

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

NS/rkk

12 December 1945

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From: Chief, Naval Technical Mission to Japan.  
To : Chief of Naval Operations.  
Subject: Target Report - Rehabilitation in the Japanese Navy.  
Reference: (a) "Intelligence Targets Japan" (DNI) of 4 Sept. 1945.

1. Subject report, covering Supplementary Questionnaire "E" of Fascicle M-1 of reference (a), is submitted herewith.

2. The investigation of the target and the target report were accomplished by Comdr. P.B. Ayres, (MC) USNR, assisted by Lieut. F. Gilbert, USNR and Phom3/c W. McCauley, USNR.



C. G. GRIMES  
Captain, USN

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**M-E**

# **REHABILITATION IN THE JAPANESE NAVY**

**"INTELLIGENCE TARGETS JAPAN" (DNI) OF 4 SEPT. 1945  
FASCICLE M-1, SUPPLEMENTARY QUESTIONNAIRE "E"**

**DECEMBER 1945**

**U.S. NAVAL TECHNICAL MISSION TO JAPAN**

# 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.

# TABLE OF CONTENTS

Summary .....	Page 1
References .....	Page 3
List of Enclosures .....	Page 4
List of Illustrations .....	Page 4
Introduction .....	Page 5
The Report	
1. a. Treatment of Wounds .....	Page 7
b. Treatment of Burns .....	Page 7
c. Treatment of Fractures .....	Page 7
2. External Skeletal Fixation Appliances .....	Page 8
3. Amputations .....	Page 8
4. Artificial Limbs .....	Page 9
5. Incidence and Care of Blindness and Deafness .....	Page 9
Enclosure (A) .....	Page 19
Enclosure (B) .....	Page 19
Enclosure (C) .....	Page 19
Enclosure (D) .....	Page 19

## REFERENCES

## A. Location of Target:

Naval Prosthetic Appliance Laboratory and Workshop, located on the grounds of the "Ryohin Sho" (Central Naval Medical Supply Depot) in MEGURO-KU, TOKYO

Second Naval Medical Hospital, TOKYO, located temporarily in the buildings of the above depot, the hospital having been moved from the Naval Medical Hospital, formerly part of the Naval Medical School in TSUKIJI, TOKYO. This is the orthopedic rehabilitation center for the Japanese Navy.

## B. Japanese Personnel Who Assisted in Securing Equipment and/or Locating Documents:

Comdr. S. E. INOBUCHI, (MC) IJN orthopedic surgeon in charge of Traumatic Surgery and rehabilitation of amputees.

Rear Adm. S. YOKOKURA, (MC) IJN roentgenologist, and former orthopedic surgeon, Senior Naval Roentgenologist and CO of Second Naval Hospital.

## C. Japanese Personnel Interrogated:

As in Reference "B".

All Japanese Naval Surgeons listed in Reference B, "Data Relative to Life in the Jungle," NavTechJap Report, Index No. M-01.

## LIST OF ENCLOSURES

- (A) List of Data Pertaining to This Target Gathered by Other Agencies.
- (B) List of Documents Forwarded to NMRI, Bethesda, Md.
- (C) List of Documents Forwarded to WDC Through ATIS.
- (D) List of Equipment Forwarded to NMRI, Bethesda, Md.

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## LIST OF ILLUSTRATIONS

### DIAGRAMS

Figure 1.	Simple Iron Frame Support .....	Page 8
Figure 2.	Artificial Arm - Draftsman's Mechanical Drawing .....	Page 10
Figure 3.	Artificial Leg Frame - Draftsman's Mechanical Drawing ...	Page 11

### PAMPHLET PHOTOGRAPHS - JAPANESE TRAINING

Figure 4.	Bamboo Thigh-Support for Training .....	Page 11
Figure 5.	"Dress" Limb Covered with Silk Stocking .....	Page 11
Figure 6.	Artificial Limb for Use in the Fields .....	Page 11
Figure 7.	Artificial Hand for Manipulating Control Stick .....	Page 12
Figure 8.	Roll Graft Transplant to Cover Stump .....	Page 12
Figure 9.	Training of Limb Amputees .....	Page 12
Figure 10.	Training of Limb Amputees .....	Page 12

### PHOTOGRAPHS - NAVAL PROSTHETIC APPLIANCES FACTORY

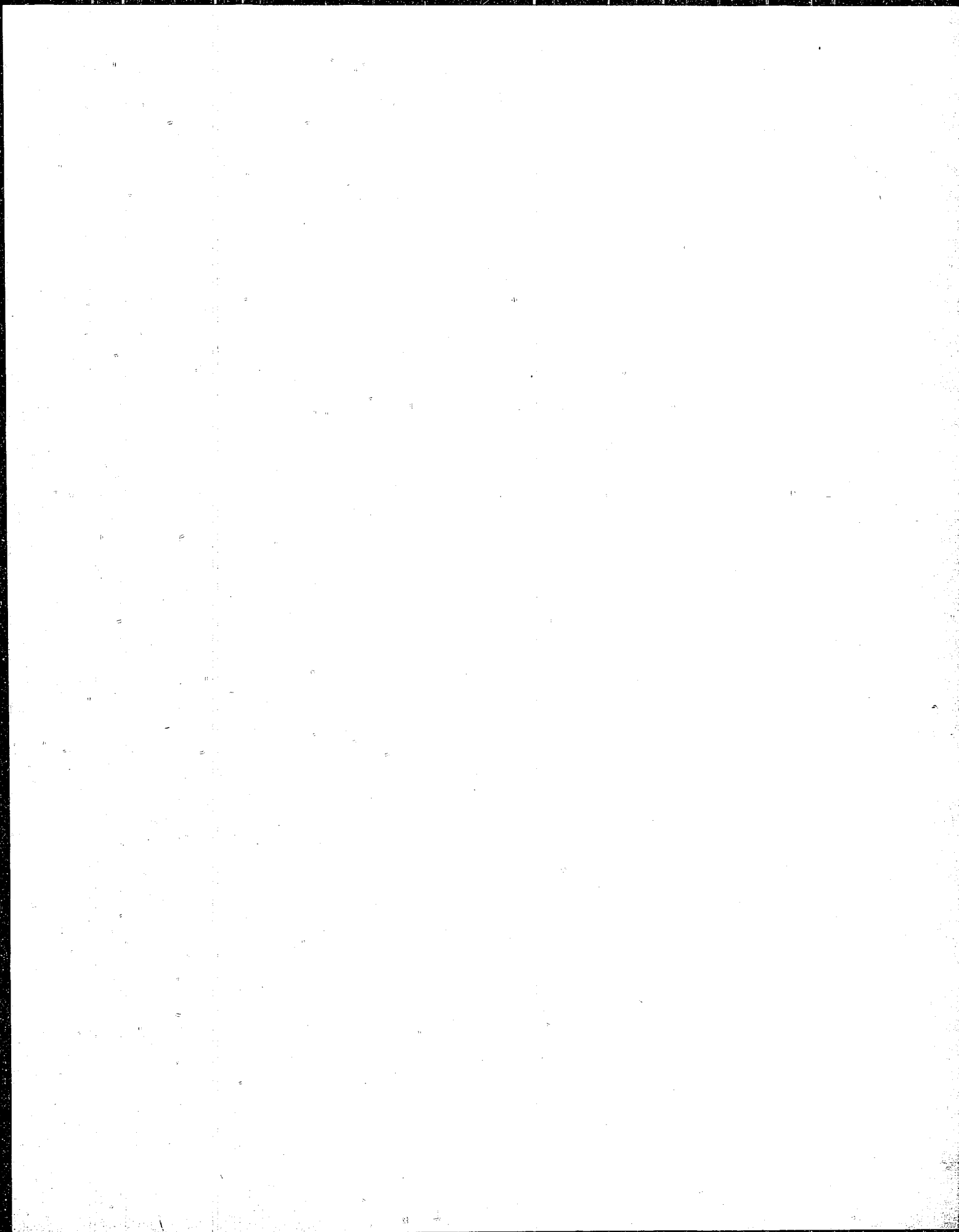
Figure 11.	Leather Working Shop .....	Page 13
Figure 12.	Wood Working Shop .....	Page 13
Figure 13.	Metal Work and Assembly Shop .....	Page 14
Figure 14.	Fitting and Finishing Shop .....	Page 14
Figure 15.	Machine Shop .....	Page 15
Figure 16.	Artificial Hands .....	Page 15
Figure 17.	Artificial Hands .....	Page 15
Figure 18.	Artificial Hands .....	Page 16
Figure 19.	Artificial Hands .....	Page 16
Figure 20.	Artificial Hands .....	Page 16
Figure 21.	Wrist Drop Apparatus .....	Page 16
Figure 22.	Artificial Arm .....	Page 17
Figure 23.	Artificial Arm .....	Page 17
Figure 24.	Artificial Arm .....	Page 17
Figure 25.	Artificial Legs .....	Page 18
Figure 26.	Artificial Legs .....	Page 18

## INTRODUCTION

The program of rehabilitation of service personnel disabled from various causes during the war years has been accelerated, expanded, and come to be recognized as a concurrent activity rather than a post-war project. Psychiatric therapy and rehabilitation in the Japanese armed forces have been outlined under NavTechJap Report "Neuropsychiatry", Index M-D. The "rehabilitation" program, such as it was, was the responsibility of the Veterans' Bureau, a separate governmental agency, since the Navy did not have the necessary facilities or personnel for such a service.

Those who were disabled by the impairment or loss of sight and hearing "in line of duty" were similarly separated from the service and received aid from the Veterans Bureau. Thus "rehabilitation" as found in the Japanese Navy was a matter of immediate restoration to active duty if possible, or, in the case of more serious body injury, restoration to a productive existence. The former was done (i.e. definitive treatment and care) at all naval hospitals, base hospitals, etc. The latter was done only at the TOKYO Naval Medical Hospital - the rehabilitation center for the Navy.

All potential amputees were gathered there for surgery and subsequent rehabilitation. Those losing limbs in combat or by emergency surgery elsewhere were sent to the training classes at this hospital. Essentially in rehabilitation the Navy provided artificial limbs and trained the patients how to use them.





## THE REPORT

1. a. Treatment for wounds commonly used varied with the preference and training of the individual medical officer. It was agreed that very little "debridement" was practised. The cardinal points were given as:

- (1) Check hemorrhage. This was done by the usual methods.
- (2) Apply antiseptic and clean the wound. Iodine or oxy-mercuric cyanide in aqueous solution was most frequently employed.
- (3) Apply a dressing.
- (4) Repair lacerations, etc., if practicable and possible. The standard surgical procedures were quoted as "operating procedure", but it is very doubtful if asepsis or antisepsis was achieved short of the field hospitals, and even at that level techniques are open to suspicion, for in the naval base fixed installations inspected much was left to be desired.
- (5) Remove foreign bodies. Apparently an effort was made to extract bullets, shell and bomb fragments, and all foreign matter wherever possible.
- (6) Use sulfa drugs. Sulfanilamid powder was sprinkled over wounds and also given intravenously and orally to check infections. The dosages seem small to us, i.e. 20 cc of 5% solution intravenously (first dose) at time of surgery, or 5 cc of 30% solution. This was followed by two days oral therapy of three grams twice a day given with an equal dose of bicarbonate of soda in water.

- b. Burns were handled almost universally by the application of dressings of cod-liver oil and expectant treatment. The blebs were opened and the dead skin peeled away as a rule. General supportive therapy followed, with intravenous fluids if required.

Wet boric acid dressings constituted the second accepted topical application, other factors remaining the same.

Third treatment application consisted of "culture fluid" dressings. Cultures were made from the raw burn surface (after a day or two) in broth, and grown seven to 10 days. This culture was then filtered and the broth liquid used as a wet dressing, which was reported to have been very effective in controlling infection.

- c. Fractures were treated by closed reduction with the application of a plaster cast as a first step. If good position could not be maintained or a satisfactory reduction achieved, there was no hesitation in resorting to open reduction. As the number of mechanical appliances available for fracture work was limited, both as to variety and number, a great deal of fracture surgery was done.

The accepted principles of reduction, fixation, and immobilization were recognized. Traction was accomplished by the use of KIRSCHNER'S wire where possible. Skin traction, due to the irritant qualities of the war-time adhesive had been abandoned. Where adequate traction for reduction could not be obtained, fractures of the arm and leg were immobilized in an airplane splint and crude BUCK'S extension, respectively, for one or

two weeks. Then open reduction was performed. Screws were occasionally used, but the common procedure was to use stainless steel wire threaded through drill holes, or, in oblique fractures, wrapped around the fragment ends, and twisted tight with pliers. All sutures used were silk from skin down, as was the case in all operations due to the lack of a safe, trustworthy sterile gut product. A dressing of 7% acriflamine was applied and the wound left undisturbed for a week, and then dressed through a window in the cast applied after the operation. X-rays pre-reduction and post-reduction, and for periodic progress reports were standard procedure.

2. The few splints, pulleys, frames, instruments and orthopedic devices seen show no advances, in fact they are all of foreign design or make and at least six to eight years old. KIRSCHNER'S wire and drill, tong calipers, and STEINMAN pins were seen. THOMAS splints, airplane splints, and the various forms of overhead counter-weighted tractions were unknown or not available.

A simple iron frame for support of all fractures of the knee and below, "devised" by a Japanese surgeon is illustrated. This was standard equipment for all naval hospitals.

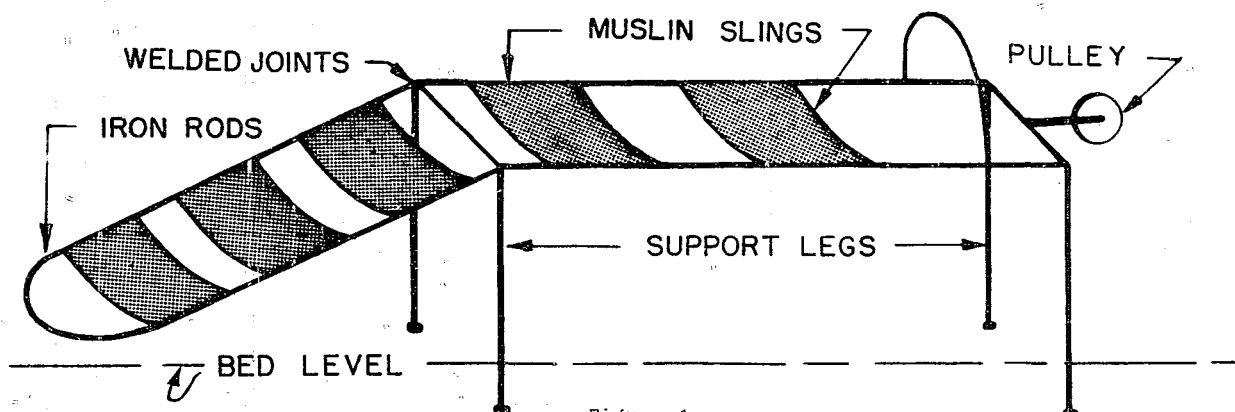


Figure 1

Simple Iron Frame Support

Airplane splints were made of plaster on wire lath for individual cases.

Counter traction was not seen in use, nor were the majority of the surgeons acquainted with the principle. No device resembling a STADER splint had been developed. All equipment had deteriorated, and no substitute metals or materials were in use, or seem to have been developed.

3. Amputations were frequent in definitive treatment as emergency field treatment was apparently often inadequate. (A great deal of traumatic osteomyelitis is still to be found among the orthopedic combat casualties in the naval hospitals.) With the return of extremity wound cases to the naval hospitals "everything possible" was done to save as much tissue as possible. However, lacking the new anti-biotics and using the sulfa drugs sparingly, time and supportive treatment were the chief therapeutic agents employed.

Amputations were done at the levels of choice for the subsequent fitting and use of artificial limbs. Hence mid-thigh and calf, lower humerus and forearm are the sites selected. However, GRITTI-STOKES and SYMES operations were performed on occasion. Local, spinal, and paravertebral blocks were used exclusively for anaesthesia. Adequate skin flaps were made, and nerve resection was high enough. The bone ends were covered only by the skin and subcutaneous tissue flaps, no penostium being used for covering the medullary cavity, and

no muscle tied over the bone ends. Silk of varying thickness was used for ligatures and sutures.

4. Artificial limbs (see illustrations) are made in the workshop of the Central Medical Supply depot and one such was furnished free to each patient at the end of his training period. The Emperor presented a prosthetic appliance of the best quality obtainable for cosmetic purposes, while the Navy furnished the utilitarian model.

Artificial arms are all of one standard design, upper sockets, mechanical elbow, forearm, and wrist as illustrated, or with a lower arm wrist-socket appliance. Legs are made of wood, duraluminum and leather, with celluloid built-up gauge casts, and all have some simple kneejoint device best described in the actual photographs.

The workshop was primitive, most of the work was hand labor, and tools and equipment were few and simple. No acrylic resin prosthetic hands had been developed. Those concerned in this supply depot had been doing some vague research, using urea, with the hope of producing some adequate compound for artificial prosthetic appliance use. No findings have so far been reached.

The training program for amputees occupied six months for leg cases and three months for arm cases. They were collected, as noted, at the Naval Hospital in TOKYO, under the supervision of Dr. INOUCHI, and there entered the course. They were encouraged by lectures and demonstrations of facility in the use of artificial limbs by members of the advanced training groups, and very intelligently handled.

It is interesting to note that all amputees, with the exception of aviation pilots having arm amputations, were discharged from the naval service. It was reported that 17 pilots had been rehabilitated and returned to active flight duty. They were fitted with quick-release hand-hooks, machined exactly to fit the controls of the craft they flew. (See illustration of Zero pilot's artificial hand.)

Training was first devoted to hardening the stump, and crude "work arms" and a "training crutch" were supplied. (See illustrations.) Leg cases were taught to walk, run, climb, balance, drill in cadence, etc., each form of exercise having a maximum allowable time limit which had to be achieved. As the amputees passed these tests their training limbs were exchanged for a better quality, until finally they earned the right to own the standard model. Arm amputees were trained in the various routines of living - such as opening doors, closets, carrying weights, feeding themselves and dressing. Then they began to learn simple manual drills, the handling of implements and the finer skills. Prosthetic work hands consisted of the ring and hook devices as shown. Cosmetic hands were made of light wood, covered with a thin layer of leather. There was no joint at the base of each finger which is slightly flexed, and fixed, but the second joint permitted a 20° total flexion. The thumb flexed at its base about 30°. The pictures illustrate maximum ranges of movement.

5. As has been summarized, the rehabilitation of the deaf and blind was a function of the Veterans Bureau and did not come under the cognizance of the Navy Ministry. When an end of therapeutic care had been reached they were separated from the service. Partial deafness was "common" in gun crews, and such personnel were assigned other duties, usually ashore, where auditory acuity was not an absolute requirement. The majority of the cases of blindness was due to traumatic injury. They received what emergency treatment was available and were returned to naval hospitals in the homeland. On discharge from the naval medical institutions they entered "The Dormitory for Wounded Servicemen" of the Relief Bureau, and received "suitable training for special occupations." Every effort to make them self-supporting was exerted. (See Enclosure "C" "Medical Treatment for Wounded Servicemen by the Relief Bureau.")

Complete deafness was reported as scarce, and no statistics were available.  
The incidence of blindness was given as follows:

<u>Year</u>	<u>Percent per 1000</u>
1941	0.03
1942	0.16
1943	0.15
1944	0.11

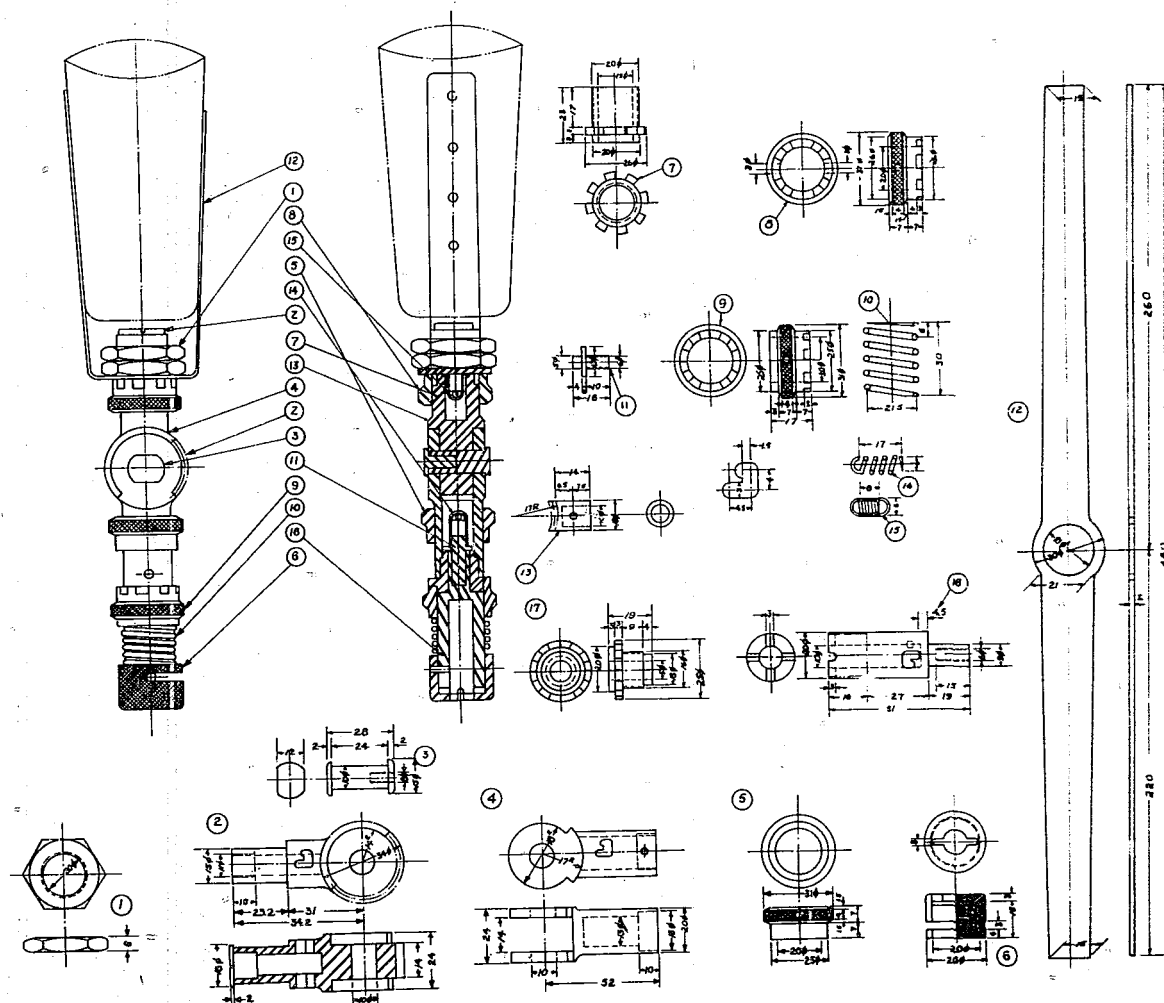


Figure 2  
Artificial Arm - Draftsman's Mechanical Drawing

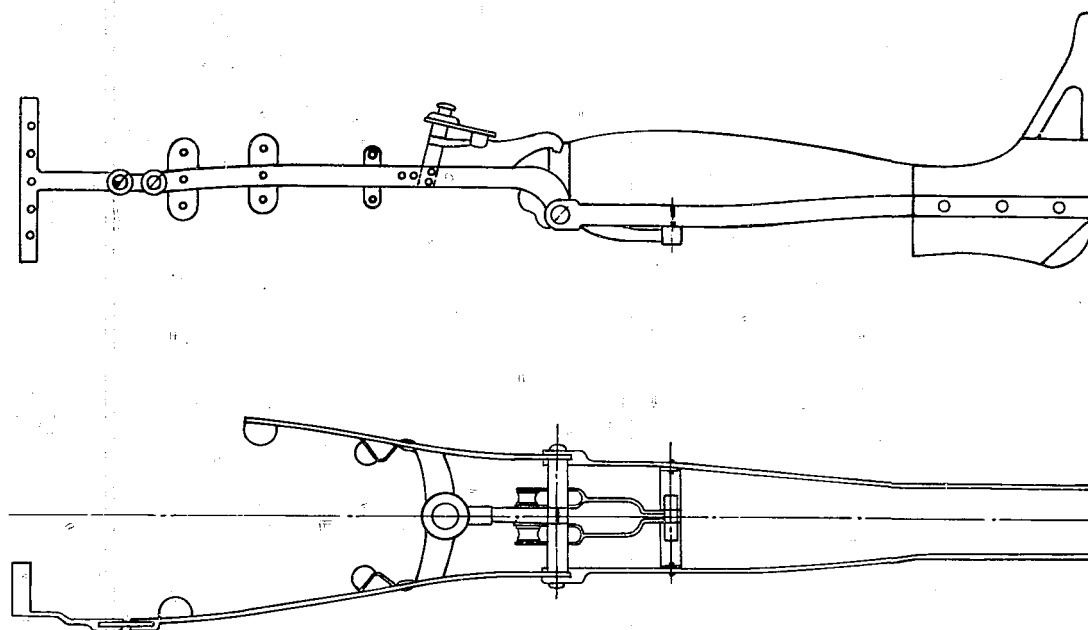


Figure 3  
Artificial Leg-Frame - Draftman's Mechanical Drawing

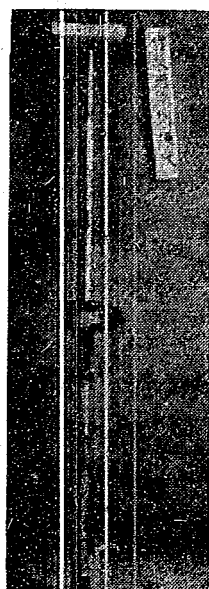


Figure 4  
Bamboo Thigh-Support  
For Training

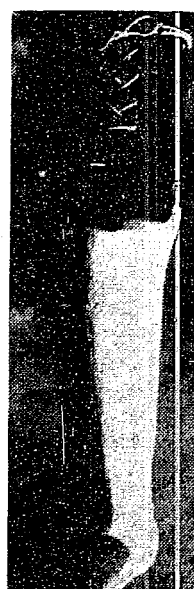


Figure 5  
"Dress" Limb Covered  
With Silk Stocking



Figure 6  
Artificial Leg for  
Use in the Fields

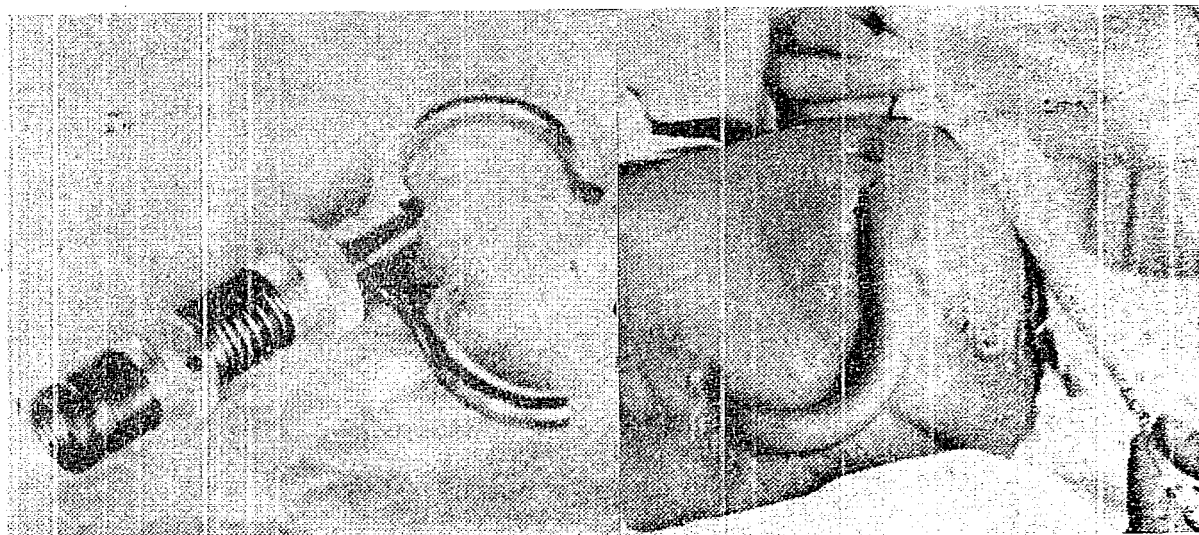


Figure 7  
Artificial Hand for  
Manipulating Control Stick

Figure 8  
Roll Graft Transplant  
to Cover Stump

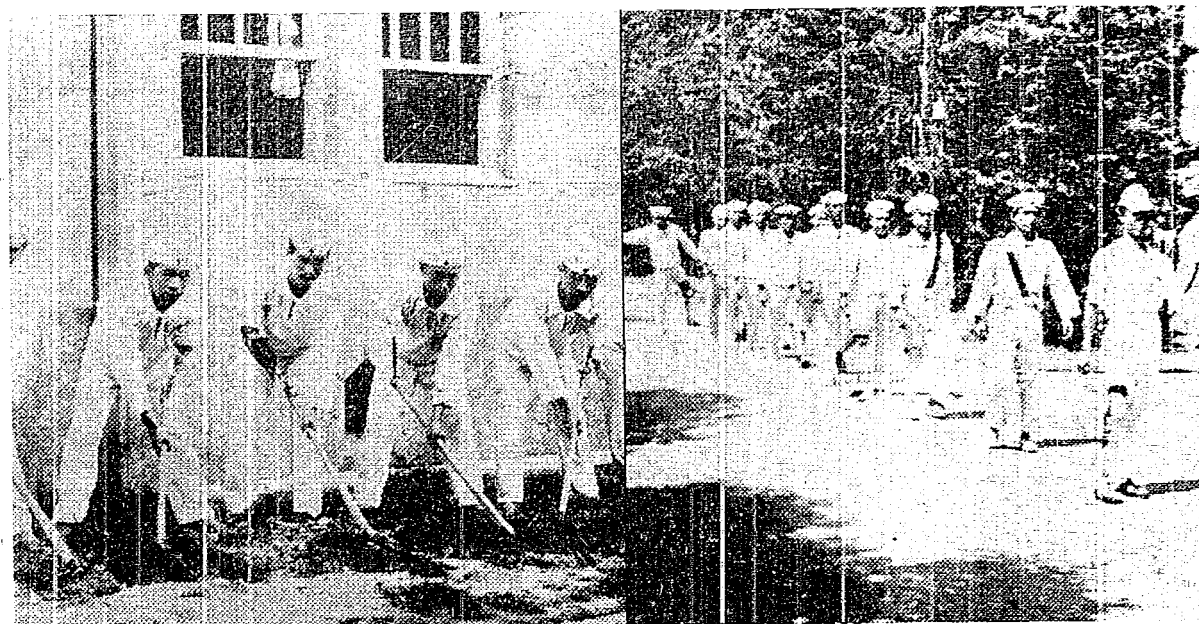


Figure 9 Training of Limb Amputees

Figure 10

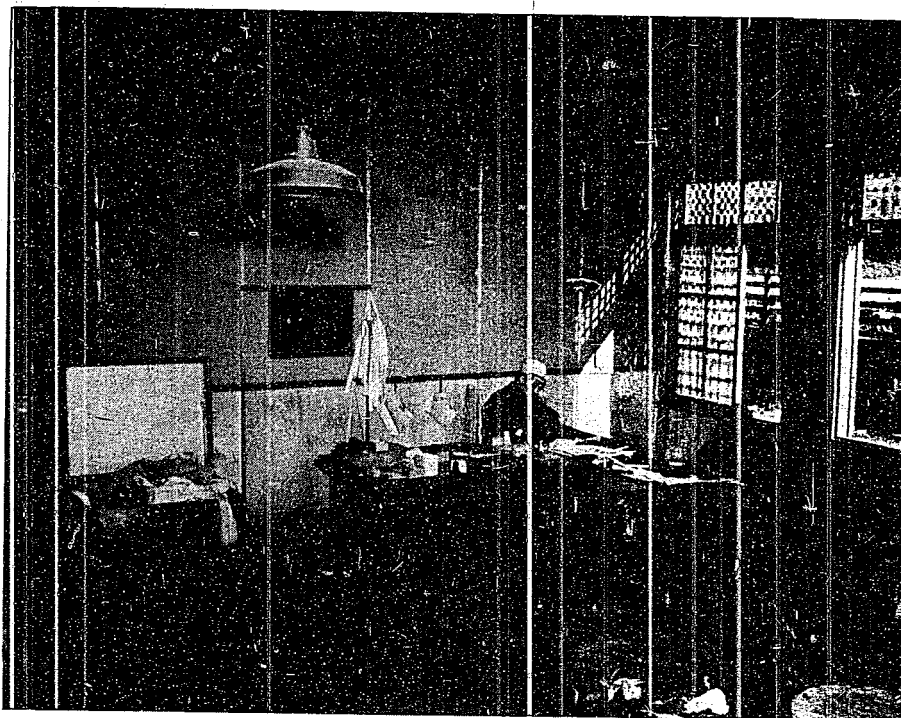


Figure 11  
Leather Working Shop

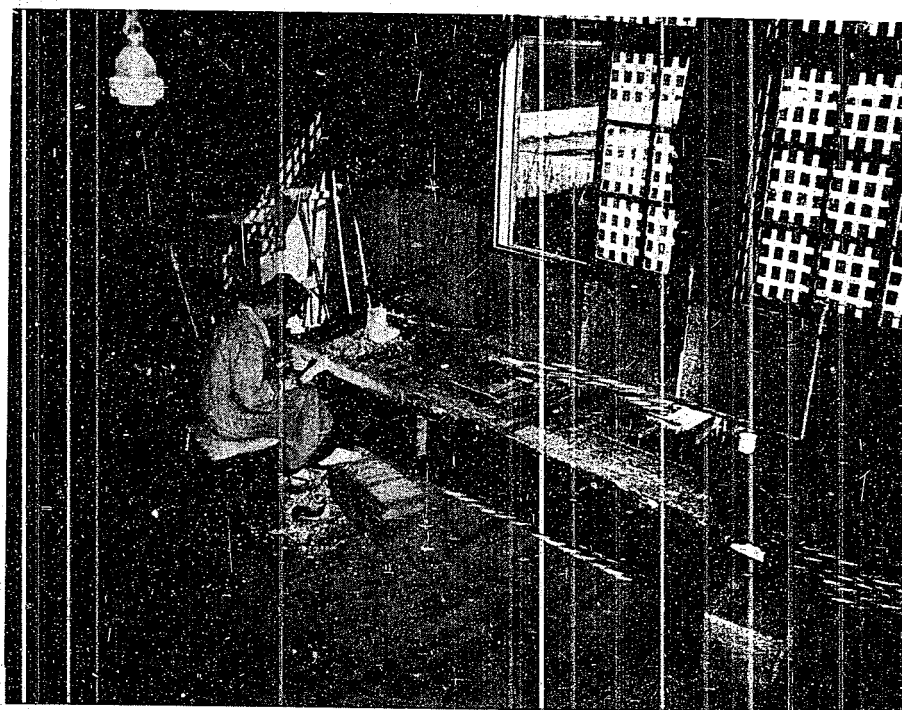


Figure 12  
Wood Working Shop



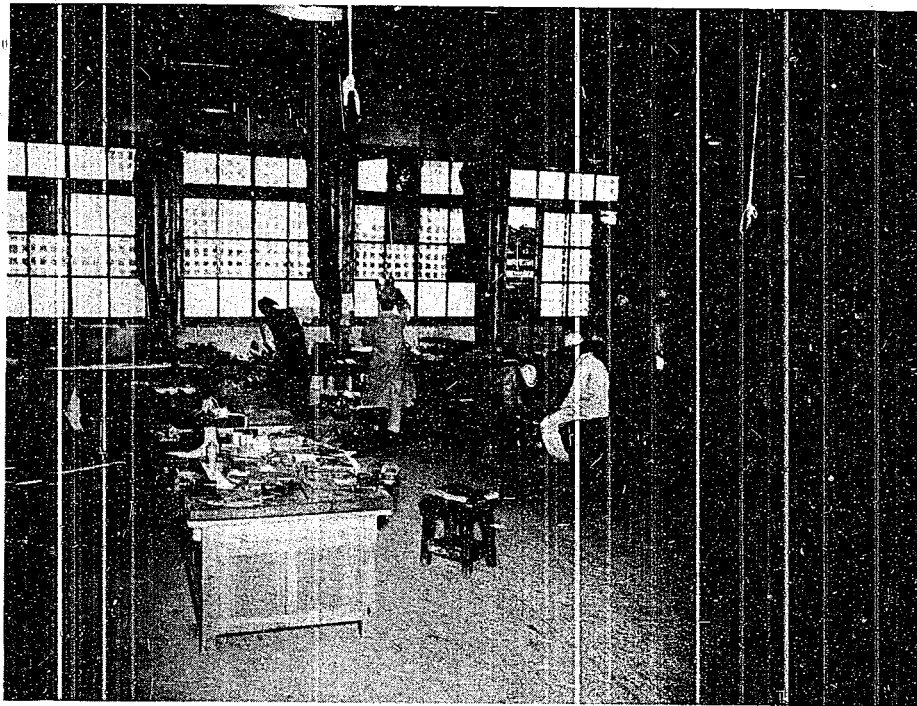


Figure 13  
Metal Work and Assembly Shop

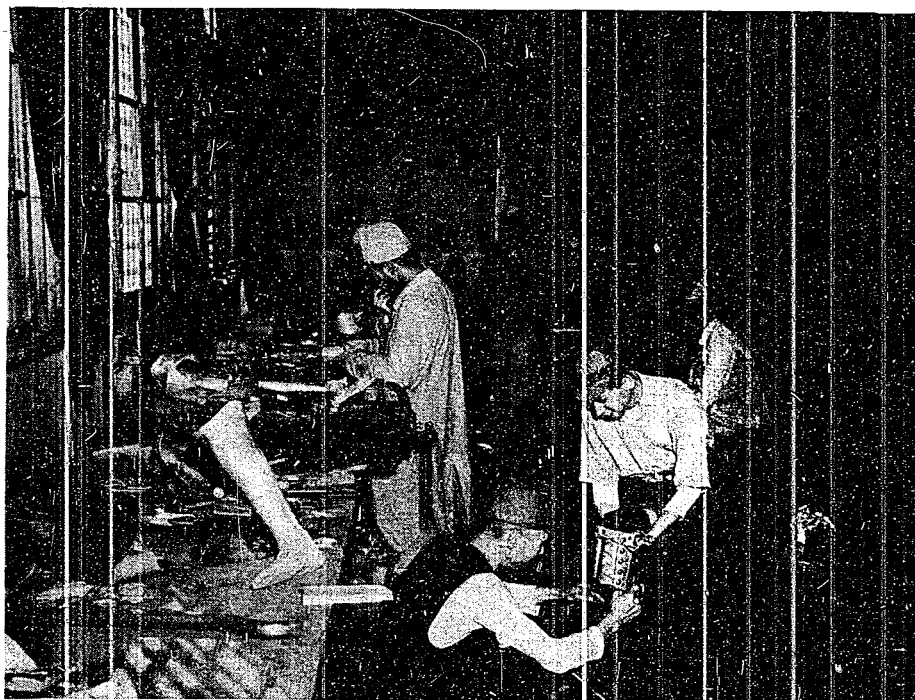


Figure 14  
Fitting and Finishing Shop



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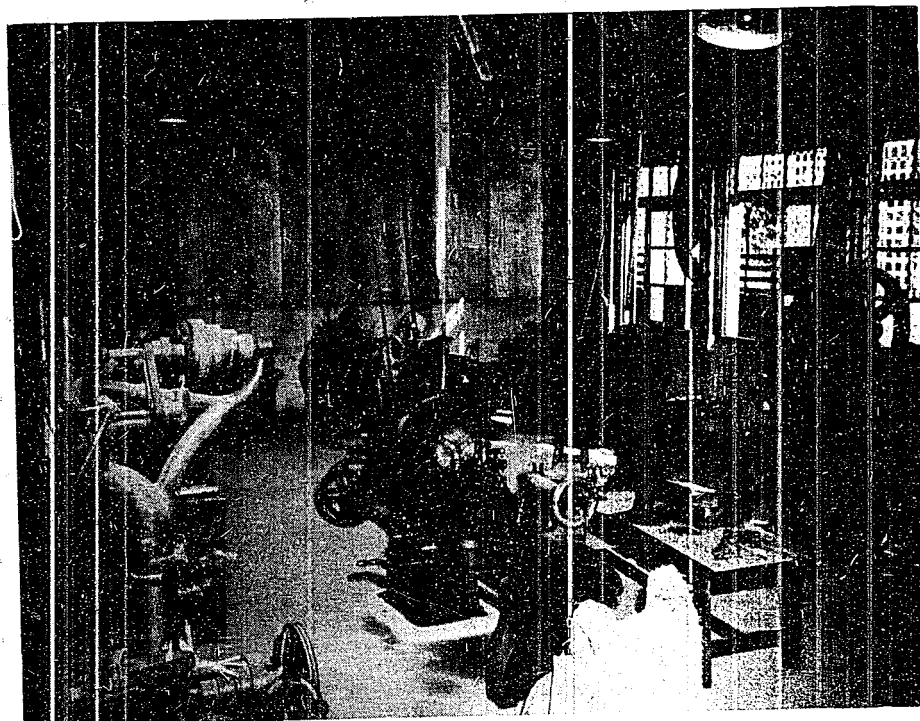


Figure 15  
Machine Shop

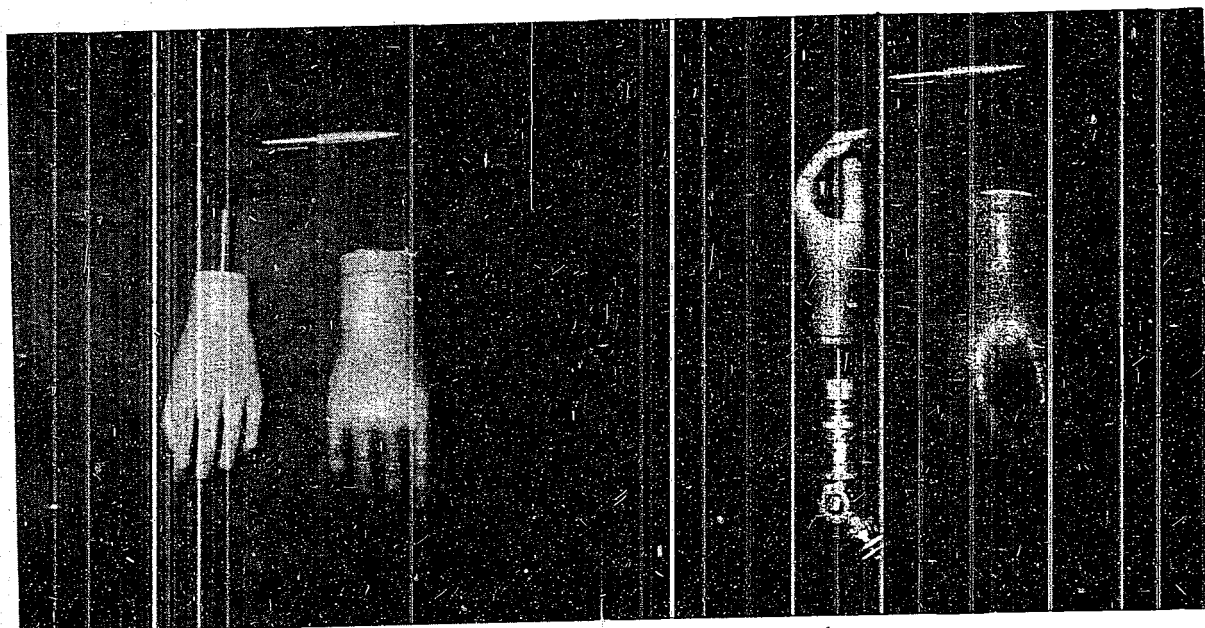


Figure 16  
Artificial Hands

Figure 17  
Artificial Hands



Figure 18  
Artificial Hands

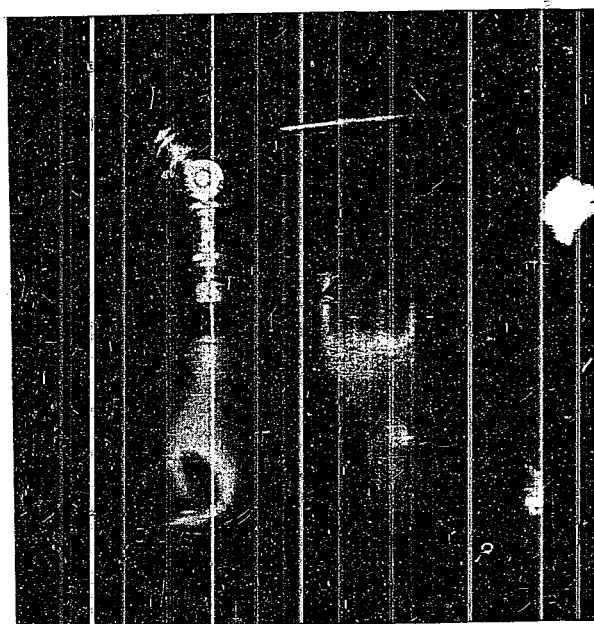


Figure 19  
Artificial Hands



Figure 20  
Artificial Hands

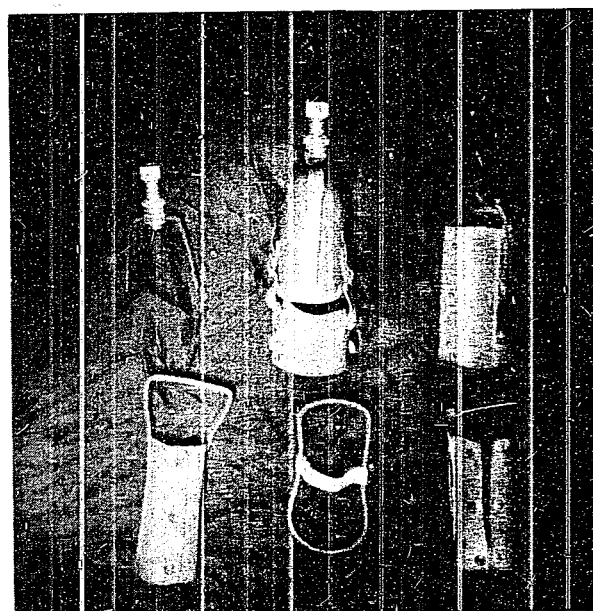


Figure 21  
Wrist Drop Apparatus



Figure 22  
Artificial Arm

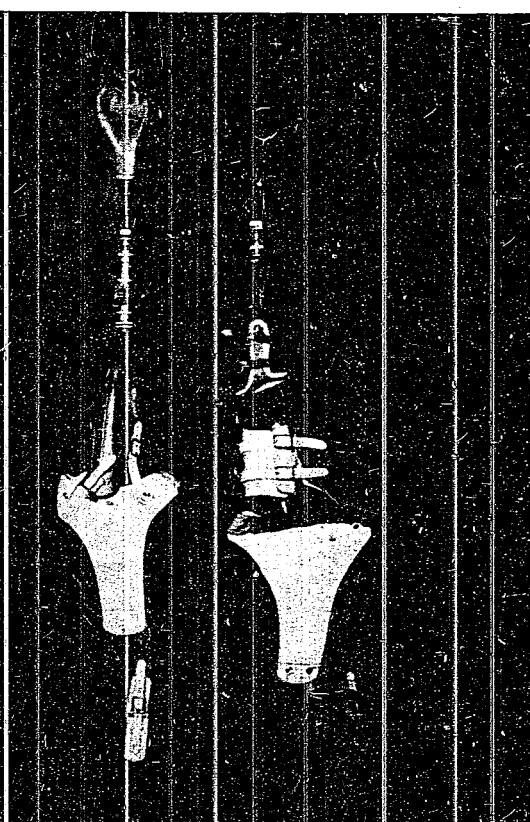


Figure 23  
Artificial Arm

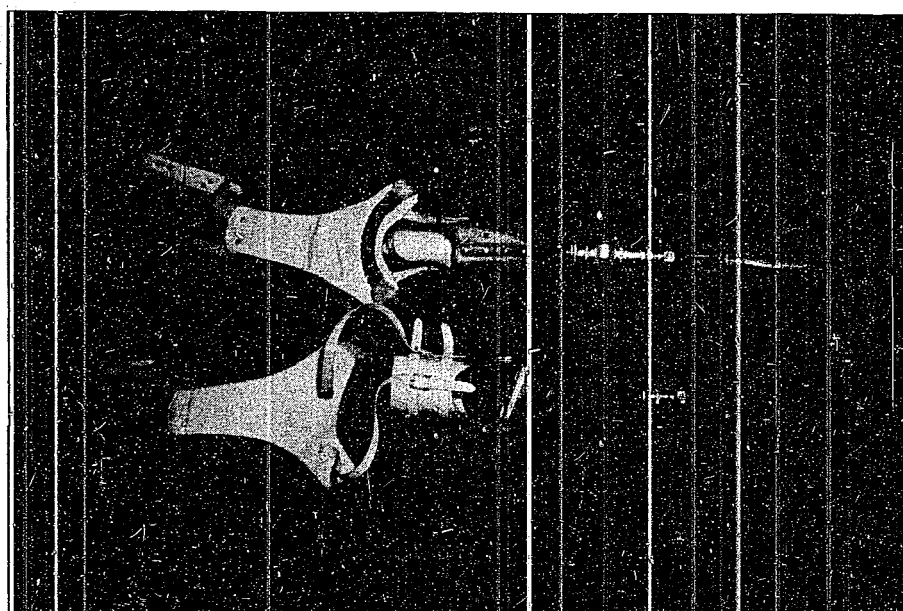


Figure 24  
Artificial Arm

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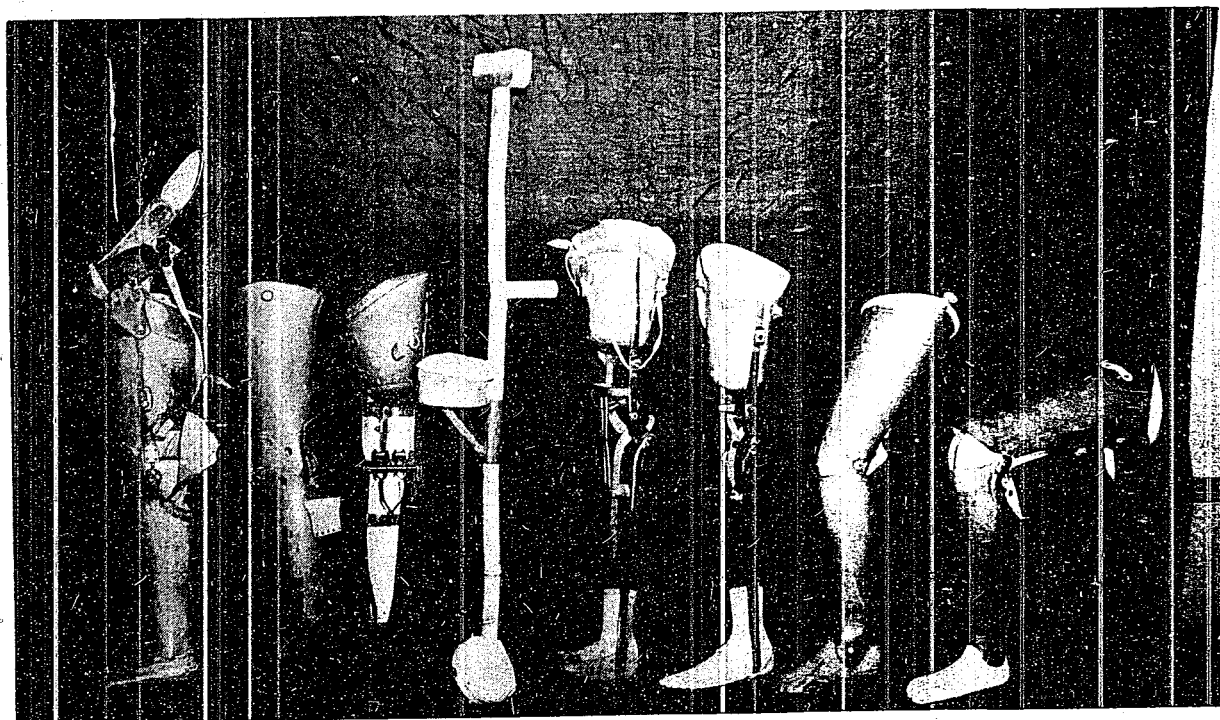


Figure 25  
Artificial Legs

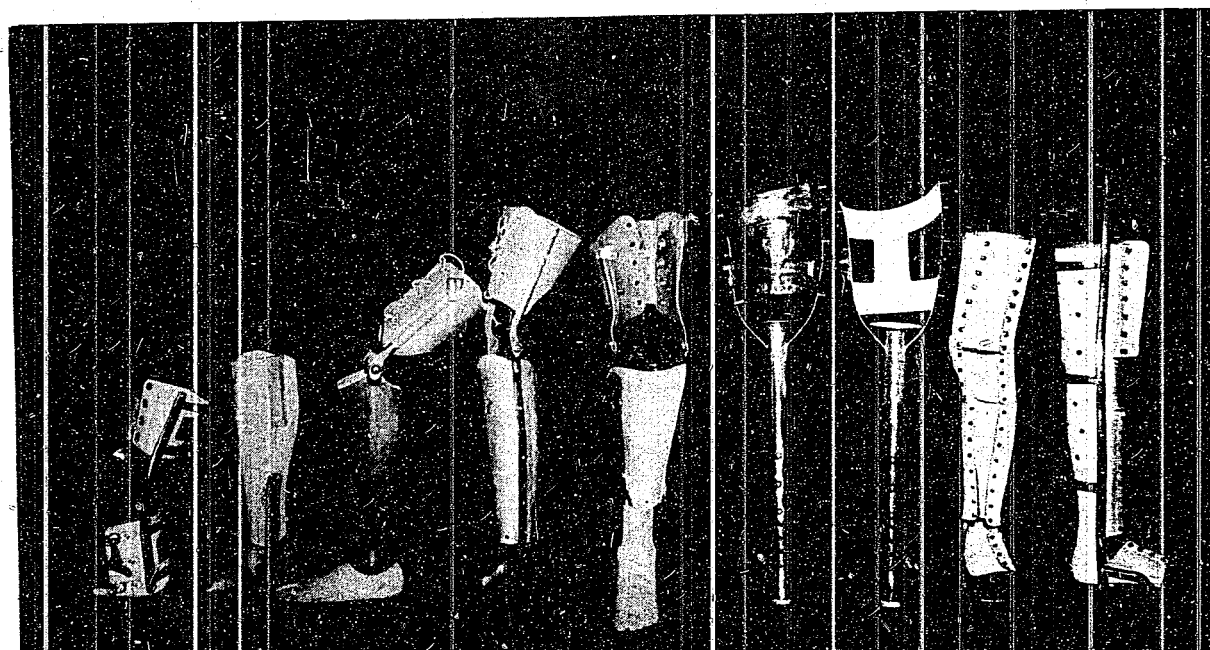






Figure 26  
Artificial Legs

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### ENCLOSURE (A)

LIST OF DATA PERTAINING TO THIS TARGET GATHERED BY OTHER AGENCIES  
Communicable Disease Statistics, Paragraph 49 of Section VII,  
"Public Health and Welfare."

### ENCLOSURE (B)

LIST OF DOCUMENTS FORWARDED TO NMRI, BETHESDA, MD.

NavTechJap Document No. ND10-7501.8 Annex No. 2

"First Aid Treatment for Battle Wounds" - Capt. (Med.) TOMITA.

### ENCLOSURE (C)

LIST OF DOCUMENTS FORWARDED TO WDC THROUGH ATIS

NavTechJap Document No. ND21-7512.1-QE  
Atis No. 3116

"Medical Treatment of Wounded Servicemen by the Relief Bureau" (Not translated.)

NavTechJap Document No. ND21-7512.2-QE  
Atis No. 3116

"Rehabilitation Training" (Not translated.)

NavTechJap Document No. ND21-7519-QE  
Atis No. 3117

"Field Handbook for Drug Treatment of Combat Casualties"

### ENCLOSURE (D)

LIST OF EQUIPMENT FORWARDED TO NMRI, BETHESDA, MD.

NavTechJap Equipment No. JE21-7510

Upper Arm, Elbow, Forearm and Wrist Sections of Standard Japanese  
Naval Prosthetic Arm.