the personnel of the demobilized Army and Navy meteorological services. It is noteworthy that Japanese meteorological personnel, in contrast to United States meteorological personnel, includes comparatively few college graduates. The average forecaster is a high school graduate with a post-graduate course in meteorology sponsored by the Central Meteorological Observatory. However, it is believed that the Japanese forecasters use all available data to a very high degree of effectiveness. Their statistical analysis of data is more thorough than that of U.S. forecasters.

Synoptic data are collected by the use of direct lines from observation stations to district observatories, which are connected by direct lines to the Central Meteorological Observatory. The Central Meteorological Observatory issues short range forecasts for 36 to 48 hours, long range forecasts for 10 days (revised every four or five days) and 30 days, and seasonal forecasts for three months and six months. Air mass and frontal concepts are widely used, but the wave theory is not followed consistently because the Japanese have difficulty in detecting warm fronts in the vicinity of the home islands. Long range forecasts are predominantly statistical correlations, analogous charts, or interpolation. The Japanese call them "dynamic", but this designation would seem to be justified only by the selection of stations in accordance with average location of air mass boundaries. The Japanese state that their long range forecasting is in an experimental stage, and that all methods tried so far fail after four or five days. Research in forecasting in Japan is difficult to evaluate because it does not seem to be centralized and coordinated.

The Japanese apparently had little appreciation of the value of meteorology in chemical warfare. No chemical warfare training was given to any meteorologist of the Army or Navy; no meteorologist was assigned to the Chemical Warfare Section of either service.

Experiments were conducted on the transmission of weather maps by wire photo. The work was operationally unsuccessful, and the experiments were abandoned in July 1945.

No research had been undertaken either on rockets for carrying meteorological instruments to high levels, or on pressure instruments to be carried aboard submarines for measurement of atmospheric pressures at the surface.

One research project on long range forecasting was investigated thoroughly and is described in some detail in the body of this report.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE METEOROLOGICAL INSTRUMENTS

Most Japanese meteorological instruments are reproductions of German, English, and French models. Research and development work on meteorological instruments has been the most impressive and important of all Japanese meteorological activities. Nevertheless, inconsistencies and lack of proportion generally are present; that is to say, when the Japanese modified a foreign instrument, they very often developed one part to an extreme without raising correspondingly the quality of the other parts.

Japanese aerological offices and general physical facilities are far inferior to those in the United States. Poor lighting, little or no heating, inadequate furniture, and generally untidy conditions prevail. These conditions very probably are worse now than before the war because of shortages of material and general confusion.

Representative Japanese meteorological instruments and equipment have been shipped to the U.S. Naval Observatory, U.S. Naval Engineering Experiment Station, Naval Research Laboratory, Ordnance Investigation Laboratory, and the Bureau of Ships.

The only Japanese instruments for measuring high wind velocities which were found by the authors of this report were Pitot tube anemometers.

A mercury barograph was observed in operation at the District Observatory at HIROSHIMA.

Particular reference is made to a report on Japanese meteorology, prepared by the Air Weather Office of Far Eastern Air Forces which covers subjects within the scope of this investigation as originally planned. The work of the Air Weather Office was not duplicated.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE HYDROGRAPHY - ARTICLE 1
ORGANIZATION, OPERATION, AND METHODS

This report represents the results of investigations requested by the Hydrographer of the United States Navy. It includes a detailed description of the internal functions, operations and methods used in the Japanese Hydrographic Department, as well as data on lithographic reproduction processes used in Japan, particularly as applied to the reproduction of charts.

Insofar as equipment, methods, practices and operations of the Japanese Hydrographic Department are concerned, the report is negative. Nothing was observed which has not been known and at least equalled in the U.S. Navy Hydrographic Office.

A list of Japanese hydrographic charts, publications, etc., which were collected and forwarded to the Washington Document Center and the U.S. Navy Hydrographic Office is attached to the report.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE HYDROGRAPHY - ARTICLE 2
WIND AND WEATHER DATA, INCLUDING HIGH ALTITUDE RADAR MAPS

The collection of "charts of all sea, river, and inland sea areas of Pacific", and of "wave and tide and current data" was quite thoroughly accomplished by the Intelligence Division, Office of the Chief Engineer, GHQ AFPAC, as reported in NavTechJap "Japanese Hydrography, Article 1 - Organization, Operation, and Methods", Index No. X-18-1. The officers who prepared this report assisted the Office of the Chief Engineer in setting up machinery for the collecting and shipping of these materials and of keeping proper records. However, in the case of considerable numbers of charts and publications, the desired numbers of ten each for charts and five each for publications was not completely attained. Except in a very few cases, at least one copy of every known chart or publication of the Japanese Hydrographic Office was collected through the Office of the Chief Engineer. Detailed information on what charts and publications are missing is given in the body of this report.

"Wind and weather data, including high altitude" has been construed to mean all charts and publications published by the Japanese Hydrographic Office that are meteorological in subject matter. This restricted construction is believed justified in view of the content of NavTechJap Report. "Japanese Aerology", Index No. X-16, In the body of this report is given a complete list of the subject charts and publications with English Translations of their titles and a statement of the almost complete collection of these charts and publication by the Office of the Chief Engineer.

"Sea bottom studies", insofar as this subject is not covered in the publications of the Japanese Hydrographic Office collected by the Office of the Chief Engineer, are reported upon in NavTechJap Report "Oceanography in Japan", Index No. X-40(N).

With reference to "radar maps of all areas", reported interrogation of Japanese chart and map making personnel always produced the information that the Japanese had not prepared or published any such maps.

Japanese hydrographic equipment and procedure was quite extensively studied by the Office of the Chief Engineer and this Mission. Detailed results of this study are set forth in the body of this report, but in general it can be stated that the equipment as well as the procedures and methods are good. However, practically nothing, either in equipment of method, is any improvement over United States equipment or method. The personnel perparing this report were scarcely in a position to test how well the Japanese utilize their good equipment and procedures and how accurate are their hydrographic results.

Incidental to the execution of this report, there were collected for the U. S. Hydrographic Office certain issues missing from the files of that office of a number of Japanese hydrographic and oceanographic journals, as enumerated in detail in the body of the report. The investigating personnel also located for seizure, or photographing and shipment, certain material pertaining to terrestrial magnetism and seismology. One hydrographic research project was investigated.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE HYDROGRAPHY - ARTICLE 3
WARTIME ACTIVITIES OF INTERNATIONAL LATITUDE OBSERVATORY
MIZUSAWA, IWATE PREFECTURE, JAPAN

The axis of the earth is not fixed relative to the earth itself, but executes a roughly conical motion in the earth, with a period approximately annual. This wandering of the earth's axis in the earth causes corresponding fluctuations in the positions on the earth's surface of the geographic poles and the geographic equator. In consequence, the latitudes of points on the earth's surface are not constant, but suffer annual variations which may be as much as 0.3 second in amplitude (0.6 second in range).

As a part of the program of the International Geodetic and Geophysical Union, five variation of latitude observatories have been in operation along parallel of latitude 39° 08'N. Two of these observatories have been in the United States, one at Gaithersburg, Maryland, and the other at Ukiah, California; one has been at Sardinia, Italy; one in Kitab, Russia; and one in Mizusawa, Japan. In addition to these, there are several observatories in the Southern Hemisphere.

During the war no information was available concerning the operations of the observatory at MIZUSAWA, Japan. A request from the Director of the U.S. Coast and Geodetic Survey - "We would like to have information as to whether this observatory has been in continuous operation, and we would like to have the records obtained during the war period forwarded to this office." - finally devolved upon the Naval Technical Mission to Japan for accomplishment.

Investigation has established the fact that the observatory in question has been, and will remain, in continuous, uninterrupted operation. The desired records have been secured and are being delivered to the Director of the U. S. Coast and Geodetic Survey.

SUMMARY

MISCELLANEOUS TARGETS

FUNGUS, MOISTURE-PROOFING AND ANTI-FUNGUS DATA

Japanese activities in the field of tropicalization were practically non-existent. A complete study made by the Office of the Chief Engineer, GHQ. SCAP, ascribes the situation to a shortage of essential raw materials for protective coverings, the fact that slow-drying Japanese paints give rise to numerous production difficulties, and an apparent lack of interest in the problem on the part of Japanese Army authorities.

In the words of the study, "Although the Japanese were aware of the problem of tropical deterioration of improperly protected material, no action was taken to provide a solution to the problem. Neither fungicidal nor radioactive materials were used to prevent fungus growth...At the close of the war there were no plans, either for research or development, on the subject, and no funds had been set up for the purpose. No military research laboratories were tropicalization-minded in any respect. This investigation disclosed that no attempt was made by the Japanese to tropicalize military materiel."

A complete report, "Technical Aspects of Tropicalization and Protective Coatings as Applied by the Japanese to Military Equipment", 10 December 1945 by Captain A.J. PASSONNO, C.E., was submitted to the Chief Engineer, GHQ, SCAP, for transmission to Chief of Engineers, War Department.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE USE OF BALLOONS FOR BARRAGE, BOMBING AND AEROLOGY

Investigation of Japanese balloon activities has been exhaustively exploited by various Army and Air Corps agencies. These investigations have generally followed the line of Japanese specialization; i.e., barrage balloons and paper bombing balloons.

Most detailed information is available concerning the four Japanese barrage balloon models (models 1, 2, 4, and 97). In a report prepared by the U.S. Army Engineer Technical Intelligence Section (1), performance data, physical characteristics, design, manufacture and production figures, as well as operational technique, are fully described. This report is referenced as "Technological Survey, Japanese Barrage Balloons (9-27 November 1945) by Mr. George E. WEIDNER, Senior Engineer". Sections on materials are devoted to the flying cable and the elastic cord, and the preparation, spreading, calendering, doubling, and vulcanizing of the fabric cloth. Photographs, diagrams, and explanations of moorings and inflation equipment, and information on operation and maintenance are included; balloon cement, envelope, gas value, dialation system, and angle of trim are treated in details.

Plans for stragetic employment of balloons never considered the use of more than ninety barrage balloons in all of JAPAN, thirty each in the TOKYO, OSAKA and the MOJI-SHIMONOSEKI areas; no more than five hundred were manufactured. The report contains details of the make-up of barrage balloon teams and organization of the chain of command, as well as a history of barrage balloon research.

Balloons and complete equipment, including winch, flying wire, fairlead, and inflation accessories, have been found and are enroute to the office of the Chief Engineer, Engineer Board, Fort BELVOIR, VA.

Although no paper bombing balloons have been recovered intact in JAPAN, presently available information is so complete as to enable construction of an authentic copy of the Japanese model.

Detailed study of the balloon as a carrier has been made in a U.S. Army Engineer Technical Report series which treats principally of the inflation, launching, and physical performance characteristics, as well as the apparatus employed for maintaining flight. This series of reports is referenced

as "Technological Survey, Paper Bombing Balloons (13-28 November 1945) by Mr. George E. WEIDNER, Senior Engineer". The report includes a complete description of vertical flight control apparatus, both fuse and hopper types. From the plant manufacturing these balloons, data was obtained regarding engineering and production, as well as information on methods of construction, chemical composition of coating materials, and cost of each balloon. A full report on the history of research activities concerning the paper bombing balloons has been made to Army Engineer Technical Intelligence and FEAF by the men responsible for such work. The report (in English) forwarded by FEAF is titled "Japanese Report of Research of Bombing Balloon (October 1945) by the Ninth Military Laboratory" (Lt. Col. NIIZUMA, Central Liaison Office, Grand Imperial Headquarters, and Dr. ARAKAWA, Central Meterological Observatory). This report describes balloon types "A" and "B", and discusses the key problems which centered about the causes of descent. Dimensions, and details of construction and manufacture are included, as well as data on height-maintaining apparatus, bombs, and radio sonde. A history of the launchings, and comment on the development of the paper bombing balloon project has been published by FEAF. (Air Technical Intelligence Group, Advance Echelon, FEAF, Report No.138 (23 November 1945) by Dr. W.H. PICKENING of the AAF Scientific Advisory Group).

Major Ray V. JONES of GHQ Technical Intelligence Section has made a most complete study of the balloons as a weapon. His interview with Major General S. KUSABA of the Ninth Military Laboratory revealed that the project was calculated to be nothing more than a stimulus to home morale. Design was exclusively that of the Japanese Army, no assistance of any kind having come from the Germans. It was estimated that approximately 10% of the total of 8000 to 9000 balloons released would reach the American mainland. Operations were ordered ceased by the War Ministry because of negligible results, advent of unfavorable weather, and a shortage of hydrogen gas. Balloon bomb loads did not exceed 45 kilograms, but consisted generally of a 15 kilogram high explosive bomb and four 5 kilogram incendiary bombs, or several special 12.2 kilogram incendiary bombs. It appears that the project was never considered with much enthusiasm.

Study of these balloons in relation to meteorological use and forecasting techniques has been made by FEAF and is fully described in their report - "Investigation of Japanese Weather Service".

SUMMARY

MISCELLANEOUS TARGETS

ATOMIC BOMB, HIROSHIMA AND NAGASAKI - ARTICLE 1
MEDICAL EFFECTS

This report covers the medical effects of the atomic bombs dropped on HIROSHIMA 6 August 1945, and on NAGASAKI 9 August 1945. It also analyzes the physical damage as related to death and injury of personnel, the organization of relief activities by the Japanese, and their methods of treatment, which were inadequate to a startling degree. The question of residual radioactivity is thoroughly considered on the basis of our own and Japanese observations, and it is concluded that only negligible danger to personnel existed after the explosion.

The great majority of casualties resulted from burn, blast or secondary injury from debris, while many survivors within a radius of four kilometers suffered from radiation effects of varying intensity. Some of these latter cases are still dying, some may reproduce abnormal offspring, and others may be permanently sterile.

SUMMARY

MISCELLANEOUS TARGETS

ATOMIC BOMBS, HIROSHIMA AND NAGASAKI - ARTICLE 2
MEDICAL EFFECTS, SUPPLEMENTARY STUDIES

There is no essential difference in the tissue changes produced by the bombs dropped at HIROSHIMA and NAGASAKI.

Atomic bomb injuries may be classified as follows:

1. Air blast injury.

   a. Primary, due to thrust or compression of sonic wave.
   b. Secondary, due to impact with wreckage.

2. Radiation blast injury.

   a. Thermal radiation blast injury.

      (1) Primary, flash burn due to radiant heat.
      (2) Secondary, due to burn from induced fire.

   b. Ionizing radiation blast injury.

      (1) Primary, due to gamma rays and neutrons.
      (2) Secondary, due to induced radiation.
      (3) Tertiary, due to residual radiation.

Changes clearly due to the effect of ionizing radiation blast include lymphoid atrophy, damage to hematopoietic tissue, production of leukopenia, injury to gonadal tissue and epilation.

SUMMARY

MISCELLANEOUS TARGETS

BOMBING EFFECTS OF NORMAL BOMBS IN JAPAN

The subject of bombing effects of normal bombs appears to have been adequately covered by the Physical Damage Section of United States Strategic Bombing Survey. The following is a list of targets which have been investigated by USSBS:

1. UBE — UBE Soda Company - 10,000# bomb.
   Team Chief - Major Edw. BRINKMAN.
   Team Members - Fire analyst, ordnance men, architects, photographer, photo-analyst and interpreter.

2. OTAKE — OTAKE Oil Refinery - 500# G.P.

3. KURE
   a. Naval Arsenal, Foundry and Heavy Ordnance Plants - 2000#, 1000# and 500# bombs.
   b. HIRO Naval Aircraft Factory - 2000# and 1000# bombs.
   c. HIRO Naval Engineering and Turbine Factory - 2000# and 1000# bombs.

4. AKASHI — KAWASAKI Aircraft Co. - 4000# L.C.

5. KOBE — KAWASAKI Locomotive and Car Works - Direct hit from 10,000# bomb.
   Field Party - One ordnance man, two structural engineers, two engineers, photo-analysts and interpreters.

6. AKASHI — Fire Study from M-69 bombs.

7. YOKKAICHI — UTSUBE Oil Refinery - 4000# L.C. and 500# G.P. bombs.

8. NAGOYA
   a. AICHI Ordnance Plant - 4000# L.C., 1000# and 200# bombs.
   b. AICHI Aircraft Engineering Plant - 4000# L.C., 1000# and 200# bombs.
   c. AICHI Aircraft Works (EITAKU Plant) - 2000# bombs.
   Team Chief - Major BENNET.

9. NAGOYA — Industrial Area - Four raids.

10.	KOROMO	TOYODO - Automotive and TORIIMATSU Arsenal.
11.	SHIMADO	City of SHIMADO - 10,000# bombs.
12.	SHIZUOKA	Aircraft Engineering Plant - 2000# G.P. bombs.
13.	HACHIOJI	M-17 and M-47 bombs. 1.12 sq. miles.
14.	TOKYO	NAKAJIMA Aircraft Plant (TORMA Plant) - 2000# G.P. bombs, plus carrier-based raid. Three story reinforced concrete building. Team Chief - Major GUILL.
15.	HITACHI	HITACHI Engineering Works (KAIGAU Plant) - 2000# G.P. bombs - saturation raid - completely destroyed.
16.	IMABARI	a. SUMITOMO Aluminum Reduction Plant - 10,000# bomb-direct hit. b. SUMITOMO Chemical Company - 10,000# bomb - direct hit.
17.	OSAKA	a. OSAKA Army Arsenal - 2000# and 1000# bombs. b. SUMITOMO Metal Industrial and Aluminum Company - 4000# and 2000# bombs. c. KAWANISHI Aircraft (NARUO Plant) - 1000# bombs. d. KAWANISHI Aircraft (TAKARAZUKA Plant) Team Chief - Major McCORD.

The field teams were made up of structural engineers, engineers, architects, photographers, draftsmen, and interpreters. In an interview with Major STEAD, assistant to Lt. Col. CHAPMAN, head of the Physical Damage Section of USSBS, it was learned that the targets listed above were very thoroughly investigated, adequate competent personnel being available. Field teams spent as much as five weeks on their investigations, which included confiscation of plans (where available), or making details of structures (where plans were unavailable), photographing of damage, determining causes of structural failures and similar items of interest.

The findings of this section will not be incorporated into report form here in JAPAN. It is felt however, that the investigations made were complete and no further investigation by NavTechJap is considered necessary.

SUMMARY

MISCELLANEOUS TARGETS

BOMBPROOF CONSTRUCTION IN JAPAN

In the field of bombproof construction there are three main subdivisions, namely: construction above ground, construction in tunnels and caves, and underground structures specially constructed.

On low lying flat areas it was necessary to design and build bombproof structures wholly above ground. Although designs were made for construction against 1000 and 2000 pound bombs, construction was realized only for protection against the 500 pound bomb. The average amount of protection given was reinforced concrete construction of 1.5 meters in thickness, overlayed with earth. Structures thus built were used for personnel shelters, and for miscellaneous small shops. They were, on the whole, well designed and well executed. Most of this type of construction was very high priority work and was not too common because of the shortage and expense of materials and skilled labor. The common type of bombproof construction in Japan is the tunnel or cave, since the geological structure and the terrain lent themselves ideally to this type of construction and the minimum amount of skilled labor, material, and equipment is needed. Japan abounds in examples of tunnel construction. On the whole they served the purpose for which they were intended but, from a construction viewpoint, few could be called good. Most of the tunnels were damp, the only drainage being accomplished by ditches on the tunnel sides. Ventilation always was poor and artificial ventilation seldom was used. Lighting was barely sufficient; heat and toilet facilities were nonexistent. The majority of tunnels were unlined and unshored due to the excellent shale material in which they were dug. Tunnels were lined only when the span became too great and these tunnels of concrete arch design were well constructed. One of the most outstanding examples of this latter type of tunnel exists at YOKOSUKA airfield, where a concrete arched tunnel of 20 meter span was constructed without shoring.

Specially constructed bombproof structures below ground were extemely rare, owing to shortages of materials and skilled labor. One excellent example was investigated, the Underground Headquarters of the Japanese Navy Ministry. Here was a structure designed against the direct hit of a 5000 pound bomb and although it received no direct hits, it survived the bombing raids on TOKYO. Constructed in 1941-42, it shows evidence of much thought and planning. It contained adequate heating, ventilating, lighting, and drainage facilities. This structure would compare favorably with any similar design in the United States and is of great interest to American engineers.

Apparently the Japanese realized too late the importance of bombproofing and dispersal. The scarcity of materials and skilled labor accounted for much of the poor and unfinished construction. When they did design and plan and were able to carry through, the results usually were good.

SUMMARY

MISCELLANEOUS TARGETS

CAMOUFLAGE OF JAPANESE SHIPS AND NAVAL INSTALLATIONS

Investigation of Japanese naval camouflage revealed that the Japanese took little interest until the latter half of the war, when their strategic position stimulated interest in camouflage. Naval vessels were for the most part painted plain grey, while experiments were conducted in camouflaging aircraft carriers and merchant ships, resulting in more or less standard camouflaging for those respective types.

Elaborate concealment and camouflage was carried out on ships in port, but although all instances of this were done on much the same principles, no standardized system or doctrine was ever developed.

Camouflaging of shore installations was seen at its best in installations built completely or partly underground, while the standard methods, such as concealment with nets and painting, were employed for installations above ground. Camouflage painting of shore installations had as its purpose confusion of the enemy during actual bombing runs rather than counteraction of photographic reconnaissance and was based on elaborate theories of brightness and visibility developed by civilian experts.

No research was ever conducted on camouflaging against infra-red reconnaissance, and no special anti-infra-red materials or techniques were developed.

SUMMARY

MISCELLANEOUS TARGETS

DESIGN OF JAPANESE STRUCTURES

The navy yards in Japan are not, on the whole, as well equipped as are similar yards in the United States. The construction of dry docks is usually good, but the utilities and dockside facilities are below the U.S. average.

At Kure Navy Yard, Dry Docks No. 3 and No. 4 are in operating condition, but the facilities ashore have been disturbed and no major overhaul of ships could be accomplished. Dry Dock No. 4 can accommodate the largest ship in the fleet, and Dock No. 3 can handle ships up to 200 meters. The shipbuilding dock is a very large dock, but has been used since the end of the war as a graveyard for midget submarines, scrap metal and other debris, and would require considerable work to put it in shape. The yard, on the whole, is ideal for the anchoring of ships, unloading of supplies, and for making limited repairs to ships. Dockside maintenance shops could be considered inoperative.

Information obtained on Dry Docks No. 1 through No. 7 at Sasebo Navy Yard showed dimensions, utilities, and dockside cranes. Information was also obtained on the general layout of the yard; additional information was obtained on the construction of ships and probably one of the largest floating cranes in Japan.

At Yokosuka Navy Yard, Dry Docks No. 4, No. 5, and No. 6 were found to be in operative condition. Dry Dock No. 6 can accommodate the largest of ships, and has six usable, large dockside cranes. Dry Dock No. 5 has suffered slight damage to the dock wall, but is in usable condition. Crane facilities are, however, limited to one 30-ton crane. Dock No. 4 is also in working condition, and can be used along with the two 20-ton hammerhead cranes. The weak links at the three docks are: (a) the poor condition of the caissons, and (b) the lack of dockside maintenance and repair shops. At Yokosuka Navy Yard there is one large hammerhead crane of 350 ton capacity in operating condition; it is being used daily in loading and unloading of ships. Maintenance at the yard has not been kept up since the war's end, and as a result, facilities are fast becoming poor. The docks themselves are typical and well constructed, and are not unusual or novel in their design.

At KOBE, the Mitsubishi Shipbuilding Company had constructed the only floating dry docks in Japan. The Navy Ministry had done little or nothing in the field of floating dry docks. The three docks at KOBE are old in design and construction, and far inferior to the floating dry docks designed by the United States during this war. In addition to these docks, there is one dry dock in the yard of very recent construction, started about 1939. It was the intention to make this dock one of the largest in Japan, but lack of materials forced the reduction in size to a fraction of its original intended length.

At Nagasaki Shipyard and Engine Works, information was obtained on Dry Docks Nos. 1, 2, and 3, which showed the sizes and shapes of these docks. In addition, answers to a questionnaire on the docks give a very complete picture of the yard.

continued

Of the two main types of hangars found in Japan, the double two-hinged arch type represents the pre-war trend in permanent hangar construction. It is a well designed and well executed structure. It uses less steel than hangars of equal size in the United States. However, it lacks refinements found in Navy hangars and is not as convenient or as completely equipped. The second type of hangar, the "Diamond Truss", is most unusual in design and the results are very good. This "Diamond Truss", or skew arch design, embodies the designer's dream of a structure of maximum strength with a minimum use of steel and erection cost. The resulting structure appears from the exterior to be an ordinary arch type structure, but the low cost of this hangar marks it as one for study by American designers.

The shortage of critical materials during the war forced the Japanese to depart radically from pre-war design standards. Refinements in weights of materials and bearing powers of soils allowed the designer to keep within the code and still save material. Wind and snow loads were reduced and factors were introduced to protect areas experiencing unusual conditions. Very few large and modern earthquake-proof structures were built because of material shortages. Earthquake protection was based on a seismic coefficient of from 0.15 to 0.12 gravity. In the field of timber construction, basic design stresses were raised and additional increases were allowed for material specifically selected. Allowable stresses in steel were raised to an unbelievable new high, approximately 34,000 pounds per square inch.

For specific structures, such as houses and housing units, limits were placed on size, shape, types of materials, design loads, and utilities to be used. All this was done with a view toward keeping the material used to a minimum and to prohibit the use of critical materials.

NavTechJap Report, "Bombproof Construction in Japan", Index No. X-31, contains a description of the underground headquarters of the Japanese Navy Ministry. In addition to being a bombproof structure, it is also an unusual one and is therefore referenced to this report. Similarly, NavTechJap Report, "Earthquake Resistant Construction in Japan", Index No. X-12, is referenced to this report.

SUMMARY

MISCELLANEOUS TARGETS

MAGNETIC DEVELOPMENT IN JAPAN DURING WORLD WAR II

The subject of magnetism in Japan may be discussed under three headings: research, manufacture, and applications.

Research on new magnetic materials and magnetic phenomena was carried on in universities, and was not affected seriously by the war until many of the laboratories were destroyed by bombing. There was little co-operation with the Army and Navy. The research was influenced substantially by Japan's lack of nickel and cobalt, and led to the development of a new iron-aluminum alloy, Alfer, which was used in magnetostriction oscillators as a substitute for nickel. The Japanese also investigated the iron-nickel-silicon alloys and found one having low nickel content and high permeability. Studies of these alloys and of iron-silicon alloys of high purity have raised some interesting scientific problems regarding magnetostriction and superstructure.

The Japanese manufacture about twenty different magnetic materials, of which four are not made in America. These are Alfer, already referred to; Sendust, a high-permeability alloy of iron, silicon and aluminum; and two permanent magnet materials, NKS and OP, both of which were developed before the war. On the other hand, Japan manufactures only a small quantity of the high-nickel, high-permeability alloys used in quantity in the United States, and does not make any of our best permanent magnet material, Alnico V. Their manufacturing processes are on a par with those used ten years ago in the United States and elsewhere. For example, silicon-iron transformer sheet is never processed by cold rolling.

One important new application of magnetic materials has been the use of Alfer in magnetostriction supersonic projectors and microphones. The NKS permanent magnet alloy and the high-permeability Sendust have been used in various kinds of apparatus in conventional ways. In the theory of the magnetic amplifier, they are far behind the United States and Germany. No evidence was found that the Japanese Navy ever received magnetic amplifiers from Germany or that they ever used them.

NavTechJap personnel interviewed about 60 individuals and visited 20 plants and institutions located between SENDAI, Honshu and FUKUOKA, Kyushu. In common with other investigators, the group found evidence of an amazing lack of co-ordination or even sympathy between military authorities and civilian scientists or manufacturers. Even when requested by military officials to undertake certain investigations, scientists were not sufficiently informed as to the ultimate objects to enable them to attack the problems in an intelligent manner, and consequently could not make important contributions to the war effort.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE METALLURGICAL SPECIFICATIONS
IRON AND STEEL, SPECIAL STEELS, SPECIAL NON-FERROUS ALLOYS

This report contains tabulations of some of the more important metallurgical specifications used in the Japanese Navy, including iron and steel, special steels and special non-ferrous metals. Principal critical alloying elements were nickel, molybdenum and tungsten. The substitute alloys developed did not approximate the prewar variety as closely as did the NE steels in the United States.

The critical metal-saving alloys were developed for special case-hardened parts, special structural steel, high-speed steel, non-magnetic wire rope, aircraft armor plate, ball bearing steel, non-ferrous alloy piston and cylinder head castings, special casting alloys, carbon steel, stainless steel, cannon-ball steel, fish-torpedo steel, and others as indicated in the tables of this report.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE WELDING STANDARDS

This report covers welding standards in the Japanese Navy, including methods, materials and specifications. In general, the standards in both material and workmanship are decidedly lower than those encountered in U.S. Navy practice. A shortage of materials and skilled labor are contributing factors, but the technical ability of Japanese welding engineers is unquestionably lower than that of their American counterparts. The Japanese Navy did not make the widespread use of welding but restricted its use to limited applications.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE METHODS OF HIGH FREQUENCY INDUCTION HEATING AND MELTING

Although the Japanese have installed many more high frequency induction furnaces, in proportion to the size and importance of their country, than other countries, they have not used them as effectively or for as varied a field of application as have others. Except for the melting of special metals and alloy steels, the making of tungsten carbides, and one experimental armor plate hardening process, the Japanese apparently overlooked the value of this method of heating in the manufacture of war materials.

With about 18,000 kw of melting capacity reported before the war, Japan added 20,000 additional kw of melting capacity during the war. Less than 700 kw was allocated for experimental work in the field of heating for hardening, surface hardening, or forging operations. Overlooking the war losses and the kilowattage installed by the other Axis countries during the war, (the figures for which are not available) Japan has some 18% of the world's total high frequency melting capacity.

Japan's status in the induction heating field can be said to be dated between 1930 and 1933. The writer introduced the first commercial equipment in 1930, and finds that the technique and type of apparatus used is substantially the same now as then, even though great strides have been reported widely in the patent and trade literature, especially in the U.S. Research and introduction of improvements have been almost nil.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE FUELS AND LUBRICANTS - ARTICLE 1
FUEL AND LUBRICANTS TECHNOLOGY

The U. S. Naval Technical Mission to Japan has investigated several aspects of Japanese fuel and lubricant technology, with particular emphasis on the research of the Japanese Navy, and has reported the findings in detail in nine current reports.

This report presents a brief itemization of aspects of this investigation judged to be of particular interest to the U. S. Navy, and lists a few original Japanese developments on which further study may be warranted.

The significant feature of the Japanese Navy's petroleum policy is the fact that it did not rely upon industry for research and refining. Instead, the Navy built, just before the outbreak of the war, one of the world's largest fuel and lubricant research institutions at OFUNA, and also built and operated two of the largest refineries in Japan. While the Army and private industry carried on independent research, the investigation indicated that the research of the Navy was foremost and, therefore, the referenced and detailed reports on fuels and lubricants present the most advanced technological information in Japan.

Aside from the purely technical aspects of fuel and lubricant development, comments are presented relative to the scientific stature of the Japanese people, and it is concluded that Japanese technical ability has been underestimated.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE FUELS AND LUBRICANTS - ARTICLE
NAVAL RESEARCH ON AVIATION GASOLINE

The Japanese fleet air arm utilized a combat aviation gasoline of 91 or 92 CFR-M octane number except during the last months of the war when concessions in quality became necessary to maintain supply. Aviation fuel of 100 octane number was made only in experimental quantities.

Considerable research attention was concentrated by the First Naval Fuel Depot, OFUNA, on developing a wide variety of processes, including alkylation, isomerization polymerization, hydrogenation, catalytic reforming and catalytic cracking, for manufacturing iso-octane and other high octane blending stocks. Commercial scale installations were made of all these processes, with the exception of isomerization and catalytic reforming. Particular ingenuity was demonstrated in the development of a large commercial plant for synthesis of iso-octane from acetylene derived from calcium carbide. The research and development work of the Japanese Navy played a leading part in the growth of the growth of the aviation industry in Japan.

Complete facilities were installed at the First Naval Fuel Depot, OFUNA, for the service testing of aviation fuels and lubricants, including full-scale aircraft engine test stands and an elaborate high-altitude low-temperature cold room. Numerous special fuel blends, dopes and anti-detonants were tested, and fundamantal combustion studies were made.

Although in the last year of the war frantic efforts were made to utilize various substitute aviation fuel sources, expecially alcohol and pine root oil, none of these materials, and no dopes or anti-detonants other than tetra-ethyl fluid were actually used in combat aviation fuels; however, ethyl alcohol was used for training purposes.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE FUELS AND LUBRICANTS - ARTICLE 3
NAVAL RESEARCH ON ALCOHOL FUELS

Japanese Naval Research pertaining to the production of alcohols from various sources and the application of alcoholic aviation fuels has been investigated. This report deals primarily with the improvement of fermentation techniques, the synthesis of alcohols, and the practical testing of alcoholic aviation gasolines. This program was, for the most part, carried out during the last year of the war and was necessitated by the acute scarcity of conventional aviation gasoline. Interesting findings include the fact that approximately one pound of ethyl alcohol could be produced by fermentation from eleven pounds of sweet potatoes and that, after a years research, it was found necessary to limit the use of ethyl alcohol fuels to training planes in view of its service performance characteristics.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE FUELS AND LUBRICANTS - ARTICLE 4
PINE ROOT OIL PROGRAM

The Japanese program for obtaining aviation gasoline and other liquid fuels from the dry distillation product of pine roots has been investigated. This program called for the erection of 36,000 small scale distillation units throughout Japan having an annual capacity of 2,500,000 barrels of pine root crude oil on a one to two year basis. By subsequent catalytic cracking or hydrocracking of this crude oil, it was planned to produce annually some 400,000 barrels per year of an aviation gasoline having an octane number of 90-94 with 0.15 per cent volume of lead. Full scale tests showed the performance of this fuel to be comparable to that of conventional aviation gasolines. An interesting technical development of this program was the successful catalytic conversion on a commercial scale of terpenes to aromatics. This source of fuel is not economically feasible in peace time, and it can only be considered as an emergency measure necessitated by the acute scarcity of conventional hydrocarbon-type fuels in the closing year of the war. However, the program is of significance in that it demonstrates the technical resourcefulness of the Japanese in the face of impending disaster.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE FUELS AND LUBRICANTS - ARTICLE 5
RESEARCH ON ROCKET FUELS OF THE HYDROGEN PEROXIDE-HYDRAZINE TYPE

Japanese naval research pertaining to rocket fuels of the hydrogen peroxide-hydrazine type has been investigated. This report deals primarily with the manufacture of hydrazine and 80% hydrogen peroxide solutions and with combustion studies of the reaction between these two materials. This rocket fuel was to be utilized principally in the newly developed SHUSUI airplane. It was reported that only one flight test was successfully completed before the termination of the war.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE FUELS AND LUBRICANTS - ARTICLE 6
RESEARCH ON DIESEL AND BOILER FUEL
AT THE FIRST NAVAL FUEL DEPOT, OFUNA

Japanese naval research pertaining to diesel and boiler fuels, as conducted at the First Naval Fuel Depot at OFUNA, has been investigated. No conspicuous progress was made in these fields, as the greater technical emphasis was on the aviation fuel research program. One interesting item was the Japanese Navy's minimum specific gravity specification for diesel fuel used in submarines, established in view of ballasting considerations. An important development was the use during the war period of 1% aluminum stearate as a pour point depressant for waxy bunker fuels obtained from Netherlands East Indies crudes. In the last year of the war the supply of both diesel and bunker fuels from petroleum sources became most critical and substitute fuels were sought. The urgency of this problem is illustrated by the fact that as a last desperate measure, edible refined soya bean oil was used as bunker fuel on the Japanese battleship YAMATO in the battle of OKINAWA.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE FUELS AND LUBRICANTS - ARTICLE 7
PROGRESS IN THE SYNTHESIS OF LIQUID FUELS FROM COAL

Impelled by the lack of petroleum resources, Japan made a determined effort to develop an industry for converting coal into oil. Paralleling the program in Germany, emphasis was placed on three primary coal conversion processes: high pressure hydrogenation, the Fischer-Tropsch Synthesis, and low-temperature carbonization.

Although the Japanese Navy initiated research on coal hydrogenation in 1925, only two commercial-scale coal hydrogenation plants were installed in the Japanese Empire. These plants were based on the Japanese Navy's 200-Atmosphere process with modifications by the respective operating companies. The actual production of oil from coal was insignificant, since one plant, at AGOCHI, Korea, never achieved continuous operation, and the other, at FUSHUN, Manchuria, operated only intermittently. Visits to these plants by The U. S. Naval Technical Mission to Japan were not feasible in view of the unsettled military conditions in those areas.

The Fischer-Tropsch industry in Japan was based primarily on Ruhrchemie patents purchased by the MITSUI interests in 1936. Only three plants ever produced oil and the actual output of each was well below design capacity. Two of these plants operated at normal pressure and utilized a cobalt catalyst, while the other operated at middle pressure and used both cobalt and iron catalysts. The iron catalysts were the product of Japanese research, the manufacturing details of which are fully described herein.

The most important source of liquid fuels from coal was the low-temperature carbonization process. Most of the installations were Lurgi or Koppers ovens, and all evidence indicated that no coal carbonization process of Japanese design was successfully operated.

The Japanese "Seven-Year Plan" called for production of 2,000,000 kiloliters of liquid fuels from coal by 1943. Actual production in the peak year, 1944, was only 113,000 kiloliters. The plan was a failure due to stoppage of foreign machinery imports by the war, diversion of critical materials during the war, and technical difficulties encountered with the coal hydrogenation and the Fischer-Tropsch processes. As a matter of interest, the output of oil from shale at FUSHUN, until 1944, exceeded the combined output from all coal conversion processes.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE FUELS AND LUBRICANTS-ARTICLE 8
NAVAL RESEARCH ON LUBRICANTS

Japanese naval research pertaining to lubricating oils has been investigated. The scarcity of Japanese crude oils having characteristics suitable for the manufacture of aircraft engine lubricants necessitated the use of imported crude oils for this purpose. As this supply was depleted, it became necessary to consider non-petroleum sources. The synthesis of lubricating oils from shale oil, paraffin wax, fatty oils, Fischer-Tropsch liquid, rubber, and other sources was studied at the First Naval Fuel Depot and other research laboratories. In applying these lubricants to practice, the use of oxidation inhibitors, oiliness agents, and other additives was frequently necessitated, in view of service performance limitations. Hence, additive studies were included as an essential part of the Navy's research program.

Perhaps the most important phase of lubricant research included in this report is the fundamental study of the relationship between structure and lubricant characteristics made by Dr. I. KAGEHIRA and co-workers. This research indicated that structures in which saturated cyclohexane rings are joined in the "para"-position either by single bonds or by paraffinic chains, are the most suitable for lubricating oils. These theories were reflected in the synthetic lubricant research conducted at the First Naval Fuel Depot.

It is believed that this report presents a broad picture of the lubricant requirements of the Japanese Navy during the war and includes detailed information on many special products peculiar to naval use.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE FUELS AND LUBRICANTS - ARTICLE 9
FUNDAMENTAL HYDROCARBON RESEARCH

This report summarizes data relative to the properties of pure hydrocarbons compiled for the Petroleum Section of the U.S. Naval Technical Mission to Japan by Dr. S. KOMATSU of the First Naval Fuel Depot, OFUNA. These data have been obtained by Dr. KOMATSU and his associates at the Imperial Universities and Institutes throughout Japan. It is Dr. KOMATSU's contention that the chemical behavior of organic compounds can frequently be anticipated by a consideration of the physical properties. In the report which he has submitted, he discusses the application of the physical characteristics of hydrocarbons to the selection of proper treating methods in preparing hydrocarbon fuels. Fuel research programs at OFUNA utilizing these fundamental studies as theoretical background are described in reports of the U.S. Naval Technical Mission to Japan relative to the pine root oil program in Japan and to the aviation gasoline research conducted by the Japanese Navy.

SUMMARY

MISCELLANEOUS TARGETS

JAPANESE FUELS AND LUBRICANTS - ARTICLE 10
OIL TECHNOLOGY AND REFINING INSTALLATIONS

This report includes certain miscellaneous data pertaining to petroleum refining installations and technology obtained by the Petroleum Section of the U. S. Naval Technical Mission to Japan.

The refining industry in Japan was based largely on imports of foreign crudes principally from the United States, and the refining techniques utilized were chiefly drawn from American practice.

An expensive industry was developed for the manufacture of refining equipment and the newer refineries were essentially 100% Japanese-made. The quality and appearance of such equipment as pressure vessels, tanks, pumps, and heat exchangers compared favorably with that produced in America.

The Japanese refining technology differed from American mainly with regard to processes utilized for the production of aviation gasoline. The manufacture of iso-octane by alkylation and polymerization was very limited due to inadequate supplies of C_4 hydrocarbons. Emphasis was put on the hydrocracking of kerosene and gas oils, with strenuous efforts being made to develop a fixed-bed catalytic cracking process. Several plants were put into operation by late 1943, using Japanese acid clay as a catalyst. The fluid-catalyst technique was unknown to Japan.

With regard to manufacture of oil from shale, a plant for refining crude wax shipped from the shale works at FUSHUN, was visited at TOKUYAMA, but no evidence of the existence of any shale mining or retorting operations in Japan was discovered.

SUMMARY

MISCELLANEOUS TARGETS

MISCELLANEOUS REPORTS OF VARIOUS
JAPANESE NAVAL RESEARCH ACTIVITIES

Many reports on the research projects underway in Japan at the time of the surrender have been submitted by various Japanese research activities. The reports contained herein constitute those which were either received too late to include in the target reports to which they logically pertain or were not pertinent to any specific target.

To obtain these reports, a list of all research programs underway when the Japanese surrendered was ordered to be submitted to the Occupation Forces, and from the list were chosen those subjects upon which full reports were desired. The Japanese government was ordered to arrange for their preparation. To do this they created the Central Laboratory of the Home Ministry located at Meguro Ku, TOKYO, which laboratory replaced specifically the First and Second Naval Technical Institutes but in practice represented all naval research organizations in Japan and acted as a clearing house for the majority of the reports obtained. The Central Laboratory assembled the key technicians that had been participating in those programs on which reports were desired and produced the reports which are presented here.

SUMMARY

MISCELLANEOUS TARGETS

OCEANOGRAPHY IN JAPAN

The present report on oceanography in Japan since 1940 is based on interviews with naval and civilian marine scientists, published documents, unpublished manuscripts and data, and discussions on investigations now underway. In the course of the work conferences were held with 83 scientists representing 41 institutions and departments concerned with various aspects of oceanography.

The report contains a discussion of the importance of oceanography in Japan, its status when the war began, and action taken to meet increased military requirements. War projects, undertaken at the request of the Army and Navy, and non-military research are presented, with the explanations of the Japanese scientists who directed the work.

The status of Japanese marine laboratories in 1946 is described in Enclosure (B). Preparatory work, prior to undertaking the mission, included a review of a report by Dr. T. Weyland Vaughan summarizing Japanese oceanographic and marine biological laboratories in 1937. For convenience in determining wartime changes the form adopted in the present report is the same as that used in Dr. Vaughan's report. Of the 23 principal Japanese marine laboratories established before 1940, all but three remain, and are either operating now or planning to resume work shortly. Operating budgets for future work cannot be estimated at the present time. The Palau Tropical Biological Station was completely destroyed and cannot be restored because the area will no longer remain under Japanese control. The government stations in Korea and Formosa are also no longer Japanese but will be continued under local government auspices. In the home islands three important new marine stations were established during the war. Six laboratories were occupied either by Japanese or American forces, eight were damaged by bombing, and four staff members were killed or severely injured.

The work of Japanese marine investigators since 1940 is recorded in 61 manuscripts (Enclosure E), 2,317 other documents (Enclosure E), and 84 disc recordings on subsurface noises (Enclosure I), which have been sent to the U.S. Hydrographic Office for use by the Oceanographic Division and cooperating marine laboratories. Publications in most cases stopped by 1944, owing to a shortage of materials rather than involvement of any appreciable number of scientific personnel in the military effort.

Relatively little use was made of trained oceanographers by the Navy and even less by the Army. Most scientists continued their prewar studies except when granted funds by the National Research Council for work on special war projects after 1942.

ENCLOSURE (D)

ENCLOSURE (D)

DOCUMENT SUMMARY

In the course of its investigations, the U.S. Naval Technical Mission to Japan seized thousands of Japanese documents from navy yards, depots, and other shore installations, from experimental laboratories, schools, and factories maintained by or connected with the Japanese Navy, and from naval vessels. After seizure the documents were assembled at the four NavTechJap collection points, SASEBO, KURE, KOBE, and YOKOSUKA and screened by representatives having cognizance of the material they contained. By this procedure duplication and unnecessary handling of useless documents were eliminated. After screening, the documents were numbered in accordance with the system described below. Thereafter, as soon as whatever local exploitation was necessary had been completed, the documents were forwarded to NavTechJap headquarters in TOKYO. There the officers preparing target reports took custody of documents pertinent to their respective targets. In a few instances, documents have been reproduced as part of a report, but, in general, the procedure has been to extract the required information, list the documents as references, and evacuate them separately. With few exceptions documents not used in the preparation of reports have been destroyed. The exceptions include documents requested by naval activities, some documents of interest to other military or governmental agencies in Japan, and a few documents of general interest turned over to the Washington Document Center. Approximately 3500 documents were evacuated to the United States.

Documents seized by NavTechJap were evacuated in accordance with GHQ, Supreme Commander Allied Powers, General Order Number 9, dated 2 October 1945. Thus, most documents were turned over to the Washington Document Center (ADVON) in TOKYO to be made accessible to other agencies in the theater for a period of two weeks, following which they were shipped to Washington Document Center, Washington, D. C. Documents of interest only to a single agency of the Navy were shipped by NavTechJap directly to the cognizant bureau or activity.

Documents seized by NavTechJap were numbered as follows: All bear the prefix ND followed by a two-digit number indicating the collection point, viz:

ND10	SASEBO
ND21	YOKOSUKA
ND22	KURE

In addition to the above, documents numbered at NavTechJap headquarters bear the prefix ND50, those collected by the Petroleum Section ND26, and certain documents collected in KYUSHU by NavTechJap Team 25 are prefixed ND25. Following the prefix and separated from it by a dash is a four digit serial number. To this may be appended a decimal point and a one or two-digit number, this device being used to designate individual items within a batch of related documents which have been grouped for reference.

NavTechJap documents evacuated through the Washington Document Center also bear an ATIS number, in the block assigned to this activity by Allied Translation and Interpretation Section, G-2, GHQ. These are four digit numbers between 3000 and 5000 and serve to identify the documents at the Washington Document Center, which has listed them in its shipping advices covering NavTechJap documents.

The following lists include all documents evacuated by NavTechJap directly or turned over to Washington Document Center. The lists include cross indices of ATIS, NavTechJap and WDC Document numbers and a compilation of documents grouped by report index numbers which correspond to the pertinent target numbers established in "Intelligence Targets Japan" (DNI) of 4 September 1945.

The Washington Document Center has established a file of ATIS vs NavTechJap Document numbers for documents filed there by NavTechJap. Document numbers assigned by WDC are listed only for those documents which were processed at the time of publication of this summary. (Where a document has been forwarded to an activity other than WDC, the disposition has been indicated.)

ENCLOSURE (D), continued

CROSS-INDEX OF ATIS, NAVTECHJAP AND WDC DOCUMENT NUMBERS

ATIS No.	NavTechJap No.	WDC No.
3001	ND25-0022	
3002	ND25-0023	202393
3003	ND25-0024	202391
3004	ND25-0025	202392
3005	ND25-0026	202395
3006	ND25-0027	202396
3007	ND25-0028	202397
3008	ND25-0029	202380
3009	ND25-0030	202381
3010	ND25-0031	
3011	ND25-0032	
3012	ND25-0033	202382
3013	ND25-0034	202383
3014	ND25-0035	
3015	ND25-0021	
3016	ND22-0020 to ND22-0028	
3017	ND25-0036	
3018	ND25-0037	
3019	ND25-0016	
3020	ND25-0017	202384
3021	ND25-0019	
3022	ND25-0018	202386
3023	ND50-1094	202400
3024	ND25-0013	202387
3025	ND25-0014	202388
3026	ND25-0002	
3027	ND25-0012	
3028	ND25-0011	202385
3029	ND25-0010	
3030	ND25-0009	
3031	ND25-0007	202389
3032	ND25-0003	
3033	ND25-0001	202390
3034	ND25-0004	(Tech. Air Intell.)
3035	ND25-0005	(Tech. Air Intell.)
3036	ND25-0006	(Tech. Air Intell.)
3037	ND25-0008	
3038	ND25-0015	(Tech. Air Intell.)
3039	ND25-0020	
3040	Void	
3041	ND50-1101.1	202401
3042	ND50-1101.2	202402
3043	ND50-1100.6	202403
3044	ND50-1100.5	202394
3045	ND50-1099	202404
3046	ND50-1098	202405
3047	ND50-1097	202406
3048	ND50-1096	202407
3049	ND50-1095	202408
3050	ND50-1093	202410
3051	ND50-1092	202411
3052	ND50-1102	202409
3053	ND50-1090.1	202412
3054	ND50-1090.2	202413
3055	ND50-1091	(Encl. to Report)

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3056	ND50-1100.1	202414
3057	ND50-1100.2	202413
3058	ND50-1100.3	202416
3059	ND50-1100.4	202417
3060	ND50-1100.7	(Encl. to Report)
3061	ND10-3202	(BuOrd)
3062	ND50-1107	202418
3063	ND50-1108	202419
3064	ND50-1106	202420
3065	Void	
3067	Void	
3068	ND10-6000	249849
3069	Void	
3070	Void	
3071	ND10-2000	189721
3072	ND50-1105	202421
3073	ND50-1109	202397
3074	Void	
3076	ND10-0500	
3077	ND50-1104	202398
3078	Void	
3079	Void	
3080	Void	
3081	Void	
3082	Void	
3083	Void	
3084	ND50-1130	202422
3085	ND50-3200 to ND50-3202	(Encl. to Report)
3086	ND50-1103	202399
3087	ND50-5000	189709
3088*	ND50-5001	189710
3089	ND50-5004	189719
3090	ND50-5006	189714
3091	ND50-5008	189704
3092	ND50-5010	189701
3093	ND50-5012	189730
3094	ND50-5014	189727
3095	ND50-5016	189723
3096	ND50-5018	189731
3097	ND50-5020	189706
3098	ND50-5022	189706
3099	ND50-5024	189705
3100	ND50-5026	189720
3101*	ND50-5003	189707
3102*	ND50-5005	189718
3103*	ND50-5007	189713
3104*	ND50-5009	189703
3105*	ND50-5011	189702
3106*	ND50-5013	189729
3107*	ND50-5015	189728
3108*	ND50-5017	189722
3109	ND21-7503	189733 to 189743
3110	ND21-7505	189711
3111	ND21-7515	189759, 189760

* Copy to BuShips

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3112	ND21-7517	189732
3113	ND21-7516	189744
3114	ND21-7506	189712
3115	ND21-7511	189746 to 189757
3116	ND21-7512	189765
3117	Void	
3118	ND21-7524	189726
3119	ND21-7527	189717, 189745
3120	ND10-7501	(NMRI)
3121	ND10-7502	(NMRI)
3122	ND21-7514	21183
3123	ND50-0001	189715
3124	ND50-0002	
3125	ND21-7509	211834
3126	ND50-0003	
3127	ND21-7520	(Encl. to Report)
3128	ND21-7521	211835, 212249
3129	ND21-7522	212250
3130	ND21-7525	189725
3131	ND50-0004	189708
3132	ND10-2504	
3133	ND10-2507	189761 to 189763
3134	ND10-2505	
3135	ND10-2506	
3136	ND10-2508	189724, 189764
3137	ND50-0005	
3138	ND50-5027	(Encl. to Report)
3139	ND50-5002	189708
3140	ND21-4550 to ND21-4552 ND21-4554 ND21-4557 to ND21-4561 ND21-4573 to ND21-4575 ND21-4577 to ND21-4578 ND21-4580 ND21-4582 to ND21-4584	189758
3141	ND50-1148	189700
3142	ND50-1146	
3143	ND50-1145	
3144	ND50-1144	
3145	ND50-1143	189716
3146	ND50-1140	245605-245668, 245693
3147	ND50-1141	245669-245692
3148	ND50-1142	245694-245723
3149	ND50-4001a	
3150	ND50-40002	
3151	ND50-3203	211836
3152	ND50-3204	211837
3153	ND50-1016	(BuShips)
3154	ND50-1017	(BuShips)
3155	ND50-1018	(BuShips)
3156	ND50-1019	(BuShips)
3157	ND50-1020	(BuShips)

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3158	ND50-1021	(BuShips)
3159	ND50-1022	(BuShips)
3160	ND50-1023	(BuShips)
3161	ND50-1024	(BuShips)
3162	ND50-1025	(BuShips)
3163	ND50-1026	(BuShips)
3164	ND50-1027	(BuShips)
3165	ND50-2999	211838
3166	ND50-1028	(BuShips)
3167	ND50-1029	(BuShips)
3168	ND50-1030	(BuShips)
3169	ND50-1031	(BuShips)
3170	ND50-1032	(BuShips)
3171	ND50-1033	(BuShips)
3172	ND50-1034	(BuShips)
3173	ND50-1035	(BuShips)
3174	ND50-1036	(BuShips)
3175	ND50-1037	(BuShips)
3176	ND50-1038	(BuShips)
3177	ND50-1039	(BuShips)
3178	ND50-1040	(BuShips)
3179	ND50-1041	(BuShips)
3180	ND50-1042	(BuShips)
3181	ND50-1043	(BuShips)
3182	ND50-1044	(BuShips)
3183	ND50-1045	(BuShips)
3184	ND50-1046	(BuShips)
3185	ND50-1047	(BuShips)
3186	ND50-1048	(BuShips)
3187	ND50-1000	(BuShips)
3188	ND50-1001	(BuShips)
3189	ND50-1002	(BuShips)
3190	ND50-1003	(BuShips)
3191	ND50-1004	(BuShips)
3192	ND50-1005	(BuShips)
3193	ND50-1006	(BuShips)
3194	ND50-1007	(BuShips)
3195	ND50-1008	(BuShips)
3196	ND50-1009	(BuShips)
3197	ND50-1010	(BuShips)
3198	ND50-1011	(BuShips)
3199	ND50-1012	(BuShips)
3200	ND50-1013	(BuShips)
3201	ND50-1014	(BuShips)
3202	ND50-1015	(BuShips)
3203	ND50-3205	(Encl. to Report)
3204	ND50-5028	211839
3205	ND5Q-5029	211840
3206	ND50-5030	211841
3207	ND50-5031	211842
3208	ND50-5032	211843
3209	ND50-5033	211844
3210	ND50-5034	211845
3211	ND50-5035	211846
3212	ND21-6260	211847
3213	ND21-6258	212601
3214	ND21-4566	
3215	ND21-4567	(Encl. to Report)

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3216	ND21-4568	(Encl. to Report)
3217	ND21-4569	(Encl. to Report)
3218	ND21-4570	(Encl. to Report)
3219	ND50-3206	(Encl. to Report)
3221	ND50-3211	(Encl. to Report)
3222	ND50-3212	(Encl. to Report)
3224	ND50-3214	(Encl. to Report)
3225	ND21-4563	211848
3226	ND21-4564	211849
3227	ND21-4562	212248
3228	ND50-1070	(BuShips)
3229	ND50-1071	(BuShips)
3230	ND50-1072	(BuShips)
3231	ND50-1073	(BuShips)
3232*	ND21-6000	213370
3233	ND50-1075	(BuShips)
3234	ND50-1076	(BuShips)
3235	ND50-1077	(BuShips)
3236	ND50-1078	(BuShips)
3237	ND50-1079	
3238	ND50-1080	(BuShips)
3239	ND50-1082	(BuShips)
3240	ND50-1083	(BuShips)
3241	ND50-1085	(BuShips)
3242	ND50-1084	(BuShips)
3243	ND50-1086	(BuShips)
3244	ND50-1087	(BuShips)
3245	ND50-1089	
3246	ND50-1177	
3247	ND50-1178	
3248	ND50-1179	
3249	ND50-1180	
3250	ND50-1181	
3251	ND50-1182	
3252	ND50-1183	
3253	ND50-1184	
3254	ND50-1185	
3255	ND21-6002	213371
3256	ND21-6013	213372
3257	ND21-6014	213373
3258	ND21-6015	213374
3259	ND21-6030	213375
3260	ND21-6043	213376
3261*	ND21-6044	213377
3262	ND21-6046	213378
3263	ND21-6047	213379
3264	ND21-6048	213380
3265	ND21-6052	213381
3266	ND21-6065	213382
3267	ND21-6173	213383
3268	ND21-6174	213384
3269	ND21-6175	213385
3270	ND21-6176	213386
3271	ND21-6177	213387

* Copy to BuShips

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3272	ND21-6178	213388
3273*	ND21-6179	213389
3274	ND21-6181	213390
3275	ND21-6182	213391
3276	ND21-6185	213392
3277	ND21-6269	213393
3278	ND50-1206	
3279	ND50-5400	
3280	ND50-1215	
3281	ND50-1217	
3282	ND50-1216	278535
3283	ND50-1159	
3284	ND50-1160	
3285	ND50-1161	
3286	ND50-1162	269553-269584
3287	ND50-1163	269585
3288	ND50-1164	
3289	ND50-1165	269820-269822
3290	ND50-1166	271550-271566-271568-271576
3291	ND50-1167	
3292	ND50-1168	
3293	ND50-1169	271577-269800-269814
3294	ND50-1170	269815-269819
3295	ND50-1171	
3296	ND50-1172	263799-269500-269552-271578 271596-271598-271602
3297	ND50-1195	271603-271605
3298	ND50-5901	
3299	ND50-5920	
3300	ND50-5900	
3301	ND21-6001	213394
3302	ND21-6017	213395
3303	ND21-6020	213396
3304	ND21-6033	213397
3305	ND21-6124	213398
3306	ND21-6125	213399
3307	ND21-6126	213400
3308	ND21-6128	213401
3309	ND21-6129	213402
3310	ND21-6130	213403
3311*	ND21-6131	213404
3312	ND21-6132	213405
3313*	ND21-6133	213406
3314	ND21-6136	213407
3315	ND21-6139	213408
3316	ND21-6148	213409
3317	ND21-6180	213410
3318*	ND21-6216.1	213411
3319*	ND21-6226	213412
3320*	ND21-6134	213413
3321	ND21-6135	213414
3322*	ND21-6137	213415
3323*	ND21-6138	213416
3324*	ND21-6140	213417
3325*	ND21-6141	213418
3326	ND21-6229	213419

* Copy to BuShips

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3327	ND21-6230	213420
3328	ND21-6073	213421
3329	ND21-6074	213422
3330*	ND21-6075	213423
3331	ND21-6076	213424
3332*	ND21-6077	213425
3333*	ND21-6078	213426
3334*	ND21-6079	213427
3335*	ND21-6080	213428
3336*	ND21-6081	213429
3337*	ND21-6082	213430
3338*	ND21-6083	213431
3339*	ND21-6084	213432
3340*	ND21-6085	213433
3341*	ND21-6086	213434
3342*	ND21-6087	213435
3343	ND21-6088	213436
3344	ND21-6089	213437
3345*	ND21-6090	213438
3346	ND21-6091	213439
3347	ND21-6092	213440
3348	ND21-6094	213441
3349*	ND21-6095	213442
3350*	ND21-6096	213443
3351*	ND21-6097	213444
3352*	ND21-6098	213445
3353*	ND21-6099	213446
3354	ND21-6100	213447
3355*	ND21-6102	213448
3356	ND21-6105	213449
3357	ND21-6155	213450
3358	ND21-6156	213451
3359	ND21-6157	213452
3360	ND21-6158	213453
3361	ND21-6159	213454
3362	ND21-6164	213455
3363	ND21-6208	213456
3364	ND21-6231	213457
3365*	ND21-6235	213458
3366*	ND21-6236	213459
3367*	ND21-6277	213460
3368	ND21-6274	213461
3369	ND21-6279	213462
3370	Assigned to document seized by FLTLOSCAP, no ND No.	210375
3371*	ND21-6093	213463
3372*	ND21-6233	213464
3373	ND50-5040	
3374	ND50-5041	
3375	ND50-5042	
3376	ND50-5043	
3377	ND50-5044	
3378	ND50-5045	
3379	ND50-5046	
3380	ND50-5047	

* Copy to BuShips

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3381	ND21-6003	213465
3382	ND21-6005	213466
3383	ND21-6027	213467
3384*	ND21-6101	213468
3385	ND21-6106	213469
3386*	ND21-6107	213470
3387*	ND21-6108	213471
3388*	ND21-6109	213472
3389*	ND21-6110	213473
3390*	ND21-6111	213474
3391	ND21-6112	213475
3392	ND21-6113	213476
3393*	ND21-6114	213477
3394*	ND21-6160	213478
3395	ND21-6163	213479
3396	ND21-6167	213480
3397	ND21-6168	213481
3398	ND21-6169	213482
3399	ND21-6170	213483
3400	ND21-6171	213484
3401	ND21-6172	213485
3402	ND21-6183	213486
3403	ND21-6213	213487
3404*	ND21-6216.2 to .7, .9	
3405	ND21-6223	213489
3406*	ND21-6232	213490
3407*	ND21-6275	213491
3408	ND21-6276	213492
3409	ND21-6278	213493
3410	ND21-6280	213494
3411	ND21-6237	213495
3412	ND21-6006	213496
3413	ND21-6007	213497
3414	ND21-6056	213498
3415	ND21-6142	213499
3416	ND21-6144	213500
3417	ND21-6145	213501
3418	ND21-6252	213502
3419	ND21-6253	213503
3420	ND21-6162	213504
3421*	ND21-6165	213505
3422*	ND21-6166	213506
3423	ND21-6070	213507
3424	ND21-6150	213508
3425	ND21-6151	213509
3426	ND21-6152	213510
3427	ND21-6153	213511
3428	ND21-6209	213512
3429	ND21-6211	213513
3430	ND21-6212	213514
3431	ND21-6214	213515
3432	ND21-6215	213516
3433	ND21-6238	213517
3434	ND21-6239	213518

* Copy to BuShips

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3435	ND21-6240	213519
3436	ND21-6241	213520
3437	ND21-6242	213521
3438	ND21-6243	213522
3439	ND21-6244	213523
3440	ND21-6245	213524
3441	ND21-6246	212147
3442	ND21-6248	212148
3443	ND21-6262	
3444	ND21-6263	
3445	ND21-6264	212149
3446	ND21-6265	212150
3447	ND21-6266	212151
3448	ND21-6285	
3449	ND21-6019	212152
3450	ND21-6024	212153
3451	ND21-6025	212154
3452	ND21-6029	212155
3453	ND21-6064	212156
3454	ND21-6197	212157
3455*	ND21-6198	212158
3456	ND21-6199	212159
3457	ND21-6200	212160
3458	ND21-6201	212161
3459	ND21-6203	212162
3460	ND21-6204	212163
3461	ND21-6205	212164
3462	ND21-6206	212165
3463	ND21-6207	212166
3464	ND21-6218	212167
3465	ND21-6219	212168
3466	ND21-6224	212169
3467	ND21-6270	212170
3468	ND21-6282	212171
3469	ND21-6004	212172
3470	ND21-6010	212173
3471	ND21-6011	212174
3472	ND21-6039	212175
3473	ND21-6041	212176
3474	ND21-6059	212177
3475	ND21-6060	212178
3476	ND21-6267	212179
3477	ND21-6268	212180
3478*	ND21-6271	212181
3479	ND21-6284	212182
3480	ND21-6008	212183
3481	ND21-6018	212184
3482	ND21-6023	212185
3483	ND21-6061	212186
3484	ND21-6062	212187
3485	ND21-6069	212188
3486	ND21-6220	212189
3487	ND21-6225	212190
3488	ND21-6012	212191
3489	ND21-6026	212192

* Copy to BuShips

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No
3490	ND21-6053	212193
3491	ND21-6054	212194
3492	ND21-6055	212195
3493	ND21-6063	212196
3494	ND21-6066	212197
3495	ND21-6067	212198
3496	ND21-6068	212199
3497	ND21-6072	212200
3498	ND21-6184	212201
3499	ND21-6186	212202
3500	ND21-6187	212203
3501	ND21-6188	212204
3502	ND21-6189	212205
3503	ND21-6190	212206
3504	ND21-6191	212207
3505	ND21-6192	212208
3506	ND21-6193	212223
3507	ND21-6194	212209
3508	ND21-6195	212210
3509	ND21-6196	212211
3510	ND21-6221	212212
3511	ND21-6227	212213
3512	ND21-6228	212214
3513*	ND21-6272	212215
3514	ND21-6273	212216
3515	ND21-6009	212217
3516	ND21-6040	212218
3517	ND21-6050	212219
3518	ND21-6051	212220
3519	ND21-6057	212221
3520	ND21-6123	212222
3521	ND21-6202	212758
3522*	ND21-6210	212759
3523	ND21-6217	212760
3524*	ND21-6115	212761
3525*	ND21-6116	212762
3526*	ND21-6117	212763
3527*	ND21-6118	212764
3528*	ND21-6119	212766
3529*	ND21-6120	212765
3530*	ND21-6122	212767
3531	ND21-6161	212768
3532	ND21-6216.8	212769
3533	ND21-6222	212770
3534*	ND21-6234	212771
3535*	ND21-6154	212793
3536	ND50-1196	
3537	ND50-3404a	
3538	ND50-5200	
3539	ND50-5201	
3540	ND50-5202	
3541	ND50-5203	
3542	ND50-5204	
3543	ND50-5205	
3544	ND50-5206	

* Copy to BuShips

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3545	ND50-5207	
3546	ND50-5208	
3547	ND50-5209	
3548	ND50-5210	
3549	ND50-5211	
3550	ND50-5212	
3551	ND50-5213	
3552	ND50-5214	
3553	ND50-5215	
3554	ND50-5216	
3555	ND50-5217	
3556	ND50-5218	
3557*	ND50-5219	
3558	ND50-1290	
3559	ND50-1301	(David Taylor Model Basin)
3560	ND50-1298	
3561	ND50-1300	
3562	ND50-1299	
3563	ND50-3407a	
3564	ND50-1147	(BuShips)
3565	ND50-1149	(BuShips)
3566	ND50-1150	(BuShips)
3567	ND50-1151	(BuShips)
3568	ND50-1152	(BuShips)
3569	ND50-1153	(BuShips)
3570	ND50-1154	(BuShips)
3571	ND50-1155	(BuShips)
3572	ND50-1156	(BuShips)
3573	ND50-1157	(BuShips)
3574	ND50-1158	(BuShips)
3575	ND50-1292	
3576	ND50-3170	
3577	ND50-3171	
3578	ND50-3173	
3579	ND50-3174	
3580	ND50-3175	
3581	ND50-3176	
3582	ND50-3177	
3583	ND50-3178	
3584	ND50-3179	
3585	ND50-3422	
3586	ND50-1291	
3587	ND50-1296	
3588	ND50-1295	
3589	ND50-1293	
3590	ND50-1294	
3591	ND50-3503	
3592	ND50-3504	
3593	ND50-3505	
3594	ND50-3506	
3595	ND50-3507	
3596	ND50-3508	
3597	ND50-3509	
3598	ND50-3510	

* Copy to BuShips

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3599	ND50-3511	
3600	ND50-3512	
3601	ND50-3513	
3602	ND50-3514	
3603	ND50-3515	
3604	ND50-3516	
3605	ND50-3517	
3606	ND50-3518	
3607	ND50-3519	
3608	ND50-3520	
3609	ND50-3521	
3610	ND50-3522	
3611	ND50-3621	
3612	ND50-3622	
3613	ND50-3611	
3614	ND50-3603	
3615	ND50-3617	
3616	ND50-3604	
3617	ND50-3618	
3618	ND50-3409a	
3619	ND50-3605	
3620	ND50-3606	
3621	ND50-3607	
3622	ND50-3608	
3623	ND50-3609	
3624	ND50-3610	
3625	ND21-3410	
3626	ND50-3616	
3627	ND50-3615	
3628	ND50-3620	
3629	ND50-3601	
3630	ND50-3600	
3631	ND21-3404	
3632	ND50-3612	
3633	ND50-3613	
3634	ND50-3614	
3635	ND21-3406	
3636	ND21-3403	
3637	ND21-3411	
3638	ND50-3619	
3639	ND50-3602	
3640	ND50-1126	(BuShips)
3641	ND50-1124	(BuShips)
3642	ND50-1125	(BuShips)
3643	ND50-1127	(BuShips)
3644	ND50-3700	
3645	ND50-3701	
3646	ND50-3702	
3647	ND50-3703	
3648	ND50-3704	
3649	ND50-3705	
3650	ND50-3706	
3651	ND50-3707	
3652	ND50-3708	
3653	ND50-3709	
3654	ND50-3710	
3655	ND50-3711	
3656	ND50-3712	

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3657	ND50-3713	
3658	ND50-3714	
3659	ND50-3715	
3660	ND50-3716	
3661	ND50-3717	
3662	ND50-3718	
3663	ND50-3719	
3664	ND50-3720	
3665	ND50-3721	
3666	ND50-3722	
3667	ND50-3723	
3668	ND50-3724	
3669	ND50-3725	
3670	ND50-3726	
3671	ND50-3727	
3672	ND50-3728	
3673	ND50-3729	
3674	ND50-3730	
3675	ND50-3731	
3676	ND50-3732	
3677	ND50-3733	
3678	ND50-3734	
3679	ND50-3735	
3680	ND50-3736	
3681	ND50-3737	
3682	ND50-3738	
3683	ND50-3739	
3684	ND50-3740	
3685	ND50-3741	
3686	ND50-3742	
3687	ND50-3743	
3688	ND50-3744	
3689	ND50-3745	
3690	ND21-6103	
3691	ND50-3436	
3692	ND50-3149	
3693	ND21-6016	
3694	ND21-6021	
3695	ND21-6022	
3696	ND21-6028	
3697	ND21-6031	
3698	ND21-6032	
3699	ND21-6034	
3700	ND21-6035	
3701	ND21-6036	
3702	ND21-6037	
3703	ND21-6038	
3704	ND21-6042	
3705	ND21-6045	
3706	ND21-6049	
3707	ND21-6058	
3708	ND21-6104	
3709	ND21-6127	
3710	ND21-6146	
3711	ND21-6147	
3712	ND21-6283	
3713	ND21-4005	

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3714	ND21-4006	
3715	ND21-4007	
3716	ND21-4009	
3717	ND21-4010	
3718	ND21-4011	
3719	ND21-4012	
3720	ND21-4013	
3721	ND21-4014	
3722	ND21-4015	
3723	ND21-4016	
3724	ND21-4017	
3725	ND21-4018	
3726	ND21-4019	
3727	ND21-4021	
3728	ND21-4024	
3729	ND21-4025	
3730	ND21-4027	
3731	ND21-4028	
3732	ND21-4034	
3733	ND21-4035	
3734	ND21-4036	
3735	ND21-4037	
3736	ND21-5226	(Encl. to Report)
3737	ND21-5227	(Encl. to Report)
3738	ND21-4040	
3739	ND21-4041	
3740	ND21-4042	
3741	ND21-4043	
3742	ND21-4044	
3743	ND21-4045	
3744	ND21-4046	
3745	ND21-4047	
3746	ND21-4048	
3747	ND21-4049	
3748	ND21-4050	
3749	ND21-4051	
3750	ND21-4052	
3751	ND21-4053	
3752	ND21-4054	
3753	ND21-4055	
3754	ND21-4056	
3755	ND21-4057	
3756	ND21-4058	
3757	ND21-4059	
3758	ND21-4060	
3759	ND21-4061	
3760	ND21-4062	
3761	ND21-4063	
3762	ND21-4064	
3763	ND21-4065	
3764	ND21-4066	
3765	ND21-4067	
3766	ND21-4068	
3767	ND21-4069	
3768	ND21-4070	
3769	ND21-4071	
3770	ND21-4072	
3771	ND21-4073	

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3772	ND21-4074	
3773	ND21-4075	
3774	ND21-4076	
3775	ND21-4077	
3776	ND21-4078	
3777	ND21-4079	
3778	ND21-4080	
3779	ND21-4081	
3780	ND21-4082	
3781	ND21-4083	
3782	ND21-4084	
3783	ND21-4085	
3784	ND21-4086	
3785	ND21-4087	
3786	ND21-4088	
3787	ND21-4089	
3788	ND21-4090	
3789	ND21-4091	
3790	ND21-4092	
3791	ND21-4093	
3792	ND21-4094	
3793	ND21-4095	
3794	ND21-4096	
3795	ND21-4097	
3796	ND21-4098	
3797	ND21-4099	
3798	ND21-4100	
3799	ND21-4101	
3800	ND21-4102	
3801	ND21-4103	
3802	ND21-4104	
3803	ND21-4105	
3804	ND21-4106	
3805	ND21-4107	
3806	ND21-4108	
3807	ND21-4109	
3808	ND21-4110	
3809	ND21-4111	
3810	ND21-4112	
3811	ND21-4113	
3812	ND21-4114	
3813	ND21-4115	
3814	ND21-4116	
3815	ND21-4117	
3816	ND21-4118	
3817	ND21-4119	
3818	ND21-4120	
3819	ND21-4121	
3820	ND21-4122	
3821	ND21-4123	
3822	ND21-4124	
3823	ND21-4125	
3824	ND21-4126	
3825	ND21-4127	
3826	ND21-4128	
3827	ND21-4129	
3828	ND21-4130	

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3829	ND21-4131	
3830	ND21-3428	
3831	ND50-3145	
3832	ND50-3160	
3833	ND50-3157	
3834	ND50-3158	
3835	ND50-3159	
3836	ND50-3148	
3837	ND50-5350	
3838	ND50-5351	
3839	ND50-5352	
3840	ND50-5353	
3841	ND50-5354	
3842	ND50-5220	
3843	ND50-5221	
3844	ND50-5222	
3845	ND50-5223	
3846	ND50-5224	
3847	ND50-5225	
3848	ND50-5228	
3849	ND50-5229	
3850	ND50-5300	
3851	ND50-5301	
3852	ND50-5302	
3853	ND50-5303	
3854	ND50-5304	
3855	ND50-5305	
3856	ND50-5306	
3857	ND50-5307	
3858	ND50-5308	
3859	ND50-5309	
3860	ND50-5310	
3861	ND50-5311	
3862	ND50-5312	
3863	ND50-5313	
3864	ND50-5314	
3865	ND50-5315	
3866	ND50-5316	
3867	ND50-5317	
3868	ND50-5318	
3869	ND50-5319	
3870	ND50-5320	
3871	ND50-5321	
3872	ND50-5322	(Encl. to Report)
3873	ND50-5323	
3874	ND50-5324	
3875	ND50-5325	
3876	ND50-5326	
3877	ND50-5327	
3878	ND50-5328	
3879	ND50-5329	
3880	ND50-5330	
3881	ND50-5331	
3882	ND50-5332	(Encl. to Report)
3883	ND50-5333	(Encl. to Report)
3884	ND50-5334	
3885	ND50-3800	
3886	ND50-3801	

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3887	ND50-3802	
3888	ND50-3803	
3889	ND50-3016	
3890	ND50-3017	
3891	ND50-3018	
3892	ND50-3019	
3893	ND50-3020	
3894	ND50-3021	
3895	ND50-3022	
3896	ND50-3023	
3897	ND50-3024	
3898	ND50-3025	
3899	ND50-3026	
3900	ND50-3027	
3901	ND50-3000	
3902	ND50-3001	
3903	ND50-3002	
3904	ND50-3003	
3905	ND50-3004	
3906	ND50-3005	
3907	ND50-3006	
3908	ND50-3007	
3909	ND50-3008	
3910	ND50-3009	
3911	ND50-3010	
3912	ND50-3011	
3913	ND50-3012	
3914	ND50-3013	
3915	ND50-3014	
3916	ND50-3015	
3917	ND50-3017	
3918	ND50-3220	
3919	ND50-3525	
3920	ND50-3526	
3921	ND50-3527	
3922	ND50-3528	
3923	ND50-3529	
3924	ND50-3530	
3925	ND50-3531	
3926	ND50-3532	
3927	ND50-3533	
3928	ND50-3534	
3929	ND50-3535	
3930	ND50-4000b	
3931	ND50-4001b	
3932	ND50-4002	
3933	ND50-5999	(USCGS)
3934	ND21-3440	
3935	ND21-3441	
3936	ND21-3442	
3937	ND21-3443	
3938	ND21-3444	
3939	ND21-3445	
3940	ND21-3446	
3941	ND21-3447	
3942	ND21-3448	
3943	ND21-3408	

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
3944	ND21-3427	
3945	ND21-3429	
3946	ND21-3430	
3947	ND21-3431	
3948	ND21-3432	
3949	ND21-3433	
3950	ND21-3434	
3951	ND21-3435	
3952	ND21-3436	
3953	ND21-3437	
3954	ND21-3438	
3955	ND21-3439	
3956	ND21-3449	
3957	ND21-3450	
3958	ND21-3451	
3959	ND21-3452	
3960	ND21-3453	
3961	ND50-3028	
3962	ND21-3454	
3963	ND21-3455	
3964	ND21-3456	
3965	ND21-3457	
3966	ND21-3458	
3967	ND21-3459	
3968	ND21-3460	
3969	ND21-3461	
3970	ND21-3462	
3971	ND21-3463	278536
3972	ND21-3464	278537
3973	ND21-3465	278538
3974	ND21-3466	278539
3975	ND21-3467	278540
3976	ND21-3468	278541
3977	ND21-3469	278542
3978	ND21-3470	278543
3979	ND21-3471	278544
3980	ND21-3472	278545
3981	ND21-3473	278546
3982	ND21-3474	278547
3983	ND21-3475	278548
3984	ND21-3476	278549
3985	ND21-3477	278550
3986	ND21-3478	278551
3987	ND21-3479	278552
3988	ND21-3480	278554
3989	ND21-3481	278555
3990	ND21-3482	278556
3991	ND21-3483	278557
3992	ND21-3484	278558
3993	ND21-3485	278559
3994	ND21-3486	278560
3995	ND21-3487	
3996	ND21-3488	278561
3997	ND50-3820	278562
3998	ND50-3821	278563
3999	ND50-3822	278564
4000	ND50-3823	278565
4001	ND50-3824	278566

ATIS No.	NavTechJap No.	WDC No.
4002	ND50-3825	278567
4003	ND50-3826	278568
4004	ND50-3827	278570
4005	ND50-3828	
4006	ND50-3829	278571
4007	ND50-3830	278572
4008	ND50-3831	278573
4009	ND50-3832	278574
4010	ND50-3833	278575
4011	ND50-3834	278576
4012	ND50-3835	278577
4013	ND50-3836	278578
4014	ND50-3837	278579
4015	ND50-3838	278580
4016	ND50-3839	278581
4017	ND50-3840	278582
4018	ND50-3841	278583
4019	ND50-3842	278584
4020	ND50-3843	278585
4021	ND50-3844	278586
4022	ND50-3845	278587
4023	ND50-3846	278588
4024	ND50-3847	278589
4025	ND50-3848	278590
4026	ND50-3849	278591
4027	ND50-3850	278592
4028	ND50-3851	278593
4029	ND50-3852	
4030	ND50-3853	
4031	ND50-3854	
4032	ND50-3855	
4033	ND50-3856	
4034	ND50-3857	
4035	ND50-3858	
4036	ND50-3859	
4037	ND50-3860	
4038	ND50-3861	
4039	ND50-3862	
4040	ND50-3863	
4041	ND50-3864	
4042	ND50-3865	278594
4043	ND50-3866	
4044	ND50-3867	
4045	ND50-3868	
4046	ND50-3869	
4047	ND50-3870	
4048	ND50-3871	
4049	ND50-3872	
4050	ND50-3873	
4051	ND50-3874	
4052	ND50-3875	
4053	ND50-3876	278595
4054	ND50-3877	278596
4055	ND50-3878	278597
4056	ND50-3879	278598
4057	ND50-3880	278599
4058	ND50-3881	278600
		278601

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
4059	ND50-3882	278602
4060	ND50-3883	278603
4061	ND50-3884	278604
4062	ND50-3885	278605
4063	ND50-3886	278606
4064	ND50-3623	
4065	ND50-3624	
4066	ND50-3625	
4067	ND50-3626	
4068	ND50-3627	
4069	ND50-3628	(BuShips)
4070	ND50-3629	(BuShips)
4071	ND50-3630	(BuShips)
4072	ND50-3631	(BuShips)
4073	ND50-3632	
4074	ND50-3633	
4075	ND50-3634	
4076	ND50-3635	
4077	ND50-3636	
4078	ND50-3637	
4079	ND50-1378	(BuShips)
4080	ND50-1382	(BuShips)
4081	ND50-1381	(BuShips)
4082	ND50-1380	(BuShips)
4083	ND50-1379	(BuShips)
4084	ND50-1225	
4085	ND50-1227	
4086	ND50-1226	
4087	ND22-2703	
4088	ND10-2105	
4089	ND10-2104	(BuShips)
4090	ND10-2103	(BuShips)
4091	ND10-2102	(BuShips)
4092	ND10-2101	(BuShips)
4093	ND10-3232	
4094	ND50-3233	
4095	ND50-3231	
4096	ND50-5839	
4097	ND50-5838	278607
4098	ND22-2704	
4099	ND22-2701	
4100	ND22-2687	
4101	ND22-2686	
4102	ND50-3887	278608
4103	ND50-3888	278609
4104	ND50-3889	278610
4105	ND50-3890	278611
4106	ND50-3891	278612
4107	ND50-3892	278613
4108	ND50-3893	278614
4109	ND50-3894	278615
4110	ND50-3895	278616
4111	ND50-3896	278617
4112	ND50-3897	
4113	ND50-3898	
4114	ND50-3899	
4115	ND50-3146	

ATIS No.	NavTechJap No.	WDC No.
4116	ND50-3147	
4117	ND50-3162	
4118	ND50-3163	
4119	ND50-3164	
4120	ND50-3165	
4121	ND50-3166	
4122	ND50-3167	
4123	ND50-5299	278618
4124	ND50-3638	
4125	ND50-3639	
4126	ND50-3640	
4127	ND50-3641	
4128	ND50-3642	
4129	ND50-3643	
4130	ND50-3644	
4131	ND50-3645	
4132	ND50-3646	
4133	ND50-3647	
4134	ND50-3648	
4135	ND50-3649	
4136	ND50-3650	
4137	ND50-3651	
4138	ND50-3652	
4139	ND50-3653	
4140	ND50-3654	
4141	ND50-3655	
4142	ND50-3656	
4143	ND50-3657	
4144	ND50-3658	
4145	ND50-3659	
4146	ND50-3660	
4147	ND50-3661	
4148	ND50-3662	
4149	ND50-3663	
4150	ND50-3746a	
4151	ND50-3747a	
4152	ND50-3748	
4153	ND50-3749	
4154	ND50-3750	
4155	ND50-3751	
4156	ND50-3752	
4157	ND50-3753	
4158	ND50-3754	
4159	ND50-3949	
4160	ND50-3950	
4161	ND50-3951	
4162	ND50-3952	
4163	ND50-3953	
4164	ND50-3954	
4165	ND50-3955	
4166	ND50-3956	
4167	ND50-3957	
4168	ND50-3958	
4169	ND50-3959	
4170	ND50-3960	
4171	ND50-3961	278619
4172	ND50-3962	

ATIS No.	NavTechJap No.	WDC No.
4116	ND50-3147	
4117	ND50-3162	
4118	ND50-3163	
4119	ND50-3164	
4120	ND50-3165	
4121	ND50-3166	
4122	ND50-3167	
4123	ND50-5299	278618
4124	ND50-3638	
4125	ND50-3639	
4126	ND50-3640	
4127	ND50-3641	
4128	ND50-3642	
4129	ND50-3643	
4130	ND50-3644	
4131	ND50-3645	
4132	ND50-3646	
4133	ND50-3647	
4134	ND50-3648	
4135	ND50-3649	
4136	ND50-3650	
4137	ND50-3651	
4138	ND50-3652	
4139	ND50-3653	
4140	ND50-3654	
4141	ND50-3655	
4142	ND50-3656	
4143	ND50-3657	
4144	ND50-3658	
4145	ND50-3659	
4146	ND50-3660	
4147	ND50-3661	
4148	ND50-3662	
4149	ND50-3663	
4150	ND50-3746a	
4151	ND50-3747a	
4152	ND50-3748	
4153	ND50-3749	
4154	ND50-3750	
4155	ND50-3751	
4156	ND50-3752	
4157	ND50-3753	
4158	ND50-3754	
4159	ND50-3949	
4160	ND50-3950	
4161	ND50-3951	
4162	ND50-3952	
4163	ND50-3953	
4164	ND50-3954	
4165	ND50-3955	
4166	ND50-3956	
4167	ND50-3957	
4168	ND50-3958	
4169	ND50-3959	
4170	ND50-3960	
4171	ND50-3961	278619
4172	ND50-3962	

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
4230	ND50-3438	
4231	ND50-3437	
4232	ND21-3402	
4233	ND21-3405	
4234	ND21-3407	
4235	ND21-3413	
4236	ND21-3415	
4237	ND21-3417	
4238	ND21-3421	
4239	ND21-3423	
4240	Void	
4241	ND21-6286	
4242*	ND21-6287	
4243*	ND21-6288	
4244	ND21-6289	
4245	ND50-4753	
4246	ND50-3454	
4247	ND50-3455	
4248	ND50-3456	
4249	ND50-3457	
4250	ND50-3458	
4251	ND50-3459	
4252	ND50-3460	
4253	ND50-3401	
4254	ND50-3402	
4255	ND50-3403	
4256	ND50-3404b	
4257	ND50-3405	
4258	ND50-3408	
4259	ND50-3406	
4260	ND50-3407b	
4261	ND50-3409b	
4262	ND50-3410	
4263	ND50-3411	
4264	ND50-3413	
4265	ND50-3414	
4266	ND50-3415	
4267	ND50-3416	
4268	ND50-3417	
4269	ND50-3418	
4270	ND50-3419	
4271	ND50-3420	
4272	ND50-3421	
4273	ND50-5841	
4274	ND50-5842	
4275	ND50-1313	
4276	ND50-1314	
4277	ND50-1315	
4278	ND50-1316	
4279	ND50-1317	
4280	ND50-1318	
4281	ND50-1319	
4282	ND50-1320	
4283	ND50-3448	
4284	ND50-3449	

* Copy to BuShips

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
4285	ND50-3450	
4286	ND50-3451	
4287	ND50-3452	
4288	ND50-3461	
4289	ND50-3462	
4290	ND50-3463	
4291	ND50-3464	
4292	ND50-3465	
4293	ND50-3466	
4294	ND50-3963	
4295	ND50-3970	
4296	ND50-3971	
4297	ND50-3972	
4298	ND22-0001	
4299	ND22-0002	
4300	ND22-0005	
4301	ND22-0006	
4302	ND50-3472	
4303	ND50-3473	
4304	ND22-0007	
4305	ND22-0008	
4306	ND22-0012	
4307	ND22-0013	
4308	ND22-0016	
4309	ND22-0031	
4310	ND22-0033	
4311	ND22-0037	
4312	ND22-0038	
4313	ND22-0039	
4314	ND22-0040	
4315	ND22-0042	
4316	ND22-1011	
4317	ND22-1012	
4318	ND22-1013	
4319	ND22-1021	
4320	ND22-1601	
4321	ND22-1214	
4322	ND22-0600	
4323	Void	
4324	ND22-1026	
4325	ND22-1027	
4326	ND22-1411	
4327	ND22-1620	
4328	ND22-1851	
4329	ND22-2000	
4330	ND22-2001	
4331	ND22-2017	
4332	ND22-3000	
4333	ND22-3001	
4334	ND22-3002	
4335	ND22-3003	
4336	ND22-3004	
4337	ND22-3005	
4338	ND22-3006	
4339	ND22-3007	
4340	ND22-3008	
4341	ND22-3009	

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
4342	ND22-3010	
4343	ND22-3011	
4344	ND22-3012	
4345	ND22-3013	
4346	ND22-3014	
4347	ND22-3015	
4348	ND22-3017	
4349	ND22-3018	
4350	ND22-3022	
4351	ND22-3023	
4352	ND22-0030	
4353	ND50-3412	
4354	ND50-5051	(HO)
4355	ND50-3467	(HO)
4356	ND50-3468	
4357	ND50-3469	
4358	ND50-3470	
4359	ND50-3471	
4360	ND50-3474	
4361	ND50-3475	
4362	ND50-3476	
4363	ND50-3477	
4364	ND50-3111	
4365	ND50-1123	(BuShips)
4366	ND50-3400	
4367	ND50-3975	
4368	ND50-3478	
4369	ND50-5052	(HO)
4370	ND50-5053	(HO)
4371	ND50-5054	(HO)
4372	ND50-5055	(HO)
4373	ND50-5056	(HO)
4374	ND50-5057	(HO)
4375	ND50-5058	(HO)
4376	ND50-5059	(HO)
4377	ND50-5060	(HO)
4378	ND22-3024	
4379	Void	
4380	ND50-3189	
4381	ND50-3100	
4382	ND50-3101	
4383	ND50-3102	
4384	ND50-3103	
4385	ND50-3104	
4386	ND50-3105	
4387	ND50-3106	
4388	ND50-3107	
4389	ND50-3108	
4390	ND50-3109	
4391	ND50-3110	
4392	ND50-3168	
4393	ND50-3169	
4394	ND50-3425	
4395	ND50-3523	
4396	ND50-3935	
4397	ND50-1361	
4398	ND50-1362	

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
4399	ND50-1363	(BuShips)
4400	ND50-1364	(BuShips)
4401	ND50-1365	(BuShips)
4402	ND21-4033	(BuShips)
4403	ND21-4032	(BuShips)
4404	ND21-4031	(BuShips)
4405	ND21-4026	(BuShips)
4406	ND21-4023	(BuShips)
4407	ND21-4030	(BuShips)
4408	ND21-4008	(BuShips)
4409	ND21-4004	(BuShips)
4410	ND21-4001	(BuShips)
4411	ND21-4002	(BuShips)
4412	ND50-1403	(BuShips)
4413	ND50-1405	(BuShips)
4414	ND50-1406	(BuShips)
4415	ND50-1407	(BuShips)
4416	ND50-1408	(BuShips)
4417	ND50-1409	(BuShips)
4418	ND50-1410	(BuShips)
4419	ND50-1411	(BuShips)
4420	ND50-1412	(BuShips)
4421	ND50-1413	(BuShips)
4422	ND50-1414	(BuShips)
4423	ND50-1415	(BuShips)
4424	ND50-1416	(BuShips)
4425	ND50-1417	(BuShips)
4426	ND50-1418	(BuShips)
4427	ND50-1419	(BuShips)
4428	ND50-1420	(BuShips)
4429	ND50-1421	(BuShips)
4430	ND50-1422	(BuShips)
4431	ND50-1423	(BuShips)
4432	ND50-1424	(BuShips)
4433	ND50-1425	(BuShips)
4434	ND50-1426	(BuShips)
4435	ND50-1427	(BuShips)
4436	ND50-1428	(BuShips)
4437	ND50-1430	(BuShips)
4438	ND50-1431	(BuShips)
4439	ND50-1432	(BuShips)
4440	ND50-1433	(BuShips)
4441	ND50-1435	(BuShips)
4442	ND50-1434	(BuShips)
4443	ND50-1436	(BuShips)
4444	ND50-1437	(BuShips)
4445	ND50-1438	(BuShips)
4446	ND50-1439	(BuShips)
4447	ND50-1440	(BuShips)
4448	ND50-1441	(BuShips)
4449	ND50-1442	(BuShips)
4450	ND50-1443	(BuShips)
4451	ND50-1444	(BuShips)
4452	ND50-1445	(BuShips)
4453	ND50-1404	(BuShips)
4454	ND50-1429	(BuShips)
4455	ND50-1400	(BuShips)

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
4456	ND50-1401	(BuShips)
4457	ND50-1402	(BuShips)
4458	ND50-1450	(BuShips)
4459	ND50-1451	(BuShips)
4460	ND50-1452	(BuShips)
4461	ND50-1453	(BuShips)
4462	ND50-1454	(BuShips)
4463	ND50-1455	(BuShips)
4464	ND50-1456	(BuShips)
4465	ND50-1457	(BuShips)
4466	ND50-1458	(BuShips)
4467	ND50-1459	(BuShips)
4468	ND50-1460	(BuShips)
4469	ND50-1461	(BuShips)
4470	ND50-1462	(BuShips)
4471	ND50-1463	(BuShips)
4472	ND50-1464	(BuShips)
4473	ND50-1465	(BuShips)
4474	ND50-3030	(Encl. to Report)
4475	ND50-3031	(Encl. to Report)
4476	ND50-3032	(Encl. to Report)
4477	ND50-3033	(Encl. to Report)
4478	ND50-3034	(Encl. to Report)
4479	ND50-5357	
4480	ND50-5356	
4481	ND50-5358	
4482	ND50-5359	
4483	ND50-5360	
4484	ND50-5361	
4485	ND50-5362	
4486	ND50-5363	
4487	ND50-5365	
4488	ND50-5364	
4489	ND50-5366	
4490	ND50-5367	
4491	ND50-5368	
4492	ND50-5369	
4493	ND50-5371	
4494	ND50-5370	
4495	ND50-5372	
4496	ND50-5373	
4497	ND50-5374	
4498	ND50-5375	
4499	ND50-1501	(BuShips)
4500	ND50-1502	(BuShips)
4501	ND50-1503	(BuShips)
4502	ND50-1504	(BuShips)
4503	ND50-1505	
4504	ND50-1506	
4505	ND50-1507	
4506	ND50-1508	
4507	ND50-1509	
4508	ND50-1510	
4509	ND50-1511	
4510	ND50-1512	
4511	ND50-1513	
4512	ND50-1514	

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
4513	ND50-1515	
4514	ND50-1516	
4515	ND50-1517	
4516	ND50-1518	
4517	ND50-3540	
4518	ND50-3541	
4519	ND50-3542	(Encl. to Report)
4520	ND50-3543	(Encl. to Report)
4521	ND50-3544	(Encl. to Report)
4522	ND50-3545	(Encl. to Report)
4523	ND50-3234	
4524	ND50-3235	
4525	ND22-2201	
4526	ND22-2012	
4527	ND22-2011	
4528	ND22-6032	
4529	ND50-1079	
4530	ND22-6300	
4531	ND22-2274	
4532	ND22-6000	
4533	ND22-6115	
4534	ND22-6500	
4535	ND22-2400	
4536	ND22-2450	
4537	ND22-2600	
4538	ND22-2649	
4539	ND50-5064	
4540	ND50-1131	285102
4541	ND50-1132	285103
4542	ND50-1133	
4543	ND50-5066	(HO)
4544	ND50-5069	(HO)
4545	ND50-5068	(HO)
4546	ND50-5074	(HO)
4547	ND50-5075	(HO)
4548	ND50-5072	(HO)
4549	ND50-5070	(HO)
4550	ND50-5071	(HO)
4551	ND50-5065	(HO)
4552	ND50-5063	(HO)
4553	ND50-5062	
4554	ND50-5073	
4555	ND50-5061	
4556	ND50-5067	
4557	ND50-3500	
4558	ND50-3112	
4559	ND50-3113	
4560	ND50-3114	
4561	ND50-3115	
4562	ND50-3116	
4563	ND50-3117	
4564	ND50-3118	
4565	ND50-3119	
4566	ND50-3120	
4567	ND50-3121	
4568	ND50-3122	
4569	ND50-3123	

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
4570	ND50-3479	
4571	ND50-3480	
4572	ND50-3481	
4573	ND50-3482	
4574	ND50-3483	
4575	ND26-0004	
4576	ND26-0005	
4577	ND26-0006	
4578	ND26-0007	
4579	ND26-0008	
4580	ND26-0009	
4581	ND26-0010	
4582	ND26-0011	
4583	ND26-0012	
4584	ND26-0013	
4585	ND26-0014	
4586	ND26-0015	
4587	ND26-0016	
4588	ND26-0017	
4589	ND26-0018	
4590	ND26-0019	
4591	ND26-0020	
4592	ND26-0021	
4593	ND26-0022	
4594	ND26-0023	
4595	ND26-0024	
4596	ND26-0025	
4597	ND26-0026	
4598	ND26-0027	
4599	ND26-0028	
4600	ND26-0029	
4601	ND26-0030	
4602	ND26-0031	
4603	ND50-3029	
4604	ND50-5076	(HO)
4605	ND50-5077	(HO)
4606	ND50-5078	(HO)
4607	ND50-5079	(HO)
4608	ND50-5080	(HO)
4609	ND50-5081	(HO)
4610	ND50-1900	(BuShips)
4611	ND50-1901	(BuShips)
4612	ND50-1902	(BuShips)
4613	ND50-1903	(BuShips)
4614	ND50-1904	(BuShips)
4615	ND50-1906	(BuShips)
4616	ND50-1907	(BuShips)
4617	ND50-1908	(BuShips)
4618	ND50-1909	(BuShips)
4619	ND50-1910	(BuShips)
4620	ND50-1905	(BuShips)
4621	ND50-3221	
4622	ND22-2014	
4623	ND22-2015	
4624	ND22-2016	
4625	ND50-1920	
4626	ND50-1921	

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
4627	ND50-1922	
4628	ND50-1923	
4629	ND22-2799	249832
4630	ND50-5843	249851
4631	ND50-3684	249833
4632	ND50-3685	249834
4633	ND50-3686	249835
4634	ND50-3687	249836
4635	ND50-3688	249837
4636	ND50-3689	249838
4637	ND50-3690	249839
4638	ND50-3691	249840
4639	ND50-3692	249841
4640	ND50-3693	249842
4641	ND50-3694	249843
4642	ND50-3695	249844
4643	ND50-3696	249845
4644	ND50-3697	249846
4645	ND50-3698	249847
4646	ND50-3699	249848
4647	ND26-0032	249850
4648	ND50-1951	(BuShips)
4649	ND50-1950	(BuShips)
4650	ND50-1952	(BuShips)
4651	ND50-5082	(HO)
4652	ND50-5083	(HO)
4653	ND50-5084	(HO)
4654	ND50-5085	(HO)
4655	ND50-5086	(HO)
4656	ND50-5087	(HO)
4657	ND50-1924	249824-249831
4658	ND50-5550	(BuShips)
4659	ND50-5551	(BuShips)
4660	ND50-5552	(BuShips)
4661	ND22-0041	278907
4662	ND50-3172	278908-278909
4663	ND50-3426	278910
4664	ND50-3747b	278911
4665	ND50-3746b	278912
4666	ND22-0003	278913
4667	ND22-0004	278914
4668	ND22-0010	278915
4669	ND50-5088	(HO)
4670	ND50-5089	(HO)
4671	ND50-5090	(HO)
4672	ND50-5091	(HO)
4673	ND50-5092	(HO)
4674	ND50-5093	(HO)
4675	ND50-5094	(HO)
4676	ND50-5095	(HO)
4677	ND50-5096	(HO)
4678	ND50-5097	(HO)
4679	ND50-5099	(HO)
4689	ND50-5098	(HO)
4681	ND50-5100	(HO)
4682	ND50-5101	(HO)
4683	ND50-5102	(HO)

ENCLOSURE (D), continued

ATIS No.	NavTechJap No.	WDC No.
4684	ND50-5103	(HO)
4685	ND50-5104	(HO)
4686	ND50-5105	(HO)
4687	ND50-5106	(HO)
4688	ND50-3050	249863
4689	ND50-3051	249864
4690	ND50-3052	249865
4691	ND50-3053	249866
4692	ND50-3054	249867
4693	ND50-3055	249868
4694	ND50-3056	249869
4695	ND50-3057	249870
4696	ND50-3058	249871
4697	ND50-3059	249872
4698	ND50-3060	249873
4699	ND50-3061	249874

ENCLOSURE (D), continued

CROSS - INDEX OF NAVTECHJAP DOCUMENT AND REPORT INDEX NUMBERS

NavTechJap No.	Report Index No.	NavTechJap No.	Report Index No.
ND10-0500	E-18	ND21-3447.1 to .25	0-30
ND10-2000	S-01, S-19	ND21-3448.1 to .7	0-30
ND10-2101.1 to .3	S-84(N)	ND21-3449	0-29
ND10-2102	S-84(N)	ND21-3450	0-29
ND10-2103	S-84(N)	ND21-3451	0-29
ND10-2104	S-84(N)	ND21-3452	0-30
ND10-2105	S-84(N)	ND21-3453.1 to .4	0-29
ND10-2504	S-01	ND21-3454.1 to .2	0-29
ND10-2505	S-01	ND21-3455.1 to .2	0-29
ND10-2506	S-01	ND21-3456	0-29
ND10-2507	A-39	ND21-3457	0-29
ND10-2508	A-39	ND21-3458	0-29
ND10-3202	0-54(N)	ND21-3459	0-29
ND10-6000.3, .4, .5	E-28	ND21-3460	0-29
ND10-7501.1 to .9	M-AA	ND21-3461	0-29
ND10-7502.1	M-AA	ND21-3462	0-29
		ND21-3463.1 to .2	0-29
ND21-3402	0-11, 0-39	ND21-3464	0-29
ND21-3403	0-53(N)	ND21-3465	0-29
ND21-3404	0-53(N)	ND21-3466	0-29
ND21-3405	0-54(N)	ND21-3467.1 to .2	0-29
ND21-3406	0-53(N)	ND21-3468	0-29
ND21-3407	0-54(N)	ND21-3469	0-29
ND21-3408	0-29	ND21-3470.1 to .3	0-29
ND21-3410	0-47(N)	ND21-3471.1 to .2	0-29
ND21-3411	0-53(N)	ND21-3472	0-29
ND21-3413	0-21	ND21-3473	0-29
ND21-3415	0-54(N)	ND21-3474	0-29
ND21-3417	0-21	ND21-3475.1 to .3	0-29
ND21-3418	0-21	ND21-3476	0-29
ND21-3419	0-21, 0-49(N)	ND21-3477	0-29
ND21-3420	0-21, 0-39	ND21-3478	0-29
ND21-3421	0-21	ND21-3479	0-30
ND21-3423	0-21	ND21-3480.1 to .2	0-30
ND21-3424	0-21	ND21-3481	0-30
ND21-3427	0-29	ND21-3482	0-30
ND21-3428	0-11, 0-54(N)	ND21-3483	0-30
ND21-3429	0-30	ND21-3484	0-29
ND21-3430	0-30	ND21-3485	0-29
ND21-3431	0-29	ND21-3486	0-29
ND21-3432	0-29	ND21-3487	0-29
ND21-3433	0-29	ND21-3488	0-29
ND21-3434	0-30	ND21-4001	0-11
ND21-3435	0-30	ND21-4002	0-11
ND21-3436	0-31	ND21-4003	0-54(N)
ND21-3437	0-31	ND21-4004	0-18
ND21-3438	0-31	ND21-4005	0-23
ND21-3439	0-31	ND21-4006	0-23
ND21-3440.1 to .47	0-31	ND21-4007.1 to .2	0-23
ND21-3441.1 to .55	0-30	ND21-4008	0-17
ND21-3442.1 to .19	0-30	ND21-4009	0-17
ND21-3443.1 to .24	0-30	ND21-4010	0-23
ND21-3444.1 to .8	0-30	ND21-4011	0-23
ND21-3445.1 to .21	0-30	ND21-4012	0-23
ND21-3446.1 to .4	0-30	ND21-4013	0-23

ENCLOSURE (D), continued

NavTechJap No.	Report Index No.	NavTechJap No.	Report Index No.
ND21-4014	0-23	ND21-4077	0-23
ND21-4015	0-23	ND21-4078	0-23
ND21-4016	0-23	ND21-4079	0-23
ND21-4017	0-23	ND21-4080	0-23
ND21-4018	0-23	ND21-4081	0-23
ND21-4019	0-23	ND21-4082	0-23
ND21-4021	0-23	ND21-4083	0-23
ND21-4023	0-18	ND21-4084	0-23
ND21-4024	0-23	ND21-4085	0-23
ND21-4025	0-23	ND21-4086	0-23
ND21-4026	0-18	ND21-4087	0-23
ND21-4027	0-23	ND21-4088	0-23
ND21-4028	0-23	ND21-4089	0-23
ND21-4030	0-18	ND21-4090	0-23
ND21-4031	0-18	ND21-4091	0-23
ND21-4032	0-18	ND21-4092	0-23
ND21-4033	0-18	ND21-4093	0-23
ND21-4034	0-23	ND21-4094	0-23
ND21-4035	0-23	ND21-4095	0-23
ND21-4036	0-23	ND21-4096	0-23
ND21-4037	0-23	ND21-4097	0-23
ND21-4040	0-23	ND21-4098	0-23
ND21-4041	0-23	ND21-4099	0-23
ND21-4042	0-23	ND21-4100	0-23
ND21-4043	0-23	ND21-4101	0-23
ND21-4044	0-23	ND21-4102	0-23
ND21-4045	0-23	ND21-4103	0-23
ND21-4046	0-23	ND21-4104	0-23
ND21-4047	0-23	ND21-4105	0-23
ND21-4048	0-23	ND21-4106	0-23
ND21-4049	0-23	ND21-4107	0-23
ND21-4050	0-23	ND21-4108	0-23
ND21-4051	0-23	ND21-4109	0-23
ND21-4052	0-23	ND21-4110	0-23
ND21-4053	0-23	ND21-4111	0-23
ND21-4054	0-23	ND21-4112	0-23
ND21-4055	0-23	ND21-4113	0-23
ND21-4056	0-23	ND21-4114	0-23
ND21-4057	0-23	ND21-4115	0-23
ND21-4058	0-23	ND21-4116	0-23
ND21-4059	0-23	ND21-4117	0-23
ND21-4060	0-23	ND21-4118	0-23
ND21-4061	0-23	ND21-4119	0-23
ND21-4062	0-23	ND21-4120	0-23
ND21-4063	0-23	ND21-4121	0-23
ND21-4064	0-23	ND21-4122	0-23
ND21-4065	0-23	ND21-4123	0-23
ND21-4066	0-23	ND21-4124	0-23
ND21-4067	0-23	ND21-4125	0-23
ND21-4068	0-23	ND21-4126	0-23
ND21-4069	0-23	ND21-4127	0-23
ND21-4070	0-23	ND21-4128	0-23
ND21-4071	0-23	ND21-4129	0-23
ND21-4072	0-23	ND21-4130	0-23
ND21-4073	0-23	ND21-4131	0-23
ND21-4074	0-23	ND21-4550 to	0-04
ND21-4075	0-23	ND21-4552	
ND21-4076	0-23	ND21-4554	0-04

ENCLOSURE (D), continued

NavTechJap No.	Report Index No.
ND21-4557 to ND21-4561	0-04
ND21-4562	0-03
ND21-4563	0-05
ND21-4564	0-05
ND21-4566	0-03
ND21-4567	0-03
ND21-4568	0-03
ND21-4569	0-03
ND21-4570	0-03
ND21-4573	0-04
ND21-4575	
ND21-4577 to ND21-4578	0-04
ND21-4580	0-04
ND21-4582 to ND21-4584	0-04
ND21-6000.0 to .14	E-28
ND21-6001	E-28
ND21-6002	E-28
ND21-6003	E-28
ND21-6004	E-28
ND21-6005	E-28
ND21-6006	E-28
ND21-6007	E-28
ND21-6008	E-28
ND21-6009	E-28
ND21-6010	E-28
ND21-6011	E-28
ND21-6012	E-28
ND21-6013	E-28
ND21-6014	E-28
ND21-6015	E-28
ND21-6016	E-28
ND21-6017	E-28
ND21-6018	E-28
ND21-6019	E-28
ND21-6020	E-28
ND21-6021	E-28
ND21-6022	E-28
ND21-6023	E-28
ND21-6024	E-28
ND21-6025	E-28
ND21-6026	E-28
ND21-6027	E-28
ND21-6028	E-28
ND21-6029	E-28
ND21-6030	E-28
ND21-6031	E-28
ND21-6032	E-28
ND21-6033	E-28
ND21-6034	E-28
ND21-6035	E-28
ND21-6036	E-28
ND21-6037	E-28
ND21-6038	E-28
ND21-6039	E-28
ND21-6040	E-28
ND21-6041	E-28
ND21-6042	E-28
ND21-6043	E-28
ND21-6044	E-28
ND21-6045	E-28
ND21-6046	E-28
ND21-6047	E-28
ND21-6048	E-28
ND21-6049	E-28
ND21-6050	E-28
ND21-6051	E-28
ND21-6052	E-28
ND21-6053	E-28
ND21-6054	E-28
ND21-6055	E-28
ND21-6056	E-28
ND21-6057	E-28
ND21-6058	E-28
ND21-6059	E-28
ND21-6060	E-28
ND21-6061	E-28
ND21-6062	E-28
ND21-6063	E-28
ND21-6064	E-28
ND21-6065	E-28
ND21-6066	E-28
ND21-6067	E-28
ND21-6068	E-28
ND21-6069	E-28
ND21-6070	E-28
ND21-6072	E-28
ND21-6073	E-28
ND21-6074	E-28
ND21-6075	E-28
ND21-6076	E-28
ND21-6077	E-28
ND21-6078	E-28
ND21-6079	E-28
ND21-6080	E-28
ND21-6081	E-28
ND21-6082	E-28
ND21-6083	E-28
ND21-6084	E-28
ND21-6085	E-28
ND21-6086	E-28
ND21-6087	E-28
ND21-6088	E-28
ND21-6089	E-28
ND21-6090	E-28
ND21-6091	E-28
ND21-6092	E-28
ND21-6093	E-28
ND21-6094	E-28
ND21-6095	E-28
ND21-6096	E-28
ND21-6097	E-28
ND21-6098	E-28
ND21-6099	E-28

ENCLOSURE (D), continued

NavTechJap No.	Report Index No.	NavTechJap No.	Report Index No.
ND21-6100	E-28	ND21-6159	E-28
ND21-6101	E-28	ND21-6160	E-28
ND21-6102	E-28	ND21-6161	E-28
ND21-6103	E-28	ND21-6162	E-28
ND21-6104	E-28	ND21-6163	E-28
ND21-6105	E-28	ND21-6164	E-28
ND21-6106	E-28	ND21-6165	E-28
ND21-6107	E-28	ND21-6166	E-28
ND21-6108	E-28	ND21-6167	E-28
ND21-6109	E-28	ND21-6168	E-28
ND21-6110	E-28	ND21-6169	E-28
ND21-6111	E-28	ND21-6170	E-28
ND21-6112	E-28	ND21-6171	E-28
ND21-6113	E-28	ND21-6172	E-28
ND21-6114	E-28	ND21-6173	E-28
ND21-6115	E-28	ND21-6174	E-28
ND21-6116	E-28	ND21-6175	E-28
ND21-6117	E-28	ND21-6176	E-28
ND21-6118	E-28	ND21-6177	E-28
ND21-6119	E-28	ND21-6178	E-28
ND21-6120	E-28	ND21-6179	E-28
ND21-6122	E-28	ND21-6180	E-28
ND21-6123	E-28	ND21-6181	E-28
ND21-6124	E-28	ND21-6182	E-28
ND21-6125	E-28	ND21-6183	E-28
ND21-6126	E-28	ND21-6184	E-28
ND21-6127	E-28	ND21-6185	E-28
ND21-6128	E-28	ND21-6186	E-28
ND21-6129.1 to .2	E-28	ND21-6187	E-28
ND21-6130	E-28	ND21-6188	E-28
ND21-6131	E-28	ND21-6189	E-28
ND21-6132	E-28	ND21-6190	E-28
ND21-6133	E-28	ND21-6191	E-28
ND21-6134	E-28	ND21-6192	E-28
ND21-6135	E-28	ND21-6193	E-28
ND21-6136	E-28	ND21-6194	E-28
ND21-6137	E-28	ND21-6195	E-28
ND21-6138	E-28	ND21-6196	E-28
ND21-6139	E-28	ND21-6197	E-28
ND21-6140	E-28	ND21-6198	E-28
ND21-6141	E-28	ND21-6199	E-28
ND21-6142	E-28	ND21-6200	E-28
ND21-6143	E-28	ND21-6201	E-28
ND21-6144	E-28	ND21-6202	E-28
ND21-6145.1 to .2	E-28	ND21-6203	E-28
ND21-6146	E-28	ND21-6204	E-28
ND21-6147	E-28	ND21-6205.1 to .2	E-28
ND21-6148	E-28	ND21-6206	E-28
ND21-6149	E-28	ND21-6207	E-28
ND21-6150	E-28	ND21-6208	E-28
ND21-6151	E-28	ND21-6209	E-28
ND21-6152	E-28	ND21-6210	E-28
ND21-6153	E-28	ND21-6211	E-28
ND21-6154	E-28	ND21-6212	E-28
ND21-6155	E-28	ND21-6213	E-28
ND21-6156	E-28	ND21-6214	E-28
ND21-6157	E-28	ND21-6215	E-28
ND21-6158	E-28	ND21-6216.1	E-28

ENCLOSURE (D), continued

NavTechJap No.	Report Index No.
ND21-6216.2 to .7	E-28
ND21-6216.8	E-28
ND21-6216.9	E-28
ND21-6217	E-28
ND21-6218	E-28
ND21-6219	E-28
ND21-6220	E-28
ND21-6221	E-28
ND21-6222	E-28
ND21-6223	E-28
ND21-6224	E-28
ND21-6225	E-28
ND21-6226	E-28
ND21-6227	E-28
ND21-6228	E-28
ND21-6229.1 to .35	E-28
ND21-6230.1 to .8	E-28
ND21-6231.1 to .4	E-28
ND21-6232.1 to .11	E-28
ND21-6233	E-28
ND21-6234.1 to .10	E-28
ND21-6235	E-28
ND21-6236	E-28
ND21-6237	E-28
ND21-6238	E-28
ND21-6239	E-28
ND21-6240	E-28
ND21-6241	E-28
ND21-6242	E-28
ND21-6243	E-28
ND21-6244	E-28
ND21-6245	E-28
ND21-6246	E-28
ND21-6248	E-28
ND21-6252	E-28
ND21-6253	E-28
ND21-6258	S-43
ND21-6260	S-43
ND21-6262	E-28
ND21-6263	E-28
ND21-6264	E-28
ND21-6265	E-28
ND21-6266	E-28
ND21-6267	E-28
ND21-6268	E-28
ND21-6269	E-28
ND21-6270	E-28
ND21-6271	E-28
ND21-6272	E-28
ND21-6273	E-28
ND21-6274	E-28
ND21-6275	E-28
ND21-6276	E-28
ND21-6277	E-28
ND21-6278	E-28
ND21-6279	E-28
ND21-6280	E-28
ND21-6282	E-28

NavTechJap No.	Report Index No.
ND21-6283	E-28
ND21-6284	E-28
ND21-6285	E-28
ND21-6286	E-28
ND21-6287	E-28
ND21-6288	E-28
ND21-6289	E 28
ND21-7503.10 to .23	MAA
ND21-7505.1 to .2	M-01
ND21-7506.1 to .3	M-12
ND21-7509	MAA
ND21-7511.10 to .28	MAA
ND21-7512.1 to .2	MAA
ND21-7514.1 to .2	M-06
ND21-7515.10 to .36	MAA
ND21-7516	M-02
ND21-7517	M-10
ND21-7520	MAA
ND21-7521.1 to .8	MAA
ND21-7522.1 to .2	MAA
ND21-7524	MAA
ND21-7525	M-06
ND21-7527	MAA
ND22-0001	S-01
ND22-0002	S-01
ND22-0003	S-01
ND22-0004	S-59
ND22-0005.1 to .2	S-19
ND22-000	S-01
ND22-0007	S-06
ND22-0008	X-33
ND22-0010	S-59
ND22-0012	X-33
ND22-0013	S-19
ND22-0016	X-33
ND22-0020 to ND22-0028	X-36(N)
ND22-0030	0-16
ND22-0031	0-16
ND22-0033	S-01
ND22-0037	S-01
ND22-0038	S-02
ND22-0039	S-19
ND22-0040	E-06, E-28
ND22-0041	S-59
ND22-0042	S-43, E-28
ND22-0600.1 to .2	S-01
ND22-1011	S-42
ND22-1012	S-42
ND22-1013	S-40, S-01
ND22-1021	S-01
ND22-1026	S-01
ND22-1027	0-09
ND22-1214	S-83(N)
ND22-1411	S-01
ND22-1601	S-01
ND22-1620	S-01

ENCLOSURE (D), continued

NavTechJap No.	Report Index No.
ND22-1851.1 to .15	O-09
ND22-2000	O-30
ND22-2001	O-30
ND22-2011	S-01
ND22-2012	S-01
ND22-2014	S-01
ND22-2015	S-01
ND22-2016	S-01
ND22-2017	O-30
ND22-2201	S-01
ND22-2274	S-01
ND22-2400	S-01
ND22-2450	S-01
ND22-2600-1	S-01
ND22-2649	S-01
ND22-2686	E-28
ND22-2687	E-28
ND22-2701	E-28
ND22-2703	E-28
ND22-2704	E-28
ND22-2799	S-01
ND22-3000	E-28
ND22-2001	E-28
ND22-3002	E-28
ND22-3003	E-28
ND22-3004	E-28
ND22-3005	E-28
ND22-3006	E-28
ND22-3007	E-28
ND22-3008	E-28
ND22-3009	E-28
ND22-3010	E-28
ND22-3011	E-28
ND22-3012	E-28
ND22-3013	E-28
ND22-3014	E-28
ND22-3015	E-28
ND22-3017	E-28, E-14
ND22-3018	E-28, E-14
ND22-3022	E-28, E-14
ND22-3023	E-28, E-14
ND22-3024	E-28, E-14
ND22-6000	S-01
ND22-6032	S-01
ND22-6115	S-01
ND22-6300	S-01
ND22-6500	S-01
ND25-0001	S-01, S-40, O-38, X-13
ND25-0002	X-13, S-01, S-40
ND25-0003	X-13
ND25-0004	X-13
ND25-0005	X-13
ND25-0006	X-13
ND25-0007	X-13
ND25-0008	X-13
ND25-0009	X-13, O-38
ND25-0010	X-13, O-38

NavTechJap No.	Report Index No.
ND25-0011	X-13
ND25-0012	X-13
ND25-0013	X-13, O-38
ND25-0014	X-13, O-38
ND25-0015	X-13
ND25-0016	X-13
ND25-0017	X-13
ND25-0018	X-13
ND25-0019	X-13
ND25-0020	X-13
ND25-0021	X-36(N)
ND25-0022	X-13, S-01, S-40
ND25-0023	X-14
ND25-0024	X-14
ND25-0025	X-14
ND25-0026	X-14
ND25-0027	X-14
ND25-0028	X-13
ND25-0029	X-13
ND25-0030	X-13
ND25-0031	X-36(N)
ND25-0032	X-36(N)
ND25-0033	X-13
ND25-0034	X-13
ND25-0035	X-13
ND25-0036	X-13
ND25-0037	X-13, S-01, S-40
ND26-0004.1 to .31	X-38(N)
ND26-0005.1 to .27	X-38(N)
ND26-0006.1 to .10	X-38(N)
ND26-0007.1 to .16	X-38(N)
ND26-0008.1 to .76	X-38(N)
ND26-0009.1 to .16	X-38(N)
ND26-0010	X-38(N)
ND26-0011.1 to .26	X-38(N)
ND26-0012	X-38(N)
ND26-0013.1 to .22	X-38(N)
ND26-0014.1 to .44	X-38(N)
ND26-0015.1 to .30	X-38(N)
ND26-0016.1 to .10	X-38(N)
ND26-0017.1 to .4	X-38(N)
ND26-0018.1 to .2	X-38(N)
ND26-0019.1 to .19	X-38(N)
ND26-0020	X-38(N)
ND26-0021	X-38(N)
ND26-0022	X-38(N)
ND26-0023.1 to .12	X-38(N)
ND26-0024.1 to .3	X-38(N)
ND26-0025.1 to .4	X-38(N)
ND26-0026.1 to .32	X-38(N)
ND26-0027.1 to .3	X-38(N)
ND26-0028.1 to .5	X-38(N)
ND26-0029.1 to .4	X-38(N)
ND26-0030.1 to .3	X-38(N)
ND26-0031	X-38(N)
ND26-0032.1 to .9	X-38(N)

ENCLOSURE (D), continued

NavTechJap No.	Report Index No.
ND50-0001	D-11, E-3
ND50-0002	D-11, E-3
ND50-0003	D-11, E-3
ND50-0004	D-11, E-3
ND50-0005	D-11, E-3
ND50-1000.1 to .49	S-01
ND50-1001.1 to .49	S-01
ND50-1002.1 to .5	S-01
ND50-1003.1 to .4	S-01
ND50-1004.1 to .46	S-01
ND50-1005.1 to .19	S-01
ND50-1006.1 to .8	S-01
ND50-1007.1 to .24	S-01
ND50-1008.1 to .23	S-01
ND50-1009.1 to .18	S-01
ND50-1010.1 to .2	S-01
ND50-1011.1 to .9	S-01
ND50-1012.1 to .6	S-01
ND50-1013.1 to .11	S-01
ND50-1014.1 to .4	S-01
ND50-1015.1 to .36	S-01
ND50-1016	S-01
ND50-1017	S-01
ND50-1018	S-01
ND50-1019	S-01
ND50-1020	S-01
ND50-1021	S-01
ND50-1022	S-01
ND50-1023	S-01
ND50-1024.0-.2	S-01
ND50-1025.0-.1	S-01
ND50-1026	S-01
ND50-1027	S-01
ND50-1028	S-01
ND50-1029	S-01
ND50-1030	S-01
ND50-1031	S-01
ND50-1032.0 to .5	S-01
ND50-1033	S-01
ND50-1034	S-01
ND50-1035	S-01
ND50-1036.0 to .2	S-01
ND50-1037.0 to .2	S-01
ND50-1038	S-01
ND50-1039.0 to .1	S-01
ND50-1040	S-01
ND50-1041.0 to .1	S-01
ND50-1042	S-01
ND50-1043.0 to .1	S-01
ND50-1044.0 to .1	S-01
ND50-1045.0 to .1	S-01
ND50-1046	S-01
ND50-1047	S-01
ND50-1048	S-01
ND50-1049	S-01
ND50-1071	S-01
ND50-1072	S-01
ND50-1073	S-01
ND50-1075	S-01
ND50-1076	S-01
ND50-1077	S-01
ND50-1078	S-01
ND50-1079	S-01
ND50-1080.1 to .2	S-01
ND50-1082	S-01
ND50-1083	S-01
ND50-1084	S-01
ND50-1085	S-01
ND50-1086	S-01
ND50-1087.1 to .2	S-01
ND50-1089	S-01
ND50-1090.1	S-42
ND50-1090.2	S-42
ND50-1091	S-42
ND50-1092	S-42
ND50-1093	S-42
ND50-1094	S-42
ND50-1095	S-42
ND50-1096	S-42
ND50-1097	S-42
ND50-1098	S-42
ND50-1099	S-42
ND50-1100.1	S-42
ND50-1100.2	S-42
ND50-1100.3	S-42
ND50-1100.4	S-42
ND50-1100.5	S-42
ND50-1100.6	S-42
ND50-1100.7	S-42
ND50-1101.1	S-42
ND50-1101.2	S-42
ND50-1102	S-42
ND50-1103	S-42
ND50-1104	S-42
ND50-1105	S-42
ND50-1106	S-42
ND50-1107	S-42
ND50-1108	S-42
ND50-1109	S-42
ND50-1110.1 to .4	S-81(N)
ND50-1111	S-81(N)
ND50-1112.1 to .2	S-81(N)
ND50-1113.1 to .3	S-81(N)
ND50-1114	S-81(N)
ND50-1115	S-81(N)
ND50-1116	S-81(N)
ND50-1117	S-81(N)
ND50-1118	S-81(N)
ND50-1119	S-81(N)
ND50-1120	S-81(N)
ND50-1121	S-81(N)
ND50-1122	S-81(N)
ND50-1123.1 to .3	S-81(N)
ND50-1124.1 to .6	S-81(N)
ND50-1125.1 to .10	S-81(N)
ND50-1126.1 to .11	S-81(N)

ENCLOSURE (D), continued

NavTechJap No.	Report Index No.	NavTechJap No.	Report Index No.
ND50-1127.1 to .6	S-81(N)	ND50-1290.1 to .12	S-83(N)
ND50-1128.1 to .2	S-81(N)	ND50-1291	S-83(N)
ND50-1129	S-81(N)	ND50-1292	S-83(N)
ND50-1130	S-42	ND50-1293	S-83(N)
ND50-1131	S-42	ND50-1294.1 to .2	S-83(N)
ND50-1132.1 to .4	S-42	ND50-1295	S-83(N)
ND50-1133.1 to .9	S-42	ND50-1296.1 to .2	S-83(N)
ND50-1140	S-92(N), S-01	ND50-1298.1 to .8	S-83(N)
ND50-1141	S-01	ND50-1299.1 to .6	S-83(N)
ND50-1142	S-01	ND50-1300.1 to .9	S-83(N)
ND50-1143	S-01	ND50-1301.1 to .4	S-83(N)
ND50-1144	S-01	ND50-1313	S-01
ND50-1145	S-01	ND50-1314	S-01
ND50-1146	S-01	ND50-1315	S-01
ND50-1147.1 to .3	S-01	ND50-1316	S-01
ND50-1148	S-01	ND50-1317	S-01
ND50-1149.1 to .2	S-01	ND50-1318.1 to .2	S-01
ND50-1150.1 to .2	S-01	ND50-1319	S-01
ND50-1151	S-01	ND50-1320	S-01
ND50-1152.1 to .4	S-01	ND50-1361.1 to .4	S-28
ND50-1153.1 to .2	S-01	ND50-1362	S-28
ND50-1154	S-01	ND50-1363	S-28
ND50-1155	S-01	ND50-1364	S-28
ND50-1156.1 to .21	S-01	ND50-1365	S-28
ND50-1157	S-01	ND50-1378.1 to .8	S-01
ND50-1158	S-01	ND50-1379	S-01
ND50-1159.1 to .32	S-01	ND50-1380.1 to .2	S-01
ND50-1160.1 to .23	S-01	ND50-1381.1 to .2	S-01
ND50-1161.1 to .27	S-01	ND50-1382	S-01
ND50-1162.1 to .27	S-01	ND50-1393.1 to .3	S-12
ND50-1163.1 to .8	S-01	ND50-1393.4 to .12	S-01
ND50-1164.1 to .2	S-01	ND50-1400	A-11
ND50-1165.1 to .3	S-01	ND50-1401	A-11
ND50-1166.1 to .28	S-01	ND50-1402	A-11
ND50-1167.1 to .21	S-01	ND50-1403	A-12
ND50-1168.1 to .16	S-01	ND50-1404	A-12
ND50-1169.1 to .16	S-01	ND50-1405	A-12
ND50-1170.1 to .10	S-01	ND50-1406	A-12
ND50-1171.1 to .12	S-01	ND50-1407	A-12
ND50-1172.1 to .97	S-01	ND50-1408	A-12
ND50-1177	S-01	ND50-1409	A-12
ND50-1178	S-01	ND50-1410	A-12
ND50-1179	S-01	ND50-1411	A-12
ND50-1180	S-01	ND50-1412	A-12
ND50-1181	S-01	ND50-1413	A-12
ND50-1182	S-01	ND50-1414	A-12
ND50-1183	S-01	ND50-1415	A-12
ND50-1184	S-01	ND50-1416	A-12
ND50-1185	S-01	ND50-1417	A-12
ND50-1195.1 to .7	S-01	ND50-1418	A-12
ND50-1196.1 to .6	S-19	ND50-1419	A-12
ND50-1206	S-17	ND50-1420	A-12
ND50-1215	S-93(N)	ND50-1421	A-12
ND50-1216	S-01, S-40	ND50-1422	A-12
ND50-1217	S-93(N)	ND50-1423	A-12
ND50-1225	S-59	ND50-1424	A-12
ND50-1226	S-59	ND50-1425	A-12
ND50-1227	S-59	ND50-1426	A-12

ENCLOSURE (D), continued

NavTechJap No.	Report Index No.
ND50-1427	A-12
ND50-1428	A-12
ND50-1429	A-12
ND50-1430	A-12
ND50-1431	A-12
ND50-1432	A-12
ND50-1433	A-12
ND50-1434	A-12
ND50-1435	A-12
ND50-1436	A-12
ND50-1437	A-12
ND50-1438	A-12
ND50-1439	A-12
ND50-1440	A-12
ND50-1441	A-12
ND50-1442	A-12
ND50-1443	A-12
ND50-1444	A-12
ND50-1445	A-12
ND50-1450	S-01
ND50-1451	S-01
ND50-1452	S-01
ND50-1453	S-01
ND50-1454	S-01
ND50-1455	S-01
ND50-1456	S-01
ND50-1457	S-01
ND50-1458	S-01
ND50-1459	S-01
ND50-1460	S-01
ND50-1461	S-01
ND50-1462	S-01
ND50-1463	S-01
ND50-1464	S-01
ND50-1465	S-01
ND50-1501.1 to .7	S-12
ND50-1502.1 to .4	S-12
ND50-1503.1 to .4	S-12
ND50-1504.1 to .5	S-12
ND50-1505.1 to .5	S-12
ND50-1506.1 to .4	S-12
ND50-1507.1 to .4	S-12
ND50-1508.1 to .4	S-12
ND50-1509.1 to .5	S-12
ND50-1510.1 to .6	S-12
ND50-1511.1 to .12	S-12
ND50-1512.1 to .4	S-12
ND50-1513.1 to .11	S-12
ND50-1514.1 to .9	S-12
ND50-1515.1 to .4	S-12
ND50-1516.1 to .3	S-12
ND50-1517.1 to .6	S-12
ND50-1518	S-12
ND50-1900	S-01
ND50-1901	S-01
ND50-1902	S-01
ND50-1903	S-01
ND50-1904.1 to .15	S-01
ND50-1905.1 to .9	S-01
ND50-1906.1 to .17	S-01
ND50-1907.1 to .35	S-01
ND50-1908.1 to .21	S-01
ND50-1909.1 to .8	S-01
ND50-1910.1 to .6	S-01
ND50-1920	S-01
ND50-1921.1 to .2	S-01
ND50-1922.1 to .3	S-01
ND50-1923	S-01
ND50-1924.1 to .63	S-01
ND50-1950.1 to .20	S-01
ND50-1951.1 to .84	S-01
ND50-1952.1 to .71	S-01
ND50-2999	M-03
ND50-3000	0-29
ND50-3001	0-29
ND50-3002	0-29
ND50-3003	0-29
ND50-3004	0-29
ND50-3005	0-29
ND50-3006	0-29
ND50-3007	0-30
ND50-3008	0-30
ND50-3009	0-38
ND50-3010	0-38
ND50-3011	0-31
ND50-3012	0-31
ND50-3013	0-29
ND50-3014	0-31
ND50-3015	0-29
ND50-3016	0-31
ND50-3017	0-31
ND50-3018	0-31
ND50-3019	0-31
ND50-3020	0-31
ND50-3021	0-30
ND50-3022	0-30
ND50-3023	0-30
ND50-3024	0-30
ND50-3025	0-30
ND50-3026	0-30
ND50-3027	0-29
ND50-3028	0-30
ND50-3029	0-32
ND50-3030	0-19
ND50-3031	0-19
ND50-3032	0-19
ND50-3033	0-19
ND50-3034	0-19
ND50-3050	0-01-1
ND50-3051	0-01-1
ND50-3052	0-01-1
ND50-3053	0-01-1
ND50-3054	0-01-1
ND50-3055	0-01-1
ND50-3056	0-01-1
ND50-3057	0-01-1

ENCLOSURE (D), continued

NavTechJap No.	Report Index No.
ND50-3058	0-01-1
ND50-3059	0-01-1
ND50-3060	0-01-1
ND50-3061	0-01-1
ND50-3100	0-47(N)
ND50-3101	0-47(N)
ND50-3102	0-47(N)
ND50-3103	0-47(N)
ND50-3104	0-47(N)
ND50-3105	0-47(N)
ND50-3106	0-47(N)
ND50-3107	0-47(N)
ND50-3108	0-47(N)
ND50-3109	0-47(N)
ND50-3110	0-47(N)
ND50-3111	0-19
ND50-3112	0-47(N)
ND50-3113	0-47(N)
ND50-3114	0-47(N)
ND50-3115	0-47(N)
ND50-3116	0-47(N)
ND50-3117	0-47(N)
ND50-3118	0-47(N)
ND50-3119	0-47(N)
ND50-3120	0-47(N)
ND50-3121	0-47(N)
ND50-3122	0-47(N)
ND50-3123.1 to .21	0-47(N)
ND50-3145	0-39
ND50-3146	0-36
ND50-3147.1 to .6	0-36
ND50-3148	0-47(N)
ND50-3149.1 to .3	0-16
ND50-3157	0-16
ND50-3158	0-15
ND50-3159	0-47(N)
ND50-3160	0-15
ND50-3162	0-36
ND50-3163	0-36
ND50-3164	0-36
ND50-3165	0-36
ND50-3166	0-36
ND50-3167	0-36
ND50-3168	0-47(N)
ND50-3169	0-47(N)
ND50-3170	0-16
ND50-3171	0-16
ND50-3172	X-13
ND50-3173	0-16
ND50-3174	0-16, 0-19
ND50-3175	0-16, 0-19
ND50-3176	0-16
ND50-3177	0-16
ND50-3178	0-16, 0-19
ND50-3179	0-16
ND50-3189	0-36
ND50-3200 to ND50-3202	0-07

NavTechJap No.	Report Index No.
ND50-3203	0-11, 0-14
ND50-3204	0-11, 0-14
ND50-3205.1 to .4	0-25
ND50-3206	0-03
ND50-3211	0-03
ND50-3212	0-03
ND50-3213	0-03
ND50-3214	0-05
ND50-3217	0-22
ND50-3220	0-22
ND50-3221	0-39
ND50-3231	0-56(N)
ND50-3232	0-35
ND50-3233	0-56(N)
ND50-3234	0-01
ND50-3235	0-01
ND50-3400	0-54(N)
ND50-3401	0-54(N)
ND50-3402	0-21
ND50-3403	0-21
ND50-3404a	0-39
ND50-3404b	0-54(N)
ND50-3405	0-54(N)
ND50-3406	0-54(N)
ND50-3407a	0-39
ND50-3407b	0-54(N)
ND50-3408	0-54(N)
ND50-3409a	0-47(N)
ND50-3409b	0-54(N)
ND50-3410	0-54(N)
ND50-3411	0-54(N)
ND50-3412	0-54(N)
ND50-3413	0-21
ND50-3414	0-21
ND50-3415	0-21, 0-39
ND50-3416.1 to .2	0-21
ND50-3417.1 to 3	0-54(N)
ND50-3418.1 to .4	0-54(N)
ND50-3419.1 to .5	0-54(N)
ND50-3420.1 to .5	0-54(N)
ND50-3421.1 to .5	0-54(N)
ND50-3422	0-16
ND50-3425	0-47(N)
ND50-3426	0-47(N)
ND50-3436	0-39
ND50-3437	0-21
ND50-3438	0-21, 0-39
ND50-3439	0-21
ND50-3440	0-21
ND50-3441	0-21
ND50-3442	0-54(N)
ND50-3443	0-21
ND50-3444	0-54(N)
ND50-3445	0-21, 0-54(N)
ND50-3446	0-21
ND50-3447	0-21
ND50-3448	0-54(N)
ND50-3449	0-54(N)

NavTechJap No.	Report Index No.
ND50-3450	0-54(N)
ND50-3451	0-54(N)
ND50-3452	0-54(N)
ND50-3454	0-54(N)
ND50-3455	0-54(N)
ND50-3456	0-21
ND50-3457	0-21
ND50-3458	0-54(N)
ND50-3459	0-21
ND50-3460	0-54(N)
ND50-3461	0-39
ND50-3462	0-21
ND50-3463	0-54(N)
ND50-3464	0-54(N)
ND50-3465	0-54(N)
ND50-3466	0-54(N)
ND50-3467	0-54(N)
ND50-3468	0-21
ND50-3469	0-54(N)
ND50-3470	0-21
ND50-3471	0-54(N)
ND50-3472	0-39
ND50-3473	0-39
ND50-3474	0-21
ND50-3475	0-54(N)
ND50-3476	0-21
ND50-3477	0-54(N)
ND50-3478	0-54(N)
ND50-3479	0-54(N)
ND50-3480	0-54(N)
ND50-3481	0-54(N)
ND50-3482	0-21
ND50-3483	0-21
ND50-3500	X-39(N)
ND50-3503	0-14
ND50-3504	0-14
ND50-3505	0-14
ND50-3506	0-14
ND50-3507	0-14
ND50-3508	0-14
ND50-3509	0-14
ND50-3510	0-14
ND50-3511	0-14
ND50-3512	0-14
ND50-3513	0-14
ND50-3514	0-14
ND50-3515	0-14
ND50-3516	0-14
ND50-3517	0014
ND50-3518	0-14
ND50-3519	0-14
ND50-3520	0-14
ND50-3521	0-14
ND50-3522	0-14
ND50-3523	0-14
ND50-3525	0-47(N)
ND50-3526	0-22
ND50-3527	0-22
	0-22

NavTechJap No.	Report Index No.
ND50-3528	0-22
ND50-3529	0-22
ND50-3530	0-22
ND50-3531	0-22
ND50-3532	0-22
ND50-3533	0-22
ND50-3534	0-22
ND50-3535	0-22
ND50-3540	0-20
ND50-3541	C-20
ND50-3542	0-20
ND50-3543	0-20
ND50-3544	0-20
ND50-3545	0-20
ND50-3600	0-53(N)
ND50-3601	0-47(N)
ND50-3602	0-53(N)
ND50-3603	0-47(N)
ND50-3604	0-47(N)
ND50-3605	0-47(N)
ND50-3606	0-47(N)
ND50-3607	0-47(N)
ND50-3608	0-47(N)
ND50-3609	0-47(N)
ND50-3610	0-47(N)
ND50-3611	0-05
ND50-3612	0-53(N)
ND50-3613	0-53(N)
ND50-3614	0-53(N)
ND50-3615	0-47(N)
ND50-3616	0-47(N)
ND50-3617	0-47(N)
ND50-3618	0-47(N)
ND50-3619	0-53(N)
ND50-3620	0-47(N)
ND50-3621	0-48(N)
ND50-3622	0-47(N)
ND50-3623	0-47(N)
ND50-3624	0-47(N)
ND50-3625	0-47(N)
ND50-3626	0-47(N)
ND50-3627	0-47(N)
ND50-3628	0-47(N)
ND50-3629	0-47(N)
ND50-3630	0-47(N)
ND50-3631	0-47(N)
ND50-3632	0-47(N)
ND50-3633	0-47(N)
ND50-3634	0-47(N)
ND50-3635	0-47(N)
ND50-3636	0-47(N)
ND50-3637	0-47(N)
ND50-3638	0-47(N)
ND50-3639	0-47(N)
ND50-3640	0-47(N), C-51(N)
ND50-3641	0-47(N), 0-53(N)
ND50-3642	0-47(N)
ND50-3643	0-47(N)

ENCLOSURE (D), continued

NavTechJap No.	Report Index No.	NavTechJap No.	Report Index No.
ND50-3644	0-47(N)	ND50-3722	0-19
ND50-3645	0-47(N)	ND50-3723	0-19
ND50-3646	0-47(N)	ND50-3724	0-19
ND50-3647	0-47(N)	ND50-3725	0-19
ND50-3648	0-47(N)	ND50-3726	0-19
ND50-3649	0-47(N)	ND50-3727	0-19
ND50-3650	0-47(N)	ND50-3728	0-19
ND50-3651	0-48(N)	ND50-3729	0-19
ND50-3652	0-51(N)	ND50-3730	0-19
ND50-3653	0-51(N)	ND50-3731	0-19
ND50-3654	0-53(N)	ND50-3732	0-19
ND50-3655	0-53(N)	ND50-3733	0-19
ND50-3656	0-53(N)	ND50-3734	0-19
ND50-3657	0-53(N)	ND50-3735	0-19
ND50-3658	0-53(N)	ND50-3736	0-19
ND50-3659	0-53(N)	ND50-3737	0-19
ND50-3660	0-53(N)	ND50-3738	0-19
ND50-3661	0-53(N)	ND50-3739	0-19
ND50-3662	0-53(N)	ND50-3740	0-19
ND50-3663	0-53(N)	ND50-3741	0-19
ND50-3684	0-47(N)	ND50-3742	0-19
ND50-3685	0-47(N)	ND50-3743	0-19
ND50-3686	0-47(N)	ND50-3744	0-19
ND50-3687	0-47(N)	ND50-3745	0-19
ND50-3688	0-47(N)	ND50-3746a	0-19
ND50-3689	0-47(N)	ND50-3746b	0-19
ND50-3690	0-47(N)	ND50-3747a	0-19
ND50-3691	0-47(N)	ND50-3747b	0-19
ND50-3692	0-47(N)	ND50-3748	0-19
ND50-3693	0-53(N)	ND50-3749	0-19
ND50-3694	0-47(N)	ND50-3750	0-19
ND50-3695	0-47(N)	ND50-3751	0-19
ND50-3696	0-47(N)	ND50-3752	0-19
ND50-3697	0-47(N), 0-53(N)	ND50-3753	0-19
ND50-3698	0-47(N)	ND50-3754	0-19
ND50-3699	0-47(N)	ND50-3800	0-19
ND50-3700	0-15	ND50-3801	0-19
ND50-3701	0-15	ND50-3802	0-19
ND50-3702	0-15	ND50-3803	0-19
ND50-3703	0-15	ND50-3820	0-19
ND50-3704	0-15	ND50-3821	0-19
ND50-3705	0-15	ND50-3822	0-19
ND50-3706	0-15	ND50-3823	0-19
ND50-3707	0-15	ND50-3824	0-19
ND50-3708	0-15	ND50-3825	0-19
ND50-3709	0-15	ND50-3826	0-19
ND50-3710	0-15	ND50-3827	0-19
ND50-3711	0-15	ND50-3828	0-19
ND50-3712	0-15	ND50-3829	0-19
ND50-3713	0-15	ND50-3830	0-19
ND50-3714	0-15	ND50-3831	0-19
ND50-3715	0-15	ND50-3832	0-19
ND50-3716	0-15	ND50-3833	0-19
ND50-3717	0-15	ND50-3834	0-19
ND50-3718	0-15	ND50-3835	0-19
ND50-3719	0-15	ND50-3836	0-19
ND50-3720	0-15	ND50-3837	0-19
ND50-3721	0-15	ND50-3838	0-19

ENCLOSURE (D), continued

NavTechJap No.	Report Index No.	NavTechJap No.	Report Index No.
ND50-3839	0-19	ND50-3897	0-19
ND50-3840	0-19	ND50-3898	0-19
ND50-3841	0-19	ND50-3899	0-19
ND50-3842	0-19	ND50-3898	0-17
ND50-3843	0-19	ND50-3899	0-17
ND50-3844	0-19	ND50-3900	0-17
ND50-3845	0-19	ND50-3901	0-17
ND50-3846	0-19	ND50-3902.1 to .2	0-17
ND50-3847	0-19	ND50-3903.1 to .2	0-17
ND50-3848	0-19	ND50-3904.1 to .4	0-17
ND50-3849	0-19	ND50-3905.1 to .8	0-17
ND50-3850	0-19	ND50-3906.1 to .24	0-17
ND50-3851	0-19	ND50-3907	0-17
ND50-3852	0-19	ND50-3908	0-17
ND50-3853	0-19	ND50-3909	0-17
ND50-3854	0-19	ND50-3910	0-17
ND50-3855	0-19	ND50-3911	0-17
ND50-3856	0-19	ND50-3912	0-17
ND50-3857	0-19	ND50-3913	0-17
ND50-3858	0-19	ND50-3914	0-17
ND50-3859	0-19	ND50-3915	0-17
ND50-3860	0-19	ND50-3916	0-17
ND50-3861	0-19	ND50-3917	0-17
ND50-3862	0-19	ND50-3918	0-17
ND50-3863	0-19	ND50-3919	0-17
ND50-3864	0-19	ND50-3920	0-17
ND50-3865	0-19	ND50-3921	0-17
ND50-3866	0-19	ND50-3922	0-17
ND50-3867	0-19	ND50-3923	0-17
ND50-3868	0-19	ND50-3924	0-17
ND50-3869	0-19	ND50-3925	0-17
ND50-3870	0-19	ND50-3926	0-17
ND50-3871	0-19	ND50-3927	0-17
ND50-3872	0-19	ND50-3935	0-17
ND50-3873	0-19	ND50-3949	0-20
ND50-3874	0-19	ND50-3950	0-20
ND50-3875	0-19	ND50-3951	0-20
ND50-3876	0-19	ND50-3952	0-20
ND50-3877	0-19	ND50-3953	0-20
ND50-3878	0-19	ND50-3954	0-20
ND50-3879	0-19	ND50-3955	0-20
ND50-3880	0-19	ND50-3956	0-20
ND50-3881	0-19	ND50-3957	0-20
ND50-3882	0-19	ND50-3958	0-20
ND50-3883	0-19	ND50-3959	0-20
ND50-3884	0-19	ND50-3960	0-20
ND50-3885	0-19	ND50-3961.1 to .21	0-20
ND50-3886	0-19	ND50-3962	0-20
ND50-3887	0-19	ND50-3963	0-54(N)
ND50-3888	0-19	ND50-3970	0-21
ND50-3889	0-19	ND50-3971	0-54(N)
ND50-3890	0-19	ND50-3972	0-54(N)
ND50-3891	0-19	ND50-3975	0-54(N)
ND50-3892.1 to .6	0-19	ND50-4000a	E-14, E-28
ND50-3893.1 to .8	0-19	ND50-4000b	E-23, E-28
ND50-3894	0-19	ND50-4001a	E-14, E-28
ND50-3895	0-19	ND50-4001b	E-23, E-28
ND50-3896	0-19	ND50-4002	E-23, E-28

NavTechJap No.	Report Index No.
ND50-4753	0-54(N)
ND50-5000	X-18
ND50-5001	X-18
ND50-5002	X-18
ND50-5003	X-18
ND50-5004	X-18
ND50-5005	X-18
ND50-5006	X-18
ND50-5007	X-18
ND50-5008	X-18
ND50-5009	X-18
ND50-5010	X-18
ND50-5011	X-18
ND50-5012	X-18
ND50-5013	X-18
ND50-5014	X-18
ND50-5015	X-18
ND50-5016	X-18
ND50-5017	X-18
ND50-5018	X-18
ND50-5020	X-18
ND50-5022	X-18
ND50-5024	X-18
ND50-5026	X-18
ND50-5027	X-32
ND50-5028	X-32
ND50-5029	X-32
ND50-5030	X-32
ND50-5031	X-32
ND50-5032	X-32
ND50-5033	X-32
ND50-5034.1 to .6	X-32
ND50-5035	X-32
ND50-5040	X-34(N)
ND50-5041	X-34(N)
ND50-5042	X-34(N)
ND50-5043	X-34(N)
ND50-5044	X-34(N)
ND50-5045	X-34(N)
ND50-5046	X-34(N)
ND50-5047	X-34(N)
ND50-5051	X-40(N)
ND50-5052	X-40(N)
ND50-5053	X-40(N)
ND50-5054	X-40(N)
ND50-5055.1 to .12	X-40(N)
ND50-5056	X-40(N)
ND50-5057.1 to .2	X-40(N)
ND50-5058	X-40(N)
ND50-5059.1 to .2	X-40(N)
ND50-5060.1 to .3	X-40(N)
ND50-5061.1 to .7	X-40(N)
ND50-5062	X-40(N)
ND50-5063	X-40(N)
ND50-5064.1 to .29	X-40(N)
ND50-5065	X-40(N)
ND50-5066.1 to .4	X-40(N)
ND50-5067.1 to .4	X-40(N)

NavTechJap No.	Report Index No.
ND50-5068	X-40(N)
ND50-5069	X-40(N)
ND50-5070.1 to .12	X-40(N)
ND50-5071	X-40(N)
ND50-5072.1 to .10	X-40(N)
ND50-5073.1 to .10	X-40(N)
ND50-5074.1 to .23	X-40(N)
ND50-5075	X-40(N)
ND50-5076.1 to .3	X-40(N)
ND50-5077.1 to .2	X-40(N)
ND50-5078.1 to .3	X-40(N)
ND50-5079	X-40(N)
ND50-5080	X-40(N)
ND50-5081.1 to .4	X-40(N)
ND50-5082	X-40(N)
ND50-5083.1 to .2	X-40(N)
ND50-5084.1 to .7	X-40(N)
ND50-5085.1 to .31	X-40(N)
ND50-5086.1 to .23	X-40(N)
ND50-5087.1 to .2	X-40(N)
ND50-5088.1 to .2	X-40(N)
ND50-5089.1 to .3	X-40(N)
ND50-5090.1 to .3	X-40(N)
ND50-5091.1 to .4	X-40(N)
ND50-5092	X-40(N)
ND50-5093.1 to .5	X-40(N)
ND50-5094	X-40(N)
ND50-5095	X-40(N)
ND50-5096	X-40(N)
ND50-5097	X-40(N)
ND50-5098.1 to .3	X-40(N)
ND50-5099	X-40(N)
ND50-5100	X-40(N)
ND50-5101	X-40(N)
ND50-5102	X-40(N)
ND50-5103	X-40(N)
ND50-5104	X-40(N)
ND50-5105	X-40(N)
ND50-5106	X-40(N)
ND50-5200	X-12
ND50-5201	X-12
ND50-5202	X-12
ND50-5203	X-12
ND50-5204	X-12
ND50-5205	X-12
ND50-5206	X-12
ND50-5207	X-12
ND50-5208	X-12
ND50-5209	X-12
ND50-5210	X-12
ND50-5211	X-12
ND50-5212	X-12
ND50-5213	X-12
ND50-5214	X-12
ND50-5215	X-12
ND50-5216	X-12
ND50-5217	X-12
ND50-5218	X-12

ENCLOSURE (D), continued

NavTechJap No.	Report Index No.	NavTechJap No.	Report Index No.
ND50-5219	X-12	ND50-5226	X-31
ND50-5220	X-31	ND50-5227	X-31
ND50-5221	X-31	ND50-5228,1 to .8	X-31
ND50-5222	X-31	ND50-5229.1 to .6	X-31
ND50-5223	X-31	ND50-5299.1 to .9	X-33
ND50-5224	X-31	ND50-5300	X-33
ND50-5225	X-31		

ENCLOSURE (D). continued

AERONAUTICS TARGETS

Legend

KNY	Kure Navy Yard
NAA2	No. 2 Navy Air Arsenal
NAA21	No. 21 Navy Air Arsenal
NAD21	21st Naval Air Depot, SASEBO
NAHQ	Navy Air Headquarters
NATA	Navy Air Technical Arsenal
NTD	Navy Technical Department
SNY	Sasebo Navy Yard
YNY	Yokosuka Navy Yard

AIRCRAFT HANDLING FACILITIES IN JAPANESE NAVAL VESSELS

A-11

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1400	4455	Blueprint: Seaplane arrangements of OYODO as modified to fleet flagship.	NATA	YNY	BuShips
ND50-1401	4456	Blueprint: Seaplane arrangements of OYODO as modified to fleet flagship.	NATA	YNY	BuShips
ND50-1402	4457	Blueprint: Seaplane arrangements of OYODO as modified to fleet flagship.	NATA	YNY	BuShips
ND50-1403	4412	Blueprint: TAIHO (CV) general arrangement, sectional profile.	NTD	YNY	BuShips
ND50-1404	4453	Blueprint: TAIHO (CV) general arrangement, flight deck.	NTD	YNY	BuShips
ND50-1405	4413	Blueprint: TAIHO (CV) general arrangement, upper gallery deck.	NTD	YNY	BuShips
ND50-1406	4414	Blueprint: TAIHO (CV) general arrangement, upper hangar deck.	NTD	YNY	BuShips
ND50-1407	4415	Blueprint: TAIHO (CV) general arrangement, lower gallery deck.	NTD	YNY	BuShips
ND50-1408	4416	Blueprint: TAIHO (CV) general arrangement, lower hangar deck.	NTD	YNY	BuShips
ND50-1409	4417	Blueprint: TAIHO (CV) general arrangement, lower deck.	NTD	YNY	BuShips
ND50-1410	4418	Blueprint: TAIHO (CV) general arrangement, upper platform deck.	NTD	YNY	BuShips
ND50-1411	4419	Blueprint: TAIHO (CV) general arrangement, lower platform deck.	NTD	YNY	BuShips
ND50-1412	4420	Blueprint: TAIHO (CV) general arrangement, hold.	NTD	YNY	BuShips
ND50-1413	4421	Blueprint: TAIHO (CV) general arrangement, bottom compartments.	NTD	YNY	BuShips
ND50-1414	4422	Blueprint: TAIHO (CV) general arrangement, forward sections.	NTD	YNY	BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1415	4423	Blueprint: TAIHO (CV) general arrangement, after sections.	NTD	YNY	BuShips
ND50-1416	4424	Blueprint: CHITOSE (CV) gasoline arrangement, lower hangar.	SNY	YNY	BuShips
ND50-1417	4425	Blueprint: CHITOSE (CV) gasoline arrangements.	YNY	YNY	BuShips
ND50-1418	4426	Blueprint: CHITOSE (CV) gasoline arrangements.	SNY	YNY	BuShips
ND50-1419	4427	Blueprint: CHITOSE (CV) gasoline arrangements.	YNY	YNY	BuShips
ND50-1420	4428	Blueprint: CHITOSE (CV) gasoline arrangements.	YNY	YNY	BuShips
ND50-1421	4429	Blueprint: UNRYU (CV) CO_2 safety arrangements for gasoline system.	YNY	YNY	BuShips
ND50-1422	4430	Blueprint: UNRYU (CV) concrete protection for gasoline tanks.	KNY	YNY	BuShips
ND50-1423	4431	Blueprint: CHITOSE (CV) vent arrangements, diagrammatic sketch of forward section.	SNY	YNY	BuShips
ND50-1424	4432	Blueprint: CHITOSE (CV) vent arrangements, diagrammatic sketch of after system.	SNY	YNY	BuShips
ND50-1425	4433	Blueprint: CHITOSE (CV) vent arrangements, hangar forward.	SNY	YNY	BuShips
ND50-1426	4434	Blueprint: CHITOSE (CV) ventilations arrangement, hangar aft.	SNY	YNY	BuShips
ND50-1427	4435	Blueprint: CHITOSE (CV) foam arrangements, upper decks.	SNY	YNY	BuShips
ND50-1428	4436	Blueprint: CHITOSE (CV) foam arrangements, lower decks.	SNY	YNY	BuShips
ND50-1429	4454	Blueprint: UNRYU (CV) foam system, hold and inner bottom.	KNY	YNY	BuShips
ND50-1430	4437	Blueprint: UNRYU (CV) foam system, flight deck.	KNY	YNY	BuShips
ND50-1431	4438	Blueprint: UNRYU (CV) foam system, upper gallery deck.	KNY	YNY	BuShips
ND50-1432	4439	Blueprint: UNRYU (CV) foam system, upper hangar deck.	KNY	YNY	BuShips
ND50-1433	4440	Blueprint: UNRYU (CV) foam system, lower gallery deck.	KNY	YNY	BuShips
ND50-1434	4442	Blueprint: UNRYU (CV) foam system, lower hangar deck.	KNY	YNY	BuShips
ND50-1435	4441	Blueprint: UNRYU (CV) foam system, lower deck.	KNY	YNY	BuShips
ND50-1436	4443	Blueprint: UNRYU (CV) engine inspection shop.	KNY	YNY	BuShips
ND50-1437	4444	Blueprint: UNRYU Class (CV), engine inspection shop.	NAHQ	YNY	BuShips
ND50-1438	4445	Blueprint: IBUKI (CV) arresting gear, control system.	NAA2	YNY	BuShips
ND50-1439	4446	Blueprint: IBUKI (CV) arresting gear, method of reeving wires.	SNY	YNY	BuShips
ND50-1440	4447	Blueprint: IBUKI (CV) arresting gear, method of reeving wires.	SNY	YNY	BuShips
ND50-1441.1 to .2	4448	Blueprint: IBUKI (CV) arresting gear, deck pulleys and method of reeving wires.	NAHQ	YNY	BuShips

ENCLOSURE (D , continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1442	4449	Blueprint: IBUKI (CV) crash barriers, arrangement of deck fittings.	NAA21	YNY	BuShips
ND50-1443	4450	Blueprint: IBUKI (CV) crash barriers, detailed layout.	NAA21	YNY	BuShips
ND50-1444	4451	Blueprint: IBUKI (CV) crash barriers, detailed layout.	NAA21	YNY	BuShips
ND50-1445	4452	Blueprint: IBUKI (CV) crash barriers, detailed layout.	NAA21	YNY	BuShips

JAPANESE NAVAL PHOTOGRAPHY

A-39

ND10-2507	3133	Research and experimentation on developing.	NATA	NAD21	WDC
ND10-2508	3136	Research reports on aircraft equipment.	NATA	NAD21	WDC

* * * * *

DOCUMENTS AND INTELLIGENCE TARGETS

Legend

JNL	Japanese Navy League, TOKYO

JAPANESE NAVY LEAGUE

D-II E-3

ND50-0001	3123	Navy League Annual Magazine: Nov. 1941.	JNL	JNL	WDC
ND50-0002	3124	Navy League Annual Magazine: Nov. 1942.	JNL	JNL	WDC
ND50-0003	3126	Navy League Annual Magazine: July 1944.	JNL	JNL	WDC
ND50-0004	3131	Navy League Annual Magazine: Dec. 1944.	JNL	JNL	WDC
ND50-0005	3137	Navy League Annual Report: June 1943.	JNL	JNL	WDC

* * * * *

ELECTRONICS TARGETS

Legend

FECC	Fujikura Electric Cable Company
FEL	Fukuishi Electronics Laboratory, SASEBO
IJN	Imperial Japanese Navy
K	KURE
KNY	Kure Navy Yard
KUY	Captain Tamio KUYAMA
MB	Meiji Building, TOKYO
ML7	Seventh Military Laboratory, ITO
N	NUMAZU
NAHQ	Navy Air Headquarters
NATD	Navy Air Technical Depot
NATL	Navy Air Technical Laboratory

NATRL	Navy Air Technical Research Laboratory
NECK	Nippon Electrical Company, KAWASAKI
NOD1	First Naval Ordnance Depot
NTD	Navy Technical Department
NTL	Navy Technical Laboratory
NTL2	Second Navy Technical Laboratory
NTL2K	Second Navy Technical Laboratory, KANAZAWA
NTL2Y	Second Navy Technical Laboratory, YOKOSUKA
S	SASEBO
SCC	Sumitomo Communications Heavy Industry Company
SNY	Sasebo Navy Yard
TMC	Tomayama Manufacturing Company
YNAD	Yokosuka Navy Air Depot
YNY	Yokosuka Navy Yard
Z	ZUSHI
?	Unknown

JAPANESE SUBMARINE AND SHIPBORNE RADAR

E-01
(See E-28)

JAPANESE AIRBORNE RADAR

E-02
(See E-28)

JAPANESE LAND-BASED RADAR

E-03
(See E-28)

JAPANESE CENTIMETER WAVE TECHNIQUE

E-04
(See E-28)

JAPANESE RADIO AND RADAR DIRECTION FINDERS

E-05
(See E-28)

JAPANESE ANTI-RADAR COVERINGS

E-06

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-0040	4314	Anti-radar paint.	?	KNY	WDC

JAPANESE RADAR COUNTERMEASURES AND VISUAL SIGNAL DISPLAY EQUIPMENT

E-07
(See E-28)

ENCLOSURE (D), continued

JAPANESE RADIO EQUIPMENT

E-08
(See E-28)

JAPANESE NAVIGATIONAL AIDS

E-09
(See E-28)

JAPANESE SONAR AND ASDIC

E-10
(See E-28)

JAPANESE COMMUNICATION SYSTEMS

E-11
(See E-28)

JAPANESE EXPERIMENTAL RADAR

E-12
(See E-28)

JAPANESE ELECTRONIC TUBES

E-13
(See E-28)

JAPANESE MAGNETIC AIRBORNE DETECTOR

E-14

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-3017	4348	Schematic diagram: Infra-red signal equipment.	?	KNY	WDC
ND22-3018	4349	Complete list of radars, IFF, and RCM for airplane use, with characteristics.	?	KNY	WDC
ND22-3022	4350	Circuit diagram: Experimental Model K Simple Radar Indicator.	?	KNY	WDC
ND22-3023	4351	Schematic diagram: Mark 4 Model 2 Modification 2 Radar.	?	KNY	WDC
ND22-3024	4378	Wiring diagram: Type 2 Mark 2 Modification 3 Radar Transmitter.	?	KNY	WDC
ND50-4000a	3150	Instruction book (annex): Type 3 Mark 1 MAD Equipment.	NTL	Z	WDC
ND50-4001a	3149	Instruction book: Type 3 Mark 1 MAD Equipment.	NTL	Z	WDC

POWER SUPPLIES FOR JAPANESE ELECTRONICS

E-15
(See E-28)

JAPANESE ANTENNAE

E-16
(See E-28)

ENCLOSURE (D), continued

JAPANESE RADIO, RADAR, AND SONAR EQUIPMENT

E-17
(See E-28)

JAPANESE RADIO APPARATUS CONSTRUCTION METHODS

E-18
(See E-28)

JAPANESE ELECTRONIC EQUIPMENT CONSTRUCTION MATERIALS

E-19
(See E-28)

JAPANESE R.F. TRANSMISSION LINES, WAVE GUIDERS, WAVE GUIDE FITTINGS, AND DIELECTRIC MATERIALS

E-20
(See E-28)

JAPANESE RADIO FREQUENCY MEASURING TECHNIQUE

E-22
(See E-28)

JAPANESE INSULATION MATERIALS

E-23

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-4000b	3930	Report on tests of general characteristics: TESON #1.	NEC	MB	WDC
ND50-4001b	3931	Results of measurements on steatite.	SCC	MB	WDC
ND50-4002	3932	Tables of construction tolerances: TESON #1.	TMC	MB	WDC

JAPANESE ELECTRONIC HARBOR PROTECTION EQUIPMENT

E-26
(See E-28)

JAPANESE ELECTRONICS - GENERAL

E-28

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND10-0500	3076	Manual for automatic coding machine.	NTL	S	WDC
ND10-6000.3, .4, .5	3068	Miscellaneous radar notebooks and blueprints.	?	FEL	WDC
ND21-6000.0 to .14	3232	Studies of electromagnetic field disturbances. Parts 1 to 13-2	IJN	YNY	WDC*

* Indicates duplicate sent to BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-6001	3301	Research experiments on the experimental ADCOCK Type Medium wave Land-based Direction Finder.	NTL	YNY	WDC
ND21-6002	3255	Studies on spherically polarized electromagnetic waves.	NTL	YNY	WDC
ND21-6003	3381	Studies of potentiometer type range determination used with radar.	NTL	YNY	WDC
ND21-6004	3469	Study of the polyphase crystal oscillator.	NTL	YNY	WDC
ND21-6005	3382	Plans for transmitted wave form charging equipment.	NTL	YNY	WDC
ND21-6006	3412	Studies on underwaters transmission of ultra-short-waves.	NTL	YNY	WDC
ND21-6007	3413	Results of experiments designed to determine depth of underwater radio receiver using watertight antenna.	NTL	YNY	WDC
ND21-6008	3480	Comparative test results: Electrolytic capacitors.	NTL	YNY	WDC
ND21-6009	3515	Centimeter wave absorption type wave meter.	NTL	YNY	WDC
ND21-6010	3470	Noise and interference limiter in mechanical reception.	NTL	YNY	WDC
ND21-6011	3471	Report on experimental model photo-electric cell audio-frequency equipment.	NTL	YNY	WDC
ND21-6012	3488	Study of the velocity modulated tube using retardation fields.	NTL	YNY	WDC
ND21-6013	3256	General study of the revolving oscillator antenna: Revolving oscillator tuning circuits.	NTL	YNY	WDC
ND21-6014	3257	Full wave form revolving oscillator antenna.	NTL	YNY	WDC
ND21-6015	3258	Stimulation of infinite phase oscillation from finite phase oscillation.	NTL	YNY	WDC
ND21-6016	3693	Report of experimental results of temporarily designated Type 97 Portable CW Radio	NTL	YNY	WDC
ND21-6017	3302	Experimental research on the small type medium wave radio navigation beacon.	NTL	YNY	WDC
ND21-6018	3481	Report of the standards committee on small paper and mica capacitors.	NTL	YNY	WDC
ND21-6019	3449	Comparative test results: Laminated phenol resin plates and phenol resin powder.	NTL	YNY	WDC
ND21-6020	3303	Experimental report on the ultra-short wave radio navigation beacon.	NTL	YNY	WDC
ND21-6021	3694	Study of the duplex transceiver.	NTL	YNY	WDC
ND21-6022	3695	Test results: Special Type 97 Mark 2 Shortwave Transmitter.	NTL	YNY	WDC
ND21-6023	3482	Comparative test results: Enamel coated fixed resistors.	NTL	YNY	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-6024	3450	Test results: High-frequency insulator manufactured by Tokyo Radio Manufacturing Company.	NTL	YNY	WDC
ND21-6025	3451	Test results: Hitlex manufactured by Hitachi Company.	NTL	YNY	WDC
ND21-6026	3489	Test results: Small ferric anode tubes.	NTL	YNY	WDC
ND21-6027	3383	Selection of impulse frequency in radar equipment.	NTL	YNY	WDC
ND21-6028	3696	Study of linear type long wave receiver.	NTL	YNY	WDC
ND21-6029	3452	Test results: Styrol-resin.	NTL	YNY	WDC
ND21-6030	3259	Experimental study of CW wave form distortion.	NTL	YNY	WDC
ND21-6031	3697	Experimental study of interchange of aircraft crystal oscillator and shipboard crystal oscillator.	NTL	YNY	WDC
ND21-6032	3698	Study of stability of Type 92 Special Receiver.	NTL	YNY	WDC
ND21-6033	3304	Study concerning improving the performance of the present shortwave direction finder.	NTL	YNY	WDC
ND21-6034	3699	Test results: Type 92 Modification 3 Special Receiver.	NTL	YNY	WDC
ND21-6035	3700	Study of use of radio equipment for shell spoting.	NTL	YNY	WDC
ND21-6036	3701	Test results: Improved version of Experimental Type 97 Long wave Receiver.	NTL	YNY	WDC
ND21-6037	3702	Test results: Temporarily designated Mark 2 Portable Carrier Telephone Equipment.	NTL	YNY	WDC
ND21-6038	3703	Plans for Experimental Mark 4 High-frequency Transmitter.	NTL	YNY	WDC
ND21-6039	3472	Study of high-frequency amplifying tubes (First report): Test Model RE-3.	NTL	YNY	WDC
ND21-6040	3516	Test results: Improved version of the temporarily designated Type 97 Precision Wave Meter.	NTL	YNY	WDC
ND21-6041	3473	Study of stability of receiver local oscillators (second report): Stable oscillation.	NTL	YNY	WDC
ND21-6042	3704	Examination USN long wave 2 KW transmitter.	NTL	YNY	WDC
ND21-6043	3260	Radiation characteristics of the polyphase vertical antenna.	NTL	YNY	WDC
ND21-6044	3261	Radiation characteristics of the star and ring shaped polyphase horizontal antennas.	NTL	YNY	WDC
ND21-6045	3705	Test results: Temporarily designated Mark 1 Portable Carrier Telephone Equipment.	NTL	YNY	WDC
ND21-6046	3262	Radiation characteristics of the rotating oscillation antenna.	NTL	YNY	WDC
ND21-6047	3263	Rotating oscillation antenna (Infinite phase antenna).	NTL	YNY	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-6048	3264	Horizontally fixed symmetrical polyphase antennas.	NTL	YNY	WDC
ND21-6049	3706	Experimental report on temporarily designated Type 97 Mark 2 Modification 2 Shortwave Transmitter.	NTL	YNY	WDC
ND21-6050	3517	Research report on improving the Type 92 Shortwave Meter.	NTL	YNY	WDC
ND21-6051	3518	Test results: Temporarily designated Zero Type Ultra-high Frequency Wave Meter.	NTL	YNY	WDC
ND21-6052	3265	Theory of design and calculation of the branching wave guide.	NTL	YNY	WDC
ND21-6053	3490	Experiments on detector tubes.	YNY	YNY	WDC
ND21-6054	3491	Tests on detector tubes, Part 1.	YNY	YNY	WDC
ND21-6055	3492	Tests on detector tubes, Part 2.	YNY	YNY	WDC
ND21-6056	3414	Investigation of the formation and electrical conductivity of sea-water.	YNY	YNY	WDC
ND21-6057	3519	Test equipment for measuring allowable grid voltages for high-frequency receiving tubes.	YNY	YNY	WDC
ND21-6058	3707	Latest communications developments in Europe and America.	YNY	YNY	WDC
ND21-6059	3474	Outline of feed-back amplifier circuits.	YNY	YNY	WDC
ND21-6060	3475	Study of constant signal generator.	NTL	YNY	WDC
ND21-6061	3483	Standard radio parts.	NTD	YNY	WDC
ND21-6062	3484	Standard radio parts.	NTD	YNY	WDC
ND21-6063	3493	Comparative test results: Radio receiving tubes.	NTL	YNY	WDC
ND21-6064	3453	Study of special insulators: Methods of producing polysterol.	NTL	YNY	WDC
ND21-6065	3266	Antenna arrays with closely spaced elements.	YNY	YNY	WDC
ND21-6066	3494	Studies of the Magnetron oscillator (No. 5): Magnetrons.	NTL	YNY	WDC
ND21-6067	3495	Studies of the Magnetron oscillator (No. 6): Trisected-anode Magnetron and the three phase electric oscillator.	NTL	YNY	WDC
ND21-6068	3496	Studies of the Magnetron oscillator (No. 7): Discussion of the polyphase electric oscillator.	NTL	YNY	WDC
ND21-6069	3485	Comparative test results: Variable high resistors.	YNY	YNY	WDC
ND21-6070	3423	Underwater listening and underwater communications.	NTL	N	WDC
ND21-6072	3497	Report of the small-type receiving tube standardization committee.	NTL	YNY	WDC
ND21-6073	3328	Instruction book: Temporarily designated Mark 1 Radar.	?	YNY	WDC
ND21-6074	3329	Modification and repair: Temporarily designated Mark 1 Radar.	?	YNY	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-6075	3330	Installation instructions (provisional): Temporarily designated Type 3 Mark 1 Model 1 Radar.	NTL	YNY	WDC*
ND21-6076	3331	Installation reports: Temporarily designated Mark 1 Model 1 Radar.	YNY	YNY	WDC
ND21-6077	3332	Installation instructions: Temporarily designated Mark 1 Model 1 Radar.	NTL	YNY	WDC*
ND21-6078	3333	Instruction book: Coupling devices and wave meter used with the temporarily designated Type 3 Mark 1 Model 1 Radar,	NTL	YNY	WDC*
ND21-6079	3334	Installation and modifications: Temporarily designated Type 3 Mark 1 Model 1 Radar.	YNY	YNY	WDC*
ND21-6080	3335	Instruction book: Transmitter, receiver, and indicator of temporarily designated Type 3 Mark 1 Model 1 Radar.	NTL	YNY	WDC*
ND21-6081	3336	Installation instructions (provisional): Temporarily designated Mark 1 Model 2 Radar.	NTL	YNY	WDC*
ND21-6082	3337	Modification report: Type 2 Mark 1 Model 2 Modification 2 Radar.	YNY	YNY	WDC*
ND21-6083	3338	Modification reports: Type 2 Mark 1 Model 2 Radar Antenna.	YNY	YNY	WDC*
ND21-6084	3339	Operating instructions: Type 2 Mark 1 Model 2 and Type 2 Mark 2 Model 1 Radar.	NTL	YNY	WDC*
ND21-6085	3340	Instruction book: KO (A) Model Indicator used with No. 13 Radar.	YNY	YNY	WDC*
ND21-6086	3341	Instruction book: Type 3 Mark 1 Model 3 (shipboard) Radar.	YNY	YNY	WDC*
ND21-6087	3342	Instruction book: Temporarily designated Type 3 Mark 1 Model 3 (land use) Radar.	YNY	YNY	WDC*
ND21-6088	3343	Installation and maintenance instructions: Temporarily designated Mark 1 Model 4A Radar.	YNY	YNY	WDC
ND21-6089	3344	Instruction book: Antenna switching device used with temporarily designated Type 3 Mark 2 Model 1 Radar.	NTL	YNY	WDC
ND21-6090	3345	Modification reports: Type 2 Mark 2 Model 1 Radar, antenna coupling device.	YNY	YNY	WDC*
ND21-6091	3346	Instruction manual: Automatic voltage regulator for UF 21 Radar.	NTL	YNY	WDC
ND21-6092	3347	Instruction book: Receiver of temporarily designated Type 3 Mark 2 Model 1 Radar.	NTL	YNY	WDC
ND21-6093	3371	Instruction book: Temporarily designated Mark 2 Model 2 Radar.	NTL	YNY	WDC*

* Indicates duplicate sent to BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-6094	3348	Operation and installation (provisional): Temporarily designated Type 2 Mark 2 Model 3 Radar.	NTL	YNY	WDC
ND21-6095	3349	Operating instructions: Temporarily designated Mark 2 Model 2 Modification 2 Radar.	NTL	YNY	WDC
ND21-6096	3350	Operating instructions (provisional): Temporarily designated Mark 2 Model 2 Modification 3 Radar.	NTL	YNY	WDC
ND21-6097	3351	Instruction book (provisional): Temporarily designated Mark 4 Model 1 Radar.	NTL	YNY	WDC
ND21-6098	3352	Instruction book (provisional): Temporarily designated Mark 4 Model 3 (land use) Radar.	NTL	YNY	WDC
ND21-6099	3353	Instruction book (provisional): Temporarily designated Mark 4 Model 3 Modification 1 (land use) Radar.	NTL	YNY	WDC
ND21-6100	3354	Instruction book: Wave meter used with Type 2 Mark 1 Model 1, Type 2 Mark 1 Model 2, Type 2 Mark 3 Model 1, Type 3 Mark 1 Model 1, Type 3 Mark 1 Model 3 Radars.	NTL	YNY	WDC
ND21-6101	3384	Report on installation of Type 2 Mark 2 Radar aboard the TAKAO (CA).	NTL	YNY	WDC
ND21-6102	3355	Instruction book for Modification 1 Wave meter used with Mark 1 and Mark 2 Radar.	YNY	YNY	WDC
ND21-6103	3690	Instruction book: 2 KVA automatic voltage regulator.	NTL	YNY	WDC
ND21-6104	3708	Instruction manual: Experimental Model 4 Matching Device.	NTL	YNY	WDC
ND21-6105	3356	Instruction book: Five KVA automatic voltage regulator, manufactured by Hitachi Company.	NTL	YNY	WDC
ND21-6106	3385	Radar maintenance.	YNY	YNY	WDC
ND21-6107	3386	Typical radar protection for use by land forces and precautions in operations.	YNY	YNY	WDC
ND21-6108	3387	Typical radar protection for use by land forces.	YNY	YNY	WDC
ND21-6109	3388	Special lookout station: Typical protection construction.	YNY	YNY	WDC
ND21-6110	3389	Tests on submarine radar.	YNY	YNY	WDC
ND21-6111	3390	Radar installation for land forces.	YNY	YNY	WDC
ND21-6112	3391	Radar blind spots.	YNY	YNY	WDC
ND21-6113	3392	Table of radar tubes.	NTL	YNY	WDC
ND21-6114	3393	Radar standard nomenclature, shipboard and land-based use.	YNY	YNY	WDC
ND21-6115	3524	Instruction book (provisional): Radar Intercept Receiver.	YNY	YNY	WDC

Indicates duplicate sent to BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-6116	3525	Test results: Temporarily designated Radar Intercept Receiver.	NTL	YNY	WDC
ND21-6117	3526	Operating instructions (provisional): Experimental oscillator for Radar Intercept Receiver.	NTL	YNY	WDC
ND21-6118	3527	Operating instructions (provisional): Radar Intercept Receiver.	NTL	YNY	WDC
ND21-6119	3528	Operating instructions (provisional): Temporarily designated Improved Type Intercept Receiver.	NTL	YNY	WDC
ND21-6120	3529	Improved installation (provisional): Temporarily designated Radar Intercept Receiver.	NTL	YNY	WDC
ND21-6122	3530	Operating instructions: Radar Intercept Receiver.	NTL	YNY	WDC
ND21-6123	3520	Centimeter wave absorption type wave meter.	NTL	YNY	WDC
ND21-6124	3305	Loop model RDF installation and errors due to installation.	NTL	YNY	WDC
ND21-6125	3306	LORENTZ Long wave Model U ADCOCK Bearing Gauge.	NTL	YNY	WDC
ND21-6126	3307	Experimental report (No. 2): Temporarily designated Zero Type Ultra-short-wave Direction Finder.	NTL	YNY	WDC
ND21-6127	3709	Installation of Mark 1 Model 2 Transmitter used with Type 97 Mark 1 Radio Beacon.	NTL	YNY	WDC
ND21-6128	3308	Test Report: Ultra-short-wave aircraft beacon.	NTL	YNY	WDC
ND21-6129.1 to .2	3309	Study of the effect of the ship's whistle, pipes, and cables on errors of the long wave direction finder and countermeasures.	YNY & KNY	YNY	WDC
ND21-6130	3310	Blind radio landing equipment.	NTL	YNY	WDC
ND21-6131	3311	Tests of AC radio beacon.	NTL	YNY	WDC
ND21-6132	3312	Tests of AC radio beacon.	NTL	YNY	WDC
ND21-6133	3313	Shortwave RDF installation and maintenance for land use.	?	YNY	WDC
ND21-6134	3320	Operation and installation instructions: Type 91 Mark 2 RDF.	NTD	YNY	WDC
ND21-6135	3321	Operation and installation instructions: Type 93 Mark 1 RDF.	NTD	YNY	WDC
ND21-6136	3314	Installation methods and precautions in operation: Land-use medium wave RDF.	NTL	YNY	WDC
ND21-6137	3322	Installation and maintenance instructions: Type 2 Model 1 RDF.	YNY	YNY	WDC
ND21-6138	3323	Installation and maintenance instructions: Type 3 Model 1 RDF.	YNY	YNY	WDC
ND21-6139	3315	Research relative to error in shipboard RDF.	SNY	YNY	WDC

Indicates duplicate sent to BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-6140	3324	Operation and installation instructions: Type 97 Mobile RDF.	NTL	YNY	WDC
ND21-6141	3325	Installation and maintenance instructions: Experimental Type 5 Model 1A RDF.	YNY	YNY	WDC*
ND21-6142	3415	Installation instructions: Type 3 Experimental Underwater Receiving Antenna.	YNY	YNY	WDC
ND21-6144	3416	Underwater wireless reception.	NTL	YNY	WDC
ND21-6145.1 to .2	3417	Underwater wireless reception material.	NTL	YNY	WDC
ND21-6146	3710	Study of special radio communications methods using phase displacement.	NTL	YNY	WDC
ND21-6147	3711	Revisions on portable radio charts explaining handling.	NTD	YNY	WDC
ND21-6148	3316	Experimental research regarding installation of loop antenna.	YNY	YNY	WDC
ND21-6150	3424	Measurement of attenuation ratio of vertically polarized supersonic waves on the surface of the sea and reflection ratios from the bottom of the sea.	NTL	N	WDC
ND21-6151	3425	Study of propagation of supersonic waves.	NTL	N	WDC
ND21-6152	3426	Study of substitute magnetostriction materials: Iron aluminum alloy, AF alloy.	NTL	N	WDC
ND21-6153	3427	Study on working of bubbles in underwater listening.	NTL	N	WDC
ND21-6154	3535	Schematic diagram: E-27 Intercept Receiver.	YNY	YNY	WDC
ND21-6155	3357	Installation drawings: Temporarily designated Mark 1 Model 1 Modification 2 Radar.	YNY	YNY	WDC
ND21-6156	3358	Operating instructions: Mark 2 Model 2 Modification 2 Radar Receiver.	NTL	YNY	WDC
ND21-6157	3359	Temporarily designated Type 3 Mark 2 Model 1 Radar Indicator.	NTL	YNY	WDC
ND21-6158	3360	Operating instructions: Mark 4 Model 1 Radar.	NTL	YNY	WDC
ND21-6159	3361	Reinstallation of Type 3 Mark 2 Radar on TAKAO (CA).	YNY	YNY	WDC
ND21-6160	3394	Installation instructions: Radar and radar intercept receivers.	YNY	YNY	WDC
ND21-6161	3531	Explanation and regulations of use of Model R-600 METOKKUSU Radar Intercept Receiver.	NTL	YNY	WDC
ND21-6162	3420	Experimental model radio altimeter.	NTD	YNY	WDC
ND21-6163	3395	Overall table of navy radar.	NTL	YNY	WDC
ND21-6164	3362	Performance tests: Temporarily designated Model 1 Radar (after installation).	YNY	YNY	WDC

* Indicates duplicate sent to BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-6165	3421	Instruction book: Type 3 Air Mark 6 Model 4 Radar.	NATD	YNY	WDC
ND21-6166	3422	Instructions for land handling of Type 3 Air Mark 6 Model 4 Radar and Type 3 Model 4 Antenna.	NATD	YNY	WDC
ND21-6167	3396	Radar installed on German cruiser.	NTL	YNY	WDC
ND21-6168	3397	Recent German radar indicators, bearing indicators, BISUMA antenna.	NTL	YNY	WDC
ND21-6169	3398	German naval radar lookout method.	NTL	YNY	WDC
ND21-6170	3399	Installation of ROTTERDAM radar on British planes and German countermeasures.	NTL	YNY	WDC
ND21-6171	3400	Installation on British planes of anti-German attack ROTTERDAM radar.	NTL	YNY	WDC
ND21-6172	3401	Outline of MEDDO radar used on British planes.	NTL	YNY	WDC
ND21-6173	3267	Measurement of the intensity of interference waves.	YNY	YNY	WDC
ND21-6174	3268	Ring wave guides and reflectors.	YNY	YNY	WDC
ND21-6175	3269	Study of circularly polarized electromagnetic waves.	NTL	YNY	WDC
ND21-6176	3270	Tables and charts of short and medium range shortwave propagation in South Sea area.	NTL	YNY	WDC
ND21-6177	3271	Study of wave propagation in the South Seas.	NTL	YNY	WDC
ND21-6178	3272	Study of the propagation characteristics of circularly polarized electromagnetic waves in the ionosphere.	NTL	YNY	WDC
ND21-6179	3273	Measurements of special conditions of radio directional antennas.	NTL	YNY	WDC
ND21-6180	3317	Collection of errors of ADCOCK antenna and goniometer used in wireless course detection gear.	NTL	YNY	WDC
ND21-6181	3274	Studies on the rotating beam antenna, (Part I): Theoretical research on the cardioid type directional antenna.	NTL	YNY	WDC
ND21-6182	3275	Studies on the rotating band antenna (Part II): Experimental studies on beam rotation.	NTL	YNY	WDC
ND21-6183	3402	List of vacuum tubes used in Japanese radar.	YNY	YNY	WDC
ND21-6184	3498	Vacuum tube characteristics.	?	YNY	WDC
ND21-6185	3276	Summary of the use of geometric circuits in centimeter wave techniques.	?	YNY	WDC
ND21-6186	3499	Simultaneous rotating oscillation oscillator in the split-anode Magnetron.	NTL	YNY	WDC

- - - -

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-6187	3500	Excitation forms and characteristic oscillation in the Magnetron .	NTL	YNY	WDC
ND21-6188	3501	Super-heterodyne detection with the OSAKA tube.	NTL	YNY	WDC
ND21-6189	3502	Regenerative detection characteristics of the OSAKA tube.	NTL	YNY	WDC
ND21-6190	3503	Influence of construction upon relationship between voltage and wave-length in design of OSAKA tube.	NTL	YNY	WDC
ND21-6191	3504	The electrostatic field within the OSAKA tube.	NTL	YNY	WDC
ND21-6192	3505	Theory of super-regenerative detection with receiving tubes using electron periodicity.	NTL	YNY	WDC
ND21-6193	3506	Theory of frequency-switching tube using electron periodicity.	NTL	YNY	WDC
ND21-6194	3507	Theory of super-heterodyne detection with receiving tubes using electron periodicity.	NTL	YNY	WDC
ND21-6195	3508	Standards of vacuum tubes used for reception.	NTL	YNY	WDC
ND21-6196	3509	Chrysanthemum type Magnetron.	NTL	YNY	WDC
ND21-6197	3454	Study of the composition of polyethylene.	NOD1	YNY	WDC
ND21-6198	3455	Study of maintenance of water repellancy of paraffin in sea water.	NTL2Y	YNY	WDC
ND21-6199	3456	Experiments on deterioration of steatite cable insulators due to sea water.	NATRL	YNY	WDC
ND21-6200	3457	Experiments on laminated phenol resin.	NTD	YNY	WDC
ND21-6201	3458	Comparative test results: Japanese manufactured steatite.	NTD	YNY	WDC
ND21-6202	3521	Research on methods of measuring high-frequency cable.	NTL	YNY	WDC
ND21-6203	3459	Results of polysterol tests.	NTD	YNY	WDC
ND21-6204	3460	Tests of rubber insulated wire for navy use.	NTD	YNY	WDC
ND21-6205.1 to .2	3461	Experiments on rubber insulated wire for navy use.	KNY	YNY	WDC
ND21-6206	3462	High-frequency cables: Handling of simple terminals.	FECC	YNY	WDC
ND21-6207	3463	Methods of moisture-proofing high-frequency cables.	FECC	YNY	WDC
ND21-6208	3363	Installation instructions (provisional): 105 S-11 Radar.	NTL	YNY	WDC
ND21-6209	3428	Underwater listening.	NTL	N	WDC
ND21-6210	3522	Instruction manual for testing radiation characteristics.	?	YNY	WDC
ND21-6211	3429	Explanatory tables and diagrams of Type 93 Hydrophone (submarine use).	NTL	N	WDC

Indicates duplicate sent to BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-6212	3430	Account of progress in research in echo ranging.	NTL	N	WDC
ND21-6213	3403	British radar.	NTL	YNY	WDC
ND21-6214	3431	Experiments in adjusting hydrophones.	NTD	N	WDC
ND21-6215	3432	Installation outline: Experimental Model OTSU (B) Hydrophone.	NTD	N	WDC
ND21-6216.1	3318	Installation report: Type 2 Medium-frequency RDF.	YNY	YNY	WDC*
ND21-6216.2 to .7 and .9	3404	Experimental report: Type 2 Mark 1 Model 2 Modification 3 Radar; Type 2 Mark 1 Model 2 Modification Radar (1.5 M. wave length), Radar using submarine RDF antenna.	YNY	YNY	WDC*(.2 and .6)
ND21-6216.8	3532	Experimental report on submarine intercept receiver covered antenna.	YNY	YNY	WDC*
ND21-6217	3523	Static measurement results.	NTL	YNY	WDC
ND21-6218	3464	Studies on temperature characteristics of high frequency insulators (First Report): Characteristics surface resistance of steatite.	NTL	YNY	WDC
ND21-6219	3465	Test results: MIPOREKKISU (Niplex) electrical insulating material.	NTL	YNY	WDC
ND21-6220	3486	Test results: Oil-filled capacitors used in communications manufacturing by Sumitomo Electric Company.	NTL	YNY	WDC
ND21-6221	3510	Rest results: Special tubes manufactured by Kawanishi Machine Manufacturing Company.	NTL	YNY	WDC
ND21-6222	3533	Performance tests: Type 2 Mark 2 Model 1 Radar Antenna used in radar intercept.	NTL	YNY	WDC
ND21-6223	3405	High-voltage power supply for radar transmitter.	NTL	YNY	WDC
ND21-6224	3466	Polyethylene polymer used for high frequency electric cable.	NTL	YNY	WDC
ND21-6225	3487	Test results: Small type electrolytic capacitors.	NTL	YNY	WDC
ND21-6226	3319	Ultra-short-wave AC navigating beacon (fourth report).	NTL	YNY	WDC*
ND21-6227	3511	Velocity modulated tubes (First report).	NTL	YNY	WDC
ND21-6228	3512	Elimination of shadows from the support in circular sweep CRT.	NTL	YNY	WDC
ND21-6229.1 to .35	3326	Map of Japanese radar installations.	YNY	YNY	WDC
ND21-6230.1 to .8	3227	Typical installations of radar and RCM.	YNY	YNY	WDC
ND21-6231.1 to .4	3364	Installation and wiring prints: Mark 2 Model 2 Radar.	YNY	YNY	WDC
ND21-6232.1 to .11	3406	Radar No. 32 installation and wave guide prints.	YNY	YNY	WDC*(.3 to .11)

Indicates duplicate sent to BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-6233	3372	External wiring diagram: Type 2 Mark 1 Model 2 Modification 3 Radar.	YNY	YNY	WDC
ND21-6234.1 to .10	3534	Pulleys for Model 1 Full-wave Antenna.	YNY	YNY	WDC*(.1, .5 to.10
ND21-6235	3365	External wiring diagram: Mark 4 Model 3 Modification 1 Radar.	YNY	YNY	WDC*
ND21-6236	3366	External wiring diagram: Mark 4 Model 2 Radar.	YNY	YNY	WDC*
ND21-6237	3411	Instruction book: Temporarily designated Mark 2 Model 2 Radar (microfilm).	?	YNY	WDC
ND21-6238	3433	Plans for sonar equipment.	NTD	N	WDC
ND21-6239	3434	Tests on the high-frequency generator used with temporarily designated Type 3 Model 2 Sonar.	NTD	N	WDC
ND21-6240	3435	Absolute measurement of underwater sound.	NTL	N	WDC
ND21-6241	3436	Study of Rochelle salts oscillation.	ML7	N	WDC
ND21-6242	3437	Experiments on electrical theory of oscillation of X-450 cut Rochelle salt crystal.	NTL	N	WDC
ND21-6243	3438	Binaural listening.	?	N	WDC
ND21-6244	3439	Experimental report on distribution in various directions of noise generated by submarines underway.	NTL	N	WDC
ND21-6245	3440	Measuring performances of various hydrophones.	NTL	N	WDC
ND21-6246	3441	Study of underwater listening.	KUY	N	WDC
ND21-6248	3442	Hydrophone arrangement for sound reception (general).	KUY	N	WDC
ND21-6252	3418	Research on sound and vibration absorbing materials (Third report): Study on preventing noise generated in the ships sound room.	NTL	YNY	WDC
ND21-6253	3419	Research on sound and vibration absorbing materials (Fourth report): Absorption effects of saddle type shock absorbers.	NTL	YNY	WDC
ND21-6262	3443	Drawings of the sonic bearing evaluators manufactured by the Oki Electrical Manufacturing Company and the Nippon Electrical Manufacturing Company (model), used with Type 97 Hydrophone.	NTL	N	WDC
ND21-6263	3444	Blueprints: Type 97 Model 2 Sonic Bearing Evaluator.	?	N	WDC
ND21-6264	3445	Experiments on the construction of underwater sound training equipment: Temporarily designated Floating Target Search Equipment.	YNY	N	WDC

Indicates duplicate sent to BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-6265	3446	Circular hydrophone arrangement for sound reception.	NTL	N	WDC
ND21-6266	3447	Underwater supersonic wave propogation.	NTL	N	WDC
ND21-6267	3476	Operation of multi-polar high-frequency amplifier.	NTL	YNY	WDC
ND21-6268	3477	Powdered cores for high frequency.	NTL	YNY	WDC
ND21-6269	3277	Research on wave transmission.	NTL	YNY	WDC
ND21-6270	3467	Research on special insulation materials: PORISUCHIRORU (polysterol).	NTL	YNY	WDC
ND21-6271	3478	Research on oscillating circuits.	NTL	YNY	WDC
ND21-6272	3513	Research on Magnetrons.	NTL	YNY	WDC
ND21-6273	3514	Research on Magnetrons.	NTL	YNY	WDC
ND21-6274	3368	Trouble shooting table: Temporarily designated Type 3 Model 2 Radar.	NTL	YNY	WDC
ND21-6275	3407	Instructions for installing radar and radar intercept equipment (proposed): Land installations.	NTL2Y	YNY	WDC
ND21-6276	3408	Instructions for installing radar and radar intercept equipment: Shipboard installations.	NTL2Y	YNY	WDC
ND21-6277	3367	Installation modifications: Temporarily designated Type 2 Mark 1 Model 1 Radar.	YNY	YNY	WDC*
ND21-6278	3409	Experiments on temporarily designated Mark 6 Model 1 Radar.	YNAD	YNY	WDC
ND21-6279	3369	Operation and installation instructions: Temporarily designated Mark 4 Model 3 Radar.	NTL	YNY	WDC
ND21-6280	3410	Performance of experimental parabolic antennas for radar intercept equipment.	NTL2Y	YNY	WDC
ND21-6282	3468	Test results: Special two-conductor rubber high-frequency cable.	NTL2Y	YNY	WDC
ND21-6283	3712	List of radio equipment scheduled for ships No. 5491 and No. 5522.	YNY	YNY	WDC
ND21-6284	3479	Experiments on torque amplifier equipment.	KNY	YNY	WDC
ND21-6285	3448	Explanation of underwater sound listening device.	?	N	WDC
ND21-6286	4241	Operator's manual: Experimental 19 Air Mark 3 Radio.	NAHQ	NTL2K	WDC
ND21-6287	4242	Instruction manual: Type 3 Air 6 Model 4 Modification 3 Radar.	NATL	NTL2K	WDC
ND21-6288	4243	Instruction book: Temporarily designated Model 1 Radio Altimeter.	NTL2	NTL2K	WDC
ND21-6289	4244	Instruction book: Type 3 Air Mark 1 Modification 1, 2, 3 Radio Telephone Equipment.	NATL	NTL2K	WDC
ND22-0040	4314	Anti-radar paint.	?	KNY	WDC
ND22-0042	4315	Sound absorbent paint.	?	KNY	WDC

* Indicates duplicate sent to BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-2686	4101	Blueprint: Compound Type Mark 3 Underwater Signal Equipment.	KNY	K	WDC
ND22-2687	4100	Blueprint block diagram: Compound Type Mark 2 Underwater Signal Equipment.	KNY	K	WDC
ND22-2701	4099	Blueprint: Compound Type Mark 3 Underwater Signal Equipment.	KNY	K	WDC
ND22-2703	4087	Blueprint: Type 99 Submarine Hydrophone Projector and Receiver Equipment.	KNY	K	WDC
ND22-2704	4098	Blueprint connection diagram: Type 93 Model 2A Submarine Hydrophone.	KNY	K	WDC
ND22-3000	4332	Handling instructions: Temporarily designated Type 3 Mark 1 Model 3 Radar (land use).	KNY	KNY	WDC
ND22-3001	4333	Handling instructions: Temporarily designated Mark 4 Model 1 Radar.	NTL	KNY	WDC
ND22-3002	4334	Handling instructions: Temporarily designated Mark 4 Model 1 Radar.	NTL	KNY	WDC
ND22-3003	4335	Instruction manual: Temporarily designated Mark 4 Model 3 Radar.	NTL	KNY	WDC
ND22-3004	4336	Circuit diagrams: Temporarily designated Mark 4 Model 3 Modification 1 Radar.	KNY	KNY	WDC
ND22-3005	4337	Shipboard installation procedures for radar and radar intercept receivers.	NTL2Y	KNY	WDC
ND22-3006	4338	Land installation procedures for radar and radar intercept receivers.	NTL2Y	KNY	WDC
ND22-3007	4339	Handling instructions: Experimentally manufactured Type 4 Model 3 Modification 1 Radar Intercept Receiver.	NTL	KNY	WDC
ND22-3008	4340	Details of 10cm radar RF system.	?	KNY	WDC
ND22-3009	4341	Details of RCM antennas under development.	?	KNY	WDC
ND22-3010	4342	List of electronics and sonar equipment.	NTD	KNY	WDC
ND22-3011	4343	List of radars with characteristics.	?	KNY	WDC
ND22-3012	4344	List of RCM equipment (radar intercept receivers).	?	KNY	WDC
ND22-3013	4345	Instruction manual: Temporarily designated Type 3 Model 2 Radar.	NTD	KNY	WDC
ND22-3014	4346	Schematic diagram: Temporarily designated Type 3 Model 2 Radar.	KNY	KNY	WDC
ND22-3015	4347	Standard installation for ships of radio, radar, and underwater acoustic equipment.	?	KNY	WDC
ND22-3017	4348	Schematic diagram: Infra-red signal equipment.	?	KNY	WDC
ND22-3018	4349	Complete list of radars, IFF, and RCM, for airplane use, with characteristics.	?	KNY	WDC
ND22-3022	4350	Circuit diagram: Experimental Model K Simple Radar Indicator.	?	KNY	WDC
ND22-3023	4351	Schematic diagram: Mark 4 Model 2 Modification 2 Radar.	?	KNY	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-3024	4378	Wiring diagram: Type 2 Mark 2 Modification 3 Radar Transmitter.	?	KNY	WDC
ND50-4000a	3150	Instruction book (annex): Type 3 Mark 1 MAD Equipment.	NTL	Z	WDC
ND50-4000b	3930	Report on tests of general characteristics: Teson #1.	NECK	MB	WDC
ND50-4001a	3149	Instruction book: Type 3 Mark 1 MAD Equipment.	NTL	Z	WDC
ND50-4001b	3931	Results of measurements on steatite.	SCC	MB	WDC
ND50-4002	3932	Tables of construction tolerances: Teson #1.	TMC	MB	WDC

JAPANESE ELECTRONICS TRAINING AND OPERATING TECHNIQUES

E-29
(See E-28)

JAPANESE ELECTRONICS - MISCELLANEOUS

E-30(N)
(See E-28)

* * * * *

MEDICAL TARGETS

Legend

AH1	First Army Hospital, TOKYO
BM	Bureau of Medicine, TOKYO
BMNM	Bureau of Medicine, Navy Ministry
HSNY	Hospital, Sasebo Navy Yard
KIU	Kyoto Imperial University
NCS	Naval Corpsmen School, KAMO
NH2	Second Navy Hospital, TOKYO
NMC	Navy Medical College
NMS	Navy Medical Society
NRB	Navy Relief Bureau
NTL	Navy Technical Laboratory, TOKYO
TMSC	Takei Medical Supply Company
TNAS	Tsuchiura Naval Air Station
TPC	Takeda Pharmaceutical Company
YNH	Yokosuka Navy Hospital
?	Unknown

DATA RELATIVE TO LIFE IN THE JUNGLE AND ON SEA ISLANDS, AND DATE ON COMPOSITION OF INSECTICIDES

M-01

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-7505.1 to .2	3110	Elementary Hygiene in the Tropics. Hygiene in the Tropics.	BMNM	NCS	WDC

ENCLOSURE (D), continued

DENTISTRY IN THE JAPANESE ARMED FORCES

M-02

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-7516	3113	Dental Nursing Manual.	NCS	NCS	WDC

PODIATRY IN THE JAPANESE NAVY

M-03

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-2999	3165	Changes in the bones of rabbits due to feeding ammonium phosphate.	?	?	WDC

AERO, SURFACE, AND SUBMARINE MEDICINE AND RESEARCH IN THE JAPANESE NAVY

M-06

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-7514.1 to .2	3122	Krapelin Test. Aeronautical Intelligence Test, Navy.	?	TNAS	WDC
ND21-7525	3130	Hygiene in Cold Districts.	BLNM	MB	WDC

BACTERIOLOGY AND CHEMISTRY IN THE JAPANESE NAVY

M-10

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-7517	3112	Advanced Bacteriological Instruction.	NCS	NCS	WDC

PHARMOCOLOGY AND MALARIOLOGY IN JAPAN - CIVILIAN AND NAVAL

M-12

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-7506.1 to .3	3114	Compendium of pharmaceutical specialties. Catalog of Takeda drugs.	TPC	TPC	WDC

ADDENDUM TO ALL MEDICAL REPORTS

MAA

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND10-7501.1 to .9	3120	Organization, administration, and training in the Medical Corps.	?	HSNY	NMRI

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND10-7502.1	3121	Manual for medical corpsmen.	BM	HSNY	NMRI
ND21-7503.10 to .23	3109	Medical training manuals.	NCS	NCS	WDC
ND21-7509	3125	Catalog.	TMSC	AH1	WDC
ND21-7511.10 to .28	3115	Report on medical research.	NTL	NTL	WDC
ND21-7512.1 to .2	3116	Medical treatment of wounded servicemen. Rehabilitation.	NRB & NMS	NH2	WDC
ND21-7515.10 to .36	3111	Various issues: National Hygiene. Navy Medicine. Journal of Navy Medical Society.	KIU & NMS	NH2	WDC
ND21-7520	3127	List of medical instruments.	YNH	YNH	Enclosure to report
ND21-7521.1 to .8	3128	Psychometric tests for aptitude.	NTL	NTL	WDC
ND21-7522.1 to .2	3129	Intelligence test for seamen. Communications test.	?	TNAS	WDC
ND21-7524	3118	Regulations for recruit physical examinations.	BM	BMNM	WDC
ND21-7527	3119	Reports of research department.	NMC	NMC	WDC

* * * * *

ORDNANCE TARGETS

Legend

AA1	First Army Arsenal
ACC	Aichi Clock Company
AOAHQ	Army Ordnance Administrative Headquarters
ATA1	First Air Technical Arsenal
ATD	Army Technical Department
ATHQ	Army Technical Headquarters
DSC	Daido Steel Company
FEC	Fuji Electric Company
IJA	Imperial Japanese Army
IJN	Imperial Japanese Navy
IJNHO	Imperial Japanese Navy, Hydrographic Office
JSAC	Japan Science and Arts Council
K	KURE
KA	Kure Arsenal
KGEL	Kure Gunnery Experimental Laboratory
KNOD	Kure Naval Ordnance Depot
KNY	Kure Navy Yard
KOD	Kure Ordnance Depot
KPG	Kamegakubi Proving Ground
MB	Meiji Building, TOKYO
MNY	Maizuru Navy Yard
MW	Ministry of War
NAD	Navy Ammunition Department
NAD	Navy Ammunition Depot
NAK	Lt. Comdr. NAKATA
NATD	Navy Air Technical Depot
NFD	Naval Fuel Depot, KURE
NGF	Naval Gun Factory, SASEBO
NM	Navy Ministry
NOC	Nippon Optical Company
NOD	Navy Ordnance Depot
NOS	Naval Ordnance School

NPD	Navy Powder Depot
NPD2	Second Navy Powder Depot
NTD	Navy Technical Department
NTL	Navy Technical Laboratory
NTL2	Second Navy Technical Laboratory
OTA	T. OTANI
PS	Private Shipyards
PSC	Private Steel Company
SIU	Sendai Imperial University
SMIC	Sumitomo Metal Industries Company
SNY	Sasebo Navy Yard
T	TOKYO
TAN	Fist Lieut. TANAKA
TIU	Tohoku Imperial University
TNY	Toyokawa Navy Yard
VJNB	Various Japanese Naval Bureaus
Y	YOKOSUKA
YA	Yokosuka Arsenal
YGSHQ	Yokosuka Guard Squadron Headquarters
YNAD	Yokosuka Navy Air Depot
YNY	Yokosuka Navy Yard
YOL	Yokosuka Ordnance Library
YTL	Yawata Technical Laboratory
YWNMC	Yawata Works, Nippon Iron Manufacturing Company
?	Unknown

JAPANESE TORPEDOES AND TUBES

0-01

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3234	4523	Original drawings showing installation of torpedoes and torpedo launchers on small suicide boats.	?	YNY	WDC
ND50-3235	4524	General torpedo tube instruction book.	KNY	KNY	WDC
ND50-3050	4688	Specifications of Metals Used in the Japanese Navy.	?	K	WDC
ND50-3051	4689	Data on Throttling Holes in Generator of Type 95 Torpedo, Generator Nozzle Rating Data, Nozzle Flame Test Data.	?	K	WDC
ND50-3052	4690	Rough Plans of DAINYU Installation Data of Running Test of Type 95 Torpedo.	?	K	WDC
ND50-3053	4691	Torpedo Instruction Book Torpedo Instruction Book Diagrams.	?	K	WDC
ND50-3054	4692	Theory of Depth Mechanisms.	?	K	WDC
ND50-3055	4693	Primary Manual of Torpedo Instructions.	?	K	WDC
ND50-3056	4694	Notes on No. 6 Engine.	?	K	WDC
ND50-3057	4695	Test Data on Types 91, 95, 96, and 98 Torpedoes, List of Various Parts for Types 93 and 95 Torpedoes.	?	K	WDC
ND50-3058	4696	Oxygen Generating Agents.	?	K	WDC
ND50-3059	4697	Test Data of KAITEN 4 Generators.	?	K	WDC
ND50-3060	4698	Recorder for Range Measurements.	?	K	WDC
ND50-3061	4699	Torpedo Screw Data.	?	K	WDC

ENCLOSURE (D), continued

JAPANESE COUNTERMEASURES AND DEFENSIVE ORGANIZATION AGAINST U.S. MINES

0-03

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-4562	3227	Handbook for Magnetic and Acoustic Mines and Sweeps. Parts 1 and 3.	YNY	YNY	WDC
ND21-4566	3214	Type 2 Model 1 Sweep Gear.	YNY	YNY	Enclosure to report
ND21-4567	3215	Temporarily designated Type 4 Sweep Gear.	YNY	YNY	Enclosure to report
ND21-4568	3216	Mark 4 Underwater Sound Bomb.	NTD	YNY	Enclosure to report
ND21-4569	3217	Type 3 Model 2 Sweep Gear.	NTD	YNY	Enclosure to report
ND21-4570	3218	Principal items of Japanese naval sweeps.	YNY	YNY	Enclosure to report
ND50-3206	3219	Handbook for Magnetic and Acoustic Mines and Sweeps (Part 2).	YNY	YNY	Enclosure to report
ND50-3211	3221	Chart of damage to ships.	?	T	Enclosure to report
ND50-3212	3222	Mines located at SHIMONOSEKI Straits.	?	T	Enclosure to report
ND50-5400	3279	Hydrographic Bulletin No. 14 (Locations of mines and safety channels).	IJNHO	T	WDC

JAPANESE MINES

0-04

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-4550 to ND21-4552 ND21-4554 ND21-4557 to ND21-4561 ND21-4573 to ND21-4575 ND21-4577 to ND21-4578 ND21-4580 ND21-4582 to ND21-4584	3140	Reports on mines and mine-firing systems.	VJNB	YNY	WDC

JAPANESE NAVAL MINING ORGANIZATION AND OPERATIONAL TECHNIQUES

0-05

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-4563	3225	Anti-sweep float.	YNY	Y	WDC
ND21-4564	3226	Mark 4 Sound Bomb.	NTD	YNY	WDC
ND50-3214	3224	Chart of Japanese mines laid.	?	T	Enclosure to report

ENCLOSURE (D), continued

SHIP SIGNATURES AND RELATED DATA

0-07

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3200 to ND50-3202	3085	Magnetic deviation charts for Japanese waters.	IJNHO	T	Enclosure to report

JAPANESE NAVAL ROCKETS

0-09

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-1027	4325	Outline characteristics: TOKURO No. 2 Engine.	?	KNY	WDC
ND22-1851.1 to .15	4328	Blueprints: TOKURO No. 2 Airplane Rocket Engine.	NTL	KNY	WDC

JAPANESE ILLUMINATING AND COLORED BURST PROJECTILES

0-11

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-3402	4232	Development tests of AA projectile for 10cm/65 cal DP gun.	KNY	YNY	WDC
ND21-3428	3830	Measuring area of projectiles and determining center of gravity.	KNY	YNY	WDC
ND21-4001	4410	Japanese Navy projectiles.	?	YNY	WDC
ND21-4002	4411	Japanese Navy projectiles.	?	YNY	WDC
ND50-3203	3151	Result of test firings, experimental cartridge cases: 12cm/45 cal Mark 1 Model 1 Shell Cases.	KNY	YNY	WDC
ND50-3204	3152	Tests on experimental manufacture of steel cartridge cases for guns: 8cm and 10cm Short Gun steel cases, experimental.	KNY	YNY	WDC

JAPANESE NAVY AMMUNITION CASES FOR 5CM AND LARGER CALIBER GUNS

0-14

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3203	3151	Result of test firings, experimental cartridge cases: 12cm/45 cal Mark 1 Model 1 Shell Case.	KNY	YNY	WDC
ND50-3204	3152	Tests on experimental manufacture of steel cartridge cases for guns: 8cm and 10cm Short Gun steel cases, experimental.	KNY	YNY	WDC
ND50-3503	3591	Research on cartridge case lacquers.	NTL	YNY	WDC
ND50-3504	3592	Report on cartridge case for 1935	KNY	YNY	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
		Type 12cm/45 cal Gun.			
ND50-3505	3593	Research on manufacture of cartridge cases: cartridge ejection.	KNY	YNY	WDC
ND50-3506	3594	Results of experiments on cartridge cases for guns.	KNY	YNY	WDC
ND50-3507	3595	Results of experiments on cartridge cases for guns.	KNY	YNY	WDC
ND50-3508	3596	Results of experimental research on cartridge cases for guns.	KNY	YNY	WDC
ND50-3509	3597	Results of experimental research on cartridge cases for guns.	KNY	YNY	WDC
ND50-3510	3598	Report of results of experimental research on cartridge cases for guns.	KNY	YNY	WDC
ND50-3511	3599	Report on modification of methods of lacquering.	KNY	YNY	WDC
ND50-3512	3600	Research on cartridge case materials.	KNY	YNY	WDC
ND50-3513	3601	Results of experiments in firing cartridges ordered outside (naval factories).	KNY	YNY	WDC
ND50-3514	3602	Results of experiments with cartridge cases below 15cm.	KNY	YNY	WDC
ND50-3515	3603	Results of experiments with cartridge cases.	KNY	YNY	WDC
ND50-3516	3604	Experiments on cartridge special fillings.	KNY	YNY	WDC
ND50-3517	3605	Results of experiments with cartridge cases.	KNY	YNY	WDC
ND50-3518	3606	Results of experiments on cartridge cases for guns.	KNY	YNY	WDC
ND50-3519	3607	Tests on life of GE brass 12cm AA cases.	KNY	YNY	WDC
ND50-3520	3608	Cartridge cases for 12cm and 12.7cm guns.	KNY	YNY	WDC
ND50-3521	3609	Steel cartridge cases for 5 and 6cm guns.	KNY	YNY	WDC
ND50-3522	3610	Steel cartridge cases made in Germany.	KNY	YNY	WDC

JAPANESE STEEL MANUFACTURING METHODS

0-15

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3158	3834	Research on components of high tensile steel.	KNY	YNY	WDC
ND50-3160	3832	Experimental manufacture of SK steel for air warfare.	SMIC	YNY	WDC
ND50-3700	3644	Reports on results of experiments.	NATD	YNY	WDC
ND50-3701	3645	Research on special steels: Hardness test of free-cutting steel.	NATD	YNY	WDC
ND50-3702	3646	Research on heat-resisting materials for steel manufacture: Erosion of heat-resisting materials.	NATD	YNY	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3703	3647	Special steels research information: Methods of gas measurement during melting process.	NATD	YNY	WDC
ND50-3704	3648	Research on special steels: Methods of gas measurement during melting.	NATD	YNY	WDC
ND50-3705	3649	Research on heat resisting materials for steel manufacture: Change of quality from double-fired brick construction of pouring gate and dam.	NATD	YNY	WDC
ND50-3706	3650	Research on special steels: Methods of gas measurement during melting process.	NATD	YNY	WDC
ND50-3707	3651	Research on heat-resisting materials for steel manufacture: Methods of roasting Dolomite.	NATD	YNY	WDC
ND50-3708	3652	Research on special steels: The influence of copper on silicon, manganese, and chrome steel.	NATD	YNY	WDC
ND50-3709	3653	Research on special steels: Methods of rapid melting (1).	NATD	YNY	WDC
ND50-3710	3654	Research on special steels: Methods of rapid melting (2).	NATD	YNY	WDC
ND50-3711	3655	Research on special steel: High-speed welding methods.	NATD	YNY	WDC
ND50-3712	3656	Research on special steels: Chemicals for maintaining temperature of feeding heads into ingots.	NATD	YNY	WDC
ND50-3713	3657	Research on special steels: Effects of intervening non-metalic substance.	NATD	YNY	WDC
ND50-3714	3658	Research on heat-resisting materials for steel manufacture: Survey of German steel furnace materials.	NATD	YNY	WDC
ND50-3715	3659	Experiments on Zirconium steel.	NATD	YNY	WDC
ND50-3716	3660	Research on special steels: Swift slag-analysis methods.	NATD	YNY	WDC
ND50-3717	3661	Research on special steels: Prevention of piping in AP shell steel.	NATD	YNY	WDC
ND50-3718	3662	Research on special steels: Tests in Type 91 and Type 95 Air Chambers used in mixing scrap in electric-hearth furnace.	NATD	YNY	WDC
ND50-3719	3663	Research on special steels: Basic open-hearth furnace.	NATD	YNY	WDC
ND50-3720	3664	Research on special steels: Comparison of steels from Hudie and Basic open-hearth furnaces.	NATD	YNY	WDC
ND50-3721	3665	Research on special steels: Nickel substitutes.	NATD	YNY	WDC
ND50-3722	3666	Research on special steels: Steel containing silicon, manganese, and chromium.	PSC	YNY	WDC
ND50-3723	3667	Research on special steels: Isometrical changes in siclicon-manganese-chromium steel.	PSC	YNY	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3724	3668	Research on special steels: Substitute steels.	KNY	YNY	WDC
ND50-3725	3669	Inspection of qualities of non-nickel steel.	KNY	YNY	WDC
ND50-3726	3670	Research on measurement of melting steel.	KNY	YNY	WDC
ND50-3727	3671	Research on measurement of melting temperature.	KNY	YNY	WDC
ND50-3728	3672	Research on steel defects (piping).	KNY	YNY	WDC
ND50-3729	3673	Various topics on medium and small calibre forged steel shell materials.	KNY	YNY	WDC
ND50-3730	3674	Research on copper-nickel-chrome steel.	KNY	YNY	WDC
ND50-3731	3675	Reference materials on the mechanical qualitites of steel.	KNY	YNY	WDC
ND50-3732	3676	Steel shell cases.	NTL	YNY	WDC
ND50-3733	3677	Construction of iron ore reducers in rotary furnaces.	?	YNY	WDC
ND50-3734	3678	Manufacture of sponge iron by rotary furnaces.	PSC	YNY	WDC
ND50-3735	3679	Defects in special type steel.	NTL	YNY	WDC
ND50-3736	3680	Nitrogen break-up in heating of steel.	KNY	YNY	WDC
ND50-3737	3681	Forging temperature for steel and steel alloys.	KNY	YNY	WDC
ND50-3738	3682	Low phosphorus content in nickel iron.	KNY	YNY	WDC
ND50-3739	3683	Manufacture of ferrous nickel.	KNY	YNY	WDC
ND50-3740	3684	Experiments with cast iron.	NTL	YNY	WDC
ND50-3741	3685	Influence of nickel and chrome on heat-resisting qualities of cast iron.	KNY	YNY	WDC
ND50-3742	3686	Cuprose steel experiments.	KNY	YNY	WDC
ND50-3743	3687	Tests with coarse nickel.	KNY	YNY	WDC
ND50-3744	3688	On nitrides of steel.	KNY	YNY	WDC
ND50-3745	3689	Tests on special steels for general purpose bombs which economize on molybdenum.	NATD	YNY	WDC
ND50-3746a	4150	Research on scrap.	NATD	KNY	WDC
ND50-3747a	4151	Influence of small amounts of nickel on CM steel (chrome-manganese-molybdenum), used as a substitute for nickel in explosive resistant metals.	NATD	KNY	WDC
ND50-3748	4152	Research on manufacture of high quality steels.	NATD	K	WDC
ND50-3749	4153	Mass effects on special steels.	DSC	Y	WDC
ND50-3750	4154	Tool steel (M0B) tests.	NATD	Y	WDC
ND50-3751	4155	Stainless clad steel.	NPD2	Y	WDC
ND50-3752	4156	Metallic cutting.	YNY	Y	WDC
ND50-3753	4157	Magnetic tests for steel.	NATD	Y	WDC
ND50-3754	4158	Changes in fatigue characteristics in tempering steel materials.	NATD	Y	WDC

ENCLOSURE (D), continued

JAPANESE HEAVY ARMOR

0-16

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-0030	4352	Descriptions of armor plate.	KNY	KNY	WDC
ND22-0031	4309	Samples of armor available at Kure Navy Yard.	KNY	KNY	WDC
ND50-3909	4183	Tough copper alloys containing no nickel.	NATD	Y	WDC
ND50-3910	4184	Barium peroxide.	KNY	Y	WDC
ND50-3149.1 to .3	3692	Tests on bullet-proof jackets.	NTL & NATD	Y	WDC
ND50-3157	3833	Experiments with 25mm projectiles versus thin armor. Composite armor experiments and tests of 15mm and 25mm projectiles.	NTL	NTL	WDC
ND50-3170.1 to .3	3576	Heavy armor and passive defense.	NTD	NTL	WDC
ND50-3171.1 to .4	3577	Reports on heavy armor.	NTD	NTL	WDC
ND50-3173.1 to .5	3578	Armor ballistics tests: Vol. 1, 2, 3, 4, and 5.	KPG	NTL	WDC
ND50-3174	3579	De Marre's formula.	KNY	NTL	WDC
ND50-3175.1 to .2	3580	Tests of projectiles versus armor plate.	ATD	NTL	WDC
ND50-3176	3581	Tests on honey-comb type armor.	NTL	NTL	WDC
ND50-3177	3582	Warship defense.	PS	NTL	WDC
ND50-3178	3583	Defense against projectiles.	NTD	NTL	WDC
ND50-3179	3584	Specifications for inspection and testing of armor plate.	NTD	NTL	WDC
ND50-3422	3585	Plans for manufacturing experimental armor (CNC analysis).	NTD	NTL	WDC

JAPANESE NAVAL PROJECTILE FUZES

0-17

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-4008	4408	Projectile fuzes.	?	YNY	WDC
ND50-3900	4174	Blueprint: Fifth-year Type Instantaneous Nose Fuzes.	NTD	Y	WDC
ND50-3901	4175	Blueprint: Model 2 Anti-submarine Fuze.	NTD	Y	WDC
ND50-3902.1 to .2	4176	Blueprints: 13mm Machine gun Fuze.	KNY	Y	WDC
ND50-3903.1 to .2	4177	Blueprints: Type 91 Mechanical Time Fuze.	NTD	Y	WDC
ND50-3904.1 to .4	4178	Blueprints: Detail of 40mm Time Fuze.	KNY	Y	WDC
ND50-3905.1 to .8	4179	Blueprints: Components of Type 13 Base Fuze.	KNY	Y	WDC
ND50-3906.1 to .24	4180	Blueprints: Components of Type 98 Mechanical Time Fuze.	NTD	Y	WDC
ND50-3907	4181	Investigation of sensitivity of primers and detonators at low temperatures.	KNY	Y	WDC
ND50-3908	4182	Lead Rhodanide.	KNY	Y	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3911	4185	Research on formation of nitride copper by combining lead azide with copper and metals containing copper.	NPD2	Y	WDC
ND50-3912	4186	Assays of nitrous lead.	KNY	Y	WDC
ND50-3913	4187	Nitro copper.	KNY	Y	WDC
ND50-3914	4188	Experimental incendiary powder for Type 93 15cm Mortar.	NTL	Y	WDC
ND50-3915	4189	Powder charge for Rheinmetal 15cm Gun.	NPD	Y	WDC
ND50-3916	4190	Operation of loading 30 second Time Delay Fuze.	KNY	Y	WDC
ND50-3917	4191	Type 91 Clockwork Fuze.	KNY	Y	WDC
ND50-3918	4192	Loading Type 92 Special Reduced Fuze.	KNY	Y	WDC
ND50-3919	4193	Tests on Type 94 Fuze.	KNY	Y	WDC
ND50-3920	4194	Tests on detonators.	KNY	Y	WDC
ND50-3921	4195	Imported mechanized fuzes.	KNY	Y	WDC
ND50-3922	4196	Tests of time fuzes.	KNY	Y	WDC
ND50-3923	4197	Data on Type 91 Mark 1 Modification 1 Time Fuze.	KNY	Y	WDC
ND50-3924	4198	Type 91 Modification 1 Time Fuze.	KNY	Y	WDC
ND50-3925	4199	Type 91 Clockwork Fuze.	KNY	Y	WDC
ND50-3926	4200	Test of Type 91 Time Fuze storage.	KNY	Y	WDC
ND50-3927	4213	Erosion of metals containing mercury fulmanite, picric acid and black powder.	KNY	Y	WDC

JAPANESE ORDNANCE FUZES

0-18

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-4004	4409	Japanese Navy long-delay bomb fuzes.	ATAl	ATAl	WDC
ND21-4023	4406	BAKA bomb fuzes and standard bomb fuzes.	ATAl	ATAl	WDC
ND21-4026	4405	Japanese Navy bomb gaines.	ATAl	ATAl	WDC
ND21-4030	4407	Type 97 Base Detonating Mechanism.	ATAl	ATAl	WDC
ND21-4031	4404	Type 2 Small Model Nose Fuze.	ATAl	ATAl	WDC
ND21-4032	4403	Type 99 Special Tail-fuze Pull Igniter for flares Type 3 Fuze for Type 0 Flare.	ATAl	ATAl	WDC
ND21-4033	4402	Type 90 Initiator Type 2 No. 50 Ordinary Bomb Fuse Type 2 Nose Fuze, Models 1 and 2 Fuze for Mark 21 Container Bombs Type 2 Initiator.	ATAl	ATAl	WDC

ENCLOSURE (D), continued

JAPANESE PROJECTILES - GENERAL TYPES

0-19

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3030	4474	15cm Common Projectile.	?	YOL	Enclosure to report
ND50-3031	4475	10cm Common Projectile for Type 98 Gun.	?	YOL	Enclosure to report
ND50-3032	4476	Type 2 14cm Common Projectile.	?	YOL	Enclosure to report
ND50-3033	4477	Model 3 36cm Common Projectile.	?	YOL	Enclosure to report
ND50-3034	4478	Model 3 Modification 1 20cm Common Projectile.	?	YOL	Enclosure to report
ND50-3111	4364	List of various types of machine gun ammunition.	NTD	K	WDC
ND50-3174	3579	De Marre's formula.	KNY	NTL	WDC
ND50-3175.1 to .2	3580	Tests of projectiles versus armor plate.	ATHQ	NTL	WDC
ND50-3178	3583	Defense against projectiles.	NTD	NTL	WDC
ND50-3820	3997	Blueprints: Japanese mortar projectiles.	NTL	Y	WDC
ND50-3821	3998	Blueprints: Japanese high-explosive projectiles.	NTD	Y	WDC
ND50-3822	3999	Blueprints: Japanese general purpose projectiles.	NTD	Y	WDC
ND50-3823	4000	Blueprints: Pyrotechnic projectiles.	NTD	Y	WDC
ND50-3824	4001	Blueprints: Rocket projectiles.	KNY	Y	WDC
ND50-3825	4002	Blueprints: Armor-piercing projectiles.	?	Y	WDC
ND50-3826	4003	Blueprints: Hollow-charge projectile.	YNY	Y	WDC
ND50-3827	4004	Blueprint: Forging and heat-treatment forms for 15cm Common Projectile.	YNY	Y	WDC
ND50-3828	4005	Blueprints: Practice, dummy, and target projectiles.	YNY	Y	WDC
ND50-3829	4006	Report on experimental results of projectiles.	KNY	Y	WDC
ND50-3830	4007	Outline of the process of filling Type 92 High-explosive Shell for Fourth-Year Type 15cm Howitzer.	KNY	Y	WDC
ND50-3831	4008	No. 3 firing test of land-use ammunition. Outline of Modification of Type 92 Shell for 15cm Howitzer. Results of tests on prevention of base explosions.	KNY	Y	WDC
ND50-3832	4009	Device for roughening outer-surface of medium calibre projectiles.			
ND50-3833	4010	Experiments on illuminating shells.	KNY	Y	WDC
ND50-3834	4011	Model 1 Navigation Target Shell.	NATD	Y	WDC
ND50-3835	4012	Machining of shells.	KNY	Y	WDC
ND50-3836	4013	Storage of Type 91 Booster.	KNY	Y	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3837	4014	Experiment on common shell manufacture from drawn pipe (Part 2) (Plus cartridge experiment).	KNY	Y	WDC
ND50-3838	4015	Investigation of methods of static explosion test on small and medium calibre projectiles.	KNY	Y	WDC
ND50-3839	4016	Experiments on special projectiles and chemical weapons for 12.7cm and 14cm guns.	NTL	Y	WDC
ND50-3840	4017	Experimental report on 15cm/50 cal Gun Mark 3 High-explosive Shell equipped with Type 13 Mark 1 Fuze.	KNY	Y	WDC
ND50-3841	4018	Filling of 36cm/45 cal Gun Type 91 Armor-piercing Shells.	KNY	Y	WDC
ND50-3842	4019	Various types of practice shells.	KNY	Y	WDC
ND50-3843	4020	Studies on air resistance of round shells and air drag of conical shells.	NTL	Y	WDC
ND50-3844	4021	Air resistance of shells.	NTL	Y	WDC
ND50-3845	4022	Research on chemical shells.	NTL	Y	WDC
ND50-3846	4023	Capped High-explosive Shell (14cm) Modification 1.	KNY	Y	WDC
ND50-3847	4024	Type 98 10cm DP Shell loading.	KNY	Y	WDC
ND50-3848	4025	Tests: 15cm and 24cm Shell.	KNY	Y	WDC
ND50-3849	4026	Power test: Ordinary shell for 15cm gun No. 4.	KNY	Y	WDC
ND50-3850	4027	Test: Safety factor in use of smoke shell on sea surfaces.	NTL	Y	WDC
ND50-3851	4028	Type 93 15cm mortar Mark 3 Experimental Shell and Experimental Incendiary Shell Type 94 Light Mortar Temporarily designated Smoke Shell.	NTL	Y	WDC
ND50-3852	4029	Report on improvement of lacquering internal cavity of projectiles (Part III).	KNY	Y	WDC
ND50-3853	4030	Notes on headings (head formings) of projectiles.	KNY	Y	WDC
ND50-3854	4031	12cm AA gun: Experiments on common shell manufactured from drawn pipe (Part 3).	KNY	Y	WDC
ND50-3855	4032	Report on improvement of lacquering of internal cavity of projectiles.	KNY	Y	WDC
ND50-3856	4033	Investigation report on booster charge which causes no misfire.	KNY	Y	WDC
ND50-3857	4034	Greater Japan Ordnance Company, Shonan Factory tools experiment report.	YNY	Y	WDC
ND50-3858	4035	Tooling work on medium calibre projectiles.	YNY	Y	WDC
ND50-3859	4036	Investigation of manufacture of base plugs for projectiles.	KNY	Y	WDC
ND50-3860	4037	Studies of prevention of explosive deflagration.	NAD*	Y	WDC
ND50-3861	4038	Chemical ordnance in cold areas.	NTL	Y	WDC
ND50-3862	4039	Report on moisture-proof qualities of filling materials used as plugs.	KNY	Y	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3863	4040	14cm Projectiles: Hydraulic pressure tests.	KNY	Y	WDC
ND50-3864.1 to .4	4041	Charts of cartridge cases.	NOD	Y	WDC
ND50-3865	4042	Strength of steel wire in AA defense.	NTL	Y	WDC
ND50-3866	4043	Tests on Experimental Signal ENKA.	YNY	Y	WDC
ND50-3867	4044	Storage of Type 91 Time Fuze.	KNY	Y	WDC
ND50-3868	4045	Report of storage tests of Type 91 Time Fuze.	KNY	Y	WDC
ND50-3869	4046	Experiments on cause of duds in Type 91 Modification 1 Clock Fuze.	KNY	Y	WDC
ND50-3870	4047	Report of experiments on Type 88 Small Instantaneous Fuze.	KNY	Y	WDC
ND50-3871	4048	Report of results of tests on Type 91 Time Fuze reserves.	KNY	Y	WDC
ND50-3872	4049	12cm AA Gun Common-Shell experiments: Fifth-year Type Modification 1 Fuze; test as substitute for Type 91 with examination of bursting effects.	KNY	Y	WDC
ND50-3873	4050	Results of surveillance tests on Type 91 Time Fuze.	KNY	Y	WDC
ND50-3874	4051	Results on time fuze of use on 5cm Field Gun loaded with high explosive.	KNY	Y	WDC
ND50-3875	4052	Experimental research on KUPUREN (charcoal substitute in manufacture of black powder).	KNY	Y	WDC
ND50-3876	4053	Tests on imported ammunition components.	YNAD	Y	WDC
ND50-3877	4054	Experimental report on fuze used for high chamber-pressure guns.	KNY	Y	WDC
ND50-3878	4055	Type 91 Time Fuze revolutions.	KNY	Y	WDC
ND50-3879	4056	Experimental report on primer chamber for gas tightness.	KNY	Y	WDC
ND50-3880	4057	Experimental report on fuzed used for anti-landing fire.	KNY	Y	WDC
ND50-3881	4058	Experimental report on safety setting of fuze firing-pin release.	KNY	Y	WDC
ND50-3882	4059	Experimental report on Vickers Type 40mm Machine Gun Time Fuze.	KNY	Y	WDC
ND50-3883	4060	Report of storage tests on Type 91 Time Fuze.	KNY	Y	WDC
ND50-3884	4061	Experimental Report on Vickers Type 40mm Machine Gun Time Fuze (Model D Fuze).	KNY	Y	WDC
ND50-3885	4062	Experiments on Vickers 40mm Machine Gun Fuze.	KNY	Y	WDC
ND50-3886	4063	Efficiency of Type 89 and Type 91 Time Fuzes and rate of fire.	KNY	Y	WDC
ND50-3887	4102	Blueprint: Common projectile.	NTD	Y	WDC
ND50-3888	4103	Blueprint: Armor-piercing projectile.	NTD	Y	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3898	4113	Investigation or paper containers of case charges not requiring the casting mold.	NPD	Y	WDC
ND50-3899	4114	Firing tests: 21 and 15cm Special Chemical Shells.	NTL	Y	WDC
ND50-3935	4396	Abrasion and slipping of 14cm rotating bands.	KNY	Y	WDC

JAPANESE AMMUNITION PRIMERS

0-20

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3540	4517	Collection of drawings of primers for various guns.	KGEL	K	WDC
ND50-3541	4518	Miniature drawings of ammunition components (primers).	NTL	K	WDC
ND50-3542	4519	Typical drawing of electric primer for bag gun.	?	YNY	Enclosure to report
ND50-3543	4520	Typical drawing of electric primer for cartridge case.	?	YNY	Enclosure to report
ND50-3544	4521	Typical drawing of percussion primer for bag gun.	?	YNY	Enclosure to report
ND50-3545	4522	Typical drawing of percussion primer for cartridge case.	?	YNY	Enclosure to report
ND50-3949	4159	Experimental report on igniting force of Mark 2 Electric Primer.	KNY	Y	WDC
ND50-3950	4160	Tests on Mark 1 Model 3 Electric Primer.	KNY	Y	WDC
ND50-3951	4161	Experiments on Mark 2 Percussion Cap Primer.	TNY	Y	WDC
ND50-3952	4162	Model 4 Modification 2 Electric Primer.	KNY	Y	WDC
ND50-3953	4163	Operations of filling Mark 3 Fixed Percussion Cap.	KNY	Y	WDC
ND50-3954	4164	Experimental case for Mark 2 Percussion Primer.	NATD	Y	WDC
ND50-3889	4104	Blueprint: Mortar projectile.	NTD	Y	WDC
ND50-3890	4105	Blueprints: Semi-armor-piercing projectiles.	NTD	Y	WDC
ND50-3891	4106	Blueprints: Chemical liner projectiles.	NTD	Y	WDC
ND50-3892.1 to .6	4107	Blueprints: Pyrotechnic projectiles.	NTD	Y	WDC
ND50-3893.1 to .8	4108	Blueprints: High-explosive projectiles.	NTD	Y	WDC
ND50-3894	4109	Blueprints: Incendiary-shrapnel projectiles.	NTD	Y	WDC
ND50-3895	4110	Blueprints: Practice projectiles.	NTD	Y	WDC
ND50-3896	4111	Series of reports of experiments on air resistance and pressure of projectiles.	NTL	Y	WDC
ND50-3897	4112	Research on corrosion-prevention in cartridge cases.	YNY	Y	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3955	4165	Loading procedure: Casing Mark 2 Model 3 and Mark 2 Model 3 Modification 1 Percussion Caps.	KNY	Y	WDC
ND50-3956	4166	Electric currents used for testing primers.	KNY	Y	WDC
ND50-3957	4167	Report of experiments on temporarily designated Mark 2 Model 5 Electric Cap.	KNY	Y	WDC
ND50-3958	4168	Report on experiments on temporarily designated Mark 2 Model 5 Electric Cap Primer.	KNY	Y	WDC
ND50-3959	4169	Report on test of primer used for bag gun.	KNY	Y	WDC
ND50-3960	4170	Experimental report on Vickers Type Primer.	KNY	Y	WDC
ND50-3961.1 to .21	4171	Drawing of navy primer components showing manufacturing tolerances and arrangements.	YNY	Y	WDC
ND50-3962	4172	Actual tests of smoke ordnance.	YGSHQ	Y	WDC

JAPANESE INTERIOR BALLISTICS

0-21

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-3413	4235	Vibration pressures.	NPD2	YOL	WDC
ND21-3417	4237	Chemical decoppering of bore deposits.	KNY	YOL	WDC
ND21-3418	4226	Duration of muzzle blast.	NPD	YOL	WDC
ND21-3419	4225	Muzzle flash in 25mm automatic cannon.	NPD	YOL	WDC
ND21-3420	4224	Muzzle flash.	NPD2	YOL	WDC
ND21-3421	4238	Interior ballistics studies of catapults.	NPD2	YOL	WDC
ND21-3423	4239	Blast-measuring gear.	NTL	YOL	WDC
ND21-3424	4223	Theory of flash hiding.	NTL	YOL	WDC
ND50-3402	4254	Erosion of guns and their standard span of life.	KNY	YOL	WDC
ND50-3403	4255	Standard blast curves.	NTD	YOL	WDC
ND50-3413	4264	Flash characteristics of halogen and alkali salts.	NPD	YOL	WDC
ND50-3414	4265	Report of research on gun-blast measuring devices.	KNY	YOL	WDC
ND50-3415	4266	Effect of powder moisture on muzzle velocity and bore pressure.	KNY	YOL	WDC
ND50-3416.1 to .2	4267	Inspection tests of laboratory-made copper pressure gauges.	NPD2	YOL	WDC
ND50-3437	4231	Temperature co-efficients of bore pressure and muzzle velocity for various powders.	NTL	YOL	WDC
ND50-3438	4230	Investigation of KRUPP 8.8cm/40 cal AA Gun.	NTL	YOL	WDC
ND50-3439	4229	Back flash (prevention).	KNY	YOL	WDC
ND50-3440	4228	Flash preventing compounds.	NPD2	YOL	WDC
ND50-3441	4227	A flash reducing agent (ethyl dinitro benzine).	NPD2	YOL	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3443	4218	Solution of differential equations in interior ballistics.	?	YOL	WDC
ND50-3445	4220	Research on chrome-plating gun barrels.	YNY	YOL	WDC
ND50-3446	4219	Relation between temperature and compression of copper.	KNY	YOL	WDC
ND50-3447	4217	Experimental results on copper crusher gauges.	KNY	YOL	WDC
ND50-3456	4248	Experiments on pressure measurements.	KNY	YOL	WDC
ND50-3457	4249	Copper gauges for measuring powder pressures.	NPD	YOL	WDC
ND50-3459	4251	Measuring powder pressures with copper cylinder gauges.	NPD	YOL	WDC
ND50-3462	4289	Research on flash hiding.	NPD	YOL	WDC
ND50-3468	4356	Research on gun flashes.	NPD	YOL	WDC
ND50-3470	4358	Explanation of handling lead-plate type blast gauge.	KNY	YOL	WDC
ND50-3474	4360	Comparison of elliptical powder grains and tubular grains of various internal diameters.	NPD	YOL	WDC
ND50-3476	4362	Determining temperature and gas composition at muzzle for various guns.	NPD	YOL	WDC
ND50-3480	4571	MS sheet of ballistic data on guns.	?	YOL	WDC
ND50-3482	4573	MS plans of ships.	YNY	YOL	WDC
ND50-3483	4574	Calibration sheet for copper cylinder gauge.	KPG	YNY	WDC
ND50-3970	4295	Reliability of measurement of muzzle velocity.	KNY	YOL	WDC

JAPANESE TRACERS

0-22

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3217	3917	Investigation of tracer bullet visibility.	NOD	YA	WDC
ND50-3220	3918	Investigation of tracer ammunition.	NOD	YA	WDC
ND50-3525	3919	Filling of 25mm Automatic Cannon Tracer High-explosive Shell.	KNOD	YA	WDC
ND50-3526	4920	Experimental Type 99 Self-destroying Tracer High-explosive Shell.	AA1	YA	WDC
ND50-3527	3921	Experimental report on types of anti-aircraft self-destroying tracers.	AA1	YA	WDC
ND50-3528	3922	Barium peroxide plus igniting compounds for machine gun ammunition.	KNY	YA	WDC
ND50-3529	3923	Mechanical mixing method for powders.	TNY	YA	WDC
ND50-3530	3924	Carbon powder trains.	NAD	YA	WDC
ND50-3531	3925	Tracer powder stability.	KNOD	YA	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3532	3926	Pressed black powder burning characteristics.	KNOD	YA	WDC
ND50-3533	3927	Experiment on 8cm Anti-aircraft Tracer Shot.	KNOD	YA	WDC
ND50-3534	3928	Storage stability of 25mm Machine gun Tracer Bullet Powder.	KNOD	YA	WDC
ND50-3535	3929	Report on Model 1 Tracer (25mm) Machine gun Ammunition.	KNOD	YA	WDC

JAPANESE BOMBS

0-23

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-4005	3713	Experimental items under investigation.	ATAl	YNY	WDC
ND21-4006	3714	Drawing: Type 11 Parachute Flare.	ATAl	ATAl	WDC
ND21-4007.1 to .2	3715	Drawings and characteristics of Japanese naval bombs.	ATAl ATAl	ATAl ATAl	WDC WDC
ND21-4009	3716	State of principal bomb experiments and studies.	ATAl	ATAl	WDC
ND21-4010	3717	List of aircraft rocket bombs.	ATAl	YNY	WDC
ND21-4011	3718	Testing of incendiary bombs.	ATAl	ATAl	WDC
ND21-4012	3719	Drawings and description of BAKA bomb fuzes and standard impact fuzes.	ATAl	ATAl	WDC
ND21-4013	3720	Blueprint: No. 8 Mark 8 Bomb.	ATAl	ATAl	WDC
ND21-4014	3721	Blueprint: No. 25 Mark 8 Bomb.	ATAl	ATAl	WDC
ND21-4015	3722	Blueprint: No. 25 Mark 33 Bomb.	ATAl	ATAl	WDC
ND21-4016	3723	Blueprint: No. 1 Mark 9 Bomb.	ATAl	ATAl	WDC
ND21-4017	3724	Blueprint: No. 6 Mark 9 Bomb.	ATAl	ATAl	WDC
ND21-4018	3725	Blueprint: No. 25 Mark 29 Bomb.	ATAl	ATAl	WDC
ND21-4019	3726	Chart of experimentally manufactured ordnance and its capacity.	ATAl	ATAl	WDC
ND21-4021	3727	Drawings and notes on aircraft pyrotechnics.	ATAl	ATAl	WDC
ND21-4024	3728	Blueprint: No. 6 Mark 27 Bomb.	ATAl	ATAl	WDC
ND21-4025	3729	Summary of research development of aircraft ordnance.	ATAl	ATAl	WDC
ND21-4027	3730	Drawings: Mark 3 Bomb Fuze; Mark 27 Bomb Fuze.	ATAl	ATAl	WDC
ND21-4028	3731	Blueprints: Window Bomb; Target Marker Bomb.	ATAl	ATAl	WDC
ND21-4034	3732	Blueprint: No. 6 Modification 1 Land Bomb.	NATD	YNY	WDC
ND21-4035	3733	Blueprint: No. 6 Land Bomb.	NATD	YNY	WDC
ND21-4036	3734	Test data: Pressure strength of No. 6 and No. 25 Land Bombs.	NATD	YNY	WDC
ND21-4037	3735	Blueprint: No. 25 Land Bomb.	NATD	YNY	WDC
ND21-4040	3738	Blueprint: 250 kg Land Bomb.	NATD	YNY	WDC
ND21-4041	3739	Blueprint: No. 25 Land Bomb (empty case).	NATD	YNY	WDC
ND21-4042	3740	Blueprints: No. 25 and No. 25 Modification 1 Land Bomb.	NATD	YNY	WDC
ND21-4043	3741	Blueprints: No. 25 and No. 25 Modification 1 Land Bomb.	NATD	YNY	WDC

ENCLOSURE (D,, continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-4044	3742	Blueprint: Type 98 No. 25 Model 1 Land Bomb (empty case).	NATD	YNY	WDC
ND21-4045	3743	Blueprint: Type 98 No. 25 Model 1 Land Bomb (breakdown).	NATD	YNY	WDC
ND21-4046	3744	Blueprint: Temporarily designated Type 98 No. 25 Land Bomb (nose and connecting plug).	NATD	YNY	WDC
ND21-4047	3745	Blueprint: Temporarily designated Type 98 No. 25 Land Bomb (empty case).	NATD	YNY	WDC
ND21-4048	3746	Blueprint: Temporarily designated Type 98 No. 25 Land Bomb (components).	NATD	YNY	WDC
ND21-4049	3747	Blueprint: Type 98 No. 25 Land Bomb (breakdown).	NATD	YNY	WDC
ND21-4050	3748	Blueprints: Type 98 Model 1 No. 25 Land Bomb; Type 98 No. 25 Modification 1 Land Bomb (assembly).	NATD	YNY	WDC
ND21-4051	3749	Blueprint: No. 80 Land Bomb (empty case).	NATD	YNY	WDC
ND21-4052	3750	Blueprint: No. 80 Land Bomb (complete).	NATD	YNY	WDC
ND21-4053	3751	Blueprints: No. 80 and No. 80 Modification 1 Land Bomb (complete).	NATD	YNY	WDC
ND21-4054	3752	Blueprint: No. 30 Land Bomb (breakdown).	NATD	YNY	WDC
ND21-4055	3753	Blueprint: No. 30 Land Bomb (breakdown).	NATD	YNY	WDC
ND21-4056	3754	Blueprint: No. 30 Land Bomb (assembly).	NATD	YNY	WDC
ND21-4057	3755	Blueprint: No. 33 Land Bomb (breakdown).	NATD	YNY	WDC
ND21-4058	3756	Blueprint: No. 33 Land Bomb (assembly).	NATD	YNY	WDC
ND21-4059	3757	Blueprint: No. 80 Model 2 Modification 2 Ordinary Bomb (empty case).	NATD	YNY	WDC
ND21-4060	3758	Blueprint: No. 80 Model 2 Modification 2 Ordinary Bomb.	NATD	YNY	WDC
ND21-4061	3759	Blueprint: No. 80 Model 1 Modification 2 and 4 Ordinary Bomb.	NATD	YNY	WDC
ND21-4062	3760	Manufacture of material for No. 80 GP Bomb, using special ingot molds.	NATD	YNY	WDC
ND21-4063	3761	Materials for No. 50 Model 2 GP Bomb.	NATD	YNY	WDC
ND21-4064	3762	Blueprint: No. 25 Model 2 Modification 1 GP Bomb (assembly).	NATD	YNY	WDC
ND21-4065	3763	Blueprint: No. 25 Model 2 Modification 1 GP Bomb (empty case).	NATD	YNY	WDC
ND21-4066	3764	Blueprint: No. 25 Model 2 Modification 1 GP Bomb (breakdown).	NATD	YNY	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-4067	3765	Blueprint: No. 25 GP Bomb (assembly).	NATD	YNY	WDC
ND21-4068	3766	Blueprint: No. 25 Model 2 GP Bomb (explosive charge).	NATD	YNY	WDC
ND21-4069	3767	Blueprint: No. 25 Model 2 GP Bomb (construction of body).	NATD	YNY	WDC
ND21-4070	3768	Blueprint: Type 99 No. 28 Model 1 Ordinary Bomb (empty case).	NATD	YNY	WDC
ND21-4071	3769	Blueprint: Temporarily designated Type 99 No. 25 GP Bomb (explosive charge).	NATD	YNY	WDC
ND21-4072	3770	Blueprint: Type 99 No. 25 Model 1 GP Bomb (assembly).	NATD	YNY	WDC
ND21-4073	3771	Type 99 No. 25 Model 1 GP Bomb (breakdown).	NATD	YNY	WDC
ND21-4074	3772	Development of Experimental No. 25 GP Bomb.	NATD	YNY	WDC
ND21-4075	3773	Data on Experimental No. 25 Ordinary Bomb.	NATD	YNY	WDC
ND21-4076	3774	Blueprint: No. 6 Model 2 Ordinary Bomb (body construction).	NATD	YNY	WDC
ND21-4077	3775	Blueprint: No. 6 Model 2 Ordinary Bomb (complete).	NATD	YNY	WDC
ND21-4078	3776	Blueprint: No. 6 Model 1 Ordinary Bomb (assembly).	NATD	YNY	WDC
ND21-4079	3777	Blueprint: No. 6 Model 1 Ordinary Bomb (breakdown).	NATD	YNY	WDC
ND21-4080	3778	Blueprint: No. 6 Model 1 Ordinary Bomb (assembly).	NATD	YNY	WDC
ND21-4081	3779	Blueprint: No. 6 Ordinary Bomb.	NTD	YNY	WDC
ND21-4082	3780	Fabrication of No. 6 Ordinary Bomb by means of seamless tube.	NATD	YNY	WDC
ND21-4083	3781	Shock tests of materials for ordinary bomb bodies.	NATD	YNY	WDC
ND21-4084	3782	Tests on No. 6 Ordinary Bomb.	NATD	YNY	WDC
ND21-4085	3783	Blueprint: No. 6 Mark 1 Land Bomb (interior breakdown).	NATD	YNY	WDC
ND21-4086	3784	Blueprint: Temporarily designated Type 4 No. 6 Mark 1 Bomb (tail section).	NTD	YNY	WDC
ND21-4087	3785	Blueprint: Temporarily designated Type 4 No. 6 Mark 1 Bomb (burster tube).	NTD	YNY	WDC
ND21-4088	3786	Blueprint: Temporarily designated Type 4 No. 6 Mark 1 Bomb (assembly).	NTD	YNY	WDC
ND21-4089	3787	Blueprint: No. 6 Mark 1 Bomb (assembly).	NATD	YNY	WDC
ND21-4090	3788	Blueprint: No. 6 Mark 1 Land Bomb (gas flasks).	NATD	YNY	WDC
ND21-4091	3789	Blueprint: No. 6 Mark 1 Bomb (nose and barrel).	NATD	YNY	WDC
ND21-4092	3790	Blueprint: No. 6 Mark 1 Bomb (tail breakdown).	NATD	YNY	WDC
ND21-4093	3791	Blueprint: Type 99 No. 6 Mark 2 Bomb (nose and barrel).	NATD	YNY	WDC
ND21-4094	3792	Blueprint: Type 1 No. 25 Mark 2 Model 1 Bomb (assembly).	NATD	YNY	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-4095	3793	Blueprint: Type 1 No. 25 Mark 2 Model 1 Bomb (breakdown).	NATD	YNY	WDC
ND21-4096	3794	Blueprint: Type 1 No. 25 Mark 2 Model 1 Bomb (assembly of empty case).	NATD	YNY	WDC
ND21-4097	3795	Test and performance data: Mark 3 Bombs.	NATD	YNY	WDC
ND21-4098	3796	Blueprint: 30 kg Mark 3 Bomb (assembly).	NATD	YNY	WDC
ND21-4099	3797	Blueprint: Type 99 No. 3 Mark 3 Bomb (pellets).	NATD	YNY	WDC
ND21-4100	3798	Blueprint: Type 99 No. 3 Mark 3 Bomb (empty case).	NATD	YNY	WDC
ND21-4101	3799	Blueprint: Type 2 No. 25 Mark 3 Bomb (tail-section breakdown).	NATD	YNY	WDC
ND21-4102	3800	Blueprint: Type 3 No. 25 Mark 4 Bomb (propellant).	NATD	YNY	WDC
ND21-4103	3801	Blueprint: Experimental 14 No. 25 Mark 4 Bomb (propellant).	NATD	YNY	WDC
ND21-4104	3802	Metallurgical data: Experimental 14 No. 25 Mark 4 Bomb.	NATD	YNY	WDC
ND21-4105	3803	Complete description of Mark 4 Bomb.	NATD	YNY	WDC
ND21-4106	3804	Blueprint: Temporarily designated Type 99 No. 80 Mark 5 Bomb (explosive charge).	NATD	YNY	WDC
ND21-4107	3805	Blueprint: Type 2 No. 80 Mark 5 Model 1 Bomb (explosive charge).	NATD	YNY	WDC
ND21-4108	3806	Blueprint: Experimental 14 No. 150 Mark 5 Bomb (explosive charge).	NATD	YNY	WDC
ND21-4109	3807	Blueprint: 30 kg Bomb for Tests.	NATD	YNY	WDC
ND21-4110	3808	Blueprint: 30 kg Model 2 Practice Bomb.	NATD	YNY	WDC
ND21-4111	3809	Blueprint: 30 kg Model 1 Practice Bomb.	NATD	YNY	WDC
ND21-4112	3810	Blueprint: 30 kg Model 1 Practice Bomb.	NATD	YNY	WDC
ND21-4113	3811	Surface Smoke Bomb.	NATD	YNY	WDC
ND21-4114	3812	Forty-first bomb experiments.	NATD	YNY	WDC
ND21-4115	3813	Pictures of bomb trials.	NATD	YNY	WDC
ND21-4116	3814	Thirty-third bomb experiments.	NATD	YNY	WDC
ND21-4117	3815	Chemical data on bomb composition.	NATD	YNY	WDC
ND21-4118	3816	Heat treatment of materials for No. 25 GP Bomb.	NATD	YNY	WDC
ND21-4119	3817	Second experiment on anti-aircraft smoke bomb.	NTL	YNY	WDC
ND21-4120	3818	Annealing of bombs.	NATD	YNY	WDC
ND21-4121	3819	Illuminant for Flare B.	KNOD	YNY	WDC
ND21-4122	3820	Tests of large parachute flares.	KNOD	YNY	WDC
ND21-4123	3821	Blueprint: Type 15 Model 2 Modification 1 Base Arming Mechanism (complete).	NATD	YNY	WDC
ND21-4124	3822	Blueprint: Type 97 Mark 2 Model 2 Nose Arming Mechanism (complete).	NATD	YNY	WDC
ND21-4125	3823	Blueprint: Nose Fuze (obsolete) on Mark 3 Bomb.	NATD	YNY	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-4126	3824	Blueprint: Type 2 Arming Mechanism for 30, 60, 125, and 250 kg bombs (assembly).	NATD	YNY	WDC
ND21-4127	3825	Blueprint: Type 2 Arming Mechanism for 30, 60, 125, and 250 kg bombs (breakdown).	NATD	YNY	WDC
ND21-4128	3826	Blueprint: Electrical arming mechanism for 250 kg land bomb (assembly for underwater tests).	YNY	YNY	WDC
ND21-4129	3827	Nose arming mechanism for 30 kg and 10 kg Mark 3 Bombs.	NATD	YNY	WDC
ND21-4130	3828	Chart of bomb-gaine information.	?	YNY	WDC
ND21-4131	3829	Experimental data on bomb fuzes and gaines.	NATD	YNY	WDC

DESCRIPTION AND OPERATION OF JAPANESE TYPE 3 PHOTOELECTRIC FUSE

0-24
(See 0-23)

JAPANESE EXPLOSIVES

0-25

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3205.1 to .4	3203	Drawings of washing tanks for TNT and nitrator for toluol.	IJN	MNY	Enclosure to report

JAPANESE FIRE CONTROL

0-29

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-3408	3943	Mark RO-500 Submarine 10.5cm Trunnion Tilt Indicator.	KNY	YOL	WDC
ND21-3427	3944	Torque amplifier.	ACC	YOL	WDC
ND21-3431	3947	Experimental long-range bearing repeater.	KNY	YOL	WDC
ND21-3432	3948	Experimental construction of long-range bearing repeater.	KNY	YOL	WDC
ND21-3433	3949	Dead time computer.	YNY	YOL	WDC
ND21-3449	3956	Destroyer director: Firing and illuminating circuits.	YNY	YOL	WDC
ND21-3450	3957	Experimental manufacturing and design of range averager.	KNY	YOL	WDC
ND21-3451	3958	Abstract on Type 98 Gyro Compass.	?	YOL	WDC
ND21-3453.1 to .4	3960	Blueprints: Type 96 Model 1 90cm and 110cm Searchlights; Type 96 Model 1 and Model 2 Searchlight Directors.	NTD	YOL	WDC
ND21-3454.1 to .2	3962	3.5 meter Type 93 Range Fixer (Book A).	NTD	Y	WDC
ND21-3455	3963	4.5 meter Type 93 Rangefinder.	NTD	YOL	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-3456	3964	Method of seeing halving line in rangefinder at night.	YNY	YOL	WDC
ND21-3457	3965	3 meter Type 90 Model 2 Rangefinder.	NTD	YOL	WDC
ND21-3458	3966	Model comparing tests of anti-thermal device for rangefinder.	KNY	YOL	WDC
ND21-3459	3967	10 meter Type 94 Model 2 Rangefinder.	NTD	YOL	WDC
ND21-3460	3968	Report on anti-vibration tests for rangefinder (using red rubber).	KNY	YOL	WDC
ND21-3461	3969	3 meter Type 89 Rangefinder.	NTD	YOL	WDC
ND21-3462	3970	10 meter Type 3 Rangefinder.	NTD	YOL	WDC
ND21-3463.1 to .2	3971	Automatic regulator to avoid heat effect on rangefinder.	KNY	YOL	WDC
ND21-3464	3972	Experimental design 2 meter Type 89 Rangefinder.	NTL	YOL	WDC
ND21-3465	3973	Notes on 8 meter Rangefinder and Tower (battleship design).	KNY	YOL	WDC
ND21-3466	3974	Notes on design of 3 meter Type 91 Rangefinder.	NTL	YOL	WDC
ND21-3467.1 to .2	3975	General description of 25mm gun sight. (LPR).	YNY	YOL	WDC
ND21-3468	3976	Method to convert spotting data of spotting ship to correct values for firing ship.	NTL	YOL	WDC
ND21-3469	3977	Fine measurement of fall of projectile.	KNY	YOL	WDC
ND21-3470.1 to .3	3978	Investigation of lateral spotting photography.	NTL	YOL	WDC
ND21-3471.1 to .2	3979	10cm Model 1 Gun Sight.	NTD	YOL	WDC
ND21-3472	3980	8cm Inclinometer.	NTD	YOL	WDC
ND21-3473	3981	Experiment of improved halving glass for Type 2 Range-rate Calculator Inclinometer.	YNY	YOL	WDC
ND21-3474	3982	Experimental design of gun turret sight.	NTL	YOL	WDC
ND21-3475.1 to .3	3983	Anti-vibration device ror 12cm binocular sight.	KNY	YOL	WDC
ND21-3476	3984	Experimental results of luminous paint on submarine gun sights.	KNY	YOL	WDC
ND21-3477	3985	Automatic steering recorder.	YNY	YOL	WDC
ND21-3478	3986	Investigation on night spotting.	YNY	YOL	WDC
ND21-3484	3992	Accuracy and efficiency of simplified differentials gear in directors.	KNY	YOL	WDC
ND21-3485	3993	Range clocks report (Type 90, Type 2, and Type 10 (1921).	NTD	YOL	WDC
ND21-3486	3994	Data on mechanical play and torque of TAKAO (CA) director.	KNY	YOL	WDC
ND21-3487	3995	Effect of play and torque on accuracy director.	KNY	YOL	WDC
ND21-3488	3996	Notes on mechanical play on roll corrector of destroyer director.	KNY	YOL	WDC
ND50-3000	3901	Aichi Automatic Follow-up.	ACC	KNY	WDC
ND50-3001	3902	Type 92 Range Averager Device.	?	KNY	WDC
ND50-3002	3903	F. A. Torque Amplifier.	ACC	KNY	WDC
ND50-3003	3904	German co-ordinate transformer.	KNY	KNY	WDC
ND50-3004	3905	Type 94 Air Follow-up.	ACC	KNY	WDC
ND50-3005	3906	Type 95 Fire Control (gear train).	NM	KNY	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3006	3907	Type 5 Radar Director (general arrangement).	NM	KNY	WDC
ND50-3013	3914	Gyro-compass material.	NM	KNY	WDC
ND50-3015.1 to .16	3916	Type 94 Magnetic-clutch Type FU AA Director.	NM	KNY	WDC
ND50-3027	3900	Type 4 Gyro Horizon.	?	KNY	WDC

JAPANESE ANTI-AIRCRAFT FIRE CONTROL

O-30

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-3429	3945	Fire control tests: FUSO (BB).	KNY	YOL	WDC
ND21-3430	3946	Fire control tests: SUZUYA (CA).	KNY	YOL	WDC
ND21-3434	3950	AA defense for naval vessels	NTL	YOL	WDC
ND21-3435	3951	Type 94 AA Director, adjustments.	NTD	YOL	WDC
ND21-3441.1 to .55	3935	Blueprints: Type 92 LA Data Computer for 36cm and 40cm guns.	YNY	YOL	WDC
ND21-3442.1 to .19	3936	Blueprints: Type 92 LA Computer for 20cm gun.	?	YOL	WDC
ND21-3443.1 to .24	3937	Blueprints: Type 91 AA Director.	NTD	YOL	WDC
ND21-3444.1 to .8	3938	Blueprints: Type 95 AA Director (land use).	NOC*	YOL	WDC
ND21-3445.1 to .21	3939	Blueprints: Mode[illegible] LA Director.	KNY	YOL	WDC
ND21-3446.1 to .4	3940	Blueprints: Type 94 Model 3 LA Director.	SNY	YOL	WDC
ND21-3447.1 to .25	3941	Blueprints: LA Data Computer.	NTD	YOL	WDC
ND21-3448.1 to .7	3942	Blueprints: Electrical Data (AA) Computer.	YNY	Y	WDC
ND21-3452	3959	Simplified Type 2 AA Computer.	KNY	YOL	WDC
ND21-3479	3987	AA firing data converter of Type 94 Model 1 Spotting Instrument.	NTD	YOL	WDC
ND21-3480.1 to .2	3988	Mechanical play and transmission efficiency of destroyer director.	KNY	YOL	WDC
ND21-3481	3989	General description of Type 91 AA Director Sight.	NTD	YOL	WDC
ND21-3482	3990	AA deflection table (7cm Type 88 Army Gun).	NTD	YOL	WDC
ND21-3483	3991	AA deflection table (12.7cm/40 cal and 8cm/40 cal Guns).	YNY	YOL	WDC
ND22-2000	4329	Research on plotting of moving bodies in space by electrical vectors.	?	KNY	WDC
ND22-2001	4330	Manual for Type 5 AA Batteries.	KNY	KNY	WDC
ND22-2017	4331	Visual direction for automatic control of machine guns and searchlights.	FEC	KNY	WDC
ND50-3007	3908	Brief description of Type 98 Rangekeeper.	NM	KNY	WDC
ND50-3008	3909	Solid cam manufactured by Nippon Optical Company.	NM	KNY	WDC

ENCLOSURE (D). continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3021.1 to .2	3894	Notes on Type 94 Rangekeeper.	NM	KNY	WDC
ND50-3022.1 to .2	3895	Schematic diagram: Type 94 Data Computer.	NM	KNY	WDC
ND50-3023	3896	Type 94 Machine gun Sight.	NM	KNY	WDC
ND50-3024	3897	Schematic diagram: Type 95 AA Director.	NM	KNY	WDC
ND50-3025	3898	Handbook for Type 2 AA Director.	NM	KNY	WDC
ND50-3026	3899	Schematic diagrams: Type 3 AA Rangekeeper.	NM	KNY	WDC
ND50-3028	3961	HA deflection calculator for use with Type 92 LA Rangekeeper.	NM	KNY	WDC

JAPANESE SURFACE AND GENERAL FIRE CONTROL

0-31

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-3436	3952	Reduction of dispersion.	SNY	YOL	WDC
ND21-3437	3953	Projectile dispersion.	KNY	YOL	WDC
ND21-3438	3954	Dispersion reports.	SNY	YOL	WDC
ND21-3439	3955	Dispersion charts.	SNY	YOL	WDC
ND21-3440.1 to .47	3934	Blueprints: Type 94 Director-computer for 1217cm Twin Gun.	NOC	YOL	WDC
ND50-3011	3912	LA Gun Sight (early type).	NM	KNY	WDC
ND50-3012	3913	Notes on Type 92 Rangekeeper.	NM	KNY	WDC
ND50-3014	3915	Type 92 Target Data Computer.	NM	KNY	WDC
ND50-3016	3889	Notes on rangekeepers.	NM	KNY	WDC
ND50-3017	3890	Type 92 Rangekeeper (MOGAMI)(CA).	NM	KNY	WDC
ND50-3018	3891	Type 97 Director (HIEI)(BB).	NM	KNY	WDC
ND50-3019	3892	Type 94 Director (Battleship)	NM	KNY	WDC
ND50-3020	3893	Schematic diagram: Type 91 AA Director.	NM	KNY	WDC

JAPANESE TORPEDO FIRE CONTROL

0-32

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3029	4603	Report of conference on torpedo fore control systems on submarines.	NTD	YOL	WDC

JAPANESE DEMOLITION METHODS

0-35

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3232	4093	Manual: Japanese Ground Warfare Weapons.	KOD	KNY	WDC

ENCLOSURE (D), continued

JAPANESE LIGHT ARMOR

0-36

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3146	4115	Measuring resistance of shield plates tc rifle bullets.	SIU	TIU	WDC
ND50-3147.1 to .6	4116	Bullet-proof glass.	NATD	Y	WDC
ND50-3162	4117	Test of experimental manganese-vanadium steel.	JSAC	TIU	WDC
ND50-3163	4118	Zero degree elevation firing against armor using 5cm AP shells.	TAN	Y	WDC
ND50-3164	4119	Measurement of penetration resistance of ballistic pendulum armor.	TIU	TIU	WDC
ND50-3165	4120	Research on rifle shields.	NTL	Y	WDC
ND50-3166	4121	Ballistic tests of non-nickel gun shields.	KNY	Y	WDC
ND50-3167	4122	Experiments with special steel plates.	NATL	Y	WDC
ND50-3189	4380	Experiments in pressure-resisting qualities of glass in lookout window.	KNY	Y	WDC

JAPANESE ORDNANCE RESEARCH, TESTING AND TRAINING

0-38

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND25-0001	3033	Tests and examination regulations: Shipbuilding, ordnance, and engine materials.	NM	YWNMC	WDC
ND25-0009	3030	Report of important experimental research, 1943.	YTL	YWNMC	WDC
ND25-0010	3029	Report of important experimental research, 1944.	YTL	YWNMC	WDC
ND25-0013	3024	Army basic specifications (metallurgical).	AOAHQ	YWNMC	WDC
ND25-0014	3025	Army provisional specifications for metals.	AOAHQ	YWNMC	WDC
ND50-3009	3910	General history of director development.	NM	KNY	WDC
ND50-3010	3911	Early development of directors.	NM	KNY	WDC

JAPANESE ORDNANCE RESEARCH

0-39

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-3402	4232	Development tests of AA projectile for 10cm/65 cal DP Gun.	KNY	YOL	WDC
ND21-3420	4224	Muzzle flash.	NPD2	YOL	WDC
ND50-3145	3831	Methods of mechanical testing in metallurgy.	SIU	YOL	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3221	4621	Study of super initial high velocity machine gun and its projectiles.	NTL2	YOL	WDC
ND50-3404a	3537	Research on blast measuring device.	NPD	YOL	WDC
ND50-3407a	3563	Vibration damper.	YNY	YOL	WDC
ND50-3415	4266	Effect of powder moisture on muzzle velocity and bore pressure.	KNY	YOL	WDC
ND50-3436	3691	High-speed camera for use in photographing penetrative ballistics.	KNY	YOL	WDC
ND50-3438	4230	Investigation of KRUPP 8.8cm/40 cal AA Gun.	NTL	YOL	WDC
ND50-3461	4288	Results of measurement of vibration of muzzles of 20cm/50 cal guns of KINUGASA (CA).	KNY	YOL	WDC
ND50-3472	4302	MS notebook on experimental firing of bombs from guns	NAK	T	WDC
ND50-3473	4303	Penetration curves of bombs versus armor.	?	T	WDC
ND50-3476	4362	Determining temperature and gas composition at muzzle for various guns.	NPD	YOL	WDC
ND50-3746b	4665	Report of status of aircraft ordnance research: No. 27.	NATD	?	WDC
ND50-3747b	4664	Report of status of aircraft ordnance research: No. 26.	NATD	?	WDC

JAPANESE RESEARCH IN AIRBORNE ACOUSTICS AND EARTHWAVES

0-41

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3800	3885	Description and use of Type 90 Large Acoustic Detector.	MW	MB	WDC
ND50-3801	3886	Description and use of Type 90 Small Acoustic Detector.	MW	MB	WDC
ND50-3802	3887	Operating instructions: Type 97 Sound Locator.	MW	MB	WDC

JAPANESE ORDNANCE EQUIPMENT - INTERNAL RECORDERS, WAVE AND TIDE METERS, TORPEDO RECOVERY GEAR, UNDERWATER LOCATORS

0-42

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3803	3888	Operating instructions for steroplanigraph.	IJNHO	MB	WDC

ENCLOSURE (D), continued

ND50-3120	4566	Tracing: Structure of wooden dolly for 25mm Twin Mount Type 96.	YNY	YOL	WDC
ND50-3121	4567	Tracing: 25mm Triple Assembly Type 96.	YNY	YOL	WDC
ND50-3122	4568	Tracing: 25mm Triple Assembly Type 96 Model 2.	YNY	YOL	WDC
ND50-3123.1 to .21	4569	General armament arrangement of ships from heavy cruisers to suicide boats.	YNY	YOL	WDC

JAPANESE NAVAL GUNS AND MOUNTS

O-47(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-3410	3625	Bore blower.	KNY	YNY	WDC
ND50-3100	4381	Report of experiments on Vickers Type 40mm Model 2 Machine Gun.	KNY	YOL	WDC
ND50-3101	4382	Report on vibration of 25 rounds continuous feed Vickers Type 40mm Single Machine Gun Mount.	KNY	YOL	WDC
ND50-3102	4383	Assembly, disassembly, and handling 25mm Type 95 Twin Mount.	YNY	YOL	WDC
ND50-3103	4384	Experimental aiming training equipment used with Type 95 25mm Machine Gun firing equipment.	KNY	YOL	WDC
ND50-3104	4385	Durability test of 13mm Type 93 Machine Gun and test of 13mm Common Ammunition.	YNY	YOL	WDC
ND50-3105	4386	Tests of accuracy of Vickers 12mm Machine Gun.	KNY	YOL	WDC
ND50-3106	4337	Explanation of Vickers Type 12mm Model 2 Modification 10 Machine Gun.	NTD	YOL	WDC
ND50-3107	4388	Essentials of machine gun construction methods.	YNY	YOL	WDC
ND50-3108	4389	Experiments on decoppering machine gun barrels.	YNY	YOL	WDC
ND50-3109	4390	Tests of machine gun barrel materials.	NTL	YOL	WDC
ND50-3110	4391	Machine gun springs and spring materials.	NTL	YOL	WDC
ND50-3112	4558	Blueprint: 25mm Single Assembly Type 96 Model 3.	NTD	YOL	WDC
ND50-3113	4559	Blueprint: 25mm Single Assembly Type 96 Model 8.	YNY	YOL	WDC
ND50-3114	4560	Blueprint: 25mm Single Assembly Type 96 Experimental Model.	YNY	YOL	WDC
ND50-3115	4561	Blueprint: 25mm Single Assembly Type 96 Experimental Model.	NTD	YOL	WDC
ND50-3116	4562	Tracing: 25mm Single Assembly Type 96.	YNY	YOL	WDC
ND50-3117	4563	Tracing: 25mm Single Assembly Type 96 Model 3.	YNY	YOL	WDC
ND50-3118	4564	Blueprint: 25mm Twin Assembly Type 96 Model 4.	KNY	YOL	WDC
ND50-3119	4565	Blueprint: Structure of traversing gear of 25mm Twin Mount Type 96 Experimental.	YNY	YOL	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3148	3836	Test on accuracy of Vickers 12mm Machine Gun.	KNY	YOL	WDC
ND50-3159	3835	Blast tests against 25mm Twin Mount Machine gun Shield.	KNY	YOL	WDC
ND50-3168	4392	Progress report on experiments and improvements on Vickers Type 40mm Machine Gun.	KNY	YOL	WDC
ND50-3169	4393	Tests of Vickers Type 40mm Single Machine Gun Mount manufactured at KURE. Report on improvements.	KNY	YOL	WDC
ND50-3409a	3618	Magnetic type remaining rounds indicator.	NATD	YOL	WDC
ND50-3425	4394	Standard adjusting procedure for 13mm machine gun.	YNY	YOL	WDC
ND50-3426	4663	Report on tests of experimental 25mm machine gun ammunition.	NPD	?	WDC
ND50-3523	4395	Explanation of 25mm Type 94 Twin Machine gun Mount.	YNY	YOL	WDC
ND50-3601	3629	Report on counter measures for leakage in hydraulic system in battleship magazines.	KNY	YNY	WDC
ND50-3603	3614	Reports of experiments on main battery sprinkler system of ISE (BB).	KNY	YNY	WDC
ND50-3604	3616	Experiments on reversing elevating hand wheel on firing of 12.7cm/40 cal Type 89 Twin Gun.	KNY	YNY	WDC
ND50-3605	3619	Concerning spring designs and efficiency of double gears with springs.	KNY	YNY	WDC
ND50-3606	3620	Report on contact corrosion of materials used on turrets.	KNY	YNY	WDC
ND50-3607	3621	Reports on corrosive effects of sea water on light metals used in turrets.	KNY	YNY	WDC
ND50-3608	3622	Reports of friction experiments on nitrited gears.	KNY	YNY	WDC
ND50-3609	3623	Experiments on pressure gauges and measuring methods.	KNY	YNY	WDC
ND50-3610	3624	Carbon-steel wire for valve springs.	NATD	YNY	WDC
ND50-3615	3627	Data collected on ammunition hoist experiments after final gunnery test of HATSUKARI (TB).	KNY	YNY	WDC
ND50-3616	3626	Results of training trials of 36cm turrets on ISE (BB) after modification of training gear.	KNY	YNY	WDC
ND50-3617	3615	Suggestions for improving various mechanical parts of 40mm gun turrets on MUTSU (BB).	SNY	YNY	WDC
ND50-3618	3617	Report on investigation of play of elevating gear on 20mm gun turret on NACHI and MYOKO (CA).	KNY	YNY	WDC
ND50-3620	3628	Outline for second modifications of fire protection tube between powder magazine and loading room of 20cm multiple-mount gun turrets on AOBA and IBUKI (CA).	KNY	YNY	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3622	3612	Report on results of measurements of vibration of muzzles of 20cm/50 cal guns of ATAGO (CA) as result of sudden stop of elevation while at anchor.	KNY	YNY	WDC
ND50-3623	4064	General investigation of pneumatic recuperators of 36cm gun mount on ISE (BB).	KNY	K	WDC
ND50-3624	4065	Corrosion of 36cm gun mounts of HYUGA (BB).	KNY	K	WDC
ND50-3625	4066	Notes on cordite hoist interlocks of 20cm twin mounts and lever mechanism of ATAGO Class (CA).	KNY	K	WDC
ND50-3626	4067	Concerning moment of inertia of 20cm E Type Turret (revolving part).	KNY	K	WDC
ND50-3627	4068	20cm cordite hoist.	KNY	K	WDC
ND50-3628	4069	Ammunition hoist on NACHI (CA). New type record loading gear. Removal and replacement of main director for main armament.	KNY	K	WDC
ND50-3629	4070	Trial results of Type 89 12.7cm Power Rammer.	KNY	K	WDC
ND50-3630	4071	Summary of items and plans for Type 89 12.7cm/40 cal Twin mount DP Gun.	KNY	K	WDC
ND50-3631	4072	Report on results of tests on ammunition hoist for 10cm gun of I-68 (SS).	KNY	K	WDC
ND50-3632	4073	Second report on Modification 2 Fuze-setting Machine for 12.7cm AA guns.	KNY	K	WDC
ND50-3633	4074	Report of tests on recoil liquid research.	NTL	K	WDC
ND50-3634	4075	Report of experiments on nine-cylinder type hydraulic motors.	KNY	K	WDC
ND50-3635	4076	Notes on hydraulic control valves and materials used.	KNY	K	WDC
ND50-3636	4077	Report on experiments with V.T. Type Hydraulic Motors.	KNY	K	WDC
ND50-3637	4078	Report on ammunition supply for main armament of ISE (BB).	KNY	K	WDC
ND50-3638	4124	Clearance that should be given to worm and worm wheel of 20cm gun turret.	KNY	K	WDC
ND50-3639	4125	Various methods of laying electric cables by gun.	NTD	K	WDC
ND50-3640	4126	Concerning rust resistance in recoil ring of 20cm gun.	KNY	K	WDC
ND50-3641	4127	Experimental report on comparative efficiency of three-cylinder type hydraulic engines before and after repair following use over long periods for loading HYUGA (BB) 36cm gun turrets.	KNY	K	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3642	4128	Report of measurement of amount of recoil of the turret and muzzle of an adjacent gun and the lateral motion of the breech of this gun during experimental firing of 20cm twin turret gun, measured by means of drum device in ordnance department.	KNY	K	WDC
ND50-3643	4129	Report of experiments on efficiency of seven-cylinder hydraulic ramming engine for 36cm gun on KIRISHIMA (BB).	KNY	K	WDC
ND50-3644	4130	Experimental report on ammunition handling equipment inside 36cm/45 cal gun magazines of ISE and HYUGA (BB).	KNY	K	WDC
ND50-3645	4131	Conditions of repair and maintenance of ISE and HYUGA (BB) 36cm gun training valve.	KNY	K	WDC
ND50-3646	4132	Summary of cutting-off work of FUSO (BB) 36cm turret barbette.	KNY	K	WDC
ND50-3647	4133	Ordnance instruction materials (40cm gun turret).	NOS	K	WDC
ND50-3648	4134	Ordnance instruction materials (36cm gun turret).	NOS	K	WDC
ND50-3649	4135	On 15cm gun-loading trays of FUSO (BB).	KNY	K	WDC
ND50-3650	4136	Experimental report on Type 89 12.7cm/40 cal multiple-mount DP gun and 36cm gun blasts. Influence of 36cm gun blasts on HYUGA (BB) final firing trials.	KNY	K	WDC
ND50-3684	4631	Method of manufacture of air stop machine.	KNY	K	WDC
ND50-3685	4632	Experimental report on the functioning of the communications equipment inside the 36cm gun turrets of HYUGA (BB).	KNY	K	WDC
ND50-3686	4633	Results and observations from tests of traversing power, defects of guns, and terminal velocity.	KNY	K	WDC
ND50-3687	4634	Experimental report on Third-year Type Mark B 12.7cm/50 cal Twin mount Cannon.	KNY	K	WDC
ND50-3688	4635	Automatic retrenchment gun.	KNY	K	WDC
ND50-3689	4636	Experimental report on Tenth-year Type 21cm/45 cal AA Gun.	KNY	K	WDC
ND50-3690	4637	Experimental report on Tenth-year Type 12cm/45 cal AA Gun.	KNY	K	WDC
ND50-3691	4638	Guns on 10,000 ton cruiser.	KA	K	WDC
ND50-3692	4639	TAKAO (CA) twin turrets.	KA	K	WDC
ND50-3694	4641	Pneumatic recuperation of 36cm gun and calculation of recoil brake.	KA	K	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3695	4642	Determination of valve opening and safety valve of elevating hydraulic cylinder of 40cm gun turret.	KA	K	WDC
ND50-3696	4643	Report on efficiency of swash plate hydraulic engine for loading 40cm gun turret.	KA	K	WDC
ND50-3697	4644	Experimental results of loading device for 15.5, 15, and 14cm projectiles.	KA	K	WDC
ND50-3698	4645	Report on temperatures in cruiser turrets during hot summers.	KA	K	WDC
ND50-3699	4646	Effectiveness of turret ventilation on AKAGI (CV) after first modification.	KA	K	WDC

JAPANESE FUZE-SETTING EQUIPMENT

O-48(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3621	3611	Factors influencing accuracy of time-delay fuze setters.	KNY	YNY	WDC
ND50-3651	4137	Report on experimental tests of fuze-setting mechanism for 12.7cm DP Gun.	KNY	Y	WDC

JAPANESE MUZZLE BRAKES AND FLASH HIDERS

O-49(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-3419	4225	Muzzle flash in 25mm automatic cannon.	NPD	YOL	WDC

JAPANESE ORDNANCE - MAINTENANCE AND PROTECTIVE COATINGS

O-51(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3640	4126	Concerning rust resistance in recoil ring of 20cm gun.	KNY	K	WDC
ND50-3652	4138	Reports concerning prevention of compresses air leakages.	KNY	K	WDC
ND50-3653	4139	Experimental report on anti-rust materials used on submarine guns and machine guns.	KNY	K	WDC

ENCLOSURE (D), continued

HYDRAULIC PUMPS IN JAPANESE NAVAL ORDNANCE

O-53(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-3403	3636	Report on measures against breakdown of hydraulic motors on NAGATO (BB).	YNY	YNY	WDC
ND21-3404	3631	Recoil liquids.	KNY	YNY	WDC
ND21-3406	3635	Non inflammable turret oil.	NFD	YNY	WDC
ND21-3411	3637	Experiments on hydraulic buffers.	KNY	YNY	WDC
ND50-3600	3630	Measurements of recuperation pressure and recuperation brake pressure of guns by means of piezo quartz pressure gauge.	KNY	YNY	WDC
ND50-3602	3639	Report on oil cooler for 20cm powered turret.	SNY	YNY	WDC
ND50-3612	3632	Experimental report on recoil liquids.	KNY	YNY	WDC
ND50-3613	3633	Effect of modernized packing on the fire power of battleships and heavy cruisers.	YNY	YNY	WDC
ND50-3614	3634	Report on anti-freeze hydraulic fluid and oil meter.	NATD	YNY	WDC
ND50-3619	3638	Report on USG oils.	KNY	YNY	WDC
ND50-3641	4127	Experimental report on comparative efficiency of three-cylinder type hydraulic engines before and after repair following use over long periods for loading 36cm gun turrets on HYUGA (BB).	KNY	K	WDC
ND50-3654	4140	Tests on amount of oil pumped by No. 35 Hydraulic Pump in moving 20cm turret.	KNY	K	WDC
ND50-3655	4141	Static pressure drop due to the resistance of valves, cocks, or stream line in oil systems using No. 2 outside mineral oil.	KNY	K	WDC
ND50-3656	4142	Accuracy of copper column and pressure indicator (gauges and measuring methods).	KNY	K	WDC
ND50-3657	4143	Research on types of oil for ordnance.	NTL	K	WDC
ND50-3658	4144	Experiments on the performance of control valve after modification.	KNY	K	WDC
ND50-3659	4145	Notes on hydraulic engines (No. 3): Design of elliptic hydraulic engine.	KNY	K	WDC
ND50-3660	4146	Experimental reports on friction resistance of pressured oil used as motive power for turrets.	KNY	K	WDC
ND50-3661	4147	Tests on recoil liquid.	KNY	K	WDC
ND50-3662	4148	Experimental research on using oil as a buffer at low temperatures.	NATD	NATD	WDC
ND50-3663	4149	Experimental report on efficiency of 200 hp wabble-plate type hydraulic engine.	KNY	K	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3693	4640	Experimental firing result of the recoil.	KNY	?	WDC
ND50-3696	4643	Report on efficiency of swash plate hydraulic engine for loading 40cm gun turret.	KA	K	WDC

JAPANESE NAVAL GUNS

O-54(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND10-3202	3061	Construction blueprints of naval guns.	?	NGF	BuOrd
ND21-3405	4233	20cm projectile ejector.	KNY	YOL	WDC
ND21-3407	4234	Modification of submarine guns.	KNY	YOL	WDC
ND21-3415	4236	Forging of breech ring.	KNY	YOL	WDC
ND21-3428	3830	Measuring area of projectiles and determining center of gravity.	KNY	YNY	WDC
ND21-4003	3074	Characteristics of Japanese Navy guns, 3 in. to 18 in.	?	YNY	WDC
ND50-3400	4366	Blueprint: Barrel of 12.7cm/50 cal Gun.	?	YOL	WDC
ND50-3401	4253	Experimental report on rifling cutting.	KNY	YOL	WDC
ND50-3404b	4256	Types of powder and ammunition components used in various guns.	?	YOL	WDC
ND50-3405	4257	Improvements in gun barrel construction.	KNY	YOL	WDC
ND50-3406	4259	Experiments with auto-frettage compressors (hydraulic).	KNY	YOL	WDC
ND50-3407b	4260	Research on breech screw lubricants.	KNY	YOL	WDC
ND50-3408	4258	Investigation of causes of defects in 12cm gun barrel surfaces of KAKO (CA).	KNY	YOL	WDC
ND50-3409b	4261	Experiments on breech stop.	KNY	YOL	WDC
ND50-3410	4262	Manufacturing methods for obturators.	KNY	YOL	WDC
ND50-3411	4263	Experiments on Third-year Type 12cm Gun firing pin.	KNY	YOL	WDC
ND50-3412	4353	Technical report on primer lock and pistol firing pin.	KNY	YOL	WDC
ND50-3417.1 to .3	4268	Blueprints: 40cm/45 cal gun.	KNY	YOL	WDC
ND50-3418.1 to .4	4269	Blueprints: Type 13 12cm Gun.	KNY	YOL	WDC
ND50-3419.1 to .5	4270	Blueprints: 12.7cm/50 cal AA Gun.	KNY	YOL	WDC
ND50-3420.1 to .5	4271	Blueprints: 12.7cm/40 cal AA Gun.	KNY	YOL	WDC
ND50-3421.1 to .5	4272	Blueprints: 14cm/50 cal Gun.	KNY	YOL	WDC
ND50-3442	4222	Research on strength of gun barrels.	NTL	YOL	WDC
ND50-3444	4221	Basic research on auto-frettage.	NTL	YOL	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3445	4220	Research on chrome-plating gun barrels.	YNY	YOL	WDC
ND50-3448	4283	Erosion of 20mm gun barrels and the force necessary to seat projectiles.	KNY	YOL	WDC
ND50-3449	4284	Trials of experimental ejector rods.	YNY	YOL	WDC
ND50-3450	4285	Radial expansion of 20mm gun barrel.	KNY	YOL	WDC
ND50-3451	4286	Report on auto-frettage.	KNY	YOL	WDC
ND50-3452	4287	Basic research on auto-frettaged guns.	NTL	YOL	WDC
ND50-3454	4246	Heat treatment and tensile strength of gun wire.	KNY	YOL	WDC
ND50-3455	4247	Manufacture of thick gun sections by pierce forging.	KNY	YOL	WDC
ND50-3458	4250	Physical experiments on auto-frettaged barrels.	KNY	YOL	WDC
ND50-3460	4252	Star gauge sheets.	?	KNY	WDC
ND50-3463	4290	Air-blast ejector tests.	KNY	YOL	WDC
ND50-3464	4291	Anti-rust springs for submarine guns.	KNY	YOL	WDC
ND50-3465	4292	Procedure for rifling a tapered barrel.	NTL	YOL	WDC
ND50-3466	4293	Measurements of bending of Third-year Type 20cm/50 cal Guns due to sun heating.	KNY	YOL	WDC
ND50-3467	4355	Basic tests on nickel-chrome steel gun barrels to find causes of longitudinal cracks.	KNY	YOL	WDC
ND50-3469	4357	Experiments on motive force of 36cm firing device ejectors.	KNY	YOL	WDC
ND50-3471	4359	Investigation of breech plugs.	KNY	YOL	WDC
ND50-3475	4361	Strength calculations in guns with separate liners.	KNY	YOL	WDC
ND50-3477	4363	Research on strength of gun barrels.	NTL	YOL	WDC
ND50-3478	4368	MS pamphlet on Japanese Naval guns.	?	T	WDC
ND50-3479	4570	MS sheet of gun and ammunition data, 8cm to 40cm.	?	YOL	WDC
ND50-3480	4571	MS sheet of ballistic data on guns.	?	YOL	WDC
ND50-3481	4572	MS sheet of gun data, 8cm to 46cm.	OTA	K	WDC
ND50-3963	4294	Investigation of prevention of projectile slipping down into chamber.	NTL	YOL	WDC
ND50-3971	4296	Design and operation of Type 89 12.7cm Twin AA Gun.	KNY	YOL	WDC
ND50-3972	4297	Modification of breech stopper on Third-year Type 12.7cm/50 cal Gun.	KNY	YOL	WDC
ND50-3975	4367	Experiments on gas checks for various guns below 20cm.	KNY	YOL	WDC
ND50-4753	4245	Radial expansion tests in gun barrels.	KNY	YOL	WDC

ENCLOSURE (D) continued

JAPANESE FIELD AND AMPHIBIOUS EQUIPMENT - KYUSHU DEFENCE SYSTEMS

0-56(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3231	4095	Map of defense of KYUSHU (troop positions).	IJA	SNY	WDC
ND50-3233	4094	Japanese field weapons.	IJA	KNY	WDC

* * * * *

SHIPS TARGETS

Legend

A	Author
ATL3	Third Army Technical Laboratory
DAIC	Diesel Automotive Industrial Company, TOKYO
EES	Engine Experimental Station, YOKOSUKA
FEC	Fuji Electric Company
FSW	Fujinagata Shipbuilding Works, OSAKA
HAS	Lieut. K. HASHIMOTO, IJN
HC	Hitachi Company, TOKYO
HIW	Hanshin Iron Works, KOBE
HNECD	Hiro Navy Engine Construction Department
HNY	Hiro Navy Yard
IIW	Ikegai Iron Works, TOKYO
IJA	Imperial Japanese Army
IJN	Imperial Japanese Navy
JSS	Japan Shipbuilding Society
K	KURE
KAW	KAWASAKI
KDI	Kanegafuchi Diesel Industries
KEW	Kobe Engine Works
KNECD	Kure Navy Engine Construction Department
KNY	Kure Navy Yard
MB	Meiji Building, TOKYO
MC	Ministry of Communications
MEC	Mitsubishi Electric Company, KOBE
MEL	Marine Engineering Laboratory
MHIC	Mitsubishi Heavy Industries Company
MNY	Maizuru Navy Yard
MSC	Mitsubishi Shipbuilding Company, NAGASAKI
MTEC	Mitsubishi Tokyo Engineering Company
NB	Nissan Building, TOKYO
NEC	Nisshin Electric Company, KYOTO
NECK	Nippon Electric Company, KAWASAKI
NIW	Niigata Iron Works
NM	Navy Ministry
NPD2	Second Navy Powder Depot
NSS	Navy Submarine School
NTD	Navy Technical Department
NTL	Navy Technical Laboratory
PB	Patents Bureau, TOKYO
PS	Private Shipyards
S	SASEBO
SCA	Shipbuilding Control Association, TOKYO
SCC	Sumitomo Communications Company
SEC	Shibaura Electric Company
SG	Shipbuilders Guild

SHI	SHIKISHIMA (OBB)
SNAJ	Society of Naval Architects of Japan
SNY	Sasebo Navy Yard
SUZ	SUZUTSUKI (DD)
T	TOKYO
TEW	Tokyo Engineering Works
TI	Technical Institute
TMI	Tenth Military Institute, HIMEJI
TOK	Lt. Comdr. TOKUGAWA, IJN
TS	Tokyo Shipyard
VS	Various Shipyards
Y	YOKOSUKA
YNY	Yokosuka Navy Yard
YOD	Yokosuka Ordnance Depot
YWNMC	Yawata Works, Nippon Iron Manufacturing Company
?	Unknown

CHARACTERISTICS OF JAPANESE NAVAL VESSELS

S-01

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND10-2000	3071	Blueprints: HA-201 (SS).	?	SNY	WDC
ND10-2504	3132	Inventory of arms, equipment, etc. of SUZUTSUKI (DD).	?	SUZ	WDC
ND10-2505	3134	Inventories and blueprints of SHIKISHIMA (OBB).	?	SHI	WDC
ND10-2506	3135	New ship construction.	?	?	WDC
ND22-0001	4298	Statistics on I-400, I-201, I-352 Classes (SS).	KNY	KNY	WDC
ND22-0002	4299	Statistics on various Japanese naval vessels.	KNY	KNY	WDC
ND22-0003	4666	Data on ships under construction at KURE at the end of the war.	?	K	WDC
ND22-0006	4301	Information on YAMATO (BB) and other battleships and carriers.	?	KNY	WDC
ND22-0033	4310	Estimation and actual data on hull construction: Man hours, number of rivets, length of welding time, etc.	KNY	KNY	WDC
ND22-0037	4311	Blueprint: Hull, I-9 (SS).	?	KNY	WDC
ND22-0600.1 to .2	4322	Blueprints: I-201, I-351, I-400 Class (SS) (general arrangements, displacement curves, and specifications).	?	KNY	WDC
ND22-1013	4318	Standards of materials (metals, rubber, etc.).	KNY	KNY	WDC
ND22-1021	4319	Standard turbine calculations.	?	KNY	WDC
ND22-1026	4324	Summary of development and result of the chief experiments.	MEL	KNY	WDC
ND22-1411	4326	Blueprint: Water level controller KASHINO (AF).	MHIC	KNY	WDC
ND22-1601	4320	Mechanical diagrams of main engines: I-15 Class (SS).	NTL	KNY	WDC
ND22-1620	4327	Engines on I-176 (SS).	?	KNY	WDC
ND22-2011	4527	Wire and cable specifications.	?	K	WDC
ND22-2012	4526	Fire and heat-proof cable specifications.	KNY	K	WDC
ND22-2014	4622	Manual: Sound-powered telephones.	KNY	K	WDC
ND22-2015	4623	Instruction manual: Type 92 Plug Exchange.	YNY	K	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-2016	4624	Manual: Battery type telephones.	NTD	K	WDC
ND22-2201	4525	Blueprints: Electrical plans, YAMATO Class (BB).	?	K	WDC
ND22-2274	4531	Layout diagram: DC 220 volt emergency power source, DC 20 volt power source, gyro-compass power source, MYOKO (CA).	?	K	WDC
ND22-2400	4535	Blueprints: Electrical plans, ASASHIO Class (DD) and KAGERO Class (DD).	?	K	WDC
ND22-2450	4536	Blueprints: Electrical plans, MATSU Class (DD).	?	K	WDC
ND22-2600-1	4537	Blueprints: Electrical plans, I-201 Class (SS).	?	K	WDC
ND22-2649	4538	Blueprints: Electrical plans, I-400 Class (SS).	?	K	WDC
ND22-2799	4629	Instruction manual: Type 3 Mark 4 Model 2 Gyro-compass (ANSCHUTZ Type).	?	K	WDC
ND22-6000	4532	Blueprints: Electrical plans, CHIKUMA (CA).	?	K	WDC
ND22-6032	4528	Blueprints and tracings: Electrical plans, UNRYU Class (CV).	?	K	WDC
ND22-6115	4533	Blueprints: Electrical plans, OYODO (CL).	?	K	WDC
ND22-6300	4530	Blueprint: Electrical plans, IBUKI (CA).	?	K	WDC
ND22-6500	4534	Blueprints: Electrical plans, TERUTSUKI Class (DD).	?	K	WDC
ND25-0001	3033	Tests and examination regulations: Shipbuilding, ordnance, and engine materials.	NM	YWNMC	WDC
ND25-0002	3026	Navy specifications.	NM	?	WDC
ND25-0022	3001	Material specification (addenda and corrections to basic publications).	NTD	NTD	WDC
ND25-0037	3018	Hard chrome plating.	PB	PB	WDC
ND50-1000.1 to .49	3187	Blueprints: YAMATO (BB).	NTD	KNY	BuShips
ND50-1001.1 to .49	3188	Builders' plans: KATSURAGI (CV).	NTD	YNY	BuShips
ND50-1002.1 to .5	3189	Stability data, lines of displacment, curves: TAIHO (CV).	NTD	YNY	BuShips
ND50-1003.1 to .4	3190	Inclining data, structural sections, general arrangements, and midship section: SHINANO (CV).	NTD	SNY	BuShips
ND50-1004.1 to .46	3191	Stability, lines, structural data, arrangement plans, piping diagrams: ATAGO (CA).	NTD	YNY	BuShips
ND50-1005.1 to .19	3192	Stability, form, structural data, arrangement plans: TONE (CA).	NTD	SNY	BuShips
ND50-1006.1 to .8	3193	Characteristics, weights, form, piping diagrams: IBUKI (CA).	NTD	SNY	BuShips
ND50-1007.1 to .24	3194	Characteristic, stability, weight, arrangement, piping system data: AGANO Class (CL).	NTD	KNY	BuShips
ND50-1008.1 to .23	3195	Characteristics, stability, weight, form, arrangement, piping system data: OYODO (CL).	NTD	YNY	BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1009.1 to .18	3196	Characteristics, stability, form, weight, arrangement, piping system data: HARUTSUKI Class (DD).	NTD	SNY	BuShips
ND50-1010.1 to .2	3197	Midship section and general arrangements: KAGERO Class (DD).	MNY	MNY	BuShips
ND50-1011.1 to .9	3198	Stability, structure, piping system data: ASASHIO Class (DD).	NTD	SNY	BuShips
ND50-1012.1 to .6	3199	Characteristics, form, arrangement data: MATSU Class (DE).	NTD	Y	BuShips
ND50-1013.1 to .11	3200	Characteristics, stability, weight, form, structure, arrangement data: SHIMUSHU Class (DE).	NTD	KNY	BuShips
ND50-1014.1 to .4	3201	Arrangement and structure of SB Type Landing Craft.	NTD	KNY	BuShips
ND50-1015.1 to .36	3202	Miscellaneous design data for Japanese warships.	NTD	KNY	BuShips
ND50-1016	3153	Machinery arrangements of various Japanese naval vessels.	KNY	KNY	BuShips
ND50-1017	3154	Machinery layout of several Japanese naval vessels.	KNY	KNY	BuShips
ND50-1018	3155	Plan of main steam stop valve.	NTD	NTD	BuShips
ND50-1019	3156	Plan of main steam stop valve.	NTD	NTD	BuShips
ND50-1020	3157	Plan of main steam stop valve.	NTD	NTD	BuShips
ND50-1021	3158	Plan of float-control valve.	NTD	NTD	BuShips
ND50-1022	3159	Schematic diagram of distilling plant.	NTD	NTD	BuShips
ND50-1023	3160	Print of name-plate data of distilling plant.	NTD	NTD	BuShips
ND50-1024.0 to .2	3161	Piping plans: Engine rooms, UNRYU Class (CV) and NACHI Class (CA).	NTD	YNY	BuShips
ND50-1025.0 to .1	3162	Piping plans: Boiler rooms, UNRYU Class (CV). New construction machinery trials: UNRYU Class (CV).	NTD	YNY	BuShips
ND50-1026	3163	Machinery design requirements: YAMATO (BB).	NTD	NTD	BuShips
ND50-1027	3164	Machinery design requirements: TERUTSUKI Class (DD).	NTD	NTD	BuShips
ND50-1028	3166	Machinery design requirements: MATSU Class (DE).	NTD	NTD	BuShips
ND50-1029	3167	Machinery design requirements: KAGERO Class (DD).	NTD	NTD	BuShips
ND50-1030	3168	Machinery design requirements: SHIMAKAZE (DD).	NTD	NTD	BuShips
ND50-1031	3169	Machinery design requirements: UNRYU Class (CV).	NTD	NTD	BuShips
ND50-1032.0 to .5	3170	Machinery design requirements: new construction machinery trials, (Vol. I and II), arrangements plans: MOGAMI Class (CA).	NTD	NTD	BuShips
ND50-1033	3171	Piping plans: Piping outside machinery spaces, YAMATO Class (BB).	NTD	NTD	BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1034	3172	Piping plans: Boiler rooms, YAMATO Class (BB).	NTD	NTD	BuShips
ND50-1035	3173	Piping plans: Engine rooms, YAMATO Class (BB).	NTD	NTD	BuShips
ND50-1036.0 to .2	3174	Piping plans: Engine rooms and boiler rooms, ATAGO Class (CA). New construction machinery trials: ATAGO Class (CA).	NTD	YNY	BuShips
ND50-1037.0 to .2	3175	Piping plans: Boiler rooms, AGANO Class (CL). New construction machinery trials: AGANO Class (CL).	NTD	YNY	BuShips
ND50-1038	3176	Piping plans: Engine rooms, AGANO Class (CL).	NTD	YNY	BuShips
ND50-1039.0 to .1	3177	Schematic diagrams of piping systems in boiler rooms OYODO (CL). Speed, RPM, hp, fuel consumed and other data from trials: OYODO (CL).	NTD	NTD	BuShips
ND50-1040	3178	Piping plans: Engine rooms, OYODO (CL).	NTD	NTD	BuShips
ND50-1041.0 to .1	3179	Piping plans: Boiler rooms, TERUTSUKI Class (DD). New construction machinery trials: TERUTSUKI Class (DD).	NTD	NTD	BuShips
ND50-1042	3180	Piping plans: Engine rooms, TERUTSUKI Class (DD).	NTD	NTD	BuShips
ND50-1043.0 to .1	3181	Piping plans: KAGERO Class (DD). New construction machinery trials: KAGERO Class (DD).	NTD	NTD	BuShips
ND50-1044.0 to .1	3182	Piping plans: Boiler rooms, SHIMAKAZE (DD). New construction machinery trials: SHIMAKAZE (DD).	NTD	NTD	BuShips
ND50-1045.0 to .1	3183	Piping plans: MATSU Class (DE). New construction machinery trials: MATSU Class (DE).	NTD	NTD	BuShips
ND50-1046	3184	New construction machinery trials: YAMATO Class (BB).	NTD	YNY	BuShips
ND50-1047	3185	Piping plans: Engine rooms, NAGATO Class (BB).	NTD	YNY	BuShips
ND50-1048	3186	Piping plans: Boiler rooms, NAGATO Class (BB).	NTD	YNY	BuShips
ND50-1070	3228	Navy specifications on rubber covered wire.	NM	K	BuShips
ND50-1071	3229	Specifications for voltage regulators.	NM	NEC	BuShips
ND50-1072	3230	Specifications on electrical instruments.	NM	NEC	BuShips
ND50-1073	3231	Specifications on DC motors.	NM	SEC	BuShips
ND50-1075	3233	Application chart for DC motor starters and controllers.	MEC	MEC	BuShips
ND50-1076	3234	Specifications for turbo-generators.	NM	SEC	BuShips
ND50-1077	3235	Miscellaneous specifications on diesel generators.	NM	SEC	BuShips
ND50-1078	3236	Specifications on dead-front switchboards.	NM	NEC	BuShips
ND50-1079	4529	Diagram: Control, metering, and powering systems, TAIHO (CV).	NM	K	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1080.1 to .2	3238	Manufacturer's test report: 450 volt AC circuit breaker.	SEC	NM	BuShips
ND50-1082	3239	Instruction book: Destroyer generators and switchboard.	FEC	K	BuShips
ND50-1083	3240	Instruction book: Type NF Circuit-breaker.	MEC	K	BuShips
ND50-1084	3242	Miscellaneous specifications on circuit equipment (materials, finishes, nameplates, etc.).	YNY	NEC	BuShips
ND50-1085	3241	Miscellaneous specifications on circuit-breakers, connection boxes, switches, transformers, finishes, condensers, bakelite.	KNY	NEC	BuShips
ND50-1086	3243	Miscellaneous specifications on switches, connection boxes, fuses, resistors.	NM	NEC	BuShips
ND50-1087.1 to .2	3244	Front and side views: 800 Ampere DC Air Circuit Breaker, Carbon Type.	NEC	NEC	BuShips
ND50-1089	3245	400 Ampere, 450 volt AC Air Circuit-Breaker, Drawout Type.	MEC	MEC	BuShips
ND50-1140	3146	Documents dealing with submarine batteries, torpedoes, radio equipment, and general submarine characteristics.	?	S	WDC (Shipped by ComSubRon 13)
ND50-1141	3147	Documents dealing with ship's electrical equipment and radar. Submarine hull plans. Miscellaneous scientific works.	?	S	WDC (Shipped by ComSubRon 13)
ND50-1142	3148	Submarine hull, engine, and electrical plans.	?	S	WDC (Shipped by ComSubRon 13)
ND50-1143	3145	Model experiments on elastic stability of submarine pressure hulls.	TOK	?	WDC
ND50-1144	3144	Model experiments on the elastic stability of closed and cross-stiffened circular cylinders under uniform external pressure.	TOK	?	WDC
ND50-1145	3143	Approximate method of calculation of collapsing pressure of thin cylindrical, conical, and spherical shells.	TOK	?	WDC
ND50-1146	3142	Approximate method of calculating the collapsing pressure of thin cylindrical, conical, and spherical shells with uniform	SG	?	WDC
ND50-1147.1 to .3	3564	Blueprints: I-16 Class (SS).	KNY	?	BuShips
ND50-1148	3141	Submarine trial data.	?	?	WDC
ND50-1149.1 to .2	3565	Blueprints: I-36 Class (SS).	YNY	?	BuShips
ND50-1150.1 to .2	3566	Blueprints: I-176 Class (SS).	YNY	?	BuShips
ND50-1151	3567	Blueprints: I-361 Class (SS).	NTD	?	BuShips
ND50-1152.1 to .4	3568	Blueprints: I-400 Class (SS).	NTD	?	BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1153.1 to .2	3569	Blueprints: RO-35 Class (SS).	NTD	?	BuShips
ND50-1154	3570	Blueprints: HA-101 Class (SS).	NTD	?	BuShips
ND50-1155	3571	Blueprints: HA-201 Class (SS).	NTD	?	BuShips
ND50-1156.1 to .21	3572	Blueprints: Airplane crane, I-400 Class (SS).	NTD	?	BuShips
ND50-1157	3573	Blueprints: I-351 Class (SS).	NTD	?	BuShips
ND50-1158	3574	Blueprints: Airplane catapult for submarines.	?	T	BuShips
ND50-1159.1 to .32	3283	Torpedo record books.	?	Y	WDC (Shipped by JICPOA)
ND50-1160.1 to .23	3284	Instruction books (submarine equipment).	?	Y	WDC (Shipped by JICPOA)
ND50-1161.1 to .27	3285	Torpedo firing doctrine tables.	?	Y	WDC (Shipped by JICPOA)
ND50-1162.1 to .27	3286	Torpedo firing angle charts.	?	Y	WDC (Shipped by JICPOA)
ND50-1163.1 to .8	3287	Torpedo firing problem tables.	?	Y	WDC (Shipped by JICPOA)
ND50-1164.1 to .2	3288	Blueprints: Electronic motored floating mine (powder filling device and battery).	?	Y	WDC (Shipped by JICPOA)
ND50-1165.1 to .3	3289	Blueprints: Torpedo batteries.	?	Y	WDC (Shipped by JICPOA)
ND50-1166.1 to .28	3290	Blueprints: Submarine storage batteries.	?	Y	WDC (Shipped by JICPOA)
ND50-1167.1 to .21	3291	Blueprints: Submarine secondary batteries.	?	Y	WDC (Shipped by JICPOA)
ND50-1168.1 to .16	3292	Blueprints: Submarine miscellaneous batteries.	?	Y	WDC (Shipped by JICPOA)
ND50-1169.1 to .16	3293	Blueprints: Miscellaneous submarine electrical plans.	?	Y	WDC (Shipped by JICPOA)
ND50-1170.1 to .10	3294	Blueprints: Midget submarines.	?	Y	WDC (Shipped by JICPOA)
ND50-1171.1 to .12	3295	Miscellaneous documents on submarines.	?	Y	WDC (Shipped by JICPOA)
ND50-1172.1 to .97	3296	Design, construction, and assembly of various submarine equipment, instruments, and aids.	?	Y	WDC (Shipped by JICPOA)
ND50-1177	3246	1000 Ampere, 450 Volt AC Air Circuit-breaker, Drawout Type.	MEC	MEC	BuShips
ND50-1178	3247	Front, rear, and side views: After switch-board for submarines.	MEC	MEC	BuShips
ND50-1179	3248	Front and side views: Generator and bus-tie control panels.	MEC	MEC	BuShips
ND50-1180	3249	Switchboard for small destroyer.	NEC	NEC	BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1181	3250	Front and side views: Switchboard for escort vessel.	NEC	NEC	BuShips
ND50-1182	3251	Wiring diagram: After main switchboard for HATSUKAZE (DD).	NEC	NEC	Enclosure to report
ND50-1183	3252	Table of current-carrying capacity and diameter of various sizes of wire and cable.	NM	NM	BuShips
ND50-1184	3253	Standard drawings of 450 volt AC circuit-breakers manufactured by Nisshin, Fuji, Hitachi, Shibaura, and Mitsubishi Companies.	NM	NM	BuShips
ND50-1185	3254	Oscillograms of 800 KVA, 450 Volt, Three-phase, 60 Cycle AC Generator.	SEC	NM	BuShips
ND50-1195.1 to .7	3297	Miscellaneous documents on submarines.	?	Y	WDC (Shipped by JICPOA)
ND50-1216	3282	Specifications for examining and testing materials.	NM	?	WDC
ND50-1313	4275	Model tests on strength of submarine hulls against underwater explosions.	NTL	NTL	WDC
ND50-1314	4276	Experiments on watertight ready-use lockers for submarine ammunition.	YOD	Y	WDC
ND50-1315	4277	Record of bridge construction: ASHIGARA (CA).	YOD	NTL	WDC
ND50-1316	4278	Report on experiments on effect of depth on power of explosives.	KNY	Y	WDC
ND50-1317	4279	Comparative table of battleship bulges.	?	T	WDC
ND50-1318.1 to .2	4280	Underwater explosions (Vol. I and II).	NPD2	Y	WDC
ND50-1319	4281	Strength of bulge of first-line ships.	NTD	T	WDC
ND50-1320	4282	Research on armor plate as protection against torpedo explosions.	?	T	WDC
ND50-1378.1 to .8	4079	Drawings: Japanese public address equipment for naval vessels.	NEC	NEC	BuShips
ND50-1379	4083	Microphone plans for general defense and engineers announcing system.	NEC	NEC	BuShips
ND50-1380.1 to .2	4082	Specifications: Mark 4 and Mark 5 Models 201, 202, 203, and 204 Public-address Systems.	NTD	SNY	BuShips
ND50-1381.1 to .2	4081	Manual: Mark 4 Model 1 Loudspeaker System (No. 3257, Sections I and II).	NEC	KAW	BuShips
ND50-1382	4080	Instruction book: Model 201 and Model 202 Public-address Systems.	NEC	NEC	BuShips
ND50-1393.4 to .12	4173	Blueprints: Landing craft and other vessels used in amphibious warfare.	TMI	TMI	ComPhib for PacFlt
ND50-1450	4458	General arrangement: 14m Landing Craft.	NTL	YNY	BuShips

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1451	4459	Spiral propeller for 14m Landing Craft.	PS	YNY	BuShips
ND50-1452	4460	Blade propeller for 14m Landing Craft.	PS	YNY	BuShips
ND50-1453	4461	General arrangement: 10m Landing Craft.	NTD	YNY	BuShips
ND50-1454	4462	Turbine explanation manual.	YNY	YNY	BuShips
ND50-1455	4463	Plans and sections: Second-class Transport (turbine).	NTD	YNY	BuShips
ND50-1456	4464	Structural sections: Second-class Transport.	KNY	YNY	BuShips
ND50-1457	4465	Leading particulars: Second-class Transport (diesel).	KNY	YNY	BuShips
ND50-1458	4466	Deck plans and sections: Second-class Transport (diesel).	YNY	YNY	BuShips
ND50-1459	4467	Leading particulars: First-class Transport.	PS	YNY	BuShips
ND50-1460	4468	General arrangement of decks: First-class Transport.	PS	YNY	BuShips
ND50-1461	4469	Midship section: First-class Transport.	PS	YNY	BuShips
ND50-1462	4470	Leading particulars: KUMANO MARU.	IJA	YNY	BuShips
ND50-1463	4471	Deck plan: KUMANO MARU.	PS	YNY	BuShips
ND50-1464	4472	Midship section: KUMANO MARU.	PS	YNY	BuShips
ND50-1465	4473	No. 1 High-speed Supply Craft.	ATL3	YNY	BuShips
ND50-1900	4610	Second report on pitting of gear teeth.	NTL	NB	BuShips
ND50-1901	4611	First report on pitting of gear teeth.	NTL	NB	BuShips
ND50-1902	4612	Test of propeller-type circulating pump.	HNY	SNY	BuShips
ND50-1903	4613	Research report on pitting of gear teeth.	?	NB	BuShips
ND50-1904.1 to .15	4614	Assemblies and detail drawings of propulsion turbines for AKITSUKI (DD).	MNY	SNY	BuShips
ND50-1905.1 to .9	4620	Assemblies and part of detail drawings of propulsion turbines for YAMATO (BB).	KNY	KNY	BuShips
ND50-1906.1 to .17	4615	Assemblies of propulsion turbines and reduction gears for KATSURAGI (CV).	KNY	T	BuShips
ND50-1907.1 to .35	4616	Assemblies and detail drawings of propulsion gears of AKITSUKI (DD).	NTD	SNY	BuShips
ND50-1908.1 to .21	4617	Assemblies and detail drawings of 270mm auxiliary turbine and gear.	TS	SNY	BuShips
ND50-1909.1 to .8	4618	Assemblies of auxiliary turbines and gears for condensate, fuel oil, circulating, and feed pumps, and for blower.	HNY	SNY	BuShips
ND50-1910.1 to .6	4619	Assemblies of main oil cooler, feed pump, circulating pump, air ejector, condensate pump and blower.	PS	SNY	BuShips
ND50-1920	4625	Standards of electric light signaling equipment.	SNY	K	WDC
ND50-1921.1 to .2	4626	Assembly: Type 4 Model 2 Switch Box.	SCC	K	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1922.1 to .3	4627	Blueprints: Sound-powered telephones.	SCC	K	WDC
ND50-1923	4628	Assembly: Type 4 Model 2 Telephone.	SCC	K	WDC
ND50-1924.1 to .63	4657	Blueprints: Shipboard electrical equipment.	SNY	S	WDC
ND50-1950.1 to .20	4649	Blueprints: Boilers, YAMATO (BB).	KNY	KNY	BuShips
ND50-1951.1 to .84	4648	Blueprints: Steam propulsion machinery, AKITSUKI (DD).	SNY	SNY	BuShips
ND50-1952.1 to .71	4650	Results of trial acceptance runs.	NM	NB	BuShips

JAPANESE SUICIDE CRAFT

S-02

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-0038	4312	Specifications for water-proof glue used in construction of suicide boats.	?	KNY	WDC

REPORTS OF DAMAGE TO JAPANESE WARSHIPS

S-06

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-0007	4304	Bombing damage to warships in KURE Harbor.	KNY	KNY	WDC

GENERAL ARRANGEMENT AND CAPACITY PLANS OF JAPANESE STANDARD TYPE MERCHANT SHIPS

S-12

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1393.1 to .3	4173	Blueprints: KUMANO MARU, SETTSU MARU, HYUGA MARU.	TMI	TMI	WDC
ND50-1501.1 to .7	4499	Blueprints: Type A Ships.	VS	SCA	WDC
ND50-1502.1 to .4	4500	Blueprints: Type B Ships.	VS	SCA	WDC
ND50-1503.1 to .4	4501	Blueprints: Type C Ships.	VS	SCA	WDC
ND50-1504.1 to .5	4502	Blueprints: Type D Ships.	VS	SCA	WDC
ND50-1505.1 to .5	4503	Blueprints: Type E Ships.	VS	SCA	WDC
ND50-1506.1 to .4	4504	Blueprints: Type F Ships.	VS	SCA	WDC
ND50-1507.1 to .4	4505	Blueprints: Type K Ships.	VS	SCA	WDC
ND50-1508.1 to .4	4506	Blueprints: Type TL Ships.	VS	SCA	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1509.1 to .5	4507	Blueprints: Type TM Ships.	VS	SCA	WDC
ND50-1510.1 to .6	4508	Blueprints: Type TS Ships.	VS	SCA	WDC
ND50-1511.1 to .12	4509	Blueprints: Type 2A Ships.	VS	SCA	WDC
ND50-1512.1 to .4	4510	Blueprints: Type 2D Ships.	VS	SCA	WDC
ND50-1513.1 to .11	4511	Blueprints: Type 2E Ships.	VS	SCA	WDC
ND50-1514.1 to .9	4512	Blueprints: Type 2TL Ships.	VS	SCA	WDC
ND50-1515.1 to .4	4513	Blueprints: Type 2TM Ships.	VS	SCA	WDC
ND50-1516.1 to .3	4514	Blueprints: Type R Ships.	VS	SCA	WDC
ND50-1517.1 to .6	4515	Blueprints: Type TAKATSU MARU Ships.	VS	SCA	WDC
ND50-1518	4516	Wartime standard ship specifications of Japanese merchant vessels.	NTD	NTD	WDC

JAPANESE SUBMARINE OPERATIONS

S-17

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1206	3278	Transport and supply by submarines.	NSS	?	WDC

JAPANESE SUBMARINE EQUIPMENT

S-19

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND10-2000	3071	Plans: HA-201 (SS).	?	SNY	WDC
ND22-0005.1 to .2	4300	Statistics on I-351, I-56, I-400, I-40 (SS) and on sub chasers and patrol boats.	?	KNY	WDC
ND22-0013	4307	Fuel load conditions: I-400 (SS).	?	KNY	WDC
ND22-0039	4313	Blueprint: Submarine hanging apparatus.	?	KNY	WDC
ND50-1196.1 to .6	3536	Miscellaneous plans on piping arrangements of automatic balancing control apparatus.	SNY	SNY	WDC

JAPANESE MINESWEEPING GEAR AND EQUIPMENT

S-28

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1361.1 to .4	4397	Training pamphlets on minesweeping.	?	T	WDC
ND50-1362	4398	Method of determining impact point of mines	YNY	T	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1363	4399	Notebooks of Comdr. TADENUMA (microfilm).	A	T	WDC
ND50-1364	4400	Summary of mines.	YNY	T	WDC
ND50-1365	4401	Essential details of mine sweeping gear.	YNY	T	WDC

JAPANESE SHIPS - MISCELLANEOUS ITEMS

S-40

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-1013	4318	Standards of materials (metals, rubber, etc.).	KNY	KNY	WDC
ND25-0001	3033	Tests and examination regulations Shipbuilding, ordnance, and engine materials.	NM	YWNMC	WDC
ND25-0002	3026	Navy specifications.	NM	?	WDC
ND25-0022	3001	Material specifications (addenda and corrections to basic publications).	NTD	NTD	WDC
ND25-0037	3018	Hard chrome plating.	PB	PB	WDC
ND50-1216	3282	Specifications for examining and testing materials.	NM	?	WDC

JAPANESE NAVY - DIESEL ENGINES

S-42

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-1011	4316	Handling instructions: Type 22 Mark 22 Model 10 Diesel Internal Combustion Engine.	?	KNY	WDC
ND22-1012	4317	Manual: Type 51 Model C Diesel Internal Combustion Engine.	NTD	KNY	WDC
ND50-1090.1	3053	Test stand report: Model 51-6 Diesel Engine.	TEW	YNY	WDC
ND50-1090.2	3054	Blueprints: Model 51-10 Diesel Engine.	NM	NM	WDC
ND50-1091	3055	Assembly drawing: Experimental compound diesel engine.	MSC	MSC	Enclosure to report
ND50-1092	3051	Catalog: Solid-injection diesel engines.	IIW	IIW	WDC
ND50-1093	3050	Catalog: Niigata diesel and semi-diesel engines.	NIW	NIW	WDC
ND50-1094	3023	Catalog: Kobe heavy oil marine engines.	KEW	KEW	WDC
ND50-1095	3049	Catalog: Mitsubishi diesel engines.	MSC	MSC	WDC
ND50-1096	3048	Catalog: Diesel engines.	HIW	HIW	WDC
ND50-1097	3047	Marine trial run data.	FSW	FSW	WDC
ND50-1098	3046	Automotive diesels.	DAIC	DAIC	WDC
ND50-1099	3045	Catalog: Diesel engines.	KDI	KDI	WDC
ND50-1100.1	3056	Blueprints: ZC 707 20 Cylinder Experimental Engine.	TEW	TEW	WDC
ND50-1100.2	3057	Blueprints: ZB 35 Single-cylinder Experimental Engine.	TEW	TEW	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1100.3	3058	Report on ZB 35 Single-cylinder Engine.	TEW	TEW	WDC
ND50-1100.4	3059	Detail drawings: ZC 707 20 cylinder Experimental Engine.	TEW	TEW	WDC
ND50-1100.5	3044	Assembly drawings: V-12 Air-cooled Pre-combustion Diesel Engine.	TEW	TEW	WDC
ND50-1100.6	3043	Assembly drawings: V-12 Air-cooled Direct-injection Diesel Engine.	TEW	TEW	WDC
ND50-1100.7	3060	Test data: ZB 35 Single-cylinder Experimental Engine.	TEW	TEW	Enclosure to report
ND50-1101.1	3041	Blueprints: V-12 Water-cooled Diesel Engine.	HC	HC	WDC
ND50-1101.2	3042	Blueprints: V-12 Air-cooled Diesel Engine.	HC	HC	WDC
ND50-1102	3052	Substitute materials. Engineering standard rules.	SNAJ	MSC	WDC
ND50-1103	3086	Model 61 Experimental Diesel Engine.	EES	EES	WDC
ND50-1104	3077	Model 63 Diesel Engine and experimental versions.	EES	EES	WDC
ND50-1105	3072	Blueprints: Model 62 Experimental Engine.	EES	EES	WDC
ND50-1106	3064	Blueprints: Model 13 Diesel Engine.	EES	EES	WDC
ND50-1107	3062	Blueprints: Diesel engines.	EES	EES	WDC
ND50-1108	3063	Test report: Electromagnetic type kinetic bend testing device.	EES	EES	WDC
ND50-1109	3073	Blueprints and test data: Model 22 Engine.	KNECD	EES	WDC
ND50-1130	3084	Blueprints and test data: Model 2 Engine.	HNECD	EES	WDC
ND50-1131	4540	Complete blueprints: ZB 35 Single-cylinder Experimental Diesel Engine.	MTEC	MTEC	WDC
ND50-1132.1 to .4	4541	Complete blueprints: ZCB 354 10 Cylinder Experimental Diesel Engine.	MTEC	MTEC	WDC
ND50-1133.1 to .9	4542	Complete blueprints: ZC 707 20 Cylinder Experimental Diesel Engine.	MTEC	MTEC	WDC

JAPANESE NAVAL VESSELS - OWN SHIPS NOISE

S-43

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND21-6258	3213	Standard types and sizes of rubber shock absorbers.	NTL	YNY	WDC
ND21-6260	3212	Annals of the meeting on methods of installing rubber shock absorbers on ships afloat.	NTL	YNY	WDC
ND22-0042	4315	Sound-absorbent paint.	?	KNY	WDC

ENCLOSURE (D), continued

JAPANESE NAVY PAINTS

S-59

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-0004	4667	Instructions for flight-deck paints.	?	K	WDC
ND22-0010	4668	Research on ship paints.	?	K	WDC
ND22-0041	4661	Various ship paint specifications.	?	K	WDC
ND50-1225	4084	Ship painting instructions.	IJN	Y	BuShips
ND50-1226	4086	Japanese Navy paint formulas.	?	Y	BuShips
ND50-1227	4085	Tests and specifications for Japanese Navy paints.	IJN	Y	BuShips

WELDING IN JAPANESE NAVAL CONSTRUCTION

S-81(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1110.1 to .4	4201	Firecracker method of welding.	NTD	MB	BuShips
ND50-1111	4202	Practical application of welding to navy surface vessels.	NTD	KNY	BuShips
ND50-1112.1 to .2	4204	Research on mild steel coated Mark 1 and Mark 2 Electrodes.	KNY	KNY	BuShips
ND50-1113.1 to .3	4203	Welding to armor plate.	KNY	K	BuShips
ND50-1114	4205	Welding symbols and types of connections.	KNY	K	BuShips
ND50-1115	4206	Welding standards.	YNY	S	BuShips
ND50-1116	4207	Experiments on welding and riveting.	KNY	S	BuShips
ND50-1117	4208	Temporary specifications for mild-steel electrodes.	NM	K	BuShips
ND50-1119	4209	Semi-automatic welding machine.	KNY	K	BuShips
ND50-1120	4210	Twin-rod multiphase welding.	KNY	K	BuShips
ND50-1121	4211	Research on large-diameter electrodes.	?	K	BuShips
ND50-1122	4212	Flame gouge.	KNY	K	BuShips
ND50-1123.1 to .3	4365	Articles on welding.	KNY	NTL	BuShips
ND50-1124.1 to .6	3641	Proceedings of Japanese technical bodies: Papers dealing with electric welding.	TI	S	BuShips
ND50-1125.1 to .10	3642	Welded construction methods.	VS	NTL	BuShips
ND50-1126.1 to .11	3640	Welding.	YNY	NTL	BuShips
ND50-1127.1 to .6	3643	Welding.	KNY	NTL	BuShips
ND50-1128.1 to .2	4215	Tests of portable X-ray apparatus used for examination of welds. Rules for inspection of welds.	KNY	T	BuShips
ND50-1129	4214	Radiography in the German Navy	?	K	BuShips

ENCLOSURE (D), continued

JAPANESE MODEL BASINS

S-83(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-1214	4321	Measurements of hull vibration: KUMANO (CA).	KNY	KNY	WDC
ND50-1290.1 to .12	3558	Reports on rudder and turning model tests performed at MEGURO Model Basin.	JSS	T	David Taylor Model Basin
ND50-1291	3586	Personel work book of Technical Research Administrator IZUBUCHI, former Director of MEGURO Model Basin.	A	NTL	David Taylor Model Basin
ND50-1292	3575	Research on resistance of high-speed boats.	NTL	NTL	David Taylor Model Basin
ND50-1293	3589	Research on resistance of round-bilge type high-speed boats.	NTL	NTL	David Taylor Model Basin
ND50-1294.1 to .2	3590	On the form of bottom of the sea bus. Model experiment on the dynamic of forces acting on the ship's bottom in a rough sea.	HAS	NTL	David Taylor Model Basin
ND50-1295	3588	Report of findings of ship-testing laboratory.	NTL	NTL	David Taylor Model Basin
ND50-1296.1 to .2	3587	Calculation sheets for Ship Model 300. Test results and plans.	MC	NTL	David Taylor Model Basin
ND50-1298.1 to .8	3560	Trial data, offsets, ship's data book: SHIGURE (DD).	NTD	YNY	David Taylor Model Basin
ND50-1299.1 to .6	3562	Stress and vibrations in SUZUYA (CA).	YNY	YNY	David Taylor Model Basin
ND50-1300.1 to .9	3561	Turning circle trial data: SUZUYA (CA), NOSHIRO (CL), MUTSU (BB), OYODO (CL), UNRYU (CV), TAKAO (CA), HA-201 (SS), RO-100 (SS), TAKE (DD).	YNY	YNY	David Taylor Model Basin
ND50-1301.1 to .4	3559	Propeller drawings: SHINANO (CV), ZUIKAKU (CV), UNRYU (CV), MATSU (DD).	YNY	YNY	David Taylor Model Basin

JAPANESE DAMAGE CONTROL

S-84(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND10-2101.1 to .3	4092	Flooding calculation diagram: SHINANO (CV) (two appendices).	YNY	SNY	BuShips
ND10-2102	4091	Explanation of quick flooding and pumping apparatus for IBUKI (CV).	SNY	SNY	BuShips
ND10-2103	4090	Diagram: Emergency flooding countermeasurements for ISE (BB).	KNY	K	BuShips
ND10-2104	4089	200mm emergency valve attached to oil pressure cylinder.	NTD	NTD	BuShips
ND10-2105	4088	Views on flooding when ship is damaged.	NTD	NTD	BuShips

ENCLOSURE (D), continued

LEAD-ACID STORAGE BATTERIES USED BY THE JAPANESE NAVY

S-92(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1140	3146	Documents dealing with submarine batteries, torpedoes, radio equipment, and general submarine characteristics.	?	S	WDC (Shipped by ComSubRon 13)

TENTH MILITARY EXPERIMENTAL STATION, MUROTSU, HONSHU, JAPAN

S-93(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-1215	3280	Report of investigations on marine engines, supply ships, escort vessels, suicide craft, submersible gun mounts, landing craft, etc.	TMI	TMI	BuShips
ND50-1217	3281	Report of investigations carried on by Tenth Military Institute during 1944.	TMI	TMI	BuShips

* * * * *

SPECIAL TARGETS

Legend

AAHQ	Army Air Headquarters
AM	Army Ministry
AOHQ	Army Ordnance Headquarters
ASA	T. ASADA
ATL3	Third Army Technical Laboratory
BMT	Bureau of Mines, TOKYO
BNIHQ	Headquarters, Bureau of Naval Installations
CMO	Central Meteorological Observatory, TOKYO
DSYIC	Documents Section, Yokosuka Intelligence Center
EARI	East Asia Research Institute
ECA	Electric Control Association, TOKYO
ERI	Earthquake Research Institute, TOKYO
EWTC	Electric Wire Technical Committee
FEIC	Furukawa Electrical Industries Company
FES	Fisheries Experimental Station, FUSAN, Korea
FIU	Fukuoka Imperial University
FPCRI	Furukawa Physics and Chemistry Research Institute, TOKYO
FSSOP	Fushun SMR Shale Oil Plant
HIU	Hokkaido Imperial University
HO	Hydrographic Office, TOKYO
HOS	Professor HOSHINO, Tokyo Imperial University
IFES	Imperial Fisheries Experiment Station
IFI	Imperial Fisheries Institute
IFI*	Imperial Fuel Institute, KAWAGUCHI
IJNHO	Imperial Japanese Navy, Hydrographic Office
ILO	International Latitude Observatory, MIZUSAWA
IMO	Imperial Marine Observatory
IPCR	Institute of Physical and Chemical Research, TOKYO

JEIC	Japan Electrical Industry Company
JFI	Japanese Fisheries Institute
JNIB	Japan Nickel Information Bureau
JRC	Japan Refining Company, KUDAMATSU
JSSF	Japanese Society of Scientific Fisheries
KIU	Kyoto Imperial University
KIU*	Kyushu Imperial University, FUKUOKA
KNY	Kure Navy Yard
KPC	Kansai Paint Company
KRC	Kobe Refining Company
KRCC	Kobe Refining Company, Chofu Branch
KRCM	Kobe Refining Company, Moji Branch
KSC	Kobe Steel Company
KSCC	Kobe Steel Company, Chofu Branch
MAK	Captain MAKINO, Bureau of Ship Construction
MB	Meiji Building
MGO	Mitsui Geophysical Observatory
MICA	Metal Industries Control Association
MIH	Dr. MIHARA
MOC	Mitsubishi Oil Company
MSC	Mitsubishi Shipbuilding Company
MSOC	Miike Synthetic Oil Company
MTB	Maritime Transportation Bureau, Ministry of Transportation and Communications
MTL7	Seventh Military Technical Laboratory, MATSUMOTO
MU	Lt. Comdr. MURI, IJN, Bureau of Naval Installations
NCEHQ	Navy Civil Engineering Headquarters
NDCPC	Navy Drawn Copper Control and Purchasing Cooperation
NFDO	Naval Fuel Depot, OFUNA
NIMC	Nippon Iron Manufacturing Company
NIU	Nagoya Imperial University
NM	Navy Ministry
NOC	Nippon Oil Company
NOM	T. NOMITSU
NRC	National Research Council
NS	Nagasaki Shipyard, NAGASAKI
NTL	Navy Technical Laboratory
NTL2	Second Navy Technical Laboratory
OIU	Osaka Imperial University
OLL	Otsu Limnological Laboratory, Lake BIWA
OSJ	Oceanological Society of Japan
PB	Patents Bureau, TOKYO
PCSJ	Physico-Chemical Society of Japan
SAP	SAPPORO
SCI	Society of Chemical Industry
SCK	Ships Company of KATS[illegible]
S[illegible]	Shiraishi Foundat[illegible] Company, TOKYO
SN[illegible]	Sasebo Navy Yard
T	TOKYO
TIU	Tohoku Imp[illegible] University
TIU*	Tokyo Imperial University
TIW	Tomoe Iron Works, TOKYO
TMIS	Tohoku Metal Industries, SENDAI
TOC	Toa Oil Company
UCH	Lt. Comdr. UCHIDA, IJN
V	Various
VSS	Various Scientific Societies
YNY	Yokosuka Navy Yard
YOS	H. YOSHINAGA
YSW	Yawata Steel Works
YTI	Yawata Technical Institute
YWNMC	Yawata Works, Nippon Iron Manufacturing Company
?	Unknown

ENCLOSURE (D), continued

PHYSICAL CHEMISTRY RESEARCH IN JAPAN

X-01

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5550	4658	The afterglow spectrum of nitrogen: The near infra-red region.	IPCR	IPCR	BuShips
ND50-5551	4659	The arc spectrum of nitrogen (N_1), Part III: The intermediate region.	IPCR	IPCR	BuShips
ND50-5552	4660	The arc spectrum of mercury (Hg_1).	IPCR	IPCR	BuShips

JAPANESE ULTRA-VIOLET COMMUNICATION EQUIPMENT

X-03

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5838.1 to .6	4097	Construction details: Type II Army Photophone.	MTL7	MTL7	WDC
ND50-5839	4096	Blueprints: Details of Type III Navy Infra-red Communications Equipment and other infra-red equipment.	NTL2	NTL2	WDC
ND50-5841	4273	Infra-red navigational aid equipment.	ATL3	?	WDC
ND50-5842.1 to .2	4274	Experimental infra-red photography.	NTL	?	WDC
ND50-5843.1 to .5	4630	Ultra-violet light communications equipment.	ASA & YOS	OIU	WDC

JAPANESE OPTICS

X-05

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3611	3613	Shock-proofing optical ordnance.	YNY	YNY	WDC

JAPANESE GEOPHYSICAL RESEARCH

X-06

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5350.1 to .9	3837	Bulletin of Earthquake Research Sept. 1937; Dec. 1941 to Mar. 1944.	TIU*	TIU*	WDC
ND50-5351	3838	Seismology and Geophysics Bibliography for Japan, 1870-1923.	TIU*	TIU*	WDC
ND50-5352	3839	On the Polybasite of SANTOKU, Korea.	KIU	KIU	WDC
ND50-5353.1 to .2	3840	Reports on geophysical observations, April 1933 to June 1944.	MGO	MGO	WDC
ND50-5354	3841	Geophysics: Vol. 2, Oct. 1941.	KIU	KIU	WDC
ND50-5355	4216	Mechanical properties of soil.	ERI	NIU	WDC
ND50-5356	4480	A long-period seismograph for strong quakes.	TIU*	TIU*	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5357.1 to .2	4479	Strain seismograph. Tilting of earthquake waves and other short-period tilting movements (microfilms).	KIU	KIU	WDC
ND50-5358	4481	A note on the theory of the vertical-motion seismograph.	TIU*	TIU*	WDC
ND50-5359	4482	Construction of precision recording apparatus for seismograph.	TIU*	TIU*	WDC
ND50-5360	4483	New drive for seismograph drum.	TIU*	TIU*	WDC
ND50-5361	4484	Relative gravity measurements using long-range shortwave radio transmitter methods.	TIU*	TIU*	WDC
ND50-5362	4485	Dependence on amplitude of the oscillation period of gravity pendulum.	TIU*	TIU*	WDC
ND50-5363	4486	Changes in tilt at the time of the great Tottori earthquake.	?	KIU	WDC
ND50-5364	4488	Explosive activities of the volcano Asama and tilting of the earth's surface.	TIU*	TIU*	WDC
ND50-5365	4487	On volcanic activities and earth surface tilting.	TIU*	TIU*	WDC
ND50-5366	4489	Recent changes in area of base-line rhombus at MITAKA.	TIU*	TIU*	WDC
ND50-5367	4490	Secular deformations of base-line rhombus at MITAKA in relation to seismic activities in vicinity.	TIU*	TIU*	WDC
ND50-5368	4491	Geophysics: Vol. 5, No. 1.	KIU	KIU	WDC
ND50-5369	4492	Vertical displacements in regions markedly deformed.	TIU*	NIU	WDC
ND50-5370	4494	On prior indications of major earthquakes.	NIU	NIU	WDC
ND50-5371	4493	Theory of seismic waves and properties of elastic solid bodies (notes only).	CMO	CMO	WDC
ND50-5372	4495	Gravity anomalies and underground mass distribution.	TIU*	TIU*	WDC
ND50-5373	4496	Calculation of gravity as affected by undefined plane.	TIU*	TIU*	WDC
ND50-5374	4497	Results of releveling in TOKYO, 1940.	TIU*	NIU	WDC
ND50-5375	4498	Seismic prospecting on sea bottom.	TIU*	TIU*	WDC

EARTHQUAKE RESISTANT CONSTRUCTION IN JAPAN

X-12

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5200	3538	Observations of the damage to buildings in the IZU-SAGAMI area resulting from earthquakes.	JIA	TIU*	WDC
ND50-5201	3539	Observations of the damage to buildings resulting from North KANTO earthquake, September 1931.	JIA	TIU*	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5202	3540	Standards of design of concrete buildings.	JIA	JIA	WDC
ND50-5203	3541	Typical structural details.	JIA	JIA	WDC
ND50-5204	3542	Calculations of bending movements in rectangular frames subject to horizontal forces.	JIA	TIU*	WDC
ND50-5205	3543	Observations and recommendations on earthquake-resistant construction for standard wood frame dwellings.	JIA	JIA	WDC
ND50-5206	3544	Standard calculations for steel-frame structures.	JIA	JIA	WDC
ND50-5207	3545	Theory of vibrations and structures.	TIU*	TIU*	WDC
ND50-5208	3546	Study relating to vibrations along three dimensions of one-story structures of special shapes.	TIU* & AAHQ	TIU*	WDC
ND50-5209	3547	Study of vibrations of a one-story building frame: Part I.	JIA	TIU*	WDC
ND50-5210	3548	Study of vibrations of a one-story building frame: Part II.	JIA	TIU*	WDC
ND50-5211	3549	Study of vibrations of a one-story building frame: Part III.	JIA	TIU*	WDC
ND50-5212	3550	Study of vibrations of a one-story building frame: Part IV.	JIA	TIU*	WDC
ND50-5213	3551	Studies on the rigidity of the joints of rigid frames.	JIA	TIU*	WDC
ND50-5214	3552	Experiments with models in regard to changes in plasticity of rigid frames.	JIA	TIU*	WDC
ND50-5215	3553	Temperature stress on one-story rigid frames.	JIA	TIU*	WDC
ND50-5216	3554	Studies on dampened vibrations in buildings (Part I): Dampening effects in wooden structures.	JIA	JIA	WDC
ND50-5217	3555	Studies on dampened vibrations in buildings (Part II): Dampened vibration in reinforced concrete structures.	JIA	JIA	WDC
ND50-5218	3556	Studies on dampened vibrations in buildings (Part III): Effects of foundation condition on vibration period and modulus of dampening of rigid frame structures.	JIA	JIA	WDC
ND50-5219	3557	Studies on vibrations in buildings (Part IV): Dampened vibration of steel frame buildings.	JIA	JIA	WDC

JAPANESE METALLURGY

X-13

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND25-0001	3033	Tests and examination regulations: Ship-building, ordnance, and engine materials.	NM	YWNRC	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND25-0002	3026	Navy Specifications.	NM	YWNMC	WDC
ND25-0003	3032	Table of comparative specifications of principal common steel materials.	NM	YWNMC	WDC
ND25-0004	3034	Japanese aircraft specifications: Iron and steel.	?	YWNMC	Technical Air Intelligence
ND25-0005	3035	Specifications for special steels for aircraft.	YWNMC	YWNMC	Technical Air Intelligence
ND25-0006	3036	Chart of specifications for special steels for navy aircraft.	NM	YWNMC	Technical Air Intelligence
ND25-0007	3031	Statistics of Yawata Works.	NIMC	YWNMC	WDC
ND25-0008	3037	Statistics for Nippon Iron Manufacturing Company.	NIMC	YWNMC	USSBS
ND25-0009	3030	Report of important experimental research, 1943.	YTI	YWNMC	WDC
ND25-0010	3029	Report of important experimental research, 1944.	YTI	YWNMC	WDC
ND25-0011	3028	Description of Yawata Technical Institute facilities.	YWNMC	YWNMC	WDC
ND25-0012	3027	Report on experiments.	YWNMC	YWNMC	WDC
ND25-0013	3024	Army basic specifications (Metallurgical).	AOHQ	YWNMC	WDC
ND25-0014	3025	Army provisional specifications for metals.	AOHQ	YWNMC	WDC
ND25-0015	3038	Specifications for aircraft materials (copper and copper alloy).	AM & NM	KRCM	Technical Air Intelligence
ND25-0016	3019	Test heat and creep limits of heat-resisting steel.	YWNMC	YTI	WDC
ND25-0017	3020	Basic calculations charts of required amounts of new raw materials.	NDCPC	KRCC	WDC
ND25-0018	3022	Yearly production chart by types.	KRC	KRCC	WDC
ND25-0019	3021	Metallurgical research reports.	KRC	KRCC	WDC
ND25-0020	3039	Japanese aircraft specifications: Non-ferrous metals.	KSC	KSCC	Technical Air Intelligence
ND25-0022	3001	Material specifications (addenda and corrections to basic publications).	NTD	NTD	WDC
ND25-0028	3007	Anti-corrosive copper alloy.	PB	PB	WDC
ND25-0029	3008	Copper-iron-magnesium-aluminum alloy.	PB	PB	WDC
ND25-0030	3009	Anti-corrosive high-strength aluminum alloy.	PB	PB	WDC
ND25-0033	3012	Wear-proof alloy.	PB	PB	WDC
ND25-0034	3013	High-hardness alloy copper.	PB	PB	WDC
ND25-0035	3014	Gas turbine rocket.	PB	PB	WDC
ND25-0036	3017	High-temperature turbine blade.	PB	PB	WDC
ND50-3172.1 to .2	4662	Data on nitride steel and spring steel.	?	?	WDC

ENCLOSURE (D), continued

QUALITY OF JAPANESE ELECTRIC WIRES AND CABLES

X-14

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND25-0023	3002	Standard specifications.	EWTC	ECA	WDC
ND25-0024	3003	Wartime standard specifications for wire.	JEIC	ECA	WDC
ND25-0025	3004	Standard specifications of electric wire materials (annex).	BMT	BMT	WDC
ND25-0026	3005	Standard specifications.	JEIC	ECA	WDC
ND25-0027	3006	Standard specifications of electric wire materials.	MICA	BMT	WDC

JAPANESE HYDROGRAPHY

X-18

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5000	3087	Catalog of unclassified Japanese navigation charts and books.	IJNHO	HO	WDC
ND50-5002	3139	System of oceanographic observations.	IJNHO	HO	WDC
ND50-5004	3089	Manual for marine meteorological observations.	IJNHO	HO	WDC
ND50-5006	3090	Treatment of hydrographic charts and books.	IJNHO	HO	WDC
ND50-5008	3091	Textbook of Oceanography.	IJNHO	HO	WDC
ND50-5010	3092	Compilation of hydrographic charts and books.	IJNHO	HO	WDC
ND50-5012	3093	General Theory in Natural Geography.	IJNHO	HO	WDC
ND50-5014	3094	Manual of photography (for lithography).	IJNHO	HO	WDC
ND50-5016	3095	Method of reporting notices to mariners.	IJNHO	HO	WDC
ND50-5018	3096	Hydrographic Surveying, Vol. I.	IJNHO	HO	WDC
ND50-5020	3097	Hydrographic Surveying, Vol. II.	IJNHO	HO	WDC
ND50-5022	3098	Hydrographic Surveying, Vol. III.	IJNHO	HO	WDC
ND50-5024	3099	Method of cartography for charts.	IJNHO	HO	WDC
ND50-5026	3100	Method of spherical projection.	IJNHO	HO	WDC
ND50-5400	3279	Hydrographic Bulletin, No. 14.	IJNHO	HO	WDC
ND50-5900.1 to .2	3300	Research on the horizontal transmission of sound through seawater in the Pacific Ocean.	IJNHO	HO	HO
ND50-5901.1 to .2	3298	Index of Naval General Staff Charts and Basic Naval General Staff Charts, Sheets I and II.	IJNHO	HO	HO
ND50-5920	3299	Monthly Bulletin of Solar Phenomena: April to Nov. 1945	IJNHO	HO	WDC
ND50-5999.1 to .75	3933	Records of measurements of zenith distances of stars at the International Latitude Observatory.	ILO	ILO	USCGS

ENCLOSURE (D), continued

BOMBPROOF CONSTRUCTION IN JAPAN

X-31

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5220	3842	Vibration of various bodies in various media due to concussion.	JIA	JIA	WDC
ND50-5221	3843	Theoretical studies of bomb-resistant structures with simple supporting walls.	JIA	JIA	WDC
ND50-5222	3844	Studies of bomb resistant structures: Walls under impact.	JIA	JIA	WDC
ND50-5223	3845	Bomb resistant structures with walls freely supported at both ends.	JIA	JIA	WDC
ND50-5224	3846	Studies of concussion-resistant power of reinforced concrete walls.	JIA	JIA	WDC
ND50-5225	3847	Studies of reinforced concrete members subject to great forces.	JIA	JIA	WDC
ND50-5226	3736	Chart of detailed study of air defense walls for pump houses at building dock and dry dock No. 4.	NM	T	Enclosure to report
ND50-5227	3737	Typical section, tunnel revetment, TATEYAMA Airfield.	NM	T	Enclosure to report
ND50-5228.1 to .8	3848	Main caisson and explosion mat, underground headquarters, Japanese Navy Ministry.	SFC	MB	WDC
ND50-5229.1 to .6	3849	Entrances to underground headquarters, Japanese Navy Ministry.	SFC	MB	WDC

CAMOUFLAGE OF JAPANESE SHIPS AND NAVAL INSTALLATIONS

X-32

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5027	3138	Camouflage plans of Japanese aircraft carriers.	DSYIC	YNY	Enclosure to report
ND50-5028	3204	Diagrams of camouflage of KATSURAGI (CV).	SCK	T	WDC
ND50-5029	3205	Rules for camouflage concealment.	BNIHQ	T	WDC
ND50-5030	3206	Degree of brightness and standard color table for camouflage.	KPC	T	WDC
ND50-5031	3207	Instructions for protection of shipping and related notes.	MTB	T	WDC
ND50-5032	3208	Experiment on camouflage of aircraft carriers.	UCH	Y	WDC
ND50-5033	3209	Camouflage and concealment of naval vessels.	MAK	T	WDC
ND50-5034.1 to .6	3210	Camouflage of buildings against air raids.	HCS	T	WDC
ND50-5035	3211	Camouflage of naval shore installations.	MU	T	WDC

ENCLOSURE (D), continued

DESIGN OF JAPANESE STRUCTURES

X-33

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-0008	4305	3000 ton testing machine.	?	KNY	WDC
ND22-0012	4306	Fire-fighting soap: General description.	KNY	KNY	WDC
ND22-0016	4308	Arrangement of machine tools and other installations.	KNY	KNY	WDC
ND50-5299.1 to .9	4123	Information on No. 7 drydock, Sasebo Navy Yard.	SNY	MB	WDC
ND50-5300	3850	Layout of dry docks at Kure Navy Yard.	NCEHQ	MB	WDC
ND50-5301	3851	Specifications: No. 4 dry dock, Kure Navy Yard.	NCEHQ	MB	WDC
ND50-5302	3852	Chart: No. 4 dry dock, Kure Navy Yard.	NCEHQ	MB	WDC
ND50-5303	3853	Dock Manual: Kure Navy Yard dry docks.	NCEHQ	MB	WDC
ND50-5304	3854	Water intake and exhaust arrangements: No. 4 dry dock.	NCEHQ	MB	WDC
ND50-5305	3855	General chart of water mains: Kure Navy Yard.	NCEHQ	MB	WDC
ND50-5306	3856	Chart of magazine flooding and exhaust arrangements: No. 4 dry dock.	NCEHQ	MB	WDC
ND50-5307	3857	Chart of electric power system: Building dock and No. 4 dry dock.	NCEHQ	MB	WDC
ND50-5308	3858	Chart of oil and compressed air services for shipbuilding area.	NCEHQ	MB	WDC
ND50-5309	3859	Details of air raid protection for pump house, No. 4 dock, and building dock.	NCEHQ	MB	WDC
ND50-5310	3860	Chart of dockside cranes, No. 4 dock, and building dock.	NCEHQ	MB	WDC
ND50-5311	3861	Specifications: Shipbuilding dock.	NCEHQ	MB	WDC
ND50-5312	3662	General plan: Shipbuilding dock.	NCEHQ	MB	WDC
ND50-5313	3863	Details of fendering for shipbuilding dock.	NCEHQ	MB	WDC
ND50-5314	3864	Plan of oil and compressed air services, Part 2.	NCEHQ	MB	WDC
ND50-5315	3865	Manual: Kure Navy Yard dry docks.	NCEHQ	MB	WDC
ND50-5316	3866	Organization of departments, Sasebo Navy Yard.	NCEHQ	MB	WDC
ND50-5317	3867	Summary of work done during last year of war at Sasebo Navy Yard.	NCEHQ	MB	WDC
ND50-5318	3868	General plan of Sasebo Navy Yard.	NCEHQ	MB	WDC
ND50-5319	3869	Dock manual: Sasebo Navy Yard, dry docks.	NCEHQ	MB	WDC
ND50-5320	3870	Details of shipbuilding slips, Sasebo Navy Yard.	NCEHQ	MB	WDC
ND50-5321	3871	Information on No. 5 and 6 dry docks at Yokosuka Navy Yard.	NCEHQ	MB	Enclosure to report WDC
ND50-5322	3872	Plan: No. 1 floating dock, Kobe ship yards.	MSC	MB	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5323	3873	Plan: No. 2 floating dock, Kobe Shipyards.	MSC	MB	WDC
ND50-5324	3874	General layout and equipment plan: No. 3 floating dock, KOBE.	MSC	MB	WDC
ND50-5325	3875	Transverse section: No. 3 floating dock, Kobe Shipyard.	MSC	MB	WDC
ND50-5326	3876	General plan: No. 4 dock, Kobe Shipyard.	MSC	MB	WDC
ND50-5327	3877	General plan: No. 1 dock, Nagasaki Shipyard.	MSC	MB	WDC
ND50-5328	3878	General plan: No. 2 dry dock, Nagasaki Shipyard.	MSC	MB	WDC
ND50-5329	3879	General plan: No. 3 dry dock, Nagasaki Shipyard.	MSC	MB	WDC
ND50-5330	3880	Chart of compressed air system: Nagasaki Shipyard.	MSC	MB	WDC
ND50-5331	3881	Information on No. 1, 2, and 3 dry docks at Nagasaki Shipyard.	NCEHQ	MB	Enclosure to report
ND50-5332	3882	Diamond truss design.	TIW	MB	Enclosure to report
ND50-5333	3883	Steel erection details for skewarch hangar, Yokosuka Airfield	TIW	MB	WDC
ND50-5334	3884	Journal of the Japanese Institute of Architecture: August 1944.	JIA	MB	WDC

MAGNETIC DEVELOPMENT IN JAPAN DURING WORLD WAR II

X-34(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5040	3373	Experimental research on special magnetic and electrical properties of iron-silicon-nickel alloys.	TIU	TMIS	WDC
ND50-5041	3374	On the magneto-striction of iron-aluminum alloys and a new alloy, ALFER.	TIU	TIU	WDC
ND50-5042	3375	Magnetic and electrical qualitites of iron-silicon-aluminum magnetic alloys.	TIU	TMIS	WDC
ND50-5043	3376	Japan Nickel Review: Vol. 8, No. 4, Oct. 1940.	JNIB	?	WDC
ND50-5044	3377	Summary of process for manufacture of silicon-steel plate.	YSW	YWNMC	WDC
ND50-5045	3378	Report on investigation of cold-rolled steel.	TIU	MB	WDC
ND50-5046	3379	New high-permeability alloys of iron and nickel.	FEIC	FPCRI	WDC
ND50-5047	3380	MS study on heat treatment.	MIH	MB	WDC

ENCLOSURE (D), continued

JAPANESE WELDING STANDARDS

X-36(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND22-0020 to ND22-0028	3016	Documents on welding.	KNY	KNY	WDC
ND25-0021	3015	Binder of documents on welding.	V	NS	WDC
ND25-0031	3010	Covered welding rods.	PB	PB	WDC
ND25-0032	3011	Steelite welding.	PB	PB	WDC

JAPANESE FUELS AND LUBRICANTS

X-38(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND26-0004.1 to .31	4575	List of selected correspondence between Germany and the Mitsui Company.	MSOC	MSOC	WDC
ND26-0005.1 to .27	4576	Various reports on aviation gasoline.	NFDO	NFDO	WDC
ND26-0006.1 to .10	4577	Research reports on alcohol and its use as fuel.	NFDO	NFDO	WDC
ND26-0007.1 to .16	4578	Reports on research into diesel and boiler fuels.	NFDO	NFDO	WDC
ND26-0008.1 to .76	4579	Research reports on conversion of coal to oil.	NFDO	NFDO	WDC
ND26-0009.1 to .16	4580	Research reports on lubricating oils.	NFDO	NFDO	WDC
ND26-0010	4581	Reference on pine-root oil.	NFDO	NFDO	WDC
ND26-0011.1 to .26	4582	Kyushu Imperial University Technology Reports: Vol. XV, No. 1 to Vol. XIX, No. 3.	KIU*	KIU*	WDC
ND26-0012	4583	Work handbook for fuel.	NFDO	NFDO	WDC
ND26-0013.1 to .22	4584	Hydrocarbon research.	NFDO	NFDO	WDC
ND26-0014.1 to .44	4585	Reports on oil technology.	NFDO	NFDO	WDC
ND26-0015.1 to .30	4586	Detail drawings of Miike Synthetic Oil Company.	MSOC	MSOC	WDC
ND26-0016.1 to .10	4587	Research papers on lubricating oils.	MSOC	MSOC	WDC
ND26-0017.1 to .4	4588	Research papers on catalysts.	MSOC	MSOC	WDC
ND26-0018.1 to .2	4589	Miike Company research on pine oil.	MSOC	MSOC	WDC
ND26-0019.1 to .19	4590	Research on coal to oil manufacture.	MSOC	MSOC	WDC
ND26-0020	4591	Preparation of aviation gasoline from pine-root oil.	IFI*	IFI*	WDC
ND26-0021	4592	Explosive combustion of coal-dust fuel.	IFI*	IFI*	WDC
ND26-0022	4593	Synthesis of triptane.	IFI*	IFI*	WDC
ND26-0023.1 to .12	4594	Reports on coal hydrogenation.	IFI*	IFI*	WDC
ND26-0024.1 to .3	4595	Reports on FISHER-TROPSCH Process.	IFI*	IFI*	WDC
ND26-0025.1 to .4	4596	Reports on low-temperature carbonization.	IFI*	IFI*	WDC

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND26-0026.1 to .32	4597	Research on gasoline synthesis.	IPCR	KIU	WDC
ND26-0027.1 to .3	4598	Journal of Society of Chemical Industry.	SCI	KIU	WDC
ND26-0028.1 to .5	4599	Journal of Society of Chemical Industry.	SCI	KIU	WDC
ND26-0029.1 to .4	4600	Journal of Society of Chemical Industry.	SCI	KIU	WDC
ND26-0030.1 to .3	4601	Journal of Society of Chemical Industry.	SCI	KIU	WDC
ND26-0031	4602	Shale oil.	FSSOP	JRC	WDC
ND26-0032.1 to .9	4647	Research papers on catalytic cracking.	MOC, TOC, & NOC	TOC	WDC

REPORTS OF CENTRAL LABORATORY OF JAPANESE HOME INDUSTRY

X-39(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-3500	4557	Copper columns for pressure measurement.	NTL2	NTL2	WDC

OCEANOGRAPHY IN JAPAN

X-40(N)

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5051	4354	Oceanographical Investigations, Semi-annual Report: Nos. 66 to 71, Jan. 1941 to Oct. 1943.	IFES	IFES	HO
ND50-5052	4369	Journal of Imperial Fisheries Experiment Station: Nos. 10 to 13, March 1940 to March 1943.	IFES	IFES	HO
ND50-5053	4370	Fisheries Investigations, Supplementary Report: Nos. 7 to 9, March 1940 to March 1943.	IFES	IFES	HO
ND50-5054	4371	Monthly oceanographic charts: Jan. 1941 to Feb. 1944.	IFES	IFES	HO
ND50-5055.1 to .12	4372	Bulletin, Japanese Society of Scientific Fisheries: 1932 to 1943.	JSSF	IFI	HO
ND50-5056	4373	Journal of Imperial Fisheries Institute: 1940 to 1942.	JFI	IFI	HO
ND50-5057.1 to .2	4374	Annotation of Oceanographic Research: 1926 to 1929. Miscellaneous reprints.	IFI	IFI	HO
ND50-5058	4375	Oceanographic Investigations.	IFI	IFI	HO
ND50-5059.1 to .2	4376	Scientific Fisheries Association, Proceedings: Vol. VIII, Nos. 1 to 4; Vol. IX, Nos. 2 to 4.	TIU*	TIU*	HO
ND50-5060.1 to .3	4377	Oceanographic Investigations in the Western Pacific: Vol. I, Parts 1 to 3.	EARI	EARI	HO
ND50-5061.1 to .7	4555	Journal of Oceanography: Vol. XI, No. 3; Vol. XII, Nos. 1 to 3; Vol XIII, Nos. 1 to 3.	IMO	IMO	HO

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5062	4553	Tidal Currents of OSAKA Bay.	IMO	IMO	HO
ND50-5063	4552	Memoirs of Imperial Marine Observatory: Vol. VIII, No. 3.	IMO	IMO	HO
ND50-5064.1 to .29	4539	Complete original corrected records of oceanographical surveys of the Imperial Japanese Navy, Central Hydrographic Office: 1929 to 1945.	IJN	HO	HO
ND50-5065	4551	Miscellany of Hydrography: Vols. I to X (microfilm).	IJNHO	HO	HO
ND50-5066.1 to .4	4543	Memoirs of College of Science: Series A, Vol. XXIII, Nos. 1 to 3; Series B, Vol. XV, No. 3 Article 9.	KIU	KIU	HO
ND50-5067.1 to .4	4556	On the tides and seiches of OSAKA Bay. Coal-tar creosete as a ship-boring animal preventative. Miscellaneous reprints.	KIU	OLL	HO
ND50-5068	4545	Review of Physical Chemistry of Japan: 1944.	PCSJ	KIU	HO
ND50-5069	4544	Papers on oceanography.	NOM	KIU	HO
ND50-5070.1 to .12	4549	Sound-producing fishes of Japan. Studies on turbulence. Marine invertebrates. Textbook: Oceanographic science.	KIU*	KIU*	HO
ND50-5071	4550	Oceanographic investigations in the western Pacific.	EARI	EARI	HO
ND50-5072.1 to .10	4548	Means sea-level at Japanese stations. Journal of Faculty of Science: Section IV, Vol. VI, Part 4. Journal of Zoological Society of Japan: Vol. XXII, Nos. 1 to 4. Zoological Magazine: Vol. XIX, Nos. 1 to 6. Journal of Agriculture: Vol. IX, No. 5; Vol. XV, No. 2.	TIU*	TIU*	HO
ND50-5073.1 to .10	4554	Hydrographic Office, Secret Documents No. 168 and Vol. 146, Nos. 1, 2, 3, 10, 12, 18, 21, 22, 23.	IJNHO	HO	HO
ND50-5074.1 to .23	4546	Report on Oceanographic Investigations 1916-1926: Vol. 1 and 2. Oceanographic charts: 1927-1940. Annual Hydrographic Observations: Nos. 1 to 9, 1926-1934.	FES	FIU	HO
ND50-5075	4547	Geophysical Magazine: Vol. XIII, Nos. 3 and 4.	CMO	CMO	HO
ND50-5076.1 to .3	4604	Science Reports of Tohoku Imperial University (Fourth series): Vol. XV, Nos. 1 to 4; Vol. XVI, Nos. 1 to 4; Vol. XVII, Nos. 1 to 4.	TIU	TIU	HO
ND50-5077.1 to .2	4605	Studies from Institute of Geology and Paleontology: No. 29 and Special Jubilee Issue, 1941.	TIU	TIU	HO

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5078.1 to .3	4606	Reports of Institute of Agricultural Research (Fishery series): Nos. 1 and 3.	TIU	TIU	HO
ND50-5079	4607	Miscellaneous reprints on marine studies.	TIU	TIU	HO
ND50-5080	4608	Journal of the Oceanographical Society of Japan: Vol. I, Nos. 1 and 2; Vol. II, Nos. 1 to 4; Vol. III, No. 1.	OSJ	CMO	HO
ND50-5081.1 to .4	4609	Science of the Ocean: Vol. I, Nos. 2 to 7; Vol. II, Nos. 1 to 12; Vol. III, Nos. 1 to 3, 6 to 12; Vol. IV, Nos. 1 to 3, 5 to 12.	OSJ	CMO	HO
ND50-5082	4651	Memoirs of Imperial Marine Observatory: Vol. VII, Nos. 3 and 4.	IMO	IMO	HO
ND50-5083.1 to .2	4652	Journal of Oceanography: Vol. XII, Nos. 1, 2, and 3; Vol. XII, Nos. 1 to 4; Vol. XIV, Nos. 1 and 2.	IMO	IMO	HO
ND50-5084.1 to .7	4653	Various oceanography reports.	IMO	CMO	HO
ND50-5085.1 to .31	4654	Manuscript reports on oceanographic studies, 1940-1943: Nos. 1 to 11, 13, 14, 16 to 27, 29 to 34.	CMO	CMO	HO
ND50-5086.1 to .23	4655	Manuscript reports on oceanographic studies, 1941-1945: Nos. 35 to 52, 55 to 58, 60.	CMO	CMO	HO
ND50-5087.1 to .2	4656	Various oceanographic reports. Science of the Ocean: Vol. IV, No. 4.	CMO	CMO	HO
ND50-5088.1 to .2	4669	Records of Oceanographical Works of Japan: Vol. I and II.	NRC	NRC	HO
ND50-5089.1 to .3	4670	Records of Oceanographical Works of Japan: Vol. III, Nos. 1 and 2; Vol. IV, Nos. 1 and 2; Vol. V, Nos. 1 and 2.	NRC	NRC	HO
ND50-5090.1 to .3	4671	Records of Oceanographical Works of Japan: Vol. VI, Nos. 1 and 2; Vol. VII, Nos. 1 and 2; Vol. VIII, Nos. 1 and 2.	NRC	NRC	HO
ND50-5091.1 to .4	4672	Records of Oceanographical Works of Japan: Vol. IX, Nos. 1 and 2; Vol. X, Nos. 1 and 2; Vol. XI, Nos. 1 and 2; Vol. XII, No. 1.	NRC	NRC	HO
ND50-5092	4673	Bulletin of the Imperial Fisheries Experiment Station: Nos. 1 to 8, 1925 to 1943.	IFES	IFES	HO
ND50-5093.1 to .5	4674	Oceanographic charts: 1927 to 1941. Report of Oceanographical Investigations: No. 1, 1926, No. 2, 1927. Report of Hydrographic Investigations: 1928 to 1942.	IFES	IFES	HO
ND50-5094	4675	Report of Hydrographic Investigations: Nos. 1 to 9, 1928 to 1942.	IFES	IFES	HO
ND50-5095	4676	Miscellaneous reports.	IFES	IFES	HO

ENCLOSURE (D), continued

NavTechJap No.	ATIS No.	Title	Issuing Authority	Place of Seizure	Disposition
ND50-5096	4677	Scientific Papers of the Institute of Algological Research: Vol. II, No. 2; Vol. III, No. 1.	HIU	SAP	HO
ND50-5097	4678	Journal of the Faculty of Science, Series V: Vol. IV, No. 5; Vol. V, Nos. 2 and 3.	HIU	SAP	HO
ND50-5098.1 to .3	4680	Journal of the Faculty of Science, Series VI: Vol. VII, Nos. 2 to 4; Vol. VIII, Nos. 1 to 4; Vol. IX, No. 1.	HIU	SAP	HO
ND50-5099	4679	Miscellaneous reprints.	HIU & VSS	SAP	HO
ND50-5100	4681	Miscellaneous reprints.	HIU & VSS	SAP	HO
ND50-5101	4682	Plankton Review: Vols. II to XV.	NRC	NRC	HO (Via WDC)
ND50-5102.1 to .10	4683	Japanese Journal of Zoology: Vols. I to VIII (excepting Vol. VI, Nos. 1 and 3, Vol. VIII, Nos. 1 and 2).	NRC	NRC	HO (Via WDC)
ND50-5103.1 to .10	4684	Japanese Journal of Astronomy and Geophysics: Vols. I to XXI.	NRC	NRC	HO (Via WDC)
ND50-5104.1 to .2	4685	Journal of Imperial Fisheries Institute: 1923 to 1944 (not complete).	IFI	IFI	HO (Via WDC)
ND50-5105	4686	Journal of the Association of Fishing Hobbies: Vols. XXVIII to XXXVIII (not complete).	IFI	IFI	HO (Via WDC)
ND50-5106	4687	Science of the Sea: Vol. XIII.	CMO	CMO	HO (Via WDC)

* * * * *

ENCLOSURE (E)

ENCLOSURE (E)

EQUIPMENT SUMMARY

PREFACE

Organization and Procedure

The U.S. Naval Technical Mission to Japan collected and shipped to the U.S. for intelligence purposes over 12,000 items of Japanese equipment. The Equipment Summary is constructed with the purpose of presenting in convenient form all available, pertinent information on each item.

Each item was assigned a serial number when seized, and reported to the nearest of four collection points, which were maintained at SASEBO, YOKOSUKA, KURE, and KOBE by the Equipment and Documents Section of NavTechJap. At these collection points, all equipment was assembled, crated and shipped. Bills of lading or cargo manifests for each shipment were submitted to NavTechJap Headquarters for screening.

Numbering System

The serial numbers assigned to equipments consisted of the letters JE followed by a two-digit number indicating the collection point in the vicinity of which the equipment was seized, followed by a four-digit number peculiar to that item. Numbers alloted the collection points were as follows:

SASEBO	JE0-0001	to	JE0-9999
	JE2-0001	to	JE2-9999
	JE3-0001	to	JE3-9999
	JE10-0001	to	Je10-9999
	JE12-00001	to	JE12-99999
YOKOSUKA	JE21-0001	to	JE21-9999
KURE	JE22-0001	to	JE22-9999
KOBE	JE23-0001	to	JE23-9999

Two blocks of numbers were also alloted which had no geographical significance. The Petroleum Section was assigned numbers from JE26-0001 to JE26-9999, and items collected by headquarters of NavTechJap in TOKYO were assigned numbers ranging from JE50-0001 to JE50-9999.

Suffixes in the form of decimals or letters appended to the serial numbers as given above were intended to designate separate parts of one complete item or several identical items in one lot.

KOBE operated as a collection point but not as a shipping point because the port was not cleared of mines during the operation period of the Mission. Therefore, all equipment collected at KOBE was forwarded to either YOKOSUKA or KURE and shipped from there. Thus series JE23 numbers will be found in both KURE and YOKOSUKA shipping lists.

The Equipment Summary

The following Equipment Summary is a compilation of all items of Japanese equipment of intelligence value shipped to the U.S. by NavTechJap. The five columns in the table indicate each serial number, the quantity of each item returned, the best description obtainable of each item, an abbreviation indicating the ultimate destination of each item, and a symbol indicating the shipment in which each item was returned to the U.S. Items are assembled according to the target reports to which they pertain and arranged in order of the most outstanding

features, where possible. Thus bombs are arranged by weight, guns and ammunition by caliber, radar equipment by type number, and a few sections are in order of serial numbers.

The Table of Contents which follows list the target reports and the pages on which the pertinent equipment may be found. Under each entry in this section is a list of the types of equipment to be found in that target and cross-references to any other target reports which may contain related equipment.

Legend I lists the abbreviations used in the Summary and the proper addresses of the activities which are final destinations for NavTechJap Equipment.

Legend II explains the symbols used to designate the various shipments. All available shipping information will be found here, such as the name of each ship, dates of sailing, numbers of bills of lading - from which the Summary was compiled, and the dates and distribution of letters in which the bills of lading were enclosed.

Note

Due to inconsistencies in nomenclature used in reporting seized equipment, it was sometimes impossible to assign target numbers in strict accordance with the written reports. Therefore, the categories found in the Equipment Summary are slightly at variance with the corresponding reports in some cases.

TABLE OF CONTENTS

A-39	JAPANESE NAVAL PHOTOGRAPHY (See also X-05) Cameras, Camera mounts, Camera Repair Kits, Camera Magazines, Spare Parts, Film, Developing Kits, Chemicals, Printers, Printing Paper, Stereoscopes, Lenses, Filters, Film Testers, Intervalometers.	Page 410
E-01	JAPANESE SUBMARINE AND SHIPBORNE RADAR (See also E-02, E-08, E-16, and E-17) Radar, Radar Intercept Receivers, Radar Lobe Switching Unit and Wave Guide	Page 413
E-02	JAPANESE AIRBORNE RADAR (See also E-01, E-08, E-16, and E-17) Aircraft Radar, Aircraft Radar Receivers	Page 413
E-05	JAPANESE RADIO AND RADAR DIRECTION FINDERS	Page 414
E-07	JAPANESE RADAR COUNTERMEASURES AND VISUAL SIGNAL DISPLAY EQUIPMENT (See also X-02) Photophones, Signal Searchlight, Photocell, Modulators, Rotating Machine, Miscellaneous Tubes.	Page 414
E-08	JAPANESE RADIO EQUIPMENT (See also E-16, E-17) Transmitters, Transceivers, Receivers	Page 415
E-09	JAPANESE NAVIGATIONAL AIDS (See also E-10, X-05 and X-17) Altimeters, Fathometer (Electronic Aids Only)	Page 417
E-10	JAPANESE SONAR AND ASDIC (See also E-09, E-26) Sonar, Echo Ranging Gear, Sound Heads, Listening Gear, Underwater Sound Gear, Chemical Recorders	Page 418
E-13	JAPANESE ELECTRONIC TUBES (See also E-07, E-17)	Page 418
E-14	JAPANESE MAGNETIC AIRBORNE DETECTOR	Page 419
E-16	JAPANESE ANTENNAE (See also E-01, E-02, and E-08)	Page 419
E-17	JAPANESE RADIO, RADAR, AND SONAR EQUIPMENT One Transmitting and Receiving Crystal	Page 419
E-22	JAPANESE RADIO FREQUENCY MEASURING TECHNIQUE (see also S-01) Wavemeters, Output Meters, for Meter Wave Radar	Page 419
E-26	JAPANESE ELECTRONIC HARBOR PROTECTION EQUIPMENT (See also E-10) Hydrophones, Sound Gear, Magnetic Loop Detectors	Page 420
M--	ALL MEDICAL TARGETS (See also X-11) Oxygen Breathers, Gas Decontaminants, Drugs Cystoscopes, Artificial Arm.	Page 421

ENCLOSURE (E), continued

0-01	JAPANESE TORPEDOES AND TUBES Torpedoes, Torpedo Exploders, Torpedo Warheads, Torpedo Exercise Heads, Torpedo Gyroscopes, Torpedo Recorders, Torpedo Tubes.	Page 421
0-04	JAPANESE MINES Sea Mines, Anchors, Sweep Obstructors, Mine Firing Units, Spare Parts, Horns, Extenders, Drogues, Soluble Washers, Arming Springs and Pistons, Mine Magnets, Clock, Induction Coils, Base Plate Parts, Mine Tools.	Page 430
0-08	JAPANESE DEPTH CHARGES Depth Charges, Pistols, Boosters, Tail Fins, Launcher	Page 433
0-09	JAPANESE NAVAL ROCKETS Rockets, Rocket Mortars, Rocket Grid, Motor Fuzes	Page 434
0-10	JAPANESE PROPELLANTS	Page 435
0-12	JAPANESE PYROTECHNICS (See also 0-09, X-11) Flares, Flare Containers, Flare Candles, Flashing Shells, Signal Pistols, Pyrotechnic Devices, Sea Marker, Underwater Red Ball	Page 435
0-14	JAPANESE NAVAL AMMUNITION CASES FOR 5CM AND LARGER CALIBER GUNS (See also 0-19)	Page 436
0-16	JAPANESE HEAVY ARMOR	Page 436
0-17	JAPANESE NAVAL PROJECTILE FUZES Bomb and Projectile Fuzes, Gaines, and Boosters	Page 437
0-19	JAPANESE PROJECTILES - GENERAL TYPES (See also 0-12, 0-14, X-11) All Sizes and Types of Ammunition, Rounds, Shells, Belt Links, Projectiles, Ammunition Cases, Mortar-Fired Pamphlet Containers	Page 441
0-20	JAPANESE AMMUNITION PRIMERS	Page 446
0-22	JAPANESE TRACERS	Page 447
0-23	JAPANESE BOMBS All Sizes and Types of Bombs, Rocket Bombs, Bomb Tails, Heat-Homing Heads, Fort-6 and Fort-7, Bomb Spacer, Bomb Releases	Page 447
0-25	JAPANESE EXPLOSIVES (See also 0-19, 0-23) Detonators, Boosters, Demolition Charges, Shaped Charges, Primacord, Pull Igniters	Page 450
0-27	JAPANESE INCENDIARY MIXTURES (See also 0-12, 0-19, 0-23) Incendiary Candles, Flamethrowers, Incendiary Grenades, Thermite Charges, Incendiary Alloy	Page 450
0-29	JAPANESE FIRE CONTROL (See also 0-30, 0-32, X-05) Directors, Computers, Selsyh, Vision Train, Rangefinders, Sight, Firing Time Limit Instrument	Page 451

ENCLOSURE (E), continued

O-30	JAPANESE ANTI-AIRCRAFT FIRE CONTROL (See also O-29, O-32, X-05) Directors, Computers, Fuze Time Computers, Deflection Resolvers, Parallax Converter, Stable Element, Gyro-Horizon, Sights, Selsyn.	Page 452
O-32	JAPANESE TORPEDO FIRE CONTROL (See also O-29, O-30)	Page 453
O-39	JAPANESE ORDNANCE RESEARCH (See also O-51) Gas Flow Meter, Thermometers, Balance, Hydrometer, Pressure Gages, Comparator, Blasting Magnets, Engine Indicators, Magnetostriction Tension Gages.	Page 453
O-45(N)	JAPANESE 18" GUNS & MOUNTS 18" Naval Guns, Bogies and Rummers, Loading Cage, Shell Tilting Bucket and Waiting Tray	Page 453
O-47(N)	JAPANESE NAVAL GUNS AND MOUNTS (See also O-56(N) and O-39) All Naval Guns Under 18" (approx) and All Guns from 20mm to 40cm not Specifically for Land Use, Training Motors, Gun Accessories, Gun Testing Devices, and Bore-Sight Telescopes.	Page 454
O-56(N)	JAPANESE FIELD AND AMPHIBIOUS EQUIPMENT-KYUSHU DEFENSE SYSTEMS (See also O-25, O-45, O-47) All Guns, Mortars, Howitzers, etc. from Small Arms Through 15cm Specifically not Naval Guns, Machine Gun Mounts, Machine Gun Synchronizers, Magazines, Rocket Launchers, Tanks, Trucks Armored Cars, Personnel Carriers, Prime Movers, Land Mines, Grenades	Page 456
S-01	CHARACTERISTICS OF JAPANESE NAVAL VESSELS Burner Tips, Latex Composition, Glue, Turbines, Steering Control Unit, Gyro Compass Repeater, Fluorescent Fixture, Lighting Equipment, Pumps, Boiler Compound, Master Compass, Electrical Equipment, Starters, Switches, Switch Boxes, Junction Boxes, Motors, Generators, Motor Generators, Midget Submarine, Underwater Log, Salinity Indicator, Telephone Equipment, Intercom Equipment, Battle Announcing Systems, Engine Order Telegraph, Ships Telegraph Equipment, Distribution Panels, Relays, Wire Samples, Meters.	Page 460
S-19	JAPANESE SUBMARINE EQUIPMENT Periscopes, Batteries	Page 464
S-28	JAPANESE MINESWEEPING GEAR AND EQUIPMENT Explosive Hooks, Cutters Floats, Moored Sweep Cables, Magnetic Sweep Cables, Serrated Sweep Wire, Magnets, Paravanes, Fessenden Oscillator, Sound Shells, Noise Makers Simulated Sound Source, Submarine Sound Decoy, Dan Bouy Parts, Drag Net, Sweep Tackle, Mine Detectors	Page 464
S-37	JAPANESE DEGAUSSING Magnetometers	Page 466

ENCLOSURE (E), continued

S-42 JAPANESE NAVY - DIESEL ENGINES — Page 467
Dynamometers, Engine Accessories.

S-79 JAPANESE NAVY PAINTS (See also X-32) — Page 468
Anti-Radar Paint, Sound Absorbing Paint, Bottom Paint, Unspecified Paint.

S-81(N) WELDING IN JAPANESE NAVAL CONSTRUCTION — Page 468
Welding Electrodes.

S-83(N) JAPANESE MODEL BASINS — Page 468
Model Ships and Propeller Models

S-84(N) JAPANESE DAMAGE CONTROL — Page 468
Fire Curtain, Fire Extinguisher, Gasoline Vapor Detector.

S-91(N) SPECIAL UNDERWATER ATTACK UNITS (FUKURYU) AND HARBOR DEFENSE MEASURES — Page 469
Diving Suits and Equipment

S-92(N) LEAD-ACID STORAGE BATTERIES USED BY THE JAPANESE NAVY (See also S-19) — Page 469

S-97(N) JAPANESE ANCHORS AND ANCHOR CHAIN — Page 469
Anchor Chain

X-02 JAPANESE INFRA-RED DEVICES (See also A-39, E-07, X-05) — Page 469
Infra-Red Communication Equipment, Infra-Red Binoculars and Lenses, Filters, Mirrors, Heat Detectors.

X-05 JAPANESE OPTICS (See also A-39) — Page 470
Bombsights, Gunsights, Bombsight Levels, Binoculars and Mounts, Celestial Navigation Slide Rules, Celestial Navigation Calculators, Navigational Plotting Boards, Driftmeters, Sextants, Turret Periscope, Canada Balsam, Glass Samples.

X-11 JAPANESE CHEMICAL WARFARE (See also M--, O-12, O-19 O-23, and O-27) — Page 472
Gas Masks, Cannisters, Protective Suits, Smoke Balls, Smoke Candles, Smoke Pots, Smoke Tubes, Smoke Shells, Smoke Compound, Gas Detection Apparatus, Decontamination Equipment, Gas Containers.

X-17 JAPANESE METEOROLOGICAL INSTRUMENTS (See also E-09, X-40) — Page 473
Altimeters, Anemographs, Anemometers, Anemoscopes, Barographs, Barometers, Cloudsondes, Drift Indicator, Evaporagraphs, Hydrogen Generator, Hydrographs, Meterographs, Nephoscopes, Pibal Balances, Pilot Balloons, Psyscrometers, Pulviometers, Radio Direction Tracking Receivers, Radiosonde Receivers, Rain Gages, Raysonde Equipment, Hydrometers, Thermometers, Snow Gages, Solar Radiation Gear, Theodolites, Thermo-Barographs, Thermographs, Water-Current Meter, Wind Instruments, Miscellaneous.

X-28	ATOMIC BOMBS, HIROSHIMA AND NAGASAKI Samples of Radio-Active Earth	Page 478
X-32	CAMOUFLAGE OF JAPANESE SHIPS AND NAVAL INSTALLATIONS (See also S-59) Camouflage Paints	Page 478
X-34(N)	MAGNETIC DEVELOPMENT IN JAPAN DURING WORLD WAR II Alfero and Alpern Sheets, Magnetostriction Oscillators, Magnetic Sheild, Recording Wire, Magnet Cores, Magnetic Amplifiers.	Page 478
X-38(N)	JAPANESE FUELS AND LUBRICANTS Coke, Coal, Catalysts, Oils, Fuels, Greases, Anti-Corrosives, Refining Clays, Valve Assemblies, Autoclaves, Fuel-Air Ratio Meter Assembly.	Page 479
X-40(N)	OCEANOGRAPHY IN JAPAN (See also E-09, X-17) Animal Sound Recordings, Pipettes, Thermometers, Water Bottles, Water Current Meter, Water Sampler, Clinometer, Sea-Water Color Comparator, Normal Sea-Water, Silicate Sample Bottles, Secchi Disc.	Page 481
----	UNCLASSIFIED Undesignated and Unclassified Equipment	Page 482

ENCLOSURE (E), continued

LEGEND I - DESTINATIONS

BOSTON	Naval Shipyard, Boston, Massachusetts
BNY	Naval Shipyard (Maspeth Annex), Brooklyn, New York
BuAer	US Naval Observatory, for Bureau of Aeronautics, Navy Department
BuMines	US Bureau of Mines, Central Experiment Station, 4800 Forbes Street, Pittsburg, Pennsylvania
BuOrd	Bureau of Ordnance, Navy Department, Washington, D.C.
BuS	Bureau of Ships, Navy Department, Washington D.C.
DTMB	David Taylor Model Basin, Navy Department, Washington, D.C.
EDU	Experimental Diving Unit, Naval Shipyard, Washington, D.C.
EES	Engineering Experiment Station, Annapolis, Maryland.
HYDRO	US Hydrographic Office, Washington, D.C.
NAF	Naval Aircraft Factory, Naval Shipyard, Philadelphia, Pa.
NMRI	Naval Medical Research Institute, Bethesda, Maryland
NMWTS	Naval Mine Warfare Testing Station, Solomons, Maryland
NOL	Naval Ordnance Laboratory, Naval Shipyard, Washington, D.C.
NPG	Naval Proving Grounds, Dahlgren, Virginia
NRL	Naval Research Laboratory, Bellevue, Washington 20, D.C.
OIL	Ordnance Investigation Laboratory, Naval Powder Factory, Indian Head, Maryland
PHTH	Submarine Base, Pearl Harbor, T.H.
Ports	Naval Shipyard, Portsmouth, New Hampshire
PSL	Photo Science Laboratory, Naval Air Station, Anacostia, D.C.

LEGEND II - SHIPMENTS

KURE

K-1 Shipped 28 November 1945 to Ordnance Investigation Laboratory, Naval Powder Factory, Indian Head, Maryland Via NATS

K-2 SS HAMILTON VICTORY-Manifest Dated 20 December 1945

From: Kure Base, Port Command, KURE, Japan

To: Naval Overseas Freight Terminal 103 Berry St., San Francisco, California

For: Ordnance Investigation Laboratory Naval Powder Factory, Indian Head, Maryland Manifest Enclosed in Letter from Chief, NTJ to CNO Dated 4 January with Copies to JICPOA; OIL; BuShips; NRL; Maspeth Annex (Brooklyn Navy Yard) ComWesSeaFron.

Sailed: 21 December 1945

K-3 LSM 371 GB/LN-10814107 Dated 3 February 1946
LSM 362 GB/LN-10814106 Dated 3 February 1946
LSM 479 GB/LN-10814105 Dated 3 February 1946

From: NavTechJap, KURE, Japan

To: Naval Proving Ground, Dahlgren Virginia B/L s Enclosed in Letter from Chief, NTJ to CNP Dated 2 February 1946 with Copies to NPG Dahlgren, ComWesSeaFron, ComEasSeaFron, JIC OA, Fifth Fleet.

Sailed: 6 February 1946

K-4 USS TYRRELL (AKA 80)

GB/LN-10814104 Dated 2 February 1946

To: Ordnance Investigation Laboratory, Naval Powder Factory, Indian Head, Maryland.

GB/LN-18312702 Dated 2 February 1946

To: Naval Proving Ground, Dahlgren, Virginia

GB/LN-18312703 Dated 2 February 1946

To: Naval Research Laboratory, Vellevue

From: NavTechJap, KURE, Japan B/L s Enclosed in Letter from Chief NTJ to CNO Dated 9 February 1946 with Copies to: NOL, BuOrd, ComWesSeaFron, ComEasSeaFron, JICPOA, Com5th Flt, Oil, NPG, NRL.

Sailed: 3 February 1946

K-5 LST 307-B/LN-18312801 Dated 3 March 1946

From: NavTechJap, KURE, Japan

To: OinC, Submarine Base, Pearl Harbor, T.H. B/L Enclosed in letter from Chief, NTJ to CNO Dated 6 March with Copies to OIL,

BuShips, ComWesSeaFron, JICPOA OinC Sub Base Pearl, COMNAVJAP.

Sailed: 4 March 1946

SASEBO

S-1 USS SKASIT (AKA 105)-B/L No M1192-46 Loaded at CARL 83

To: Ordnance Investigation Laboratory, Naval Powder Factory, Indian Head, Maryland

SS ALLEN C BALCH-B/L-Memo 51-46 Dated 20 October 1945.

From: 8th Serv Regt., SC FMF Pac-CARL 83

To: Naval Overseas Freight Terminal, 103 Berry St. San Francisco, California

For: Ordnance Investigation Laboratory, Naval Powder Factory, Indian Head, Maryland.

Sailed: 21 October 1945

USS EURAYLE

To: Supply Officer, Sub Base, Pearl Harbor, T.H.

For: Ordnance Investigation Laboratory, Naval Powder Factory, Indian Head, Maryland

Sailed: 16 October 1945

USS HANOVER (AKA 73)-B/L M-1084-46 thru B/L M-1089-46 Dated 13 November 1945 and 14 November 1945

From: 8th Serv Regt SC FMF Pac Carl 83

To: Ordnance Investigation Laboratory, Naval Powder Facotry, Indian Head Maryland

S-2 SS ESPARTA-B/L ml415-46 Dated 6 January 1946

From: 8th Serv Regt SC FMPAC-Carl 83

To: Depot Quartermasters, DOS, 100 Harrison St. San Francisco, California

For: Ordnance Investigation Laboratory Naval Powder Factory, Indian Head, Maryland B/L Enclosed in Letter from Chief, NTJ, to CNP with copies to OIL, ComWesSeaFron Dated 22 January 1946.

S-3 USS MONROVIA (APA 31)-B/L m-1522-46 of 25 January 1946

From: 8th Serv Regt SC FMFPAC CARL 83

To: Supply Officer, Naval Supply Depot San Francisco California

For: Chief of BuShips, Code #665 Navy Dept, Washington, D.C. B/L Enclosed in Letter from Chief, NTJ to CNO with Copies to: OIL, BuShips Code #665, ComWesSeaFron, JICPOA, Dated 20 February 1946

Sailed: 5 February 1946

YOKOSUKA

Y-1 Shipped to Ordnance Investigation Laboratory, Naval Powder Factory, Indian Head, Maryland Prior to 1 December 1945

Y-2 Navy Air Freight Office (NATS), YOKOSUKA, Japan-B/L N-GG 76-46 and 77-46, Plane Trip No. 56105 Departure Date 6 December 1945 from KISARAZU, Japan.

To: Forwarded Directly to Naval Medical Research Institute, Bethesda, Maryland, Attention: Lt. Cmdr. N. Pace B/L Enclosed in Letter from Chief NTJ to CNO Dated 4 January 1946 with copies to JICPOA, OIL, BuMed, Nav Med Research Inst.

Y-3 Naval Air Freight Office (NATS), YOKOSUKA, Japan-Departed KISARAZU, Japan 31 December 1945

To: Photo Science Laboratory, Naval Air Station, Anacostia, D.C. Attention: Director of Photography B/L Enclosed in Letter from Chief, NTJ to CNO Dated 9 January 1946 with copied to OIL, PSL ComWesSeaFron.

Y-4 USS MILLS VICTORY

B/LN-11-695907 Dated 14 January 1946

To: Ordnance Investigation Laboratory, Naval Powder Factory, Indian Head, Maryland.

B/Ln-11-695905 Dated 14 January 1946

To: Photo Science Laboratory, Naval Air Station, Anacostia, D.C.

B/LN-11695906 Dated 14 January 1946

To: Naval Research Laboratory, Vellevue.

From: NavTechJap, YOKOSUKA, Japan B/L s Enclosed in Letter from Chief, NTJ to CNO Dated 17 January with copies to OIL, PSL, NRL Bellevue, OinC Freeman Field Seymour, ComWesSeaFron, JICPOA.

Sailed: 14 January 1946

Y-5 YP-421-NTJ Material List Dated YOKOSUKA 23 January 1946

From: NavTechJap, YOKOSUKA, Japan.

To: Ordnance Investigation Laboratory, Naval Powder Factory, Indian Head, Maryland Material List Enclosed in Letter from Chief NTJ to CNO Dated 26 January 1946 with Copies to JICPOA, OIL, ComWesSeaFron, ComEasSeaFron.

Sailed: 24 January 1946

Arrived: 16 April 1946 at Indian Head, Md

Y-6 USS HESPERIA (AKS 13)

Navy SO NR #3923 B/L (GCO) #119 dated 25 February 1945

ENCLOSURE (E), continued

To: Supply Officer, Naval Mine Warfare Test Station, Solomons, Maryland Attention: Countermeasures Officer

Navy SO NR #3923 B/L (GCO) #120 dated 25 February 1946

To: Naval Research Laboratory, Bellevue, Washington, 20 D.C.

Navy SO NR #3923 B/L (GCO) #121 dated 25 February 1946

To: U.S. Naval Observatory, for Buaer, Washington, D.C.

Navy SO NR #3929 B/L (GCO) #122 dated 25 February 1946

To: Ordnance Investigation Laboratory, Naval Powder Factory, Indian Head, Maryland

Navy SO NR #3923 B/L (GCO) #123

To: US Naval Engineering Experiment Station, Chemical Department, Annapolis, Maryland

Navy SO NR #3923 B/L (GCO) #124 dated 25 February 1946

To: BuShips, Navy Department, Washington, D.C.

Navy SO NR #3923 B/L (GCO) #125 dated 25 February 1946

To: US Hydrographic Office, Washington, D.C.

Navy SO NR #3923 B/L (GCO) #126 dated 25 February 1946

To: US Bureau of Mines, Central Experiment Station, 4800 Forbes St., Pittsburg, Pa. Attention: Mr. Storch.

Navy SO NR #3923 B/L (GCO) #127 dated 25 February 1946

To: BuOrd, Navy Department, Washington, D.C.

Navy SO NR #3923 B/L (GCO) #128 dated 25 February 1946

To: Naval Ordnance Laboratory, Navy Yard, Washington, D.C.

Navy SO NR #3923 B/L (GCO) #129 dated 25 February 1946

To: Photo Science Laboratory, Naval Air Station, Anacostia, D.C.

Navy SO NR #3923 B/L (GCO) #130 dated 25 February 1946

To: BuShips Code #665, Navy Department, Washington, D.C. Attention: Capt Duval

Navy SO NR #3923 B/L (GCO) #131 dated 25 February 1946

To: Section 660 BuShips, Navy Department, Washington, D.C.

Navy SO NR #3923 B/L (GCO) #132 dated 25 February 1946

To: Chief of BuShips, Washington, D.C.

Navy SO NR #3923 B/L (GCO) #133 dated 25 February 1946

To: David Taylor Model Basin, Navy Department, Washington 25, D.C. Attention: Lt. P.F. Markstrom

Navy SO NR #3923 B/L (GCO) #134 dated 25 February 1946

To: Supply Officer, Boston Navy Yard

Navy SO NR #3923 B/L (GCO) #135 dated 25 February 1946

To: Naval Proving Grounds, Dahlgren, Va.

Navy SO NR #3923 B/L (GCO) #136 dated 25 February 1946

To: Naval Aircraft Factory, Navy Yard Philadelphia, Pa.

From: Supply Officer, Navy #3923, YOKOSUKA, Japan all B/L s Enclosed in Letter from Chief, NTJ to CNO Attention: OP-16-PT Dated 6 March, 1946 with Copies to:

OIL, Indian Head, Maryland; ComWesSeaFron; Naval Mine Warfare Test Station, Solomons; Maryland; NRL, Bellevue, Washington, D.C; US Naval Observatory, for BuAer Washington, D.C; BuShips, Navy Department; US Hydrographic Office, Washington, D.C; US Bureau of Mines, Central Exp. Sta; 4800 Forbes St, Pittsburg Pa; BuOrd; NOL, Navy Yard, Washington, D.C; PSL, NAS, Anacostia, D.C; David Taylor Model Basin, Navy Dept; Washington, D.C; Commandant, Navy Yard, Boston, Mass.; Naval Proving Grounds, Dahlgren, Va.; Naval Aircraft Factory, Navy Yard; Philadelphia, Pa.; Supply Officer, NSD, Oakland, Cal.; US Naval Engineering Experiment Station

Sailed: 2 March 1946

Y-7 LST 697

Navy SO NR #3923 B/L #165 Dated 13 March 1946

To: Supply Officer, Bureau of Ships, Navy Department, Washington, D.C.

Navy SO NR #3923 B/L #166 Dated 13 March 1946

To: Ordnance Investigation Laboratory, Naval Powder Factory, Indian Head, Maryland

Navy SO NR #3923 B/L #167 Dated 13 March 1946

To: U.S. Naval Mine Warfare Testing Station, Solomons, Maryland All B/L s enclosed in letter from Chief, NTJ to CNO (Attn: OP-23) Dated 7 May 1946, with copies to: ComWesSeaFron; BuShips; OIL Indian Head, Maryland; Naval Mine Warfare Testing Station, Solomons, Maryland; CINPAC: WDIT, G-2 SCAP

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
		JAPANESE NAVAL PHOTOGRAPHY		
		A-39		
JE10-3009	5	Type 89 Gun Camera	PSL	S-1
JE10-3008	3	Type 89 Gun Camera and Developing Boxes	PSL	S-1
JE10-3003	4	Type 99 Aerial Camera (f 3.5 Lens)	PSL	S-1
JE10-3002	2	Type 99 Aerial Camera (f.4.5 Lens)	PSL	S-1
JE21-3002(1-163) inclusive except for Nos. 1,11,13, 36,37, 50-71 90-92 92-97 100-101 107-108 112-118 127-130 140-145 146-160	138	Type 99 Aerial Camera Lens)	PSL	Y-4
JE21-3026(1)	1	Type 100 Aerial Camera-40cm Lens	PSL	Y-4
JE21-3048(1-3)	3	Type 1 Mod 2 Camera	PSL	Y-4
JE21-3031(1-9)	9	Type 4 Aerial Camera-75cm elbow	1-OIL 8-PSL	Y-4
JE21-3025(1-13)	13	K-8 Aerial Camera (f 4.5, 25cm Lens)	1-OIL 12-PSL	Y-4
JE21-3010(1-6)	6	K-8 Aerial Camera (f 5, 50cm Lens)	PSL	Y-4
JE10-3010	3	K-8 Aerial Camera (50cm Lens)	PSL	S-1
JE10-3013	3	K-8 Camera Mounts	PSL	S-1
JE21-3013(1-16)	16	K-8 Camera Mounts	1-OIL 15-PSL	Y-4
JE21-3012(1-5)	5	K-8 Camera Repair Kits, Intervalometers, and Spare Parts	PSL	Y-4
JE10-3012	3	K-8 Camera Repair Kits Intervalometers, and Spare Parts	PSL	S-1
JE10-3014	3	K-8 Camera Magazines	PSL	S-1
JE21-3014(1-21)	21	K-8 Camera Magazines	1-OIL 20-PSL	Y-4

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE10-3001	5	F-8 Aerial Cameras	PSL	S-1
JE21-3001	85	F-8 Aerial Cameras	PSL	Y-4
JE21-3033(1-13)	13	F-8 Camera Mounts	PSL	Y-4
JE10-3004	6	Hand-Held Aerial Camera (Tessar Lens)	PSL	S-1
JE10-3005	2	Hand-Held Aerial Camera (Hexar Lens)	PSL	S-1
JE10-3015	3	Spare Focal-Plane Shutters for Hand-Held Aerial Cameras	PSL	S-1
JE10-3016	1 Bx	Spare Magazines for Hand-Held Aerial Cameras	PSL	S-1
JE21-3027(1-8)	8	Aerial Flack-Spotting Cameras	1-OIL 7-PSL	Y-4
JE21-3028(1-9)	9	Aerial Flack-Spotting Camera Mounts	1-OIL 3-PSL	Y-4
JE10-3000	2	Voigtlander Still Cameras	PSL	S-1
JE10-3006	1	11 x 14 View Cameras with tripod	PSL	S-1
JE21-3032(1-5)	5	Experimental Telphoto Aerial Camera - 100cm Lens	1-OIL 4-PSL	Y-4
JE21-3029(1-3)	3	Experimental Telephoto Aerial Camera -70cm Lens	PSL	Y-4
JE21-3030(1-7)	7	Experimental Telephoto Cameras with Mounts, 70cm Lenses	PSL	Y-4
JE21-3052(A-D)	4	Cassegraham Camera Units, Lenses and Stands	PSL	Y-4
JE21-3039(1-3)	3	Torpedo Cameras	PSL	Y-4
JE22-3101(A-D)	4	Aerial Reconnaisance Cameras	PSL	K-4
JE21-3009(1-8, 10-21,23-36)	34	Gun Cameras	PSL	Y-4
JE21-3058(1-3)	3	Gun Cameras and Magazines	PSL	Y-4
JE21-3047(1-2)	2	Small Aerial Cameras	PSL	Y-4
JE21-3063(1-2)	2	Periscopic Cameras	PSL	Y-4
JE50-5039	1	High-Speed Camera Frame (Large)	PSL	K-4
JE50-5052	1	High-Speed Camera Frame (Small)	PSL	K-4
JE23-0102(1-9)	9	Aerial Cameras	PSL	Y-6
JE21-3049(1)	1	Small Camera	PSL	Y-6

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-5021	1	Infra-Red Telephoto Camera (Schmidt)	NRL	Y-4
JE50-5022	1	Infra-Red Telephoto Camera	NRL	Y-4
JE50-5023	1	Infra-Red Telephoto Camera, Perisco-Pricelass Lens	NRL	Y-4
JE50-5024	2	Infra-Red Telephoto Camera, Periscopic - glass Lenses	NRL	Y-4
JE21-3056	880 rolls	Type 89 35mm Aerial Film	PSL	Y-3
JE21-3055	100 rolls	Type 99 9cm Aerial Film	PSL	Y-3
JE21-3054	303 rolls	F-8 18cm Aerial Film	PSL	Y-3
JE21-3053	1 Bx	Roll and Motion Picture Film Samples	PSL	Y-3
JE21-3115(1-2)	180	Rolls Film	OIL	Y-4
JE21-3034(1-3)	3 rolls	Aerial Camera Fuze 12cm Film	PSL	Y-4
JE10-3019	1 Bx	Miscellaneous Types of Film	PSL	S-1
JE10-3020	1 Bx	Assorted Film and Chemicals	PSL	S-1
JE21-3045(1-5)	5 Bx	Photographic Chemicals	PSL	Y-4
JE21-3041(1)	1	K-20 Developing Kit	PSL	Y-4
JE10-3017	1	Small Developing Tank with Film Hangers	PSL	S-1
JE10-3011	1	Aerial Developing Set	PSL	S-1
JE21-3040(2-3)	2	Aerial Developing Kits	PSL	Y-4
JE21-3038(1-4)	4	Developing Machine	PSL	Y-4
JE21-3061	1 Bx	R. Konishi Paper Samples	PSL	Y-3
JE50-5038	1	Enlarging Camera	PSL	Y-4
JE50-5039	1	Tripod for Enlarging Camera	PSL	Y-4
JE10-3022	2	Enlarging Printer for Type 99 Aerial Camera	PSL	S-1
JE21-3021(1-17)	17	Enlarging Printer	1-OIL 16-PSL	Y-4
JE21-3063(A-B)	2	Stereo-Comparagraph	PSL	Y-4
JE21-3044(1-18)	18	Sterescopes	PSL	Y-4

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE10-3018	1	Sterescope	PSL	S-1
JE21-3105(1-3)	3	Sterescopic Viewers	OIL	Y-4
JE21-3043(1)	1	Meter F 4.5 Lens	PSL	Y-4
JE21-3046(1) -3031(1-2)	3	100mm F 8 Lenses	PSL	Y-4
JE21-3051(1)	1	50cm Aerial Lens	PSL	Y-6
JE21-3062(1)	1 Bx	Filters for Lenses	PSL	Y-4
JE21-3135	1	50cm Aerial Lens	OIL	Y-6
JE10-3007	3	Type 99 Gun Camera Scoring Projector	PSL	S-1
JE21-3060(1-3)	3	Type 1 Mod 2 Intervalometer	PSL	Y-4
JE21-3138(1)	1 Bx	Optical Film Tester	PSL	Y-4
JE21-3035(1-5)	5	Ziess Magazine Sets	PSL	Y-4
JE21-3036(1-3)	3	Ziess Vacuum Pumps	PSL	Y-4
JE21-3037(1-2)	2 Bx	Ziess Camera Spare Parts	PSL	Y-4
		JAPANESE SUBMARINE AND SHIPBOARD RADAR (may include some airborne radar)		
		E-01		
JE23-0007(1-2)	1	Type 2 Radar Intecept Receiver with Tubes (100mc to 700mc)	OIL	K-4
JE10-6101(1-4)	4	Mk 2 Modif. 1 Radar Intercept Receiver (E-27) Mk 2 Modif. 1 Radar Intercept Receiver (E-27)	NRL NRL	S-1 S-1
JE2-201 -202 -203(1-2)				
JE22-6100(A-C)	1	Mk 2 Model 2 Modif. 3 Radar	NRL	K-2
JE22-6104(A-Y) -6144(A-D)	5	Mk 2 Model 2 Modif. 4 Radar	NRL	K-2
JE10-6000(1-23) -6001(1-19, 21-22 -6002(1-17)		Mk 2 Model 2 Modif. 4 Radar	NRL	S-1
JE23-0003(1-5)	1	Type 3 Mk 1 Model 1 (Temporarily Designated Radar)	OIL	K-4
JE22-6117(A-K) JE10-6010(1-11)	5	Type 3 Mk 1 Model 3 Radar Type 3 Mk 1 model 3 Radar	NRL NRL	K-2 S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
-6011(1-11) -6012(1-10) -6013(1-10)				
JE2-204	1	Type 4 Radar Intercept Receiver	NRL	S-1
JE10-6103(1-3) -6104(1-2) -6105(1-2) -6106(1-2)	4	Type 4 Model 3 Modif 1 Radar Intercept Receiver	NRL	S-1
JE10-6066	1	Mk 32 Radar Lobe Switching Unit and Wave Guide	NRL	S-1
JE10-4979(1-15)	1	Radar Gear	OIL	S-1
		JAPANESE AIRBORNE RADAR		
		E-02		
JE21-6343	1	Type 3 Air Mk 6 Model 3 Radar Receiver (H-6)	NRL	Y-4
NE0-01 -02	2	Mk 6 Model 4 Modif 4 Aircraft Radar	NRL	S-1
JE21-6349(1-8)	1	Exp 19 Air Mk 1 Model 12 Radar (Fk-3) 1-Transmitter 2-Dynamotor 3-Antenna Unit 4-Dynamotor-Transmitter Cable 5-Transmitter-receiver Cable 6-Receiver-Remote Indicator Cable 7-Receiver 8-Remote Indicator	NRL	Y-4
		JAPANESE RADIO AND RADAR DIRECTION FINDERS		
		E-05		
JE10-6023(1-8)	1	Type 93 Mk 1 Radio Direction Finder	NRL	S-1
JE21-6345(1-4)	1	Exp 19 Direction Finder (FD) 1-Loop Antenna (for Small Planes) 2-Loop Antenna (for Large Planes) 3-Receiver 4-Loop Rotating Mechanism	NRL	Y-4
JE22-6130	1	Special Radio Direction Finder Receiver (120 to 10,000 Kc)	NRL	K-2
		JAPANESE RADAR COUNTERMEASURES AND VISUAL SIGNAL DISPLAY EQUIPMENT		
		E-07		
JE10-3100SD	1	Signal Searchlight	OIL	S-1
JE50-5801	4	Army Photophones No. 2 - Hand Gene-		

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
-5807 -5807		rator and Amplifier		Y-4
JE50-5802 -5805 -5808 -5811	4	Army Photophones No. 2 Main Unit and Accessories	NRL	Y-4
JE50-5803 -5806 -5809 -5812	4	Army Photophones No.2 - Tripods	NRL	Y-4
JE21-6327	1	Type 5 Amplifier Photophone	OIL	Y-4
JE21-6328	1	Translator and Photocell	OIL	Y-4
JE21-6329(1-6)	6	Modulators	OIL	Y-4
JE21-6330	1	Rotating Machine	OIL	Y-4
JE21-6331	1	Motor Generator	OIL	Y-4
JE21-5838	1 Bx	Miscellaneous Tubes (Photophone)	NRL	Y-4
JE21-5837	1 Bx	Mercury Tubes (Photophone)	NRL	Y-4
		JAPANESE RADIO EQUIPMENT		
		E-08		
JE10-6027(1-6)	1	Type 90 Radio Telephone Transmitter	NRL	S-1
JE22-6112(A-F) -6113(A-F)	2	Type 90 Model 1 Modif 1 Transceivers	NRL	K-2
JE22-6111(A-E)	1	Type 92 Mod 3 Receiver	NRL	K-2
JE22-6110(A-E)	1	Type 92 Mod 4 Receiver	NRL	K-2
JE22-6133(A-D)	1	Type 92 Mk 4 Mod 1 Long-Wave Receiver	NRL	K-2
JE10-6024(1-10)	1	Type 93 Radio Telephone Transmitter	NRL	S-1
JE22-6114(A-K) -6115(A-J)	2	Type 93 Ultra-Shortwave Transmitter	NRL	K-2
JE10-6028	1	Type 94 Mk 6 Radio Telephone Transceiver	NRL	S-1
JE22-6124(A-D) 6125 (A,B, D-G)	2	Type 95 Mk 5 Shortwave Transmitter	NRL	K-2
JE22-6109	1	Type 97 Shortwave Receiver	NRL	K-2
JE22-6134(A-C)	1	Type 97 Mk 2 AW Transmitter	NRL	K-2
JE22-6138(A-B)	1	Type 99 Model 4 Transmitter	NRL	K-2
JE22-6105(A-D)	3	Type 1 Model 1 Receivers	NRL	K-2

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
-6106(A-D)				
JE10-6025(1-5)		Type 1 Model 1 Receivers	NRL	S-1
JE22-6120(A-B) -6121(A-C)	2	Mk 2 Medium Wave Transmitters	NRL	K-2
JE22-6122(A-C) -6123(A-C)	2	Type 2 Mk 5 Mod 1 Medium Wave Transmitters	NRL	K-2
JE22-6107(A-F) -6108(A-F)	2	Type 3 Special Receivers	NRL	K-2
JE21-6344	1	Type 3 Air Mk 1 Mod 3 Transceiver (Dynamotor-Battery Test Cable)	NRL	Y-4
JE21-6341(1-5)	1	Type 3 Air Mk 1 Mod 3 Transceiver (N-1) 1-Microphone 2-Transceiver 3-Dynamotor-Transceiver Cable 4-Control Unit 5-Transceiver	NRL	Y-4
JE21-6342(1-4)	1	Type 3 Air Mk 1 Mod 3 Transceiver (N-1) 1-Microphone 2-Transceiver 3-Transceiver 4-Dynamotor-Transceiver Cable	NRL	Y-4
JE22-6132(A-D)	1	Type 4 Model 3 Intercept Receiver	NRL	K-2
JE22-6101(A)	1	Type 4 Model 3 Modif 1 RCM Receiver	NRL	K-2
JE22-6102(B)	1	Type 4 Model 3 Modif 1 Antenna	NRL	K-2
JE10-6029(1-4)	1	Type 5 Radio Telephone Transceiver	NRL	S-1
JE21-6350(1-5)	1	Experimental 18 Air Mk 8 Model 2 Radio 1-Dynamotor 2-Transmitter 3-Exp Receiver 4-Receiver 5-Earphones	NRL	Y-4
JE21-6351(1-2)	1	Experimental 18 Air Mk Model 3 Radio 1-Transceiver 2-Battery Box	NRL	Y-4
JE21-6352(1-7)	1	Experimental 19 Air Mk 1 Transceiver (P-1) 1-Control Unit 2-Calibration Unit 3-Dynamotors 4-Microphone 5-Dynamotor-Transceiver Cable 6-Transceiver-Control Cable 7-Transceiver	NRL	Y-4

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE21-6353(1-7)	1	Experimental 19 Air Mk 1 Transceiver (Same as JE21-6352(1-7) above, but with Microphone Type 3 Air Mk 1 instead of Dynamotor-Transceiver Cable)	NRL	Y-4
JE21-6346(1-7)	2	Exp 19 Air Mk 3 Transceivers(12U) (R3) 1-Dynamotor 2-Transceiver 3-Loading Coil 4-Dynamotor-Transceiver Cable 5-Transceiver-Coil Cable 6-Modulator 7-Microphone	NRL	Y-4
JE21-6348(1-2)	1	Exp 19 Air Mk 3 Transceiver (24U) (R3) 1-Transceiver 2-Loading Coil	NRL	Y-4
JE21-6340(1-7)	1	Experimental 19 Air Mk 4 Transceiver 1-Dynamotor 2-Transceiver 3-Dynamotor-Transceiver Cable 4-Control Unit 5-Modulator 6-Loading Coil 7-Microphone	NRL	Y-4
JE22-6103(A-D) -6131(A-C)	2	Ultra-Long Wave Submarine Receivers	NRL	K-2
JE22-6140	2	Ultra-Long Wave Submarine Receivers Less Antennas	NRL	K-2
JE23-0008(1-2)	1	Hand-Held Type Intercept Receiver 1-Amplifier 2-Antenna	OIL	K-4
		JAPANESE NAVIGATIONAL AIDS		
		E-09		
JE21-6354(1-6)	3	Temporarily Designated Model 1 Altimeters (FH-1) 1-Transmitter 2-Receiver 3-Control Unit 4-Indicator 5-Dynamotor 6-Antennas	NRL	Y-4
JE22-6128(A-C)	1	Type 90 Model 2 Modif 1 Fathometer	NRL	K-2

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of items	Destination	Shipment
		JAPANESE SONAR AND ASDIC		
		E-10		
JE21-6334(1-2)	1	Type 93 Sound Head Projector	OIL	Y-4
JE10-6071(1-51)	1	Type 93 Model 1 Echo Ranging Gear	NRL	S-1
JE22-6129(A-U)	1	Type 93 Model 1 Sonar	NRL	K-2
JE23-0014(1-2)	1	Type 93 Model 1 Underwater Sound Gear 1-Stack 2-Stack Holder	OIL	K-4
JE23-0004(1-4)	1	Type 93 Model 2A Underwater Sound Gear 1-Direction Indicator 2-Filter 3-Transmitting Head 4-Transmitting Head	OIL	K-4
JE10-6110(1-4)	1	Type 93 Model 5 Echo Ranging Equipment	NRL	S-1
JE22-6119(A-H)	1	Type 0 Model 1 Modif 1 Listening	NRL	K-2
JE10-4987(1-9)	1	Type 2 Mod 3 Sound Gear	NRL	S-1
JE21-6002(4-5)	1	Type 3 Model 1 Sonar Amplifier Unit	OIL	Y-4
JE22-6127(A-Y)	1	Type 3 Model 1 Sonar	NRL	K-2
JE22-6126(A-N)	1	Type 3 Model 2 Sonar	NRL	K-2
JE10-6070(1-22)	1	Type 3 Model 2 Echo Ranging Equipment	NRL	S-1
JE10-6020(1-3, 6-18) -6057(1-16) 18,20) -6058(1-10, 12,15,18	3	Type 3 Model 3 Echo Ranging Equipment	NRL	S-1
JE21-6001(4)	1	Type 3 Model 3 Sonar Relay Box	OIL	Y-4
JE22-6022(A-N)	1	Type 3 Model 4 Modif 1 Sonar	NRL	K-2
JE23-0006(1-4)	1	Type 5 Underwater Sound Gear 1-Stack 2-Exciter 3-Recorder 4-Oscillator	OIL	K-4
JE10-6072(1-11)	1	"Simple" Type Model 3 Echo Ranging Gear	NRL	S-1
JE21-6003(1-3, 6-8)	6	Sound Heads	OIL	Y-4

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE22-6148	1	Model 1 Sound Head	NRL	K-2
JE22-6149	-	Experimental Chemical Records Model 1	NRL	K-2
		JAPANESE ELECTRON TUBES		
		E-13		
JE0-3	2 Cases	CRT Tubes	NRL	S-1
JE22-6150(1-3)	-	Miscellaneous Vacuum Tubes	NRL	K-2
JE50-5836	154	Tubes, Assorted Vacuum	NRL	Y-4
JE21-6357	-	Transmitting Tubes, FB-324A	NRL	Y-4
JE21-6359	-	Transmitting Tubes, F2-064A	NRL	Y-4
JE23-0009(1-2)	2	12 inch Cathode Ray Tube	OIL	K-4
		JAPANESE MAGNETIC AIRBORNE DETECTOR		
		E-14		
JE21-6335(1-3) -6336(1-3) -6337(1-4)	3	Type 3 Mk 1 Magnets (Search Coil, Search Coil Cover, Amplifier)	NRL	Y-4
JE21-6338(1-14)	1	Type 3 Mk 1 Magnet (Search Coil, Search Coil Cover, Motor-Generator, Compensator, Miscellaneous Parts)	NRL	Y-4
JE21-6339	1	Special Air Mk 1 Magnet Amplifier (New Type)	NRL	Y-4
		JAPANESE ANTENNAE		
		E-16		
JE21-6151	1	Mk 2 Modif 2 Model 4 Radar Submarine Antenna	NRL	K-2
JE2-205	1	Type 4 Receiver Antenna Unit	OIL	S-1
		JAPANESE RADIO, RADAR AND SONAR EQUIPMENT		
		E-17		
JE21-6358	-	Crystal (Transmitting and Receiving)	NRL	Y-4
		JAPANESE RADIO FREQUENCY MEASURING TECHNIQUE		
		E-22		
JE10-6032(1-3)	1	Type 92 Model 1 Wavemeters	NRL	S-1

ENCLOSURE (E). continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE10-6030(1-3)	1	Type 92 Modif 2 Wavemeters	NRL	S-1
JE10-6031(1-3)	1	Type 96 Model 1 Wavemeters	NRL	S-1
JE10-6026 -6033(1-2) -6034(1-6)	3	Type 99 Model 1 Wavemeters	NRL	S-1
JE22-6137	1	Output Meter for Meter Wave Radar	NRL	K-2
		JAPANESE ELECTRONIC HARBOR PROTECTION EQUIPMENT		
		E-26		
JE10-6051(1-12)	1	Type 93 Model 2 or 3 Hydrophone	NRL	S-1
JE10-6054(1-10)	1	Type 97 Model 2 Hydrophone	NRL	S-1
JE10-6055(1-9, 11, 12) -6056(1,3-8)	2	Type 0 Model 1 Hydrophone	NRL	S-1
JE50-1351	1	Type 3 Hydrophone	NMWTS	Y-6
JE10-6021(1-10)	1	Type 3 Model 1 Hydrophone	NRL	S-1
JE10-6059(1-13)	1	Type 3 Model 2 Hydrophone	NRL	S-1
JE10-6022(1-7)	1	Type 3 Model 3 Hydrophone	NRL	S-1
JE10-6050(1-7) -6063(1-2)	3	Type 4 Model 2 Hydrophones	NRL	S-1
JE10-4986(1-12)		Type 4 Model 2 Hydrophones	OIL	S-1
JE10-6014(1-3)	1	"Simple" Type Hydrophone	NRL	S-1
JE10-6061(1)	1	Hydrophones for use with Type 92 Mine	NRL	S-1
JE50-1323	10	Hydrophones, Two of Each Type Army Type 4, Rochelle Salt Army Test Model RW-11 Rochelle Salt Navy Type 93 Dynamic Navy Type 0 Rochelle Salt Navy Dynamic	NMWTS	Y-6
JE50-1335	1	Dynamic Hydrophone	NMWTS	Y-6
JE50-1337(1-2)	1	Hydrophone Assembly	NMWTS	Y-6
JE50-1338	1	Carbon Button Hydrophone	NMWTS	Y-6
JE50-1236	-	Hydrophones	NMWTS	Y-6
JE10-4977(1-14)	1	Sound Gear	OIL	S-1
JE10-6053(1-11)	1	Type 2 Model 1 Magnetic Loop Detectors	NRL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE10-6052(1-12)	1	Type 2 Model 4 Magnetic Loop Detectors	NRL	S-1
JE22-6118(A-K)	1	Type 4 Listening Gear	NRL	K-2
JE21-6006	1	Type 97 Sound Evaluator	OIL	Y-7
		ALL MEDICAL TARGETS		
JE10-7501	1	Kg Model 130 Oxygen Breather	NMRI	S-1
JE10-7502	1	Oxygen Gas Mask Mod 1 With Instructions and Translations	NMRI	S-1
JE10-7503	20 Bx	M, 4 Gas Decontamination Bulbs with Labels and Translations	NMRI	S-1
JE10-7504	1 Bx	Japanese Drug Samples with Labels and Translations	NMRI	S-1
JE21-7511-7516 -7518 -7520 -7523-7525 -7528 -7529	13 Bx	Miscellaneous Drug Samples	OIl	Y-4
JE21-7517 -7521 -7522	3	Cystoscopes	OIL	Y-4
JE21-7507	10 ampules	Syphilis Diagnostic Sol	OIL	Y-4
JE21-7510	1	Artificial Arm, Navy Ryohismsho	OIL	Y-4
JE21-7505	-	Drugs and Medical Equipment and Samples	OIL	Y-4
JE21-7509	1	Type 5 Oxygen Breathing Apparatus	OIL	Y-4
		JAPANESE TORPEDOES AND TUBES		
		0-01		
		Torpedoes		
JE10-4677(1) -4678(1) -4679(1)	3	6 Year Type Torpedoes	OIL	S-1
JE10-4878	1	6th Year Type Model 1 Torpedo	OIL	S-1
JE10-4681(1)	1	6th Year Type Modif 1 Torpedo	OIL	S-1
JE10-4681(1) -4682(1) -4683(1)	3	6th Year Type Modif 2 Torpedoes	OIL	S-1
JE10-4865(1-2)	8	8th Year Type Model 2 Torpedoes	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE10-6052(1-12)	1	Type 2 Model 4 Magnetic Loop Detectors	NRL	S-1
JE22-6118(A-K)	1	Type 4 Listening Gear	NRL	K-2
JE21-6006	1	Type 97 Sound Evaluator	OIL	Y-7
		ALL MEDICAL TARGETS		
JE10-7501	1	Kg Model 130 Oxygen Breather	NMRI	S-1
JE10-7502	1	Oxygen Gas Mask Mod 1 With Instructions and Translations	NMRI	S-1
JE10-7503	20 Bx	M, 4 Gas Decontamination Bulbs with Labels and Translations	NMRI	S-1
JE10-7504	1 Bx	Japanese Drug Samples with Labels and Translations	NMRI	S-1
JE21-7511-7516 -7518 -7520 -7523-7525 -7528 -7529	13 Bx	Miscellaneous Drug Samples	OIL	Y-4
JE21-7517 -7521 -7522	3	Cystoscopes	OIL	Y-4
JE21-7507	10 ampules	Syphilis Diagnostic Sol	OIL	Y-4
JE21-7510	1	Artificial Arm, Navy Ryohismsho	OIL	Y-4
JE21-7505	-	Drugs and Medical Equipment and Samples	OIL	Y-4
JE21-7509	1	Type 5 Oxygen Breathing Apparatus	OIL	Y-4
		JAPANESE TORPEDOES AND TUBES		
		0-01		
		Torpedoes		
JE10-4677(1) -4678(1) -4679(1)	3	6 Year Type Torpedoes	OIL	S-1
JE10-4878	1	6th Year Type Model 1 Torpedo	OIL	S-1
JE10-4681(1)	1	6th Year Type Modif 1 Torpedo	OIL	S-1
JE10-4681(1) -4682(1) -4683(1)	3	6th Year Type Modif 2 Torpedoes	OIL	S-1
JE10-4865(1-2)	8	8th Year Type Model 2 Torpedoes	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE10-4670(1) -4671(1) -4672(1) -4862(1-3)	6	Type 93 Model 1 Modif 1 Torpedoes	OIL	S-1
JE10-4863(1-2) -4873	3	Type 93 Model 1 Modif 2 Torpedoes	OIL	S-1
JE10-4673(1) -4674(1) -4675(1) -4872(1-3)	6	Type 93 Model 1 Modif 3 Torpedoes	OIL	S-1
JE10-4676(1) -4871(1-3)	4	Type 93 Model 3 Torpedoes	OIL	S-1
JE10-4689(1)	1	Type 94 Torpedo	OIL	S-1
JE10-4861(1-3)	3	Type 94 Model 1 (Temporary Deisgnation) Torpedoes	OIL	S-1
JE10-4870(1-3) JE22-1506 -1507 -1508 -1509	7	Type 94 Model 2 Torpedoes Type 94 Model 2 Torpedoes	OIL OIL	S-1 K-4
JE10-4658(1) -4659(1)	2	Type 95 Modif 1 Torpedoes	OIL	S-1
JE10-4660(1) -4662(0-1) -4853 -4888(1-2)	6	Type 95 Model 2 Torpedoes	OIL	S-1
JE10-4663(1) -4889(1-2)	3	Type 96 Torpedoes	OIL	S-1
JE21-4505	1	Type 1 Aerial Torpedo (Jet Propelled)	OIL	Y-7
JE10-4653(1) -4654(1) -4655(1) -4891(1-3)	12	Type 2 Torpedoes	OIL	S-1
JE22-1510 -1511 -1512 -1513 -1514 -1515		Type 2 Torpedoes	OIL	K-4
JE10-4884(1-2) -4885(1-3)	5	Type 2 (Temporary Designation) Torpedoes	OIL	S-1
JE10-4656(1) -4657(1) -4886 -4887(1-3)	6	Type 2 Special Torpedoes	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE21-4508	9	Type 4 Torpedoes	OIL	Y-4
JE22-1061(1-8)		Type 4 Torpedoes	OIL	K-4
JE10-4690(1) -4691(1) -4692(1)	3	Type 4 Mk 1 Model 1 Aerial Torpedoes	OIL	S-1
JE21-4990(1-3)	3	Type 4 Modif 1 Model 1 Torpedoes	OIL	Y-4
JE10-4499(1)	2	Type 5 Eleven Inch Torpedoes	OIL	S-1
JE21-4991	1	Type 5 (Rocket) Torpedo	OIL	Y-4
JE21-4511	1	Type 6 Aerial Torpedo Bomb	OIL	Y-4
JE21-4988	1	Type 7 Aerial Torpedo Bomb	OIL	Y-4
JE21-4518(1-2)	1	Type 8 Special Torpedo (Complete)	OIL	Y-4
JE21-4507	1	Type k Torpedo Engine-220 HP	OIL	Y-4
JE20-4965	1	Type M Torpedo (without Head)	OIL	Y-4
JE22-1501 -1504	2	Kaiten Type 1 (Body)	OIL	K-4
JE22-1502 -1505	2	Kaiten Type 1 (Torpedoes)	OIL	K-4
JE22-1521	1	Kaiten Type 2 (Body)	OIL	K-4
JE22-1522 -1523	2	Kaiten Type 4 (Body)	OIL	K-2
JE21-4517	1	Buffer Aerial Torpedo Wing	OIL	Y-4
		Torpedo Exploders		
JE10-4768(1-6) -4770(1-13)	-	4th Year Type Mk 1 Model 1 Exploders	OIL	S-1
JE10-4769(1-26)	-	4th Year Type Mk 1 Model 2 Exploders	OIL	S-1
JE10-4573(1-7) -4577(1-3) -4578(1-4) -4580(1-3)	-	Type 90 Exploders	OIL	S-1
JE10-4770(1-13)	-	Type 90 Model 2 Exploders	OIL	S-1
JE22-3414 -3415		Type 90 Model 2 Exploders	OIL	K-4
JE22-3416	1 Bx	Type 90 Model 2 Strong Exploders	OIL	K-4
JE10-4571(1-4) -4572(1-4) -4573(1-7)	-	Type 91 Model 1 Exploders	OIL	S-1
JE10-4569(1-12)	-	Type 91 Model 2 Exploders	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
-4570(1-18) -4574(1-11)				
JE10-4570(1-18)	-	Type 91 Model 3 Exploders	OIL	S-1
JE22-3417		Type 91 Model 3 Exploders	OIL	K-4
JE10-4848	1 Bx	Type 98 Model 1 Exploders	OIL	S-1
JE10-4569(1-12) -4574(1-11) -4575(1-4) -4576(1-2) -4578(1-4) -4579(1-3) -4581(1-2) -4582(1-3) -4583(1-2) -4584(1-2) -4585(1-3)	-	Type 2 Exploders	OIL	S-1
JE22-3402	1	Type 2 Special Torpedo Exploders	OIL	K-4
JE10-4568(1-16) -4769(1-26) -4847	-	Type 2 Modif 1 Exploders	OIL	S-1
JE22-3418	-	Type 2 Modif 1 Exploders	OIL	K-4
JE22-3418 -3259 -3260 -3261 -3262 -3411 -3412 -3413	-	Type 2 Model 2 Exploders	OIL	K-4
JE22-3410	1 Bx	Type 3 Exploders	OIL	K-4
JE21-4426	1 Bx	Type 4 Mk 1 Model 1 Exploders	OIL	Y-5
JE22-3409	1 Bx	Type 4 Model 1 Modif 1 Exploders	OIL	K-4
JE10-4846	1 Bx	Type 10 Model 2 Exploders	OIL	S-1
JE10-4496	1 Bx	Whisker Type Exploders	OIL	S-1
JE10-4998	3	Torpedo Pistols (3) & Tool Kit (1)	OIL	S-1
JE21-4973	-	Assorted Torpedo Exploders	OIL	Y-4
JE21-4075 -4338		Assorted Torpedo Exploders	OIL	Y-5
JE23-0011(8-13)		Assorted Torpedo Exploders	OIL	K-4
		Torpedo Warheads		
JE10-4712(1-2)	2	4th Year Type Aerial Torpedo Warheads	OIL	S-1
JE10-4619(1) -4620(1)	8	6th Year Type Torpedo Warheads	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No.	Quant	Description of Items	Destination	Shipment
-4621(1) -4622(1) -4623(1) -4624(1) -4703(1-2)				
JE10-4613(1) -4614(1) -4615(1) -4616(1) -4617(1) -4702(1-2)	7	8th Year Type Mk 2 Torpedo Warheads	OIL	S-1
JE10-4701(1)	1	Type 44 Torpedo Warhead	OIL	S-1
JE10-4618(1)	1	Type 89 Model 2 Torpedo Warhead	OIL	S-1
JE10-4708(1)	1	Type 90 Torpedo Warhead	OIL	S-1
JE10-4705(1-2)	2	Type 91 Modif 2 Torpedo Warheads	OIL	S-1
JE10-4704(1-2)	2	Type 93 Model 1 Modif 1 Torpedo Warheads	OIL	S-1
JE10-4700(1-2) -4856(1-3)	5	Type 95 Torpedo Warheads	OIL	S-1
JE10-4625(1)	5	Type 95 Model 2 Torpedo Warheads	OIL	S-1
JE10-4706(1)	1	Type 2 Torpedo Warhead	OIL	S-1
JE10-4707(1)	1	Type 2 Special Torpedo Warhead	OIL	S-1
JE22-1500 -1503	2	Kaiten Type 1 Torpedo Warheads	OIL	K-4
JE22-1520	1	Kaiten Type 2 Torpedo Warheads	OIL	K-4
JE22-1524 -1524	2	Kaiten Type 4 Torpedo Warheads	OIL	K-4
JE21-4986	1	'OR'-2 (Torpedo?) Head-Body Only	OIL	Y-4
JE21-4985	13	Net Cutters for Torpedo Warheads	OIL	Y-4
		Torpedo Exercise Warheads		
JE10-4869(1-9)	9	6th Year Type Exercise Heads	OIL	S-1
JE10-4594(1) -4595(1) -4596(1) -4597(1)	4	6th Year Type Model 2 Exercise Heads	OIL	S-1
JE10-4892(20-22, 25-30)	9	8th Year Type Exercise Heads	OIL	S-1
JE10-4598(1) -4600(1) -4601(1)	4	8th Year Type Model 2 Exercise Heads	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE10-4589(1) -4869(10) -4892(1)	3	Type 44 Exercise Heads	OIL	S-1
JE10-4586(1) -4892(18-19)	3	Type 89 Model 2 Exercise Heads	OIL	S-1
JE10-4892 (23-24)	2	Type 90 Exercise Heads	OIL	S-1
JE10-4599(1)	1	Type 90 Model Exercise Head	OIL	S-1
JE10-4892 (16-17)	2	Type 91 Exercise Heads	OIL	S-1
JE10-4602(1) -4603(1) -4604(1) -4605(1) -4892(31-36)	10	Type 91 Model 2 Exercise Heads	OIL	S-1
JE22-1064(1-4)	4	Type 91 Model 3 Exercise Heads	OIL	K-4
JE22-1065(1-4)	4	Type 91 Model 3 Strong Exercise Heads	OIL	K-4
JE10-4892(4-11)	8	Type 93 Exercise Heads	OIL	S-1
JE10-4989(2)	1	Type 93 (Large) Exercise Head	OIL	S-1
JE10-4989(3-6)	4	Type 93 (Small) Exercise Heads	OIL	S-1
JE10-4590(1) -4591(1) -4592(1) -4593(1)	4	Type 93 Model 1 Modif 1 and 2 Exercise Heads	OIL	S-1
JE10-4869(20-25)	6	Type 94 Model 2 Exercise Heads	OIL	S-1
JE10-4989(1) -4892(12-15)	5	Type 95 Exercise Heads	OIL	S-1
JE10-4606(1) -4607(1) -4608(1) -4609(1) -4869(11-17)	11	Type 95 Model 2 Exercise Heads	OIL	S-1
JE10-4869(18-19)	2	Type 96 Exercise Heads	OIL	S-1
JE10-4892(2-3)	9	Type 2 Exercise Heads	OIL	S-1
JE22-1516 -1517 -1518 -1519 -3255 -3256 -3257		Type 2 Exercise Heads	OIL	K-4

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE10-4578(1) -4588(1)	2	Type 2 Model 3 Exercise Heads	OIL	S-1
JE10-4499(2)	2	Type 5, 11" Exercise Heads	OIL	S-1
JE10-4611 -4612	2	Radio Type Exercise Heads	OIL	S-1
JE10-4776(1) -4777(1)	2	Type Z 2 smoke Filled Torpedo Heads	OIL	S-1
		Torpedo Gyroscopes		
JE10-4541(1-4) -4545(1-4) -4546(1-4) -4547(1-4) -4548(1-4) -4550(1-4) -4551(1-4) -4560(1-5) -4768(1-6) -4769(1-26)	-	4th Year Type Gyros	OIL	S-1
JE22-3423		4th Year Type Gyros	OIL	K-4
JE10-4542(1-4) -4543(1-4) -4545(1-4)	12	4th Year Type Gyros	OIL	S-1
JE10-4851	1 Bx	4th Year Type Model 2 Gyros	OIL	S-1
JE10-4849	1 Bx	6th Year and 8th Year Type Gyros	OIL	S-1
JE10-4544(1-4) -4549(1-4) -4552(1-3) -4553(1-4) -4556(1-5)	-	Type 91 Gyros	OIL	S-1
JE22-3403 -3404		Type 91 Gyros	OIL	K-4
JE21-4992	1 Bx	Type 91 Gyros Modified for Type 2 Torpedo	OIL	Y-4
JE21-4993(2)	1 Bx	Type 91 Strong Gyros	OIL	Y-4
JE21-4994(1-2)	2	Type 91 Gyros for Use in Midget Subs and PT Boats	OIL	Y-4
JE10-4768(1-6) -4769(1-26)	-	Type 91 Modif. 1 Gyros	OIL	S-1
JE21-4987(1-2)	2	Mk 91 Mod 3 Gyros	OIL	Y-4
JE21-4510(1-2)	2	Mk 91 Mod 3 Strong Gyros	OIL	Y-4
JE10-4548(1-4) -4567(1-4)	-	Type 92 Gyros	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE10-4556(1-5) -4557(1-4) JE21-4995(1-3)	7	Type 98 Gyros	OIL	S-1 Y-4
JE10-4554(1-4) -4555(1-4) -4558(1-4) -4559(1-4) -4561(1-4) -4562(1-4) -4563(1-4) -4564(1-4) -4565(1-4) -4566(1-4) -4850	-	Type 98 Modif 1 Gyros	OIL	S-1
JE22-3405 -3406		Type 98 Modif 1 Gyros	OIL	K-4
JE22-3425 -3426 -3427 -3428	4	Type 2 Gyros	OIL	K-4
JE21-4508(1-2)	2	Type 4 Gyros	OIL	Y-4
JE21-4996(1-3)	3	Electric Gyros	OIL	Y-4
JE10-4759(1-10)	10	Type 2 Modif 1 Gyro Compasses, Torpedo Practice Scuttling Clocks	OIL	S-1
		Torpedo Recorders		
JE21-4998(1-2)	-	Type 2 Recorder Mechanisms	OIL	Y-4
JE21-4997(1-2)	-	Type 92 Recorder Mechanisms	OIL	Y-4
JE21-4999(1-3)	-	Type 93 Recorder Mechanisms	OIL	Y-4
JE10-4760(1-2)	2 Bx	Raido Recorder Mechanisms	OIL	S-1
JE10-4755(1-6)	1 Bx	Recorder Mechanisms	OIL	S-1
JE21-4971 -4972		Recorder Mechanisms	OIL	Y-4
JE22-3507		Recorder Mechanisms	OIL	K-4
JE50-1256	1 Bx	Parts for Recording Depth Gauges	NMWTS	Y-6
JE50-1261(1)	1	Recording Depth Gauge and Accessories	NMWTS	Y-6
JE50-1239(1-7)	7	Assorted Depth Recorders	NMWTS	Y-6
		Torpedo Tubes		
JE22-1052	1	Type 92 Model 4 Quad Mount Torpedo Tube	OIL	K-4
JE50-1143	2	Torpedo Tubes with Equipment	Ports	[illegible]

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
		JAPANESE MINES		
		0-04		
		Mines		
JE21-4524	1	Temp Designated 7th Year Type Mine	OIL	Y-4
JE21-4522	1	Mk 1A Mine	OIL	Y-4
JE21-4523	1	Mk 1B Mine	OIL	Y-4
JE21-4533	1	Mk 3 Mine	OIL	Y-4
JE21-4539(C)	1	Mk 4 Mine	OIL	Y-4
JE22-3272 -3273	2	Mk 5 Moored Mines with Anchors	OIL	K-4
JE21-4519 3271	2	Mk 5 Modif. 1 Mines Mk 4 Modif. 1 Mines	OIL OIL	Y-4 K-4
JE21-4531	1	Mk 6 Model 1 Mine	OIL	Y-4
JE21-4533 -4535(1-2)	3	Mk 6 Model 3 Mines	OIL	Y-4
JE21-4509(1-2)	2	Type 88 Modif. 1 Mines	OIL	Y-4
JE21-4534	1	Type 89 Mine with Anchor	OIL	Y-4
JE10-4633(1) JE21-4515(1-2)	3	Type 92 Mines with Anchor (1) Type 92 Mines with Anchor (1)	OIL OIL	S-1 Y-4
JE21-4515(3)	1	Type 92 Mine (Cross Section no Anchor)	OIL	Y-4
JE21-4501(1-2)	2	Type 93 Mod 1 Mines	OIL	Y-4
JE21-4502(1)	1	Type 93 Model 3 Mine	OIL	Y-4
JE21-4892	1	Type 94 Model 2 Mine	OIL	Y-4
JE10-4630(1-2) -4631(1-2) -4632	12	Type 96 Mine	OIL	Y-4
JE21-4544 -4561(1-2)		Type 96 Mines (cont)	OIL	Y-4
JE21-4566(1-4)		Type 96 Mines (cont)	OIL	Y-5
JE21-4543(2)	1	Type 96 Modif. 1 Mine	OIL	Y-4
JE23-0013(1-2)	2	Type 96 Modif. 1 Anti-Sub Mines (net)	OIL	K-4
JE21-4968	1	Type 1 Mine	OIL	Y-4
JE10-4771(1)	5	Type 2 Mines with Anchors	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Item	Destination	Shipment
-4772(1) -4773(1) -4774(1) -4775(1,				
JE10-4639(1) -4640(1) JE10-4709 JE22-3491	8	Type 3 Aircraft Laid Mines	OIL	S-1
		Type 3 Aircraft Laid Mines	OIL	K-4
JE21-4512(1-2)	2	Type 4 Mines	OIL	Y-4
JE10-4634(1) -4635(1) -4636(1) -4637(1) -4638(1)	8	Type 5 Mines with Anchors	OIL	S-1
JE21-4975(1-3)		Type 5 Mines with Anchors	OIL	Y-4
JE21-4541	1	Type 9 Mine	OIL	Y-4
JE10-4710	5	Type "A" Mines	OIL	S-1
JE21-4514(1-2) -4517	3	Type "K-2" Mines	OIL	Y-4
JE21-4517	1	"u-1" Mine 8	OIL	Y-4
JE10-4497	2	German Mines, Assorted	OIL	S-1
JE21-4529(1-2)	2	German Mines (Kurihama Yoko)	OIL	Y-4
JE21-4521(1-15) -4527(1-5) -4542	21	Chinese and Russian Mines (assorted)	OIL	Y-4
JE21-4562(1-2)	2	British Type Aircraft Laid Mines	OIL	Y-4
JE21-4530 JE22-3274 -3275 -3470 -3471 -3478(A-B)	7	Acoustic Mines Acoustic Mines	OIL OIL	Y-4 K-4
JE22-3268 -3269 -3270 JE50-1276(1-2)	4	Sweep Obstructors with Anchors	OIL	K-4
		Sweep Obstructors with Anchors	NMWTS	K-4
JE23-0012(1-2)	2	Sweep Obstructors	OIL	K-4
JE23-0012(3-4)	2	Sweep Obstructor Anchors	OIL	K-4
JE21-4966	1	Avocado Pendulum Type Mine	OIL	Y-4
JE21-4981	1	Beach Mine, Temporary Designation	OIL	Y-4

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Item	Destination	Shipment
JE21-4528(1-8)	8	Unidentified Mines	OIL	Y-4
JE23-0103(1-2)	2	Floating Mines	OIL	Y-7
		Mine Accessories		
JE10-4645(1-8)	-	Mk 6 Modif (Mine) Spare Parts	OIL	S-1
JE21-4504(4-5) -4505(1-3) -6000 -6001	4	Type 92 Control Units For Mine Detonating Equipment	OIL	Y-4
JE21-4567(1-6)	6	Type 93 Arming Springs and Pistons (Mine)	OIL	Y-5
JE10-4647(1-2)	-	Type 2 Horns (20) Safety Cables, Insulated Wires	OIL	S-1
JE22-3252	1	Mk 2 Revised Mine Unit	OIL	K-1
JE21-4545(1-30)	30	Type 3 Magnetic Mine Units	OIL	Y-4
JE21-4546(1-8)	8	Type 3 Acoustic Mine Units	OIL	Y-4
JE10-4651(1)	1	Type 5 Extender and Arming Mechanism	OIL	S-1
JE10-4645(1-8)	5	Type "A" Mine Magnets	OIL	S-1
JE21-4513	1	Type "K-1" Mine Parachute Cover	OIL	Y-4
JE21-4974	1 Bx	Type "K-2" Mine Soluble Washers	OIL	Y-4
JE22-3508 -3509 -3510	3	Yokosuka Type Mine Exploder	OIL	K-4
JE10-4646(1-4)	-	Lead Horns for Type 2, Type 5, Type "A" Mines	OIL	S-1
JE21-4547(1-20)	-	Lead Horns, Assorted	OIL	Y-4
JE50-1340	1	German Period Delay Mechanism	NMWTS	Y-6
JE50-1341(1-2)	2	Delay Mechanisms	NMWTS	Y-6
JE10-4496	-	24 Hour Clock, Chemical Horn Plugs, and Dip Needle Mechanism	OIL	S-1
JE22-3253 -3289 JE22-3496 -3497 -3498 -3499 -3500	7	Acoustic Mine Units, Assorted Acoustic Mine Units, Assorted	OIL OIL	K-1 K-4
JE22-3254	-	Miscellaneous Parts for Mine Base	OIL	K-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE21-4803	-	Induction Coils for Mines	OIL	Y-4
		Mine Tools		
JE10-4645(1-8)	-	Type 92 Tools, Hydrophone, Set of Rubber Washers, Spare Parts,	OIL	S-1
JE10-4649(1-17)	5 Bx	Type 96 Tools	OIL	S-1
JE10-4645(1-8)	-	Type 5 Tools	OIL	S-1
JE10-4645(1-8)	1 Bag	Type "A" Tools	OIL	S-1
JE21-4548	1	Influence Mine Tool Kit	OIL	Y-4
JE22-3288	7	Magnetic Mine Units, Assorted	OIL	K-1
JE22-3492 -3493 -3494 -3495		Magnetic Mine Units, Assorted	NMWTS	K-4
JE22-3501 -3502		Magnetic Mine Units, Assorted	OIL	K-4
		DEPTH CHARGES		
		0-08		
JE10-4645(1-8)	12	Type 88 "YOKO" A/C Depth Charges with Pistols	OIL	S-1
JE23-0011(1-5)		Type 88 "YOKO" A/C Depth Charges with Pistols	OIL	K-4
JE10-4643(1-4)	2	Type 95 Depth Charge with Tools & Spare Parts	OIL	S-1
JE10-4642(1-2) -4644(1-4) -4652(1-9)	18	Type 2 Depth Charges and Tools	OIL	S-1
JE21-4568(1-3)		Type 2 Depth Charges and Tools	OIL	Y-5
JE10-4649(1-17)	5	Type 2 Depth Charge Pistols and Booster Cans	OIL	S-1
JE10-4641(1-2)	2	Type 3 Depth Charges	OIL	S-1
JE10-4648(1-9) -4649(1-17)	5 Bx	Type 3 Depth Charge Tools	OIL	S-1
JE10-4652(1-9)	3	Type 3 Model 1 Depth Charges with Pistols (5)	OIL	S-1
JE21-4570(1-4)	4	Type 3 Model 1 Modif 2 Depth Charges	OIL	Y-5
JE22-3419 -3421	2	Type 3 Model 2 Depth Charge Pistols	OIL	K-4
JE21-4969(1-3)	3	Type 4 Depth Charges	OIL	Y-4
JE21-4551	1	Type 11 Depth Charge	OIL	Y-4

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE21-4516	1	Type "JR" Depth Charge Case	OIL	Y-4
JE10-4711	5	Small Model Depth Charges	OIL	S-1
JE10-4649(1-17)	-	Small Model Depth Charge Pistols and Booster Cans	OIL	S-1
JE21-4967(1-2)	2	Experimental Depth Charges	OIL	Y-4
JE21-4550	1	Aerial Depth Charge	OIL	Y-4
JE21-4552 -4553	2	Depth Charge Pistols (Unknown Types)	OIL	Y-4
JE21-4983(1-4)	4	Tail Fins for Depth Charges	OIL	Y-4
JE21-4564	1	Depth Charge Pistol Launcher	OIL	Y-4
JE23-0005	-	Depth Charge Parachutes (Drogues)	OIL	K-4
		ROCKETS		
		0-09		
JE3-321	- Bx	5cm Rocket	OIL	S-1
JE2-121,122	29	7cm Rockets	OIL	S-1
JE21-4084(0-2)		7cm Rockets	OIL	Y-5
JE21-4378	1	75mm Rocket	OIL	Y-5
JE21-3206	1	8cm Rockets (Bazooka)	OIL	Y-4
JE21-3207	2	8cm Rockets	OIL	Y-7
JE21-4039		8cm Rockets	OIL	Y-5
JE10-4013(1-7)	7	12cm Spin Stabilized Rockets	OIL	S-1
JE21-4064(1-11)	11	12cm Incend Shrapnel Ground Rockets	OIL	Y-5
JE21-4459	1	20cm Rocket	OIL	Y-5
JE21-4498	1	40cm Rocket	OIL	Y-4
JE21-4485	1	50kg Large Tail Rocket	OIL	Y-4
JE21-4040(1-5)	5	Mk 27 Rockets	OIL	Y-5
JE21-4458	1	Circular Shroud Rocket	OIL	Y-4
JE21-4449	1	Rocket with Parachute	OIL	Y-4
JE21-4462	1	White Bomb Rocket	OIL	Y-4
JE21-4712	1	Special Rocket with Tracer Head	OIL	Y-5
JE21-4069(0-1) -4372(1-21)	-	Assorted Rockets	OIL	Y-5

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE10-4099(1-5)	5	Type 3 Rocket Mortars	OIL	S-1
JE21-4483	1	Large Rocket Mortar	OIL	Y-4
JE21-4476	1	Rocket Body, Short	OIL	Y-4
JE21-4447	1	Rocket Body, Long	OIL	Y-4
JE21-4482	1	Rocket Grid	OIL	Y-4
JE21-4446	1 Bx	Type 14 Mk 4 Experimental Rocket Motor Fuzes	OIL	Y-5
JE21-4074(0-9)	4	Experimental Gas Rockets	OIL	Y-5
JE21-4072(1-5)	5	Porcelain Rocket Heads	OIL	Y-5
		PROPELLANTS		
		0-10		
JE21-4071(0-7) -4077 -4340	-	Rocket Propellants	OIL	Y-5
JE21-4079	1 Bx	2 Propellaents	OIL	Y-7
JE21-4336	1	Rocket Motor	OIL	Y-5
		PYROTECHNICS		
		0-12		
JE21-4080(0-1) -4099	4	Type 2 Flares	OIL	Y-5
JE21-4094	1 Bx	Special Flares	OIL	Y-5
JE21-4355	1 Bx	Parachute Flares	OIL	Y-5
JE21-4464	1 Bx	"HE" Shell Mk 1 Flare	OIL	Y-5
JE21-4451	1 Bx	Experimental Type Flashing Shells Model 2 Flare (Black Overall)	OIL	Y-5
JE21-4453	1 Bx	Experimental Type Flashing Shells Model 1	OIL	Y-4
JE10-4074	1 Bx	Signal Flares, Large	OIL	S-1
JE10-4075	1 Bx	Signal Flares, Small	OIL	S-1
JE21-4432 -4442 -4448	-	Flare Containers	OIL	Y-4
JE21-4441	1 Bx	Flare Containers, Large	OIL	Y-4
JE21-4435	1 Bx	Large Fiber Flare Containers	OIL	Y-4
JE3-322	1 Bx	Flare Candles	OIL	S-1

ENCLOSURE (E) continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE21-4450 -4460	4 Bx	Flares, Unspecified	OIL	Y-4
JE21-4097 -4343		Flares, Unspecified	OIL	Y-5
JE10-3104-SD	2	Signal Pistols	OIL	S-1
JE10-4079	2 Bx	Pyrotechnic Devices (Unspecified)	OIL	S-1
JE21-4115		Pyrotechnic Devices (Unspecified)	OIL	Y-5
JE21-4104	1 Bx	Special Pyrotechnic Fuzes	OIL	Y-5
JE21-4371	1	Underwater Red Ball	OIL	Y-5
JE21-4359	1	Sea Marker (?)	OIL	Y-5
JE50-3398(1-6)	6	Colored Burst Containers	OIL	Y-6

JAPANESE NAVAL AMMUNITION CASES FOR 5CM AND LARGER CALIBER GUNS

O-14

JE22-1041	200	10cm Shell Cases	NRL	K-4
JE22-1040	170	12.7/4C cal Shell Cases	NRL	K-4
JE10-4108(1-2)	2	14cm Semi Fied Propellant Cases (loaded) (loaded)	OIL	S-1
JE10-4110(1-2) -4158(1-2)	4	15cm Semi Fied Propellant Cases (loaded)	OIL	S-1
JE10-4109(1-2)	3	20cm Semi Fixed Propellant Cases (loaded)	OIL	S-1
JE21-4047	2	Shell Cases, Steel (Unspecified)	OIL	Y-4
JE22-1042	50	25mm Magazines	NRL	K-4

ARMOR PLATE

O-16

JE50-3101 3104-3106 3108-3120 3122-3130 3132-3134 3136-3137 3150-3153 3154(1-5) 3155-3156	44pcs	Armor Plate, Assorted Samples	NPG	K-4
JE22-1006 -2073		Armor Plate, Assorted Samples	NPG	K-4
JE50-3144	9pcs	Aircraft Armor Plate 3/8" and ½"	NPG	Y-6
JE22-3143	1 Bx	Armor Plates	OIL	Y-7

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
		BOMB & PROJECTILE FUZES		
		0-17		
JE10-4132	1 Bx	A-1(a) Bomb Fuzes	OIL	S-1
JE10-4122(1-2)	2 Bx	A-1(b) Bomb Fuzes	OIL	S-1
JE10-4038	4 Bx	A-3(a) Bomb Fuzes	OIL	S-1
JE10-4039	2 Bx	A-3(b) Bomb Fuzes	OIL	S-1
JE10-4040 -4126	3 Bx	A-3(c) Bomb Fuzes	OIL	S-1
JE10-4041	6 Bx	A-3(d) Bomb Fuzes	OIL	S-1
JE10-4124(1-2)	2 Bx	A-3(f) Bomb Fuzes	OIL	S-1
JE10-4042 -4123(1-2)	4 Bx	B-2(a) Bomb Fuzes	OIL	S-1
JE10-4043	3 Bx	B-3(a) Bomb Fuzes	OIL	S-1
JE10-4044	3 Bx	B-3(b) Bomb Fuzes	OIL	S-1
JE10-4125	1 Bx	B-6(a) Bomb Fuzes	OIL	S-1
JE10-4047	1 Bx	B-6(New) Bomb Fuzes	OIL	S-1
JE10-4045	2 Bx	C-1(a) Fuzes	OIL	S-1
JE10-4046	2 Bx	C-2(a) Bomb Fuzes	OIL	S-1
JE10-4048	2 Bx	D-2(a) Bomb Fuzes	OIL	S-1
JE10-4133	1 Bx	D-2(b) Bomb Fuzes	OIL	S-1
JE10-4049	2 Bx	D-2(c) Bomb Fuzes	OIL	S-1
JE10-4050	2 Bx	D-3(a) Bomb Fuzes	OIL	S-1
JE21-4070	1 Bx	E-1(a) Fuzes for Parachute Missile	OIL	Y-5
JE10-4004	1 Bx	3rd Year Type Projectile Fuzes	OIL	S-1
JE10-4006	2 Bx	5th Year Type Projectile Fuzes	OIL	S-1
JE10-4113	1 Bx	5th Year Type Mod 1 Combination Projectile Fuzes	OIL	S-1
JE21-4390	1 Bx	9th Year Type Fuzes	OIL	Y-5
JE10-4066	1 Bx	10th Year Type AA Projectile Fuzes	OIL	S-1
JE21-4376 -4416	2 Bx	12th Year Type Bomb Fuzes	OIL	Y-5

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Item	Destination	Shipment
JE50-3326	1 Bx	13th Year Type Model 4 Fuzes	OIL	Y-5
JE50-3319	1 Bx	13th Year Type Mk 4 Fuzes	OIL	Y-5
JE10-4005	1 Bx	Type 44 Projectile Fuzes	OIL	S-1
JE10-4010	7 Bx	Type 88 Fuzes	OIL	S-1
JE3-323		Type 88 Fuzes	OIL	S-1
JE2-66 -117 -118		Type 88 Fuzes	OIL	S-1
JE21-4069 -4076		Type 88 Fuzes	OIL	Y-5
JE21-4057	1 Bx	Type 88 Mk 2 (Temporary Designation) Firing Mechanism	OIL	Y-5
JE50-3317	2 Bx	Type 88 Model 4 Projectile Fuzes	OIL	Y-5
JE21-4072		Type 88 Model 4 Projectile Fuzes	OIL	Y-5
JE10-4014	1 Bx	Type 89 AA Projectile Fuzes	OIL	S-1
JE10-4053	3 Bx	Type 89 Times Fuzes	OIL	S-1
JE21-4117		Type 89 Times Fuzes	OIL	Y-5
JE50-3321		Type 89 Times Fuzes	OIL	Y-5
JE10-4011	2 Bx	Type 91 Projectile Fuzes	OIL	S-1
JE50-3318		Type 91 Projectile Fuzes	OIL	Y-5
JE21-4074	1 Bx	Type 91 Modif 1 Mechanical Time Fuzes	OIL	Y-5
JE10-4052	1 Bx	Type 92 Fuzes	OIL	S-1
JE3-324	1 Bx	Type 93 Fuzes	OIL	S-1
JE21-4068	1 Bx	Type 93 Mortar Fuzes	OIL	Y-5
JE21-3327	1 Bx	Type 96 Fuzes	OIL	Y-5
JE21-4073	1 Bx	Type 98 Modif 1 Mechanical Time Fuzes	OIL	Y-5
Je21-4053	1 Bx	Type 99 Nose Fuze	OIL	Y-5
JE21-4056	1 Bx	Type 99 Special Firing Mechanisms Model 1	OIL	Y-5
JE3-325	32 Bx	Type 0 Projectile Time Fuzes	OIL	S-1
JE2-129		Type 0 Projectile Time Fuzes	OIL	S-1
JE10-4112		Type 0 Projectile Time Fuzes	OIL	S-1
JE10-4072	1 Bx	Type 1 Projectile Fuzes	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-3320	1 Bx	Type 1 Fuzes (25mm)	OIL	Y-5
JE21-4037(1-5)	5 Bx	Type 1 Special Long Delay Noze Fuzes	OIL	Y-5
JE10-4114	3 Bx	Type 2 Projectile Nose Fuzes	OIL	S-1
JE21-4044(1-2)		Type 2 Projectile Nose Fuzes	OIL	Y-5
JE10-4111	1 Bx	Model 2 Anti-Submarine Projectile Fuzes	OIL	S-1
JE21-4380	1 Bx	Type 3 Bomb Fuzes	OIL	Y-5
JE21-4038(1-7)	7 Bx	Type 3 Electric Firing Mechanisms	OIL	Y-5
JE21-4379	1 Bx	Mk 3 Bomb Nose Fuzes	OIL	Y-5
JE21-4061 (1-28,30-31)	30	Type 3 Photoelectric Bomb Fuzes for Use with Mk 31 Bomb (with Tubes)	OIL	Y-4
JE21-4001	14	Type 3 Electric Firing Devices, Nose, for Use with Bomb MK 31.	OIL	Y-1
JE21-4001(1)	1 Bx	Vacuum Tubes PLS0V, UY630x3764A for Use with Type 3 Influence Fuze (Above)	OIL	Y-4
JE21-4045(1) -4046(2)	1 Bx	Type 3 Model 2 Nose Time Fuzes	OIL	Y-5
JE10-4001(1-50)	50	Photoelectric Fuzes (Type 3?)	OIL	S-1
JE10-4159(1)	1 Bx	Accessoried for JE10-4001(1-50)	OIL	S-1
JE50-3325	1 Bx	Mk 4 (Temporary Designation) Mechanical Time Fuzes	OIL	Y-5
JE50-3933	1	Type 4 Combination Percussion Mechanical Time Fuze	OIL	Y-6
JE50-3932	1	Type 4 Mk 0 Navy Mechnical Time Fuze	OIL	Y-6
JE10-4008	1 Bx	Type 5 Mod 2 Fuzes	OIL	S-1
JE10-4007	2 Bx	Type 13 Mk 1 Mod 1 Fuzes	OIL	S-1
JE10-4069	1 Bx	Type 13 No 2 Projectile Fuzes	OIL	S-1
JE10-4070	1 Bx	Type 13 No 3 Projectile Fuzes	OIL	S-1
JE10-4071	1 Bx	Type 13 No 4 Projectile Fuzes	OIL	S-1
JE21-4171	1 Bx	Type 13 Mk 3 Projectile Fuzes	OIL	Y-5
JE21-4412	1 Bx	Type 18 (Experimental) Aerial Burst Fuzes	OIL	Y-5
JE21-4384	2 Bx	"RO"-3 Fuzes	OIL	Y-5

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
-4394				
JE21-4393	1 Bx	"KO"-4 Mk 1 Shell Fuzes	OIL	Y-5
JE22-3430	1 Bx	BAKA Bomb Fuzes	OIL	K-4
JE21-4421	1 Bx	BOLO Bomb Mechanical Time Fuzes, NP Devices	OIL	Y-5
JE50-3929	-	Nose Fuzes for "OKA" Bomb	OIL	Y-6
JE50-3929	1	Army Acoustic Type Bomb Fuze	OIL	Y-6
JE50-3931	1	Portion of Army Experimental Radio Fuze Receiver	OIL	Y-6
JE10-4003	1 Bx	40mm Time Fuzes	OIL	S-1
JE21-4067(1-9)	9 Bx	50mm Powder Fuzes	OIL	Y-5
JE21-4049 JE10-4130	2 Bx	15cm Mortar Fuzes 15cm Mortar Fuzes	OIL OIL	Y-5 S-1
JE21-4414	1 Bx	Transverse Pcket Fuzes	OIL	Y-5
JE21-4406	1 Bx	All-Ways Action Bomb Fuzes	OIL	Y-5
JE21-4392	1 Bx	Experimental Type Small Model Fuzes	OIL	Y-5
JE21-4408	1 Bx	Aerial Burst Bomb Fuzes	OIL	Y-5
JE21-4374	1 Bx	Short Delay Tail Fuzes	OIL	Y-5
JE21-4398	1 Bx	Experimental Model, Two Second Delay Fuzes	OIL	Y-5
JE10-4054-4065 JE21-4333	5 Bx	Assorted Projectile Fuzes Assorted Projectile Fuzes	OIL OIL	S-1 Y-5
JE10-4134	2 Bx	Rocket Fuzes	OIL	S-1
JE10-4009	2 Bx	Anit-Submarine Fuzes	OIL	S-1
JE21-4389 -4411	2 Bx	Assorted Mortar Fuzes	OIL	Y-5
JE21-4374 -4397 -4402 -4403 -4410 -4419 -4420 -4422 -4382	9 Bx	Assorted Bomb Fuzes	OIL	Y-5
JE21-4113	1 Bx	Assorted Fuzes	OIL	Y-5

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Item	Destination	Shipment
		GAINES & BOOSTERS		
		0-17		
JE10-4137	1 Bx	A-1 Gaines	OIL	S-1
JE10-4138	1 Bx	A-2 Gaines	OIL	S-1
JE104139	1 Bx	A-3 Gaines	OIL	S-1
JE10 4140	1 Bx	A-4 Gaines	OIL	S-1
JE10-4141	1 Bx	B Gaines	OIL	S-1
JE10-4142	1 Bx	C Gaines	OIL	S-1
JE10-4012	1 Bx	Type 91 Booster Tubes	OIL	S-1
JE21-4111	1 Bx	Type 3 "Electric" Gaines	OIL	Y-5
JE10-4143	1 Bx	Type 5 Gaines	OIL	S-1
JE10-4146	1 Bx	Small Type Bomb Gaines	OIL	S-1
		AMMUNITION		
		0-19		
JE10-4026	1 Bx	.256 Cal Rifle Ammunition	OIL	S-1
JE10-4019	5 Bx	7.7mm Ball Ammunition	OIL	S-1
JE10-4020	3 Bx	7.7mm AP Ammunition	OIL	S-1
JE10-4021	2 Bx	7.7mm Tracer Ammunition	OIL	S-1
JE10-4022	1 Bx	7.7mm Ammunition Links	OIL	S-1
JE10-4030(1-10)	10 Bx	13mm Machine Gun Ammunition (All Types)	OIL	S-1
JE22-1035	1 Bx	13.2mm AP Ammunition	OIL	S-1
JE10-4028(1-7)	7 Bx	25mm Machine Gun Ammunition (Tracer, AP, HE)	OIL	S-1
JE10-4029(1-3)	3 Bx	25mm Incendiary Machine Gun Ammunition	OIL	S-1
JE22-1034	6800	25mm Practice Ammunition	OIL	S-1
JE21-4091	4 Bx	25mm Projectiles (?) with Wooden Bullet	OIL	Y-5
JE22-1033	300	3cm Common Ammunition	OIL	S-1
JE3-340	10 Bx	37mm AP Ammunition	OIL	S-1
JE21-4083(4-5)	2 Bx	37mm Rounds	OIL	Y-5
JE21-4401	1 Bx	37mm Brass Nose (Rounds?)	OIL	Y-5
JE21-4091	5	40mm Type 5 [illegible] Projectiles	OIL	Y-5

ENCLOSURE (E) continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE3-331	87	47mm AP Ammunition	OIL	S-1
JE2-116		47mm AP Ammunition	OIL	S-1
JE2-119	65	47mm HE Ammunition	OIL	S-1
JE3-332		47mm HE Ammunition	OIL	S-1
JE10-4018		47mm HE Ammunition	OIL	S-1
JE21-4082(1-3)	3 Bx	47mm Steel Cased Rounds	OIL	Y-5
JE21-4399 -4400	2 Bx	50mm Projectiles	OIL	Y-5
JE10-4034	1 Bx	5cm Grenade Discharger Ammunition	OIL	S-1
JE10-4017	5 Bx	57mm AP Ammunition	OIL	S-1
JE21-4005(1-10)	10 Bx	6cm Common Projectiles	OIL	Y-5
JE21-4006(1-10)	10 Bx	6cm Practice Projectiles	OIL	Y-5
JE3-336	11	70mm Howitzer Ammunition	OIL	S-1
JE10-4105(1-3)	3 Bx	7cm Fixed, Steel Case Army Ammunition	OIL	S-1
JE21-4076	1 Bx	7cm Rounds	OIL	Y-5
JE10-4051(1-5)	5 Bx	75mm Type 90 Long Pointed AA Shells	OIL	S-1
JE2-132	348	75mm (Type 90?) Long Pointed AA Shells	OIL	S-1
JE3-326		75mm (Type 90?) Long Pointed AA Shells	OIL	S-1
JE3-328	27	75mm Dual Purpose Gun Ammunition	OIL	S-1
JE3-329	189	75mm Howitzer Ammunition	OIL	S-1
JE3-330	65	75mm Mountain Gun Ammunition	OIL	S-1
JE2-120	155	75mm AP Ammunition	OIL	S-1
JE21-4107	1 Bx	75mm Rounds	OIL	Y-5
JE10-4102(1-2)	2 Bx	3" Shrapnel Ammunition	OIL	S-1
JE21-4026(1-10)	10 Bx	8cm Semi-Fixed, Time Practice Projectiles, 12 Holes in Nose	OIL	Y-5
JE21-4029	1 Bx	8cm Fided, Time Practice Projectiles, with 12 Holes in Nose	OIL	Y-5
JE21-3306(1-3)	3 Bx	8cm Anti-Submarine Projectiles	OIL	Y-5
JE21-4030(1-10)	10 Bx	8cm Fixed Practice Projectiles	OIL	Y-5
JE21-4025(1)	1 Bx	8cm Target Projectiles	OIL	Y-5

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-3309(1-20)	20	8cm Type 3 AA Common Projectiles	OIL	Y-5
JE21-4027(1)	1 Bx	8cm Star Projectiles	OIL	Y-5
JE10-4002	1 Bx	8cm AA Mortar Ammunition	OIL	S-1
JE21-4348	1 Bx	8cm Mustard Mortar (shell?)	OIL	Y-5
JE3-339	65	81mm Mortar Ammunition	OIL	S-1
JE3-327	141	88mm Long Pointed AA Ammunition	OIL	S-1
JE3-338	119	90mm Mortar Ammunition	OIL	S-1
JE21-4070	1	90mm Mortar Shell	OIL	Y-5
JE21-4064	1	90mm Projectile	OIL	Y-5
JE21-4349	1 Bx	90mm Gas Mortar (Shell?)	OIL	Y-5
JE21-4032(1-10)	10 Bx	10cm Time Practice Projectiles with 12 Holes in Nose	OIL	Y-5
JE21-4033(1-2)	2 Bx	10cm Fixed Practice Projectiles, Black Overall, Yellow Nose	OIL	Y-5
JE22-1030	140	10cm 60 cal Practice Ammunition	NRL	K-4
JE22-1031	860	10cm 60 cal time Practice Ammunition	NRL	K-4
JE22-1032	23	10cm 60 cal Common Ammunition	NRL	K-4
JE50-3312(1-5)	5	4" AA Type 98 Projectiles	OIL	Y-5
JE3-333	61	105mm HE Projectiles, Short	OIL	S-1
JE3-337	62	105mm HE Projectiles, Long	OIL	S-1
JE3-335	28	105mm Semi-Fixed Propellant Charges	OIL	S-1
JE2-127	499	105mm Fixed Ammunition	OIL	S-1
JE21-2118	2	105mm Rounds	OIL	Y-5
JE21-4065(1-16)	16	105mm Projectiles	OIL	Y-5
JE21-4012(1-10)	10 Bx	12cm Fixed Target Projectiles, Green Overall, Large Nose	OIL	Y-5
JE10-4082(1-5)	5	12cm Fixed Anti-Submarine Ammunition	OIL	S-1
JE10-4083(1-5)	5	12cm Fixed Illuminating Ammunition	OIL	S-1
JE10-4084(1-4)	4	12cm Fixed Common Ammunition	OIL	S-1
JE10-4085	1	12cm Fixed Practice Ammunition	OIL	S-1
JE10-4097	1 Bx	12cm Target Shells	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE10-4095	4	12cm Illuminating Shells	OIL	S-1
JE50-3311(1-5)	5	12cm AA Shells with Steel Cases	OIL	Y-5
JE22-1028	23	12.7cm 40 cal Type 3 Illuminating Ammunition	NRL	K-4
JE22-1025	40	12.7cm 50 cal Time Practice Round (Complete)	NRL	K-4
JE22-1026	40	12.7cm 40 cal Practice Ammunition	NRL	K-4
JE22-1027	20	12.7cm 40 cal Common Ammunition	NRL	K-4
JE22-1029	23	12.7cm 40 cal Anti-Sub Ammunition	NRL	K-4
JE21-4095(1-4)	16	12.7cm Ammunition	OIL	Y-5
JE21-4014(1-20)	20	12.7cm Illuminating Projectiles, Red Overall	OIL	Y-5
JE21-4015(1-9)	9	12.7cm Star Shells, Blue Overall	OIL	Y-5
JE21-4013(1-21)	21	12.7cm Anti-Submarine Projectiles with Red Band Around Flange-Screws on Nose	OIL	Y-5
JE21-4017(1-10)	10	12.7cm Time Practice Projectiles, Black with 12 Holes	OIL	Y-5
JE21-4016(1-10)	10	12.7cm Smoke Shells, Red-Orange Overall	OIL	Y-5
JE10-4087	1	14cm HE Shell	OIL	S-1
JE21-4018(1-27)	27	14cm Illuminating Projectiles, Red Overall	OIL	Y-5
JE21-4020(1-9)	9	14cm Star Shells, Blue Overall	OIL	Y-5
JE21-4019(1-10)	10	14cm Anti-Submarine Projectiles, Band Around Steel	OIL	Y-5
JE21-4021(1-23)	23	14cm Common Projectiles, Maroon Overall	OIL	Y-5
JE10-4096	2	14cm Special Common Shells	OIL	S-1
JE21-4022(1-25)	25	14cm Common Capped Projectiles, Maroon Overall	OIL	Y-5
JE10-4094	2	14cm Practice Shells	OIL	S-1
JE21-4023(1-10)	10	14cm AP Time Practice Projectiles with 12 Holes	OIL	S-1
JE10-4093(1-3)	3	14cm Smoke Shells	OIL	S-1
JE21-4062	1	15cm AA Gun Dummy Rounds	OIL	Y-4

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Item	Destination	Shipment
JE3-320	301	15cm HE Artillery Shells	OIL	S-1
JE3-341	132	15cm Propellant Charges	OIL	S-1
JE10-4101(1-3) JE21-4424	4	15cm Mortar Ammunition 15cm Mortar Ammunition	OIL OIL	S-1 Y-5
JE10-4155(1-2)	2	15cm AP Shells (Empty)	OIL	S-1
JE10-4092(1-2)	2	15cm Incendiary Shrapnel Shells	OIL	S-1
JE10-4091(1-2)	2	15cm Illuminating Shells	OIL	S-1
JE21-4025(1-26)	26	15cm Common Projectiles, Maroon Ogive	OIL	Y-5
JE21-4335	1	15cm HE Shell	OIL	Y-5
JE21-4066(1-6)	6	15cm Army Projectiles	OIL	Y-5
JE21-4024(1-10)	10	15cm Star Shells, Blue Overall	OIL	Y-5
JE21-4334	1	15cm White Phosphorus Shell	OIL	Y-5
JE22-1020 JE21-4004(1-5)	6	155mm Type 91 Practice Ammunition 155mm Type 91 Practice Ammunition	NRL OIL	K-4 Y-5
JE22-1022	5	155mm Type 0 Common Ammunition	NRL	K-4
JE21-4098	1	155mm Projectile	OIL	Y-5
JE21-4003(1-10)	10	155mm AP Practice Projectiles, Black Overall	OIL	Y-5
JE21-4002(1-25)	25	155mm AP Practice Projectiles, White Overall, Green Nose	OIL	Y-5
JE2-46	249	16cm Projectiles	OIL	S-1
JE2-47	125	16cm Semi-Fixed Propellant Cases	OIL	S-1
JE10-4098(1-2)	2	20cm AP Shells	OIL	S-1
JE10-4086(1-10)	10	20cm Short Semi-Fixed Projectiles	OIL	S-1
JE21-4011(1-10)	11	20cm Illuminating Projectiles, Red Overall	OIL	Y-5
JE21-4009(1-10)	10	20cm Type 88 AP Projectiles, with White Ogive (empty)	OIL	Y-5
JE21-4007(1-10)	10	20cm Type 91 AP Time Practice Projectiles with 12 Holes in Nose	OIL	Y-5
JE21-4008(1-10)	10	20cm Type 91 AP Spotting Practice Projectiles with Band at Nose	OIL	Y-5
JE21-4010(1-25)	25	20cm Type 91 AP Projectiles, White Overall Green Nose	OIL	Y-5

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Item	Destination	Shipment
JE22-1018	3	20cm Type 91 AP Ammunition	NRL	K-4
JE22-1019	8	20cm Type 0 Common Ammunition	NRL	K-4
JE2-50	1	30cm Common Shell (empty)	OIL	S-1
JE10-4154(1-3)	3	36cm AP Shells	OIL	S-1
JE10-4089(1-5)	5	36cm Common Shells	OIL	S-1
JE10-4090(1-5)	5	36cm HC Shells	OIL	S-1
JE22-1015	27	36cm Type 91 AP Ammunition	NRL	K-4
JE22-1016	3	36cm Type 0 Common Ammunition	NRL	K-4
JE10-4153(1-5)	5	40cm AP Shells	OIL	S-1
JE22-1012	30	40cm Type 91 AP Ammunition	NRL	K-4
JE22-1011	23	40cm Type 91 Practice Ammunition	NRL	K-4
JE22-1013	8	40cm Type 0 Common Ammunition	NRL	K-4
JE22-1014	6	40cm Type 0 Incendiary Shrapnel Shells	NRL	K-4
JE22-1008	200	46cm Type 91 AP Ammunition	NRL	K-4
JE22-1009	30	46cm Type 91 Practice Ammunition	NRL	K-4
JE22-1010	6	46cm Type 91 Incendiary Shrapnel Shells	NRL	K-4
JE21-4427	1	"KE" Zero Shell	OIL	Y-4
JE21-4085	1	Mortar-Fired Pamphlet Container	OIL	Y-5
JE10-4032(1-3)	3 Bx	14th Year Type Pistol Ammunition	OIL	S-1
JE3-334	53Bx	Assorted Small Arms Ammunition	OIL	S-1
JE21-4036(1)	1	AA Projectile (Empty)	OIL	Y-5
JE21-4035	1	Special Common Projectile (Empty)	OIL	Y-5
JE21-4078(1-2) -4080(1-2) -4081(1-2)	6	Large Projectiles (Assorted)	OIL	Y-7
JE21-4377	1	White Phosphorus Mortar (Shell?)	OIL	Y-5
		JAPANESE AMMUNITION PRIMERS		
		0-20		
JE10-4116	1 Bx	Mk 1 Electric Primers	OIL	S-1
JE10-4067 -4115(1-2)	4 Bx	Mk 1 Model 4 Percussion Primers	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE22-1037	1000	Mk 1 Model 4 Percussion Primers	NRL	K-4
JE22-1036	300	Mk 2 Mod 3 Primers	NRL	K-4
JE22-1038	1000	10cm Primers	NRL	K-4
JE50-3934	1 Bx	Percussion Component Body for Percussion Primer	OIL	Y-7
JE22-1039	1000	12.7cm Primers	NRL	K-4
JE10-4135	1 Bx	Electric Primers	OIL	S-1
JE10-4136(1-2)	2 Bx	Percusiion Primers	OIL	S-1
JE10-4147	1 Bx	Chemical Primers	OIL	S-1
JE10-4148 -4149	2 Bx	Pyrotechnic Primers	OIL	S-1
		JAPANESE TRACERS		
		0-22		
JE21-4073	1 Bx	Special Tracer Heads	OIL	Y-5
		JAPANESE BOMBS		
		0-23		
JE21-4423	1 Bx	½kg Bombs	OIL	Y-5
JE21-4369(1)	1 Bx	1kg (Modified) Smoke Bombs	OIL	Y-5
JE21-4370	1 Bx	1kg (Modified) Bombs	OIL	Y-5
JE21-4087(0-1)	2 Bx	1kg Practice Bombs	OIL	Y-5
JE21-4444	1 Bx	2kg Concrete Bombs	OIL	Y-4
JE2-210	1 Bx	2kg Incendiary Training Bombs	OIL	S-1
JE21-4434	1 Bx	4kg Experimental Type Practice Bombs	OIL	Y-4
JE21-4075(1-2)	2 Bx	5kg Practice Bombs	OIL	Y-5
JE2-210	1 Bx	5kg Incendiary Training Bombs	OIL	S-1
JE21-4433	1 Bx	7kg Experimental Type Practice Bombs	OIL	Y-4
JE21-4497	1 Bx	10kg Bombs	OIL	Y-4
JE21-4108	2	10kg Type 94 Practice Bombs	OIL	Y-5
JE21-4352	1 Bx	10kg Spherical Bombs	OIL	Y-5
JE21-4068(0-1)	2 Bx	10kg Rocket Bombs	OIL	Y-5
JE21-4065(1-3) -4436 -4437	5	12kg 12th Year Streamlined Bombs	OIL	Y-4

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE21-4358	1	12kg Incendiary Bomb	OIL	Y-4
JE21-4360 -4362	2	15kg Bombs	OIL	Y-5
JE21-4361	1	15kg Bomb, Long Tail	OIL	Y-5
JE21-4445	1	30kg Bomb, Small	OIL	Y-4
JE21-4443	1	30kg Bomb, Short	OIL	Y-4
JE21-4496	1	30kg Concrete Bomb	OIL	Y-4
JE21-4066 -4439	2	50kg 12th Year Type Streamlined Bombs	OIL	Y-4
JE21-4488	1	50kg Rough Coated Bomb	OIL	Y-4
JE21-4490	1	50kg Bomb with Slotted Nose	OIL	Y-4
JE21-4489(1-2)	2	50kg Gliding Bombs	OIL	Y-4
JE21-4456	1	50kg Bomb)?) with Four Holes in Nose	OIL	Y-4
JE21-4466	1	50kg Photo-Flash Bomb	OIL	Y-5
JE21-4484	1	50kg Circular Tail Shroud	OIL	Y-4
JE21-4096	1	60kg Mk 27 Rocket Bomb	OIL	Y-5
JE10-4151(1-5)	5	70kg Incendiary Bombs	OIL	S-1
JE2-111	5	100kg Bombs	OIL	S-1
JE21-4455	1	150kg Mk 2 "RO-3" Bomb with large Tail	OIL	Y-4
JE21-4457	1	"RO-3" Mk2 (150kg) Bomb	OIL	Y-4
JE21-4058	1	250kg Navy Aerial Burst Experimental Bomb	OIL	Y-4
JE2-106	5	250kg Bombs	OIL	S-1
JE10-4121(1-4)	4	250kg GP Bombs	OIL	S-1
JE10-4107(1-5)	5	250kg GP Bombs for VT Fuzes	OIL	S-1
JE2-101 JE10-4156(1-3) -4157(1-2)	10	500kg Bombs (New) 500kg Bombs (New)	OIL	S-1
JE10-4119(1-2)	2	500kg Streamlines Kamikaze Bombs	OIL	S-1
JE10-4117(1-5)	5	800kg GP Bombs	OIL	S-1
JE10-4118(1-3)	3	800kg Bombs for Kamikaze	OIL	S-1
JE10-4120(1-5)	5	800kg Bombs for VT Fuzes	OIL	S-1
JE21-4077(1-9)	9	Type 93 Incendiary Bombs	OIL	Y-5

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Equipment of Items	Destination	Shipment
JE21-4454	1	Type 96 No 6 Bomb	OIL	Y-4
JE23-0002(1-2)	2	Type 1 No 25 Mk 2 Model 1 Bombs	OIL	K-4
JE21-4052	1	Type 2 No 80 Mk 5(Bomb?)	OIL	Y-5
JE10-2005	4	Type 3 Mk 27 No 6 Aircraft Rocket Bombs	OIL	S-1
JE21-4050	1	Mk 4 Bomb	OIL	Y-5
JE21-4440	1	No 6 (?) Gas Bomb	OIL	Y-4
JE21-4043	1	No 6 Mk 1 Bomb	OIL	Y-5
JE21-4051	1	No 150 Mk 5 (Bomb?)	OIL	Y-5
JE21-4431	1	"KO 2" Bomb	OIL	Y-4
JE21-4067	1	Bell-Ringing Bomb	OIL	Y-4
JE21-4469	1	Large Rubber Nosed Bomb	OIL	Y-4
JE21-4468	1	Medium Rubber Nosed Bomb	OIL	Y-4
JE21-4467	1	Small Rubber Nosed Bomb	OIL	Y-4
JE21-4345 -4354	2	Smoke Bombs	OIL	Y-5
JE21-4050 -4059	2	Armor-Piercing Rocket Bombs	OIL	Y-4
JE21-4487	1	Bomb with Four Side Pockets	OIL	Y-4
JE21-4479 -4480	2	Folding Tail Bombs	OIL	Y-4
JE21-4430	1	Long-Tailed Bomb	OIL	Y-4
JE21-4452	1	Gray Cluster Bomb	OIL	Y-6
JE21-4347	1	Experimental Bomb	OIL	Y-5
JE21-4353	1	Wooden Case Bomb	OIL	Y-5
JE21-4365 -4418	-	Assorted AP Bombs	OIL	Y-5
JE21-4368	1	Air-to-Air Bomb	OIL	Y-5
JE21-4465	1	Large Sheet-Metal Bomb	OIL	Y-5
JE21-4060	6	Rocket Bombs	OIL	Y-4
JE10-4150(1-5)		Rocket Bombs	OIL	S-1
JE21-4479 -4480 -4481	3	Folding Bomb Tails	OIL	Y-4

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE21-4493 -4494 -4495	3	Rocket Bomb Tail Sections	OIL	Y-4
JE21-4478	1	Tail Section (Bomb?)	OIL	Y-4
JE50-5016 -5017	2	Heat Homing Bomb Heads	NRL	Y-4
JE21-4491	1	Fort-7 Body Section	OIL	Y-4
JE21-4492	1	Fort-6 Body Section	OIL	Y-4
JE23-100(1-10)	10	SEKURA Bombs	OIL	Y-7
JE21-4366	1	Bomb Spacer	OIL	Y-5
JE22-3474(A-J)	10	Type 6 Rack Bomb Releases	OIL	K-4
JE22-3431 -3432 -3433 -3434	4	Type 97 Modif 1 Mod Bomb Suspension Hook	OIL	K-4
JE21-4082	1 Bx	20 Bomb Release Detonators	OIL	Y-7
		JAPANESE EXPLOSIVES		
		0-25		
JE23-0011(6)	1 Bx	Detonators, Electric (Lead Azide)	OIL	K-4
JE23-0011(7)	1 Bx	½# Boosters (Shimose)	OIL	K-4
JE21-4105	1 Bx	5# Demolition Charges	OIL	Y-5
JE21-4079(1-9)	9	Assorted Shaped Charges	OIL	Y-5
JE10-4037	1 Bx	Primacord	OIL	S-1
JE10-4078	1 Bx	Pull Igniters	OIL	S-1
		JAPANESE INCENDIARY MIXTURES		
		0-27		
JE2-226	8	No 1 Incendiary Candles	OIL	S-1
JE3-11 -12 -13 -14 -15	5	Type 93 Flame Throwers with Tanks	OIL	S-1
JE10-4127	1 Bx	Incendiary Rifle Grenades	OIL	S-1
JE10-4027(1-2)	2 Bx	Mk 1 Incendiary Bomb Disposal	OIL	S-1
JE21-4093(0-2)	3 Bx	Thermite Charges for Bomb Dis-	OIL	Y-5

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
		posal		
JE50-3930	1 Bar	"Electron" Metal (Incendiary Alloy)	OIL	Y-6
		JAPANESE FIRE CONTROL		
		0-29		
JE21-3407	1	Type 92 Director	OIL	Y-4
JE10-3204(0-1)	2	Type 94 Computer	OIL	S-1
JE10-3207(0-1)	2	Type 94 Director	OIL	S-1
JE22-1051	1	Type 96 HA/LA Director	OIL	K-4
JE10-3129SD 1,2	2	Type 1 Director	OIL	S-1
JE10-3130 SD 1,2	2	Type 1 Computers	OIL	S-1
JE10-4860(1-2)	2	Data Computers	OIL	S-1
JE21-3403	1	Type 91 (?) Selsyn Kit	OIL	Y-4
JE21-3411(1-5)	-	Type 94 Mod 5 Selsyn	OIL	Y-4
JE21-3411(1-5)	-	Type 2 Mod 1 Selsyn Deflection Transmitters for Gun Sight	OIL	Y-4
JE21-3410(1-4)	-	Mod 3 Selsyn	OIL	Y-4
JE21-3413	1	Differential Selsyn, Big Type	OIL	Y-4
JE21-3414	1	Differential Selsyn, Small Type	OIL	Y-4
JE22-2025 -2027	2	Selsyn Motor, Generator and DC Unit	BNY	K-2
JE22-2034	1	Selsyn Motor	BNY	K-2
JE22-2028	1	Selsyn Transmitter	BNY	K-2
JE10-4988(1-2)	2	Portable Vision Train	OIL	S-1
JE22-1050(1-2)	2	Rangefinders- 8 meter	OIL	K-4
JE21-3106(1-2)	2	Type 2 Gun Bombsights	OIL	Y-4
JE21-3113(1-2)	2	Turret Sights	OIL	Y-4
JE21-3406	1	Deflection Slide Rule	OIL	Y-4
JE21-3407 -3408	2	Firing Time Limit Instruments	OIL	Y-4
JE21-3409	1	Firing Time Limit Relay Instruments	OIL	Y-4

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
		JAPANESE ANTI-AIRCRAFT FIRE CONTROL		
		0-30		
JE21-3405	1	Type Mod 2 AA Surface Director and Computer	OIL	Y-4
JE50-3004 -3008	2	Type 94 Fuze Time Computers	OIL	Y-6
JE50-3012(1-4)	1	Type 94 AA Director 1-Director 2-Range Finder 3-Miscellaneous Parts 4-Miscellaneous Parts	OIL	Y-6
JE50-3005 -3009	2	Type 94 Vertical Deflections Resolvers	OIL	Y-6
JE50-3007	1	Type 94 Parallax Converter	OIL	Y-6
JE50-3011	1	Type 3 Land Use AA Computer	OIL	Y-6
JE50-3019	1	Type 4 Stable Element	OIL	Y-6
JE50-3017	1	Type 5 AA Computer, Equipment for	OIL	K-4
JE50-3016	1	Type K7-N3 Gyro Horizon	OIL	K-6
JE21-3218	1	Director for Type 2, 20mm AA Gun	OIL	Y-4
JE10-3211(0-1)	2	AA Machine Gun Director	OIL	S-1
JE50-3010	1	Lateral Deflection Resolver	OIL	Y-6
JE50-3013	1	Pointer's Optical Sighting Bracket	OIL	Y-6
JE50-3014	1	Layer's Optical Sighting Bracket	OIL	Y-6
JE50-3015	1	Cross Leveler's Sight	OIL	Y-6
JE50-3018	1	Magnetic Clutch Torque Amplifier	OIL	Y-6
JE50-3006	1 Bx	Miscellaneous Fire Control Equipment	OIL	Y-6
		JAPANESE TORPEDO FIRE CONTROL		
		0-32		
JE23-0001	1	Model 92 Modif 1 Locating Panel for Torpedo Fire Control	OIL	K-4

ENCLOSURE (E). continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-3001(1-2)	1	Type 92 Mod 2 Submarine Director	OIL	Y-6
JE50-3002 -3003	2	Type 5 Mod 3 Director	OIL	Y-6
JE21-3400	1	Right Target Bearing Transmitter Used on Cruisers as Torpedo Directors	OIL	Y-4
JE21-3401	1	Left Target Bearing Transmitter Used on Cruisers as Torpedo Directors	OIL	Y-4
		JAPANESE ORDNANCE RESEARCH		
		O-39		
JE50-3201	1	Gas Flow Meter	NOL	Y-6
JE50-3202	2	Precision Thermometers 0 to 305 Degrees 0 to 210 Degrees	NOL	Y-6
JE50-3203	1	Precision Balance	NOL	Y-6
JE50-3204	1	Telescope for Precision Balance	NOL	Y-6
JE50-3205	1 Set	Weights for Precision Balance	NOL	Y-6
JE50-3206	1	Precision Hydrometer	NOL	Y-6
JE50-3207	1	Pressure Gauge 0-600kg/sq cm	NOL	Y-6
JE50-3208	1	Pressure Gauge 0-160kg/sq cm	NOL	Y-6
JE50-3209	1	250mm Comaprator	NOL	Y-6
JE50-3210	1	Blasting Magnets	NOL	Y-6
JE50-3211 -3212	2	Engine Indicators	NOL	Y-6
JE50-3231	1 Bx	Magnetostriction Tension Gauges for Water Tunnel	BuOrd	Y-6
		JAPANESE 18" GUNS AND MOUNTS		
		O-45(N)		
JE22-2071	1	18" Gun (46cm) with Breech	NPG	K-3
JE22-2070	1	18" Gun (46cm) without Breech	NPG	K-3
JE22-2070(A)	1	Separate BreechRing for JE22-2070	NPG	K-3
JE50-3180 -3181	2	18" Gun Slides and Cradles	NPG	K-4
JE50-3182 -3183	2	Shell Bogies and Rammers	NRL	K-4

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-3184	1	Power Loading Cage	NRL	K-4
JE50-3185	1	Shell Tilting Bucket and Waiting Tray	NRL	K-5
		JAPANESE NAVAL GUNS LESS THAN 18"		
		O-47(N)		
JE21-3213	1	20mm Vickers AA Machine Gun	OIL	Y-4
JE21-3216	1	20mm Quad Mount AA MG	OIL	Y-4
JE21-3220	1	20mm Type 98 AA MG	OIL	Y-4
JE21-3219	1	20mm Type 2 AA MG	OIL	Y-4
JE2-21 -22 -23 -24 -25	5	20mm Dual Mount MG	OIL	S-1
JE10-3201(0-3)	4	25mm Type 96 Twin AA MG	OIL	S-1
JE10-3202(0-3)	4	25mm Type 96 Triple Mount AA MG	OIL	S-1
JE10-3203(0-3)	4	25mm Type 96 Single Mount AA MG	OIL	S-1
JE21-3200	1	40mm Bofors Gun	OIL	Y-4
JE22-3477(A,B,E)	3	40mm Type 5 Model 14 Gun Mounts	OIL	K-4
JE22-3477(C,D,F)	3	40mm Type 5 Model 14 Gun Barrels	OIL	K-4
JE22-3506	1	40mm Gun Mount	OIL	K-4
JE21-3212	1	75mm Type 88 AA Gun	OIL	Y-4
JE2-61 -62 -63 -64 -65	5	75mm Type 4 AA Guns	OIL	S-1
JE0-9 -14 -15 -16	4	8cm 9th Year Type Short Naval Guns	OIL	S-1
JE0-17 -18 -19 -20	4	8cm 10th Year Type Dual Purpose Guns	OIL	S-1
JE0-62 -63 -64 -65	4	8cm Type 41 Short Naval Guns	OIL	S-1

ENCLOSURE (E). continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE10-3205(0-1)	2	8cm Type 99 Twin Gun Assemblies	OIL	S-1
JE10-3206(0-1)	2	8cm Type 99 Twin Gun Mounts	OIL	S-1
JE3-398 -399	2	88mm Type 99 AA Guns	OIL	S-1
JE3-79	1	10cm Model 38 Gun	OIL	S-1
JE22-1002(0-6)	1	10cm Type 98 Twin AA Gun 1-Training Circel 2-Roller Path 3-Training Gear Segment 4-Training Gear Segment 5-Training Gear Segment 6-Training Gear Segment	NRL	K-4
JE22-1003(0-6)	1	10cm Type 98 Twin AA Gun (Same as JE22-1002(0-6)	NRL	K-4
JE22-3475(1-7)	7	10cm Breech Blocks	OIL	Y-7
JE2-57 -58 -59 -60				
JE10-3209	1	12cm 10th Year Type Twin Gun and Mount	OIL	S-1
JE10-3210	1	12cm 10th Year Type Singel DP Gun	OIL	S-1
JE0-21 -22 -23	3	12cm Type 41 Short Naval Guns	OIL	S-1
JE0-66	1	12cm Short Naval Gun	OIL	S-1
JE22-1000(0-2)	1	12.7/40 cal Type 89 Twin AA Gun 0.Gun 1.Roller Path 2.Training Gear	NRL	K-4
JE22-1001(0-2)	1	12.7/40 cal Type 89 Dp Gun 0.Gun 1.Roller Path 2.Training Gear	NRL	K-4
JE10-3200(2)	1	12.7/50 cal Type 89 DP Gun	OIL	S-1
JE22-1004	1	12.7cm Experimental Gun	NRL	K-4
JE22-1007	1	40cm (16") 3rd Year Type Model 2 Gun	NPG	K-3
JE22-2072	1	16" Gun Slide and Cradel	NPG	K-4
JE22-1005(1-2)	2	Training Motors	NRL	K-4
JE2-135	4	14th Year Type AA Gun	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
-136 -137 -138				
JE2-123 -124 -125 -126	4	Accessories for 14th Year Type AA Gun	OIL	S-1
JE21-3217(1-5)	5	Gun Testing Devices	OIL	Y-4
JE21-3101(1-2)	2	Bore-Sight Telescopes for 20mm MG	OIL	Y-4
		JAPANESE FIELD AND AMPHIBIOUS EQUIPMENT (Artillery)		
		O-56(N)		
JE0-75 -76 -77 -78 -79	5	7.7mm Type 92 Light Machine Guns	OIL	S-1
JE0-67	5	7.7mm Model 92 Heavy Machine Guns	OIL	S-1
JE3-93 -70 -71 -72 -73	5	7.7mm Model 97 Tank Machine Guns	OIL	S-1
JE3-67	5	7.7mm Type 99 Light Machine Guns	OIL	S-1
JE22-3476(A-G)	7	13mm Modif 93713 Guns (Rifles?)	OIL	K-4
JE10-3208(1-3)	3	13mm Machine Guns	OIL	S-1
JE3-3 -4	2	37mm Type 94 Anti-Tank Guns	OIL	S-1
JE3-43 -44	2	47mm Type 1 Anti-Tank Guns	OIL	S-1
JE3-8 -10	2	70mm Type 92 Battalion Howitzers	OIL	S-1
JE3-53 -54	2	75mm Type 38 Field Artillery Guns	OIL	S-1
JE3-45 -46	2	75mm Model 41 Mountain Guns	OIL	S-1
JE3-48 -50	2	75mm Type 94 Mountain Guns	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE0-51 -52 -53 -54 -55	5	8cm New Type Mortars (Tubes and Mounts)	OIL	S-1
JE3-300 -301 -302 -303 -304	5	81mm Type 99 Mortars, Complete	OIL	S-1
JE3-22 -23 -24 -25 -26	5	9cm Type 97 Mortars with Bipods and Base Plates	OIL	S-1
JE3-80	1	9cm Mortar	OIL	S-1
JE3-81	-	Accessoried for 9cm Mortar	OIL	S-1
JE12-00012 -00013 -00014	3	10cm Howitzers	OIL	S-2
JE3-55 -56 JE2-48 -50 -51	5	105mm Type 91 Howitzers 105mm Type 91 Howitzers 105mm Type 91 Howtizers	OIL OIL OIL	S-1 S-1 S-1
JE2-26 -27 -28 -29 -30	5	105mm Self-Propelled Howitzers	OIL	S-1
JE21-3201	1	12cm Type 3 Howitzer	OIL	Y-4
JE3-59	2	12cm Type 2 Mortars (Tubes, Bipods, and Base Plates)	OIL	S-1
JE21-3203	1	12cm Mortar	OIL	Y-4
JE21-3204	1	15cm Mortar (Complete)	OIL	Y-4
JE0-72 -73	3	15cm Type 93 Mortar Tubes (3) with 2 Base Plates, 3 Bipods	OIL	S-1
JE0-46 -47 -48 -49 -50	5	15cm New Type Mortars (Tubes, Bipods and Base Plates)	OIL	S-1
JE21-4043(1-5)	5	15cm Mortars	OIL	Y-5
JE3-16 -18	2	15cm Type 4 Howtizers	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE2-36	3	15cm Howtitzers	OIL	S-1
JE21-4499	1	250kg Bomb Rocket Mortar	OIL	Y-5
JE0-70	5	Grenade Dischargers	OIL	S-1
JE21-3210	1	Semi-Automatic Rifle (M-1 Copy)	OIL	Y-4
JE21-3209	1	Semi-Automatic Rifle (Experimental)	OIL	Y-4
JE0-69	5	Type 100 Automatic Rifles	OIL	S-1
JE21-3220(1-8)	8	Type 97 Machine Guns (Tank)	OIL	Y-4
JE21-3211	1	Heavy Machine Guns Mount	OIL	Y-4
JE0-68	5	3rd Year Tyoe Heavy Machine Gun Tripods	OIL	Y-4
JE10-3109 SD	1	Type 3 Machine Gun Synchronizer	OIL	S-1
JE10-3117 SD 1	1	Machine Gun Synchronizer Model	OIL	S-1
JE10-4144	1 Bx	Type 6 Magazine	OIL	S-1
JE10-4145	1 Bx	Type 98 Magazine	OIL	S-1
JE3-305 -306 -307 -308	4 Bx	Miscellaneous Artillery Accessories	OIL	S-1
		(Rocket Launchers)		
JE0-59 -60 -61	3	12cm Multiple Tube Rocket Launchers	OIL	S-1
JE21-3214	1	12cm Dual Purpose Rocket Launcher	OIL	Y-4
JE21-3205	1	12cm Rocket Launcher	OIL	Y-4
JE3-61 -62 -63 -64 -66	5	Anti-Tank Rocket Launchers	OIL	S-1
		(Miscellaneous)		
JE2-6 -7 -8 -9 -10	5	Type 97 Tanks	OIL	S-1
JE2-11 -12	5	Type 3A Fixed Turret Tanks	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
-13 -14 -15				
JE2-16 -17 -18 -19 -20	5	Type 3B Electric Turret Tanks	OIL	S-1
JE21-3215	1	Type 4 Amphibious Tank	OIL	Y-4
JE21-3208	1	Radio Controlled Miniature Tank	OIL	Y-4
JE2-1 -2 -3 -4 -5	5	Armored Personnel Carriers	OIL	S-1
JE3-76	1	Light Armored Car (Half-Track)	OIL	S-1
JE3-77	1	Amphibious Truck	OIL	S-1
JE2-31 -32 -33 -34 -35	5	Reconnaisance Cars	OIL	S-1
JE2-41 -42 -43 -44 -45	5	Prime Movers	OIL	S-1
JE21-4110 -4088	2	Type 93 Non-Magnetic Land Mines	OIL	Y-5
JE21-4041	1	Type 3 Seashore Land Mine	OIL	Y-4
JE21-4042	1	Type 5 Strike Mine	OIL	Y-4
JE10-4023(1-5)	5	Yardstick Anti-Tank Mines	OIL	S-1
JE10-4024	6 Bx	Fuzes for Yarstick Mines	OIL	S-1
JE10-4100(1-10) 4035	11	Wooden Box Land Mines	OIL	S-1
JE21-4090	4	Wooden Box Mine	OIL	Y-5
JE10-4106	1 Bx	Tape Measure Land Mine	OIL	S-1
JE10-4015(1-5)	5	Terra-Cotta Land Mines (Small)	OIL	S-1
JE10-4033(1-5)	5	Attack Mines (Hot Lunge)	OIL	S-1
JE10-4016	5 Bx	Conical Land Mines	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE21-4081(1-2)	2 Bx	Large Hemispherical Land Mines	OIL	Y-5
JE21-4413	1 Bx	Bag Mines	OIL	Y-5
JE10-4031	1 Bx	Land Mine Fuzes	OIL	S-1
JE10-4103	1 Bx	Frangible Grenades	OIL	S-1
JE10-4104	1 Bx	Frangible Smoke Grenades	OIL	S-1
JE10-4095	1 Bx	Model 4 Pottery Hand Grenades	OIL	S-1
JE10-4096	1 Bx	Molotov Cocktails	OIL	S-1
		CHARACTERISTIC OF JAPANESE NAVAL VESSELS		
		S-01		
JE22-2[illegible]	1	Burner Tip, Variable Delivery	BNY	K-2
JE22-2009	1	Burner Tip 15 35/16	BNY	K-2
JE22-2013	-	Later Composition from CV Katsuragi Flight Deck	BNY	K-2
JE22-2[illegible]	-	Waterproof Glue and Hardener	BNY	K-2
JE22-2014	1	Model 180 Auxiliary Turbine	BNY	K-2
JE22-2015	1	270cm Auxiliary Turbine	BNY	K-2
JE22-2017	1	270cm Auxiliary Turbine	BNY	K-2
JE22-2026	1	Steering Control Unit	BNY	K-2
JE22-2038	1	Gyro Compass Repeater	BNY	K-2
JE22-2039	1	Fluorescent Fixture	BNY	K-2
JE22-2040	1	Rudder Angle Indicator	BNY	K-2
JE22-2041	1	Steering Control Indicator	BNY	K-2
JE22-2053	1	Portable Battery Light	BuS	K-4
JE22-2057(A-C)	3 Bx	Chime Lighting Equipment	BuS	K-4
JE50-1137	1	"Handy Billy" Pump	OIL	Y-6
JE22-2062	1	Pump, Oil	OIL	K-4
JE10-2006	2 Bx	Boiler Compound	BuS	S-1
JE50-1132(1)	1	Water Pump	BuS	Y-6
JE50-1132(2)	1	Duster Compressor	BuS	Y-6
JE50-1132(3)	1	Strainer for 120 volt Exhaust Motor Generator	BuS	Y-6

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-1132(4)	1 Bx	Starter for 50 volt 50 amp, Damping Cut-Out Switch 162A, Plug Box with Dimming Switch	BuS	Y-6
JE50-1132(5)	1 Bx	Double Pole Double Throw Switch 162A Counting Repeater with Flexible Cable and Seven Pole Plug with Studs	BuS	Y-6
JE50-1132(6)	1	Amplifier Tube	BuS	Y-6
JE50-1132(7)	1	Amplification Box 180A	BuS	Y-6
JE50-1132(8)	1	Master Compass	BuS	Y-6
JE50-1132(9)	1 Bx	Double Pole Double Throw Switch 162A, Lamp Signal Box 162A, 500 volt Circuit Change Box 162A	BuS	Y-6
JE50-1132(10)	1	Master Compass	BuS	Y-6
JE50-1132(11)	1	120 volt 333 amp Motor Generator	BuS	Y-6
JE50-1132(12)	1	Transmitter Box 227	BuS	Y-6
JE50-1132(13)	1	Distribution Box 162A	BuS	Y-6
JE50-1132(14)	1	50 volt 50 amp Motor Generator	BuS	Y-6
JE50-1132(15)	1	Aneschiitz Type Sensitive Element X293	BuS	Y-6
JE22-1950	1	Two-Man Submarine	PHPH	K-5
JE22-1055(1-2)	1	Shaft Revolution Transmitter and Receiver	OIL	K-4
JE22-2050	1	Type 92 Underwater Log	BuS	K-4
JE22-2051	1	Type 93 Underwater	BuS	K-4
JE22-2051M	1	Type 98 Underwater Log (Pitot Tube)	BuS	K-4
JE22-1059(1-3)	1	Salinity Indicator Transmitter Indicating Meter Power Unit	OIL	K-4
JE22-2024	-	Sound Powered Hand and Chest Phone Sets	BNY	K-2
JE50-1283(A)	1	Sound Powered Telephone Molded Rubber Handset	BuS	Y-6
JE50-1284 -1285	2	Sound Powered Telephones Portable, Breast Transmitter, and Head Phones	BuS	Y-6

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-1282(A-B)	2	Handset Ringer Boxes	BuS	Y-6
JE22-2033	1	Loud-Speaker for Ships Announcing System	BNY	K-2
JE22-1057 (1-5, 7-9)	8	Bell CMA Buzzer and Horn of Each Type Used on Japanese Combat Vessels	OIL	K-4
JE50-1287	1	Type 2 Reproducer for Battle Announcing	BuS	Y-6
JE50-1288	1	Type 2 Mod 1 Reproducer for Battle Announcing	BuS	Y-6
JE50-1289	1	Type 3 Reproducer	BuS	Y-6
JE21-6326(1-2)	2	Loud-speakers	OIL	Y-7
JE50-1286	1	Microphone for Battle Announcing Equipment	BuS	Y-6
JE22-2015	1	Intercom Control Panel	BNY	K-2
JE22-2031 2032	1	Special Telephone Switchbox (Two Units)	BNY	K-2
JE22-1056(1-2)	1	Engine Revolution Change Order Transmitter and Receiver	OIL	K-4
JE22-2054	-	Teletalk Equipment	BuS	K-4
JE22-2055(A-B) -2056(A-B) -2058 -2059 -2060(A-B)	-	Ships Telegraph Equipment	BuS	K-4
JE22-1060	2	440 volt Drawout Circuit Breakers with Batteries (20)	OIL	K-4
JE22-2036	1	220 volt D.C. Distribution Circuit Breakers	BNY	K-2
JE22-2018	1	100 volt D.C. Generator Control Panel	BNY	K-2
JE22-2042	1	A.C. Generator Control Panel	BNY	K-2
JE22-2043	1	A.C. Generator Distribution Panel	BNY	K-2
JE10-2005(1)	1	Electric Distribution Shock-Proof Panel	BuS	S-1
JE10-2005(2)	6	Fuze Boxes	BuS	S-1
JE10-4857(1-3)	3	Sound 1-C Cables	OIL	S-1
JE22-2020	-	Miscellaneous Samples of	BNY	K-2

ENCLOSURE (b), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
		Armored Cable	BNY	K-2
JE0-(4,5,6,7,8)	5	Cables	NRL	S-1
JE22-2021	1	Shipboard Lighting Fuze Box	BNY	K-2
JE50-1219 -1220	2	Over Current Relay	BuS	Y-6
JE50-1221	1	Reverse Current Relay	BuS	Y-6
JE50-1228	-	Samples of Japanese Wire	BuS	Y-6
JE50-1395	-	Bitumastic [illegible]terial Used in Community Stuffing Boxes	BuS	Y-6
JE50-1396	-	Rotating Cable Supports and Castings Upon Which They Rot te from 10cm Turret	BuS	Y-6
JE50-1133-1	1 Bx	Distritution Box (Switch-board for repeater compass) 7 Junction Boxes for Repeater Compass Damping Switch Motor Generator(For master Compass) Resistance for Batteries	BuS	Y-7
JE50-1133-2	1 Bx	Reaning gear Switch Resistance Suction Pump Switch Board (for master Compass)	BuS	Y-7
JE50-1133-3	1 Bx	Master Compass (No.1)	BuS	Y-7
JE50-1133-4	1 Bx	Master Compass (No 4) (Accessories)	BuS	Y-7
JE50-1133-5	1 Bx	Spare Parts	BuS	Y-7
JE50-1133-6	1 Bx	Master Compass (Accessories)	BuS	Y-7
JE50-1133-7	1 Bx	Motor Generator 50V 210	BuS	Y-7
JE50-1133-8	1 Bx	Motor Generator 50V 210	BuS	Y-7
JE50-1133-9	1 Bx	Adjuster	BuS	Y-7
JE50-1133-10	1 Bx	Repeater Compass	BuS	Y-7
JE50-1133-11	1 Bx	8 Batteries	BuS	Y-7
JE50-1133-12	1 Bx	Amplifier	BuS	Y-7
JE50-1133-13	1 Bx	Master Compass (No. 2)	BuS	Y-7
JE50-1133 14	-	Master Compass Supporter	BuS	Y-7
JE50-1191	1 Bx	Portable [illegible]agnetic Meters	BuS	S-3

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-1397	1	Lighting Door Switch	BuS	Y-6
JE21-4504	1	Type "M" Motor	OIL	Y-7
		JAPANESE SUBMARINE EQUIPMENT		
		S-19		
JE21-3114	10 Bx	Periscopes for Suicide Torpedoes		
JE22-1053	1	Japanese Periscope	OIL	K-4
JE22-2019	1	Type 13 Submarine Battery	BNY	K-2
JE22-2022	2	Submarine Batteries	BNY	K-2
JE22-2023	2	Small Batteries	BNY	K-2
		JAPANESE MINESWEEPING GEAR AND EQUIPMENT		
		S-28		
JE22-3473(A-T)	20	Type 99 Small Model Hooks (Explosives?)	OIL	K-4
JE10-4648(1-9)	5	Mk 2 Explosive Hooks	OIL	S-1
JE10-4650(1-9)	10	Mk 2 Model 1 Explosive Hooks	OIL	S-1
JE21-4555		Mk 2 Model 1 Explosive Hooks	OIL	Y-4
JE50-1245(0-2)	3	Explosive Cutters	NEWTS	Y-6
JE10-4650(1-9)	1 Bx	Tools for Mk 2 Model 1 Explosive Hook	OIL	S-1
JE10-4649(1-17) -4650(1-9)	3 Bx	Plungers for Explosive Hooks	OIL	S-1
JE10-4650(1-9)	2 Bx	Tools for Explosive Hooks	OIL	S-1
JE50-1279(1-3)	3	Cutters	NEWTS	K-4
JE21-4800(1-22)	22	Floats for Type 2 Sweep	OIL	Y-4
JE50-2353(1-2)	2	Type 2 Floats	NEWTS	Y-6
JE50-1255(1-2) -1261(1) -1270(1-2) -1274(1-11)	16	Assorted Floats	NEWTS	Y-6
JE50-1334(2)	1	Type 2 Magnetic Sweep Electrode	NEWTS	Y-6
JE50-1332	1 coil	Type 2 Mod 1 Magnetic Sweep Cable, Short Leg	NEWTS	Y-6
JE50-1333	1 coil	Type 2 Mod 1 Magnetic Sweep	NEWTS	Y-6

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
		Cable, Catenary Cable		
JE50-1252	1 coil	Type 3 Two-Ship Sweep Wire, Left-Hand Lay	NMWTS	Y-6
JE50-1273	1 coil	Type 3 Two-Ship Sweep Wire, Right-Hand Lay	NMWTS	Y-6
JE21-4805	15 coils	Type 3 Sweep Cable	OIL	Y-4
J321-4804	8 coils	Type 2 or 3 Heavy Ton Sweep Cable	OIL	Y-4
JE21-4801	4	Type 3 Sweep Polarity Switches	OIL	Y-4
JE50-1280(1-3)	2	Type 5 Magnetic Sweep Cable (with one Hanger)	NMWTS	K-4
JE50-1331 -1329	2 coils	Type 5 Magnetic Sweep Cable	NMWTS	Y-6
JE50-1328(1-2)	2	Clamps for Type 5 Magnetic Sweep Cable	NMWTS	Y-6
JE50-1330	1 Bx	Type 5 Magnetic Sweep Repair Material and Chafing Gear	NMWTS	Y-6
JE50-1240	1 coil	Serrated Sweep Wire	NMWTS	Y-6
JE50-1265	1 coil	Serrated Wire Rope for Bow Paravane	NMWTS	Y-6
JE21-4807(1-2)	2 coil	Magnetic Sweep Cable	OIL	Y-4
JE50-1257(1)	1 Bx	Type 3 Magnets, 4 x 86cm	NMWTS	Y-6
JE21-4802(1-4)	4	Magnetic Bars	OIL	Y-4
JE50-1246(2)	1 Bx	Composite Minesweeping Magnets	NMWTS	Y-6
JE50-1277(1,6)	2	Composite Magnets, Short Type	NMWTS	K-4
JE21-4569(-6)	6	Experimental Paravanes	OIL	Y-5
JE50-1275	1	Paravane for Hi-Speed, Single-Ship Sweep	NMWTS	K-4
JE50-1234(1-2)	2	Paravanes with Depth Charges	NMWTS	Y-6
JE50-1339	1	Paravane Launching Crane	OIL	Y-7
JE50-1271(1-4)	2 sets	Large Single-Ship Sweep Paravanes and Accessories	NMWTS	Y-6
JE50-1259	1	Depressor for Large Single-Ship Sweep	NMWTS	Y-6
JE50-1278	1	Fessenden Oscillator, 500 Cycles	NMWTS	K-4

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE10-4073 -4088	3	Sound Shells for Minesweeping	OIL	S-1
JE21-4565(1-2)	2	Self Propelled Noise Makers	OIL	Y-5
JE50-1233	1	"Simulated Sound Source" - 100 volts ½ H P	NMWTS	
JE50-1266	1	Submarine Sound Decoy	NMWTS	Y-6
JE50-1260(7-8)	2 Bx	Dan Bouy Parts	NMWTS	Y-6
JE50-1260(9)	1	Control Clock for Lighted Dan Bouy	NMWTS	Y-6
JE50-1237(1-3)	3	Submarine Cable Cutters	NMWTS	Y-6
JE50-1258	1	Drag Net	NMWTS	Y-6
JE50-1263(1)	1	Bow Paravane Stopper	NMWTS	Y-6
JE50-1242(1-3)	3	Depressor Snatch Blocks	NMWTS	Y-6
JE50-1243(1-2)	-	Two Paravane Swivels, One Swivel Stall	NMWTS	Y-6
JE50-1248	1	Pelican Hook	NMWTS	Y-6
JE50-1238(1-2)	6	Cable Grips	NMWTS	Y-6
JE50-1244(2)	1	Large Minesweeping Swivel	NMWTS	Y-6
JE50-1241(1-6)	6	Moored Sweep Fittings	NMWTS	Y-6
JE21-4473	1	Mine Detector for Landing Barge (KOKEURI E)	OIL	Y-4
JE21-4474	1	Mine Detector for Landing Barge	OIL	Y-4
JE21-4470	1 Bx	Miscellaneous Electric Equipment for Mine Detector	OIL	Y-4
JE21-4475	1	Mine Detector for Transport	OIL	Y-4
JE21-6007(1-3)	1	Type Magnetic (Mine?) Detectors	OIL	Y-4
JE50-1268(1)	1 Bx	Type 1 Sound Bombs (loaded)	OIL	Y-7
JE50-1268(2-3)	2 Bx	Type 3 Sound Bombs (loaded)	OIL	Y-7
JE50-1268(4)	1 Bx	Type 4 Sound Bombs (loaded)	OIL	Y-7
JE50-1269(1-2)	2 Bx	Simplified Sound Bomb (loaded)	OIL	Y-7
		JAPANESE DEGAUSSING		
		S-37		
JE50-1174	1	Mitsubishi magnetometer with	OIL	Y-4

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
		Spare Parts	OIL	Y-4
JE50-1173	1	Model Y Magnetometer with Spare Parts	OIL	Y-4
JE50-1175	1	Model G Magnetometer with Spare Parts	OIL	Y-4
		JAPANESE NAVY DIESEL ENGINES		
		S-42		
JE50-1235(1-3)	3	Assorted Dynamometers 1-Dynamometer 2-Hydraylic Dynamometer 3-Recording Dynamometer	NRWTS	Y-6
JE50-1272	1	Recording Dynamometer	NRWTS	Y-6
JE50-1130(1)	-	ZB-1 Type AB-35 Single- Cylinder Diesel Engine, Lubricating Oil Tank, Primary Fuel Oil Filter, Temporary Fuel Oil Filter, Primary Fuel Hand Priming Pump	BuS	Y-6
JE50-1130(2)	1	ZB-2 Lubrication Oil Cooler for ZB-35-1	BuS	Y-6
JE50-1131(1)	1	ZC-1 Type ZC-707 2000 H P Diesel Engine, 9-Fuel Oil Pipes 3-Steam Pipes 1-Air Pipe		
JE50-1131(2)		ZC-2 Oil Cooler for Type ZC-707 Engine (J-05)	BuS	Y-6
JE50-1131(3)	-	ZC-3 Water Cooler for Type ZC-707 Engine with One Unit Injector (M0-1), Twenty Starting Air Valves (P101 to P105), 200 Piston Rings A-B-C (C303 to C305), 100 Oil Rings A-B (C307, C308), Four Cylinder Gaskets (113), Ten non-Return Valves and Seats (M107, M108,) 290 Needle Rollers (215C) (E114 to E145), Two Special Tools	BuS	Y-6
JE50-1131(4)	-	ZC-4 Exhaust Gas Manifold, Front and Rear Auxiliary Fuel Tank No 2, Swirl Chamber, Temporary Fuel Pump, Breezer, Eight Lubricating Oil Pipes, Three Fuel Oil Pipes Three Water Pipes	BuS	Y-6
JE50-1131(5)	-	ZC-5 Main and Auxiliary Oil Filter Cranking Handle (S-1), Oil Priming Pump Handle	BuS	Y-6

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-1131(6)	-	ZC Air Starting Bombs (Six), Instrument Panel, Hand Priming Oil Pump, Nine Lubricating Oil Pipes, Nine Fuel Oil Pipes, Three Cylinder Linders, Two Pistons, Connecting Rod and Bearing, Special Sliding Conduit	BuS	
		JAPANESE NAVY PAINTS		
		S-59		
JE22-2008 -2009	2	Samples of Anti-Radar Paint	BNY	K-2
JE22-2010	1	Sample of Sound Absorbant Paint	BNY	K-2
JE22-2011	1	Sample of Ingredients of Sound Absorbant Paint	BNY	K-2
JE22-2012	1	Sample of Bottom Paint (Base)	BNY	K-2
JE22-2013	1	Sample of Bottom Paint (Face)	BNY	K-2
JE10-2002	13 cans	Paint	NRL	S-1
JE22-2061	2	Paint Samples	NRL	K-4
JE50-1224		Paint Samples	NRL	K-4
		WELDING IN JAPANESE NAVAL CONSTRUCTION		
		S-81(N)		
JE22-2029	-	Mk 23 Welding Electrodes	BNY	K-2
JE22-2030	-	Mk 1 Welding Electrodes	BNY	K-2
		JAPANESE MODEL BASINS		
		S-83(N)		
JE23-0015(1-3)	3	Ship Models	OIL	K-4
JE50-1297	7	Model Propellers (Two of Aluminum)	DTMB	Y-6
		JAPANESE DAMAGE CONTROL		
		S-84(N)		
JE22-2004	1	Spun Glass Fire Curtain from Carrier KATSURUGI	BNY	K-2
JE22-2006	-	Soap Bubble Fire Extinguisher, Nozzel, and Two Quarts of Soap from Carrier KATSURUGI	BNY	K-2
JE22-1058(1)	1	Gasoline Vapor Detector and Inst.	OIL	K-4

ENCLOSURE (E), continued

NavTecnJap Equipment No	Quant	Description of Items	Destination	Shipment
		SPECIAL UNDERWATER ATTACK UNITS		
		S-91(N)		
JE10-5043	1 Bx	Water Pump for Diving Equipment	EDU	S-1
JE10-5044	1 Bx	Diving Equipment	EDU	S-1
JE10-5045 -5046	2 Bx	Spare Parts for Diving Equipment	EDU	S-1
JE50-1135(1-10) 1136	-	Self Contained Diving Suits and Accessories	OIL	Y-4
		LEAD ACID STORAGE BATTERIES USED BY THE JAPANESE NAVY		
		S-92(N)		
JE10-4880	1	Type 2 Battery	OIL	S-1
JE10-4896	1	Type 2 Battery Cell	OIL	S-1
JE10-4981(1-25)	25	Type 3 Batteries	OIL	S-1
JE10-4900	1	Type 5 Battery Cell	OIL	S-1
JE10-4899(1-2)	2	Type 12 Battery Cells	OIL	S-1
JE10-4898(1-2)	2	Type 13 Battery Cells	OIL	S-1
JE10-4895	1	Type 14 Battery Cell	OIL	S-1
JE10-4897(1-2)	2	Type 15 Battery Cells	OIL	S-1
JE50-1247	1 Bx	Sea Cell Batteries	AMMTO	Y-3
JE10-4895	1	Hydrogen Tester	OIL	S-1
JE10-4893	1	Battery Cleaner	OIL	S-1
		JAPANESE ANCHORS AND ANCHOR CHAINS		
		S-97(N)		
JE50-1492(0-1)	2 shots	64m/m Anchor Chain for ATAGO Class Cruiser	BOSTON	Y-3
		JAPANESE INFRA-RED DEVICES		
		K-02		
JE22-6116(A-J) -6135(A-J)	2	Type 2 Infra-Red Communication Equipment	NRL	K-2
JE22-6136(A-F)	1	Type 3 Infra-Red Communication Equipment	NRL	K-2

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE23-0101(1-11)	-	Infra-Red Signaling Equipment	NRL	Y-6
JE50-5025	1	White-Light Signal Gun for Type 3 Navy Communication Set	NRL	Y-4
JE50-5034	1	Infra-Red Gun for Type 3 Navy Communication Set	NRL	Y-4
JE50-5840	1	Infra-Red Gun for Type 111 Navy Communication Set	NRL	Y-6
JE50-5029	1	5cm Infra-Red Binocular Telescope	NRL	Y-4
JE50-5028	1	10cm Infra-Red Binoculars	NRL	Y-4
JE50-5027	1	15cm Infra-Red Binocular Telescope	NRL	Y-4
JE50-5026	1	Mangin Lense for Infra-Red Telescope	NRL	Y-4
JE50-5814	1	Bracket for 50-100 Power Infra-Red Binoculars	NRL	Y-4
JE50-5031	1	Infra-Red Monocular Telescope, Detachable Lens	NRL	Y-4
JE50-5031 -5032	2	Infra-Red Objective Lenses, f 2.3/ 15cm	NRL	Y-4
JE21-3110	1 Bx	Infra-Red Lenses, Experimental Type	OIL	Y-4
JE21-6324	1 Bx	Filters	OIL	Y-4
JE21-6325(1-4)	4	Mirrors	OIL	Y-4
JE21-6333	1	Mirror Heat Ray Detector	OIL	Y-4
JE50-5819	1	Infra-Red Heat Detector Amplifier	NRL	Y-6
		JAPANESE OPTICS		
		X-05		
JE10-3119	1	Type 96 Model 5 Bombsight	OIL	S-1
JE10-3102	1	Type 95 Gun Bombsight	OIL	S-1
JE10-3103	1	Type 2 Model 1 Bombsight	OIL	S-1
JE10-3114 -3115	6	Type 3 Gun Bombsights	OIL	S-1
JE10-3114	1	Type 4 Gun Bombsight	OIL	S-1
JE10-3101	1	OIJI Type Machine Gun Sight	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE10-3110	1 Bx	Bombsight Bubble Levels	OIL	S-1
JE10-3126	1	8cm Binoculars	OIL	S-1
JE50-5251	2	10cm Binoculars	OIL	Y-6
JE10-3127	2	12cm Binoculars for Type 97 Director	OIL	S-1
JE21-3109(1-	2	12cm Spotting Binoculars	OIL	Y-4
JE21-3103	1	12cm AA Binoculars with Tripod and Mount	OIL	Y-4
JE21-3102	1	12cm AA Binoculars with Elbow	OIL	Y-4
JE10-3118	2	12cm AA Binocular Tripods and Mounts	OIL	S-1
		JAPANESE OPTICS		
		X-05		
JE10-3124	2	18cm Binoculars	OIL	S-1
JE10-3112	1	Celestial Navigation Slide Rules	OIL	S-1
JE10-3116	2	Celestial Navigation Calculators	OIL	S-1
JE10-3113	2	Navigational Plotting Boards	OIL	S-1
JE10-3121	2	Type 97 Mk 1 Model 4 Driftmeters	OIL	S-1
JE10-3108	2	Type 97 Driftmeter Mounts	OIL	S-1
JE10-3120	1	Driftmeter for Night Use	OIL	S-1
JE10-3106	2	Small Driftmeters	OIL	S-1
JE10-3105	2	Bubble Sextants	OIL	S-1
JE10-4978(1-4) JE21-5035 -5037 -3107(1-3)	9	Assorted Sextants Assorted Sextants	OIL OIL	S-1 Y-4
JE21-3104	1	Turret Periscope	OIL	Y-4
JE50-3036	1	One Man Periscope	OIL	Y-6
JE10-3123	2 Jars	Canada Balsam	OIL	S-1
JE21-3130(1-5)	5 Bx	Glass Samples	OIL	Y-4
JE21-3032(1-2)	2 Bx	FUJI Glass Samples	FSL	Y-4

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
		JAPANESE CHEMICAL WARFARE		
		X-11		
JE2-209	6	17th Year Type Gas Masks	OIL	S-1
JE2-207	6	Type 91 or 99 Light Army Gas Masks	OIL	S-1
JE21-7506	-	Type 93 Mk 3 Gas Masks	OIL	Y-4
JE2-206(1-6) JE21-7506	7	Type 97 Navy Gas Masks Type 97 Navy Gas Masks	NRL OIL	S-1 Y-7
JE23-0010(1-2)	2	Modif 1 Gas Masks	OIL	K-4
JE2-208	6	Model 1 Light Gas Masks	OIL	S-1
JE21-7530(1-2) -7531 -7532	4	Type 1 Air Gas Masks	OIL	Y-4
JE2-215 JE21-7506	3	Type 3 Gas Masks Type 3 Gas Masks	OIL OIL	S-1 Y-4
JE2-218	1	Oxygen Gas Mask	OIL	S-1
JE2-219	75	Navy Gas Mask Cannisters	OIL	S-1
JE21-7506	2	Undesignated Cannisters	OIL	Y-4
JE21-7506	1	Type 98 Protective Suit, Upper Half Only	OIL	Y-4
JE21-7506	1	Light Protective Suit, Pants and Gloves Only	OIL	Y-4
JE2-221	85	Type 2 Special Small Smoke Candles	NRL	S-1
JE2-211	30	Model 3 Small Smoke Candles	OIL	S-1
JE2-222	16	Special Smoke Candles	OIL	S-1
JE10-4131	1 Bx	Smoke Candles	OIL	S-1
JE21-4109	3	Floating Smoke Candles	OIL	Y-5
JE2-224	10	Tools for Igniting Smoke and Tear Gas Candles	OIL	S-1
JE10-4128(1-2)	2 Bx	30kg Smoke Pots	OIL	S-1
JE10-4129	1 Bx	Smoke Tubes (Small)	OIL	S-1
JE10-4076	2 Bx	Smoke Balls	OIL	S-1
JE10-4181	1 Bx	Smoke Shells	OIL	S-1
JE10-4152(1-2)	2 Bx	Mk I Smoke Compound	OIL	S-1

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE2-213	1	Type 3 Gas Testing Apparatus	OIL	S-1
JE2-212	7	Gas Detection Kits	OIL	S-1
JE2-216	65	Gas Detection Units	OIL	S-1
JE2-228	6	A and B Sniff Test Agents	OIL	S-1
JE2-217	2 Bx	Mk 5 Decontamination Powder	OIL	S-1
JE2-230	4	Mk 6 Decontamination Sets	OIL	S-1
JE2-214	10 Bx	Mk 6 Decontamination Powder	OIL	S-1
JE2-220	1	Decontamination Estimation Wheel	NRL	S-1
JE21-4342	1	Gas Flask for Mk 1 Bomb	OIL	Y-3
JE21-4332	1	Gas Cylinder for 250Kg Bomb	OIL	Y-3
JE2-227	4	Tin Cylinders	OIL	S-1

JAPANESE METEOROLOGICAL INSTRUMENTS

X-17

JE50-5701	2	Altimeters, Precision Pressure Aneroid	1-NRL 1-Buaer	Y-3
JE50-5933	2	Altimeters, Recording	1-NRL 1-Buaer	Y-3
JE50-5930	6	Anemo-Cinemagraphs	4-NRL 2-Buaer	Y-3
JE50-5998	6	Anemographs Dine's	3-NRL 3-Buaer	Y-3
JE50-5986	3	Anemographs, Dine's Recorder Hand	2-NRL 1-Buaer	Y-3
JE50-5921	3	Anemographs, Robinson	1-NRL 2-Buaer	Y-3
JE10-3107	2	Anemometers	OIL	S-1
JE10-5101	19	Anemometer, Hand	OIL	S-1
JE50-5957	2	Anemometers, Hand, Type A Navy	1-NRL 1-Buaer	Y-3
JE50-5950	1	Anemometer, Portable, Army	Buaer	Y-3
JE50-5949	1	Anemometer, Recording, Army Unclassified	Buaer	Y-3
JE50-5934	2	Anemometer Recorders, Robinson, Unclassified	1-NRL 1-Buaer	Y-3

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-5927	3	Anemoscopes, Fixed Record, Mechanical Linkage	1-NRL 1-BuAer	Y-6
JE50-5999	1	Atmospheric Recorder, Sferics, Type 3 Navy (Incomplete)	BuAer	Y-6
JE50-5977	1	Barograph, Army	NRL	Y-6
JE50-5938	2	Barographs, Type A, Navy	1-NRL 1-BuAer	Y-6
JE50-5946	2	Barographs, Type 2-A, Navy	1-NRL 1-BuAer	Y-6
JE50-5967	2	Barometers, Aneroid, Box	1-NRL 1-BuAer	Y-6
JE50-5990	3	Barometers, Fortin, Mercury, Portable, Army	2-NRL 1-BuAer	Y-6
JE50-5978	2	Barometers, Mercury, Station Type, Navy	1-NRL 1-BuAer	Y-6
JE50-5980	2	Baro-Thermo-Hydrographs	1-NRL 1-BuAer	Y-6
JE50-5710	4	Cloudsonds, Type A, Army	2-NRL 2-BuAer	Y-6
JE50-5714	3	Cloudsonds, Type A, Navy	1-NRL 2-BuAer	Y-6
JE50-5715	4	Cloudsonds, New Type, Navy	2-NRL 2-BuAer	Y-6
JE50-5704	2	Drift Indicators, Type 96	1-NRL 1-BuAer	Y-6
JE50-5969	2	Evaporagraphs 96	1-NRL 1-BuAer	Y-6
JE50-5705	1	Evaporagraph, Navy	NRL	Y-6
JE50-5959	2	Evaporimeters	1-NRL 2-BuAer	Y-6
JE50-5722	1	Hydrogen Generator, Army	BuAer	Y-6
JE50-5976	2	Hydrographs, Army, Unclassified	NRL	Y-6
JE50-5937	2	Hydrographs, Navy	1-NRL 1-BuAer	Y-6
JE50-5948	1	Hydrograph, Navy, Unclassified	BuAer	Y-6
JE50-5987	2	Meterographs, Airplane	1-NRL 1-BuAer	Y-6

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-5963	2	Nephoscopes	1-NRL 1-BuAer	Y-6
JE50-5963	3	Pibal Balances, 2 Types	2-NRL 1-BuAer	Y-6
JE50-5993	5	Pibal Balances, Navy	3-NRL 2-BuAer	Y-6
JE50-5972	2	Pibal Balances, Spring	1-NRL 1-BuAer	Y-6
JE50-5926	2 Bx	Pilot Balloons (20,60,100,200, and 400gr) White & Pink	1 Bx-NRL 1 Bx-BuAer	Y-6
JE50-5966	1	Psycrhrometer, Assman's	NRL	Y-6
JE50-5943	3	Psycrhrometers, Army, Unclassified	1-NRL 2-BuAer	Y-6
JE50-5944	1	Psychrometer, Navy, Unclassified	BuAer	Y-6
JE50-5988	2	Pulviometers, Army	1-NRL 1-BuAer	Y-6
JE50-5730	4	Radio Direction Tracking Receivers, Type 2	BuAer	Y-6
JE50-5738(19)	1	Radiosonde Receiver, Old Type, Army	BuAer	Y-6
JE50-5997	3	Radio Tracking Devices, Type 4	2-NRL 1-BuAer	Y-6
JE50-5998	1	Radio Tracking Device, Type 4	NRL	Y-6
JE50-5922	2	Rain Gages, 20cm Diam, Non-Recording,	1-NRL 1-BuAer	Y-6
JE50-5965	2	Rain Gages, Non-Recording, Portable, Army	NRL	Y-6
JE50-5954	2	Rain Gages, Non-Recording, Navy, Unclassified	NRL	Y-6
JE50-5961	4	Rain Gage Measuring Glasses, 2 Types	2-NRL 2-BuAer	Y-6
JE50-5991	3	Raysonde Electrical Testers	2-NRL 1-BuAer	Y-6
JE50-5991	1	Raysonde Pressure Interrupter	NRL	Y-6
JE50-5992	5	Raysonde Pressure Interrupter Testers	3-NRL 2-BuAer	Y-6
JE50-5738 (14,15,17,18)	4	Raysonde Receivers, Old Type Army	BuAer	Y-6

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-5713	3	Raysonde Transmitters, Old Type 97, Navy (PPP-TT & R.N.)	2-NRL 1-BuAer	Y-6
JE50-5707	2	Raysonde Transmitters, New Type 97	BuAer	Y-6
JE50-5711	4	Raysonde Transmitters, New Type 97 (PPP-TT)	2-NRL 2-BuAer	Y-6
JE50-5707	1	Raysonde Transmitter, New Type 97 (PPP-TT-RN)	NRL	Y-6
JE50-5708	2	Raysond Trasmitters, Type 3, Army	1-NRL 2-BuAer	Y-6
JE50-5971	3	Sea Water Hydrometers	2-NRL 1-BuAer	Y-6
JE50-5970	1	Sea Water Thermometer, Navy	BuAer	Y-6
JE50-5962	2	Snow Gages	1-NRL 1-BuAer	Y-6
JE50-5970	4	Solar Radiation Thermometers and Tripods Army	2-NRL 2-BuAer	Y-6
JE50-5960	4	Sunshine Recorders, Jordan's	2-NRL 2-BuAer	Y-6
JE50-5929	2	Theodolites, Old Type, Army	1-NRL 1-BuAer	Y-6
JE50-5973	2	Theodolites, Unclassified, Army	1-NRL 1-BuAer	Y-6
JE50-5974	2	Theodolites, Type 92, Navy	1-NRL 1-BuAer	Y-6
JE50-5702	2	Theodolites, Type 92-A, Navy	1-NRL 1-BuAer	Y-6
JE50-5958	2	Theodolites, Type 92-A, Navy-Sextant	NRL	Y-6
JE50-5975	2	Theodolites, Type 3, Army	1-NRL 1-BuAer	Y-6
JE50-5935	2	Thermo-Barographs, Type A, Navy	1-NRL 1-BuAer	Y-6
JE50-5936	2	Thermo-Barographs, Type 1-B, Navy	1-NRL 1-BuAer	Y-6
JE50-5934	1	Thermograph, Army, Unclassified	BuAer	Y-6
JE50-5989	2	Thermographs, Earth, Remote Reading, Capillary Tube	1-NRL 1-BuAer	Y-6

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-5939	2	Thermographs, Type 1-A, Navy	1-NRL 1-BuAer	Y-6
JE50-5940	2	Thermographs, Type 1-B, Navy	1-NRL 1-BuAer	Y-6
JE50-5941	2	Tyermographs, Type 2-A, Navy	1-NRL 1-BuAer	Y-6
JE50-5947	1	Thermograph, Type 2-A, Navy	BuAer	Y-6
JE50-5964	2	Thermometers, Earth, "L" Tube, Army	1-NRL 1-BuAer	Y-6
JE50-5703	2	Thermometers, Earth, "L" Tube, Navy	1-NRL 1-BuAer	Y-6
JE50-5981	2	Thermometers, Maximum and and Minimum, Army	1-NRL 1-BuAer	Y-6
JE50-5942	1	Thermometer, Mercury, Short, Navy	BuAer	Y-6
JE50-5706	2	Thermometers, Mercury Standard	1-NRL 1-BuAer	Y-6
JE50-5979	2	Thermometers, Recording, Army	1-NRL 1-BuAer	Y-6
JE50-5945	1	Thermometer, Underground, CWC, Army-Navy	BuAer	Y-6
JE50-5931	2	Tripod Theodolites, Type 92-A, Navy	1-NRL 1-BuAer	Y-6
JE50-5932	1	Tripod Theodolite, Type 3, Army	NRL	Y-6
JE50-5716	1	Water Current Meter	BuAer	Y-6
JE1-3111SD-1	1	Weather Instrument	OIL	S-1
JE50-5985	2	Wind Direction Recorders, Army	1-NRL 1-BuAer	Y-6
JE50-5995	4	Wind Instruments, Type 91-A, Navy	2-NRL 2-BuAer	Y-6
JE50-5996	4	Wind Instruments, Type 97-A, Navy	2-NRL 2-BuAer	Y-6
JE50-5928	2	Wind Recorders, Robinson Old Type, Army	1-NRL 1-BuAer	Y-6
JE50-5982	4	Wind Vane Masts, Recording	3-NRL 1-BuAer	Y-6
JE50-5700	2	Wind Velocity Counters, Army	1-NRL 1-BuAer	Y-6

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-5953	2	Wind Velocity and Direction Calculating Instruments	1-NRL 1-BuAer	Y-6
JE22-2052(A-E)	5	Wind Velocity and Direction Indicators	BuS	K-4
JE21-3404	1	Wind Velocity Indicator	OIL	Y-4
JE50-5955 JE50-5738 (1-13) (18,20,26)	-	Miscellaneous Aerological	NRL BuAer	Y-6
JE50-5702	1	Stand for Navy Type 73 Theodolite	BuAer	Y-6
JE50-5983	2	Valves for Hydrogen Cylinder	1-NRL 1-BuAer	Y-6
		ATOMIC BOMBS		
		X-28		
No Serial Number	9 Bx 700 lbs	Radio-Active Earth Samples from Hiroshima and Nagasaki	NMRI	Y-2
		CAMOUFALGE OF JAPANESE SHIPS AND NAVAL INSTALLATIONS		
		X-32		
JE50-1223(1-2)	- 1 Qt. 5 Gal. 5 Gal.	Paints Color No.2 Hot Venetian AF No. 2 Hot Venetian AF No. 1	NRL	Y-4
		MAGNETIC DEVELOPMENT IN JAPAN DURING WORLD WAR II		
		X-34(N)		
JE50-5200 -5201	2	Alpern Sheets	BuOrd	Y-6
JE50-5202 -5203	2	Alfer Sheets	BuOrd	Y-6
JE50-5204 -5208	2	Magnetostriction Vibrators	BuOrd	Y-6
JE50-5205	-	Laminations for Magnetostriction Oscillators	BuOrd	Y-6
JE50-5206(1-2)	1	Magnetic Shield (Sendust) (Two Parts)	BuOrd	Y-6
JE50-5207	1 Roll	Recording Wire	BuOrd	Y-6
JE50-5209	1	Telephone Ringer	BuOrd	Y-6
JE50-5210	1	NKS Magnet Receiver	BuOrd	Y-6

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-5211	1	Senduct Cores	BuOrd	Y-6
JE50-5212	-	Alfers or Alpern (Small Pieces)	BuOrd	Y-6
JE50-5213	1	Magnetic Amplifier	BuOrd	Y-6
JE50-5214	1	Magnetic Amplifier (HARADA)	BuOrd	Y-6
JE50-5215	1	Receiver and Transmitter with OP Magnet	BuOrd	Y-6
JE50-5216	1	NKS Magnet for Loud-speaker	BuOrd	Y-6
		JAPANESE FUELS AND LUBRICANTS		
		X-38(N)		
JE26-0001	1 Bx	Condensed Oil, Motor Gaoline, Diesel Oil	NRL	S-1
JE26-0002	1 Bx	Paraffin Oil, Paraffin	NRL	S-1
JE26-0003	1 Bx	Catalysts	NRL	S-1
JE26-0004	1 Bx	Coke, Coal, Catalysts	NRL	S-1
JE26-0005	1 Bx	Active Carbon Oil, Condensed Oil	NRL	S-1
JE26-0006	1 Bx	Pine Root Oil and Gasoline	NRL	S-1
JE26-0007(1-5)	1 Bx	Lubricants	NRL	S-1
JE26-0008 thru 0012	1 Bx	Lubricants	NRL	S-1
JE26-0013(1)	1 liter	Diesel Fuel	EES	Y-6
JE26-0013(2)	2 liters	Precise Oil No. 1	EES	Y-6
JE26-0014(1)	200cc	Torpedo Engine Oil for Summer Use	EES	Y-6
JE26-0014(2)	50cc	Precise Oil No. 5	EES	Y-6
JE26-0014(3)	50cc	Dodecene Polymer (Precise Oil Function)	EES	Y-6
JE26-0014(4)	-	Dodecene Polymer (Higher Fraction)	EES	Y-6
JE26-0014(5)	1 liter	Hydrocracked Oil from Pine Root Oil	EES	Y-6
JE26-0014(6)	150cc	Catalytic Cracked Oil From Pine Root Oil	EES	Y-6
JE26-0015(1)	500cc	Aero-Engine Oil (From Rubber)	EES	Y-6

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE26-0015(2)	500cc	Aero-Engine Oil (from Paraffin Wax)	EES	Y-6
JE26-0015(3)	500cc	Aero-Engine Oil (from Fatty Oil)	EES	Y-6
JE26-0015(4)	100cc	Aero-Engine Oil (from Shale Oil)	EES	Y-6
JE26-0015(5)	500cc	Mobile Oil (from Rubber)	EES	Y-6
JE26-0015(6)	500cc	Shark Oil (Crude)	EES	Y-6
JE26-0015(7)	300cc	Squalene (from Shark Oil)	EES	Y-6
JE26-0016(1)	5kg	Magneto Grease	EES	Y-6
JE26-0016(2)	5kg	Controllable-Pitch Propeller Grease	EES	Y-6
JE26-0016(3)	5kg	Rocker-Arm Grease	EES	Y-6
JE26-0016(4)	5kg	Sea-Water-Proof Grease	EES	Y-6
JE26-0017(1)	1500cc	Pine Root Oil (Crude)	EES	Y-6
JE26-0017(2)	-	Anti-Corrosive Oil for Cylinder	EES	Y-6
JE26-0018(1)	5kg	Grease for Framework of Aerial Torpedo	EES	Y-6
JE26-0018(2)	2kg	Anti-Corrosive for Interior of Air-Flask of Aerial Torpedo	EES	Y-6
JE26-0018(3)	1.5kg	Catalyst for Rocket Fuel-$K_3Cu(N_4)$	EES	Y-6
JE26-0018(4-5)	400gm	Acid Clay for Mineral Oil Refining at 140°C	EES	Y-6
JE26-0018(6)	-	Acid Clay (Granular)	EES	Y-6
JE26-0018(7)	400gm	Acid Clay for Mineral Oil Refining at 300°C	EES	Y-6
JE26-0018(8)	400gm	Acid Clay Used for Catalytic Cracking	EES	Y-6
JE26-0019(1)	500gm	Iron Catalyst, Middle Pressure (Similar to That Used at Takakama)	BuMines	Y-6
JE26-0019(2)	500gm	Mixture of: Fe-25%, Cu-2%, Mn-12.5% Kieselguhr-20%, Al_2O_3-4%, K_2CO_3	BuMines	Y-6
JE26-0019(3)	-	Ochre Catalyst, Middle Pressure, CuO-5, Mn-1.5, K_2CO_3	BuMines	Y-6

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
		-4.0, Fe-100		
JE26-0021	1	Rotary Discharge Valve Assemply 4' x 1½' x 1½'	BuMines	Y-6
JE26-0022(1-2)	2	Manual High-Pressure Valve Assemblies 6" x 6" x 6"	BuMines	Y-6
JE26-0023	1	High-Pressure Flanged Union Joint Assembly 18"	BuMines	Y-6
JE26-0024	1	High-Pressure Rotating Autoclave Assembly 2' x 1' x 1'	BuMines	Y-6
JE26-0025(1-2)	2	Brass Compression Union Assemblies	BuMines	Y-6
JE26-0026	1	Super-Pressure Bomb (Autoclave) Assembly 1½' x 6" x 6"	BuMines	Y-6
JE26-0027	1 drum	Hydrocracking Catalyst	BuMines	Y-6
JE26-0028	20 liter	Aero-Engine Oil No. 100	EES	Y-6
JE26-0029	20 liter	Tea-Seed Oil	EES	Y-6
JE26-0030(1-2)	20 liter	Hair Oil	EES	Y-6
JE26-0031	20 liter	Aero-Engine Oil No. 140	EES	Y-6
JE26-0032	20 liter	Aero-Engine Oil No. 120	EES	Y-6
JE26-0033	1	Fuel-Air Ratio Meter Assembly, Including: 2-Mixture Ratio Meter Connection Boxes 1-Copper Tubing Connection 1-Resistance Tube 2-Mixture Ratio Meter Indicators 3-Rubber Tubes	NAF	Y-6

OCEANOGRAPHY IN JAPAN

X-40(N)

JE50-5051	13	Animal Sound Recordings (Submarine)	HYDRO	Y-6
JE50-5052	1	Knudsen Type Pipette	HYDRO	Y-6
JE50-5053 -5054	2	Burette Pipettes	HYDRO	Y-6
JE50-5055	1	Reversing Thermometer, Protected	HYDRO	Y-6
JE50-5056	1	Reversing Thermometer, Unprotected	HYDRO	Y-6

ENCLOSURE (E), continued

NavTechJap Equipment No	Quant	Description of Items	Destination	Shipment
JE50-5057	1	Nansen Type Water Bottle	HYDRO	Y-6
JE50-5058	1	Ekman Type Water Bottle	HYDRO	Y-6
JE50-5059	1	Ekman Type Current Meter	HYDRO	Y-6
JE50-5060	1	Surface Water Sampler	HYDRO	Y-6
JE50-5061	1	Meter Wheel	HYDRO	Y-6
JE50-5062	1	Clinometer	HYDRO	Y-6
JE50-5063	1	Sea-Water Color Comparator	HYDRO	Y-6
JE50-5064	1	Sea-Water Color Comparator Frame	HYDRO	Y-6
JE50-5065	1	Tube of Normal Sea-Water	HYDRO	Y-6
JE50-5066	2	Silicate Sample Bottles	HYDRO	Y-6
JE50-5067	3	Salinity Sample-Bottles	HYDRO	Y-6
JE50-5068	1	Secchi Type Disc	HYDRO	Y-6
		UNCLASSIFIED		
JE21-4806	1	String of U-Clamps	OIL	Y-4
JE21-6008(1-2)	2	Sound Generators	OIL	Y-4
JE21-4463	1	T-37 Food Container	OIL	Y-4
JE21-3112	1 Bx	Standard Curve Templates	OIL	Y-4
JE21-4063	-	Green Sea Dye Maulers	OIL	Y-4
JE21-4461	1	Cylinder Container	OIL	Y-4
JE21-4471	-	T-30 of T-26 (?)	OIL	Y-4
JE21-3111	1	Box of Chemicals	OIL	Y-4
JE21-4055	1	Not Designated	OIL	Y-5
JE10-3128	1 Bx	Spherical Star Maps	OIL	S-1
JE50-1250	-	Brand (?)	NMWTS	Y-6