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HANDBOOK OF  
JAPANESE EXPLOSIVE  
ORDNANCE

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OPNAV 30-3M

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15 AUGUST 1945

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# Handbook of Japanese Explosive Ordnance

OpNav 30-3M  
15 August 1945

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UNITED STATES  
GOVERNMENT PRINTING OFFICE  
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# HANDBOOK OF JAPANESE EXPLOSIVE ORDNANCE

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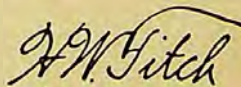
## LETTER OF PROMULGATION

NAVY DEPARTMENT,  
OFFICE OF THE CHIEF OF NAVAL OPERATIONS,  
*Washington, 15 August 1945.*

This publication is a reprint with slight revisions of a field publication, JAPANESE EXPLOSIVE ORDNANCE, originally published in the Southwest Pacific Area by Mobile Explosives Investigation Unit No. 1 under the auspices of the Commander, Seventh Fleet. Revisions have been held to an absolute minimum in order to meet urgent operational requirements for this manual by military and naval personnel.

HANDBOOK OF JAPANESE EXPLOSIVE ORDNANCE is a manual designed to instruct personnel in the recognition of dangerous ordnance. It is not intended to serve as a handbook for mine and bomb disposal.

This publication is to be handled in accordance with Art. 76, U. S. Navy Regulations.



(S) H. W. FITCH,  
By direction.

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Color sheets for identification of Japanese ammunition.

# HANDBOOK OF JAPANESE EXPLOSIVE ORDNANCE

## INTRODUCTION

This book is a nontechnical identification manual of Japanese explosive and chemical ordnance. It is designed to aid:

- (1) Experienced field personnel who, in addition to disposal work, are concerned with recovering and reporting on new ordnance.
- (2) Untrained field units desirous of recognizing weapons and devices used by the enemy.
- (3) All forces needing information to safeguard themselves from the dangers of unexploded ordnance, booby traps, and mines.

Technical details of operation and construction have been purposely omitted in order to make this book one for handy reference. The information presented must in no manner be regarded as sufficient basis for disposal or rendering safe operations. All such work should be done by specially trained personnel of Army, Navy, or Marine Bomb Disposal and Navy Mine Disposal Units who are available in combat or forward areas.

New material should be reported to the Mobile Explosives Investigation Units, Army Technical Intelligence teams, or Bomb and Mine Disposal personnel.

All explosive ordnance must be handled with caution.

Souveniring of explosive ordnance should be prohibited. In addition to the danger of accidents, much valuable intelligence material is thereby lost. In the same manner, hasty disposal by demolition or dumping in deep water destroys valuable sources of intelligence. Careful noting and reporting of new ordnance, including booby traps, and the tactical employment of such new ordnance will save lives.

No attempt has been made to maintain a uniform scale for photographs of items of ordnance appearing in the text. Large bombs, certain bomb fuzes, and major caliber projectiles are shown in approximately relative proportions, but the range in size of ordnance pictured is too great to permit the use of a consistent scale.

## I. JAPANESE ORDNANCE MARKINGS

In handling captured Japanese ordnance, an ability to read labels and markings is of major importance in quick and positive identification. Furthermore, in many cases no description of the ordnance is complete without its Japanese designation, for without that it is impossible to make a definite tie-up between the ordnance reported and the information available from captured documents. For this reason a list of the most common ordnance terms encountered is included in this book.

In order to use these terms a few facts about Japanese terminology must be borne in mind.

### Writings and Sounds

Japanese writing consists either of a system of Chinese ideographs (Kanji) or of signs in one of two syllable alphabets (Kana). In either case the Japanese pronunciation can be expressed in our alphabet (Romaji). In the glossary both the Japanese writing, either Kanji or Kana, and the Romaji is given, since an ideograph may have several phonetic readings, each with a different meaning, and a single phonetic combination may correspond to several ideographs, each with a different meaning. It is only by knowing both the writing and the sound that all chance of confusion can be eliminated.

### Direction Characters are Read

Japanese writing can be read from left to right, right to left, or top to bottom, but never from bottom to top. Only the sense can tell you in which direction to read it. In most ordnance labels, however, the location of common characters like "type" will suffice for orientation.

### Numbering System

1 一 7 七	20 二十 or 二〇
2 二 8 八	21 二十一 or 二一
3 三 9 九	100 百 or 一〇〇
4 四 10 十 or 拾	1000 千 or 一〇〇〇
5 五 11 十一 or 一一	0 零 or 〇
6 六 12 十二 or 一二	

Notice that numbers over 10 may be written in the original Japanese style (e. g.,  $21=2\times 10+1=$  二十 一 ) or by simple translation of the Arabic (e. g.,  $21=$  二 一 ). In many cases where long numbers like serial numbers are used, the Japanese use the Arabic numerals without change.

### Dating System

The Japanese employ two systems of dating. One is based on the age of the empire and can always be translated to our dating by remembering that the Japanese year 2600 corresponds to 1940. The other is based on the year of the particular emperor's reign—termed eras. These can be translated by remembering that the Meiji era ended in 1912 in its 45th year; the Taisho era in 1926 in its 15th year; and the present Showa era started in 1926 and is now in its 20th year. The era symbols are:

明 治	Meiji
大 正	Taisho
昭 和	Showa

For all practical purposes, the Japanese year begins at the same time as ours.

### System of Ordnance Designation

A. TYPE NUMBER: Items of ordnance, as well as most other items of military equipment, are given a type number indicating the year the item was finally adopted for service use. (This may occur several years after the ordnance has been in production and actual use.)

Until the Showa era, items were designated by the year of the era; since then the year of the empire may, however, be used. With Taisho and Showa eras the type is usually given in terms of the number of the year, e. g.: "10th year Type." When the year of the empire is used, only the last two numerals are employed, e. g.: 99=2599 (1939). 式 *shiki* is the term for type.

Examples:

四一式	Type 41 (Meiji)	1908
十一式	Type 11 (Taisho)	1922
九九式	Type 99 (Empire)	1939
十二年式	12th year Type (Showa)	1937
零式	Type 0 (Empire)	1940
一五式	Type 15 (Showa)	1940
一式	Type 1 (Empire)	1941

There are several possibilities for ambiguity; however, in almost every case the nature of the ordnance will give enough indication of the date to permit accurate reading.

試 *shi* or 試式 *shi shiki* (experimental) is used for items not yet officially adopted. It is believed that the number used with it gives the year of the Showa era in which the experimental development was authorized. Example: 一四試 is experimental 14.

B. MARK NUMBER: 號 (often abbreviated 号) *go*, is translated as "mark." Some ordnance recovered has had no type number, but only a mark number. With some other ordnance, such as Navy bombs, special purpose types may have a mark number following the type number.

Example: 九九式三番三號 is Type 99 No. 3 Mk 3 (an aerial burst incendiary shrapnel bomb). 番 *ban* means number and is used to give the weight classification of Navy bombs.

C. DESCRIPTION OF ORDNANCE: Following the type number (and mark number if used) is a brief description of the ordnance. This may be only a word or so, giving the caliber of a gun for instance, or it may be more lengthy, describing the uses and the characteristics of the ordnance. In cases where several similar pieces of ordnance have the same type number, all parts of the description may be needed for accurate identification.

Examples: 小 叟 火 信 管 , *sho eika shinkan*, means Small Time Fuze. 炸 藥 八 八 式 機 雷 改 一 用 , *sakuyaku bachi bachi shiki kirai kai ichi yo*, is Bursting Charge for Type 88 Mine Mod. 1.

D. MODEL AND MODIFICATION: Following the description of the ordnance, model and modification numbers, if any, are given. Both terms indicate changes in the basic design, but the nature of the change denoted by each is not known. It is clear that a change in model number is more drastic than a change in modification number.

型 *Kata*—model

改 *Kai*—modification, abbreviated “mod” in this book.

Usage: 二 型 model 2 (numerals precede).

改 二 mod. 2 (numerals follow).

#### Other Information on Labels

In addition to the designation of the ordnance, most labels and items are marked to indicate the date and place of manufacture. The date will either follow a Showa character or be identifiable by grouping of numerals. It will always be in terms of the Showa era.

Examples:

(a) 昭 和 十 七 年 八 月 is translated “Showa 17th year 8th month,” meaning August 1942.

(b) 昭 十 八 11 is translated “Showa 18, 11,” meaning November 1943.

(c) 18.8 is Showa 18.8, meaning August 1943.

(d) S  $\frac{1}{16}$  is Showa 16, 4, meaning April 1941.

Example (a) shows the most complete method of expressing the date; this is usually reserved for labels.

Example (b) illustrates mixing Japanese and Arabic numerals to distinguish years and months.

Examples (c) and (d) show systems using all Arabic numerals and in (d) even a Western letter. These last three are the common methods used on the ordnance itself.

Place names create more trouble because various codes are employed which are not completely known. For this reason only the Tokyo and Osaka Army arsenals and five Naval arsenals are included here.

<i>Arsenal</i>	<i>Kanji</i>	<i>Romaji</i>	<i>Arsenal Mark</i>
Tokyo	東 or 京	to or kyo	☆
Osaka	阪	saka	✕
Kure	呉	kure	⚓
Toyokawa	豊	toyo	⚓
Yokosuka	横	yoko	⚓
Maizuro	舞	Mai	⚓
Sasebo	佐	Sa	⚓

Much confusion has been caused by varying translations of the same terms by different translators. For most ordnance terms there are naturally several English readings which can be defended on the basis of a dictionary. Nevertheless, only one or two translations will make good sense in terms of the ordnance and unless a single one of these is selected and standardized, there can be no certainty that two translators are speaking of the same item.

The translations in this book are the standard translations used by Allied Translator and Interpreter Section, Southwest Pacific Area.

GENERAL TERMS

陸軍	.....	Army
海軍	.....	Navy
工廠; 造兵廠	.....	arsenal
火藥製造所	.....	powder factory
年	.....	year
月	.....	month
日	.....	day
航空兵	.....	Air Service
用	.....	use
米	.....	meter
料	.....	kilometer
左	.....	left
右	.....	right
火藥	.....	powder

Place names create more trouble because various codes are employed which are not completely known. For this reason only the Tokyo and Osaka Army arsenals and five Naval arsenals are included here.

<i>Arsenal</i>	<i>Kanji</i>	<i>Romaji</i>	<i>Arsenal Mark</i>
Tokyo	東 or 京	<i>to</i> or <i>kyo</i>	☆
Osaka	阪	<i>saka</i>	✕
Kure	呉	<i>kure</i>	⚓
Toyokawa	豊	<i>toyo</i>	⚓
Yokosuka	横	<i>yoko</i>	⚓
Maizuro	舞	<i>Mai</i>	⚓
Sasebo	佐	<i>Sa</i>	⚓

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GENERAL TERMS

陸軍	.....	Army
海軍	.....	Navy
工廠	.....	arsenal
造兵廠	.....	powder factory
製藥所	.....	year
年	.....	month
月	.....	day
日	.....	Air Service
航空	.....	use
用兵	.....	meter
米	.....	kilometer
料	.....	left
左	.....	right
右	.....	powder
藥	.....	

GENERAL TERMS—Continued

炸藥	.....	bursting charge
爆藥	..... <i>sakuyaku</i>	explosive
日本	..... <i>bakuyaku</i>	Japan
名稱	..... <i>Nippon</i>	designation
收數	..... <i>meishō</i>	contents (precedes numerals on packing box labels)
筒	..... <i>shūjōsū</i>	suffix to numerals, (giving contents of box)
櫃	..... <i>ko</i>	centimeter
耗	..... <i>senchi-mētoru</i>	millimeter
大	..... <i>miri-mētoru</i>	large
小	..... <i>dai</i>	small
起爆藥	..... <i>shō</i>	initiator (detonator)
傳爆藥	..... <i>kibakuyaku</i>	booster
	..... <i>denbakuyaku</i>	



GENERAL TERMS—Continued

破	裂	.....	<i>haretsu</i>	burst
製	造	.....	<i>seizō</i>	manufacture
鑄	填	爆	發	cast (explosive filling)
小	粒	藥	.....	fine grain powder
黃	赤	綠	鼠	yellow
桃	白	茶	照	red
夕	彈	明	夕	green
				grey
				peach
				white
				brown
				illuminating
				shaped charged, hollow charge

第	.....	prefix to numerals
改	.....	modification
實	.....	service use
用	.....	repair
修	.....	recondition, reconstruct
理	.....	place
改	.....	cast
造	.....	gram
所	.....	kilogram
所	.....	loaded
鑄	.....	provisional designation
瓦	.....	weight
瓦	.....	inspect
毘	.....	
裝	.....	
填	.....	
假	.....	
稱	.....	
量	.....	
檢	.....	

GENERAL TERMS—Continued

噴進彈	.....	<i>funshindan</i>	rocket
ヤ	.....	<i>ya</i>	incendiary symbol
ケ	.....	<i>ke</i>	smoke symbol

BOMBS AND FUZES

爆彈	.....	<i>bakudan</i>	bomb
陸上	.....	<i>riku (jō)</i>	land
陸用爆彈	.....	<i>riku (yō) bakudan</i>	land bomb
通常	.....	<i>tsūjō</i>	ordinary
空雷	.....	<i>kurai</i>	aerial torpedo
演習爆彈	.....	<i>enshūbakudan</i>	practice bomb
鋼性爆彈	.....	<i>kōseisen bakudan</i>	semi-steel bomb
代用爆彈	.....	<i>daiyō bakudan</i>	substitute bomb
彈底	.....	<i>dantei</i>	tail (of bomb)
彈頭	.....	<i>dantō</i>	nose (of bomb)



BOMBS AND FUZES—Continued

炸成形	.....	<i>assakuseikei</i>	performed pressed (bursting charge)
發裝	.....	<i>hakkasōchi</i>	firing mechanism (term used for navy bomb fuzes)
複信管	.....	<i>fukudō shinkan</i>	combination fuze (impact or time)
機上切換	.....		
着信管	.....	<i>kijō sekkan nidō shinkan</i>	instantaneous-short delay fuze (mechanically adjustable in aircraft) impact fuze
信發管	.....	<i>chakuhatsu shinkan</i>	fuze; gaine (navy fuzes)
觸信管	.....	<i>shinkan</i>	Anti-disturbance (A/D) fuze
解信管	.....	<i>shokuhatsu shinkan</i>	Anti-withdrawal (A/W) fuze
長延期信管	.....	<i>kaihatsu shinkan</i>	long delay fuze
風車	.....	<i>chōenki shinkan</i>	arming vanes (bomb fuze)
起爆裝置	.....	<i>fūsha</i>	initiator
跳飛	.....	<i>kibakosochi</i>	skipping
	.....	<i>chōhī</i>	

PROJECTILES AND FUZES

彈丸	.....	<i>dangan</i>	projectile
破甲彈	.....	<i>hakōdan</i>	AP projectile
徹甲彈	.....	<i>tekkōdan</i>	AP projectile
被帽彈	.....	<i>hōbōdan</i>	capped AP projectile
破甲榴彈	.....	<i>hakōryūdan</i>	AP HE projectile
徹甲實包	.....	<i>tekkō jippō</i>	AP ammunition (small arms)
通常彈	.....	<i>tsūjō dan</i>	common projectile
鑄鐵榴彈	.....	<i>chūtetsu ryūdan</i>	cast iron HE projectile
鈍頭彈	.....	<i>dontōdan</i>	blunt-nose projectile
榴彈	.....	<i>ryūdan</i>	HE shell
曳光榴彈	.....	<i>eikōjibaku ryūdan</i>	SD tracer projectile
榴霰彈	.....	<i>ryūsandan</i>	shrapnel shell
完成彈	.....	<i>kanseidan</i>	projectile, complete with fuze

PROJECTILES AND FUZES—Continued

曳	光	燒	マ	實	彈	裝	常	減	彈	穿	通	實	普
包	實	實	包	藥	藥	裝	裝	藥	甲	常	包	通	實
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	<i>eikō jippō</i>	<i>shōjippō</i>	<i>ma</i> (followed by number)	<i>jippō</i>	<i>danyakuhō</i>	<i>sōyakutō</i>	<i>jōsō</i>	<i>gensō</i>	<i>danyakutō</i>	<i>senkōryūdan</i>	<i>tsūjō danyaku</i>	<i>jippō</i>	<i>futsū jippō</i>
	tracer ammunition (small arms)	incendiary ammunition (small arms)	aircraft ammunition symbol	ball ammunition	cartridge (fixed, complete round)	propellant charge container	normal propellant charge	reduced propelling charge	complete round	hollow charge ammunition	common ammunition	ball ammunition	ordinary ball ammunition



PROJECTILES AND FUZES—Continued

戰車砲	.....senshahō	tank gun
對野戰砲	.....taihō (abb. for taisenshahō)	A/Tk gun
野戰砲	.....yasehō	field gun
火砲	.....kahō	gun (general)
榴彈砲	.....ryūdampō	howitzer
榴砲	.....ryūkyū	howitzer and mortar
曲射步兵砲	.....kyokushahohēhō	infantry mortar
迫砲	....."haku"	Mortars
藥包	.....yakuhō	increment (mortar ammunition)
打筒	.....uchiagetō	barrage mortar
如農	.....kanon	gun (as opposed to howitzer)
鋼性銃彈	.....kōseisen dan	semi-steel projectile
目標彈	.....mokuhyō dan	target projectile

UNDERWATER ORDNANCE

機雷	..... kirai	mine
視發機雷	..... shihatsukirai	controlled naval mine
管制機雷	..... kanseikirai	controlled naval mine
沈底式	..... chienteishiki	ground type (naval mine)
磁氣機雷	..... jiki kirai	magnetic mine (marine)
誘導型磁氣機雷	..... yudōgatajiki kirai	induction type mine
音響機雷	..... onkyōkirai	acoustic mine
繫維針式	..... kenshiki	anchored type (naval mine)
磁針型磁氣機雷	..... jishin gatajiki kirai	magnetic needle type magnetic mine
機雷缶	..... kiraikan	mine case
觸角	..... shokkaku	horn (naval mine)
數期爆裝置	..... kaisukibakusōchi	(1) period delay mechanism (2) ships counter (naval mines)
雷原	..... raigen	naval mine field

UNDERWATER ORDNANCE—Continued

機雷	．．．．．	<i>kiraien</i>	naval mine barrier
爆破鉤	．．．．．	<i>bakuhakō</i>	explosive (hook) grapnel
魚雷	．．．．．	<i>gyorai</i>	torpedo
爆發尖	．．．．．	<i>bakuhatsusen</i>	torpedo exploder
爆雷	．．．．．	<i>bakurai</i>	depth charge
爆雷發火裝置	．．．．．	<i>bakurai hakkasōchi</i>	depth charge pistol
頭部	．．．．．	<i>tobu</i>	head (used for torpedo warhead)
Markings Found on Torpedo Bodies			
開	．．．．．	<i>hiroku</i>	open
閉	．．．．．	<i>shimeru</i>	close
塞氣弁	．．．．．	<i>sokkiben</i>	air stop valve
安全弁	．．．．．	<i>anzemben</i>	safety valve (relief valve)

裝氣弁	.....	sokiben	air charging valve
排網	.....	hai	drain
瀆不歸弁	.....	rokumo	strainer
清水	.....	fukiben	check valve
空氣	.....	seisui	fresh water
燃料	.....	kūci	air
潤滑油	.....	nenryo	fuel
接離	.....	junhatsuyū	lubricating oil
深	.....	tsugu	join
深	.....	hanasu	separate
淺	.....	shindochoitei	depth setting
強	.....	fukai	deep
	.....	asai	shallow
	.....	Tsuyoi	strong (used in torpedo designations)

GRENADERS AND LAND MINES

踏	式地雷	.....	<i>fumushiki jirai</i>	contact land mine
係	式發地雷	.....	<i>keiteshiki shokuhatsujirai</i>	trip wire type contact land mine
匕	ノ線地雷	.....	<i>pianosen jirai</i>	trip wire land mine
視	發地雷	.....	<i>shihatsu jirai</i>	remotely controlled land mine
棒	地雷	.....	<i>bojirai</i>	"Yardstick" anti-vehicular mine
人	用地雷	.....	<i>jinyō jirai</i>	Anti-Personnel mine (A/P)
膠	着爆雷	.....	<i>kōchaku bakurai</i>	(1) sticky mine
敷	設爆雷	.....	<i>fusetsudan</i>	(2) adhesive mine
破	甲爆雷	.....	<i>hakōbakurai</i>	bullet land mine
踏	式地雷門管	.....	<i>tōrakushiki jirai monkan</i>	Armor Piercing mine (AP) (applied to magnetized A/Tk mine)
曳	火手榴彈	.....	<i>eika shuryūdan</i>	pressure type igniter for land mines
手	匕	.....	<i>chibi</i>	time hand grenade
手	投火瓶	.....	<i>tenage kabō</i>	frangible grenade
		.....		frangible incendiary grenade

手	投	火	焰	瓶	.....	<i>tenage kaenbin</i>	Molotov cocktail
破	壞	筒	的	雷	.....	<i>hakaitō</i>	bangalore torpedo
遊	擊	的	地	火	.....	<i>yūgekiteki jirai</i>	booby trap
時	限	發	機	.....	<i>jigen hakkaki</i>		demolition clock
爆	發	鐘	.....	<i>bakuhatsukan</i>			demolition can
電	氣	管	管	.....	<i>denkuraikan</i>		electric cap
導	火	雷	管	.....	<i>dōka raikan</i>		non-electric cap
導	爆	索	.....	<i>dōbaku-saku</i>			detonating cord
導	火	索	.....	<i>dōkasaku</i>			safety fuse
摩	擦	門	管	.....	<i>masatsu monkan</i>		friction primer
點	火	具	.....	<i>tenkagu</i>			igniter
時	限	點	火	具	.....	<i>jigen tenkagu</i>	delay firing device

## II. JAPANESE MILITARY EXPLOSIVES

### Introduction

The information in the following table is based on a correlation of information gathered from examination of explosives in Japanese ordnance and from captured documents. A few statistics on standard explosives have been added.

Many of the explosives in the table, particularly in the Army group, are rarely used and some have not yet been recovered. For this reason, a knowledge of the color and appearance of the more common explosives, such as picric, TNT, TNT/RDX mixtures, trinitroanisole and its mixtures, will permit rapid identification of most explosive fillings.

Japanese characters included in the table will assist in identification. Markings are found on packing cases, wrappings on the ordnance itself, and on labels fixed to the explosive charge.

Care in handling all explosives cannot be overemphasized.

The sensitive gains on Japanese fuzes, grenades, and mines have caused scores of injuries to personnel in all Pacific campaigns. The following precautions are of special emphasis:

1. Many Japanese explosives are toxic. Contact with the explosive or exposure to fumes and smoke may cause dermatitis.
2. Explosives containing aluminum mixtures burn violently in the open and detonation may occur if they are confined.
3. Type 88 Explosive (Army "Karitto") is especially dangerous to burn and should be handled in small quantities.
4. Explosives subjected to abnormal climatic, handling or storage conditions may be sensitive to friction, heat or shock.
5. Mercury fulminate and lead azide are commonly used as initiators in fuzes and gains. Only slight shock or friction is required to detonate these explosives and any attempt to burn the explosives or ordnance containing them will also produce detonation.
6. Dismantling of explosive ordnance should always be done by trained personnel with special equipment.

## ARMY EXPLOSIVES

EXPLOSIVE	USE	JAPANESE DESIGNATION*	COLOR	TOXIC	REMARKS
Primers (cap composition)					
1. Mercury fulminate Potassium chlorate Antimony trisulfide	Primer cap composition	煙火 <i>bakufun</i> —exploding powder	Light grey to tan	No	Documents: Mks I and III are ammunition primers; Mk II is a fuze primer
2. Potassium chlorate 60% Arsenic sulfide 40%	Primer cap composition	爆粉 雷粉 <i>raibun (enka)</i> —thunder powder (smoke and fire)	Light grey to tan	No	Documents: Suggest use as primer in pyrotechnics. Never recovered
3. Potassium chlorate Antimony sulfide	Primer cap composition		Light grey to tan	No	Most common mixture for fuze primers
Initiators (detonators)					
4. Mercury fulminate	Initiator for fuzes and blasting caps	雷汞 <i>raiko</i> —thunder mercury	White to grey or brownish-yellow, sparkling crystals; looks like sand	No	Detonates without melting. Detonating point: 180° C. Decomposed in a solution of sodium thiosulfate (hyppo).
5. Lead azide	Initiator for fuzes and detonators	空化鉛 <i>chikkaen</i>	Creamy white to buff or very light grey	No	Most common initiator, especially where a black powder relay is present. Detonates without melting. Detonating point 350° C. Decomposed by acetate solution
Boosters					
6. Picric acid	Main booster charge	黄色 藥 <i>oshoku yaku</i> —yellow color explosive	Pale yellow to bright lemon yellow; obvious crystals	Yes	Pressed. Melting Point: 122.5° C. Detonating point: 320° C. May turn skin yellow. Used equally well as booster or main charge

\*To save space the character *yaku* (explosive) is not included in the characters for each designation.

ARMY EXPLOSIVES—Continued

EXPLOSIVE	USE	JAPANESE DESIGNATION	COLOR	TOXIC	REMARKS
Boosters—Continued					
7. Tetryl	Sub booster	若亞 <i>meiyaku</i>	Light cream to yellow	Yes	Pressed. Melting point: 190.5° C. Detonating point: 260° C.
8. R. D. X.	Sub booster	硝字 <i>shoujaku</i>	Chalky white, smooth hard	No	Pressed (often with wax). Melting point: 202° C.
Main charges					
9. Picric acid	Bombs, projectiles, land mines, bangalore torpedoes	See No. 6	Pale yellow to bright lemon yellow; obvious crystals	Yes	Usually cast in preformed paper-wrapped blocks
10. TNT	Bombs (rare), projectiles, hand grenades	茶福 <i>chakatsuzuka</i> —tea-brown explosive	Pale straw to light brown, sometimes pink	Yes	Generally cast into case. Granular. Melting point: 80.6° C. Detonating point: 470° C.
11. TNT 25% Picric 75%	Bombs	茶黄 <i>chaoyaku</i> —TNT picric	Straw-yellow	Yes	Cast—rare. Documents: TNT lowers melting and facilitates casting. A bit less sensitive than picric. Melting point: below 120° C. Detonating point: below 350° C.
12. Picric 50% Dinitronaphthalene 50%	Projectiles	黄那 <i>onayaku</i>		Yes	Cast—rare. Documents: Picric 80% Dinitronaphthalene 20%. Dinitronaphthalene aids casting and makes less sensitive
13. Picric 90% Wax 10%	Projectiles	黄脂 <i>oshiyaku</i> —picric wax	Yellow	Yes	Pressed. Used in nose of A. P. projectile. Documents: Low sensitivity
14. T. N. T. 70% Dinitronaphthalene 30%	Projectiles	茶那 <i>chanayaku</i>		Yes	Cast

15. T. N. T. 70%, 60%, 50% R. D. X. 30%, 40%, 50%	Bombs, projectiles, land mines, Bangalore torpedo	二号波	nigotanyaku-Mk 2 pale yellow explosive	Fale yellow or cream	Yes	Cast. Appears to be the coming Army explosive. Many new types of ordnance have it. Documents indicate a tetryl content, but analysis has never shown it.
16. Ammonium nitrate 75% R. D. X. 25%	Bombs	安瓦	anga waika	White	No	Cast in case with T. N. T. surround. Very hygroscopic. Documents give guanidine nitrate as an ingredient, but it has not shown up in analysis
17. R. D. X. 85% Whx 15%	A. P. projectiles		unknown	Waxy white	No	Pressed
18. Trinitrophenol	Projectiles	平寧	ketayaku	Yellow and easy to confuse with T. N. T.	Yes	Cast. Melts at 79° C. Documents: T. N. T. less powerful than picric, stable in storage and with metals.
19. Ammonium nitrate 50% T. N. T. 50%	Bombs, projectiles	硝斗	shotoyaku	Brown	Yes	Presumably cast. Documents: In shells, especially semisteel shells (high carbon cast iron), increases number of effective shell fragments. Never recovered
20. Ammonium nitrate 90% Dinitronaphthalene 10%	Main charge for semisteel cast shells. Explosive for tunnel warfare	硝那	shonayaku	Yellowish-brown	No	Presumably cast. Documents: Not as effective as No. 19, but does not give off poisonous fumes. Good for demolition and land mines. Never recovered

Main charges used only in machine gun ammunition

21. Black powder	Army 20 mm	有煙 黑色	yuanyaku-non-smokeless powder. kokushakuyaku-five black color explosive	Block loose, powdery, no grains	No	Used in 20 mm as a temporary measure. Sometimes termed "rice powder"; this designation distinguishes it from high explosives
22. P. E. T. N.	Army 7.7 mm, 12.7 mm fuseless	硝英	shoeyaku	Chalky white to grey	No	Also used in primacord and blasting caps
23. R. D. X. 45% P. E. T. N. 55%	Army 7.92 mm, and 12.7 mm.			Chalky white	No	

ARMY EXPLOSIVES—Continued

EXPLOSIVE	USE	JAPANESE DESIGNATION	COLOR	TOXIC	REMARKS
Demolition charges					
24. Picric acid	Standard demolition blocks	See No. 6		Yes	Cast.
25. Ammonium perchlorate 70.9% R. D. X. 17.0% Silicon carbide 1.3% Paraffin 4.8%	Standard demolition blocks	灰色	Loose, dark grey powder	No	Pressed. Hygroscopic. Documents: less sensitive than picric and more powerful. Gunithine nitrate listed as ingredient, but analysis does not show it.
26. T. N. T. 53% R. D. X. 47%	Standard demolition blocks	See No. 15		Yes	Cast
27. R. D. X. 80% Vegetable oil 20%	Demolition rolls	膠質	Light brown	No	There may be another plastic containing R. D. X. and nitroglycerine. Darker, smoother than U. S. plastic explosive. Requires powerful detonating agent
28. Potassium chlorate 80% D. N. T. 16% Castor bean oil 4%	Substitute demolition charge. Also used as substitute main charge for hand grenades and mortars.	鹽斗	Light brown	Yes	Documents: Very hygroscopic and very sensitive. Never recovered
29. Potassium chlorate 80% M. N. T. 15% Castor bean oil 5%	Presumably same as No. 28.	鹽那	Light yellow	Yes	Documents: Characteristics same as No. 28. Out of use. Never recovered

30. Dynamites	Substitute demolition charge.	ダイナマイト 櫻	daimanito—generally marked by brands representing trees or flowers. <i>C. F., s a k u r a</i> (cherry)	Buff to brown color	No	Some types recovered but no analysis available. Documents: Binders—diatomaceous earth nitrocellulose (gelatin dynamite). "Faint smoke" dynamite—gelatin dynamite with borax or salt. "Non-freezing" dynamite—gelatin dynamite with dinitrolycol or dinitroxyline. "Over heat" dynamite—Ammonium nitrate dynamite—gelatin dynamite with ammonium chlorate. On all types storage over 2 yrs. is forbidden
31. Ammonium nitrate 79% Dinitronaphthalene 10% Sodium chloride 10% Sawdust 1%	Substitute demolition charge	硝安爆	shon bakujaku		No	Documents: Characteristics generally the same as Nos. 19 and 20. Principal use is commercial. T.N.T. may be substituted for dinitronaphthalene. Never recovered
32. Ammonium perchlorate 66% Silicon carbide 16% Wood pulp 12% Crude oil 6%	Substitute demolition charge	カリット	karitto	Grey powder	No	Loosely packed grey powder, same as Navy Type 88. It is believed that the silicon carbide aids in uniform propagation of the detonating wave through the loosely packed powder. Dangerous to burn. Documents: Not hygroscopic, safe to handle, and stable. Produces poisonous fumes. Ferrisilicon listed as ingredient, but not by Navy Type 88. Navy Type 88 is silicon carbide. Never recovered as Army explosive
33. Ammonium nitrate Charcoal		アモン	amon gaku		No	Documents: Term it "substitute powder". Never recovered

ARMY EXPLOSIVES—Continued

EXPLOSIVE	USE	JAPANESE DESIGNATION	COLOR	TOXIC	REMARKS
Propellants					
34. Black powder	Ejector charges for 70 mm mortar, the propellant and pyrotechnics	See No. 21		No.	According to documents, also used as explosive charge in "substitute 130" bombs and projectiles
35. Brown powder	Unknown	緋色 <i>kasabokuyaku</i>		No	Documents: Under-carbonized black powder. Never recovered
36. Single base smokeless powders, Sample: Nitrocellulose 9% Diphenylamine 2%	Majority of propellant charges	無煙 <i>zencryaku</i> —smokeless powder (general term)  <i>menyaku</i> —gun cotton	Chalk white	No	Documents term it "C"
37. Double base smokeless powders, Sample: Nitrocellulose 67.8% Nitroglycerine 28.3% Diphenylamine 0.7% Sodium chloride 2.2%	Propellant charges, especially mortars	ニトログリセリン <i>Nitroglycerin</i> — Nitroglycerine	Yellow—opaque	No	Documents term it "G" smokeless powder, sub-divided into "A" type if a volatile solvent is used in manufacture, and "B" type if it is not. "B" type is tending to replace single base because of speed of manufacture
Delay train and flash powders					
38. Black powder	Delays and relays in bomb and projectile fuzes; delays and igniters in pyrotechnics	See No. 21		No	

## NAVY EXPLOSIVES

### Primers (cap composition)

Primer cap composition	Not certain; may be same as Army designation	No
1. Potassium chlorate		
<b>Initiators (detonators)</b>		
2. Mercury fulminate	Not certain; may be same as Army designation	No
3. Lead azide	Not certain; may be same as Army designation	No

### Boosters

4. Tetryl	Sub-booster in mines; occasionally sole booster	Not certain; may be same as Army designation	Yes	Pressed. See Army No. 7
5. Picric acid	Main booster in many mines	<i>shimose bakuyaku-shimose explosive</i> 下瀬爆薬	Yes	Pressed. See Army No. 5
6. Trinitronisol 70% H. N. D. 30%	Auxiliary booster in bombs	$H_2$ 混合 <i>H<sub>2</sub> kōgō—H<sub>2</sub> mixture. (Abbreviation for Type 98)</i>	Yes	Pressed

### Main charges

7. Picric acid	Bombs, projectile, sea mines, land mines	See No. 5	Yes	Cast either into case or into preformed paper-wrapped blocks
8. Ammonium perchlorate 65% Silicon carbide 16% Wood pulp 12% Oil 6%	Mines and depth charges	Type 88 八八式	No	Dangerous to burn, very sensitive to friction. Documents give ferro-silicon in place of silicon carbide. See Army No. 32

# NAVY EXPLOSIVES—Continued

EXPLOSIVE	USE	JAPANESE DESIGNATION	COLOR	TOXIC	REMARKS
Main charges—Continued					
9. Trinitroanisol	Bombs	九一式 Type 01	Yellow crystals; smooth; does not stain readily until exposed to moisture, then stains brownish red.	Yes	Melting point: 68° C. Detonating point: about 500° C.
10. Trinitroanisol 60% R. D. X. 40%	Torpedo warheads	九四式 Type 04	Cream yellow, smooth	Yes	Known from documents only. Detonating point: about 100° C.
11. T. N. T. 60% H. N. D. 40%	Torpedo warheads, depth charges (documents only)	九七式 成型 (seipata) — Type 07 block-filled	Yellow to orange; darker than picric; stains brown	Yes	Cast into blocks which are packed into warhead
12. Trinitroanisol 70% H. N. D. 30%	Bombs; sea mines, depth charges	九八式 Type 08	Greenish yellow, darker than picric, smooth, less crystalline than picric. Stains brown.	Yes	Cast into case.
13. Ammonium picrate 81% Aluminum powder 16% Wood pulp 2% Oil 1%	Depth charges	一式 Type 1	Loose greenish-yellow powder	No	Granular. Does not melt. Detonating point about 475° C.
14. TNT 60% H. N. D. 24% Aluminum powder 16%	Torpedo warheads, mines, depth charges	乙 otsu—B	Dark green, smooth	Yes	Known from documents only. Approximates German hexamite
15. Oil 2.5% Ammonium perchlorate 79.2% Silicon 16.4% Iron 0.3% Aluminum 0.7%	Depth charges	四式 Type 4	Grey powder, similar in appearance to Type 88	No	Composition similar to Type 88 but will not burn readily
16. Oil and trinitroamphthalene 8.2% Ammonium chlorate 51.5% Barium nitrate 34.5% Wood pulp 5.0%	Unknown	Unknown	Brown powder	No	Found as a booster in preparing bombs for demolition. Burns green. Dangerous to burn in quantity

Main charges used only in machine gun ammunition

	Sec No. 4	Yes	Pressed
17. Tetryl	Navy 25 mm		
18. TNT	Navy 25 mm and 40 mm	Yes	Pressed or cast
19. TNT 50% P.E. T. N. 50%	Navy 25 mm and 30 mm	Yes	Cast
20. TNT 66% Aluminum powder 34%	Navy 25 mm	Yes	Cast

Propellants

	Not certain; may be same as Army designation	No	See Army No. 36
21. Black powder	Ejector charge for illuminating shells and pyrotechnics		
22. Single base smokeless powder. Sample: Nitrocellulose 98.0% Diphenylamine 0.8% Dinitrotoluene 0.95% Graphite 0.25%	Ammunition propellant	No	See Army No. 36
23. Double base smokeless powder. Sample: Nitrocellulose 65.6% Sodium chloride 1.5% Nitroglycerine 20.2% Centralite 3.7%	Ammunition propellant		See Army No. 37

Delay train and flash powders

	Not certain; may be same as Army designation	See Army No. 33
24. Black powder	Delays and relays in bomb and projectile fuzes, delay and igniters for pyrotechnics	

### III. JAPANESE UNDERWATER ORDNANCE

#### MINES

##### General

Sea mines are effective weapons against all classes of shipping. The steel mine case, containing the explosive charge and the firing mechanism, can be designed to drift on the ocean surface or to moor beneath the surface by a heavy anchor and mooring cable. Other mines rest on the sea bottom and are called ground mines.

##### Contact Mines

Mines are classified as contact or influence, depending on their firing mechanisms. Contact mines are generally spherical, with several lead, steel, or copper projections screwed into the mine case. These are called horns, and when a horn is bent or broken by contact with a ship, it detonates the mine. Horns are of several types, but the most common is the chemical horn. Bending or breaking the horn shatters a glass vial and allows an acid to flow between the electrodes of a battery. The current thus generated fires the electric detonator of the mine. Some contact mines have a long copper wire antenna extending out of the top or bottom of the case. Should a steel ship touch an antenna while both are immersed in sea water, the mine will explode. Contact moored mines usually have some type of safety mechanism to render the mines inactive if they break adrift, as well as devices to make sure that the mines are safe while aboard the mine-laying ship, submarine, or plane.

Release of mooring tension is the most common method used by the Japanese to disarm a moored contact mine if it breaks free of its moorings. This is essentially a spring-loaded rod set in the base of the mine and free to move up and down. When the mine is correctly moored, the buoyant mine case is held beneath the surface by its anchor. This strain on the mooring cable pulls the mooring spindle down, compressing its spring. Contacts on the spindle inside the mine close gaps in the circuit between the horns and electric detonator, and the mine is armed. If the mooring cable parts and the mine rises to the surface, there is no longer any tension on the mooring spindle. The spindle moves upward under influence of its spring and breaks the firing circuit within the mine.

The operation of the mooring spindle and other safety devices, especially after the mine has been laid for some time, is unreliable. In many cases sea growth will so foul the moving parts that they will not operate.

### Influence Mines

Influence mines may be of any shape, but are usually cylindrical and rather like a bomb in appearance. These mines do not require contact with a ship in order to fire, and hence may be laid on the bottom many feet below the ship. Any physical change which takes place in the water around the mine due to the ship's passage over it could be utilized to actuate the firing mechanism. However, the most common types are magnetic and acoustic. Any mine without horns or antenna is almost certainly either an influence mine, sensitive enough to be detonated by the slightest noise or motion of the case, or else a controlled mine connected by an electric cable to the shore and fired by sending a current through that cable.

### Mine Designation.

The Bureau of Ordnance has recently redesignated Japanese mines. In the future all Japanese mines that have been recovered will be designated by the letter "J" and a second letter to indicate the specific mine. Mines known only through intelligence sources are designated by fruit names. The following table gives both the Japanese and the new U. S. designations. This handbook will use Japanese designations wherever possible. U. S. designations will be employed where the Japanese is unknown.

<i>Japanese Designation*</i>	<i>U. S. Designation</i>	<i>Japanese designation*</i>	<i>U. S. Designation</i>
Type 88 Mod 1.....	JA	Unknown.....	JM
Type 92.....	JK	Unknown.....	Pomegranate
Type 92 Model 1.....	JK	Type 3 Electrical Mine...	Lime
Type 93 Model 1.....	JB	Type 3 Mk 1 Aircraft	
Type 93 Model 2.....	Blueberry	Mine Model 1.....	JJ
Type 93 Model 3.....	JB	Type 3 Mark 2 Aircraft	
Type 93 Model 3 Mod 1..	JB	Mine Model 1 (Pro-	
Type 93 Model 4.....	JB	visional designation	
Type 94 Model 2.....	JF	K2).....	JJ.
Type 94 Model 2 Mod 1..	JF	Type 3 Mark 6.....	Pear.
Type 96.....	Apricot	Small Model Mine Model	
Type 96 Mod 1.....	Grapefruit	1.....	JE.
Mark 5 Mod 1.....	JC	Small Model Mine Model	
Mark 6 Model 1.....	JH	2.....	JG.
Mark 6 Model 2.....	JL	Mark 2 Explosive Hook..	Grape.
Mark 6 Model 2 Mod 1..	Persimmon	Mark 2 Mod. 1 Explosive	
Unknown.....	Banana	Hook.....	JD.

\*Mod. stands for Modification.

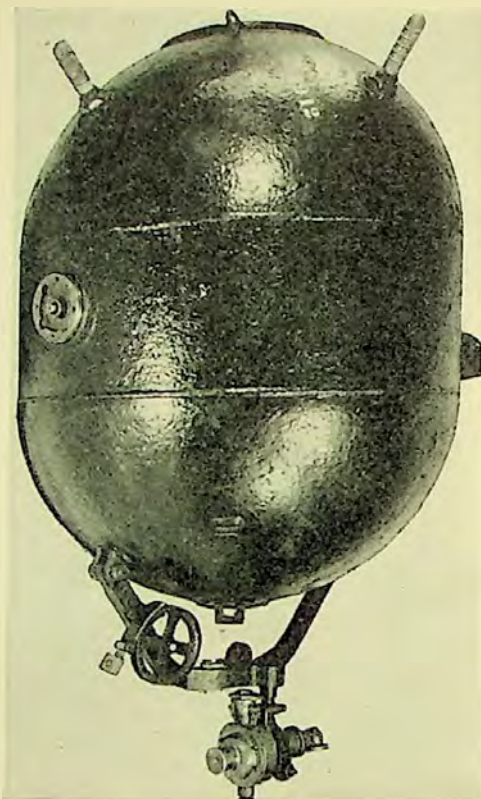


FIGURE 1.

### Type 88 Mod 1 (Fig. 1)

This is an offensive submarine-laid mine of the contact type, with four chemical horns on the upper hemisphere. The case consists of two hemispheres separated by a cylindrical belt and is filled with 396 lbs. of block-fitted Shimose. A circular pan 17 in. deep may be fitted into the top of the mine in place of the top cover plate. The depth setting hydrostat and mooring cable pulleys are mounted on a bail attached to the bottom of the case. A side pocket accommodates a spring-loaded safety switch. The detonator is located in a socket at the bottom of the case and should be pulled out of the mine if it breaks free of its moorings.

### Type 92 (Fig. 2)

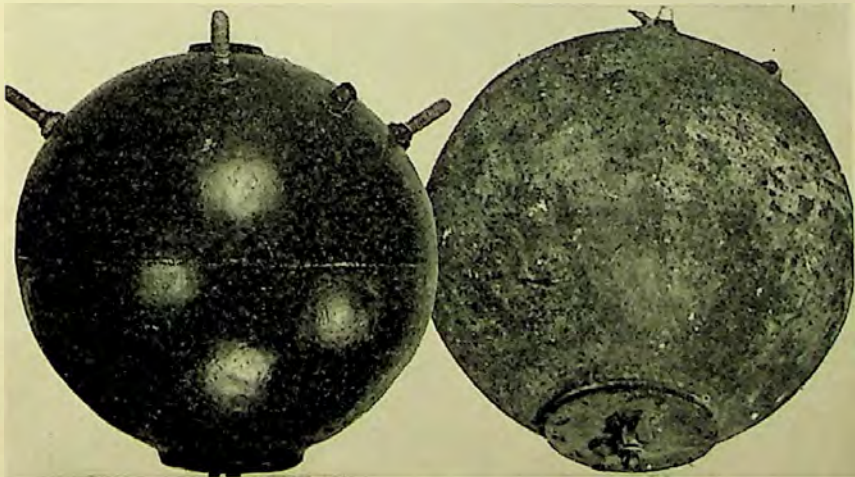
The Type 92 is a moored controlled mine. Its height is 55 in., diameter 41.5 in., and it is filled with 1,100 lbs. of Type 88 Explosive. This mine is fired by closing a switch in the control station ashore, hence there are no horns. The combined control and mooring cable enters the mine through the base plate. The detonator and booster assembly are bolted to the charge case underneath the top cover plate. A microphone to detect the presence of ships is fitted under the top cover plate of the mine. A Type 92 Model 1 without a microphone and filled with Type 1 Explosive has also been recovered.

### Type 93 Model 1 (Fig. 3)

This is a moored mine 34 in. in diameter containing about 220 lbs. of Type 88 Explosive. Four chemical horns are located around the upper hemisphere. The base plate houses the detonator and the mooring spindle, to which the mooring cable is attached. The Type 93 Model 2 has three additional horns on the lower hemisphere. The



FIGURE 2.



side view

FIGURE 3.

base

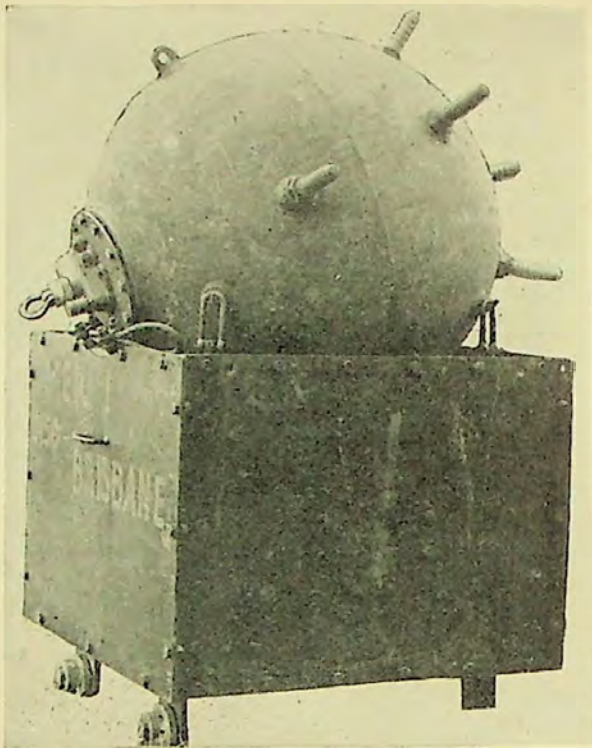


FIGURE 4.—Type 93 Model 3 Mod. 1 and anchor.

Type 93 Model 4 has six horns on the upper hemisphere and three on the lower, and is loaded with Type 1 Explosive. A Model 3 with nine horns has been reported, and Model 3 Mod. 1 (Fig. 4) with eight or nine horns and a modified base plate have been recovered. It is also believed that a Type 93 Model 5 exists.

#### **Type 94 Model 2 (Fig. 5)**

The Type 94 Model 2 is a ground controlled mine hemispherical in shape with a base diameter of 28 in. and a height of 25 in. The filling consists of about 190 lbs. of Type 88 Explosive. Four wheels are secured to the base of the mine. The firing cable enters the booster and detonator well in the side of the case. A Type 94 Model 2 Mod. 1 which eliminates the wheels and depends on safety fuse and a non-electric detonator for firing, has also been recovered.



FIGURE 5.

**Mark 5 Mod. 1 (Fig. 6)**

This is a moored contact mine with a 180 lb. block-fitted Shimose charge. Four chemical horns and a large cover plate are fitted to the upper hemisphere. A spring-loaded arming switch and the detonator holder are located under a bung in the top cover plate. The base plate and mooring spindle are located in a well in the base of the mine and are covered with a rubber diaphragm.



FIGURE 6.

**Mark 6 Model 1 (Fig. 7)**

This is a large moored contact mine 41 in. in diameter. Four chemical horns are set in the upper hemisphere, two on bosses and two screwed directly into the case. Four anchor legs are welded 90° apart around the lower hemisphere, and a mooring spindle is located at the bottom of the case. The mooring cable is secured

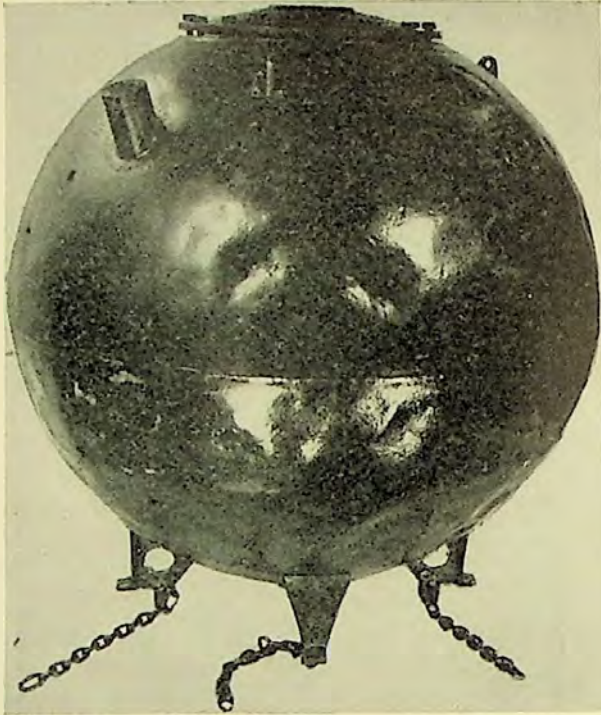


FIGURE 7.

to the spindle and to the four anchor legs by short lengths of chain. A bung in the top cover plate covers the spring-loaded arming switch and the detonator. The Shimose filling is block-fitted within a charge case and weighs 478 lbs. The Mark 6 Model 2 has a 440-lb. Shimose charge and differs from the Model 1 in that it does not have the chain mooring bridle on the base. The base plate is similar to the Mark 5 Mod. 1 but is flush with the case of the mine.

A Mark 6 Model 2 Mod. 1 filled with 440 lbs. of Type 88 and a Mark 6 Model 3 with two additional horns on the lower hemisphere have been reported.

#### **Small Model Mine Model 1 (Fig. 8)**

This mine is widely used by the Japanese. It is a ground contact mine designed for laying in shallow water and on reefs against landing craft. It is hemispherical in shape, 10 in. high and 20 in. in base diameter. Two chemical horns and a spring-loaded safety switch are located on the upper surface of the case. The filling consists of about 45 lbs. of Type 98 Explosive.

The mine may be planted off enemy beaches between obstacles.



FIGURE 8.

Wires may be strung between the obstacles and the horns of the mine in such a manner that landing craft striking one of the wires instead of the mine itself, will bend a horn and detonate the mine. On



FIGURE 9.—Small Model Mine Model 1 as Floating Charge.

beaches, roads or airstrips, small type mines may be found buried up to the horns and employed as anti-vehicle mines. (See ch. VI.)

Small type mines can be rigged as floating demolition charges (Fig. 9). The mine is lashed to logs, and two nonelectric detonators taped to each horn. Hand grenade igniters secured to the logs on either side of the mine are connected by safety fuse to the detonators on the horns. The mine is exploded by striking the igniters. This improvised weapon is probably intended for use by swimmers against ships.

#### Small Model Mine Model 2 (Fig. 10)

A later version of the Small Mine, the Model 2, may also be used as a shallow water mine although so far it has been found principally in land minefields. The mine shell is smaller and forms the section of a cone 12 in. in height and 14 in. in base diameter. It is loaded with 22 lbs. of Type 98 Explosive. A single chemical horn and the safety switch assembly are placed in a well in the top of the mine and secured by a keep ring.



FIGURE 10.

### Type 3 Mark 1 Aircraft Mine Model 1 (Figs. 11, 12, and 13)

This is an aircraft or surface laid moored mine. A parachute and metal parachute housing (Fig. 11) are secured to the top of the mine when it is laid by planes. Four chemical horns fitted with extension arms are screwed into the top of the mine case. The base plate on



FIGURE 11.

the bottom of the case mounts the mooring hydrostat and houses the mooring lever and switch (Fig. 12). The detonator and booster are located in a tube running transversely through the mine case. The mine is 71 in. long (53 in. without parachute housing), 24 in. in diameter, and contains a 240-lb. charge of Type 98 Explosive.

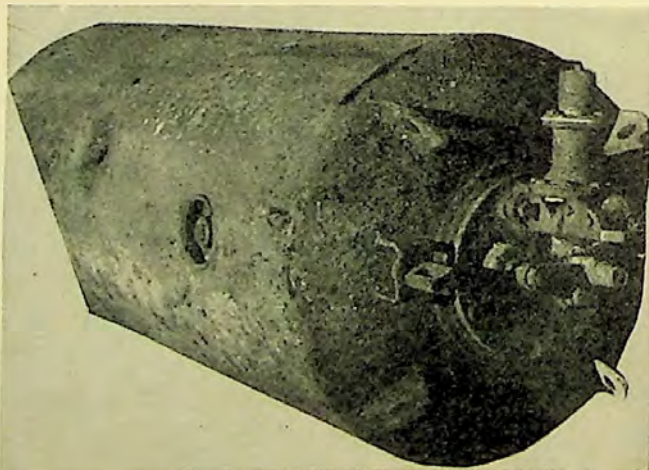


FIGURE 12.

### Type 3 Mark 2 Aircraft Mine Model 1 (Fig. 14)

This is an aircraft-laid drifting mine. It is similar to a bomb in outward appearance, 6 ft. long and 14 in. in diameter. The mine is filled with about 123 lbs. of Type 98 Explosive cast in the hemispherical nose. The detonator and booster are housed in a transverse tube running through the mine, while farther aft in another pocket is the hydrostatic arming switch.



FIGURE 14.



FIGURE 13.—Type 3 Mark 1 Aircraft Mine Model 1 Adrift.



FIGURE 15.—Type 3 Mark 2 Aircraft Mine Model 1 Adrift.

The tail section breaks free of the mine after laying and floats on the surface. The mine proper is suspended vertically about 6 ft. under the surface of the water by a cable attached to the buoyant tail. When the tail is released three sensitive switch horns spring out around the base of the mine case. Approximately five pounds pressure on any of the horns will fire the mine.

Only a small part of the tail is visible when the mine is drifting (Fig. 15). The mine can be safely disposed of by puncturing the tail with small arms fire. There is no disarming device, so the mine, once laid, remains armed. After a few hours a soluble plug in the tail dissolves, and the mine sinks.

### **Type 96 (Fig. 16)**

This is reported to be a mine secured to antisubmarine nets. The firing mechanism is of the tension type, detonating the mine when a submarine fouls a panel of the net. The mine is loaded with 120 lbs. of Type 88 or Type 97 Explosive. The Type 96 Mod. 1 has a slightly larger charge and varies in the details of the firing mechanism. The Type 96, with a modified firing mechanism, may be encountered as a land mine or booby trap.

### **Type 3 Mark 6**

This mine is apparently a modified Type 88 Mod. 1 and has the same appearance. The Shimose filling is somewhat larger (440 lbs.) than the Type 88, but the total weight is less.

### **Banana (Fig. 17)**

Very little is known of this mine, but it is of the moored contact type. There are four chemical horns on the upper portion of the case, and a mooring spindle is fitted in the base. The mine is loaded with 275 lbs. of Type 88 Explosive.

### **JM (Fig. 18)**

Though JM is a moored contact mine, it has no horns. The jolt received by the pendulum firing mechanism, when a ship strikes the mine, closes an electrical contact and fires the detonator. The mine is pear shaped (29 in. in diameter and 53 in. in height) and carries a calculated charge of approximately 110 lbs. It is believed unlikely that "Banana" or JM will ever be found in any quantity.

### **Pomegranate (Fig. 19).**

This is a Vickers antenna mine purchased by the Japanese before the war. The mine is spherical, 41 in. in diameter, and has six chemical horns on the upper hemisphere. Two additional horns are fitted on brackets welded to the lower hemisphere. An upper antenna and float and/or lower antenna are secured to the mine. A mooring lever system of the British Mk XIV type is mounted on the base plate which also houses the detonator holder under a strongback.

Beached antenna mines are particularly dangerous to handle since contact between the copper antenna and the steel mine case or any other steel object may cause the mine to fire.

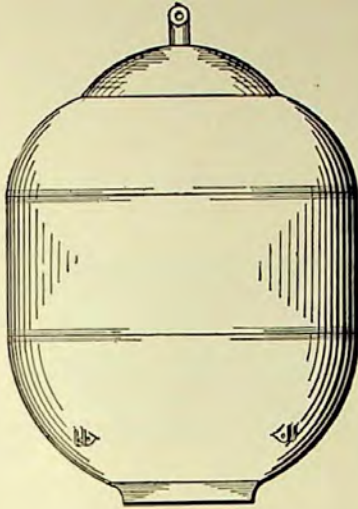


FIGURE 16.

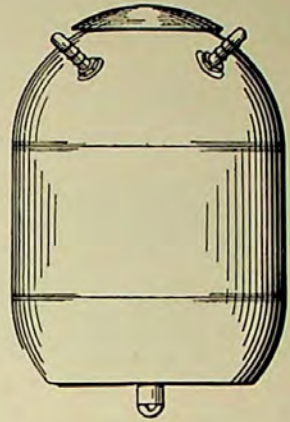


FIGURE 17.



FIGURE 18.

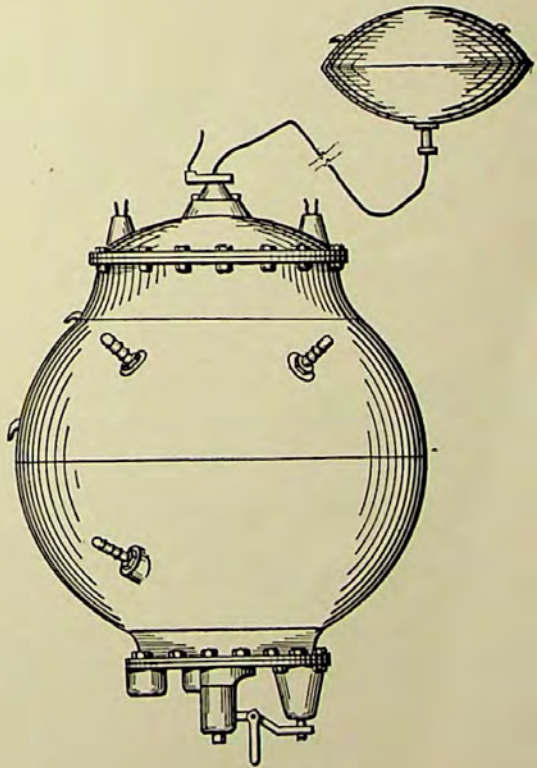


FIGURE 19.

### Type 3 Mine

The Type 3 is the first Japanese attempt to employ influence mines. According to the recovered documents, the various models are all copies of the German S and N mines, and may be fitted with either magnetic or acoustic firing mechanisms.

The cylindrical aluminum case is either 7 ft. or 11 ft. long and 21 in. in diameter. There are three transverse pockets in the case. The



FIGURE 20.—German S Mine

pocket farthest aft houses the hydrostatic delay arming clock, and the booster and booster release mechanism will be found in the center opening. Directly opposite on the other side of the case is the detonator under a cover plate. The contents of the forward pocket are unknown, but it may contain a self-destroying clock.

The Type 3 is laid from submarine torpedo tubes, although it could easily be fitted with a parachute for aircraft laying. In this case the mine will be 4 ft. or 5 ft. longer and will resemble the German mine (Fig. 20).



FIGURE 21.

### Mark 2 Mod. 1 Explosive Hook (Fig. 21)

This weapon is actually an explosive charge used for mine sweeping rather than a mine. The cylindrical body is 10 in. long, 8 in. in diameter, and has been recovered filled with varying weights of Type 88 Explosive. (33 lbs. maximum.) Slimose fillings have also been reported. The detonator is located under a stuffing box in the side of the body.

The hook is towed underwater from the swivels secured to brackets on the ends of the case. When one of the four projecting arms welded to the body

fouls a mine mooring cable or an underwater obstruction, the hook is fired electrically from the towing ship.

The Mark 2 Mod. 0 Hook is reported to have a combination firing mechanism, actuated either electrically or by the tension put on the hook when it fouls something.

### Objects Commonly Reported as Mines

It is outside the scope of this book to discuss Allied mines likely to be found, but there are several items of Japanese and Allied equipment that are often erroneously reported as drifting or beached mines. A short description of such objects may aid correct mine recognition. However, unless a foreign object can be identified positively as a nonexplosive piece of equipment, it should not be moved until local mine, bomb disposal or intelligence officers have been consulted.

### Mine Sweeping Floats

Fig. 22 shows representative types of Japanese mine sweeping floats and marker buoys. Japanese characters are often painted on the

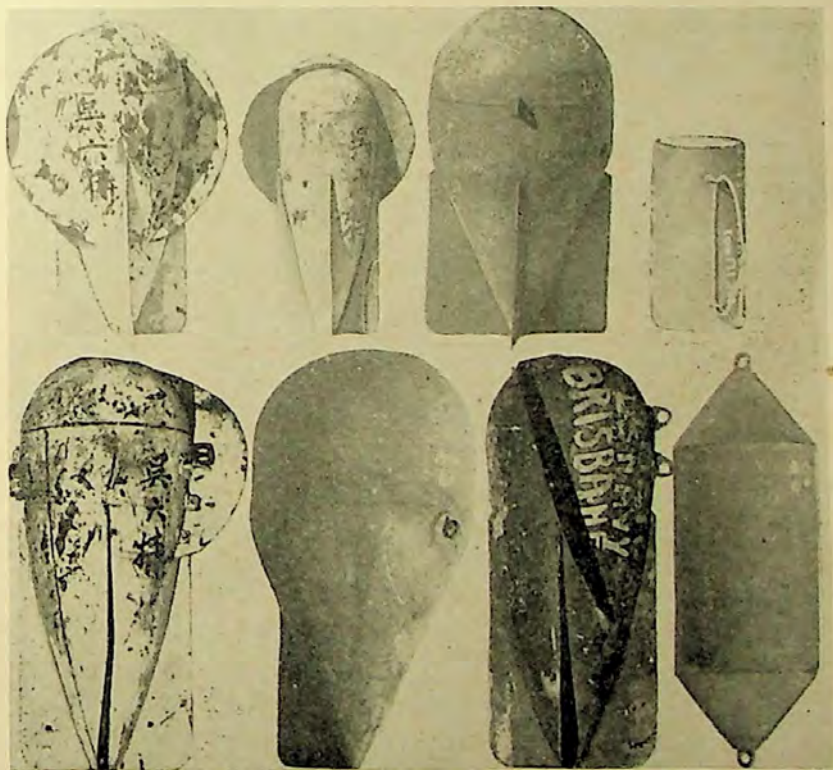


FIGURE 22.—Japanese Mine-Sweeping Floats.

floats, and some have a junction box bolted to the float body. Other Allied or enemy anchorage and navigational buoys may drift ashore. Intelligence officers or the Port Director should be contacted for identification.



FIGURE 23.—U. S. D4 Float.



FIGURE 21.—Japanese Mine on Beach.

### U. S. D4 Floats (Fig. 23)

These are steel cylindrical floats 18 in. in length and 10 in. in diameter. Usually three steel horns surrounded by copper cups are secured to the float. The cups are connected to a copper eyebolt in the base of the float by insulated wire. The floats are part of the U. S. Mark 6 Antenna Mine, but contain no explosive charge.

### Parts of Aircraft

Belly tanks, wing tips, and parts of fuselages have been reported as drifting mines.

### Pyrotechnics and Sea Markers

Floating smoke pots or flares can cause serious burns or may even explode if handled carelessly. Therefore, do not touch unidentified objects.

### Precautions

Moored mines frequently break adrift of their moorings and wash ashore (Fig. 24). Aircraft-laid mines may be dropped on land, and the Small Model Japanese Mines are designed to be laid either on land or in the sea. Often mines are captured in ammunition dumps

or may be rigged as booby traps. At sea, floating mines may be sunk by gunfire from a safe distance (200 yards), but mines should never be sunk in a harbor or anchorage. Under no circumstances shoot at mines on land, as this may detonate them or make them more sensitive.

Mines on the beach should never be touched or even approached. The proper procedure is to clear the area within five hundred yards and get in touch with the local Mine or Bomb Disposal Officer. If none is immediately available, send a report to the Area Commander and a specialist will be dispatched to do the job.

Due to the frequent failures of safety devices, mines are often discovered in the active state. Their sensitivity depends on a number of factors which disposal officers are trained to assess. Attempts by untrained personnel to dismantle, destroy, or souvenir mines, place in jeopardy the lives of everyone within the area. In addition to the great risk involved, items of intelligence value may be destroyed by such heedless action. Information on Japanese mines is very incomplete, and all possible specimens are desired.

MOORED AND DRIFTING CONTACT MINES

Japanese designation	U. S. designation	Old type	Nature	Dimensions		Type and wt. of charge (lbs.)	Total wt. (lbs.)	Firing Methods	Safety Devices		Remarks	Fig. No
				Dia (in.)	Length (in.)				Arming	Disarming		
Type 88 Model 1	JA	II	Moored	33.9	45.8	306 block filled Shimose.	847	4 chemical horns.	Spring-loaded switch with solenoid plug delay.	Comesaling on mooring cable which withdraws detonator.	Laid by subs of the I-321 Type. Most information taken from documents. An offensive mine.	1
Type 93 Model 1	JB	IV	Moored	34	34	220 Type 88	484	4 chemical horns.	Mooring safety switch with soluble plug delay. Detonator and booster separated prior to mooring.	Mooring safety switch.	Most commonly found moored chemical horn mine.	3
Type 93 Model 2	Blueberry	VIII	Moored	34	34	220 Type 88	484	7 chemical horns.	Same as Mine Type JB	Same as Mine Type JB	Model of JB	
Type 93 Model 3	JB	VIII	Moored	34	34	220 Type 88	484	8 or 9 chemical horns.	Same as Mine Type JB	Same as Mine Type JB	Same as JB (Type 93-3-1) but does not incorporate lever type base plate.	
Type 93 Model 3 Mod. 1.	JB	IV	Moored	34	34	220 Type 88	484	8 or 9 chemical horns.	Mooring safety switch with soluble plug delay. Detonator and booster separated prior to mooring.	Mooring safety switch.	Commonly found moored chemical horn mine. Those mines with lower horn bosses are often found with the lower bosses blanked off.	4
Type 93 Model 4	JB	IV	Moored	34	34	220 Type 88	484	8 or 2 chemical horns.	Mooring safety switch with soluble plug delay. Detonator & booster separated prior to mooring.	Mooring safety switch.	Commonly found moored chemical horn mine. Those mines with lower horn bosses are often found with the lower bosses blanked off.	

Mk 5 Mod. 1.....	JO.....	V	Moored.....	32.9	33.7	182 block fitted Shimose.	456	4 chemical horns.	Spring-loaded switch with soluble plug delay; mooring safety switch.	Mooring safety switch.	Very similar to JH, mooring system being the only major difference.	6
Mk 6 Model 1.....	JH.....	XV	Moored.....	41.4	41.4	478 block fitted Shimose.	944	4 chemical horns.	Spring-loaded switch with soluble plug delay and dash-pot damped mooring safety switch.	Mooring safety switch.		7
Mk 6 Model 2.....	JL.....		Moored.....	41.1	41.1	440 cast Shimose.		4 chemical horns.				
Mk 6 Model 2 Mod. 1.	Persimmon.....	VII	Moored.....	41.3		440 Type 88.	903	4 chemical horns.	Spring-loaded arming switch with soluble plug delay and mooring safety switch.	Mooring safety switch.	Similar to JC and JH with same mooring safety switch as JC. Information from document.	
Type 3 Mk 2 Aircraft Mine Model 1.	JJ.....		Drifting.....	14.25	22.5	123 Cast Type 98.	300	3 switch horns.	Hydrostatic switch, soluble plug delay in tail release mechanism, and horn release mechanism and safety switch.	None.....	Offensive mine. Scuttles self after soluble plug delay.	14, 15
Type 3 Mk 6.....	Pear.....	I	Moored.....	35.5	45.3	440 Shimose.....	900	4 chemical horns.	Not known but believed similar to Mine Type JA.		Believed to be a redesign of D. A. with same mooring and safety features.	11, 12, 13
Type 3 Mk 1 Aircraft Mine Model 1.	JJ (Camote).....		Moored.....	23.5	52.75	240 Type 98.....	600	3 chemical horns.	Hydrostatic booster release, mooring safety switch with soluble plug delay, and horn release mechanism.	Mooring safety switch.	Can be surface laid.	
Unknown.....	JM.....	IX	Moored.....	32.5		170 Type 88.....	450	Inertia pendulum.			Obsolete mine.	18
Unknown.....	Pomegranate.....	X	Moored.....	41				6 chemical horns and upper and/or lower antenna.	Antenna safety switch and mooring safety switch.	Mooring safety switch.	Reported to be very similar to the British Vickers antenna mine.	19

MOORED AND DRIFTING CONTACT MINES—Continued

Japanese designation	U. S. designation	Old designation	Nature	Dimensions		Type and wt. of charge (lbs.)	Wt. (sq ft)	Firing Methods	Safety Devices		Remarks	No.
				Dia (in)	Length (in)				Arming	Disarming		
Unknown	Banana	III	Moored	35.5		275 Type 88		4 chemical horns.	Mooring safety switch with soluble plug delay.	Mooring safety switch.	Believed to be similar to Dutch Vickers.	17

BEACH CONTACT

Small Model Mine Model 1.	JE	XIII	Ground	20.5	10.5	45 Cast Type 98.	110	2 chemical horns.	Spring-loaded switch, manually operated.	None	Has been found wired in parallel and series thus eliminating arming spindle switch as a means of visual determination of armed conditions.	8
Small Model Mine Model 2.	JG	XVI	Ground	14.3 (max.) 7 (min.)	14.5	22 Cast Type 98.	52.5-52.5	1 chemical horn.	Same as Mine Type JE.	JE	Same as for Mine Type JE.	10

CONTROLLED MINES

Type 92	Quince	XII	Moored	58.2		1100 Type 88	1,650	Electrically controlled.	Not known.		Laid in clusters of six. Acoustically monitored.	2
Type 92 Model 1.	JK		Moored	41.5	55.0	1100 Temp. Type 1.	1,687	Controlled or automatic.	Soluble plug delays mooring.	None	Laid in clusters of six. Magnetically monitored.	5
Type 94 Model 2.	JF	XIV	Ground	24.8	25.6	190 Type 88	580	Controlled	None	None	None	

Type 04 Model 2 Mod 1.	JF	XIV	Ground	24.8	25.6	190 Type 88	580	Safety fuse and nonelectric detonator.	None	None	Eliminates the skirt and wheels. Used as demolition charge.	21
Mk 2 Explosive Hook	Grape		Towed sweep device.	11.5 (max.)	25	19 Type 88	39	550 lb. tension.	None	None	Same as JD with substitution of tension firing device for electrical control.	
Mk 2 Explosive Hook, Mod 1.	JD	XI	Towed sweep device.	11.5 (max.)	25	10 Shimose or Type 88.	39	Electrically controlled.	None	None	May be used as a ground controlled mine either in water or on land.	

NET MINES

Type 96	Apricot	VI	Attached to nets.	20.1	27.2	121 Type 97 or 88.	238	Tension mechanism 300 lb. tension needed for firing.	Hydrostatic plunger and shear pin.	Not known	Attached to anti-sub nets.	16
Type 96 Mod 1	Grapefruit	VI	Attached to nets.	20.1	27.2	132 Type 97 or 88.	248		Similar to Apricot		Change of position of charge alters the center of gravity from that in the Type 96.	

INFLUENCE MINES

Type 3 Electric Mine	Lime		Ground	21	11'2"	1950 (Type unknown).	2, 308	Acoustic or magnetic unit.	Not known		Model 1 is magnetic, Model 2 is acoustic.	
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## TORPEDOES

### General

The torpedo, the most lethal weapon in use against ships, is a self-propelled underwater projectile. A modern torpedo is a complex affair containing within its cigar-shaped body the explosive filling and the machinery necessary to drive the torpedo on a set course at a set depth to its target. (Fig. 25.)



FIGURE 25.—Japanese Torpedo.

Most torpedoes are steam-driven. Compressed air, fuel, and water are mixed in a combustion pot and ignited. The high-pressure gases thus created are fed into a turbine or steam engine geared to the propellers. A gyroscope controls the vertical rudders to steer the torpedo on a definite course. The horizontal rudders are controlled by a hydrostatic valve and pendulum assembly and keep the torpedo at a stable depth beneath the surface. Other mechanisms start and stop the torpedo, convert impulses received from the gyro and pendulum into rudder motion, and lubricate and cool the moving parts.

Recognition of a torpedo is easy. There is no mistaking the long cylindrical body with co-axial screws and horizontal and vertical rudders fitted to the tail. It is, however, difficult to identify a specific model. Aside from comparatively minor differences in dimensions and in the details of the exploders, most torpedoes look very much alike.

### Japanese Torpedoes

The best means of identifying Japanese torpedoes is by translation of the markings stamped on the body. These will be found on the top center line (in line with the guide stud) just aft of the joint between the airflask and the after body. Warheads are also usually marked on the top center line on the curve of the nose.

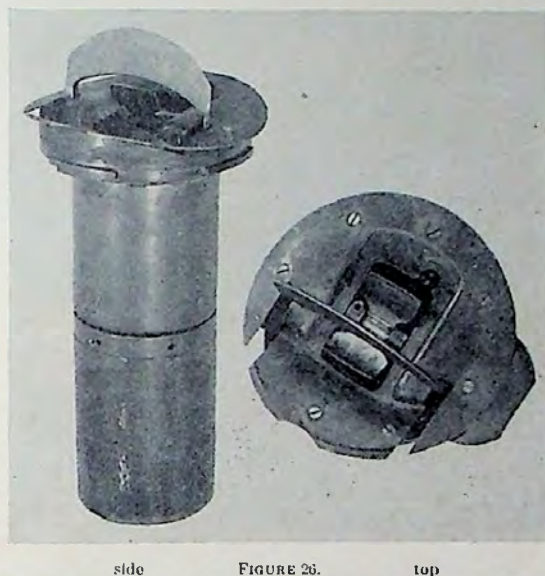
For the past 20 years the Japanese Navy has conducted an extensive torpedo-research program. The result has been the design of torpedoes unrivaled in speed and range, yet carrying an extra weight of explosive. The table on page 60 gives pertinent details of most known torpedoes. Much of the data is compiled from intelligence sources and should be evaluated accordingly.

### Exploders

The nose section of the torpedo, called the warhead, contains the explosive filling as well as the means of detonating that charge.

These exploder mechanisms are usually designed to operate on the impact of the warhead with the target, although influence types have been perfected.

**TYPE 90 EXPLODER (Fig. 26).**—The Type 90 is locked in a transverse pocket on the top centerline of the warhead. The exploder is made up of two cylindrical containers jointed by a center ring. The upper body houses the arming and firing mechanisms; the lower, the detonator and booster. An impeller wheel is mounted in the top of

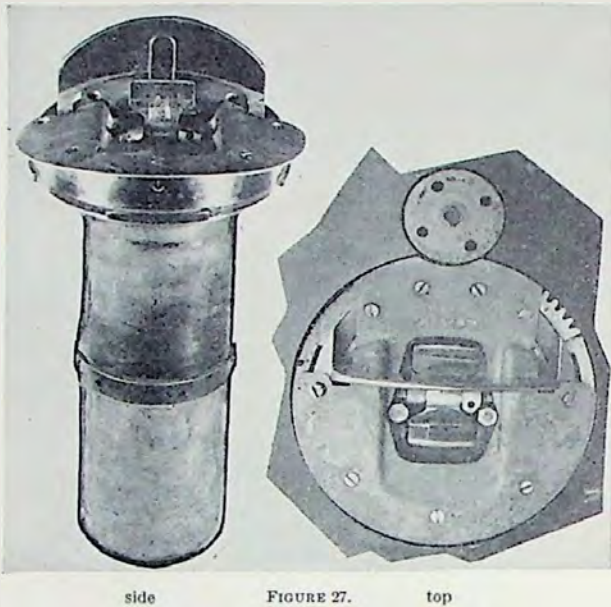


the exploder (the only part visible when the exploder is set in the warhead). A movable spring-loaded bail projects from the exploder and arcs over the impeller. The selector screw forward of the impeller varies the arming distance by changing the gear train.

As the torpedo begins its run, water pressure forces the bail down against the top of the exploder, unlocking the firing mechanism. The impeller wheel spins, and, after a certain number of turns, depending on the selector screw setting, arms the firing mechanism through a gear train. The exploder will then fire upon impact.

The Type 90 Model 2 (Fig. 27) is a revision of the Type 90 for use in aircraft torpedoes. A detent on the bail prevents the impeller from turning until the bail is in the down position. Also there is no selector screw. Otherwise the exploders are identical.

**TYPE 91 EXPLODER (FIG. 28).**—This mechanism threads into the nose of the warhead and is similar in action to a bomb fuze. Two horizontal and one vertical lever extend radially from the exploder, and a four-bladed impeller is secured to the nose.



side

FIGURE 27.

top

After the torpedo enters the water, the spring-loaded vertical lever moves aft, unlocking the impeller. Rotation of the impeller frees the striker and unmasks the striker point. Impact on any one of the levers or the pistol itself will shear two copper wires and drive the striker into the detonator, exploding the warhead.

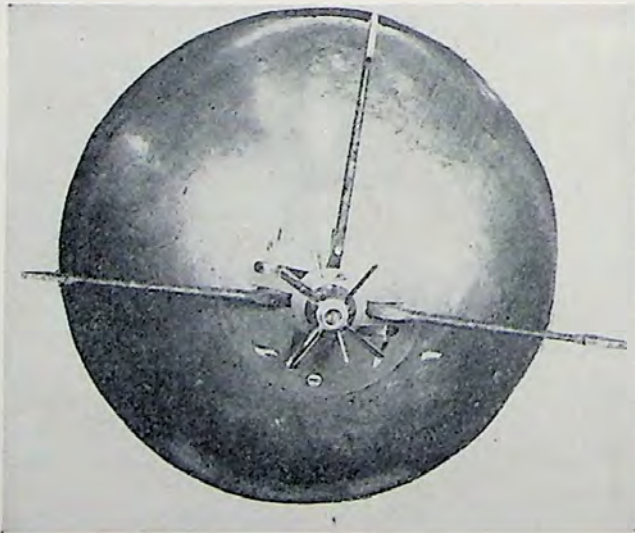
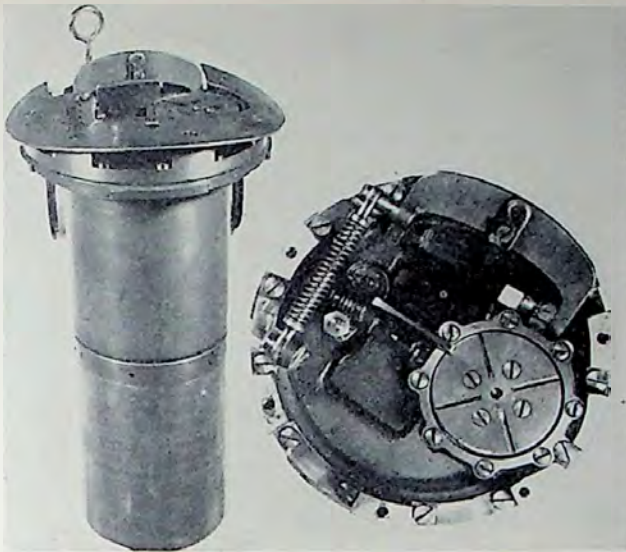


FIGURE 28.



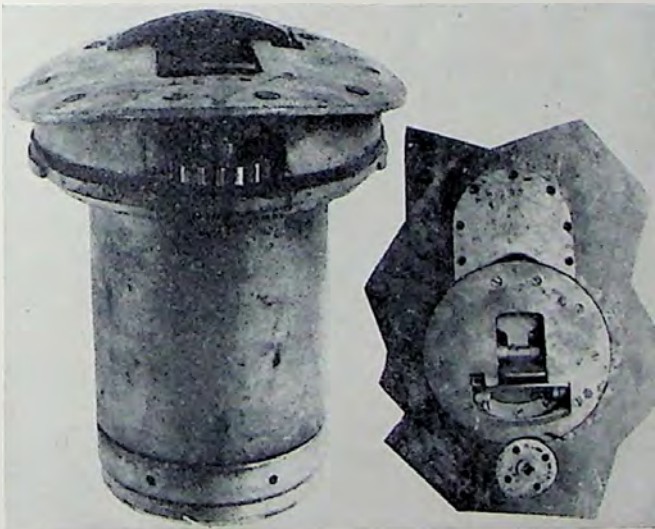
side

FIGURE 29.

top

The Type 91 Model 1 fits in 24 in. torpedoes while the smaller Model 2 is for 21-in. torpedoes. It is believed that a Model 3 for 18-in. torpedoes is also in existence. The Type 91 is an obsolete exploder found only in the older torpedoes.

**TYPE 2 EXPLODER (FIG. 29).**—The Type 2 is of the same general construction and employs the same arming and firing principles as



side

FIGURE 30.

top

the Type 90. However, the operation of the mechanism within the exploder is quite different. An impeller wheel is again mounted in the top of the exploder. On one side of the impeller is a brass anti-countermining diaphragm; and on the other, the selector screw. A small bail is aft of the impeller. Unless the safety pin is in position, the bail will be down against the after edge of the exploder.

**TYPE 3 EXPLODER (FIG. 30).**—This exploder is similar to the Type 90 Model 2 (Fig. 27) in appearance. It is fitted in conjunction with the hydroplane mechanism in the special Type 3 warhead (Fig. 31) for use in the Type 91 torpedo and is located on the bottom center-line. The bail of this exploder is much smaller than that of the Type 90 Model 2. In addition a small arc gear meshing with a similar gear in the recess in the warhead is pivoted in the forward edge of the exploder housing.



FIGURE 31.—Hydroplane Torpedo Warhead (under side).

The brass hydroplane itself is set in a well on the top of the warhead. (Fig. 32.) A length of wire runs forward from the hydroplane through a groove in the warhead to a fairlead and from there to the cable reel in the nose.

As the torpedo makes its run, the bail of the exploder is depressed and the impeller arms the mechanism. Two impellers on either side

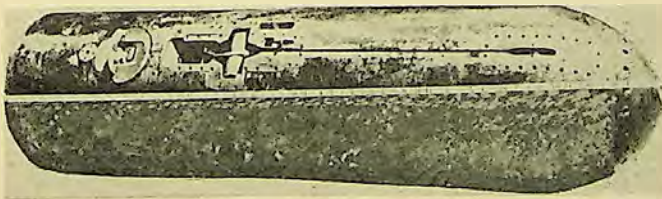


FIGURE 32.—Hydroplane Torpedo Warhead (upper side).

of the hydroplane raise the hydroplane and fairlead from their respective pockets in the warhead. Finally the hydroplane is released mechanically, and, due to its shape, rises above the torpedo, unreeling the 25 ft. length of wire attached to it.

The strain on the wire and hydroplane as the torpedo moves through the water cocks the operating mechanism. Then, should the hydroplane strike a solid object, it breaks free of the wire. Release of

tension on the wire allows the spring-loaded cocking arm to rotate the arc gear on the Type 3 exploder through a system of gears and shafting, firing the detonator and the warhead.

The hydroplane exploder greatly extends the vertical range of the torpedo and makes it more effective against shallow-draft vessels. As long as the torpedo passes beneath the ship so that the hydroplane can strike the hull, it will explode. A Type 90 Model 2 Exploder located aft of the hydroplane will operate if the torpedo itself hits the target.

### **Precautions**

Unexploded torpedoes are usually found on beaches or reefs. The exploder will normally be fully armed. In this condition, jarring of the torpedo, movement of the bails or impellers of any pistol, or pressure on the levers or nose of the Type 91, may detonate the torpedo. In addition, the possibility of a magnetic or acoustic exploder must be kept in mind.

Torpedoes (or just the warhead) may be encountered rigged as booby traps. (See Chapter VI.) The Type 3 Warhead is almost ready-made for such purposes. The hydroplane wire could easily be rigged as a trip wire operating the exploder when tension is applied (mechanism uncocked) or when the taut wire is broken (mechanism cocked). On Guam a Type 3 warhead was planted as a controlled mine. The hydroplane wire was to be pulled from a machine gun nest nearby. The Type 3 warhead planted in shallow water with the hydroplane wire strung between obstacles would make a very effective anti-invasion mine.

Do not touch torpedoes, wherever they are found. Be on the lookout for trip wires leading to warheads, but never cut or handle them. All possible enemy torpedoes and exploders are desired, and Mine Disposal personnel are trained to render this type of ordnance safe with the minimum amount of risk.

JAPANESE TORPEDOES

Designation	Use	Diameter	Total length	Length of war-head	Type and amount of explosive	Total weight (lbs.)	Exploder	Remarks
Type 44 Mark 2 Mod. 1.	PT boats.	17.7"	18' 8"	48"	400 lbs. of Type 97 or 98.	1,834	Type 91 Model 3, Type 93 Model 3 reported.	Obsolete. A Mod. 2 is reported.
6th Year Type	Subs; old destroyers and cruisers.	21"	22' 5"	37"	450 lbs. of Shimose.	3,200	Type 01 Model 2	Obsolete.
8th Year Type Mk 2 Mod. 2.	Destroyers and cruisers.	24"	27' 5"	43"	About 850 lbs. of Shimose or Type 98.	5,800	Type 01 Model 1.	Obsolescent.
Type 89 Mod. 1.	Subs, possibly destroyers and PT boats.	21"	23' 6"	44"	635 to 660 lbs. of Type 94, 97, or Shimose.	3,670	Type 90.	A Mod 2 with a slightly smaller warhead has been reported. All these torpedoes are obsolete.
Type 90.	Destroyers and cruisers.	24"	27' 10"	47"	890 lbs. of Type 94 or Shimose.	5,760	Type 90.	Obsolete. Replaced by Type 93.
Type 91 Mods. 1, 2, 3, 3 (Special), 4, 6 and 7.	Aircraft, PT boats.	17.7"	17' 3" to 18' 10"	37" to 75"	340 to 900 lbs. of Shimose, Type 94, 97 or 98.	1,725 to 2,250	Type 2 or Type 90 Model 2, Type 3 Hydroplane warhead and exploder may be fitted with Mod 3 torpedo.	The Mods. vary in weight, dimensions, construction of tail, etc. It is believed that Models 1 through 3 may be fitted with Mod 3 torpedoes. Only Types 4, 5, 6, 7, 8, and 9 are the standard aircraft torpedoes.
Type 92 Mod. 1	Subs.	21"	23' 8"	55"	660 lbs.	3,370	Unknown. A magnetic exploder is possible.	Copied from the Germans. This torpedo is electric driven.
Type 93 Model 1 Mod. 2.	Destroyers and cruisers.	24"	29' 9"	55"	1,080 lbs., Type 97.	6,000 to 6,300	Type 90 or Type 2.	This is the standard Japanese fleet torpedo and is a very superior weapon. A Model 3 carrying 1,700 lbs. of Type 97 Explosive has been recovered.
Type 94 Mod. 1*	Subs.	21"	22'	88"	870 lbs. of Type 97 or Shimose.	3,245	Probably Type 90.	Intelligence data on the Type 94 torpedoes is confusing and contradictory.
Type 94 Mod. 2*	Aircraft.	17.7"	17' 4"	60"	460 lbs. of Shimose.	1,820	Probably Type 90 Model 2.	Apparently the most common submarine torpedo.
Type 95*	Subs.	21"	23' 6"	71"	880 lbs. of Type 97.	3,620	Type 90 or Type 2.	
Type 97.	Midget subs, PT boats.	17.7"	18' 5"	71"	790 lbs. of Type 97.	2,200	Type 90 or Type 2	An aircraft torpedo, a Type 2 (Special) carrying a 650 lb. charge of Type 97 has also been recovered.
Type 2.	Midget sub.	17.7"	18' 5"	72"	774 lbs. of Type 97.	2,080	Type 2 or Type 90.	

\*Indicates torpedoes that have not been recovered.

## DEPTH CHARGES

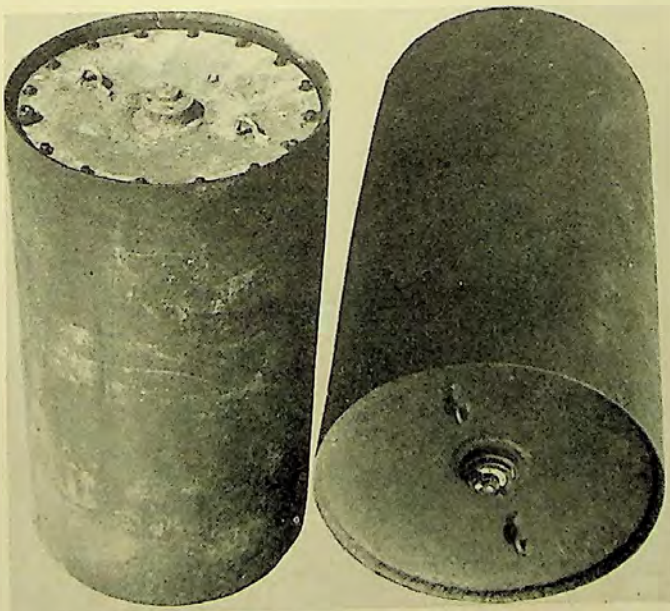
### General

The sole purpose of the depth charge is to destroy submerged submarines. As such, it is still the most widely used weapon of its type in spite of many new developments in antisubmarine warfare. Most depth charges are of a standardized design, consisting of an explosive-filled cylindrical "ash-can" body and equipped with a pistol to detonate the charge at a definite depth below the surface of the ocean. The pistol is housed in a central tube running along the central axis of the case.

In order to sink or damage a submarine the depth charge must explode in the immediate vicinity of the target, no matter what its depth. A depth charge pistol normally makes use either of the ratio between water pressure and depth or of the ratio between time and depth to accomplish this. The Japanese incline towards the latter principle.

### Japanese Depth Charges

The depth charges of the Japanese Navy, like its mines but unlike its torpedoes, are obsolete in design. In view of the successes of American submarines, new countermeasures, such as magnetic pistols or contact-firing rockets, should be expected.



pistol end

FIGURE 33.

filling end

**TYPE 88 DEPTH CHARGE.**—The Type 88 is a comparatively old model. It has never been recovered and is probably no longer in service. Its dimensions, 30.5 in. in length and 17.7 in. in diameter, are standard for all known Japanese depth charges. It is filled with 327 lbs. of Shimose. The pistol is operated by water pressure and can be set to fire at depths of 82 ft. or 148 ft. by varying the opposing spring pressure.

**TYPE 91 MODEL 1 MOD. 1 DEPTH CHARGE.**—Another obsolete charge, the Type 91 contains 220 lbs. of Type 88 explosive. Changing the area of a diaphragm receiving water pressure allows the pistol to fire in 82 ft. or 164 ft. of water.

**TYPE 95 DEPTH CHARGE (FIG. 33).**—The Type 95 was the regular issue depth charge until the appearance of the Type 2. It is of standard dimensions and is filled with 220 lbs. of Type 88 explosive. One end of the charge is removable and is bolted to a flange in the interior of the case. Slow ships drop the Type 95 with a parachute attached to slow down its rate of descent so that the ship can escape the danger area before the charge explodes.

The pistol (Fig. 34) can be set for depths of 98 ft., 98 ft. with parachute, 197 ft., and safe. Depth setting is accomplished by varying the amount of time necessary for a certain amount of water to enter and operate the firing mechanism. The size of the water inlet is different for each setting; the smaller the inlet, the deeper the setting.

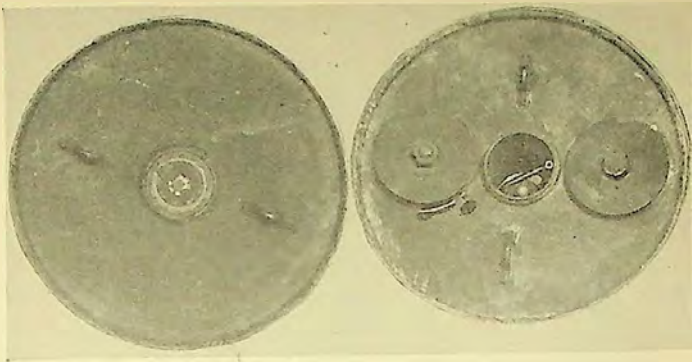
The Type 95 Mod. 1 contains 325 lbs. of Type 97 or 98 Explosive, while the Mod. 2 is loaded with 240 lbs. of Type 1. A new pistol with an additional setting of 292 ft. is believed to be in existence, probably used in the Type 95 Model 1 Mods. 1 and 2.



FIGURE 31.

**TYPE 2 DEPTH CHARGE (Fig. 35).**—This depth charge and pistol are almost direct copies of British models. The size of the depth charge has been changed slightly in order to bring it up to standard Japanese dimensions. Two filling bungs are located in one end of the case. The filling is Type 88.

The pistol (Fig. 36) operates on the same depth setting principle as the Type 95, but the range of depth settings, 98 ft., 197 ft., 292 ft., 390 ft., 480 ft., and "safe," is much greater.



pistol end

FIGURE 35.

filling end

The Type 2 Mod. 1, containing 357 lbs. of Type 98 explosive, has been recovered. Type 97 explosive may be an alternate filling. Type 2 Mod. 2's, loaded with 242 lbs. of either Types 1 or 4 explosive have also been recovered.

50 KG. ARMY DEPTH CHARGE (Fig. 37).—This depth charge is probably used on suicide boats or small patrol boats. It is 20 in. in length, 13 in. in diameter, and carries a charge of approximately 75 lbs. of TNT. The firing mechanism is housed in a well in one end of the case.

EXPERIMENTAL TYPE 3 120 KG. DEPTH CHARGE (Fig. 38).—The Type 3 is rigged on Army suicide boats. It is fired by a pull igniter instead of a hydrostatic pistol. The charge is 24½ in. long and 15¼ in. in diameter. The explosive filling weighs about 200 lbs.

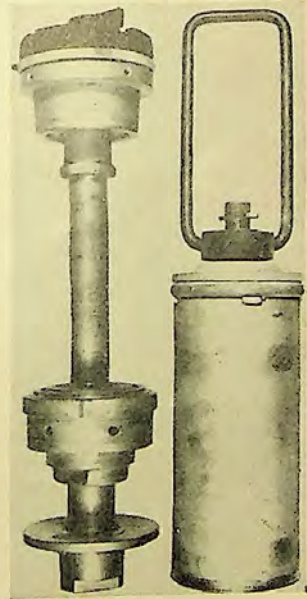


FIGURE 36.

### Precautions

Depth charges may be found on beached ships or in storage dumps. Although all known Japanese pistols require water pressure in order to operate, an influence-firing pistol may appear at any time. The use of Type 2 Depth charges as land mines with the pistols converted to pressure devices is common (See Chapter VI). Depth charges should never be dismantled by untrained personnel.

Depth charges are often dropped accidentally and fail to fire due to insufficient depth of water. Divers unfamiliar with the details of depth charge operation should not attempt to raise them. Mine Disposal personnel will be available to do the job.

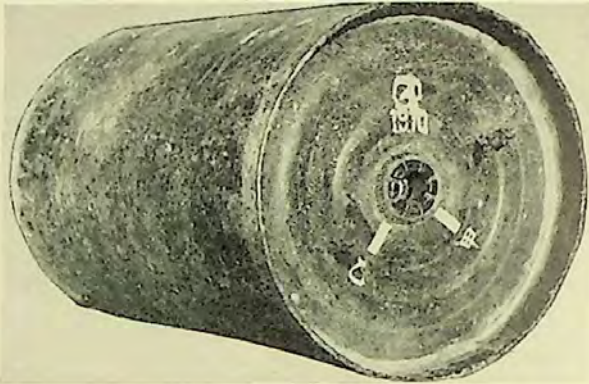


FIGURE 37.

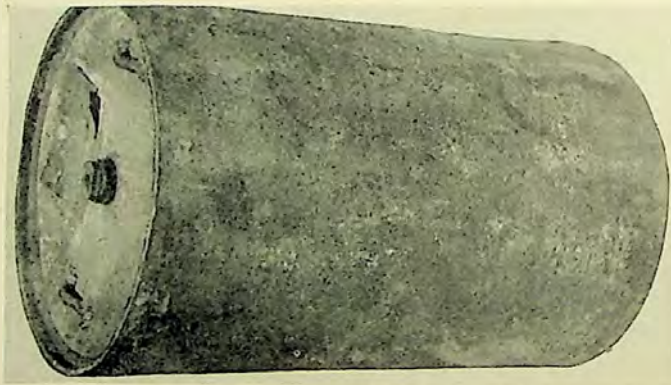


FIGURE 38.

### Miscellaneous

**SUICIDE BOATS.**—The Japanese Army and Navy have both constructed suicide boats. The craft are light plywood gasoline-driven speedboats, 15 to 20 ft. long. The Army boat (Fig. 39) mounts two 120 kg. depth charges on racks on the side. The charges are released when the boat strikes its target by a system of steel rods which open the slings securing the charges in their racks. Some boats have a third depth charge rigged to roll over the stern.

The Navy type boat (Fig. 40) has a 640-lb. charge of Type 98 explosive built into the nose. The boat is exploded electrically upon contact with the target, or by throwing a switch in the cockpit. A stand-by pull igniter firing device is also fitted. The switches con-

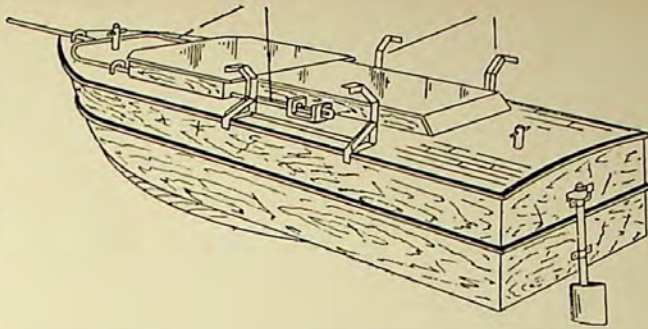


FIGURE 39.—Japanese Army Suicide Boat.

trolling the selective electric firing are mounted in the cockpit, and the boat could easily be booby-trapped by changing the leads.

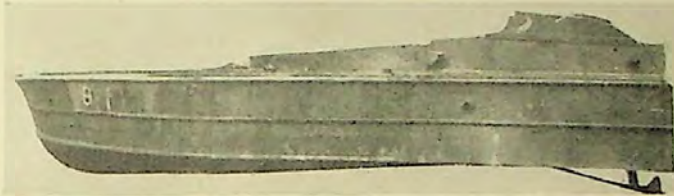


FIGURE 40.—Japanese Navy Suicide Boat.

**MARK 3 SOUND MISSILE (FIG. 41).**—This device consists of a case 8 $\frac{3}{4}$  in. long and 5 $\frac{1}{2}$  in. in diameter, filled with Type 88 Explosive. When it is dropped into the water, the sodium under the top cap explodes, blowing the cap off and operating a pull igniter. Then, after a short delay the explosive charge detonates. The use of the missile is not definitely known, but it is believed to be an antisubmarine weapon. A Mark 3 Modified and Mark 4 Missiles, varying slightly in dimensions and internal construction, have also been recovered. Under no conditions attempt to dismantle any of these missiles.

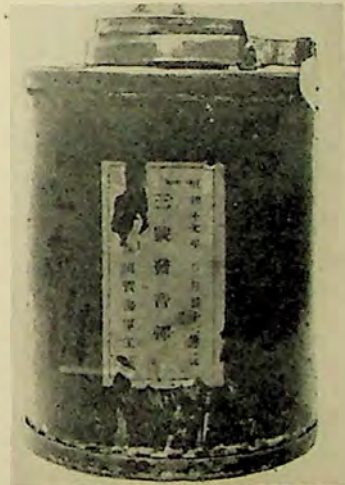


FIGURE 41.

**YOKOSUKA DEPTH CHARGE.**—This reported antisubmarine weapon is not a depth charge in the accepted sense. It is towed under water by escort ships and will explode upon contact with a submerged submarine. The charge is cylindrical in shape, about 5 ft. in length and 1 ft. in diameter. The filling is 55 lbs. of Type 88. Vertical and horizontal rudders are fitted on the tail, and an impeller-armed impact firing mechanism is located in the nose.

## IV. JAPANESE BOMBS AND FUZES

### I. ARMY BOMBS

The Japanese Army Air Force has its own distinct series of bombs. Although Army planes have dropped Navy bombs against ships and submarines, and the beginning of inter-service coordination is suggested by the recovery of a Navy bomb filled and marked by the Army (Fig. 42), construction and markings are generally so different that distinguishing between the ordnance of the two services is rarely a problem.



FIGURE 42.—Navy  
Type 97 No. 6  
Land Bomb with  
Army Markings.

The types of bombs in use by the Japanese Army include general use (general purpose HE), antishipping, chemical, special use (antiaircraft, cluster bombs, etc.), substitute and practice. Various substitute, practice and old model bombs described in documents are not included in this book because they are believed to be obsolete.

Antishipping bombs are a recent development. Documents first suggested that the Japanese Army was becoming concerned with combatting Allied shipping and submarines, normally the province of Navy bombers. Navy Ordinary and Mark 2 bombs, designated Type 4 by the Army, were probably first used for this purpose. Later modified Army bombs, new bomb designs and special new fuzes appeared. Experimental AP bombs, also for use against ships, have been reported in documents but never recovered.

No special antisubmarine bomb was ever designed by the Army. General use bombs with a nose plug and a special 3.5-second delay antisubmarine tail fuze have served the purpose.

It should particularly be noted that the small special bombs contain sensitive fuzes and constitute a hazard to souvenir hunters and personnel unaware of their dangers.

### Construction

General use bombs are normally made in three pieces with the tail cone filled with explosive. The nose or the tail cone is welded to the

barrel and the other part is threaded to the barrel for the final junction in assembly. Occasionally the nose and barrel are made in one piece. Older bombs (Type 92, 94, 99) have the nose threaded, while the new bombs (Type 3) have the threaded junction between tail cone and barrel. The table indicates in each case where the junction occurs.

Type 92 500 Kg. bombs with a heavy bolted external nose band have been recovered (Fig. 56). The purpose of this attachment is not known.

Time bombs, Type 1, are similar in construction to the older general use bombs, with the exception of an enlarged nose fuze pocket for the C-3 (a) time fuze, and a specially constructed tail fuze pocket for the E-1 (a) antiwithdrawal fuze. Older type general use bombs have been recovered with a large nose fuze pocket for a time fuze and a tail fuze pocket for ordinary impact fuzing. This is apparently a stage in transition to the Type 1 bomb. Such bombs have been designated in the table as Modified Type 92, Modified Type 94; the use of Modified in this case is *not* Japanese terminology.

Type 99 30 Kg., and Type 3 100 and 250 Kg. bombs have been recovered modified for antishipping use. The modification is accomplished by welding full-length steel struts to the tail fins. In addition, the 100 and 250 Kg. sizes may have a heavy internal reinforcing plate bolted just forward of the junction of tail cone and barrel.

Type 4 bombs, designed particularly for antishipping use, have been recovered in 100, 250, and 500 Kg. sizes. Documents report the existence of an 800 Kg. size. They have the internal reinforcing plate and heavy hollow fins supported by an explosive-filled tube.

The construction of chemical and special bombs are noted in the table. Substitute bombs, constructed generally for fragmentation purposes, are made of low-grade steel or concrete and sometimes have walls filled with steel fragments and concrete.

## Suspension

All Army bombs except those carried in containers are suspended by a single rectangular hinged suspension lug at the center of gravity.

## Filling

General use and antishipping bombs are usually filled with pre-cast paper-wrapped blocks of explosive, surrounded by paraffin or in the latest types by cast TNT. In the table only the fillings found in particular bombs are listed, but it is quite possible that any of the H. E. fillings may be found in any of the general use bombs. Fillings for other types of bombs are described in the tables.

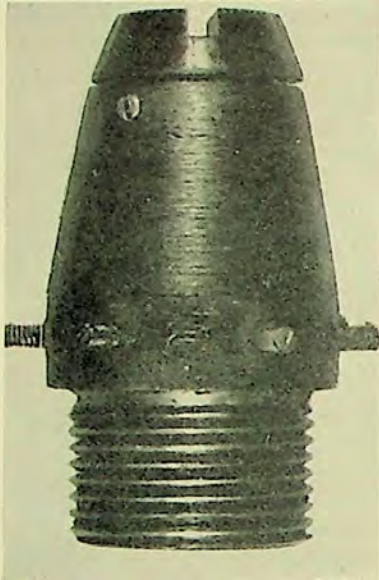


FIGURE 43.—Army Bomb Fuze Adapter.

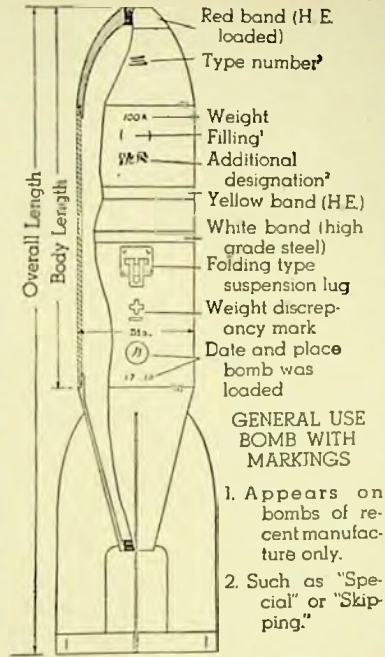


FIGURE 44.

## Fuzing

In general 250 and 500 Kg. Army bombs use larger fuzes. Through the use of an adapter (Fig. 42) however, Army tail fuzes with smaller threads may be used in larger Army bombs. This permits tail fuzes for low-level, antishipping and antisubmarine attacks to be used in bombs of all sizes.

The probable fuzing for each Army bomb is given in a subsequent chart.

## Markings

Typical markings for general use bombs are illustrated by a drawing (Fig. 44) and in the photographs. Chemical bombs follow the same pattern with additions as noted in the table. Special use bombs have parts of the typical marking.

## Size

To date the small sizes of general use bombs, particularly 50 and 100 Kg., have been used almost exclusively. Although documents refer to 1000 Kg. bombs, none larger than 500 Kg. have ever been recovered. This is probably due to the limited bomb-carrying capacity of present Army bombers.

JAPANESE ARMY BOMBS

Weight classification	Japanese Type No.	Overall length (less fuze)	Body length	Body diameter	Filling	Color and markings	Construction	Remarks	Fig. No.	
15 Kg.	92	25½"	14½"	4"	Picric Acid	Black with red tipped nose; yellow and white body bands	Steel rings around body, nose and tail thread on	Vertical suspension from tail as well as horizontal on some. Primary use is A/P	45	
	92 Special 1				TNT					
	99	33½"	19¾"	5½"	Cyclonite/TNT	Black with red tipped nose; yellow and white bands	Nose threads on 2 Special tail fuze pocket for A/W fuze 3		46	
	1*									
30 Kg.	94				Picric Acid		Nose threads on 2		47	
	94 Special 1	40½"	24"	7"	Cyclonite/Ammonium nitrate	Black with red tipped nose; yellow and white body bands	Nose fuze pocket modified to receive large nose time fuze			
	Modified 94						Tail threads on			
	3*				Picric Acid		Nose threads on, Special tail fuze pocket for A/W fuze 3			Nature of modification is unknown
	1	39½"	23"							
50 Kg.	1 Modified*						Nose threads on 2		49	
	94				Picric Acid					
	94 Special 1				Cyclonite/Ammonium nitrate		Nose fuze pocket modified to receive large nose time fuze			
	Modified 94	52½"	31½"	9½"	Picric Acid	Black with red tipped nose; yellow and white body bands	Tail threads on			
	3	39½"	23"				Nose threads on, Special tail fuze pocket for A/W fuze 3			Nature of modification is unknown

GENERAL USE

See footnotes at end of table.

JAPANESE ARMY BOMBS—Continued

Weight classification	Japanese Type No.	Overall length (less fuze)	Body length	Body diameter	Filling	Color and markings	Construction	Remarks	Fig. No.
250 Kg.	92				Picric Acid	Black with red tipped nose; yellow and white body bands	Nose threads on	Nature of modification is unknown	53
	92 Special* 1			Nose fuze pocket modified to receive large nose time fuze					
	Modified 92	76 $\frac{3}{4}$ "	46"	11 $\frac{3}{4}$ "					
	3*						Tail threads on		
500 Kg.	1				Picric Acid	Black with red tipped nose; yellow and white body bands	Nose threads on. Special tail fuze pocket for A/W	Nature of modification is unknown	54
	1 Modified*	75 $\frac{1}{2}$ "	45 $\frac{3}{8}$ "						
	92						Nose threads on.		
	92 Special 1	99 $\frac{3}{4}$ "	57 $\frac{5}{8}$ "	15"			Tail threads on		
1,000 Kg.	3*				Picric Acid	Black with red tipped nose; yellow and white body bands	Nose threads on. Special fuze pocket for A/W	Nature of modification is unknown	55
	1*						Tail threads on		
	1 Modified*								
	95*								
3*									
ANTISHIPPING									
30 Kg.	99	33 $\frac{1}{2}$ "	19 $\frac{1}{2}$ "	5 $\frac{1}{4}$ "	Cyclonite/TNT	Black with red tipped nose; yellow and white body bands	Nose threads on. Full length sheet steel struts welded to tail	Apparently a field improvisation. Effectiveness against shipping doubtful	57

100 Kg.	3	52½"	31¾"	9½"	Picric Acid.	Black with red tipped nose, yellow or yellow and white body bands. Type number and use (skipping) stencilled on body. 跳飛	Tail threads on. Full length sheet steel struts welded to tail. Some have heavy internal reinforcing plate bolted just forward of junction of tail cone and barrel.	68
250 Kg.		76¼"	46"	11¾"				69
100 Kg.		53¼"	31½"	9½"		Black overall, red nose and yellow body bands. Use (skipping) and type number may be stencilled on body.	Tail is tubular with thickened end similar to Navy Mk 8 "Skipping" bomb.	60
250 Kg.		76"	34¼"	12"	Picric soaked with TNT.		Tail threads on. Internal reinforcing ring bolted at aft junction.	61
500 Kg.	4	99¾"	57½"	15"				62
800 Kg.*								
200 Kg.*								
400 Kg.*	Experimental AP							

20 and 30 cm. Howitzer shells tested as AP bombs. Documents say tests satisfactory and service model being prepared.

#### CHEMICAL

1 Kg.	93	13½"	8½, 6"	2½"	Thermite and HE	Black overall	Magnesium nose and body, steel tail	Internal inertia striker	63
5 Kg.	100	15¾"		3¾"	Thermite and black powder	Black forward body, tin aft	Two sections screwed to central wooden striker assembly housing	Internal inertia striker	64
12 Kg.	97	25¾"	11¾"	3¾"	Black powder, pressed thermite	Black overall, white body band	Nose threads on, tail cone friction fit		65
50 Kg.	92	45"	26¾"	7½"	Chemical gas (50/50 Lewisite Mustard)	Grey overall, red and blue nose bands yellow-white-yellow body bands	Nose piece attached by three dowel pins	Secondary internal striker in nose. Recovered only in CBI theater	66
	97				White phosphorus and rubber pellets	Grey overall, yellow and white body bands			67

See footnotes at end of table.

JAPANESE ARMY BOMBS—Continued

Weight classification	Japanese Type No.	Overall length (less fuze)	Body length	Body diameter	Filling	Color and markings	Construction	Remarks	Fig. No.
50 Kg.	100 *	40½"	23½"	7¼"	Gas	Grey overall, red tipped nose, yellow - white double width yellow body bands	Nose piece attached by three dowel pins	Based only on finding smoke bomb with gas markings painted over	68
					Smoke (FS)	Grey with red nose band; marked <b>4</b>			
					White phosphorus and rubber pellets	Grey overall with red nose band, white body band marked <b>7</b>			
									70

CHEMICAL—Continued

SPECIAL

½ Kg.	40 mm. cluster Bomb.	10¾"	4¼"	1½"	Cyclonite/TNT	Black with yellow band	HE body screws to aluminum body and tail. Shaped-charge nose	Type 3, 30 Kg. cluster carries 30 bombs	71
0.4 Kg.	To <b>2</b> Long and Short	41¾"		2½"	Cyclonite/TNT	Black with red band around nose	Two-piece steel case	Type 2, 50 Kg. cluster carries 70 bombs	72 & 73
½ Kg.	To <b>3</b>	43½"	23¼"	2½"	Cyclonite/TNT	Black with red tipped nose; yellow body band.	One-piece, tail fins welded to body	A.A. bomb suspended on steel cable below two parachutes; all-ways action fuze	74
Pamphlet Container		37"	18¾"	7¾"	Pamphlets	Light brown over-all	Cardboard body split longitudinally	63 bombs per cluster	75 & 76
Pamphlet Container		49"	26"	9½"	Pamphlets	Light brown over-all	Cardboard body split longitudinally	50 Kg. size	77
								100 Kg. size	78

Aircraft Missile	1	8½"	5½"	5½"	Black powder burster surrounding flash producing pellets	Black over-all	Water-proofed pressed paper sphere	Thrown by hand. Pellets may produce low order explosion. Friction igniter	79
Rocket Bomb	Ro3*								

SUBSTITUTE

10 Kg.	94	27½"	18¾"	4"	Black powder	Black over-all, red tipped nose.	Concrete case; base plate threads in		80
15 Kg.	97	24"	14½"	4"	Picric acid	Black over-all, red tipped nose, yellow and white body bands.	Case walls filled with concrete and steel pellets. Tail suspension lug.	"fragmentation" by Japanese, included here because of construction similarity.	81
30 Kg.	1	31½"	20"	5½"	Black powder and pyrotechnic mixture.	Black over-all, red tipped nose.	Case walls filled with concrete and steel pellets.	代 (Substitute) appears on case.	82

PRACTICE

4Kg.	95	26"	16½"	4½"	Spotting charge in tail.	Black over-all.	Concrete nose, light steel body around wooden rod.	Contains internal striker and spotting charge.	83
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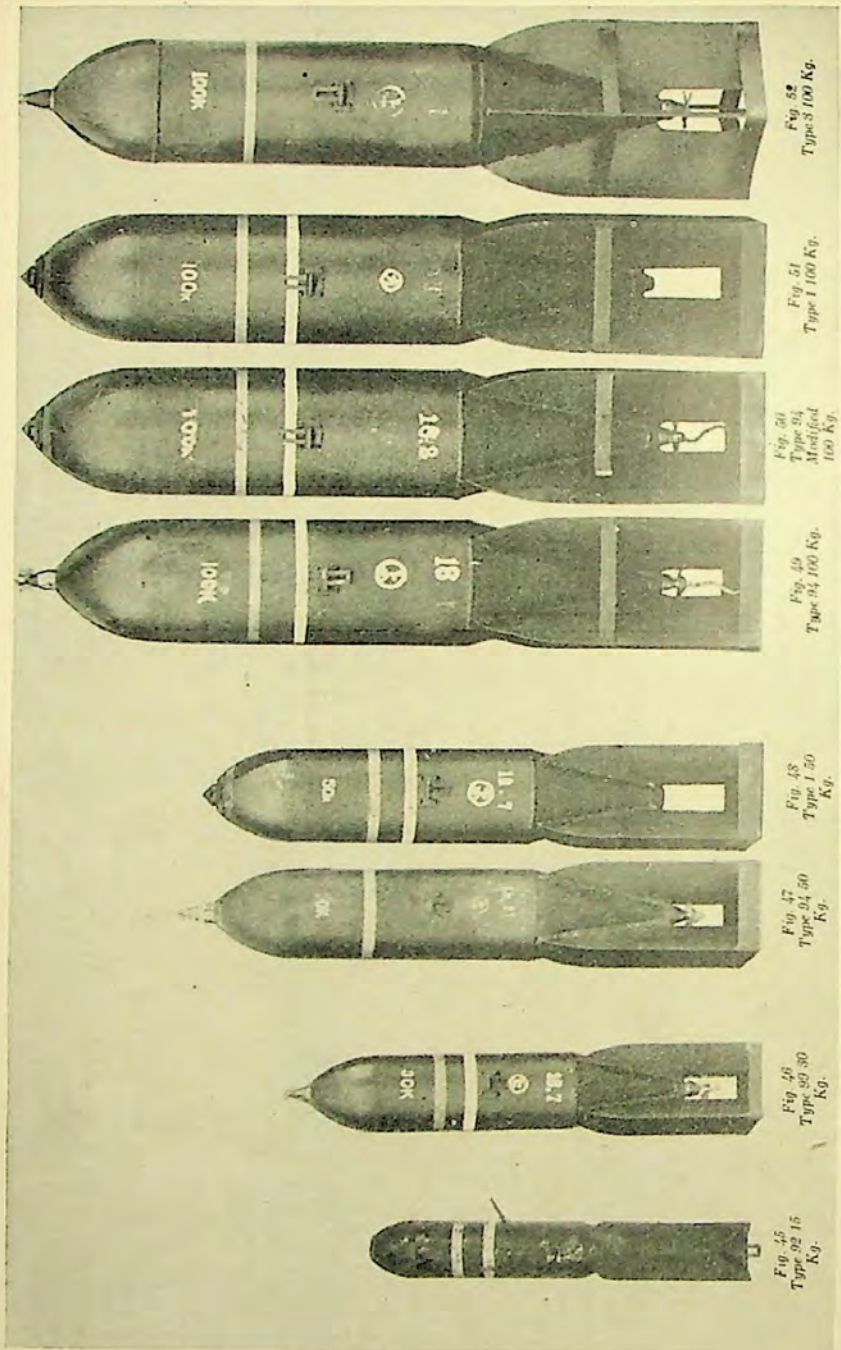
\*1 "Inrecovered.

2 "Special" bombs differ only in having the filling cast directly into the case. So far only TNT and Cyclonite/Ammonium nitrate have been observed. 3 30, 50, and 100 kg. impact-fuzed bombs may have tail brakes added to be dropped as part of a mixed load with Type 1 time bombs of the same size. Only 100 Kg. bombs of this type have been observed.

A nose attachment and a tail parachute may be added to impact-fuzed 15, 30, and 50 kg. H. E. and 50 kg. incendiary bombs for minimum altitude bombing to produce a burst on the surface of the ground. None have been recovered. Documents recommend alternate use of the B-1 (b) tail fuze and nose plug, D-5 (a) nose fuze and tail plug.

4 The pocket for the E-1 (a) antithdrawal tail fuze in Type 1 bombs is distinguished by an annular groove below the threads.

5 According to documents the color of the double-width band indicates the type of gas: yellow—blister gas, green—tear gas, red—vomiting gas, blue—choking gas, brown—blood and nerve poisons.



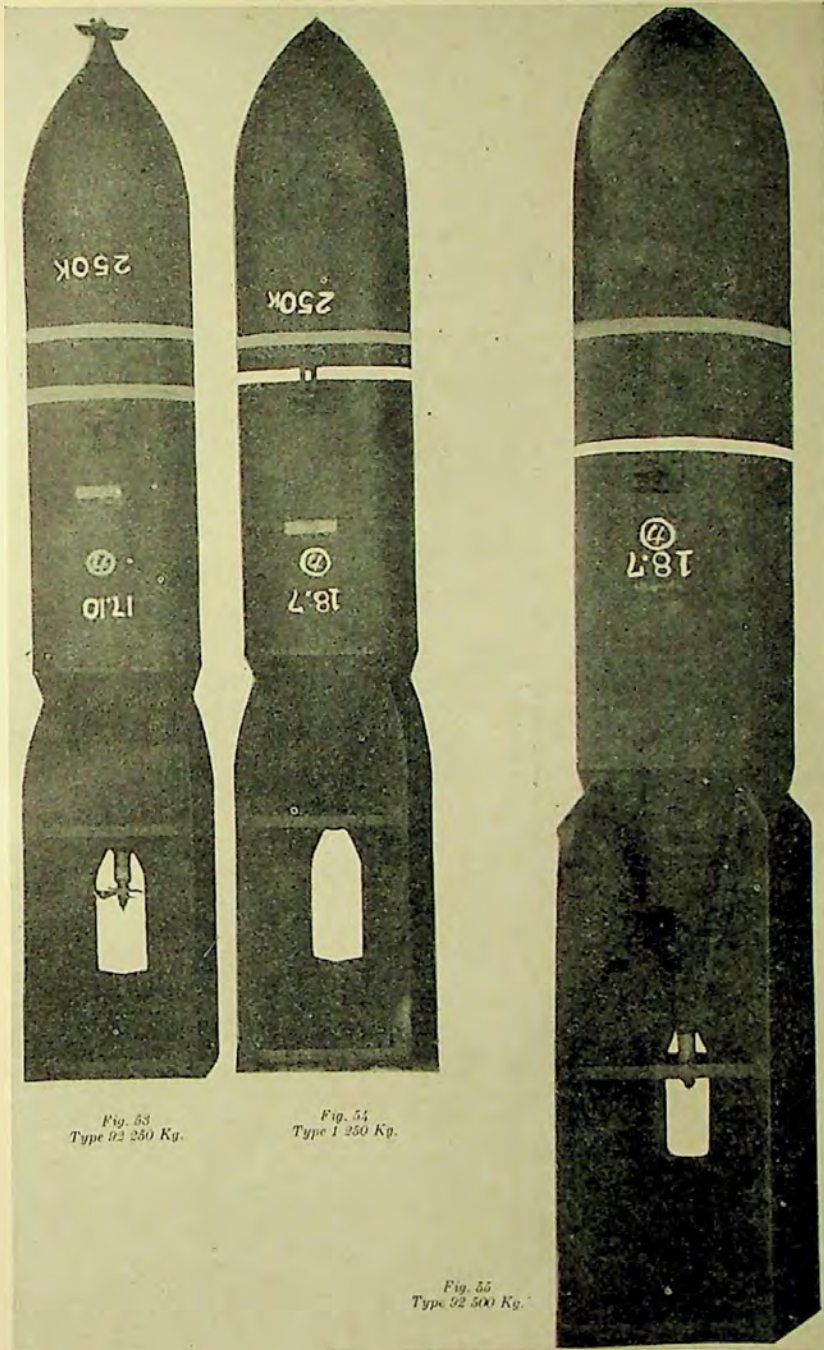


Fig. 53  
Type 92 250 Kg.

Fig. 54  
Type 1 250 Kg.

Fig. 55  
Type 92 500 Kg.



Fig. 56  
Type 52 200 Kg. with  
nose cord



Fig. 58  
Type 3 100 Kg. "Skipping"



Fig. 57  
Type 40 30 Kg.  
"Skipping"



Fig. 59  
Type 3 250 Kg.  
"Skipping"



Fig. 60  
Type 4 100 Kg. Anti-  
Shipping



Fig. 61  
Type 4 250 Kg. Anti-  
Shipping



Fig. 62  
Type 4 500 Kg. Anti-  
Shipping

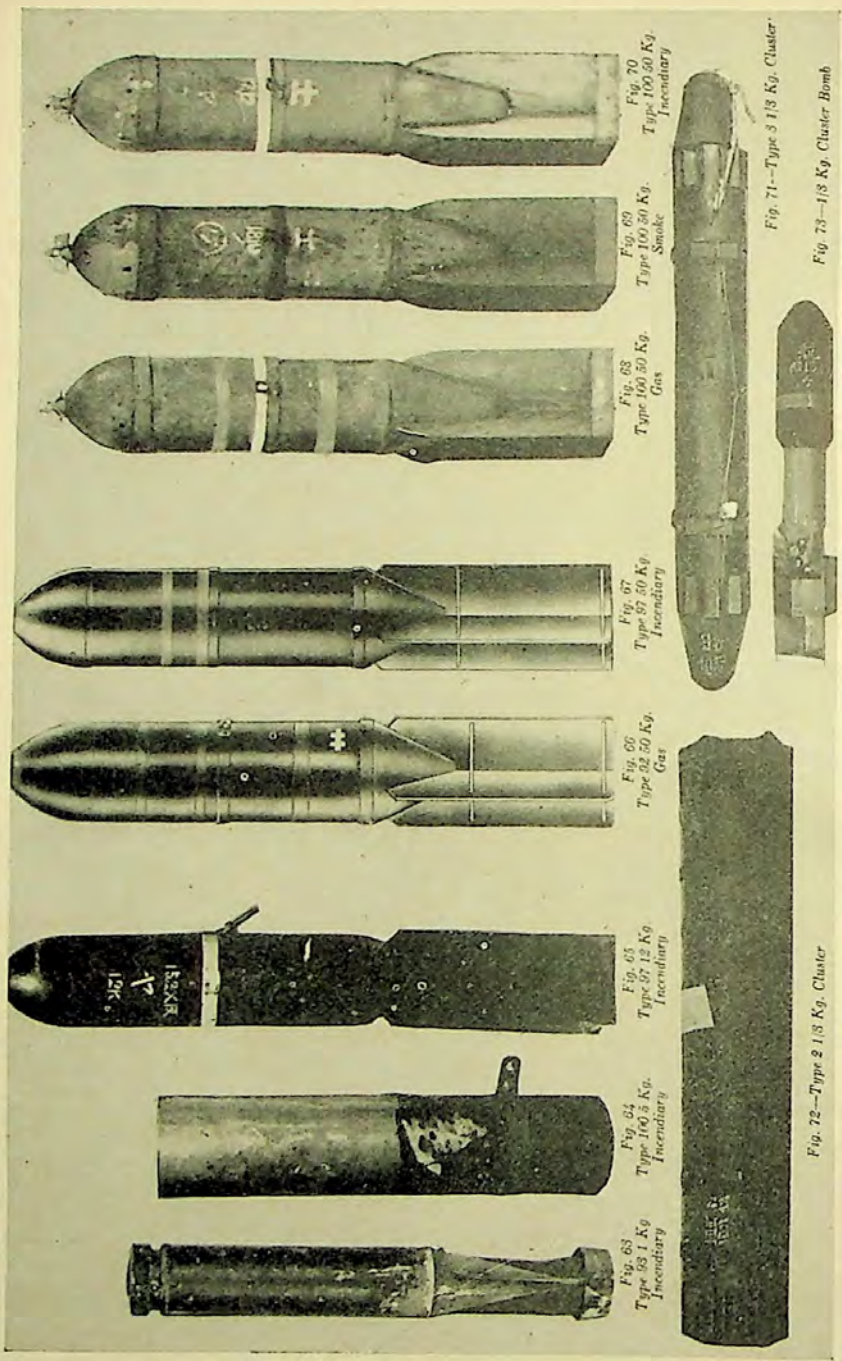


Fig. 70  
Type 100.50 Kg.  
Incendiary

Fig. 69  
Type 100.50 Kg.  
Smoke

Fig. 68  
Type 100.50 Kg.  
Gas

Fig. 67  
Type 97.50 Kg.  
Incendiary

Fig. 66  
Type 92.50 Kg.  
Gas

Fig. 65  
Type 97.12 Kg.  
Incendiary

Fig. 64  
Type 100.5 Kg.  
Incendiary

Fig. 63  
Type 93.1 Kg.  
Incendiary

Fig. 71—Type 3 18 Kg. Cluster

Fig. 73—18 Kg. Cluster Bomb

Fig. 72—Type 2 18 Kg. Cluster



Fig. 74  
To 2 Long and  
Short



Fig. 75  
To 3 Container



Fig. 77  
50 Kg.  
Pamphlet  
Container



Fig. 78  
100 Kg.  
Pamphlet  
Container



Fig. 76  
1/2 Kg. To 3 Container Bomb



Fig. 80  
Type 94 10 Kg. Substitute



Fig. 81  
Type 97 15 Kg.  
Fragmentation



Fig. 82  
Type 1 30 Substitute



Fig. 83  
Type 95 4 Kg. Practice



Fig. 79  
Type 1 Aircraft Missile

## ARMY BOMB FUZES

Japanese fuzes are given an Allied designation consisting of three parts:

- (1) A capital letter—
  - A—nose impact fuze.
  - B—tail impact fuze.
  - C—time fuze (nose or tail).
  - D—airial burst fuze (nose or tail).
  - E—protective fuze (nose or tail).

(2) A numeral indicating approximately the order of recovery by Allied forces, within the general classification of A, B, C, D, or E.

(3) A small letter indicating whether the fuze is the first, second, etc., example recovered of a basic design. Thus, the difference between an A-2 (a) and an A-2 (b) is roughly equivalent to the difference between modifications of a certain mark of U. S. Navy ordnance.

Since this system of designation takes no account of the distinction between Army and Navy ordnance, and since in many cases the order of recovery is far different from the order of development by the Japanese, a knowledge of the Japanese fuze designations is important for coordinating intelligence.

Japanese Army bomb fuzes are distinctive from those of the Navy. Individual Army fuzes are interchangeable in Army bombs, but cannot be used in Navy bombs.

Army fuzes may be distinguished by (1) holes in the arming vanes for arming wires, (2) safety forks usually fitted over the vanes into holes in the top of the fuze body. In all but the A-2 (b) and A-6 (b), the primer is contained in the fuze and not the gaine.

Unrecovered fuzes, reported in recent documents, include the Type 3 tail impact fuze (replaces B-1 (a)), a Type 1 aerial burst tail fuze which is probably similar to the D-5 (a), and 0.2-second delay tail fuze for AP bombs.



Fig. 84  
A-2(a)  
(Type 93 Inst.-Short  
Delay Nose Fuze)



Fig. 85  
A-2(a) with black  
powder garnie  
(Type 93 Inst.-Short  
Delay Nose Fuze)



Fig. 86  
A-2(b)  
(12th Year Type Inst.-  
Nose Fuze)

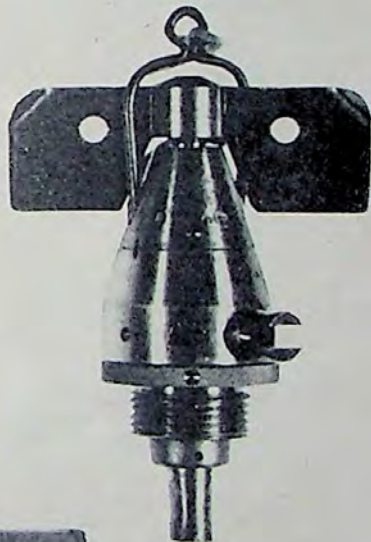


Fig. 87  
A-2(c)  
(Type 99 Inst.-Short Delay  
Nose Fuze, mechanically  
selected in plane)

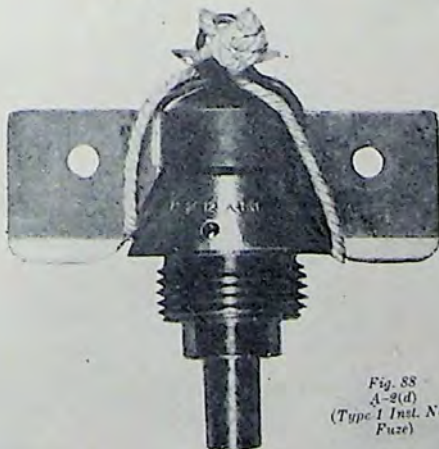


Fig. 88  
A-2(d)  
(Type 1 Inst. Nose  
Fuze)

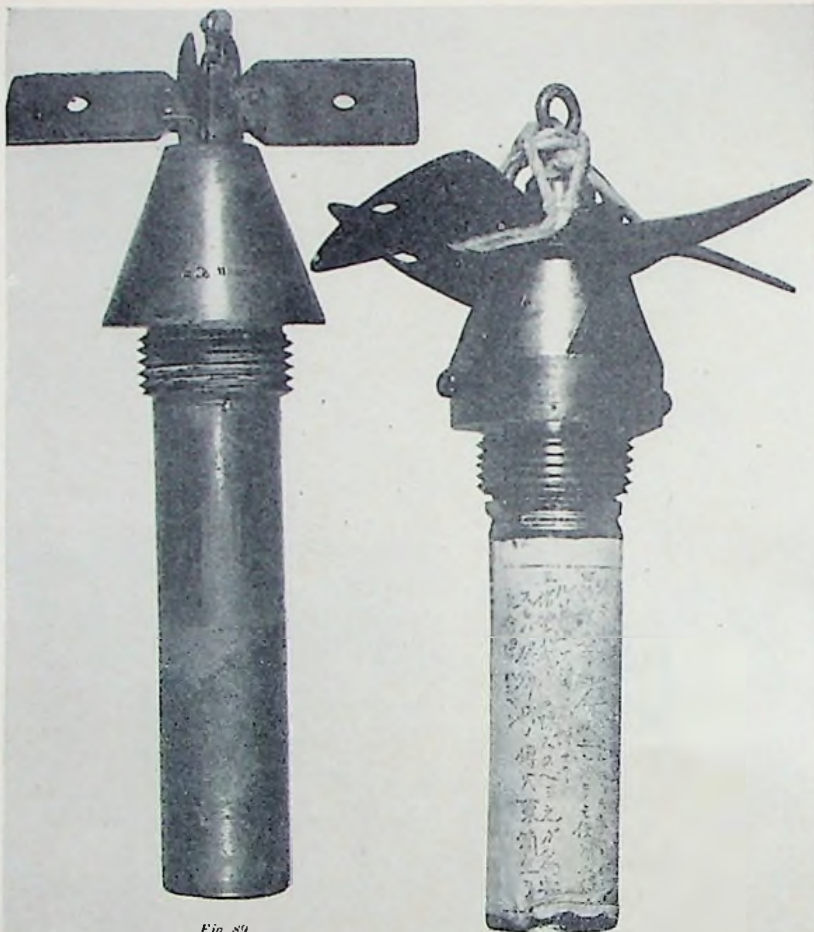


Fig. 89  
A-4(a)  
(Type 92 Large Bomb Nose Fuze)

Fig. 93  
A-8(a)  
(Type 4 2-second delay Nose Fuze)



Fig. 90  
A-9(a)  
(Type 3 Small Inst. Nose Fuze)



Fig. 91  
A-6(b)



Fig. 92  
A-7(a)

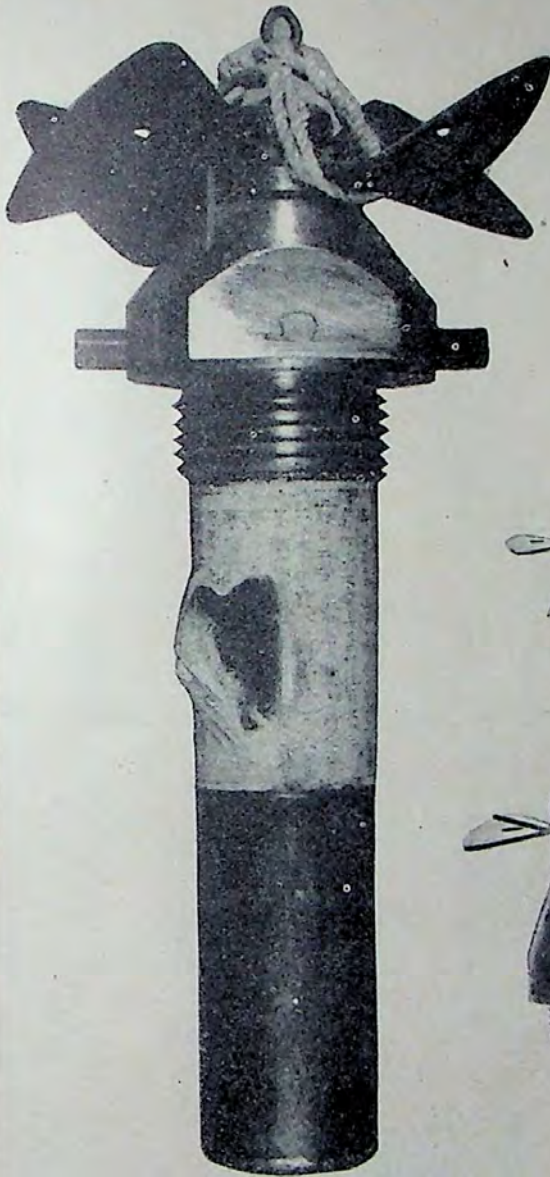


Fig. 94  
A-5(b)  
(Type 1 2-second delay Nose  
Fuze for Large Bombs)

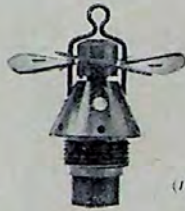


Fig. 95  
B-1(a)  
(12th Year Type  
Tail Fuze)



Fig. 96  
B-1(b)  
(Type 1  
15-second delay  
Tail Fuze)

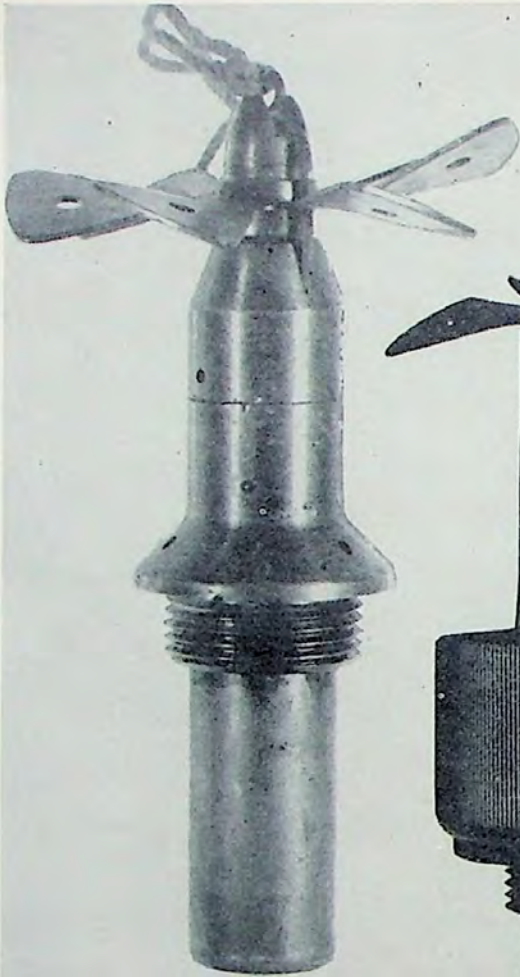


Fig. 97  
B-4(a)  
(Type D2 Large Bomb Tail  
Fuze)

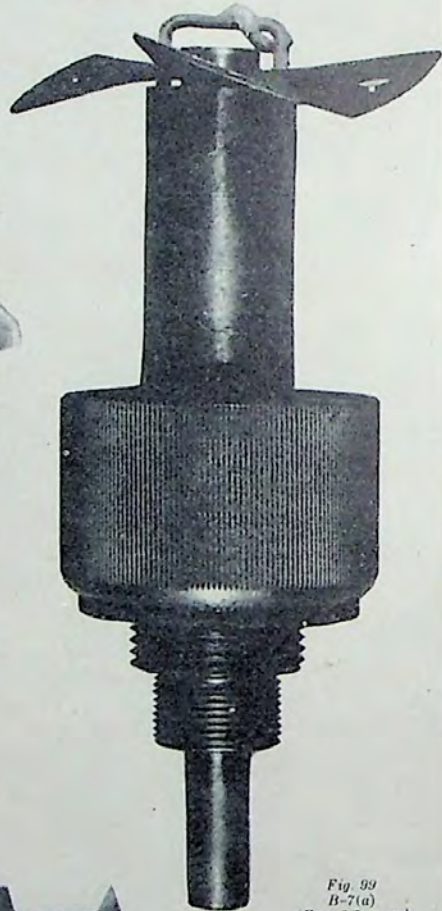
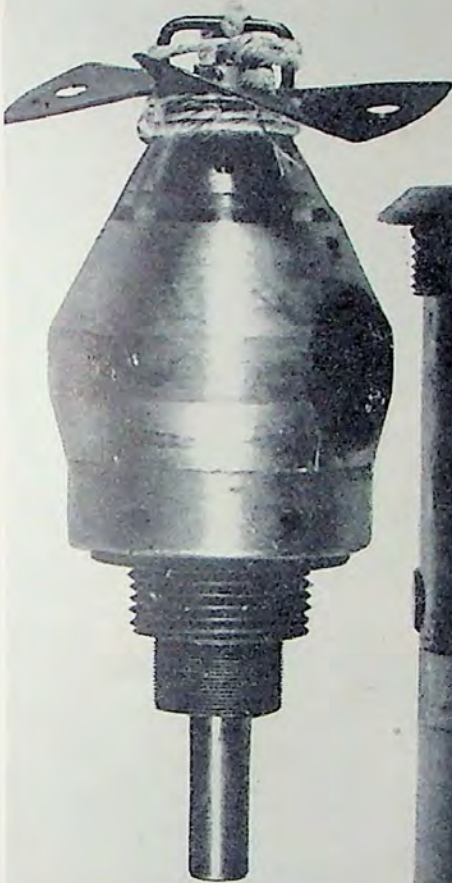


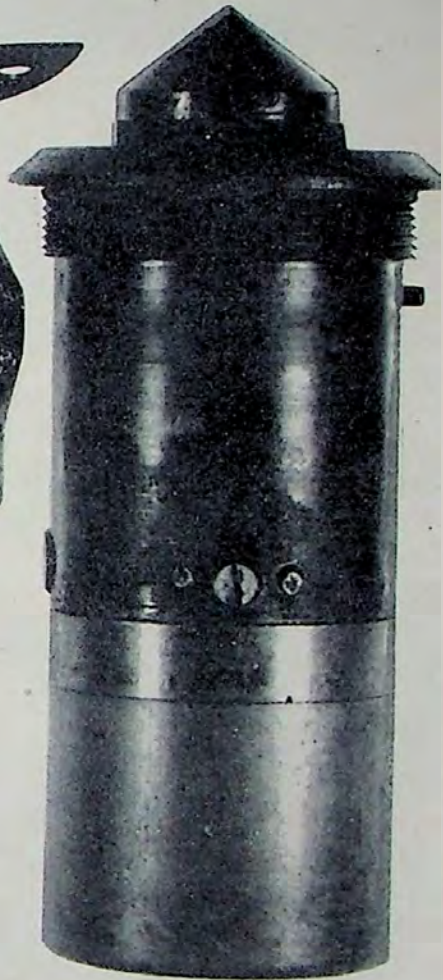
Fig. 99  
B-7(a)  
(Exp. 3.5-second  
delay Anti-  
Submarine Tail  
Fuze)



Fig. 98  
B-5(a)



*Fig. 100*  
*B-S(a)*  
*(Type 4 5-second delay Tail*  
*Fuze)*



*Fig. 101*  
*C-S(a)*  
*(Type 1 Long Delay Nose*  
*Fuze)*

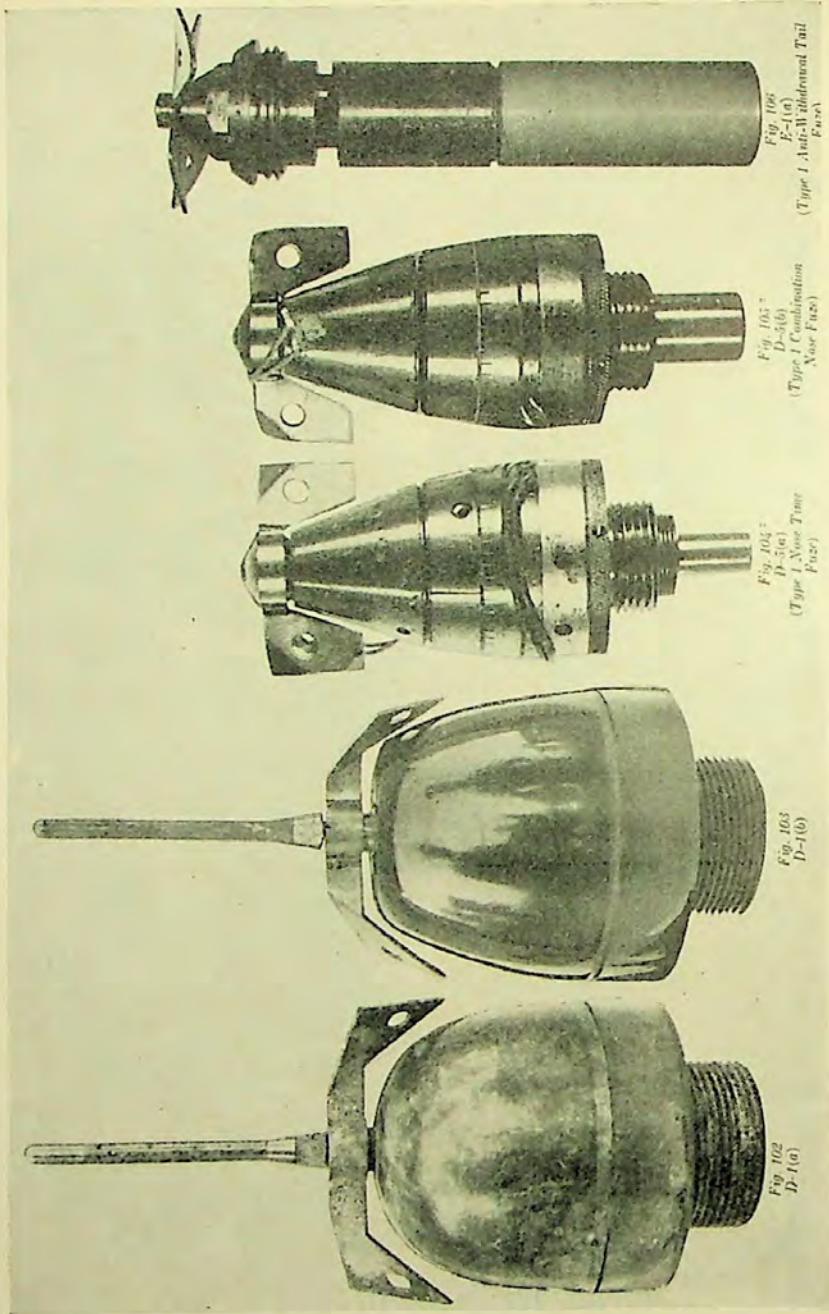


Fig. 106  
E-1(a)  
(Type I Anti-Windblast Tail Fuse)

Fig. 105  
D-5(b)  
(Type I Combination Nose Fuse)

Fig. 104  
D-5(c)  
(Type I Nose-Timer Fuse)

Fig. 103  
D-1(b)

Fig. 102  
D-1(a)

<sup>1</sup> The C-3 (a) is the only recovered Japanese Army time fuze. Its size, and the large bomb fuze pocket it requires, are always distinctive. Differing characters appearing on the head of the fuze, and the packing containers, indicate increasing delay times. Tests have given the average time as follows:

A 甲 —38 minutes    B 乙 —4-9 hours    C 丙 —12-14 hours    D 丁 —15-23 hours

<sup>2</sup> D-5 (a) nose fuzes use the H. E. gaine and are used in bombs through 100 kg. for air-to-air bombing. D-5 (b) nose fuzes use the black powder magazine and incorporate an additional striker to function on impact if the aerial burst feature fails. D-5 (b) fuzes are used in parachute flares and the pamphlet container.

PROBABLE ARMY BOMB FUZING

Type	Weight (Kg)	Nose	Tail
------	-------------	------	------

GENERAL USE

92	15	A-2 (b), A-2 (d)	None
92 Special			
99	30	A-2 (a), A-2 (c)	B-1 (a)
		Plug	B-1 (b)
94, 94 Special, 3	50 100	A-2 (a), A-2 (c)	B-1 (a)
		Plug	B-1 (b)
92, 3	250 500	A-1 (a)	B-1 (a)
		Plug	B-1 (b)
95, 3	1,000	A-1 (a)	B-1 (a)
		Plug	B-1 (b)
Modified 94	50 100	C-3 (a)	Plug
Modified 92	250		
1	30	C-3 (a)	E-1 (a)
1, 1 Modified	50		
	100		
	250		
	500		

CHEMICAL

93	1	Internal striker	None
100	5	Internal central striker	
97	12	A-2 (a), B. P. magazine	None
92, 97, 100	50	A-2 (b), A-2 (d)	None

SPECIAL

40 mm cluster	½	None	B-5 (a)
To 2	0.4	A-7 (a)	None
To 3	½	A-6 (a), A-6 (b)	None
	Pamphlet containers	D-1 (a), D-1 (b), D-5 (b)	None
1	Aircraft Missile	Pull Igniter	
Ro 3	Rocket Bomb	Type 1 nose or tail time fuze*	

PROBABLE ARMY BOMB FUZING—Continued

Type	Weight (Kg)	Nose	Tail
ANTISHIPPING			
99	30	A-8 (a)	B-8 (a)
3	100		
	250	A-8 (b)	
4 Skipping	100	A-8 (a)	
	250	A-8 (b)	
	500		
Experimental A1*	200		Experimental 0.2-sec. delay AP bomb fuze*
	400		
ANTISUBMARINE			
3	50, 100, 250		B-7 (a)
SUBSTITUTE			
94	10	A-2 (a), B. P. magazine	None
97	15	A-2 (b) A-2 (d)	
1	30	A-2 (a), B. P. magazine	B-1 (a)

\*Unrecovered.

ARMY GAINES

Gaines used with Japanese Army bomb fuzes are shown in Fig. 107. The flash from a primer in the fuze (with the exception of the A-2 (b) and A-6 (b)) ignites the gaine. The A-2 (b) and A-6 (b)

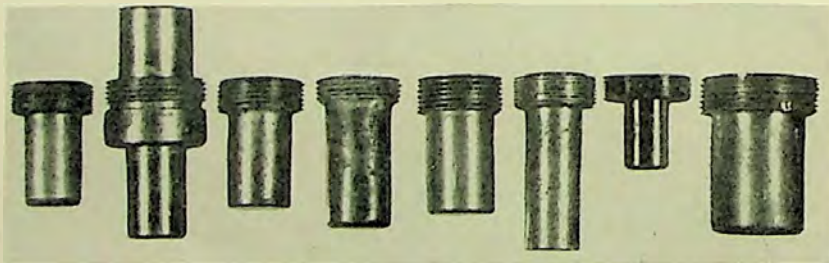


FIGURE 107.

- |         |         |         |         |         |         |         |                  |
|---------|---------|---------|---------|---------|---------|---------|------------------|
| A-2 (a) | A-2 (c) | A-4 (a) | A-6 (a) | A-7 (a) | B-1 (a) | A-8 (a) | D-5 (b) magazine |
| A-2 (b) |         | A-5 (b) |         |         | B-1 (b) |         |                  |
| A-2 (d) |         | B-4 (a) |         |         | B-7 (a) |         |                  |
| C-3 (a) |         |         |         |         | B-8 (a) |         |                  |
| D-1 (a) |         |         |         |         |         |         |                  |
| D-1 (b) |         |         |         |         |         |         |                  |
| D-5 (a) |         |         |         |         |         |         |                  |
| E-1 (a) |         |         |         |         |         |         |                  |

fuzes have no internal primer and the gaine is pierced directly by the striker.

Because of the presence of a sensitive initiator imbedded in or in close proximity to powerful boosting explosives these gaines present a great hazard. Even trained personnel have experienced accidents in stripping them and in the field no attempt at break-down should be made.

Boosters are either contained in a brass cup threaded on to the fuze around the gaine (see fuze photos), or in a paper cylinder housed in the main charge itself.

## II. NAVY BOMBS

The organization of Japanese Navy Air Force bombs follows a peculiar pattern. For this reason, although a good proportion of Navy bombs have been known since early in the war, it has been difficult to classify them in any system useful for intelligence purposes. The recent Central and Southwest Pacific campaigns, however, have yielded valuable captured specimens and documents. Correlation of the two makes it possible to fit the known bombs into the Japanese pattern and to predict with reasonable certainty the characteristics of bombs mentioned in documents but not yet recovered. Numerous points still remain in doubt, but a discussion of what is known will clarify the points where further information is needed.

This section deals with all Navy bombs recovered or for which documentary evidence appears sufficiently complete or reliable to be of value.

### General Description of Navy Bombs

(1) *Designations:* Japanese Navy bombs are divided into land, ordinary, special, target marker, smoke and practice bombs. (Dummy and training bombs are not covered.) Land bombs are regularly a general purpose type, but ordinary bombs do not fit any standard U. S. term. Their smooth cases give superior penetrating qualities to land bombs, but in some instances are no thicker. Land and ordinary bombs are consistently nose fuzed, with tail fuzes in sizes of 250 Kg. and above. Special bombs are for specialized uses. They are designated by mark numbers, each number corresponding to a particular use.

The designation may include all or any of the following: "Type ----," giving the year of adoption; "No. ---," giving weight classification divided by 10 (i. e., "No. 6" for 60 Kg.); the kind of bomb; "model ----," and "modification ----." In bombs of recent manufacture this information ordinarily appears on the bomb body as well as on packing cases and labels.

The method of designating land and ordinary bombs is as follows: the first bomb design in a size is designated by size and kind, i. e., No. 25 land, No. 50 Ordinary Model 2. Model and Mod. are used where appropriate. No Type number is assigned. When a new bomb design in the same size appears, it is assigned a Type number in addition to the other markings, i. e., Type 98 No. 25 Land, Type 2 No. 50 Ordinary Model 1.

In the ordinary bomb series, the streamlined bombs have no type number and are distinguished from the cylindrical bombs by the

designation "Model 2." Cylindrical bombs, manufactured at a later date and designated by "Model 1," have a type number assigned wherever a cylindrical size duplicates a streamlined size.

All special bombs but one have a type number; target marker, smoke, and practice may or may not.

According to documents a new designation system for bombs exists. Bombs already in existence will not be redesignated but new designs will be marked according to the new system.

Mk 0-9	Anti-Shipping
Mk 10-19	Chemical (especially incendiary)
Mk 20-29	Anti-Aircraft
Mk 30-39	Anti-Land

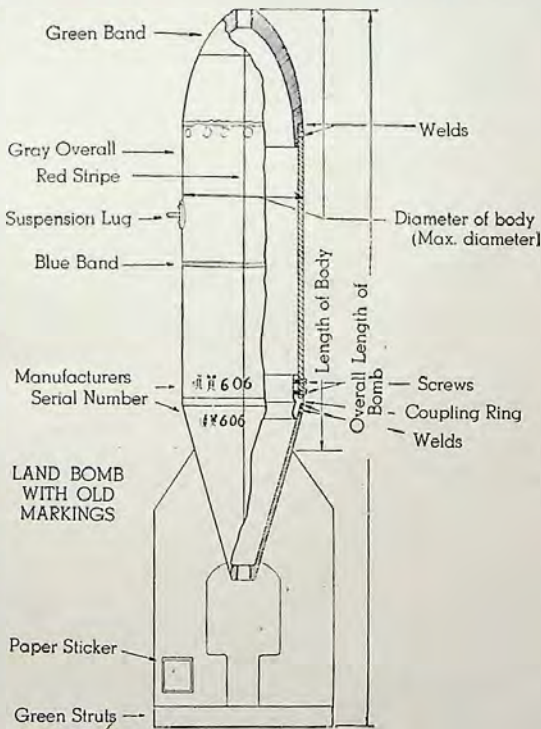


FIGURE 108.

No date is known for inauguration of the new system. Certain relatively new mark bombs such as Mk 8, Mk 27 and 28, and Mk 31 are consistent with this system.

(2) *Construction.*—There are two principal types of body construction. One, which will be called the "land type" (Fig. 108) in the table, is of three-piece construction. The nose is joined to the barrel by

either a combination of riveting and welding or by welding alone. The tail cone is attached by a coupling ring arrangement which permits the cone to be filled with explosive. The cone or the barrel is attached to the coupling ring by rivets or welds and final junction is made by screwing the coupling ring to the other part.

"Ordinary type" (Fig. 109), as used in the table, is of two-piece construction. The nose and barrel are manufactured as one piece.

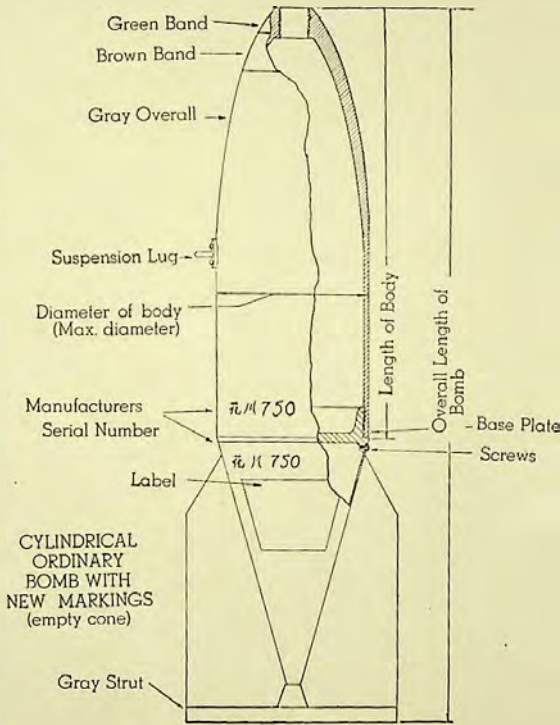


FIGURE 109.

If the tail cone is filled in sizes up through No. 50 it threads into the barrel; in the No. 80 size an interrupted thread arrangement is used. If the cone is empty, a male base plate closes the barrel and the cone is attached to the base plate by threads or screws.

In the case of some chemical bombs using land-type construction, inner cases may be used to contain the chemical filling. Wherever any other type of construction is used, brief detail will be given in the table.

(3) *Suspension.*—Bombs up to and including No. 25 are suspended horizontally by a single U-shaped fixed lug. Some bombs have two lugs 180° apart, but no reason for this is known. Larger bombs are suspended from aircraft torpedo release gear employing two guide studs

located 180° apart on the bomb. Recently, suspension bands have been recovered which permit single lug suspension of No. 25 and larger bombs from Army and Navy bomb racks. (Fig. 110.)

(4) *Filling.*—In some H. E. bombs the fillings are cast directly into the cases which are protected by a heavy lacquer. In other H. E. bombs, and in chemical bombs using an H. E. charge, the explosive is cast into a block, paper wrapped, and usually loaded with the additional insulation of flannel or paraffin.

(5) *Color markings.*—During the war the Japanese Navy changed the scheme of color markings used to indicate type of bombs. The basic body color of service bombs has been and is grey; this color may vary from light grey to dark grey, greenish grey, or almost blue owing to variation of paint or to weathering.

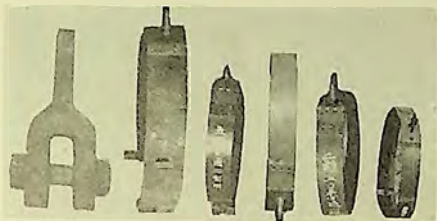


FIGURE 110.—Lug and Suspension Bands.

The old color pattern consisted of painting key colors as a broad band on the nose and on the tail struts. The colors on nose and struts might be and usually were the same. A band slightly aft of the suspension lug may be an additional key. Thin red stripes 180° apart running from nose to apex of tail cone appeared on all service bombs.

In the new scheme all bombs containing explosive have the nose tipped in green. A key color appears as a band immediately behind the green tip. On some special bombs another key color is used on the tail struts, but on the majority of bomb types the struts are the same color as the body. The red stripes and body band are dropped. Additional body bands may appear on No. 80 Ordinary bombs. The meaning of these bands is explained in the table.

In the table, the nose, the body, and the tail strut colors are listed for each bomb. A combination like "Gr/Bv" indicates a nose tipped in green with an adjacent brown identifying band. Body bands are noted where present.

Sufficient types of bombs of recent manufacture have been recovered to confirm the color scheme given in a captured document as the new Navy code. Accordingly, the colors are listed for all type bombs covered in the document even though the bombs may never have been recovered, or recent specimens with the new code may not yet have been observed.

(6) *Size.*—The largest bombs recovered are No. 80 bombs. At present no Japanese plane has been recovered equipped to carry larger bombs. The use of such bombs is thus dependent on the introduction of new bombers or modification of present ones.

JAPANESE NAVY BOMBS

Type bomb	Japanese designation	Over-all length (less fuze)	Body length	Body diameter	Total weight	Filling	Color markings		Construction	Remarks	Fig. No.
							Old	New			
1. Land Bombs (f).	No. 6*	46.03"	9.45"	63.5 kg.	Shimose					Type 69 No. 6 Mk 2 cone with multiple struts. Observed.	
	Type 07 No. 6	40.0"	7.85"	50 kg.	Shimose	Gr Gy, Gr, Red stripes, blue band.	Gr/Br, Gy, Gy.	Land type.	Most common Navy bomb to date. "Daisycenter", effect with inst. fuze.	111	
	Type 2 No. 6 Land Model 5 Container.	41.25"	26.0"		Five 7 kg. HE bombs.		Gr/Br, Gy, Gy.	Empty nose and frame. No control tube. Two sides contain bombs.	Central tube received without explosive never re-covered. Documents report production ceased.	112	
	No. 25	72.0"	35.5"	258 kg.	Type 98	Gr Gy, Gr, Red stripes, blue band.	Gr/Br, Gy, Gy.	Land type.	Documents report production ceased.	113	
	Type 98 No. 25	72.0"	39.6"	238 kg.	Type 98	Gr Gy, Gr, Red stripes, blue band.	Gr/Br, Gy, Gy.	Land type.	May be turned down after assembly to appear smooth on exterior.	114	
2. (a) Ordinary Bombs, streamlined. <sup>3</sup>	No. 80	111.4"	69.5"	795 kg.	Shimose	None noted.	Gr/Br, Gy, Gy.	Land type.		115	
	No. 3 Model 2	33.0"	10.75"	32 kg.	Never reported but probably Shimose.	Gr, Gy, Gr, Red stripes.	Gr/Br, Gy, Gy.	Ordinary Type. Cone empty.		116	
	No. 6 Model 2	42.5"	25.5"	63 kg.	Shimose	Gr, Gy, Gr, Red stripes.	Gr/Br, Gy, Gy.	Ordinary Type. Cone empty.	Documents report production ceased.	117	
	No. 25 Model 2	71.25"	44.75"	254 kg.	Shimose	Gr, Gy, Gr, Red stripes.	Gr/Br, Gy, Gy.	Ordinary Type. Cone filled.	Some specimens on Tarawa were concrete filled. Production ceased.	118	

	No. 50 Model 2.	90.0"	45.0"	16.5"	490 kg.	Type 98.	None noted.	Gr/Br, Gy, Gy.	Ordinary Type. Cone filled.	119
	No. 100 Model 2.					Shimose.		Gr/Br, Gy, Gy.	Ordinary Type. Cone filled.	
(b) Ordinary Bombs, cylindrical.	Type 99 No. 6 Model 1.	42.25"	25.8"	8.9"	63 kg.	Shimose.	Gr, Gy, Gr. Red stripes.	Gr/Br, Gy, Gy.	Very common. "Daisy-cutter" effect with inst. fuse.	120
	Type 99 No. 25 Model 1.	68.0"	39.75"	11.5"	245 kg.	Type 91.	Gr, Gy, Gr. Red stripes.	Gr/Br, Gy, Gy.	Known as "Pearl". Three trap doors in cone for access to fuse.	121
	Type 2 No. 50 Model 1.	78.0"	38.5"	15.5"	490 kg.	Type 07.	None noted.	Gr/Br, Gy, Gy.	Heavy bomb, less than 15% loading factor. Slightly streamlined. Three trap doors in cone.	122
	No. 80 Model 1.	111.5"	62.0"	17.5"	827 kg.	Type 91.	Gr, Gy, Gr. Red stripes.	Gr/Br, Gy, Gy. Blue band at ft of guide stud.	Green band indicates Mod 3, blue band, Mod 4.	123
	Type ---, No. 100 Model 1.					Shimose.		Gr/Br, Gy, Gy.	Ordinary Type. Cone filled.	
3. Mk 1 Bombs, Gas.	Type 1 No. 6 Mk 1 Land.					Mk 2 nonpersistent gas.	None noted.	Gr/Yel, Gy, Yel.	Type 97 No. 6 Land body.	
	No. 6 Mk 1 Land.	42.21"		9.45"	69 kg.	Type 98 Mk 3 persistent gas.	None noted.	Gr/Yel, Gy, Yel.	Type 99 No. 6 Mk 2 body without multiple struts.	
4. Mk 2 Bombs, Antisubmarine.	Type 90 No. 6 Mk 2 (no mod) and Mod 1.	42.25"	21.0"	9.4"	63.6 kg.	Type 98.	Blue, Gy, Blue. Red stripes.	Gr/Yel, Gy, Gy.	Multiple tail strutting, nose boss. Mod 1 same except for addition of antiricochet ring.	124 and 125
	Type 1 No. 25 (no mod) and Mod 1.	71.75"	35.65"	14.0"	292 kg.	Type 98.	Blue Gy, Gy.	Gr/Blue, Gy.	No. 25 Land bomb body carrying light sheet metal fins to which a plywood streamer is bolted. Mod 1 has an antiricochet ring.	126, 127 and 128

See footnotes at end of table.

JAPANESE NAVY Bombs—Continued

Type bomb	Japanese designation	Over-all length (less fuze)	Body length	Body diameter	Total weight	Filling	Color markings		Construction	Remarks	Fig. No.
							Old	New			
5. Mk 3 Bombs, Aerial Burst in secondary Shrapnel.	Type 99 No. 3 Mk 3 (no mod) and Mod 1.	24.4"	13.4"	5.75"	32 kg.	Shimose, WP filled steel pellets.	Silver, Gy, Silver, Red stripes.	Gr/Silver, Gy, Red.	Ordinary Type. Cone filled with H. E.	Tail fins bent for spin. Primary use against bomber formations. Noed J has body fins for quicker spinning.	129 and 130
	Type 3 No. 6 MK 3	40.0"	21.0"	7.8"	53 kg.	Type 98, WP filled steel pellets.	None noted	Gr/Silver, Gy, Red.	Land Type.....	Tail fins offset for spin. No nose fuze.	131
	Type 2 No. 25 MK 3 Model 1.	69.0"	39.0"	12.0"	250 kg.	Ignition powder, steel tubes with intensive incendiary mixture.	Silver, Gy, Red, Red stripes.	Gr/Silver, Gy, Red.	Land Type.....	Tail fins offset for spin. Body similar to Type 98 No. 25 Land except for thickness of barrel.	132
6. Mk 4 Bombs, Rocket Bombs.	Type 99 No. 3, Mk 4 Practice.				33 kg.					Known only from documents and POW interrogation. Nose fuzed. Two athwartship igniting devices at junction of bomb and motor ignite propellant after bomb is dropped.	
	Type 3 No. 25, Mk 4.	74.17"		11.81"	295.4 kg.			(Gr/White, Gy, Red.		Known only from documents and POW interrogation. Believed to be AP with tail fuze only. Igniting device same as above.	
7. Mk 5 Bombs, Armor Piercing.	Exp. 14 No. 50, Mk 4.										
	Type 99 No. 80, Mk 5.	92.1"	48.3"	16.1"	746 kg. (less tail)	Type 91.	None noted.	Gr/White, Gy.	Ordinary Type. Cone empty.	Converted projectile body. Two tail fuzes. Documents report production ceased.	133

Type 2 No. 80, Mk 5 Model 1.	91.45"	15.9"	\$17.2 kg.			Gr/White, Gy	Ordinary Type. Cone empty.	Sketched in documents. Appears similar to Type 99 except for enlarged filling cavity.	-----
Type 3 No. 150, Mk 5.	108.11"	19.08"	1,408.6 kg.			Gr/White, Gy		Reported to be in manufacture in January 1944.	-----
Type 98 No. 7, Mk 6 Model 1.	40.0"	8.85"		4 electron fire pots, black powder and first fire charge.	Red Gy, Red, Red stripes.	Gr/Red, Gy	Land Type.	Uses same case as Type 97 No. 6 Land bomb.	134
Type 98 No. 7, Mk 6 Model 2.	42.25"	9.4"		Solid oil mixture, thermite igniting tube, black powder nose charge.	Red Gy, Red, red stripes.	Gr/Red, Gy Red.	Land Type.	Type 99 No. 6 Mk 2 case without multiple struts.	-----
Type 1 No. 7 Mk 6 Model 3 (no mod) and Mod 1.	42.25"	9.4"	77 kg.	H. E. burster tube, 520 rubber pellets impregnated with iron and aluminum.	Red Gy, Red, Red stripes.	Gr/Red, Gy Red.	Land type.	Uses Type 99 No. 6 Mk 2 case without multiple struts. Mod 1 has 182 cylindrical rubber pellets impregnated with iron and aluminum.	135
9. Mk 7 Bomb, Baellus.				Bacteria		Purple, Gy Purple.		Reported in documents. POW says 1 kg. Practice Bomb case used.	
10. Mk 8 Bomb, Antishipping.	67.4"	11.8"	281 kg.	Type 97		Gr/Br, Gy, Gy		Body similar to Type 98, No. 25 Land case with four thickened, hollow fins welded to explosive filled, tubular tail. No tail fuse pocket.	136
11. Mk 16 Bomb								This Mark number was assigned to a time-fuzed bomb designed to drop a currain of flak in front of enemy plane formations.	

See footnotes at end of table.

JAPANESE NAVY BOMBS—Continued

Type bomb	Japanese designation	Over-all length (less fuze)	Body length	Body diameter	Total weight	Filling	Color markings		Construction	Remarks	Fig. No.
							Old	New			
12. Mk 18 Bomb*										This Mark number was assigned to a bomb which could be armed and dropped directly on parked aircraft or sea-planes at anchor.	
13. Mk 19 Bomb, Rocket type*					7.5 kg.					A rocket type bomb fired at bomber formations by fighters. Reported replaced by Mk 28.	
14. Mk 21 Bomb, Container for 1 kg. bombs.	Type 2 No. 6, Mk 21 Model 1.	41.0"	36.25"	9.5"		Black powder nose charge, 40 1 kg. hollow charge bombs.	None noted.	Gr/Br, Gy, Gy.	Blunt nose and tail pieces, and side sections held by straps and locked by wires attached to nose.	Aerial burst fuze ignites black powder charge to open container. B-5 (b) fuze in 1 kg. bombs. Small bombs filled with Type 08. Documents report production ceased.	137 and 138
15. Mk 22 Bomb, Spike Bomb Container.	Type 2 No. 6, Mk 21 Model 2.  Exp. 18 No. 80, Mk 22*.	42.25"	36.25"	9.5"	40 kg.	Black powder nose charge, 36 1 kg. bombs not hollow charge.  19 spike bombs	None noted.	Gr/Br, Gy, Gy.	Similar construction but only 3 side pieces.	Operation the same as B-5 (c) fuze in 1 kg. bombs. Small bombs filled with Type 97.	139 and 140
16. Mk 23 Bomb, Time Bomb.	Type 3 No. 6, Mk 23, Model 1.	40.7"	21.8"	7.85"		Shimose. Type 98		Gr/Br, Gy, Gy.	Land type	Sketched in documents. Container apparently fuzeless. Spike bomb has nose time fuze, tail A/D fuze.	
									Land type	Type 97 No. 6 Land bomb with nose ring and tail brake.	141

17. Mk 24 Bomb, Container for parachute bombs.	Exp. 18 No. 6, Mk 24*.				5 parachute bombs.				Sketched in documents. Appears to be amicable although method of opening container not apparent.	142
18. Mk 25 Bomb, Wedge bomb container.	Exp. 18 No. 4.5, Mk 25*.				3 wedge-shaped bombs about 15 kg. size.				Sketched in documents. Wedge bomb has A/D nose fuze. Documents suggest alternate loading of 0.5 kg. (not clear) bombs with an A/D nose fuze.	143
19. Mk 26 Bomb, Time Bomb.	Exp. 18 No. 25, Mk 26*.							Land type with double nose.	Sketched in documents. Nose charge is supposed to prevent penetration of the remainder of bomb, which is time fuzed.	
20. Mk 27 Bomb, Incendiary.	Type 4, No. 6, Mk 27*.								Briefly mentioned in documents as a Rocket Type Aerial Burst bomb containing white phosphorous.	
21. Mk 28 Bomb, Rocket Type.	Type 3, No. 1, Mk 28*.					7.7 kg.			Rocket bomb carried by fighters for use against bomber formations. Formerly the Mark 19 bomb.	
22. Mk 31 Bomb, Possibly Influence Type.	Type 3, No. 25, Mk 31 Model 1.	62.0"	30.25"	11.75"	Type 98.	171.8 kg.		Grey over-all.	No firing mechanism recovered. Nose threads take Type 3 Electric fuze. Bombs as recovered are tail heavy, probably take heavy nose firing device which may be influence type.	142
	Type 3, No. 80, Mk 31 Model 1.	113.13"	71.13"	17.25"	Type 98.	718.9 kg.		Grey over-all.		143

See footnotes at end of table.

JAPANESE NAVY Bombs—Continued

ROCKET BOMB

Type bomb	Japanese designation	Over-all length (less fuse)	Body length	Body diameter	Total weight	Filling	Color markings		Construction	Remarks	Fig. No.
							Old	New			
23. Baka Bomb, Warhead.	Large bomb body for military use.	68.5"		23.5"	1,200 kg.	Type 91.....		Gr/Br. Gy, Red base plate.	Larger version of No. 80. Lead case closed by threaded base plate, no tail.	Warhead for use in piloted rocket bomb, carried for use (fuses armed by pilot and an air arming nose fuse).	144 & 146

TARGET MARKER

24. Target Marker Bomb.	Type 3, No. 6....	42.25"	21.0"	9.5"	70.3 kg.	Type 98 nose charge, 3 canisters containing WP filled steel pellets.		Red Gy, Red.....	Lead type.....	Dististinguished by 4 external annular longitudinal grooves 90° removed. Type 99 No. 6 Mk 2 bomb case without multiple struts.	146
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ANTI-RADAR

25. Window Bomb.	Silver Paper Scattering Bomb.	37.0"		1.75"	2 kg.	Delay element, ejection charge, metal coated paper strips		Grey over-all.....	Sheet metal barrel closed by nose and end cap. Four fins.	Pull igniter actuated, bomb thrown out of plane by hand, delay element causes aerial burst. Metal coated strips provide false target for our radar.	147
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SMOKE AND PRACTICE

26. Smoke Bomb	No. 3, Model 2 <sup>a</sup> A & B.					Black powder elec- tion charge, picric burst, white phos- phorous main charge.	Gr/Black, Gy.	Scanty documentary information only.	148
	Type 99 No. 3, Model 1 <sup>a</sup> .					Same except has red phosphorous main charge.	Gy/Black, Gy.		
27. Practice Bombs (with spotting charge)	Type 99, No. 6, Smoke <sup>a</sup> .					Black powder, picric and sodium.	Gr/Black, Gy.	Type 99 No. 6 Mk 2 bomb case.	Operation same as Type 99. External appearance same.
	Type 99 No. 3	33.4"	16.0"	7.0"	31 kg.	Gravel in nose, glass discs in barrel, wood block and smoke fluid can in tail.	Nose green or black, barrel black, tail and struts white, red stripes.	Ordinary type without coupling ring. Cone filled four slots between fins.	
	30 kg.	35.75"	19.5"	7.0"	30 kg.	Concrete in barrel, wood block and smoke fluid cap in tail.		Same as Type 99 or with separate nose piece.	
Type 99, No. 1 <sup>a</sup> .	27.75"		4.72"	10.9 kg.	Shimose burster, Titanium spotting charge. Nose sand loaded, body con- tains glass discs.	Gr/Black, Wh. Wh.		Reported in docu- ments only.	
4 kg. Mod 1 <sup>a</sup> , 2 <sup>a</sup> , 3 <sup>a</sup> and Model 1 <sup>a</sup> .	17.07"		5.47"	4.026 kg.	Shimose burster in tail. Spotting charge; Siannic or titanium tet in Mod 2; red phosphorous in Mod 3; Titanium tet in Model 1.	Gr/Black, Wh. Wb.			
1 kg. Mod 1 <sup>a</sup> , 2 <sup>a</sup> , 3.	10.5"	9.0"	3.0"	1 kg.	Shimose gaino, red phosphorous spot- ting charge.	White rubber nose, black body, white tail and fins.		Rubber nose screwed to body, tail fits on by bayonet joint.	Formerly listed as incendiary, smoke, A.P. Mods 1 and 2, unrecovered, have white phosphorous spotting charge.

<sup>a</sup> Unrecovered.

<sup>1</sup> Although 500 kg. Land bombs have not been recovered or reported in documentary descriptions of ordnance, they are listed in a documentary requirement for certain naval air bases. Their existence is therefore probable but not enough information exists to include them in the table.

<sup>2</sup> All Land and some Ordinary bombs are produced in a no Mod. version, and also with one or more Mods. The Mods. in this case refer to alternative fillings. Usually the no Mod. bombs have Shimose, and the Mod. 1's have Type 98, Type 91 and Type 97 and occasionally used.



Fig. 111  
Type 97 No. 6 Land



Fig. 112  
Type 2 No. 6 Land Model 5 Container



Fig. 113  
No. 25 Land



Fig. 114  
Type 98 No. 25  
Land



Fig. 115  
No. 80 Land



*Fig. 116*  
*No. 3 Model 2*  
*Ordinary*



*Fig. 117*  
*No. 6 Model 2*  
*Ordinary*



*Fig. 118*  
*No. 3 Model 2*  
*Ordinary*



*Fig. 119*  
*No. 50 Model 2*  
*Ordinary*



Fig. 120  
Type 99 No. 6 Model 1 Ordinary



Fig. 121  
Type 99 No. 25 Model 1 Ordinary



Fig. 122  
Type 3 No. 50 Model 1  
Ordinary



Fig. 123  
No. 80  
Model 1  
Ordinary



Fig. 124  
Type 99 No. 6 Mk. 2



Fig. 125  
Type 99 No. 6 Mk. 2  
Mod. 1



Fig. 126  
Type 1 No. 25 Mk. 2  
Model 1



Fig. 127  
Type 1 No. 25 Mk. 2  
Model 1 Mod. 1



Fig. 128  
Plywood tail fins for  
No. 25 Mk. 2 bombs



Fig. 129  
Type 99 No. 3 Mk. 3



Fig. 130  
Type 99 No. 3 Mk. 3 Mod. 1



Fig. 131  
Type 3 No. 6 Mk. 3



Fig. 132  
Type 2 No. 25 Mk. 3  
Model 1



Fig. 133  
Type 99 No. 80 Mk. 5

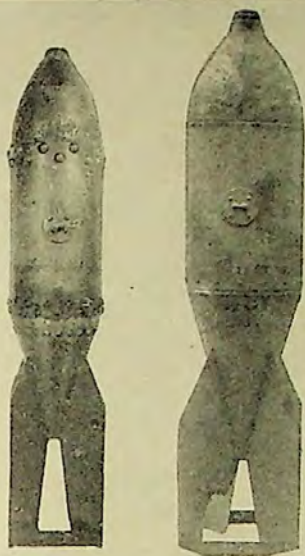


Fig. 134  
Type 58 No. 7 Mk. 6  
Model 1

Fig. 135  
Type 1 No. 7 Mk. 6  
Model 1 Mod. 1



Fig. 137  
Type 2 No. 6 Mk. 21  
Model 1 Container



Fig. 138  
1 Kg. Hollow-charge  
Bomb



Fig. 136  
Type 3 No. 25 Mk. 8  
Model 1



Fig. 139  
Type 2 No. 6 Mk. 21  
Model 2 Container



Fig. 140  
1 Kg. H. E.  
Bomb



Fig. 141  
Type 3 No. 8 Mk. 23 Model 1



Fig. 142  
Type 3 No. 25  
Mk. 31 Model 1



Fig. 143  
Type 3 No. 80 Mk. 31  
Model 1



Fig. 146  
Type 3 No. 6  
Target Marker



Fig. 148  
Type 50 No. 3  
Practice

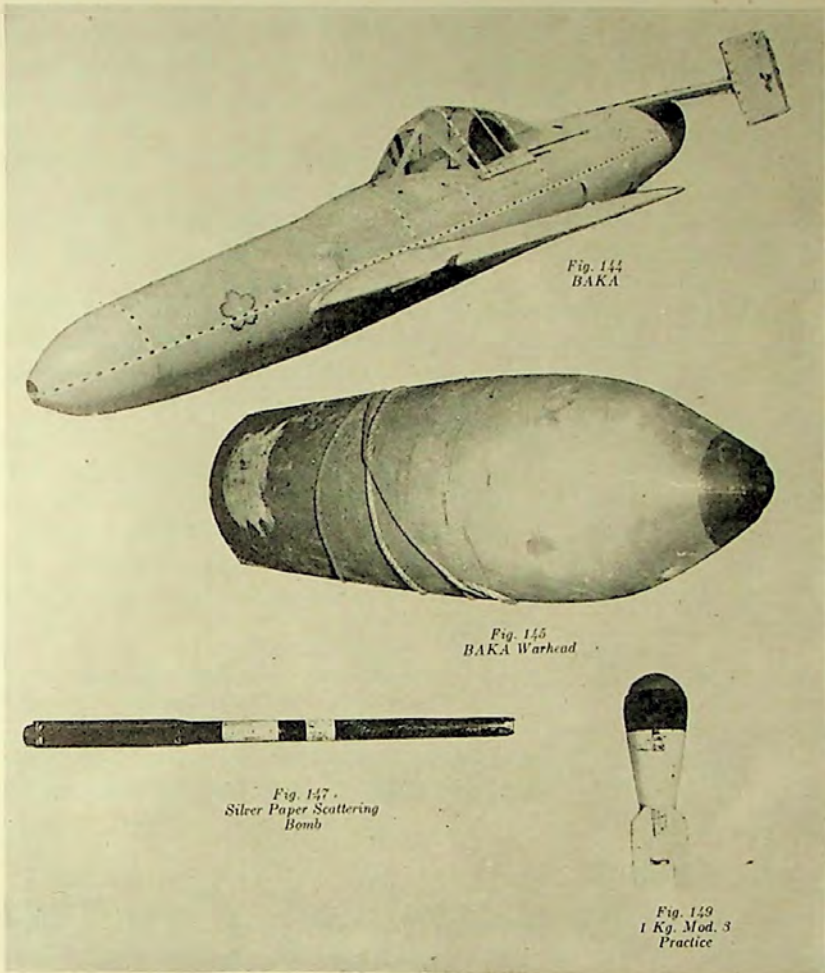


Fig. 144  
BAKA

Fig. 145  
BAKA Warhead

Fig. 147  
Silver Paper Scattering  
Bomb

Fig. 149  
1 Kg. Mod. 3  
Practice

## NAVY BOMB FUZES

Japanese Navy bomb fuzes are distinctive in appearance from those of the Army, and are generally a larger size. Navy fuzes are interchangeable only in Navy fuzes.

Navy fuzes may be distinguished by (1) lack of holes in the vanes for arming wires, (2) safety forks or safety pins usually inserted into the fuze body from the side. With the exception of the D-2, D-3, and D-4 aerial burst fuzes, Navy fuzes contain no explosive. All elements of the explosive train are in the gaine.

Probable fuzing combinations for the bombs are given in a special chart. An explanation of the Allied designation system for Japanese fuzes is given in the introduction to Army fuzes.

### Time Fuzes

Japanese Navy time fuzes, C-2 (a) (nose) and C-1 (a) (tail), may be used in any Japanese Navy bomb with A-3 or B-3 (a) size fuze pockets, respectively. Three models of each fuze, with increasing delay times, are manufactured. (Recent documents do not mention a Model 3 of the C-2 (a).) Tests of the delay in the various models produced the following averages:

	C-2 (a)	C-1 (a)
Model 1.....	Not recovered.	Not recovered.
Model 2.....	20 hours.	17¼ hours.
Model 3.....	Not recovered.	24½ hours.

An unrecovered nose time fuze, Type 1 (Models 1 and 2), is reported by a POW to be antiwithdrawal. This fuze is hemispherical and has no vanes.

### A-3 and A-1 Series Fuzes

The largest series of Japanese fuzes is the Navy A-3 series. Since these fuzes all operate in the same manner, and have very similar external appearance, they are frequently confused. By matching the Allied with the Japanese designation, as below, it is possible to understand the system of the series.

Type 97 Model 2.....	A-3 (a).
Type 97 Model 1.....	A-3 (d).
Type 3 Nose Initiator.....	A-3 (e).
Type 0 Model 2.....	Unrecovered.
Type 0 Model 1.....	Unrecovered.
Type 2 Nose Initiator.....	A-3 (c).
Type 1 Model 2.....	A-3 (b).
Type 1 Model 1.....	Unrecovered.
Type — Nose Initiator.....	Unrecovered.

Each of the above groups uses a basic design. (See pictures of Navy fuzes.) Model 1 fuzes are for No. 50 and No. 80 bombs; Model 2 for smaller bombs. The Nose Initiators, for use in Mk. 3 incendiary-shrapnel bombs, are modified to take the practice bomb gaine (Fig. 184).

Additional fuzes, using the A-3 design, include:

Type 2, No. 50 Ordinary Bomb.  
 Model 1 Nose Fuze..... A-3 (f).  
 Baka Bomb Nose Fuze..... A-3 (g).  
 Type 2, Small Model Nose Fuze..... Unrecovered.

The A-1 series follows the same pattern:

Type 2 Model 2..... A-1 (a).  
 Type 2 Model 1..... A-1 (c).  
 Type 90 Initiator..... }  
 Dummy Bomb Mk 1 Initiator }..... A-1 (b).

Documents report that Type 2 fuzes are no longer in production.

PROBABLE NAVY BOMB FUZING

Japanese Designation	Nose	Tail
LAND		
No. 6.....	A-3 (a).....	
Type 97, No. 6.....	A-3 (a).....	
No. 25.....	A-3 (a).....	B-3 (a).
	C-2 (a).....	C-1 (a).
Type 98, No. 25.....	A-3 (a).....	B-3 (a).
	C-2 (a).....	C-1 (a).
No. 80.....	A-3 (d).....	B-3 (b).
Type 2, No. 6 Container.....	A-3 (a).....	
7-kg. Container Bomb.....	Type 2 Small Model*.....	
ORDINARY		
Streamlined:		
No. 3, Model 2.....	A-3 (a).....	
No. 6, Model 2.....	A-3 (a).....	
No. 25, Model 2.....	A-3 (a).....	B-3 (a).
No. 50, Model 2.....	A-3 (d).....	B-3 (b).
Cylindrical:		
Type 99, No. 6, Model 1.....	A-3 (a).....	
Type 99, No. 25, Model 1.....	A-3 (a).....	B-2 (a).
Type 2, No. 50, Model 1.....	A-3 (f).....	B-2 (a).
No. 80, Model 1.....	A-3 (d).....	B-3 (b).
SPECIAL		
Mk. 1:		
Type 1, No. 6, Mk. 1.....	A-3 (a).....	
No. 6, Mk. 1.....	A-3 (a).....	
Mk. 2:		
Type 99, No. 6, Mk. 2.....	A-3 (a).....	
Type 1, No. 25, Mk. 2.....	A-3 (a).....	B-3 (a).
Mk. 3:		
Type 99, No. 3, Mk. 3.....	A-1 (b), A-3 (c), A-3 (e).....	D-2 (a).
Type 3, No. 6, Mk. 3.....		} D-2 (a).
Type 2, No. 25, Mk. 3.....	A-3 (a).....	
Mk. 4:		
Type 99, No. 3, Mk. 4 Practice.....	Fuzing unknown.....	
Type 3, No. 25, Mk. 4.....		Type 3, No. 25, Mk. 4 Bomb Tail Fuze* and Type 3, Mk. 4 Tail Igniting Mechanism.*
Exp. 14, No. 50, Mk. 4.....	Fuzing unknown.....	

See footnotes at end of table.

PROBABLE NAVY BOMB FUZING—Continued

Japanese Designation	Nose	Tail
SPECIAL—Continued		
Mk. 5 <sup>1</sup> :		
Type 99, No. 80, Mk. 5.....		B-2 (b).
Type 2, No. 80, Mk. 5.....		Type 2, No. 80, Mk. 5 Bomb Tail Fuze.*
Type 3, No. 150, Mk. 5.....		Unknown.
Mk. 6:		
Type 98, No. 7, Mk. 6, Model 1.....	A-3 (a), A-3 (b)	
Type 98, No. 7, Mk. 6, Model 2.....		
Type 1, No. 7, Mk. 6, Model 3 and Mod. 1.....		
Mk. 7: Exp. 13, 1-kg. Mk. 7.....	Fuzing unknown	
Mk. 8: Type 3, No. 25, Mk. 8.....	A-3 (a)	
Mk. 16: Exp. 16, Mk. 16.....	Fuzing unknown	
Mk. 16.....	Fuzing unknown	
Mk. 19.....	Fuzing unknown	
Mk. 21:		
Type 2, No. 6, Mk. 21.....	D-4 (a)	
1-kg. shaped Charge.....		B-5 (b).
1-kg. H. E.....		B-5 (c).
Mk. 22:		
Exp. 18, No. 80, Mk. 22.....	Container apparently fuzeless.....	
Spike Bomb.....	Type 1, Special Bomb Nose Fuze* (Time fuze).	Type 2 Special Tail Fuze Model 11* (antidisturb- ance).
Mk. 23: Type 3, No. 6, Mk. 23.....	C-2 (a)	
Mk. 24:		
Exp. 18, No. 6, Mk. 24.....	Unknown	
Parachute Bombs.....	Type 2, Small Model*	
Mk. 25:		
Exp. 18, No. 4.5, Mk. 25.....	Container apparently fuzeless.....	
Wedge Bomb.....	Type 2, Special Bomb Nose Fuze Model 11* (antidisturbance).	
Mk. 26: Exp. 18, No. 25, Mk. 26.....	A-3 (a)	C-1 (a).
Mk. 27.....	Type 4, Mk. 27 Fuze (Aerial Burst)*	
Mk. 28: Type 3, No. 1, Mk. 28.....	Type 3, Mk. 28 Fuze*	
Mk. 31:		
Type 3, No. 25, Mk. 31.....	Type 3, Electric Firing Mecha- nism.*	B-3 (a).
Type 3, No. 80, Mk. 31.....	Type 3, Electric Firing Mecha- nism.*	B-3 (b).
Baka Bomb Warhead <sup>2</sup> .....	A-3 (g)	B-9 (a), B-10 (a).
Type 3, No. 6, Target Marker.....	A-3 (a)	
Window Bomb.....	Pull igniter	
Smoke:		
No. 3, Model 2.....		
Type 99, No. 3, Model 1.....		
Type 99, No. 6.....	Fuzing unknown.....	
Practice:		
Type 99 No. 3.....		B-6 (n).
30-kg.....		B-6 (a).
Type 99, No. 1.....	Fuzing unknown	
4-kg.....	Fuzing unknown	
1-kg.....	A-5 (a)	

\*Unrecovered.

<sup>1</sup> Mk. 5 bombs carry 2 base fuzes.

<sup>2</sup> 2 of each tail fuze are carried in the base of the Baka Bomb warhead.



Fig. 150  
A-1(a)  
(Type 2 Nose Fuse  
Model 2)

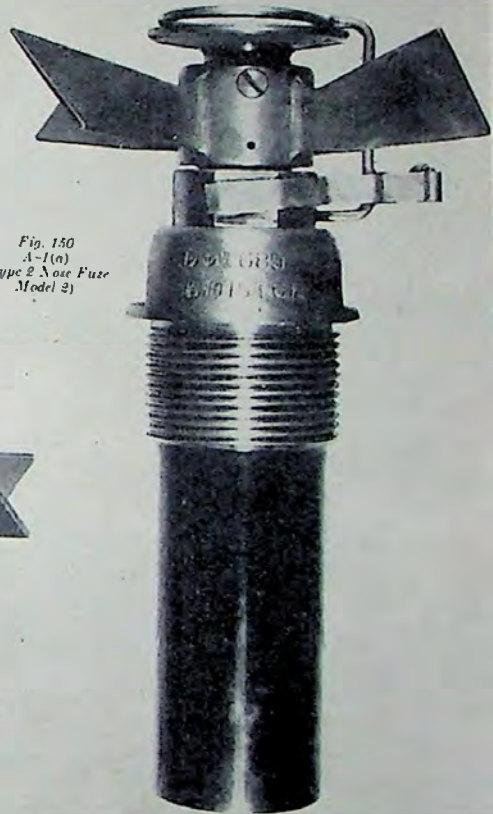


Fig. 152  
A-1(c)  
(Type 2 Nose Fuse  
Model 1)

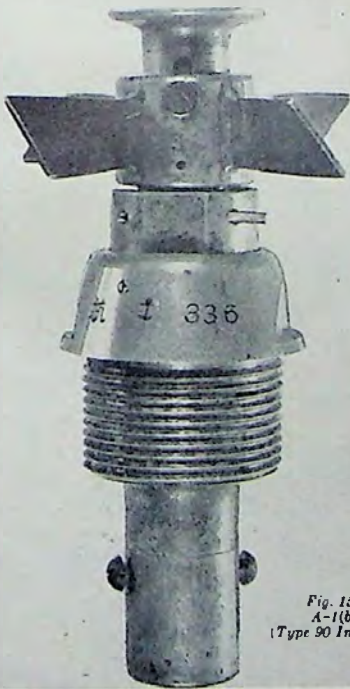


Fig. 151  
A-1(b)  
(Type 90 Initiator)

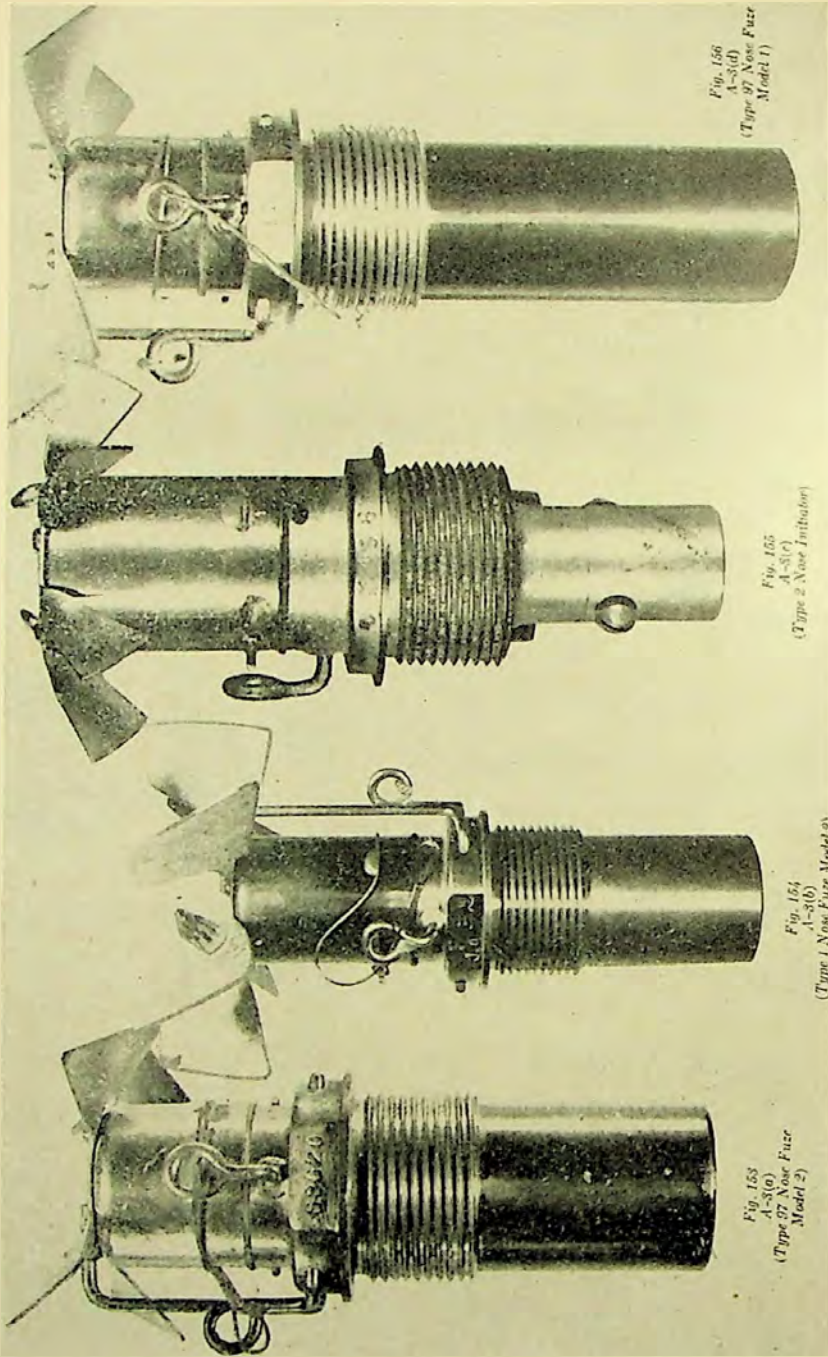


Fig. 156  
A-3(D)  
(Type 97 Nose Fuze  
Model 1)

Fig. 155  
A-3(C)  
(Type 2 Nose Initiator)

Fig. 154  
A-3(B)  
(Type 1 Nose Fuze Model 2)

Fig. 155  
A-3(O)  
(Type 97 Nose Fuze  
Model 2)

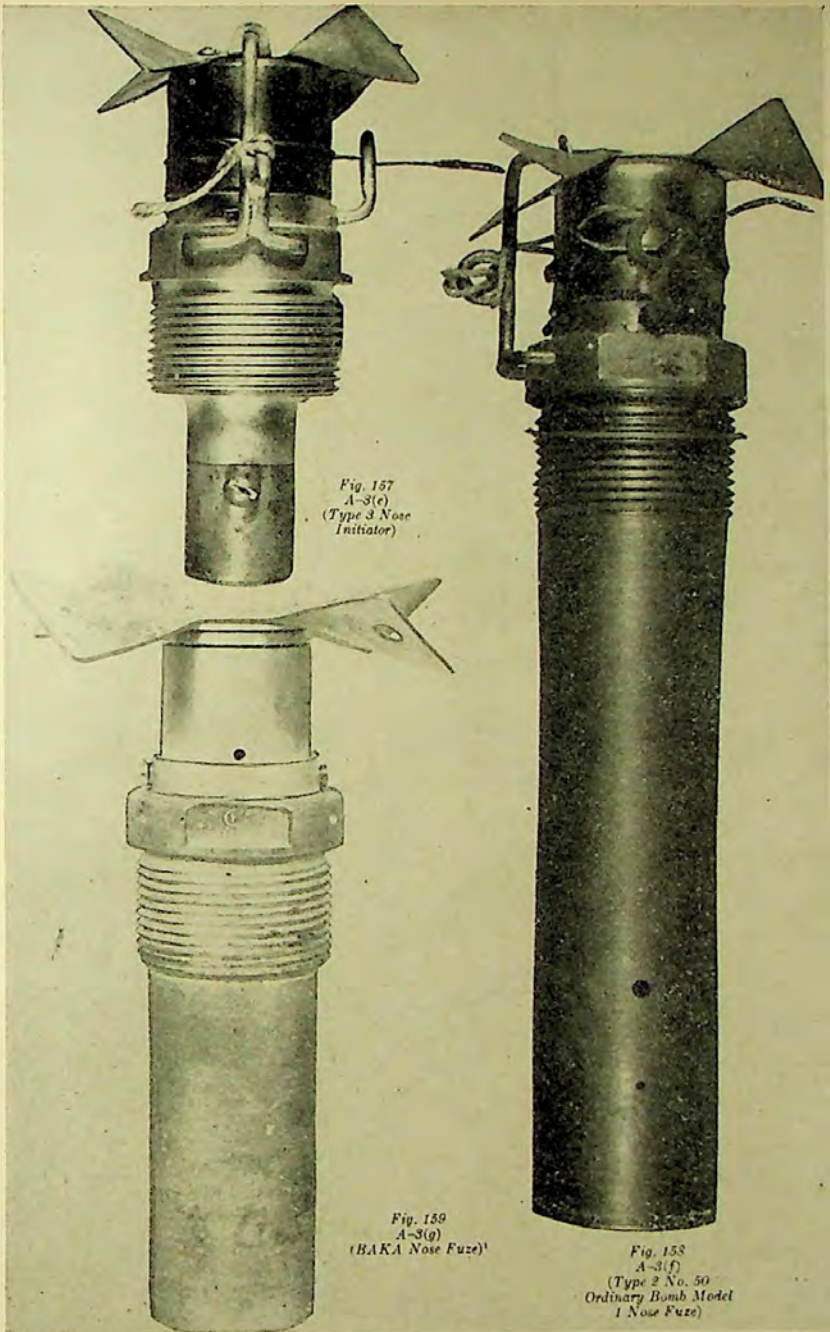
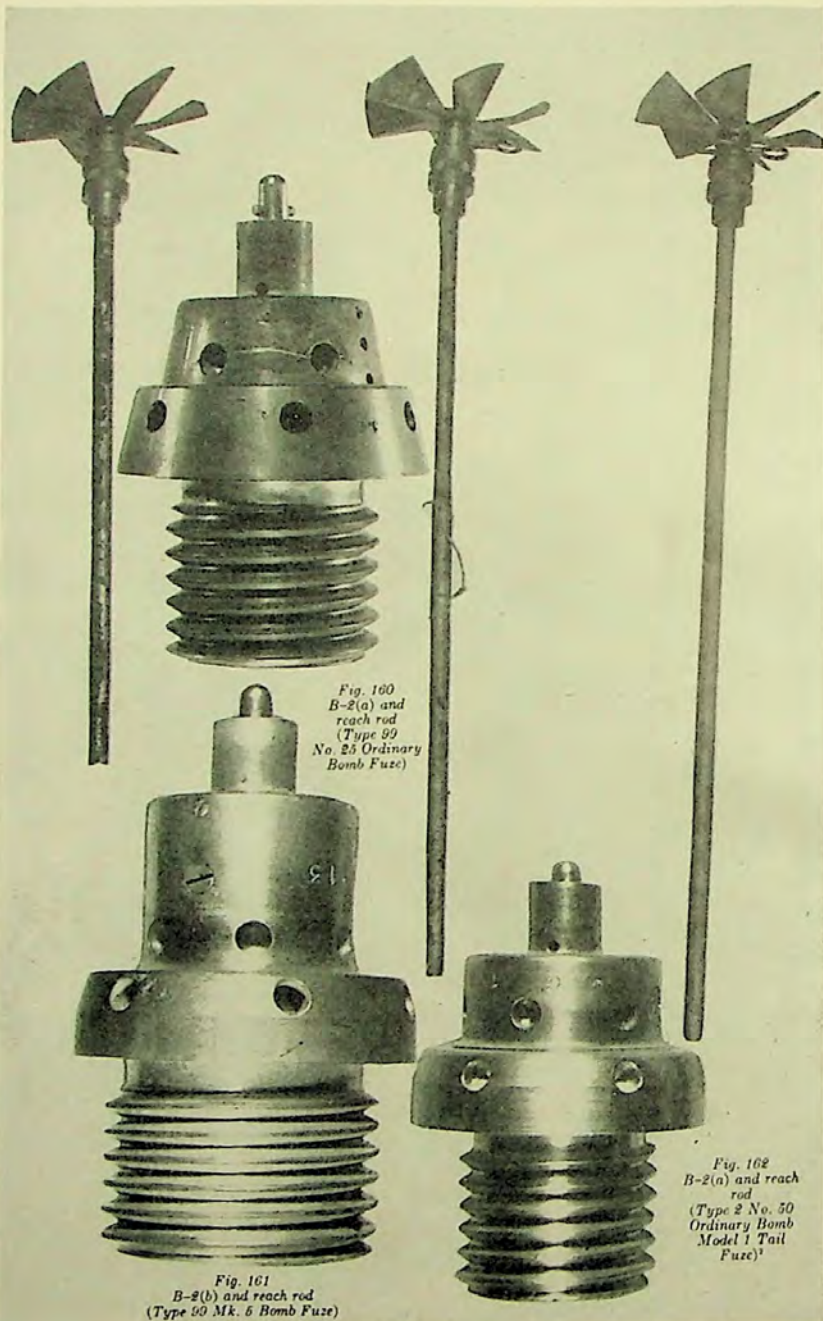


Fig. 157  
A-3(e)  
(Type 3 Nose  
Initiator)

Fig. 159  
A-3(g)  
(BAKA Nose Fuze)

Fig. 158  
A-3(f)  
(Type 2 No. 50  
Ordinary Bomb Model  
1 Nose Fuze)

A-3 (g) is the impact nose fuze used in the Baka Bomb. It is an A-3 (d) fuze modified by replacing the nose cap with a thin metal spacer between vanes and arming sleeve, by insertion of a heavy steel shear pin in place of the shear wire and by drilling holes in the vanes, apparently to accommodate an arming wire.



<sup>1</sup> This fuze differs only slightly in appearance from the B-2 (a) and has the same thread size. It has not been separately designated.

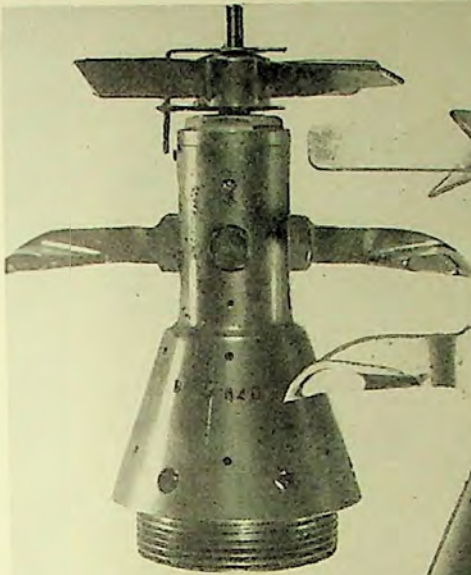


Fig. 163  
B-3(a)  
(Type 16 Tail Fuze Model 2)

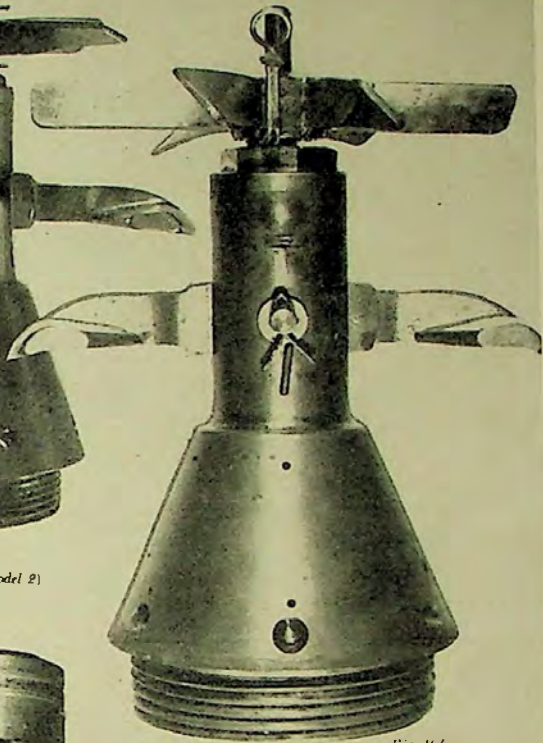


Fig. 164  
B-3(b)  
(Type 15 Tail Fuze Model 1)



Fig. 166  
B-5(b)



Fig. 167  
B-5(c)

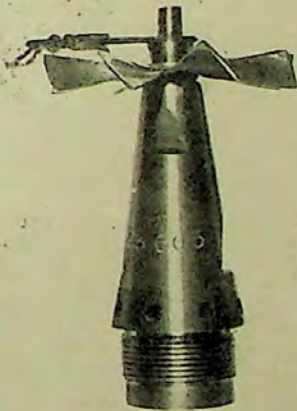


Fig. 168  
B-6(a)  
(Type 97 Tail Initiator)

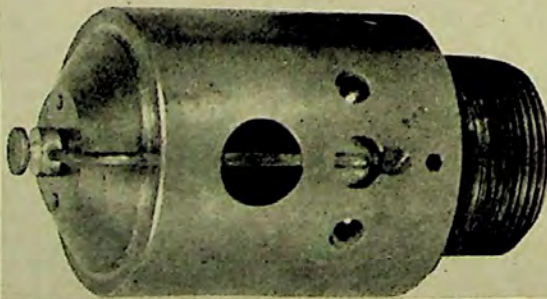


Fig. 168  
B-2(a)  
(B.A.K.A. all-ways action  
base fuse)



Fig. 169  
B-10(a)  
(B.A.K.A. impact base fuse)

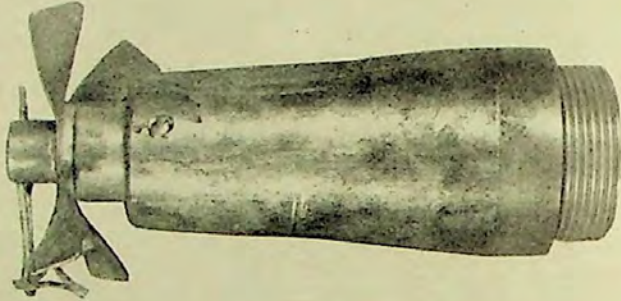


Fig. 170  
C-1(a)  
(Type 109 Special Bomb  
Tail Fuse)

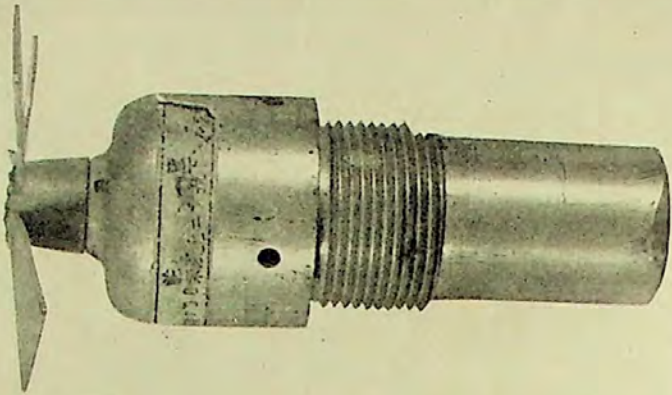


Fig. 171  
C-2(a)  
(Type 89 Special Bomb  
Nose Fuse)

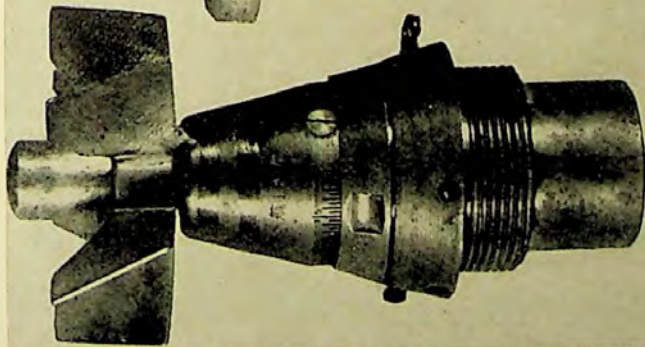


Fig. 172  
D-2(a)  
(Type 99 Mk. 3 Bomb Fuze)<sup>†</sup>

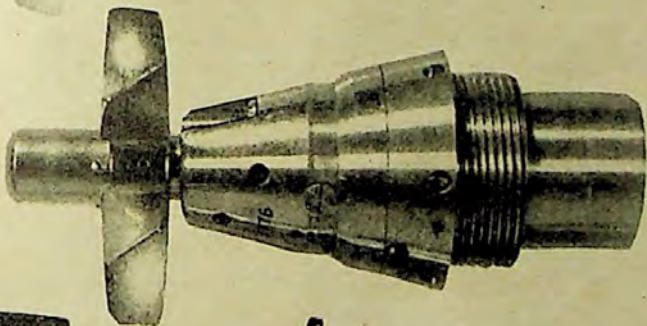


Fig. 173  
D-2(b)  
(Type 69 Mk. 3 Bomb Fuze)<sup>†</sup>

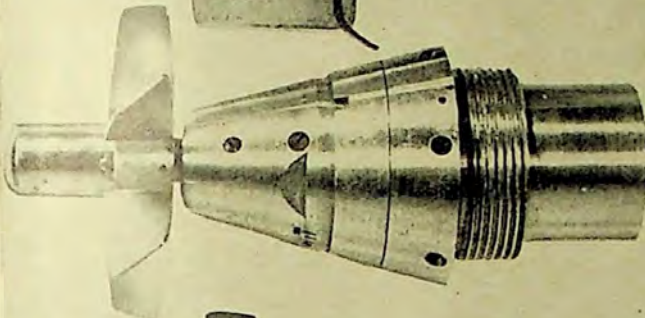


Fig. 174  
D-2(c)  
(Exp. 14 Mk. 3 Bomb Fuze)<sup>†</sup>

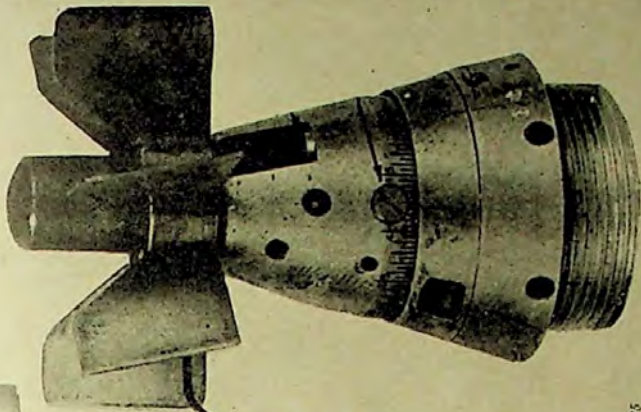
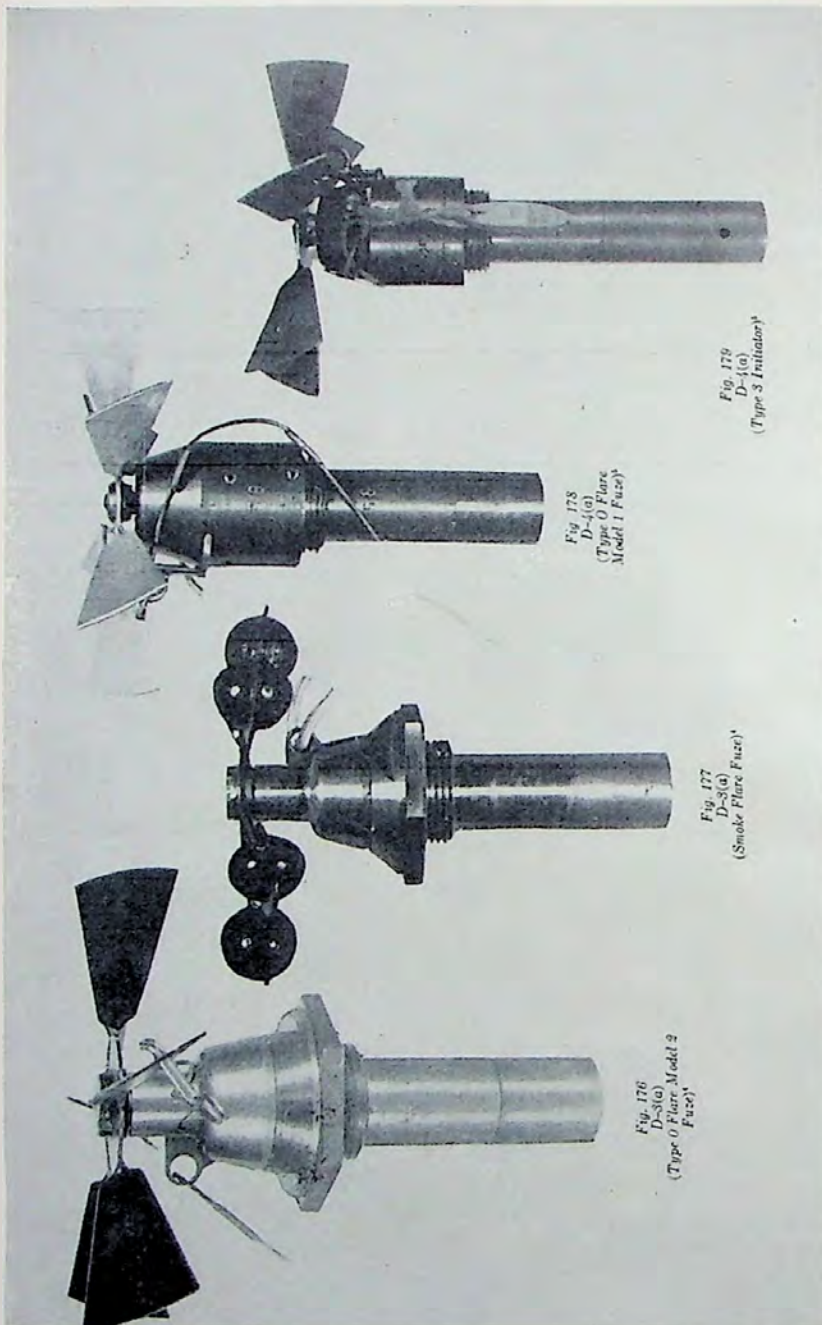


Fig. 175  
D-2(d)  
(Type 2 Mk. 3 Bomb Fuze)<sup>†</sup>

<sup>†</sup> D-2 (a), D-2 (b), D-2 (c) are aerial burst clockwork tail fuzes developed in the reverse order of their designation. D-2 (c) the experimental prototype, is cadmium plated, has no winding hole and is probably obsolete. D-2 (b) is cadmium plated, has a winding hole and is probably obsolete. D-2 (a) is brass, has a winding hole, and may be used in all Mk. 3 aerial burst incendiary bombs. The Type 99 version has a 0.20 second setting, the Type 2, a 0.80 second setting. Recent documents have referred to a Type 3 Mk. 3 tail fuze which appears to be one of the D-2 fuzes with centrifugal safety blocks removed from beneath the spring-loaded striker to shorten the arming time.



4 D-3 (a) is an aerial burst fuze used in parachute flares. For use in the side fuze pocket of the large Navy floating smoke flare, the D-3 (a) is equipped with cup-like vanes and designated merely Smoke Flare Fuze.

3 D-4 (a) is an aerial burst fuze for the Type 2 No. 6 Mk. 21 container and for the Type O Parachute Flare Model 1. When used in the Mk. 21 container the D-4 (a) is designated Type 3 Initiator and has a longer base as shown in Fig. 179.

## NAVY GAINES

Four sizes of gaines and a magazine used with seven Navy bomb fuzes are shown in the accompanying photograph. The table lists the known types of standard gaines.

No attempts should be made in the field to break down these sensitive gaines.

No. 25 and larger bombs with filled tail cones have an auxiliary tail booster of pressed explosive surrounding the gaine.

### JAPANESE NAVY BOMB FUZE GAINES

Designation	Marking	Delay in seconds		Use
		Docu- ments	Tests	
<b>STANDARD (Fig. 180)</b>				
Type 92 Land Bomb Gainie, Mod. 2.	Plain tip.....	Inst. (Straight det- onating).		Land, ordinary, Mk. bombs, common.
Type 96 Land Bomb Gainie.....	Plain tip.....	Inst. (Flash—det- onating).		Land, ordinary, Mk. bomb, rare.
Type 97 Land Bomb Gainie A.....	Green tip.....	.03	.016	Land and ordinary bombs.
Type 97 Land Bomb Gainie B.....	Red tip.....	.10	.075	Land and ordinary bomb.
Type 99 Ordinary Bomb Gainie A.	Blue tip.....	.03	.016	Land and ordinary bomb.
Type 99 Ordinary Bomb Gainie C.	Brown tip.....	.20	.079	Land (rare) and ordinary bomb.
Type 15 Ordinary Bomb Gainie.....	Plain tip.....	Variable	0-1.5	Mk. 2 bombs.
Type 1, Mk. 2 Bomb Gainie Model 5.	Unknown.....	3.5	-----	Mk. 2 bomb (documents only).
Type 1, Mk. 2 Model 1A.....	Unknown.....	10	5-7	
Type 1, Mk. 2 Model 1B.....	Plain tip.....		14-19	Mk. 2 bomb.
Type 99, Mk. 3 Bomb Gainie.....	Plain tip.....	Instantaneous		Mk. 3 bomb with D-2 series fuze (primer in fuze).
Type 4, Skipping Bomb Gainie.....	Plain tip.....		10-11	Land, ordinary, Mk. 8 bomb.
Type 3, Electric Gainie (Fig. 181).	Plain tip.....	Instantaneous		Mk. 31 bomb.
<b>Mk. 5 (Fig. 182)</b>				
Type 0, Mk. 5 Bomb Gainie.....	Plain.....	0.20	-----	Mk. 5 bombs.
<b>SMALL BOMB GAINIE (Fig. 183)</b>				
Type 2 Small Model Bomb Gainie, Model 1.	Plain.....	Instantaneous		Container carried bombs; 1 kg., 7 kg., parachute bombs.
<b>PRACTICE BOMB GAINIE (Fig. 184)</b>				
Practice Bomb Gainie.....	Plain.....	Instantaneous		No. 3 Mk. 3 Bomb with A-1 (b) and practice bombs with A-5(a) and B-6 (a).
<b>MAGAZINES (Fig. 185)</b>				
Type 98, Mk. 6 Bomb Gainie Model 1.	Plain.....		0.03	Mk. 6 bomb using igniter.
Type 98, Mk. 6 Bomb Gainie Model 2.	Plain.....	Instantaneous		
<b>DOCUMENTARY (size unknown)</b>				
Type 2, Bomb Gainie Model 11...	Unknown.....	Instantaneous		Mk. 22 and 25 bomb with Type 2 special bomb tail and nose fuzes Model 11 (A/D).
Type 4, Mk. 27 Gainie.....	Unknown.....			Mk. 27 bombs.
Type 3, Mk. 28 Gainie.....	Unknown.....			Mk. 28 bombs.



Fig. 180  
Standard Gauge



Fig. 181  
Type 3 Electric  
Gauge.



Fig. 182  
Mk. 5 Gauge



Fig. 183  
Small Model  
Gauge



Fig. 184  
Practice Gauge



Fig. 185  
Magazine

## V. JAPANESE AMMUNITION

The material in this chapter is divided into four sections: Army Ammunition, Navy Ammunition, Grenades, and Rockets. The material covered includes ammunition for small arms, aircraft machine guns and cannon, medium and large caliber weapons, and mortars. Also included are pictures of all recovered projectile fuzes.

For each size of ammunition there is information about the weapons in which it is used and recognition of the types recovered or known from documentary evidence. A clear distinction is made at all times between recovered and documentary items.

Photographs of representative rounds of each type are included to aid in recognition. No attempt is made to picture every round recovered for every gun.

In this section the following abbreviations will be used:

- AAMG —Antiaircraft Machine Gun.
- AC —Aircraft Cannon.
- ACMG —Aircraft Machine Gun.
- AP —Armor Piercing.
- API —Armor Piercing Incendiary.
- APT —Armor Piercing Tracer.
- HE —High Explosive.
- HEAT —High Explosive Antitank (hollow charge).
- HEI —High Explosive Incendiary.
- HEIT —High Explosive Incendiary Tracer.
- HET —High Explosive Tracer.
- HMG —Heavy Machine Gun.
- I —Incendiary.
- IT —Incendiary Tracer.
- LMG —Light Machine Gun.
- SD —Self Destroying.
- WP —White Phosphorus.

### ARMY AMMUNITION

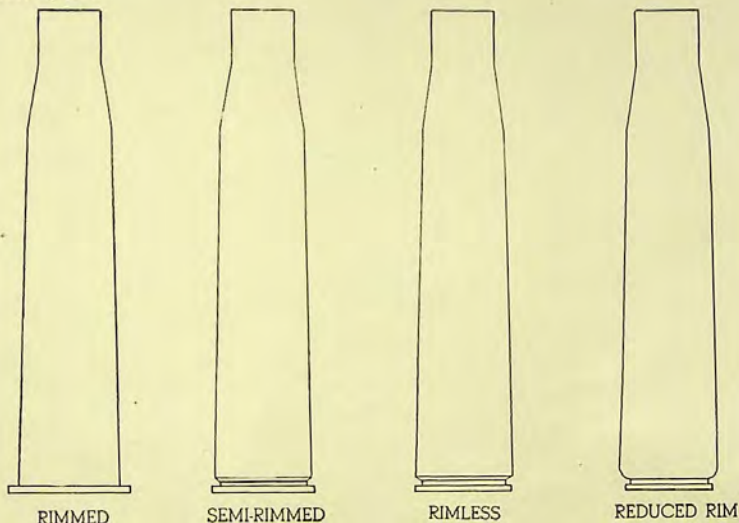
Japanese Army ammunition is of conventional design and is similar to that used by other countries. To date very little major caliber ammunition has been recovered, but it is known to exist from captured documents.

The section is divided into five parts: Small Arms (under 20 mm.), Aircraft Cannon (20 mm. and over), Medium and Large Caliber Guns (20 mm. and over), Mortars, and Fuzes.

## SMALL ARMS

Army small arms ammunition is marked by a color band around the cannelure (seam of bullet and cartridge case), which denotes the type of bullet. Several discrepancies exist in the color scheme among the different sizes, so the color bands will be given for each type and size of bullet.

The standard method of describing small arms cartridge cases is by the type of ejection lip. There are four types in use: rimless, semi-rimmed, rimmed, and reduced-rim. The drawings below illustrate each type.



### 6.5-mm. Ammunition (Fig. 186)

RECOGNITION.—Long narrow bullet with bottle necked semi-rimmed case 2 in. in length; over-all length of complete cartridge, 3 in.



FIGURE 186.

#### WEAPONS.—

##### (a) Rifle:

Type 38 Rifle.....	}	Ammunition is used in 5-round clips. Three clips are packed in individually labeled wedge-shaped cartons.
Type 38 Sniper's Rifle.....		
Type E Rifle.....		
Type 38 Carbine.....		
Type 44 Carbine.....		

##### (b) L. M. G.:

Type 11 Yr. L. M. G.....	5-round clips hopper-fed.
Type 91 Vehicle L. M. G.....	45-round magazine.
Type 96 L. M. G.....	30-round magazine.

##### (c) A. A. M. G.:

Type 3 Yr. A. A. M. G.....	30-round strips.
Type 38 A. A. M. G.....	30-round strips.

## IDENTIFICATION OF ROUNDS.—

### Recovered:

Blank .....	Purple paper bullet.
(For launching grenades from rifles.)	
Blank .....	Wooden bullet.
(Documents list as blank for M. G.)	
Practice Ball (snub-nosed) .....	Red band.
Ball (cupro-nickel jacket) .....	Red band.

### Unrecovered:

Ball:	
Steel-jacketed (or copper-jacketed).	Black primer.
Type 92 jacketed .....	Black primer.
A. P. (Type 92) .....	Black band.

REMARKS—(1) When magazines are used, ammunition is reloaded into the magazines from standard 5-round clips. Thirty-round strips of 6.5 mm. ammunition have not been recovered.

(2) Conflicting reports suggest that a reduced propellent charge is used in ammunition for L. M. G.'s and that this ammunition is marked by © stamped on the label of each carton.

(3) Existence of 6.5-mm. tracer ammunition has been rumored, but never confirmed in translations or by recovery.

## 7.7-mm. Rimless Ammunition (Fig. 187)

RECOGNITION.—Rimless case  $2\frac{1}{4}$  in. in length; over-all length of complete cartridge,  $3\frac{1}{8}$  in. In addition to the usual brass cartridge case, ammunition with steel case was found on Saipan.

### WEAPONS:

Type 99 Rifle .....	} Packed in 5-round clips, 3 clips to carton. Reloaded into magazines for L. M. G.
Type 99 Modified Rifle .....	
Type 2 Rifle .....	
Type 99 L. M. G. ....	
Type 97 Tk. M. G* .....	

\*(May be converted for ground use.)

May also be used in—

Type 92 H. M. G. ....	30-round strips.
Type 1 H. M. G. ....	30-round strips.

### IDENTIFICATION OF ROUNDS:

#### Recovered:

Blank .....	Purple Paper Bullet.
(For launching grenades from rifles.)	
Blank .....	Wooden Bullet.
(Documents list as blank for M. G.)	
Ball (Type 99) .....	Red band.



FIGURE 187.

Unrecovered:

Practice Ball (snub-nosed).

Ball:

Type 92 Ordinary	} Red band.
Type 92 Decoppering (cupro-nickel).	
Tracer (Type 92)	Green band.
A. P. (Type 92)	Black band.
I (W. P.) (Type 92)	Magenta.

**7.7-mm. Semirimmed Ammunition (Fig. 188).**

RECOGNITION.—Case identical in size and form to 7.7 rimless except larger diameter at base gives semirimmed character; bottle-necked case 2¼ in. in length; over-all length of complete cartridge, 3½ in.

WEAPONS.—

Type 89 Flex. A. C. M. G.	See note 3 following.
Type 89 Flex. A. C. M. G. (Special)	
Type 89 Fixed A. C. M. G.	Metal link belts.
Type 92 H. M. G.	30-round strips.



FIGURE 188.

IDENTIFICATION OF ROUNDS.—

Ball:	{ Type 89	} Red band.
	{ Type 92	
Tracer:	{ Type 89	} Green band.
	{ Type 92	
A. P.:	{ Type 89	} Black band.
	{ Type 92	
I (W. P.):	{ Type 89	} Magenta.
	{ Type 92	
I (H. E.) (Ma-101)		Purple.

REMARKS.—(1) This ammunition *cannot* be fired in the Type 1 H. M. G.

(2) The complete series of Type 92 designs has been recovered; Type 89 designs are documentary.

(3) When used for aircraft flexible machine guns, this ammunition is packed in 5-round clips in a manner corresponding to the packing of rimless, rifle ammunition, but the clip is of larger size to accommodate the larger base of the semirimmed type.

(4) The purple band on I (H. E.) rounds appears black unless examined carefully. However, any Japanese I (H. E.) bullet of this type may be immediately recognized by the noticeably flat nose.

### 7.7-mm. New Standard

Documentary evidence illustrating a variant type of semirimmed 7.7-mm. ammunition suggests that the Japanese have developed a standardized design of cartridge case which can be used in any Army 7.7-mm. gun, thus eliminating the need for the *two* forms of cartridge case described above. This would mean the introduction, at present, of a *third* type of Army 7.7-mm. ammunition, but would also mean the eventual standardization of a single design of propellant case for Army 7.7-mm. ammunition. (Except for the use of Army infantry rifles using Army ammunition, the Navy is already standardized on a single design of 7.7-mm. propellant case. This is a rimmed case, identical to British .303 caliber, but unlike any of the Japanese Army designs.)

It appears that the standardized case is a *semirimmed* design with the maximum basal diameter reduced to the size of the base of the present *rimless* case. This would permit its use in weapons chambered to receive the smaller diameter (present rimless) ammunition. The semirimmed nature (that is, the reduction of diameter just above the extractor lip) would permit functioning in machine guns needing this feature for proper extraction. It is presumed that sealing in firing is successfully effected by the unaltered forward portion of the case without requiring modification of the chamber of the various weapons.

The existence of this design of ammunition may explain the peculiarity of the Type 1 Heavy Machine Gun, reported to fire only *rimless* ammunition. If this gun were designed specifically to handle the standardized cartridge case, it would conceivably fire rimless or new standard ammunition and not be able to handle the old semirimmed design.

Confirmation of the existence of "new standard" 7.7-mm. ammunition in service is dependent on further detailed study of ammunition in the field.

On Luzon 7.7-mm rifle and machine gun ammunition was found with the nose of the bullets tipped red or green. First reports suggested that this was a dye applied to the bullets for identification of hits in target practice. It is also possible that some such method as this will mark the standardized ammunition.

## 7.92-mm. Ammunition (Fig. 189)

RECOGNITION.—Rimless necked case, strongly similar to 7.7-mm. rimless; case  $2\frac{1}{4}$  in. long; over-all length,  $3\frac{1}{8}$  in.; more tapered nose of bullet distinguishes this ammunition from 7.7 mm.

### WEAPONS.—

Mauser Type Rifle (probably no longer used).	
Bren Type L. M. G.-----	Box-type magazine similar to U. S. B. A. R.
Type 98 Flex. A. C. M. G. (Copy German M. G. 15)-----	} Saddle type magazine.
Type 100 Flex. A. C. M. G. (double-bar- reled)-----	

### IDENTIFICATION OF ROUNDS.—

Blank (for rifle)-----	Paper bullet.
Blank (for M. G. practice)-----	Wooden bullet.
Ball:	
(Type 98) Rifle and L. M. G	
(Type 1) A. C. M. G	
*A. P. (Type 1)-----	Black band.
*I. (W. P.) (Type 1)-----	Magenta band.
*I. (H. E.) (Type 3)-----	White band.

REMARKS.—(1) Only those rounds marked by asterisks above have been recovered.

(2) Tracer ammunition for Army 7.92-mm. weapons has neither been listed in documents, nor recovered.

## 8-mm. Ammunition (Fig. 190)

### PISTOL AMMUNITION.—

#### Use:

Nambu pistol.  
Type 14 Yr. pistol.  
Type 94 pistol.

RECOGNITION.—A cupro-nickel jacketed bullet with a rimless necked case  $1\frac{1}{16}$  in. in length; over-all length,  $1\frac{1}{4}$  in.

#### Types:

Type 14 Year Ball—no markings.  
Type 90 Tear Gas—documentary.

Specifications indicate that this is a relatively large missile (60 grams of tear agent) suggesting that it is probably launched from the pistol somewhat in the manner of launching grenades from rifles.

Blank cartridges are listed for this use. The tear gas projectile is made to fit the Type 26 Year 9-mm. revolver directly and an adapter is supplied for the Type 14 Year pistol.

#### SUBMACHINE GUN AMMUNITION.

*Use:*

- Solothurn Submachine gun.
- Bren Type Submachine gun.
- Type 100 Submachine gun.

RECOGNITION.—Uses same ammunition as the 8-mm. pistol.



FIGURE 189.



FIGURE 190.



FIGURE 191.



FIGURE 192.

#### 9-mm. Ammunition (Fig. 191)

PISTOL AMMUNITION.—

*Use:*

- Type 26 Year Revolver (Webley type).
- Smith and Wesson pistol.

RECOGNITION.—A cupro-nickel jacketed bullet with a straight rimless case  $1\frac{3}{16}$  in. in length; over-all length is  $1\frac{3}{16}$  in.

*Types:*

- Ball—no marking.
- Type 90 Tear Gas—documentary. Refer to 8-mm. above.

#### 12.7-mm. Ammunition (Fig. 192)

RECOGNITION.—Short semirimmed necked cartridge case  $3\frac{3}{16}$  in. long. This ammunition is interchangeable with Italian 12.7 mm. A. C. M. G. ammunition and some Italian rounds used by the Japanese have been recovered.

WEAPON.—HO-103 (Browning Type) A. C. M. G., formerly des-

ignated Type 1. A HO-105 gun has also been listed, but this gun has not been positively identified.

Ball (Type 1).....	Red band.
Tracer (Type 1).....	Green band.
APT (Type 1).....	Black band.
Also recovered, labeled Type 1.....	Green/White band.
HEI—fuzeless (Ma-102).....	Purple band.
HEI—fuzed (Ma-103).....	White band.
HEI—fuzed (Italian).....	{ Red body.
	{ Blue body.
	{ Green body.

REMARKS.—This ammunition is packed in 10-round cartons and is reloaded into metal link belts for use.

#### AIRCRAFT CANNON

(20-mm. and over)

Aircraft machine gun ammunition has already been described in the previous section. Aircraft machine guns use the same ammunition as ground machine guns, but usually employ incendiary and H. E. incendiary rounds not used in ground weapons.

The ammunition for aircraft cannon uses the marking system of medium and large caliber ammunition, which will be explained in the next section.

Instead of designating aircraft guns by a type number, a new system called the "Ho" ( \* ) system is used. Under this system each gun is given a "Ho" number, e. g., Ho. 103. A certain range of numbers is assigned to a certain size gun. According to documentary evidence, which has been partially substantiated by recoveries, the designations are as follows:

13-mm.....	Ho 100-103.	40-mm.....	300-301.
20-mm.....	1-5.	47-mm.....	250-251.
25-mm.....	50-(?).	57-mm.....	400-401.
30-mm.....	150-155.	75-mm.....	500-501.
37-mm.....	200-203.	120-mm.....	600-(?)

From recent documents and recoveries it is known that 13-mm., 20-mm., and 37-mm. guns exist with "Ho" designation outside of the above ranges. These are evidently developments which have been made since this chart was compiled.

In the nomenclature of aircraft ammunition, individual projectiles of some designs are designated by a different system than are other rounds of the same ammunition. This consists in assigning a three digit number preceded by the symbol Ma ( ▽ ) to these rounds in addition to, or in place of, the usual "Type" number.

Number groups may possibly be allotted to given sizes of ammunition. To date the rounds of ammunition found labeled in this manner have been: Ma 101, Ma 102, Ma 103 in ammunition under 20-mm.

(given in the previous section) and Ma 201 and Ma 202 in 20-mm. sizes to be listed in this section.

### 20-mm.—Type 94 Flexible Automatic Cannon

This gun is reported in documents, but neither the gun nor the ammunition has been recovered. It is thought to be an obsolescent gun. The following types of projectiles are reported to be used in ammunition for this gun:

Type 94 HE—uses the Type 93 Small Instantaneous Fuze.

Type 94 HET—same fuze as above.

Type 94 Substitute HE—same fuze as above.

Type 94 Tracer.

Type 94 Substitute Tracer.

According to documents, the cartridge case is marked:

九四 旋機

The case illustrated for this ammunition is a very long, rimless, unnecked case which is only slightly tapered.

### Ho-1 (Flexible) and Ho-3 (Fixed) Aircraft Cannon (Fig. 193)

RECOGNITION.—These guns were developed for aircraft use from the Type 97 20-mm Anti-tank gun. The case is identical to that for



FIGURE 193.

Type 97 ammunition, but new types of projectiles have been developed for aircraft use and in the aircraft ammunition the case is marked:

旋機 (Fixed or Flexible Machine Cannon)

The case is a necked, rimless case  $4\frac{3}{8}$  in. long. The projectiles are painted black over-all and have identifying color bands painted around the body.

TYPES.—H. E. I. (fuzed)—red band aft of the bourrelet and yellow band around middle of body. The projectile uses a Type 93 fuze. The characters 旋固機 are stencilled on the body.

H. E. I. (fuzeless) Ma 201—red band aft of the bourrelet. A brass explosive-filled nose piece completes the ogival contour of the projectile. The Ma number ( = 〇 - ) is stencilled on the body.

H. E. I. T.—red band aft of the bourrelet and green and yellow bands around the body. The projectile uses a Type 100 fuze and has 旋固機 (Flexible or Fixed cannon) stencilled on the body.

Type 100 APT—green and white bands forward of the rotating band. The same characters as above are stencilled on the body.

Type 97 Substitute AP (documentary).

### Ho-5 Aircraft Cannon (Fig. 194)

RECOGNITION.—Necked rimless case  $3\frac{3}{4}$  in. long. The projectiles are painted either black or silver grey with some rounds having



FIGURE 194.

identifying color bands. The fuzed rounds use one of four types of fuzes.

TYPES.—Empty—a blunt-nosed empty projectile painted black over-all.

Type 2 APT—a pointed solid bullet with a cavity in the base for tracer. There are three types of rounds differing in grades of hardness of the steel. 二式 (Type 2) is stencilled on the body in white paint.

- (1) *Soft round*—black over-all. This round is thought to be designated Type 2 APT Substitute.
- (2) *Medium round*—black with a green band around the body.
- (3) *Hard round*—black with green and white bands around the body.

Type 2 HEI—there are three variations of this round differing in fuzes and color schemes. Some rounds have been found with a yellow band around the body, but the use of this appears to be rare. These projectiles are designated H. E. by the Japanese, but they do contain both HE and Incendiary. They are painted black over-all and use either a Type 2 fuze or a Type 2 Modified fuze. The Type 2 fuze is a striker type identical to the Type 100 fuze used in Type 97 20-mm. ammunition except that the body is made of aluminum instead of brass.

Type 4 HEI (Ma 205)—silver-gray with a two-piece fuze. The fuze is designated the Type 4 Superdetonating fuze, an air column type with the gaine enclosed in the body of the fuze.

HEI (fuzeless) Ma 202—black over-all with a brass explosive-filled nose piece. The Ma number, 二〇二 (202), is stencilled in white on the body.

Also mentioned in documents are Type 2 Tracer, Type 2 HET, Type 2 Substitute HE and Type 2 Substitute HET projectiles.

#### German MG 151 (Fig. 195)

During one period German guns and German-made ammunition were supplied to the Japanese for use on Japanese Army planes, and recoveries of this ammunition were made frequently in the New



FIGURE 195.

Guinea-New Britain area. Though the use of German guns is believed since to have been abandoned, with quantity production of Japanese designs, German ammunition may still be encountered in Japanese stocks.

RECOGNITION.—A short rimless case  $3\frac{1}{4}$  in. long. Only the first two rounds listed below are known to be used by the Japanese, but other German rounds may be encountered in the future.

TYPES.—

HE (SD)—yellow body with a blue band.

HET (SD)—yellow body with blue and red bands.

AP—black body.

API—black body with a blue band.

APHE—black body with a wide yellow band.

HEI—yellow body with green and red bands.

HEI—yellow body with a green band.

Also reported are Ho 6, Ho 7, Ho 10, and Ho 11 guns, but there is no information on the guns or ammunition.

### 30-mm.—Ho 155 Aircraft Cannon

This gun is known only from documents and there is no information on the ammunition.

### 37-mm.—Ho 202 Aircraft Cannon

This gun is known only from documents and there is no information on the ammunition. It is probably the predecessor of the Ho 203 and Ho 204.

### Ho 203 Aircraft Cannon (Fig. 196)

RECOGNITION.—A very short rimmed necked case  $4\frac{3}{8}$  in. long. \* = 〇 = ≡ (HO 203) is stencilled on the case.

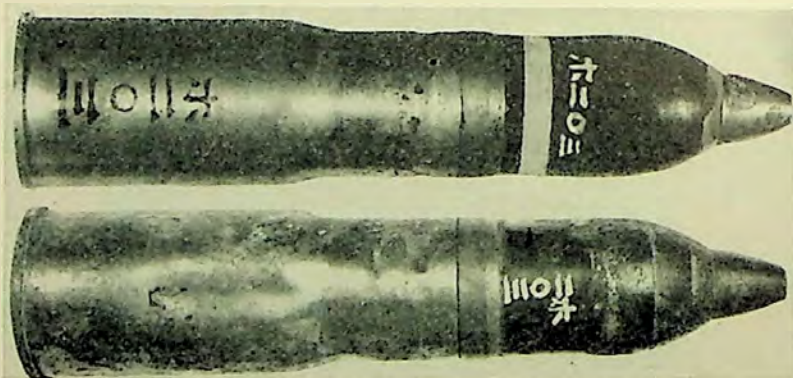


FIGURE 196.

(a)

(b)

TYPES.—HEI—black body with a red band at the nose and a yellow band around the body. The projectile uses a Type 100 small fuze and has \* = 〇 = ≡ (Ho 203) stencilled on the body in white paint. (a)

Ma 438—an empty practice projectile similar in appearance to the HEI but having the nose piece and dummy fuze constructed in one piece. The projectile is painted black overall and has \*二〇三 (Ho 203) and ㄨ ㄨ ㄨ ㄨ (Ma 438) stencilled on the body in white paint. (b)

#### Ho 204 Aircraft Cannon (Fig. 197)

RECOGNITION.—A necked rimmed case 4 $\frac{3}{8}$  in. long. \*二〇四 (Ho 204) is stencilled on the case.



FIGURE 197.

(a)  
(b)

TYPES.—HEI—same projectile as that used in the HEI round for the Ho 203. The projectile is painted black with a red band at the nose and a yellow band around the body. It uses a Type 4 Super-Detonating fuze and has \*二〇四 (Ho 204) stencilled on the body in white paint. (a)

Ma 700—an empty practice projectile resembling an AP projectile. It is painted black overall and has ㄨ ㄨ 〇〇 (Ma 700) stencilled on the body in white paint.

#### 40-mm.—Ho 301 Aircraft Cannon (Fig. 198)

RECOGNITION.—A short steel projectile with the propellant and primer contained in the base. No cartridge case is used.



FIGURE 198.

TYPES.—HE—black body with a red band at the nose and a yellow band at the center of gravity.

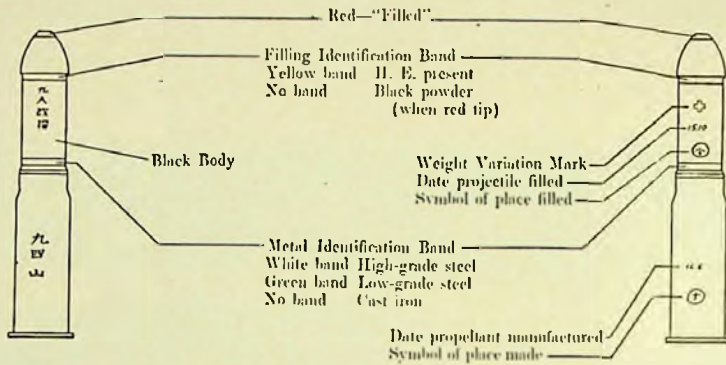
#### 57-mm.—Ho 401 and Ho 402 Aircraft Cannon

These guns are known only from documents and there is no information on the ammunition.

# MARKING OF JAPANESE ARMY AMMUNITION

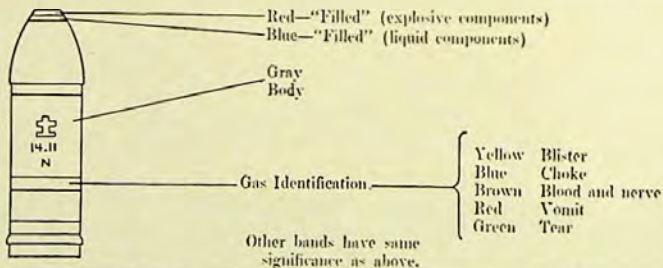
## OLD SYSTEM

### COMMON EXPLOSIVE TYPES



Japanese characters giving the type number of the projectile (painted on projectile) and type number of the gun (painted on case) appear only where there is chance of confusion with similar projectiles or cases.

### CHEMICAL (GAS OR LIQUID FILLED) PROJECTILES



### SPECIAL PURPOSE PROJECTILES

Information is lacking on the painting of special purpose projectiles in the old system. Only specimens recovered indicate the following:

- (a) Body color—black (whereas specialty is indicated by different body colors in the new system).
- (b) Special symbols indicate specific use (same as new system).
- (c) Type of steel is indicated (probably high-grade only) by white band above the rotating band.
- (d) High-explosive bursting charge, if present, is also indicated by a yellow band and red tip on the projectile.

### WEIGHT VARIATION MARKING

The variation of individual projectiles from standard weight is important in the ballistics problem and can be corrected for in setting sights. The variation is therefore indicated by plus or minus signs painted on the projectile.

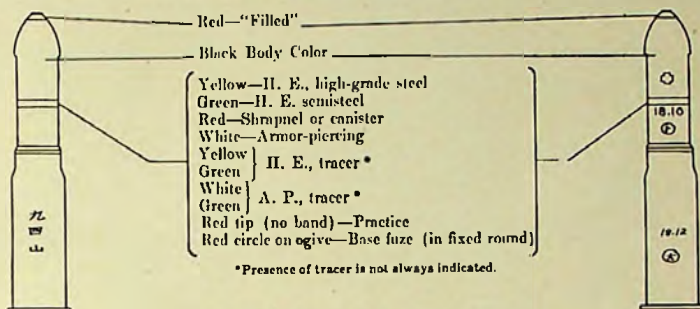
Overweight	++	1.5% to 2.5% overweight
	+	0.5% to 1.5% overweight
Standard weight	±	0.5% plus or minus
Underweight	-	0.5% to 1.5% underweight
	--	1.5% to 2.5% underweight

# MARKING OF JAPANESE ARMY AMMUNITION

## NEW SYSTEM

The new system is based on the old system, but is designed as a simplification in which fewer color bands are used. Body color of projectiles distinguishes broad groups. Color bands designate more specific features. The use of accessory markings such as type numbers, weight marks, dates, and arsenal symbols is the same in both systems.

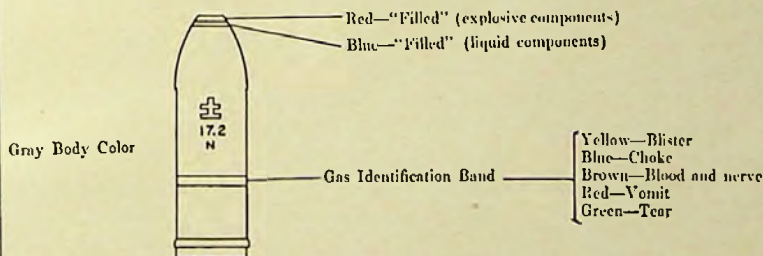
### COMMON EXPLOSIVE TYPES



Hollow-charge ammunition is distinguished from other types in the H. E.—high-grade-steel (yellow band)—group by the presence of the symbol.

Apparently later standardized marking for hollow charge is white band over yellow band (both near the middle of the body), combining armor-piercing designation and H. E. designation.

### CHEMICAL (GAS OR LIQUID FILLED) PROJECTILES



### SPECIAL PURPOSE PROJECTILES

Projectiles designed for special purposes as listed below are identified by the over-all body color and by a special symbol stenciled near the middle of the body.

PROJECTILE	COLOR OF BODY	SYMBOL
Incendiary (WP solution)	Gray	カ
Incendiary (nonliquid)	Yellow	ヤ
Smoke (signal or screening)	White	ケ
Illuminating	Red	ア
Target	Black	モ
Sand-filled	Black	ス

### 75-mm.—Ho 500 and Ho 501 Aircraft Cannon

These guns are known only from documents and there is no information on the ammunition.

### 120-mm.—Ho 600 Aircraft Cannon

This gun is known only from documents and there is no information on the ammunition.

## MEDIUM AND LARGE CALIBER

The color scheme and marking system of medium and large caliber ammunition is important for identification purposes. Two different marking systems, an old and a new, are used.

### 20-mm.—Type 97 Antitank Gun. (Fig. 199)

RECOGNITION.—Necked rimless case 4 $\frac{1}{2}$  in. long and identical to the case used in ammunition for the Ho-1 and Ho-3 Aircraft Cannon. The projectiles are painted black and have identifying color bands painted around the body. Stencilled on the case in purple ink is 九七自 (indicates Type 97 Automatic Antitank Gun). The fuzed projectiles use either the Type 93 or the Type 100 Small Instantaneous Fuze.

TYPES.—Type 98 HET—red band after the bourrelet and green and yellow bands around the body. The projectile uses a Type 93 fuze and has 九八式 (Type 98) stencilled on the body.

Type 97 APT—white band forward of the rotating band.

Type 97 Substitute APT—documentary.

Type 100 APT—green and white bands forward of the rotating band. Type 100 一〇〇式 is stencilled on the body.

Type 100 Substitute HET(SD)—documentary.

Type 100 HET(SD)—a red band aft of the bourrelet and green and yellow bands around the body. Not recovered for this gun.

### Type 98 AA-A/Tk Gun (Fig. 200)

RECOGNITION.—A necked rimless case 5 $\frac{1}{2}$  in. long with projectiles similar to the Type 97 20-mm. guns. The projectiles are painted black over-all and have identifying color bands painted around the body. Stencilled on the case is 九八機 (indicates Type 98 Machine Cannon). The fuzed projectiles use either a Type 93 or a Type 100 Small Instantaneous Fuze.

TYPES.—HET—a yellow band aft of the bourrelet and a white band around the body. The projectile uses a Type 93 fuze.

Type 97 APT—same as for Type 97 gun. Not recovered for this gun.

Type 100 APT—same projectile as that used in ammunition for the Type 97 20-mm. guns.

Type 97 Substitute APT—documentary.

Type 100 Experimental HET—a red band aft of the bourrelet and green and yellow bands around the body. The projectile uses a Type 93 fuze and has 一〇〇式試 stencilled on the body.

Type 100 HET (SD)—same color bands as the experimental model. The projectile uses a Type 100 fuze and has 一〇〇式 stencilled on the body. There are two rounds, differing only in the color of the tracer.

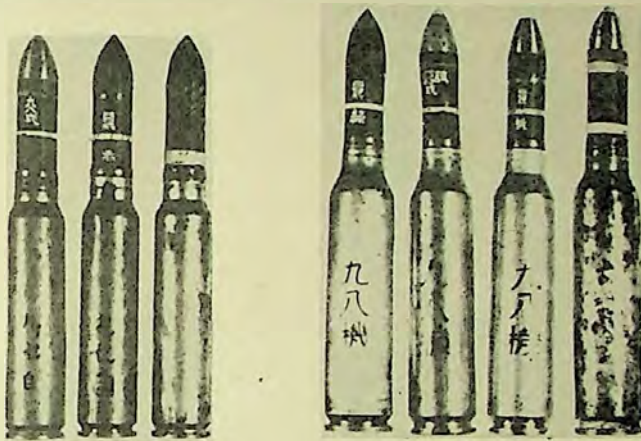


FIGURE 199.

FIGURE 200.

Type 100 Mod. 1 HET (SD)—same projectile and color bands as the Type 100, but it is filled with black powder instead of a high explosive. There are two rounds differing only in the color of the tracer. The projectile uses a Type 100 fuze and has 一〇〇式修 (indicates Type 100 Mod. 1) stencilled on the body.

Type 100 Mod. 2 IT (SD)—same projectile and color bands as the Type 100 and the Mod. 1, but there is no high explosive other than that used in the gaine. The projectile uses a Type 100 fuze and has 一〇〇式二修 (indicates Type 100 Mod. 2) stencilled on the body.

Type 100 Substitute HET (SD)—documentary.

### 37-mm. (Fig. 201)

There are eight 37-mm. Anti-Tank and Tank Guns, all of which fire the same projectiles but have different length cartridge case. Presented below is data on the projectile case lengths and markings, over-all length of rounds, and projectiles that are used in the various guns.

PROJECTILE DATA.—Type 94 HE—both the old and new color schemes have been found. Over-all length of the projectile (unfuzed) is 4¾ in. The type S3 Small Instantaneous fuze is used. (a).

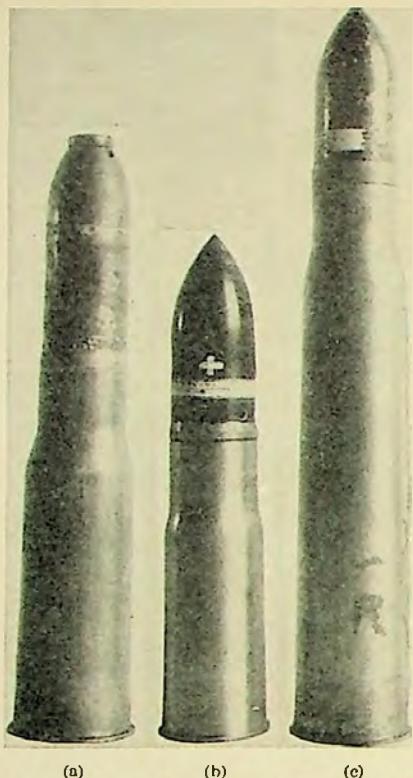


FIGURE 201.

Type 94 AP—recovered with both the new and old color schemes. Over-all length of the projectile (unfuzed) is  $4\frac{1}{2}$  in. and the fuze is the Type 94 Small Delay Base Fuze. (b).

Type 1 AP—recovered only with the new color scheme. Over-all length (unfuzed) is  $4\frac{1}{8}$  inches and the fuze is the Small Mk. 1 Base fuze. (c).

The following projectiles have been reported in documents, but not recovered.

Type 94 Substitute HE—reported to be used in ammunition for the Type 11th Yr. A/Tk. gun, the Type 94 Tank gun, and the Type 94 A/Tk. gun.

Type 94 Substitute AP—reported to be used in ammunition for the Type 11th Yr. A/Tk. gun, the Type 94 Tank gun, the Type 94 A/Tk. gun, and the Type 98 Tank gun.

Type 96 Improved Substitute—reported to be used in ammunition for the Type 94 Tank gun.

12th Yr. Type Substitute—a base-fuzed projectile reported to be used in ammunition for the Type 11th Yr. A/Tk. gun.

12th Yr. Type HE—a base-fuzed projectile reported to be used in ammunition for the Type 11th Yr. A/Tk. gun.

CARTRIDGE CASE DATA.—

Gun	Case length	Case markings
Type 11th Yr. Infantry.....	<i>Inches</i> 4 $\frac{3}{4}$	十一平步
Type 94 Tank.....	5 $\frac{3}{4}$	九四戰
Type 94 A/Tk. <sup>1</sup> .....	6 $\frac{1}{2}$	九四砲
Type 98 Tank <sup>1</sup> .....	6 $\frac{1}{2}$	九八戰
Type 100 Tank <sup>1</sup> .....	6 $\frac{1}{2}$	一〇〇戰
Type 97 A/Tk. <sup>2</sup> .....	9 $\frac{3}{8}$	None
Type 1 A/Tk. <sup>2</sup> .....	9 $\frac{3}{8}$	None
Type 1 Tank.....	9 $\frac{3}{8}$	一戰

<sup>1</sup> Since the Type 94 A/Tk., Type 98 Tank and Type 100 Tank guns use the same cartridge case, cases will be found marked for individual guns or for all three guns.

<sup>2</sup> The cases for the Type 97 and Type 1 A/Tk. guns can be distinguished by the fact that the Type 97 is almost straight, whereas the Type 1 has a pronounced neck. The Type 1 Tank and Type 1 A/Tk. guns use the same case.

COMPLETE ROUND DATA.—

Gun <sup>2</sup>	Projectile <sup>1</sup>		
	Type 94 HE	Type 94 AP <sup>3</sup>	Type 1 AP <sup>3</sup>
Type 11th Yr. Infantry.....	<i>Inches</i> 8 <sup>11</sup> / <sub>16</sub>	<i>Inches</i> 8 <sup>9</sup> / <sub>16</sub>	<i>Inches</i> .....
Type 94 Tank.....	9 <sup>1</sup> / <sub>2</sub>	9	.....
Type 94 A/Tk.....	10 <sup>1</sup> / <sub>2</sub>	10 <sup>3</sup> / <sub>4</sub>	9 <sup>1</sup> / <sub>2</sub> * .....
Type 98 Tank.....	10 <sup>1</sup> / <sub>2</sub>	10 <sup>3</sup> / <sub>4</sub>	.....
Type 100 Tank.....	10 <sup>1</sup> / <sub>2</sub>	10 <sup>3</sup> / <sub>4</sub>	.....
Type 97 A/Tk.....	13 <sup>3</sup> / <sub>4</sub>	13 <sup>3</sup> / <sub>4</sub>	.....
Type 1 A/Tk.....	*13 <sup>3</sup> / <sub>4</sub>	.....	13 <sup>3</sup> / <sub>4</sub>
Type 1 Tank.....	*13 <sup>3</sup> / <sub>4</sub>	.....	13 <sup>3</sup> / <sub>4</sub>

<sup>1</sup> A figure in a projectile column indicates that the projectile has been recovered in ammunition for use in the particular gun and denotes the over-all length of the round.

<sup>2</sup> An asterisk (\*) in a projectile column indicates that documents state that the projectile is used in ammunition for the particular gun, but the round has never been recovered and the overall length is calculated.

<sup>3</sup> A blank indicates that the projectile is not used in that particular gun.

47-mm. (Fig. 202)

There are two 47-mm. guns, a Type 1 Tank and a Type 1 A/Tk., which use the same ammunition.

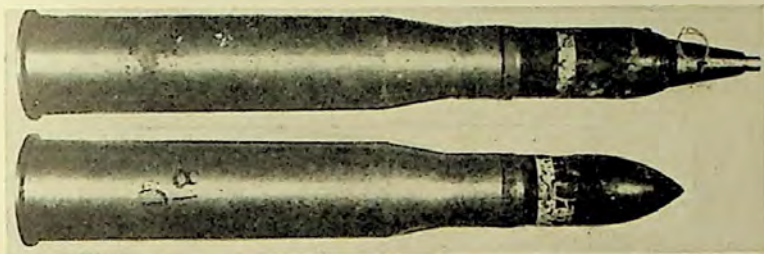


FIGURE 202.  
(a)  
(b)

PROJECTILE DATA.—Type 1 HE—recovered with the new color scheme. Over-all length (unfuzed) is 5<sup>1</sup>/<sub>2</sub> in. and the fuze is the Type 88 Instantaneous (Gun Type) or the Type 88 Short Delay (Gun Type). (a)

Type 1 AP—recovered with the new color scheme. Over-all length (unfuzed) is 5<sup>5</sup>/<sub>8</sub> in. and the fuze is the Small Mk. 2 Base Fuze. (b).

HEAT (Type unknown)—this projectile is known only from captured documents and has not been recovered.

CARTRIDGE CASE DATA.—Both guns use the same cartridge case, the over-all length of which is 11<sup>1</sup>/<sub>2</sub> in. Stencilled on the case is 一砲 (indicates Type 1 A/Tk.) and 一戰 (indicates Type 1 Tank).

COMPLETE ROUND DATA.—

Projectile	Over-all length of round
Type 1 HE.....	15- <sup>3</sup> / <sub>16</sub> " (w/o fuze).
Type 1 AP.....	15 <sup>3</sup> / <sub>8</sub> "
HEAT.....	Unknown.

57-mm. (Fig. 203)

There are two 57-mm. guns, the Type 90 Tank and the Type 97 Tank, which use the same ammunition.

A Type 1 57-mm. Tank gun is mentioned in documents, but there is no information available on either the weapon or the ammunition.

PROJECTILE DATA.—Type 90 HE—has been recovered with both the new and old color schemes. The over-all length (unfuzed) is  $7\frac{1}{2}$  in. and the fuze is the Type 88 Short Delay (Gun Type). (a)

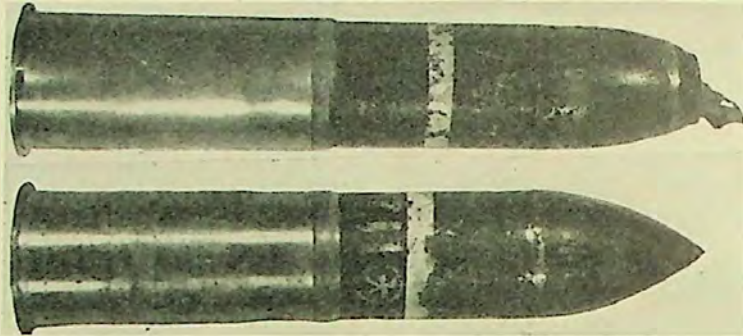


FIGURE 203.

(a)  
(b)

Type 90 Substitute HE—a cast-iron projectile painted black over-all with a red band at the nose. The over-all length is  $7\frac{3}{8}$  in. and the fuze is the Type 88 Short Delay (Gun Type). The projectile is filled with black powder.

Type 92 AP—has been recovered with the new and old color schemes. The over-all length (without fuze) is  $7\frac{1}{16}$  in. and the fuze is the Type 92 Small Base Fuze. (b)

Type 3 HEAT—This projectile is known only from captured documents. The over-all length is  $6\frac{3}{4}$  in. The Type 100 Small Instantaneous Fuze is used.

CARTRIDGE CASE DATA.—Both guns use the same cartridge case, the over-all length of which is  $4\frac{3}{4}$  in. There are no markings pertaining to guns on the case.

COMPLETE ROUND DATA.—

Projectile	Over-all Length of Round
Type 90 HE .....	11" (w/o fuze and adapter).
Type 90 Substitute HE .....	10 $\frac{5}{8}$ ".
Type 92 AP .....	11 $\frac{3}{4}$ ".
Type 3 HEAT .....	10 $\frac{1}{2}$ " (documentary).

70-mm. (Fig. 204)

There are two 70-mm. guns, the Type 92 Infantry Gun (Howitzer) and the Type 94 Tank Gun. They use the same length cartridge case, but use different propellant charges.

PROJECTILE DATA.—Type 92 HE—recovered with both the new and old color schemes. Over-all length (unfuzed) is  $9\frac{1}{4}$  in. and the fuze is the Type 88 Instantaneous (Howitzer-Mortar Type) or the Type 88 Short Delay (Howitzer-Mortar Type). (a)

Type 92 Substitute HE—a cast-iron projectile painted black over-all. Over-all length (unfuzed) is  $7\frac{3}{8}$  in. and the fuze is the same as for the Type 92 HE. This projectile is filled with black powder. (b)



FIGURE 204.

Type 3 HEAT—recovered with the new color scheme. Over-all length (unfuzed) is 9 in. and the fuze is the same as for the Type 92 HE. (d)

Type 97 Semi-Steel HE—this projectile has not been recovered, and is known only from captured documents.

Type 95 AP—this projectile has never been recovered and is known only from captured documents. According to documents, the fuze is the Type 95 Small AP Base Fuze.

Type 95 Illuminating—this projectile has never been recovered and is known only from captured documents. According to documents, the fuze is the Type 89 Small Time fuze.

Type 98 HE—documentary. According to documents, this projectile uses a Type 98 Instantaneous Short Delay fuze.

CARTRIDGE CASE DATA.—Type 92 Infantry Gun (Howitzer)—there are two types of cases, designated "A" and "B." The "A," or older design case, is crimped to the projectile and has a threaded base which may be unscrewed to vary the charge. The "B" or newer design is one piece and is removed from the projectile to vary the charge. (c)

The over-all length is 4 in. The "A" case has no marking pertaining to the gun, but the "B" case is marked 九二步(甲) (indicating Type 92 B).

Type 94 Tank Gun—the case has never been recovered, but according to documents it appears to be the same as the "B" design for the Type 92 Infantry Gun. It is 4 in. long and is stencilled 九四戰 (Type 94 Tank).

#### COMPLETE ROUND DATA.—

Projectile	Gun	
	Type 92 Infantry Gun	Type 94 Tank Gun
Type 92 HE	Inches 12 $\frac{3}{4}$ <sup>1</sup>	Inches *12 $\frac{3}{16}$
Type 92 Substitute HE	11 $\frac{3}{8}$	*11 $\frac{3}{8}$
Type 97 Semisteel HE	X <sup>2</sup>	(3)
Type 95 AP		*12 $\frac{3}{16}$
Type 95 Illuminating	*11 $\frac{1}{2}$	
Type 3 HEAT	11 $\frac{3}{4}$	*11 $\frac{3}{4}$

<sup>1</sup> A figure in a gun column indicates that the projectile has been recovered for use in that gun and denotes the over-all length of the round (w/o fuze). An asterisk by the figure indicates that documents state that the projectile is used in that gun and the figure is documentary only.

<sup>2</sup> An X in a gun column indicates that documents state that the projectile is used in that gun, but the round has never been recovered and the over-all length is not known.

<sup>3</sup> A blank indicates that the gun does not fire that projectile.

#### 75-mm. (Fig. 205)

There are nine 75-mm. guns known to be in use by the Japanese Army and three more have been mentioned in captured documents. The cases and propellant charges vary for the different weapons, but the projectiles are designed to be interchangeable. The specific purpose of a given projectile or a given gun will limit the use of some projectiles in some of the guns.

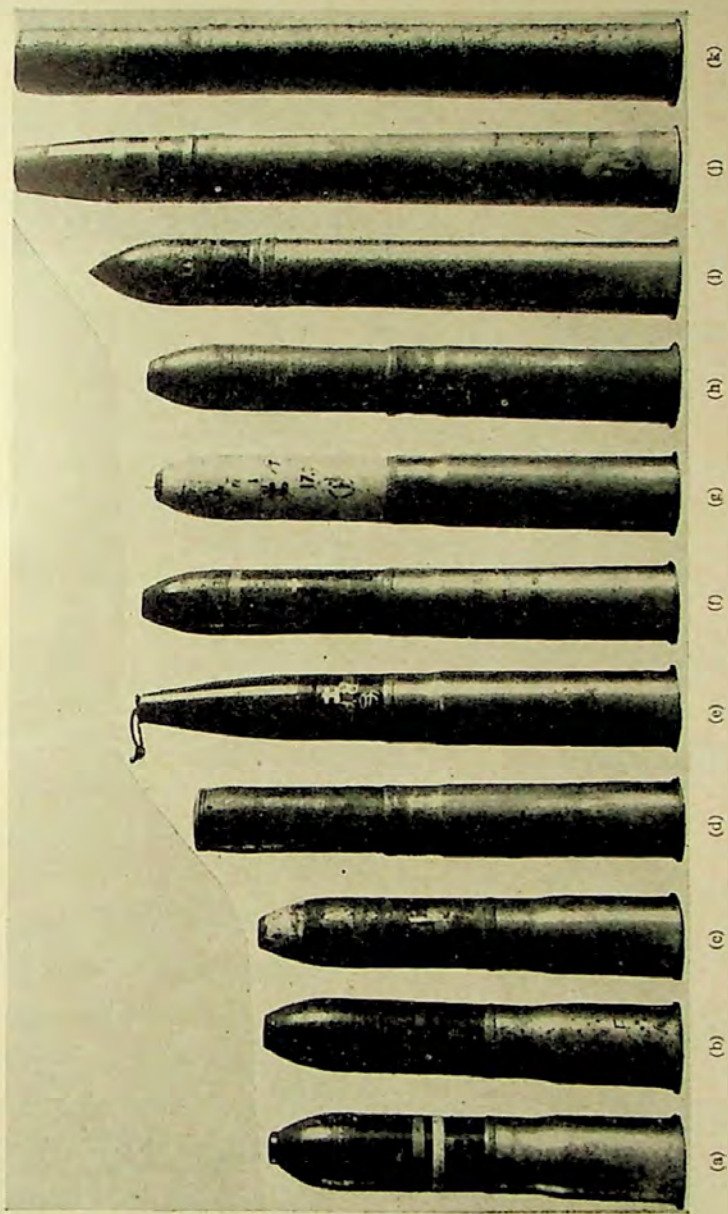


FIGURE 205.

75-MM. PROJECTILE DATA

Projectile	Color scheme found	Over-all length (w/o fuze)	Fuze	Body marking <sup>1</sup>
Type 94 HE (f)	Old and new <sup>2</sup>	11 <sup>15</sup> / <sub>16</sub> "	Type 88 <sup>3</sup>	九四式
Type 90 HE <sup>4</sup>	Not recovered	11 <sup>15</sup> / <sub>16</sub> " <sup>5</sup>	do	Unknown.
Type 10th Year HE <sup>4</sup>	do	11 <sup>15</sup> / <sub>16</sub> " <sup>5</sup>	do	Do.
Type 98 HE	do	Unknown	Type 98 Inst.—Short Delay.	Do.
Type 98 Improved HE	do	do	Type 88	Do.
Type 97 Improved HE	do	do	do	Do.
Type 1 Time HE	do	do	Type 1 Time	Do.
HE "A"	do	do	Type 3d Year Combination.	Do.
HE "B" <sup>6</sup>	Old	12 <sup>3</sup> / <sub>4</sub> "	Type 88 or Type 3d Year Combination.	Do.
Type 90 HE (Long-Pointed) <sup>7</sup> (e)	Old and new	12 <sup>3</sup> / <sub>4</sub> "	Type 88	九〇式
Type 90 HE-AA Long-Pointed (j) <sup>7</sup>	do	10 <sup>3</sup> / <sub>8</sub> "	Type 89 Time Fuze or Type 2 Combination.	None.
Type 90 Semi-Steel HE	Not recovered	Unknown	Type 88	Unknown.
Type 97 Semi-Steel HE (b)	Old and new	11 <sup>3</sup> / <sub>8</sub> "	do	九七式
Type 10th Year Semi-Steel HE	Not recovered	Unknown	Type 88 <sup>3</sup>	Unknown.
Type 87 Semi-Steel Long-Pointed	do	do	do	Do.
Type 90 Substitute "B" <sup>10</sup>	Black over-all	10 <sup>3</sup> / <sub>8</sub> "	do	None.
Type 38 Substitute "A"	Not recovered	Unknown	Type 3d Year Combination	Unknown.
Type 38 Substitute "B"	do	do	Type 88	Do.
Type 90 Substitute "A"	do	do	Type 3d Year Combination, or Type 5th Year Combination	Do.
Type 98 Substitute	do	do	Type 98 Inst.—Short Delay.	Do.
Type 90 Substitute Long-Pointed AA.	do	do	Type 89 Time	Do.
Type 98 Modified HE (c)	Old <sup>10</sup>	11"	Type 88	九八改榴
Type 2 HEAT (a)	Old and new	9 <sup>1</sup> / <sub>2</sub> "	Type 88 <sup>3</sup>	夕
Type 38 Shrapnel (d)	do	9 <sup>3</sup> / <sub>4</sub> "	Type 5th Year Combination.	None.
Type 90 Shrapnel	Not recovered	9 <sup>3</sup> / <sub>4</sub> " <sup>5</sup>	Type 3d Year Combination.	Do.
Type 1 AP <sup>11</sup> (i)	Old and new	9 <sup>7</sup> / <sub>16</sub> "	Medium Mk. 1 Base	Do.
Type 95 Capped AP	Not recovered	Unknown	Type 95 Capped AP Small Base.	Unknown.
Type 95 AP HE <sup>11</sup>	do	do	Type 95 Small Base.	Do.
Type 90 Smoke (g)	New	11 <sup>1</sup> / <sub>2</sub> "	Type 88	ケ
Type 11th Year Smoke	Not recovered	Unknown	Type 3d Year Combination.	Unknown.
Smoke (Type Unknown) <sup>13</sup>	do	do	do	Do.
Type 90 Incendiary	do <sup>14</sup>	do	Type 5th Year Combination.	Do.
Type 12th Year Incendiary.	do	do	Unknown	キ <sup>15</sup>
Incendiary (Liquid) (h)	New	11 <sup>13</sup> / <sub>16</sub> "	Type 88.	力

<sup>1</sup> The body markings listed are only those which will identify the projectile (type number and special symbols).

<sup>2</sup> This projectile has been recovered painted orange over-all. The reason for this is not known.

<sup>3</sup> Wherever the Type 88 fuze appears in this column it indicates that either the Type 88 Instantaneous (Gun Type) or the Type 88 Short Delay (Gun Type) may be used, except where an asterisk is present which indicates that only the Instantaneous Fuze may be used.

<sup>4</sup> This projectile has the same external dimensions as the Type 94, but differs in minor construction features.

<sup>5</sup> Documentary.

<sup>6</sup> This is a projectile that is adaptable for either time or impact fuze. There is a removable adapter which is taken out if it is desired to use a time fuze.

<sup>7</sup> This projectile has a double rotating band and a copper bourrelet.

<sup>8</sup> This projectile has a double rotating band and a copper bourrelet, except when it is used in ammunition for the Type 90 Field Gun, in which case it has only a single rotating band.


<sup>9</sup> This is the marking which indicates Hollow-Charge projectiles.

<sup>10</sup> Red band around nose, wide white adjacent to red band, yellow band at bourrelet, white band at rotating band.

<sup>11</sup> According to documents this projectile has a larger charge than AP projectiles and is intended for function intermediate between that of HE projectiles and true AP projectiles. For this reason the Japanese designate it AP-HE. Documents indicate that this projectile is painted like the HE rather than the AP class.

<sup>12</sup> When this projectile is used in ammunition for the Type 90 Field Gun, it has a double rotating band.

<sup>13</sup> According to drawings from captured documents, this projectile appears to be a converted Type 38 Shrapnel projectile.

<sup>14</sup> According to the new marking system outlined in documents, this projectile may be expected to be painted yellow over-all with the symbol  stencilled near the middle.

<sup>15</sup> This is a cast-iron projectile filled with black powder.

PROJECTILE DATA—Continued

Projectile	Color scheme found	Over-all length (w/o fuze)	Fuze	Body marking
Type 15th Year Illuminating.	Not recovered.....	Unknown.....	Unknown.....	ア <sup>1</sup>
Type 90 Illuminating (k).	Old and new.....	9 1/16".....	Type 5th Year Combination.	ア
Vomit Gas (Type Unknown). <sup>12</sup>	Old.....	12".....	Type 88.....	Unknown.
Type 92 Gas <sup>13</sup>	Not recovered.....	Unknown.....	Unknown.....	Do.
Type 94 Gas <sup>17</sup>	do.....	do.....	do.....	Do.
HE-AA.....	do.....	do.....	Type 10th Year Time.	Do.
Type 11th Year Target.....	do.....	do.....	do.....	赤 or 白
Experimental propaganda.	do.....	10 1/8" <sup>14</sup>	Type 5th Year Combination.	Unknown.

<sup>12</sup> Documentary.

<sup>13</sup> The Type number of this projectile has not been definitely determined. It was recovered for use in the Type 41 Mountain Gun and the only Vomit Gas projectile mentioned in documents for use in this gun is a Type 92 Red projectile.

<sup>14</sup> In addition to the Type 92 Red projectile mentioned above, documents also indicate the existence of Type 92 Yellow and Type 92 Blue projectiles. The Japanese designate their gas projectiles by Type number and by a color which indicates the type of gas (see the color scheme outlined at the beginning of this section).

<sup>15</sup> According to documents Type 94 Red, Type 94 Yellow, and Type 94 Blue projectiles are in existence.

Other projectiles not included above because of the lack of reliability of the documents or because they are probably obsolete are:

Time Practice.

Type 88 Substitute "A," "B."

Type 90 Substitute AA.

Type 94 Shrapnel.

12th Year Type HE.

Type 89 Semi-Steel Long-Pointed.

Type 96 Improved Substitute.

CARTRIDGE CASE DATA.—There are four different sizes of cartridge cases used in the various guns. The table below gives the over-all length and markings on the case which pertain to the type of gun.

Gun	Length (inches)	Markings
Type 41 Mountain Gun (Regimental Gun) <sup>1</sup> .....	7 3/4	None.
Type 94 Mountain Gun.....	11 1/16	九四山
Type 38 Field Gun <sup>2</sup> .....		(4)
		九改四三
		造
Type 41 Cavalry Cannon.....	11 1/16	五三一八
Type 38 Improved Field Gun.....		八
Type 95 Field Gun.....		野野騎野
Type 88 Field/AA Gun.....	10 1/16	八八式七高
Type 88 Field/AA Gun (Special).....		八八式七高 (持)
Type 11th Year AA Gun.....	11 1/16	Unknown.
Type 90 Field Gun.....	16 1/16	九〇白
Type 99 Tank Gun.....	Unknown	Unknown.
Type 1 Self-Propelled Gun <sup>4</sup> .....	16 1/16	Unknown.

<sup>1</sup> This gun was originally designed for use by the artillery and was designated Mountain Gun. Recently, however, it has been used only by the infantry, and for this reason the Allied forces have designated it Regimental Gun.

<sup>2</sup> These 4 guns use the same ammunition and for convenience in reference will hereafter be referred to as the Type 38 Field Gun Group.

<sup>3</sup> The Type 38 Field Gun Group uses the same case as the Type 94 Mountain Gun, but has a different propellant.

<sup>4</sup> Some cases have been found marked only for the Type 38 Field Gun and some marked only for the Type 95 Field Gun.

<sup>5</sup> Both of these guns use the same case, propellant, and projectiles.

<sup>6</sup> This gun uses the same ammunition as the Type 90 Field Gun. The gun has just been recovered and specific rounds used in it are not known.

## 75-MM COMPLETE ROUND DATA

Projectile	Gun <sup>2</sup>					
	Type 41 Moun- tain Gun	Type 91 Moun- tain Gun	Type 38 Field Gun Group	Type 90 Field Gun	Type 88 AA Gun and Type 88 AA Gun (Special)	Type 11th Year Field AA Gun
	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
Type 94 HE.....	1 17 <sup>3</sup> / <sub>4</sub>	2 11 <sup>3</sup> / <sub>4</sub>	2 11 <sup>3</sup> / <sub>4</sub>	2 7 <sup>1</sup> / <sub>4</sub>	*20 <sup>1</sup> / <sub>2</sub>	-----
Type 90 HE.....	*17 <sup>3</sup> / <sub>4</sub>	*21 <sup>3</sup> / <sub>4</sub>	*21 <sup>3</sup> / <sub>4</sub>	*27 <sup>3</sup> / <sub>4</sub>	(?)	-----
Type 10th Year HE.....	*17 <sup>3</sup> / <sub>4</sub>	*21 <sup>3</sup> / <sub>4</sub>	*21 <sup>3</sup> / <sub>4</sub>	-----	-----	-----
Type 98 HE.....	X	X	X	X	X	X
Type 98 Improved HE.....	X	-----	X	-----	-----	-----
Type 97 Improved HE.....	X	-----	X	-----	-----	-----
Type 1 Time HE.....	X	-----	X	-----	-----	-----
HE "A".....	X	X	X	-----	-----	-----
HE "B".....	*17 <sup>3</sup> / <sub>4</sub>	*22 <sup>3</sup> / <sub>4</sub>	*22 <sup>3</sup> / <sub>4</sub>	*27 <sup>3</sup> / <sub>4</sub>	-----	-----
Type 90 HE Long-Pointed.....	*17 <sup>3</sup> / <sub>4</sub>	*22 <sup>3</sup> / <sub>4</sub>	*22 <sup>3</sup> / <sub>4</sub>	*27 <sup>3</sup> / <sub>4</sub>	30 <sup>3</sup> / <sub>4</sub>	-----
Type 90 HE-AA Long-Pointed.....	-----	-----	-----	-----	27 <sup>3</sup> / <sub>4</sub>	-----
Type 90 Semisteel HE.....	*17 <sup>3</sup> / <sub>4</sub>	*21 <sup>3</sup> / <sub>4</sub>	*21 <sup>3</sup> / <sub>4</sub>	*20 <sup>5</sup> / <sub>8</sub>	-----	-----
Type 97 Semisteel HE.....	16 <sup>3</sup> / <sub>4</sub>	20 <sup>3</sup> / <sub>4</sub>	20 <sup>3</sup> / <sub>4</sub>	-----	-----	-----
Type 10th Year Semisteel HE.....	*12 <sup>3</sup> / <sub>4</sub>	-----	*10 <sup>5</sup> / <sub>8</sub>	-----	-----	-----
Type 87 Semisteel Long-Pointed.....	-----	-----	X	-----	-----	-----
Type 90 Substitute HE "B".....	X	X	X	X	-----	-----
Type 38 Substitute "A".....	X	-----	X	-----	-----	-----
Type 38 Substitute "B".....	X	-----	X	-----	-----	-----
Type 90 Substitute "A".....	X	X	X	X	X	-----
Type 98 Substitute.....	X	-----	X	X	-----	-----
Type 90 Substitute Long-Pointed AA.....	-----	-----	-----	-----	X	-----
Type 98 Modified HE.....	16 <sup>3</sup> / <sub>4</sub>	21 <sup>3</sup> / <sub>4</sub>	*21 <sup>3</sup> / <sub>4</sub>	-----	-----	-----
Type 2 HEAT.....	15 <sup>3</sup> / <sub>4</sub>	19 <sup>3</sup> / <sub>4</sub>	19 <sup>3</sup> / <sub>4</sub>	-----	-----	-----
Type 38 Shrapnel.....	15	19 <sup>3</sup> / <sub>4</sub>	10 <sup>3</sup> / <sub>4</sub>	*21 <sup>3</sup> / <sub>4</sub>	*27 <sup>3</sup> / <sub>4</sub>	-----
Type 90 Shrapnel.....	*15 <sup>3</sup> / <sub>4</sub>	*19 <sup>3</sup> / <sub>4</sub>	*19 <sup>3</sup> / <sub>4</sub>	*21 <sup>3</sup> / <sub>4</sub>	*27 <sup>3</sup> / <sub>4</sub>	-----
Type 1 AP.....	15 <sup>3</sup> / <sub>4</sub>	10 <sup>3</sup> / <sub>4</sub>	10 <sup>3</sup> / <sub>4</sub>	24 <sup>3</sup> / <sub>4</sub>	-----	-----
Type 95 Capped AP.....	-----	-----	X	-----	-----	-----
Type 95 AP-II.E.....	*17 <sup>1</sup> / <sub>4</sub>	*22	*22	*27 <sup>3</sup> / <sub>4</sub>	-----	-----
Type 90 Smoke.....	17 <sup>3</sup> / <sub>4</sub>	21 <sup>3</sup> / <sub>4</sub>	21 <sup>3</sup> / <sub>4</sub>	26 <sup>3</sup> / <sub>4</sub>	-----	-----
Type 11th Year Smoke.....	X	-----	X	-----	-----	-----
Smoke (Type Unknown) <sup>1</sup> .....	-----	-----	-----	-----	-----	-----
Type 90 Incendiary.....	*15 <sup>3</sup> / <sub>4</sub>	*19 <sup>3</sup> / <sub>4</sub>	*19 <sup>3</sup> / <sub>4</sub>	*25 <sup>3</sup> / <sub>4</sub>	-----	-----
Type 12th Year Incendiary.....	X	X	X	X	-----	-----
Incendiary (Liquid).....	16 <sup>3</sup> / <sub>4</sub>	21 <sup>3</sup> / <sub>4</sub>	*21 <sup>3</sup> / <sub>4</sub>	*20 <sup>3</sup> / <sub>4</sub>	-----	-----
Type 12th Year Illuminating.....	X	X	X	X	-----	-----
Type 90 Illuminating.....	*15 <sup>3</sup> / <sub>4</sub>	*19 <sup>3</sup> / <sub>4</sub>	*19 <sup>3</sup> / <sub>4</sub>	*24 <sup>3</sup> / <sub>4</sub>	27 <sup>3</sup> / <sub>4</sub>	-----
Vomit Gas (Type Unknown).....	17 <sup>1</sup> / <sub>4</sub>	-----	-----	-----	-----	-----
Type 92 Gas.....	X	-----	-----	-----	-----	-----
Type 94 Gas.....	-----	X	-----	-----	-----	-----
HE-AA.....	-----	-----	-----	-----	-----	X
Type 11th Year Target.....	-----	-----	-----	-----	-----	X
Experimental Propaganda.....	-----	-----	X	-----	-----	-----

<sup>1</sup> A figure in the gun column indicates that the particular projectile has been recovered in ammunition for use in the gun and denotes the over-all length of the round without fuze.

<sup>2</sup> An asterisk beside a figure in the gun column indicates that from documentary evidence it is known that the particular projectile is used in ammunition for the gun. The figure represents the over-all length as derived from documents.

<sup>3</sup> A blank indicates that the projectile is not known to be used in that gun.

<sup>4</sup> An X in a gun column indicates that documents state that the projectile is used in ammunition for the gun, but the round has never been recovered and the over-all length is not known.

<sup>5</sup> This projectile is known only from documents and there is no information as to what guns it is used in or its over-all length.

A single specimen of another 75-mm. gun, a Type 31 Year Rapid Fire Mountain Gun has been recovered, but this is believed to be obsolete and out of use. According to documents, it fires the following projectiles:

Type 94 HE.

Type 97 Improved HE.

Type 98 Modified HE.

88-mm. (Fig. 206)

The only 88-mm. gun known to be in use by the Japanese is the Type 99 8-cm. AA gun. Although designated 8 cm. by the Japanese, the bore diameter is 88 mm. This gun is modeled after one of the German 88-mm. guns.



FIGURE 206.

PROJECTILE DATA.—Type 100 HE-AA Long-Pointed—recovered with the new color scheme. The over-all length (w/o fuze) is  $11\frac{1}{16}$  in. and the fuze is the Type 100 Mechanical Time Fuze with the 75-mm. Auxiliary Detonating Fuze. The projectile has a double rotating band.

CARTRIDGE CASE DATA.—The length of the case is  $22\frac{3}{8}$  in.

COMPLETE ROUND DATA.—The over-all length of the round (w/o fuze) is  $31\frac{1}{16}$  in.

90-mm. (Fig. 207)

According to documents, two guns of this size have been used: a Schneider Type Rapid Fire Gun and a Rapid Fire Gun (type not given). These are believed to be obsolete weapons. According to these documents, these guns fire two projectiles: Shrapnel projectile A, and Shrapnel projectile B.

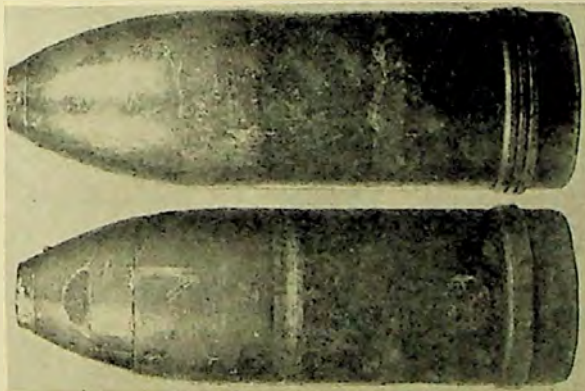


FIGURE 207.

(a)

(b)

The only 90-mm. weapon recovered, other than 90-mm. trench mortars (see Mortar Ammunition), has been a very antiquated weapon found in service on Okinawa. Though this weapon is classified as a "mortar" by virtue of the length of tube, the muzzle velocity, and the

probable employment in combat, it bears only remote resemblance to other common Japanese mortars. It is breech-loading, using an interrupted thread breech block, and employs projectiles embodying the conventional features of design of common breech-loading artillery pieces. The projectiles are fitted with conventional rotating bands and use Type 88 fuzes, armed by rotation. Two projectiles have been recovered.

*H. E. (one-piece body).*—This projectile is painted black and has a yellow band near the middle of the body. The rotating band has two grooves. Over-all length (unfuzed) is 10 $\frac{3}{8}$  in. Fuzing: Type 88 (Howitzer-mortar type). (a)

*H. E. Semisteel (?) (two-piece body).*—This projectile is similar in form to the one above, but has a short body with a screw-in nose-piece completing the ogival contour of the nose. The length with nose-piece is the same as the projectile above. There is a shallow groove immediately below the bourrelet. The body is painted black with a green band in the grooved area. The rotating band is smooth. Fuzing: Type 88 (Howitzer-mortar type). (b)

#### 105-mm. (Fig. 208)

There are several 105-mm. guns and howitzers known or reported from documents to be in use. Ammunition has been recovered



for only a few of these; consequently, much of the information given below is documentary. This size of weapon is designated 10 cm. by the Japanese, but the actual bore diameter is 105 mm.

The AA gun rounds are fixed ammunition but the field gun and howitzer rounds are semi-fixed ammunition.

PROJECTILE DATA.—Type 91 HE—has been recovered with both new and old color schemes. The over-all length (w/o fuze) is 16 $\frac{13}{16}$  in. and the fuze is the Type 88 Instantaneous or the Type 88 Short Delay. (Either the Gun Type or the Howitzer-Mortar Type is used, depending upon the type of weapon in which the projectile is used.) Stencilled

on the body in white paint is 九一式 (Type 91). (c)

Type 91 Long-Pointed HE—has been recovered with both new and old color schemes. The over-all length (w/o fuze) is 19 $\frac{1}{8}$  in. and the fuze is the Type 88 (see above). Some of these projectiles have a copper bourrelet, but others have a machined bourrelet. Other than this there is no difference in the two projectiles. (b)

The projectiles listed below have been mentioned in documents, but not recovered. There is no information available on length or marking of these projectiles.

Type 98 HE.	Type 14 Year Shrapnel.
Type 1 HE.	Type 95 Shrapnel.
Type 14 Year HE.	Type 95 AP-HE.
Type 95 Long-Pointed HE.	Type 14 Year AP-HE.
Type 100 HE AA Long-Pointed.	AP-HE, A, B, and C.
Type 91 Semisteel HE.	Cast-Iron AP-HE, A, B, C, and D.
Type 14 Year Semisteel HE.	Chilled AP-HE, A, B, and C.
Type 14 Year Substitute.	Type 14 Year Smoke.
Type 14 Year Substitute "A".	Type 95 Incendiary.
Type 14 Year Substitute "B".	Type 92 Long-Pointed Blue Gas.
Type 98 Substitute HE.	Type 92 Long-Pointed Yellow Gas.
Type 95 Substitute Projectile.	Type 93 Long-Pointed Red Gas.
HEAT (Hollow Charge).	Type 87 Target.
Type 91 Substitute Long-Pointed AA.	
Type 38 Shrapnel.	

CARTRIDGE CASE DATA.—The over-all lengths of recovered cartridge cases are:

Type 91 Howitzer.....	9 $\frac{1}{2}$ " (a).
Type 92 Field Gun.....	29" (d).

Cartridge cases for the following 105-mm. weapons have not been recovered, but length of case can be supplied from documents in some instances:

Type 14 Yr. Modified Howitzer.....	No data.
Type 38 Field Gun.....	11 $\frac{1}{8}$ " (approx.).
Type 14 Yr. Field Gun.....	18 $\frac{1}{8}$ " (approx.).
Type 14 Yr. AA Gun.....	22 $\frac{3}{4}$ ".

COMPLETE ROUND DATA

Projectile <sup>1</sup>	Type 91 Howitzer	Modified Type 14 Year Howitzer	Type 14 Year Field Gun	Type 38 Field Gun	Type 92 Field Gun	Type 14 Year AA Gun
Type 91 HE.....	*X	X	X	*X	*X	(?)
Type 92 HE.....	X				X	
Type 98 HE.....	X					
Type 1 HE.....	X					
Type 14 Year HE.....	X	X	X	X		
Type 91 Long-Pointed HE.....	*X	X	X	*X	X	X
Type 95 Long-Pointed HE.....	X	X	X	X	X	X

<sup>1</sup> An X in a gun column indicates that according to documentary evidence, the projectile can be used in that gun. An asterisk by the side of the X indicates that the projectile has been recovered with its packing box marked for use in that particular gun.

<sup>2</sup> A blank indicates that the projectile is not used in that gun according to information taken from documents.

Projectile	Type 91 Howitzer	Modified Type 14 Year Howitzer	Type 14 Year Field Gun	Type 38 Field Gun	Type 92 Field Gun	Type 14 Year AA Gun
Type 91 HE-AA Long-Pointed						3*40 <sup>11</sup> / <sub>16</sub> "
Type 100 HE-AA Long-Pointed						X
Type 91 Semisteel HE	X	X	X	X	X	
Type 14 Year Semisteel HE	X	X	X	X	X	
Type 14 Year Substitute			X	X	X	X
Type 14 Year Substitute "A"		X	X	X	X	
Type 14 Year Substitute "B"	X	X	X	X	X	
Type 98 Substitute	X					
Type 95 Substitute "A"	X	X				
Type 91 Substitute Long-Pointed AA	X					X
HEAT						
Type 38 Shrapnel			X	X	X	
Type 14 Year Shrapnel			X	X	X	
Type 95 Shrapnel	X	X				
Type 95 AP-HE	X	X	X	X	X	
14 Year Type AP-HE			X	X	X	
AP-HE, A, B, and C			X	X	X	
Cast-Iron AP-HE, A, B, C, D			X	X	X	
Chilled AP-HE, A, B, C			X	X	X	
Type 14 Year Smoke (WP)			X	X	X	
Type 95 Incendiary	X	X	X	X	X	
Type 92 Long-Pointed Blue Gas			X	X	X	
Type 92 Long-Pointed Yellow Gas			X	X	X	
Type 93 Long-Pointed Red Gas			X	X	X	
Type 87 Target						X

<sup>1</sup> This figure represents the over-all length of this round with fuze. Since the other weapons use semifixed ammunition, there is no need for the over all length figure.

120-mm. (Fig. 209)

There is only one weapon of this size known to be in use. This weapon, a Type 38 Howitzer, was thought to be obsolete, but has been encountered in recent operations.



FIGURE 209.

Another weapon, an Experimental 12 cm. Fixed AA Gun, has been reported in documents, but no information is available on the gun or the ammunition.

PROJECTILE DATA.—Shrapnel—recovered with the old color scheme. The over-all length is 12<sup>3</sup>/<sub>16</sub> in. and the fuze is the Type 5 Year Combination fuze. Three shrapnel projectiles, designated A, B, and C are listed in captured documents. It is not known which of these the recovered projectile is. (c)

AP-HE—recovered with the old color scheme. The over-all length is 14<sup>15</sup>/<sub>16</sub> in. and the fuze is the Type 88 Small Base fuze (Howitzer-Mortar Type). (b)

Several other projectiles have been mentioned in documents, but not recovered.

Type 98 HE.

Type 98 Semisteel HE, A and B.

Cast-Iron AP-HE.  
 Type 96 Improved Substitute.  
 Type 88 Substitute A, B, F, H.  
 AP-HE, A and B.

CASE DATA.—A straight rimmed case  $3\frac{1}{4}$  in. in length. (a)

Two other guns, a Schneider Type Rapid Fire Gun and a Krupp Type 40 Caliber Rapid Fire Gun are mentioned in documents, but nothing is known about the guns or the ammunition.

150-mm. (Fig. 210).

There are several 150-mm. guns and howitzers known to be in use or reported from documents. Ammunition has been recovered for only a few of these so much of the information given below is documentary. All of the rounds are semifixed ammunition.

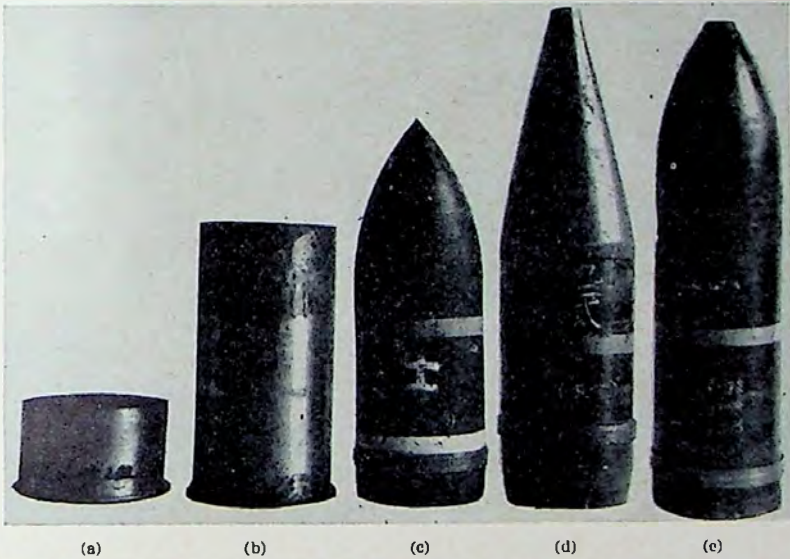


FIGURE 210.

PROPELLANT CASE DATA.—The over-all lengths of recovered propellant cases are:

Type 38 Howitzer.....	$4\frac{1}{4}$ in. (a).
Type 96 Howitzer.....	$12\frac{5}{8}$ in. (b).

Propellant cases for the following weapons have not been recovered and there is no information on their length.

Type 4 Year Howitzer:	
Case "A".....	$10\frac{3}{16}$ in.
Case "B" (two piece).....	$8\frac{7}{8}$ in.
Type 45 Gun.....	}..... $48\frac{1}{2}$ in.
Type 7 Year Gun.....	
Type 90 Gun.....	
Type 89 Gun uses a bag charge approximately 26" long.	

PROJECTILE DATA.—Type 92 HE—has been recovered with both new and old color schemes. The over-all length (w/o fuze) is  $22\frac{3}{16}$  in. and the fuze is the Type 88 Instantaneous or the Type 88 Short Delay (either the Gun type or the Howitzer-Mortar type may be used, depending upon which type of weapon the projectile is used in). Stencilled on the body in white paint is 九二式 (Type 92). (e)

Type 92 Long-Pointed HE—has been recovered with both the new and old color schemes. The over-all length (w/o fuze) is  $22\frac{3}{16}$  in. and the fuze is the Type 88. Stencilled on the body in white paint is 九二式 (Type 92). A variation of this round with a double rotating band and copper bourrelet has been recovered. (d)

Smoke (type unknown)—recovered with black body, yellow band at bourrelet and white band at rotating band. The smoke symbol ケ is stencilled on the body in white paint. Over-all length (w/o fuze) is  $19\frac{3}{16}$  in. and the fuze is the Type 88. This projectile corresponds to a Type 13 Year Smoke mentioned in documents.

Gas (type unknown)—recovered with the old color scheme (has a broad red band). Over-all length (w/o fuze) is 23 in. and the fuze is the Type 88.

Type 95 AP-HE (for Howitzer)—recovered with old color scheme. The over-all length is  $17\frac{1}{2}$  in. and the fuze is the Type 95 Medium Base Fuze. (c)

The projectiles listed below have been mentioned in documents, but not recovered. Lengths are given where available from documents.

Type 96 HE.	
Type 11 Year HE.....	$23\frac{3}{16}$ in. (w/o fuze).
Type 93 HE.....	$25\frac{1}{4}$ in. (w/o fuze).
Type 90 Long-Pointed HE.	
Type 93 Long-Pointed HE.....	27 in. (with Type 90 fuze).
Type 96 Long-Pointed HE.	
HEAT.	
Type 10 Year Semisteel HE.	
Type 96 Substitute A and B.	
Substitute A, B, and C.	
Improved Substitute A and B.	
Shrapnel "A" (for howitzer).....	$17\frac{1}{4}$ in. (with Type 5 Year Fuze).
Shrapnel "B" (for howitzer).....	15 in. (w/o Fuze).
Shrapnel (for gun—two rotating bands).....	$19\frac{1}{4}$ in. (with Type 5 Year Fuze).
AP (type unknown).	
Cast-Iron AP-HE, A C, D, G, and H.....	$17\frac{1}{16}$ in. (A and D).
Modified Cast-Iron AP-HE.	
AP-HE (for howitzer).....	$17\frac{1}{16}$ in.
AP-HE (for gun—two rotating bands).....	23 in.
Type 95 AP-HE (for howitzer).....	$17\frac{1}{16}$ in.
Type 95 AP-HE (for gun—two rotating bands).....	20 in.
AP-HE "A".	
Substitute AP (type unknown).	

Substitute AP-HE.  
 Type 11 Year Smoke.  
 Type 13 Year Smoke.  
 Type 89 Illuminating.  
 Type 92 Long-Pointed Yellow Gas.  
 Type 92 Long-Pointed Blue Gas.  
 Type 93 Long-Pointed Blue Gas.  
 Type 93 Long-Pointed Red Gas.

COMPLETE ROUND DATA

Projectile <sup>2</sup>	Gun <sup>1</sup>						
	Type 4 Year Howitzer	Type 96 Howitzer	Type 38 Howitzer	Type 89 Gun	Type 45 Gun	Type 7 year Gun	Type 90 Gun
Type 92 HE	*X	*X	*X	(?)			
Type 92 Long-Pointed HE	X	*X	*X				
Type 93 Long-Pointed HE				*X	X	X	X
HEAT		X					
Type 96 HE		X					
Type 11 Year HE	X		X				
Type 93 HE				X	X	X	X
Type 96 Long-Pointed HE				X	X	X	X
Type 90 Long-Pointed HE	X						
Type 10 Year Semisteel HE	X		X				
Type 96 Substitute A and B	X	X	X				
Type 96 Substitute HE		X					
Substitute A, B, and C	X	X	X	X	X	X	X
Improved Substitute A and B	X	X	X	X	X	X	X
Shrapnel "A" (for howitzer)	X	X	X	X	X	X	X
Shrapnel "B" (for howitzer)	X	X	X	X	X	X	X
Shrapnel (for gun—2 rotating bands)							
AP (type unknown)				X	X	X	X
Cast-Iron AP-HE	X		X				
Modified Cast-Iron AP-HE			X				
AP-HE (for howitzer)	X	X	X	X	X	X	X
AP-HE (for gun—2 rotating bands)							
Type 95 AP-HE (for howitzer)							
Type 95 AP-HE (for gun—2 rotating bands)							
AP-HE "A"			X				
Substitute AP (type unknown)				X	X	X	X
Substitute AP-HE				X	X	X	X
Type 11 Year Smoke	X						
Type 13 Year Smoke							
Type 89 Illuminating	X	X	X		X	X	X
Type 92 Long-Pointed Yellow Gas	X	X	X				
Type 92 Long-Pointed Blue Gas	X	X	X				
Type 93 Long-Pointed Blue Gas	X	X	X				
Type 93 Long-Pointed Red Gas	X	X	X				
Smoke (type unknown) <sup>3</sup>							
Red Gas (type unknown) <sup>3</sup>							

<sup>1</sup> X with an asterisk indicates recovered for that gun. X alone indicates reported in documents but not recovered.

<sup>2</sup> Blank space indicates projectile not used for that gun.

<sup>3</sup> Have been recovered but there is no information on the gun in which used.

240-mm.

Two weapons, the Type 45 Howitzer and the Type 96 Howitzer, have been reported in documents. No information is available other than a list of the projectiles that may be used in these weapons.

Type 95 AP.

AP (type unknown).

Cast-Iron AP (type unknown).

Substitute AP (type unknown).

### 270-mm.

Only one weapon, a Krupp type howitzer, has been reported in documents. The only projectile known from documents is a cast-iron AP which uses a Type 88 Coastal Gun Base fuze.

### 280-mm.

The only weapon of this size known from documents is a howitzer (type unknown). This howitzer is reported to fire two projectiles, a Type 95 AP which uses the Type 95 Large Mk. 3 Base fuze and a cast-iron AP which uses a Type 88 Coastal Gun Base fuze.

### 300-mm. (Fig. 211)

Only one weapon of this size, a Type 7-Yr. Howitzer, has been encountered. This howitzer is designated 30 cm by the Japanese, but the bore diameter is 302 mm.

PROJECTILE DATA.—AP-HE (large)—recovered with new color scheme. The over-all length is 48½ in. and the fuze is the Type 95 Large Mk. 2 Mod. 2 Base fuze. (c).

AP-HE (small)—recovered with new color scheme. The over-all length is 42½ in. and the fuze is the Type 95 Large Mk. 2 Mod. 2 Base fuze. According to documents there are two projectiles using this fuze, a Type 95 and a Type 95 "B", but the type numbers of the recovered projectiles are not known. (b)

Type 90 AP-HE—reported in documents. Uses a Type 90 Large Delay Base fuze.

CARTRIDGE CASE DATA.—A very large case 19½ in. long and 12½ in. in diameter at the mouth. (a)

Substitute AP-HE.  
 Type 11 Year Smoke.  
 Type 13 Year Smoke.  
 Type 89 Illuminating.  
 Type 92 Long-Pointed Yellow Gas.  
 Type 92 Long-Pointed Blue Gas.  
 Type 93 Long-Pointed Blue Gas.  
 Type 93 Long-Pointed Red Gas.

COMPLETE ROUND DATA

Projectile <sup>2</sup>	Gun <sup>1</sup>						
	Type 4 Year Howitzer	Type 96 Howitzer	Type 38 Howitzer	Type 89 Gun	Type 45 Gun	Type 7 year Gun	Type 90 Gun
Type 92 HE.....	*X	*X	*X	(?)			
Type 92 Long-Pointed HE.....	X	*X	*X				
Type 93 Long-Pointed HE.....				*X	X	X	X
HEAT.....		X					
Type 96 HE.....		X					
Type 11 Year HE.....	X		X				
Type 93 HE.....				X	X	X	X
Type 96 Long-Pointed HE.....				X	X	X	X
Type 90 Long-Pointed HE.....	X						
Type 10 Year Semisteel HE.....	X		X				
Type 96 Substitute A and B.....	X	X	X				
Type 96 Substitute HE.....		X					
Substitute A, B, and C.....	X	X	X	X	X	X	X
Improved Substitute A and B.....	X	X	X				
Shrapnel "A" (for howitzer).....	X	X	X	X	X	X	X
Shrapnel "B" (for howitzer).....	X	X	X				
Shrapnel (for gun—2 rotating bands).....				X	X	X	X
AP (type unknown).....				X	X	X	X
Cast-Iron AP-HE.....	X		X				
Modified Cast-Iron AP-HE.....	X	X	X	X	X	X	X
AP-HE (for howitzer).....							
AP-HE (for gun—2 rotating bands).....							
Type 95 AP-HE (for howitzer).....							
Type 95 AP-HE (for gun—2 rotating bands).....							
AP-HE "A".....			X				
Substitute AP (type unknown).....				X	X	X	X
Substitute AP-HE.....				X	X	X	X
Type 11 Year Smoke.....	X						
Type 13 Year Smoke.....							
Type 89 Illuminating.....	X	X	X		X	X	X
Type 92 Long-Pointed Yellow Gas.....	X	X	X				
Type 92 Long-Pointed Blue Gas.....	X	X	X				
Type 93 Long-Pointed Blue Gas.....	X	X	X				
Type 93 Long-Pointed Red Gas.....	X	X	X				
Smoke (type unknown) <sup>3</sup> .....							
Red Gas (type unknown) <sup>3</sup> .....							

<sup>1</sup> X with an asterisk indicates recovered for that gun. X alone indicates reported in documents but not recovered.

<sup>2</sup> Blank space indicates projectile not used for that gun.

<sup>3</sup> Have been recovered but there is no information on the gun in which used.

240-mm.

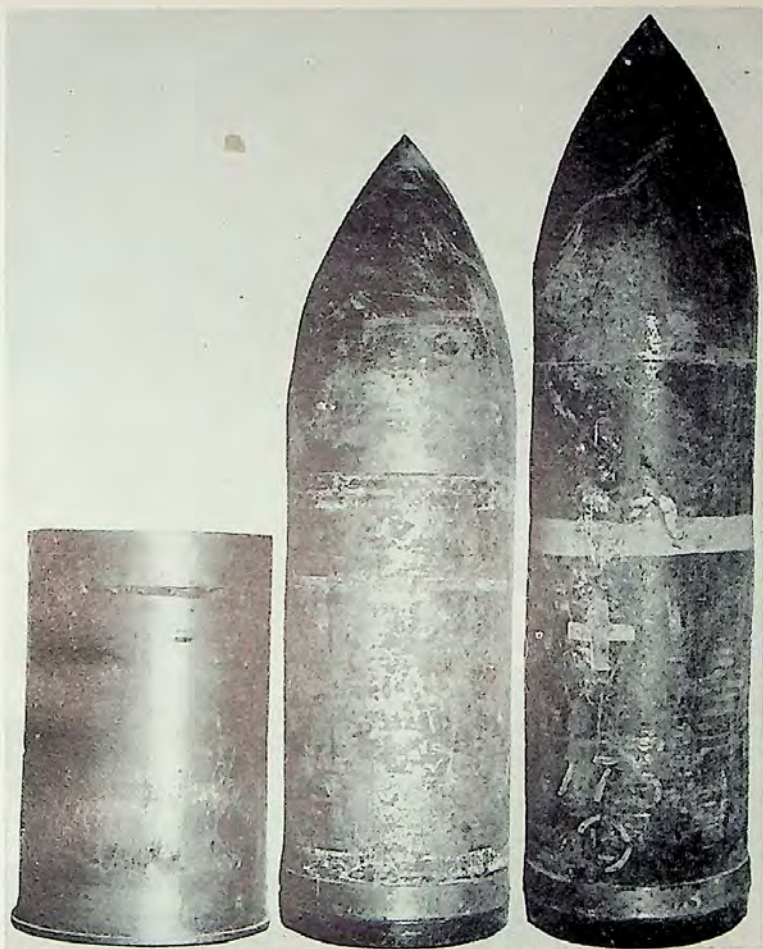
Two weapons, the Type 45 Howitzer and the Type 96 Howitzer, have been reported in documents. No information is available other than a list of the projectiles that may be used in these weapons.

Type 95 AP.

AP (type unknown).

Cast-Iron AP (type unknown).

Substitute AP (type unknown).



(a)

(b)

(c)

FIGURE 211.

## MORTARS

The Japanese Army uses a large number and many types of mortars varying in size from 50 mm. to 320 mm. In addition to the usual finned type of projectile, stick mortars and spigot mortars are used.

Mortars are an important weapon in the Japanese Army, being used by the Artillery as well as the Infantry. Weapons larger than any used by Allied forces may be encountered.

### 50-mm.

**TYPE 10 YEAR GRENADE DISCHARGER.**—This is the forerunner of the "Knee Mortar" and though it is old, is still in limited use. The following ammunition may be used:

Type 91 Hand Grenade. (See Grenades.)

Type 11 Year Smoke Grenade. (See Grenades.)

Type 10 Year Flare—a cylindrical tube with an ogival nose and a propellant assembly attached to the base. The over-all length is  $5\frac{7}{8}$  in., the color of the body is natural brass, and the propellant assembly is black. There are eight sets of perforations covered with silver foil disks on the main body (Fig. 212).



FIGURE 212.



FIGURE 213.

Signal Flares. (See Pyrotechnics.)

Also reported from documents are Type 92 Red and Type 92 Green Gas shells. (See Color Markings in Introduction.)

**TYPE 89 GRENADE DISCHARGER** (Fig. 213).—This is the weapon

referred to as the "Knee Mortar." It has a rifled bore and a provision for varying the range with a fixed angle of elevation.

Type 91 Hand Grenade. (See Grenades.) (a)

Type 89 HE—a steel projectile with a brass nose fuze, rounded nose and smooth copper rotating band. The propellant charge is contained in the base. The over-all length is  $6\frac{1}{4}$  in. and the fuze is the Type 88 Small Instantaneous fuze. Both old and new color schemes have been recovered. Also Navy color markings—green nose band, black body, yellow and white body bands. (b)

Type 95 Smoke—similar in appearance to the Type 89 HE. Over-all length is  $6\frac{1}{4}$  in. and the fuze is the Type 89 Small Time fuze. Color is black overall with a red band at the nose, a white band below the bourrelet, and a white band above the rotating band. The smoke symbol (  $\zeta$  ) is stencilled on the body in white. (c)

Type 10 Year Flare. (See "Type 10 Year Grenade Discharger" above.)

Type 89 Flare—similar to the Type 10 Year Flare. (See above.) The over-all length is  $6\frac{1}{4}$  in. and the over-all color is aluminum. Around the side of the body are four silver foil disks, each covering seven ports in the body. (d)

Signal Flares. (See Pyrotechnics.)

Type 94 Practice—same dimensions as the Type 89 HE. Has a dummy fuze in the nose.

Type 94 Substitute—documentary.

TYPE 98 SPIGOT MORTAR.—This is a unique weapon designed to neutralize enemy positions immediately before an assault.

Demolition Block—a cast-iron body containing blocks of picric acid, mounted on a stick 21 in. long. When the projectile is fired, two pull igniters in the charge ignite a delay train of 7 seconds. Two sizes have been recovered—one is  $4\frac{1}{2}$ " x 6", the other  $4\frac{3}{4}$ " x  $4\frac{3}{4}$ " (Fig. 214).



FIGURE 214.

FINNED BANGALORE TORPEDO.—This bangalore is described in Chapter VII. It is fired from the Type 98 Mortar.

FINNED PROJECTILE (Fig. 215).—A tear-drop shaped projectile with 6 fins. A hole  $\frac{5}{8}$  in. in diameter is drilled through the tail just forward of the fins. The body is black with a red nose band and a yellow band forward of the bourrelet. The propellant, fuze, and weapon are not known.

### 70-mm.

TYPE 11 YEAR MORTAR (Fig. 216).—An old weapon of poor design and probably obsolescent.

Type 11 Year HE—a projectile similar in appearance to the Type 89 50-mm. projectile. Recovered with the old color scheme. The over-all length (fuzed) is 8½ in. and the fuze is the Type 93 Mortar fuze. (a)

Type 11 Year Substitute HE—reported in documents only.

Type 89 Illuminating—reported in documents only.

Type 11 Year Smoke—reported in documents only.



FIGURE 215.



(a) (b)  
FIGURE 216.

AA BARRAGE MORTAR (Fig. 216).—A weapon used for area bombardment or AA fire.

Barrage Shell—a cylindrical tube with a wooden plug in the top and a metal cover with gas ports on the base. The over-all length is 11¼ in. and the color is black with a red band at the nose and white characters on the body. (b)

**CAUTION:** This shell carries seven small explosive tubes attached to parachutes. Dismantling this shell is particularly dangerous.

### 81-mm.

ANTIAIRCRAFT MORTAR (Fig. 217).—A smooth bore mortar designed for use against low-flying aircraft. The three types of rounds that are used have the same external construction. The body is a steel tube with six fins attached to the after end and an ogival wooden nose piece in the forward end. The propellant container is attached to the base, but is lost in flight.

HE AA Round—the forward portion of the body contains a steel tube filled with HE and attached to two parachutes. The after-portion contains a delay train and an expelling charge. A pull on the parachute cord operates a friction igniter. A self-destroying

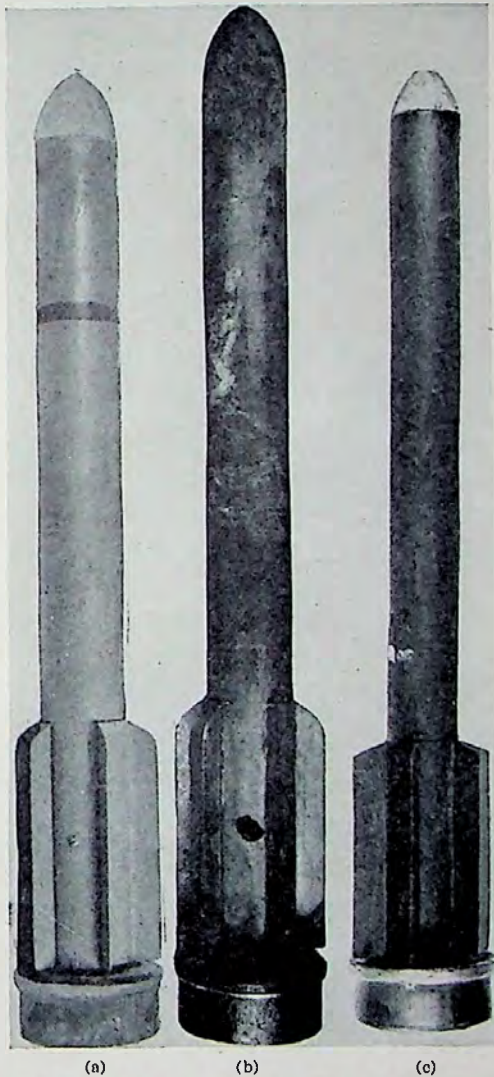


FIGURE 217.

element operates after 45 seconds of fall. The color is black over-all with a plain wooden nose. The over-all length is 21 in. (c)

Flare Round—the main body contains a flare and attached parachute, an ejection charge, and a delay ignition tube. The after-

portion contains a propellant charge and primer. The flare is ignited directly by the ejection charge when expelled. The body is unpainted galvanized iron; the wooden nose plug is painted red. The length is 22½ in. (b)

HE Smoke Round—similar to the HE AA Round, except that there is a smoke pellet in the bottom of the suspended cylinder. The expelling charge ignites the smoke-flare pellet which burns about 53 seconds and which then ignites the short delay train which burns 7 seconds before the self-destroying element functions. As with the HE AA round, the line to the upper parachute is attached to a pull igniter and if pulled before the self-destroying feature operates, will detonate the charge. The body is unpainted galvanized iron with a yellow wooden nose and green band on the body. Over-all length is 21¾ in. (a)

#### 82-mm.

CHINESE MORTAR (Fig. 218).—HE projectiles have been recovered for an 82-mm. mortar. They are tear-drop shaped with eight flat, radial tail fins. The over-all color is either gray or black. Chinese characters are stamped in the body and fuze. Left-handed swastikas are painted or stamped on the body.

#### 81-mm., 90-mm., 120-mm., and 150-mm.

Standard Japanese mortars of these sizes are smooth bore, muzzle loading weapons similar to United States mortars. Because of the similarity in construction and appearance of the ammunition all four sizes are discussed together.

The ammunition consists of a tear-drop shaped body with either 6 or 12 fins on the tapered end. The propellant cartridge and primer fit in the tail with additional charges placed in the fins or around the tail section forward of the fins. On the forward part

of the projectile is a bourrelet with several bearing surfaces separated by grooves.

The chart below gives necessary identification data on the ammunition.



FIGURE 218.

STANDARD JAPANESE MORTARS

Weapon	Projectile	Color scheme found	Number of fms	Over-all length (unfuzed)	Fuze	Fig. No.
Type 3 Year 81 mm <sup>1</sup>	Type 97 HE	Old and new	6	11 1/4"	Type 93	219a
Type 97 81 mm	Type 100 HE	Old and new	6	11 1/2"	Type 100	219b
Type 99 81 mm	Type 100 Semisteel HE	New	6	Data not available	Type 100	
Type 94 90 mm	Type 94 HE	New	6	15 7/8"	Type 93	220a
Type 97 90 mm	Type 97 HE	Not recovered	Unknown	Unknown	Type 100	
	Type 100 HE	Not recovered	Unknown	Unknown	Type 100	
	Type 94 Heavy HE	Not recovered	6	30 1/4"	Type 93	
	Type 94 Semisteel HE	New	6	14 3/4"	Type 93	220b
	Type 94 Practice	Not recovered	Unknown	Unknown	Type 93	
	Incendiary <sup>2</sup>	4	6	16"	Type 93	
	Gas (Red) <sup>3</sup>	New	6	Unknown	Unknown	
Type 2 120 mm	HE	New	12	22 1/2"	Type 100	221
Type 93 150 mm	Type 93 HE	Unrecovered	Unknown	Unknown	Unknown	
Type 96 150 mm	Type 96 HE	New	6	28 3/4"	Type 93	222a
Type 97 150 mm	Type 97 HE	New	6	24"	Type 100	222b

<sup>1</sup> This weapon is an old (1928) Army mortar. It is not to be confused with the new Type 3 (1943) Navy 81-mm. mortar.

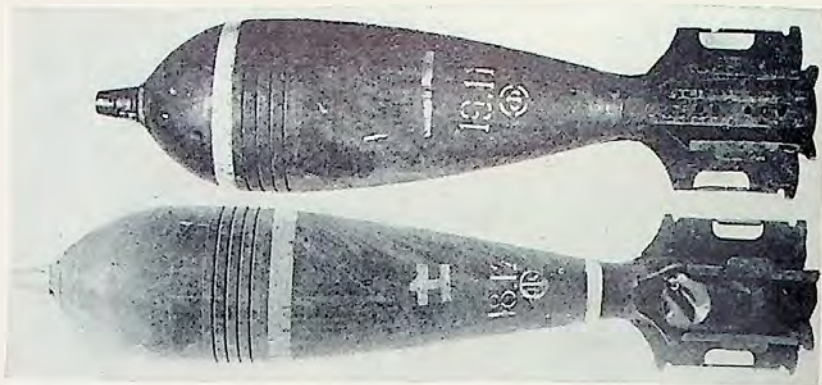
<sup>2</sup> The full designations are the Type 93 Instantaneous-Short Delay Mortar fuze and the Type 100 Instantaneous-Short Delay Mortar fuze.

<sup>3</sup> This projectile is filled with a white phosphorus-carbon disulphide solution and rubber pellets impregnated with phosphorus. A Type 11 Year Incendiary projectile is mentioned in documents, but it is not known if it is this projectile.

<sup>4</sup> Black body, red and blue nose bands, and a yellow band around the body.  
<sup>5</sup> Reported in documents only. Also reported is a Type 13 Year Smoke, but it is not known from what mortar it is fired.

<sup>6</sup> Reported from documents to have a black body with yellow, white, red, and blue bands around the body. Type 95 Red and Yellow Gas projectiles are mentioned in documents.

<sup>7</sup> Stencilled on the body in white is **一〇〇式** (Type 100).



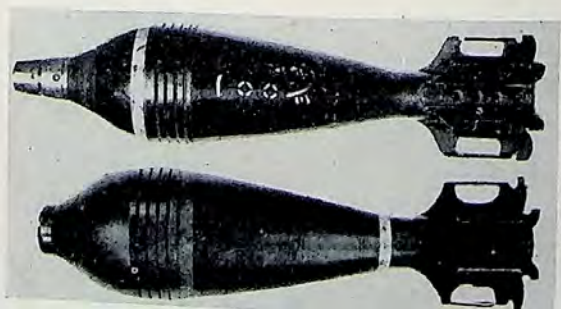
(a) (b) FIGURE 222



FIGURE 221.



(a) (b) FIGURE 220.



(a) (b) FIGURE 219.



FIGURE 223.

320-mm.

**SPIGOT MORTAR (Fig. 223).—**This is a very large crude weapon designed for defensive warfare.

**HE**—a large bomb-like projectile made in three pieces. The tail section is a hollow cylinder which fits over the spigot of the mortar. Four fins are welded on to the tail section. Over-all length is 59½ in. Color is a black body with a red nose tip and a yellow band at the base of the nose section.

#### IMPROVISED MORTARS

Several sizes of crude, improvised mortars designed to fire artillery projectiles or improvised mortar projectiles have been found in the Philippines. To date, there is no record of their effective use against United States forces. Their use emphasizes the extent to which mortars are used by the Japanese Army.

58-mm. (Fig. 224).

The mortar was not found, but several HE rounds of improvised ammunition of this size have been recovered. In appearance the round is similar to the U.S. Army 60-mm. Illuminating projectile M83A1.



FIGURE 224.

The projectile is crudely made consisting of three parts. Four fins are welded to the tail and the igniting cartridge is a cut-down .50 caliber shell. The fuze is the Type 88 modified so that centrifugal action is not necessary to arm the fuze.

### **Miscellaneous.**

Also recovered have been improvised 60-mm., 75-mm., 78-mm., 120-mm., and 127-mm. mortars. Two improvised stick mortars, a 75-mm. and a 120-mm., have also been found.

The 75-mm. and 120-mm. mortars were used to launch standard artillery projectiles.

The 78-mm. mortar closely resembles the 70-mm. barrage mortar in appearance and is thought to fire remodelled 75-mm. projectiles with fins attached to the base.

Ammunition has not been recovered for the other weapons listed above.

### **FUZES**

The fuzes employed in Japanese Army artillery are generally of conventional design, having setback and centrifugal arming features and impact firing. Frequently the firing pin protrudes above the body. This type fuze is particularly sensitive and must be handled with respect.

It is beyond the scope of this publication to describe the construction or operation of these fuzes. They are included for purposes of identification only.



Fig. 229  
Type 88 Small



Fig. 225  
AZ1505  
German 40mm Fuzes



AZ1504  
German 40mm Fuzes



Fig. 227  
Type 93 Small



Fig. 233  
Type 100 Delay-Inst.  
Mortar Fuze



Fig. 226  
Type 160 Small



Fig. 232  
Type 83 Delay Gun or  
Howitzer Fuze



Type 1 Super-Detonating



Fig. 231  
Type 88 Inst. Gun or  
Howitzer Fuze



Fig. 225  
Type 2 Med.  
Ho 5 20mm Fuzes



Type 2

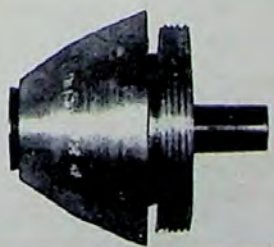


Fig. 230  
Ho 301 40mm Fuze



Fig. 235  
Type 90 Inst.-Short Delay



Fig. 234  
Type 93 Delay-Inst.  
Mortar Fuze

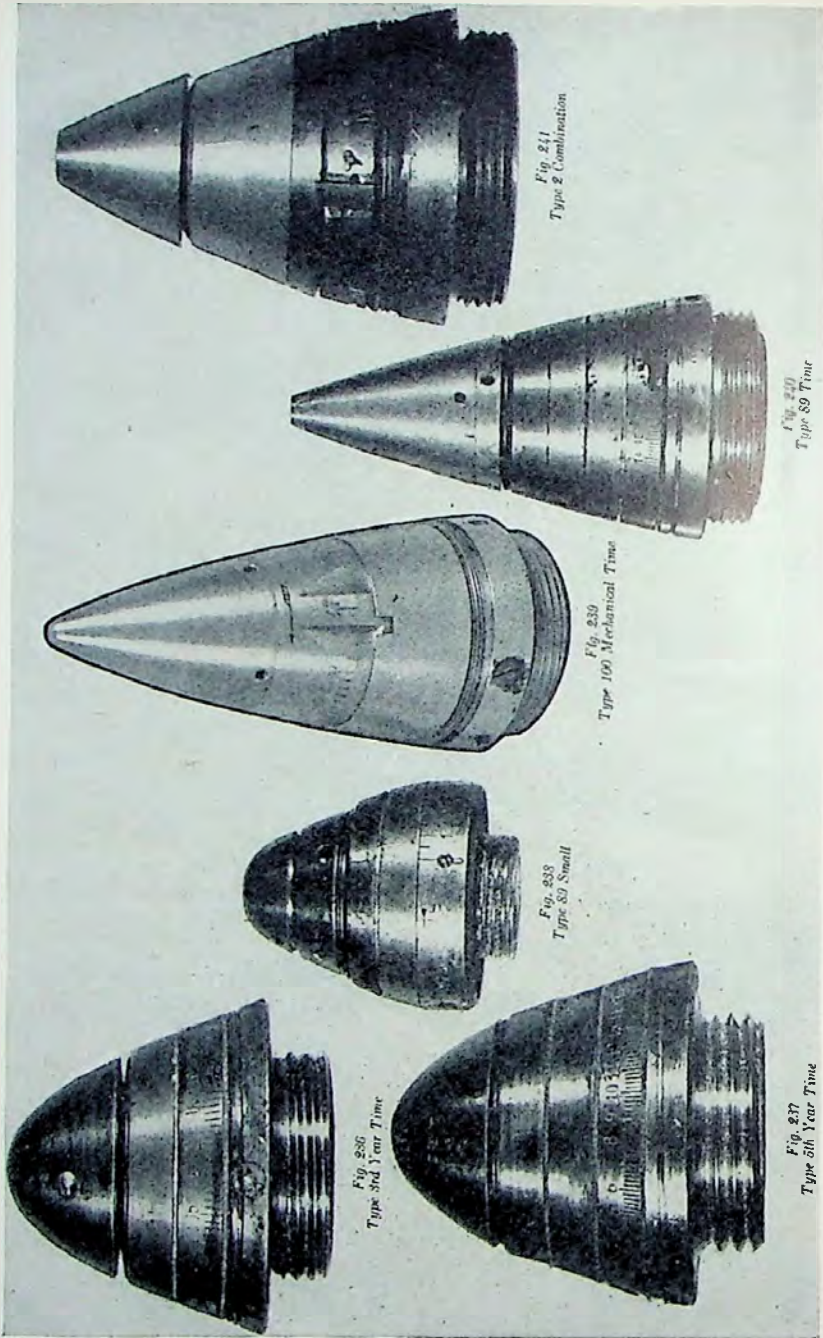




Fig. 242  
Small Mark 1 Base



Fig. 243  
Small Mark 2 Base

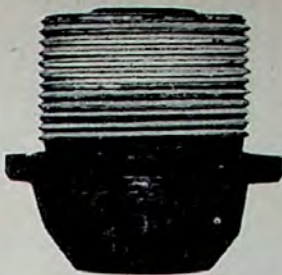


Fig. 244  
Medium Mark 1 Base



Fig. 245  
Type 94 Small Delay  
Base



Fig. 246  
Type 92 Small Delay Base



Fig. 247  
320mm Spigot Mortar Fuse



Fig. 248  
Type 88 Small How-  
itzer-Mortar Base



Fig. 249  
Type 96 Large Mark 2 Base



Fig. 250  
Type 95 Medium Base  
(Howitzer-Mortar Type)

## NAVY AMMUNITION

Navy ammunition has been divided into the following classes:

Small Arms (7.7 mm., 7.9 mm., 13 mm., 13.2 mm.).

Aircraft Cannon Ammunition (20 mm. and 30 mm.).

Antiaircraft "Automatic Weapons" (25 mm. and 40 mm.).

Large Caliber Ammunition (5 cm. and above).

### SMALL ARMS

Navy small arms ammunition typically is marked by a colored ring around the primer in the base of the cartridge case and a standard color scheme is followed in 7.7 mm., 7.9 mm., and 13.2 mm. In the 13-mm. ammunition, patterned directly after a German design, this system is not followed, but instead, the body of the projectile is painted in a distinctive color for each type.

#### 7.7-mm. (Fig. 251)

##### WEAPONS.

Type 92—A. A. M. G. (Lewis design)—Drum magazine.

Type 92—Flexible A. C. M. G. (Lewis design)—Drum magazine.

Type 97—Fixed A. C. M. G. (Vickers design)—Link belt feed.

RECOGNITION.—Rimmed brass bottle-necked case  $2\frac{3}{16}$  in. long. Interchangeable with British caliber .303. Length of complete round is  $3\frac{1}{8}$  in.

##### TYPES.

Ball—Black around primer.

Tracer—Red around primer.

A. P.—White around primer.

I (WP)—Green around primer.

I (HE)—Purple around primer.

#### 7.9-mm.

##### WEAPONS.

Type 1—Flexible A. C. M. G.

This gun is the Navy version of the Japanese Army Type 98 A. C. M. G. and the German M. G. 15.

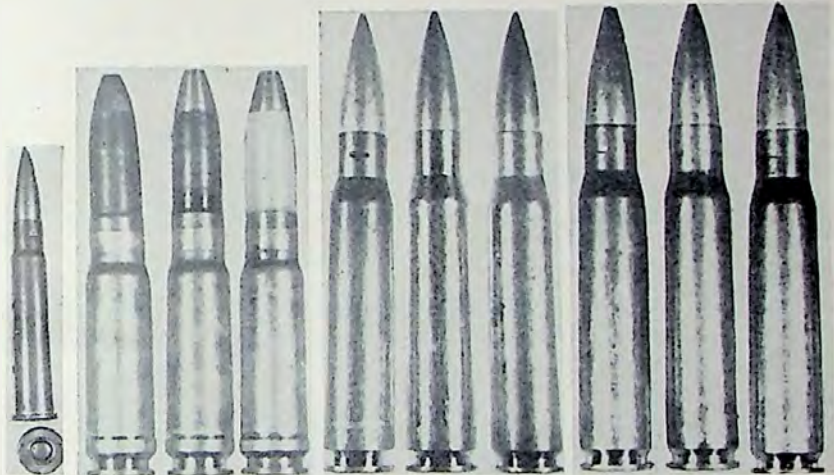
Though the weapon has been recovered, ammunition is known from documentary sources only. It is presumed to be identical to Army 7.9 ammunition except for marking.

**TYPES.**

- Ball—Black around primer.
- Tracer—Red around primer.
- A. P.—White around primer.
- I (WP)—Green around primer.
- I (HE)—Purple around primer.

**13-mm. (Fig. 252)**

**WEAPON.**—Type 2—A. C. M. G. (Copy of German 13 mm Rheinmetall-Borsig)



**FIGURE 251.**

**FIGURE 252.**

**FIGURE 253.**

**FIGURE 254.**

**RECOGNITION.**—Reduced-rim brass case  $2\frac{1}{2}$  in. long with a shoulder on the case above the extractor groove. Over-all length of complete round is  $4\frac{1}{8}$  in. All rounds have a nose fuze or a dummy fuze plug.

The body of the projectiles are painted in distinctive colors after the system used in 20-mm. aircraft cannon ammunition.

**TYPES.**

- Tracer (dummy fuze plug)—Red body.
- HET (fuzed)—Red body, brown band.
- \*HE (fuzed)—Maroon (rust).
- I (WP) (fuzed)—Yellow body.
- \*APT—White body.
- \*Practice—Black body.

Rounds marked by an asterisk (\*) have not been recovered.

13.2 mm.

WEAPONS.

Type 93—A. A. M. G. (Fig. 253).

Type 3—Fixed or Flexible A. C. M. G. (Fig. 254).

RECOGNITION.—Rimless brass case,  $3\frac{3}{8}$  in. long. Very similar in appearance but not interchangeable with U. S. Cal. .50. Over-all length of round is  $5\frac{1}{8}$  in.

The standard Navy code for marking small arms ammunition is used.

TYPES.

Ball—Black around primer.

Tracer—Red around primer.

A. P.—White around primer.

I (WP) (documentary only)—No data.

I (HE)—Recovered: Yellow around primer;

Documentary: Purple around primer

AIRCRAFT CANNON AMMUNITION (20 MM. AND 30 MM.)

20 mm.

Naval 20-mm. ammunition is divided into two classes, Type 99 Mk I and Type 99 Mk II. Both use reduced-rim cases which may be identified by length.



FIGURE 255.



FIGURE 256.

Mk I case—2¾ in. (Fig. 255).

Mk II case—4 in. (Fig. 256).

Both guns listed below use the same projectiles with their respective cases.

Type 99—Mk I fixed or flexible AC.

Type 99—Mk II fixed or flexible AC.

Nose impact fuzes are used with the projectiles listed. They are:

Small Jump-out Type (Swiss).

Model 1—Large jump-out type.

Model 2—Rotor type.

Model 3—Air column fuze.

Two-piece Fuze (undesignated).

#### TYPES:

HE (Swiss)—Yellow or dark brown.

HE (Swiss)—Light brown.

HET (SD) (Swiss)—Black.

HE—Dark brown.

HE Mod. 2—Dark brown with two white bands.

HET—Red (this round may or may not be self-destroying).

HET Mod. 1—Red with one white band.

HET Mod. 2—Red with two white bands.

HET Mod. 3—Red with three white bands.

HET Mod. 4—Red with one wide white band.

HET Mod. 5—Red, no bands. Has a two-piece steel and brass fuze.

HEI—Greenish-yellow.

HEI Mod. 1—Greenish-yellow with one white band.

HEI Mod. 2—Greenish-yellow with two white bands.

HEI Mod. 3—Greenish-yellow with three white bands.

HEI Mod. 4—Greenish-yellow with one wide white band.

HEI Mod. 4 (Special)—Greenish-yellow with † in white (documentary).

HEI Mod. 5—Yellow. No bands. Fuze tipped red.

API—White with copper nose cap. No fuze.

AP-HE—White. No fuze (documentary).

Tracer—Red. No fuze.

Tracer Mod. 2—Red with two white bands. No fuze.

Tracer Mod. 3—Red with three white bands. No fuze.

Practice—Black. No fuze.

### 30-mm. (Fig. 257)

USE.—Type 2—30-mm. Aircraft Cannon.

RECOGNITION. A short brass reduced-rim case  $3\frac{3}{8}$  in. long with a comparatively short projectile. Only one fuze, a rotor type, has been recovered. Over-all length of round is  $6\frac{1}{8}$  in.



FIGURE 257.

#### TYPES.

HEI—Greenish-yellow.

HET—Red.

Practice (Tracer)—black with a red dummy fuze.

The following rounds have been reported in documents, but have not been recovered. The color scheme given in the document does not conform to the standard scheme previously reported.

#### TYPES:

Practice—Yellow with three white bands or overall black.

Tracer—Yellow with three white bands or black with red nose.

Incendiary—Black. Designation "Ordinary" is thought to mean HE. If this is true, the color for this projectile is refuted by the recovered round.

HE—Yellow or rust colored.

AP-HE—White.

Also reported in documents is a 17 Experimental 30-mm. Model 1 which has a higher velocity and rate of fire and uses a heavier projectile than the Type 2 gun.

### 40-mm.

Only one gun, designated 17 Experimental 40-mm. Model 1, has been mentioned in documents. Neither the gun nor the ammunition has been recovered.

ANTI-AIRCRAFT "AUTOMATIC WEAPONS" (25 MM. AND 40 MM.)

25-mm. (Fig. 258)

USE.—Type 96 25-mm. Antiaircraft Gun.

RECOGNITION.—A large tapering bottle-necked rimless case of either brass or steel. Length of the case is  $6\frac{1}{8}$  in. The projectile has a wide rotating band and is painted one color over-all. The nose fuze may be either all brass or half brass and half steel. The over-all length of the round is  $8\frac{3}{8}$  in. Two types of fuzes, a Model 1 and a Model 4, have been recovered.

TYPES:

HE—Maroon or dark brown. The maroon rounds may have a green band at the nose. Model 1 or Model 4 Fuze.

HET—Red or orange with or without a green band at the nose. Some of these rounds have a removable tracer and a red-ringed primer. Model 1 or Model 4 Fuze.

HET (SD)—Red with or without a green band at the nose. These rounds are self-destroying and there is no way of distinguishing them from the HET. Both brass and steel cases have been recovered. Model 1 or Model 4 Fuze.

HEI—Green over-all. Both brass and steel cases have been recovered. Model 1 or Model 4 Fuze.

APT—White, smoky blue or black. The cavity is filled with tracer and clay. This projectile appears to be converted from a Practice projectile. Both brass and steel cases have been recovered.

Tracer—Orange over-all with dummy fuze.

Practice—Black over-all with dummy fuze in the nose.

Tracer—Red (documentary).

Tracer (Mods. 1 and 2)—(documentary).

40-mm. (Fig. 259)

USE.—Vickers-Armstrong Type Antiaircraft or Antitank Gun.

RECOGNITION.—Straight rimmed brass case  $6\frac{1}{4}$  in. long with a deep crimp in the neck, and a large screwed-in primer. The type of projectile is indicated by the over-all color. The length of the rounds is  $11\frac{1}{8}$  in., with the exception of the AP round which is  $10\frac{1}{8}$  in. long.

**TYPES.**

HE—Maroon with a green band at the nose. This projectile uses a Vickers Type time fuze (small powder-train fuze).

HE (British)—Brown with a red band around the body and a green band at the nose. Projectile has a blue point detonating fuze.

AP—White with green nose. Base detonating fuze.

Tracer—Orange. The explosive cavity of this projectile is empty and closed with a nose plug.

In addition the following are listed in documents:

Practice—HET.

Time Practice—HET Mod. 1.



FIGURE 258.

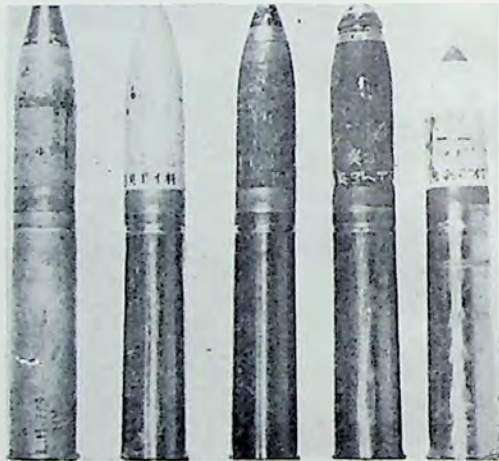


FIGURE 259.

**LARGE CALIBER (5-CM. AND ABOVE)**

Japanese naval large caliber projectiles are divided into the following classes:

HE—Nose-fuzed projectiles with high charge/weight ratio.

Common—Solid nosed base-fuzed projectiles for light penetration.

This group includes capped or uncapped projectiles with high charge/weight ratio.

AP—Capped rounds for penetration of heavy armor. These projectiles have a much lower charge/weight ratio than Common.

Illuminating—Contains a parachute-suspended illuminating flare.

Incendiary shrapnel—Contains an HE bursting charge and a canister of white phosphorus-filled steel pellets.

Shrapnel—None recovered.

Smoke Tracer—No specimens recovered. Details not known.

Target—Identification not complete. May be a target-indicating projectile.

Practice—Inert loaded projectiles for practice firing.

Drill—Dummy projectiles or complete rounds for drill in handling. Not to be fired.

#### COLOR SYSTEM OF JAPANESE LARGE CALIBER NAVAL AMMUNITION

The Japanese Navy designates types of projectiles by over-all coloring, while specific features are indicated with color bands. The data on page 178 were first obtained from documents and later substantiated from recovered rounds. Certain projectiles have been found that do not fit the color scheme in the present form. Wherever such a discrepancy occurs in the following pages, the over-all color and markings for the projectile concerned will be given.

#### 5-cm. (Fig. 260)

USE.—Short 5-cm. Gun (bore diameter 47 mm.).

RECOGNITION.—A fixed round with a short rimmed brass case  $5\frac{1}{8}$  in. long. The projectile has an extremely wide corrugated rotating band, probably the best identification feature. Over-all length of the round is  $8\frac{1}{4}$  in.

#### TYPES.

Common—Filled with black powder. A base ignition fuze closes the cavity.

Practice—Long ogive (documentary).

Practice—Short ogive (documentary).

#### 6 cm.

A 6-cm. gun with Common and Practice projectiles is listed in documents.

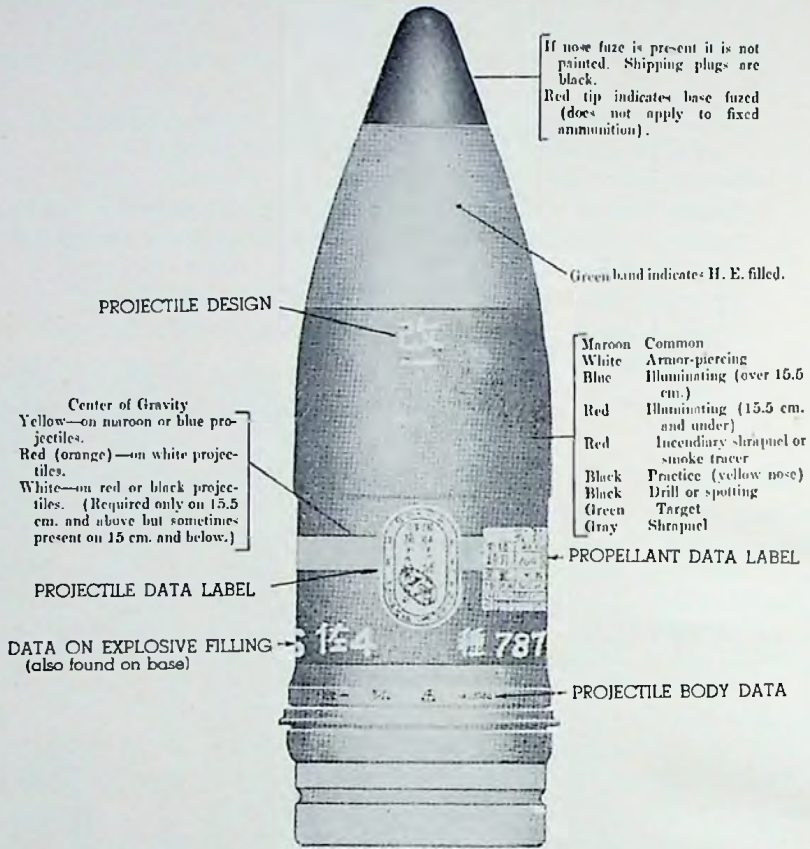
#### 8 cm.

The caliber of this ammunition actually is 3 in. but it is designated 8 cm. by the Japanese. There are both fixed and semifixed rounds in this class.



FIGURE 260.

# MARKING OF JAPANESE NAVY LARGE CALIBER PROJECTILES



### Fixed Ammunition

USE.—Type 3 Year—8-cm. 40-caliber Dual Purpose Gun. Type 88—8-cm.40-caliber Dual Purpose Gun (documentary).

RECOGNITION.—A long brass-rimmed case 16¼ in. in length.

#### TYPES.



FIGURE 261.

HE (nose fuze)—A relatively short-ogived projectile. It may be fitted with either a brass pointed nose time fuze, the Type 89, or a short brass impact fuze, the Type 5 Year. An adapter ring is used with the impact fuze. Over-all length of the round is 28 in. (Fig. 261).

Special Common—This projectile is designated AP by the Japanese but has common projectile markings. The over-all length of the round is 25¾ in. Type 1 fuze (Fig. 262).

Unidentified projectile—A long ogived projectile of three-piece construction, consisting of lower body, upper body, and windshield. Black over-all except for the nose, which is unpainted.



FIGURE 262.

Documentary evidence indicates the use of these rounds:

- Anti-Submarine.
- Smoke Tracer.
- Tracer.
- Target.
- Shrapnel.
- Practice.

### Semifixed Ammunition

USE.—8-cm. 40 caliber gun.

RECOGNITION:

A separate brass rimmed cartridge case, with a protruding primer. Case length is 15½ in.

#### TYPES.

HE—Projectile is similar to the fixed round but has no adapter ring. It takes the Type 5 Year impact fuze. The base plug is designed to take a fuze but it has not been recovered. Length of projectile is 10¼ in. (Fig. 263).

Practice—Two rounds. One is similar to the HE round, having a long ogive and a solid pointed nose. The length of the projectile is 10¼ in. The other round is shorter and has a blunt nose. Both projectiles are filled with sawdust.

The following 8-cm. guns have been listed in documents:

(a) 8-cm. Short Dual Purpose Gun.

Projectile Types:

HE.

Shrapnel.

Practice.

Time Practice.

(b) 8-cm. Short Gun.

Projectile Types:

HE.

Practice.

(c) Type 98—8-cm. 60-caliber gun.

No data.



FIGURE 263.



FIGURE 264.

## 10-cm.

### USE.

Type 98—10-cm. 50-caliber Dual Purpose Gun (documentary).

Type 98—10-cm. 65-caliber Dual Purpose Gun (recovered).

RECOGNITION.—Fixed ammunition with a bottle necked, rimmed case.  $32\frac{1}{4}$  in. long.

### TYPES.

HE—Type 88 nose impact fuze or Type 98 time fuze. Projectile is  $12\frac{5}{8}$  in. long. Over-all length of the round is  $43\frac{1}{8}$  in.

Dummy—Uses a nonstandard steel case. Length of complete round is 46 in. Dummy brass fuze in the nose. Black over-all (Fig. 264).

Practice—(Documentary).

Time Practice—Reported in captured documents.

## 12-cm.

### Semifixed Ammunition (Fig. 265)

### USE.

12-cm. 45-caliber Type 11 Year. Gun.

12-cm. 45-caliber Type 3 Year. Gun.

RECOGNITION.—A separate rimmed brass cartridge case  $21\frac{1}{2}$  in. long and with a protruding primer. (f) Steel cartridge cases have been reported in documents.

TYPES.—These projectiles are of conventional design and have an extremely high lip on the rotating band.



FIGURE 205.

HE (no adapter ring)—The nose is threaded to receive a Type 5 Year impact fuze. Length of projectile is  $16\frac{1}{4}$  in. (a).

HE (adapter ring)—This projectile is threaded to receive the Type 5 Year impact fuze (with adapter). Over-all length of projectile is  $16\frac{1}{4}$  in.

Common (base fuzed)—Over-all length of projectile is  $16\frac{3}{8}$  in. Type 3 Year Mk 1 Base fuze. (b).

Practice—A blunt nosed round with the cavity closed by a solid base plug. Projectile length is 15 in. (c).

Practice—Black with no yellow band at nose. This projectile has a dummy nose fuze and is filled with sawdust. The cavity is closed with a solid base plug. Projectile length is  $16\frac{1}{4}$  in.

Practice—A sharp nosed projectile painted over-all black with a white band at the center of gravity. Length of projectile is  $16\frac{1}{2}$  in. (d).

Drill—Black over-all with two heavy brass bands around the body. This projectile is never fired from a gun, being used entirely for practice loading. Over-all length of projectile is 15 in.

Star—Blue over-all with a yellow band below the bourrelet. Uses a 30-second nose time fuze. Projectile length is  $13\frac{13}{16}$  in. (e).

Type 3 Illuminating—Reported in documents.

#### Fixed Ammunition

Two 12-cm. guns using this type of ammunition have been recovered with several of their respective rounds. Others are mentioned in documents but have not been identified. Each gun and its ammunition are listed separately.

USE.—12-cm. 45-caliber Type 10 Year Dual Purpose Gun.

RECOGNITION (Fig. 266).—A fixed round with a very long necked brass cartridge case, 28 in. in length. Steel cartridge cases have been reported in documents.

#### TYPES.

HE Mod. 1—No base plug. Over-all length of projectile unfuzed is 14 in. Type 91 Time or Type 88 Impact fuze.

A Type 91 or a Type 4 gaine is used with the Type 91 fuze. (a).

HE Mod..2—Same size and shape as Mod. 1 but contains a base plug. Same fuzing as Mod. 1.

Common (base fuzed)—Length of projectile not available.

Incendiary Shrapnel—Characters meaning Incendiary-Shrapnel are stencilled on the body in white. Length of the projectile fuzed is  $16\frac{3}{4}$  in. Type 91 Time fuze with Type 91 or Type 4 gaine. (b).



FIGURE 206.

Time Practice (Spotting)—Length of projectile is  $15\frac{3}{4}$  in.  
Same fuze as above. (e).

Dummy—Over-all length is 37 in. Projectile has a dummy  
nose fuze. (e).

Practice—Converted from service projectile. Maroon with  
yellow nose and black band at the center of gravity. Length  
of projectile is 16 in. (d).

Documentary evidence indicates the following additional projectiles  
exist:

- Anti Submarine.
- Practice.
- Time Practice.
- Target.
- Star.

USE.—12-cm. Short Antiaircraft and Antisubmarine Gun.

RECOGNITION (Fig. 267).—Fixed ammunition with a short, tapered, rimmed brass case  $11\frac{1}{4}$  in. long.



FIGURE 267.

TYPES.

HE—Projectile length is  $12\frac{1}{2}$  in. while the over-all length is  $22\frac{1}{2}$  in. Type 0 Time or Type 88 Model 4 Impact fuze. This projectile is thought to be designated "Antisubmarine" by the Japanese.

12.7-cm. (Fig. 268)

USE.

12.7-cm. 40-caliber Type 88 Dual Purpose Gun.  
12.7-cm. 40-caliber Type 89 Dual Purpose Gun (documentary).

RECOGNITION.—A fixed round with a brass rimmed, bottle-necked case, 22 in. long. Steel cartridge cases have been reported in documents.

TYPES.

HE—May use either a Type 91 Time or a Type 88 Impact fuze. Projectile length is  $15\frac{1}{2}$  in. Over-all length is  $38\frac{1}{4}$  in. A Type 91 or a Type 4 gaine is used with the Type 91 fuze.



FIGURE 268.

Information concerning several new important developments in 12.7 ammunition has been obtained from PW sources.

These projectiles are included with rounds reported in documents.

Star—Burns 15 seconds and extinguishes when contacting water. A Type 3 Illuminating projectile is listed in documents but it is not known if it is the above round.

Special Star—Burns longer and brighter than that listed above.

Antisubmarine—Fuze may set at 0 or 5 (not known whether time or depth setting). If set at 0 it explodes just before entering the water or on impact. If set at 5 the shell will explode about 100 feet under water and not on impact. A bottle-shaped projectile.

Type 3 AA—Blunt-nosed, time-fuzed projectile loaded with steel shot.

Type 4 Antiradar—Time-fuzed, aerial-burst projectile loaded with "floating, light material" (a window projectile).

Practice.  
Time Practice.  
Type 3—Incendiary Shrapnel.

A 12.7-cm. 50-caliber Bag Gun is mentioned in documents with the following projectiles:

Practice.  
Time Practice.  
Star.  
HE (nose fuze).  
Type 3—Illuminating.  
Type 3—Incendiary-Shrapnel.

14-cm. (Fig. 269)

USE.

14-cm. 50-Caliber Type 3 Year Bag Gun.  
14-cm. 40-Caliber Gun (documentary).



FIGURE 269.

RECOGNITION.—Separate loading rounds, with the propellant in silk bag. All the projectiles, except one HE design, have a double rotating band with a high lip on the after band.

TYPES.

Common (capped)—Has a soft iron cap crimped to the nose. Projectile is 22 in. long. The base plate is threaded internally to receive the Type 13 Mk 1 Mod. 1 base fuze. (a).  
Common (uncapped)—Same fuzing as the capped Common. Length of projectile is 22 in. (b).

HE (for AA fuzing)—Projectile is 21 in. long. The nose is threaded to take either a Type 91 time fuze or a Type 88 impact fuze.

HE (for impact fuzing only)—This projectile has a single rotating band and has a large nose adapter to take the Type 5 Year fuze. No other fuze fits with the adapter removed. Length, with adapter, 21 in. (e).

Illuminating—Length of projectile is 23 in. Uses the Type 91 time fuze. (d).

Documentary Rounds—

Practice.

Antisubmarine.

The 15-cm. (152-mm., 6-in.) and 15.5-cm. (155 mm.) ammunition are so nearly the same diameter that they are often confused. Each size represents a definite class.



FIGURE 270.

### 15-cm. Semifixed (Fig. 270)

The Japanese have both semifixed and bag guns in 15-cm. size. Of these, two guns using semifixed ammunition, a Japanese Type 41 (Meiji) 15 cm./40 Gun and the British-made prototype of this weapon have been observed and identified.

Rounds recovered indicate that these guns use the same ammunition. The propellant case for these guns is 29¼ in. long.

Only one projectile known to be used with these guns has been recovered:

Common—Projectile has a short ogive and a single rotating band. Over-all length,  $23\frac{3}{4}$  in. Type 13 Mk 1 Base Fuze. (c).

### 15-cm. Separate Loading (Bag) Ammunition (Fig. 270)

Three 15-cm. guns using bag ammunition are listed in documents: (1) 15-cm. 40-caliber Gun (Bag); (2) 15-cm. 45-caliber (Bag); (3) 15-cm. 50-caliber Gun (Bag). The projectiles listed below are believed to be for use in any of these guns. No propellant charges have been recovered for 15-cm. bag guns. The projectiles are characteristically of more modern design than those recovered for the case guns, having typically two rotating bands and long streamlined nose.

#### TYPES:

Mk 4 Common—Projectile has a long ogive and is  $23\frac{3}{4}$  in. in length. Type 13 Mk 1 Mod. 1 Base fuze. (b).

Type O HE—Length of projectile is  $23\frac{3}{4}$  in. Type 3 Mod. 2 nose fuze. (a).

Practice—Solid nose, base closed by plug. Projectile length is  $22\frac{3}{4}$  in. (d).

Illuminating—Short ogival nose with large adapter ring. Type 91 Time fuze. A Type 3 projectile is mentioned in documents but it is not known if it is the one above.

Antisubmarine—Reported in documents.



FIGURE 271.

**15.5-cm. (Fig. 271)**

USE.—15.5 Bag Gun.

RECOGNITION.—A separate loading round. Propellant not recovered. Projectile has a wide double rotating band.

**TYPES.**

Type 91 AP—Recovered with base plug; the fuze is not known but it is probably a Type 13 Mk 1. Projectile length is 27½ in. (c).

Illuminating—Short ogival nose with large adapter ring. Type 91 Time fuze. Length is 27½ in. A Type 3 projectile is mentioned in documents, but it is not known if it is the one above. (b).

Type 0 HE—Length of projectile is 27½ in. The round was recovered with a shipping plug in the nose. It probably uses either a Type 91 Time or Type 88 Model 4 Impact fuze. (a).

Type 91 Practice—Documentary.



FIGURE 272.

**20 cm.**

**Semifixed Ammunition (Fig. 272).**

USE.—Short 20-cm. Antiaircraft, Antisubmarine Gun.

RECOGNITION.—A semifixed round, having a very short cartridge case, 11¼ in. in length.

**TYPES.**

Type 0 HE—Length of projectile is 24 in. Threaded to receive Type "0" nose time fuze or Type 88 Model 4 impact fuze. The projectile is characterized by the small rotating band.

Type 4 Incendiary-Shrapnel—Reported in documents.

**Bag Ammunition (Fig. 273)**

USE.—20-cm. 50-caliber Mk 2 Dual Purpose Gun.

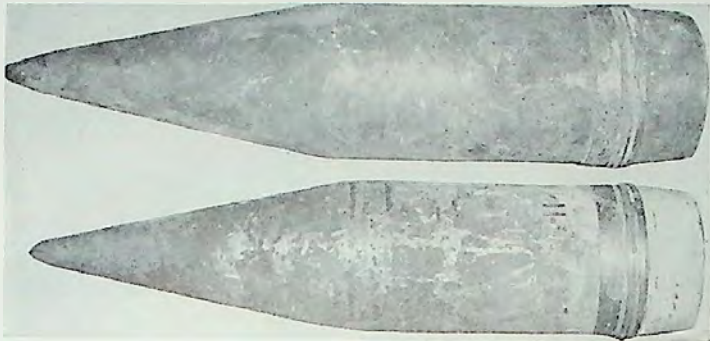


FIGURE 273.

(a)  
(b)

RECOGNITION.—A separate loading round with propellant contained in a silk bag. The propellant has not been recovered.

**TYPES:**

Type 91 AP—Projectile length is 35¼ in. Type 13 Year Mk 4 Base fuze. (b).

Type 0 HE—Projectile length is 35¼ in. Type 88 Model 2 fuze. (a).

**Documentary Rounds:**

Type 91 Common.

Type 91 Practice.

Time Practice.

Star Projectile.

Type 3 Illuminating.

Type 3 Incendiary-Shrapnel.

The following guns and projectiles are listed in documents:

USE.—20-cm. 45-caliber Bag Gun.

**TYPES:**

Practice (converted from AP).

AP.

HE.

USE.—20-cm. 50-caliber Bag Gun.

**TYPES:**

Practice.  
Time Practice.  
Type 88 AP.  
AP.  
Common (base fuze).

**AMMUNITION LARGER THAN 20 CM**

Data on the following guns and ammunition is derived entirely from documents, and is undoubtedly incomplete.

**25 cm.**

USE.—25-cm. 40-caliber Bag Gun.

**TYPES:**

Common—Type 3 Year Mk 1 base fuze.  
Practice—No data.

**36 cm.**

USE.—36-cm. 45-caliber Bag Gun.

**TYPES:**

Type 91 AP—Type 13 Mk 4 base fuze.  
Common (capped)—Fuzing not known.  
Practice (converted common).  
Type 91 Practice (converted from Type 91 AP).  
Type 0 HE.  
Type 3 Incendiary-Shrapnel.  
Type 0 Practice.

**40 cm.**

**USE:**

40-cm. 45-caliber Bag Gun.  
Type 94 40-cm. Gun.

**TYPES:**

Mk 5 AP—Type 13 Mk 3 base fuze.  
Type 88 AP—Type 13 Mk 4 base fuze.  
Practice—No data.  
Practice—Converted from AP.  
Type 91 AP—Fuzing not known.  
Type 91 Practice—Probably converted from Type 1 AP.  
Type 0 HE.  
Type 3 Incendiary-Shrapnel.  
Type 0 Practice.

8-cm. (81-mm.) (Fig. 274)

USE.—Navy Type 3—8-cm Mortar.

RECOGNITION.—A standard type of fin stabilized mortar projectile. The body has a short ogive, a forward bourrelet with five separate bearing surfaces, and a combination time and impact fuze in the nose.

TYPES.—HE—black or grey with green and maroon bands around the nose. Type 3 combination fuze.

The following types of projectiles have been reported in documents, but not recovered:

Incendiary—Smoke.

Illuminating.

Barrage.

Barrage Mod. 1.

FUZES

Except for a single case of joint use, the Type 89 Powder Time Fuze, Japanese Navy projectile fuzes are developed independently of Army designs. Like the Army fuzes, operation is based on relatively simple arming features. The mechanical time fuzes, representing the most advanced of Japanese fuze designs, are built around a clockwork mechanism showing strong influence of German design.



FIGURE 274.

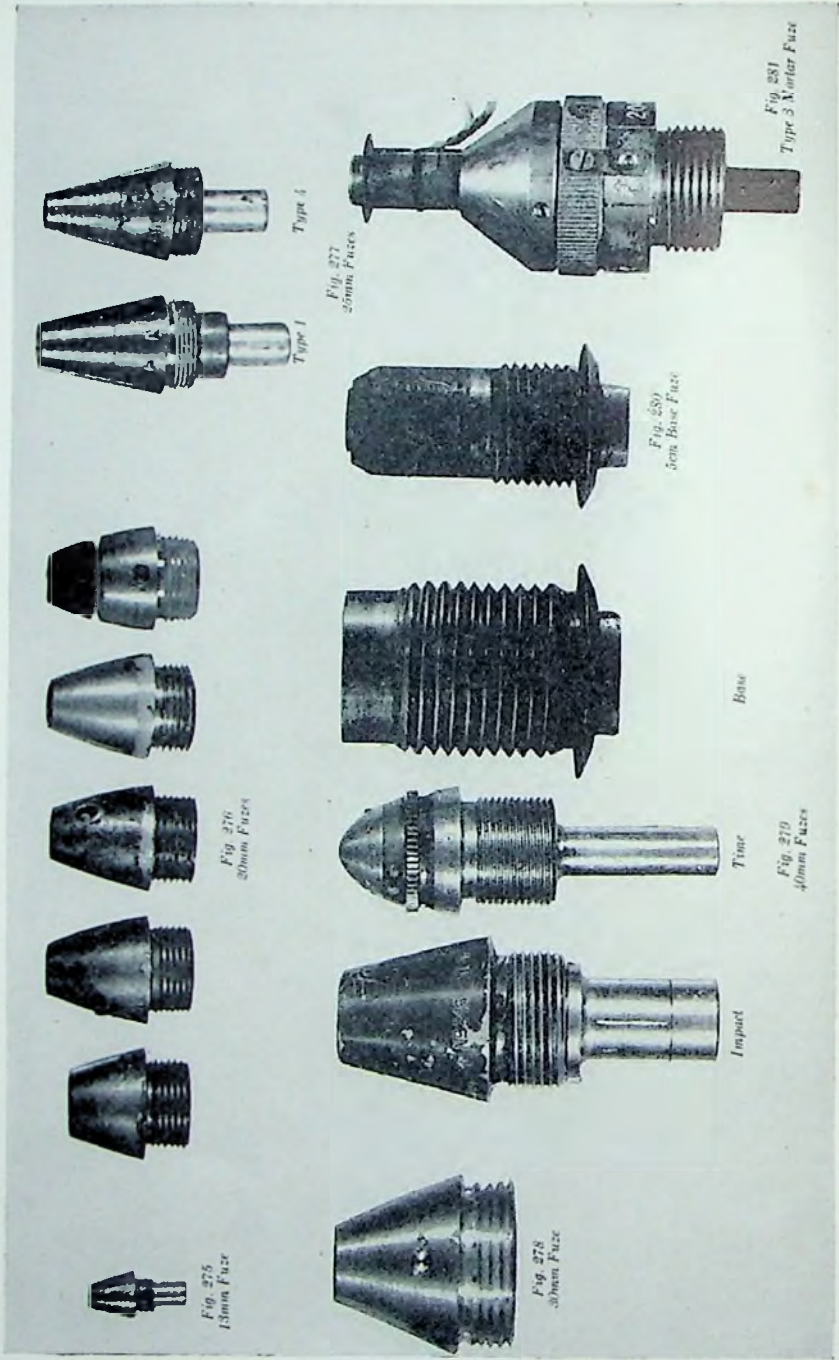




Fig. 282  
Type 5th Year Impact



Fig. 283  
Type 88 Model 2



Fig. 284  
Type 88 Model 4



Fig. 285  
20cm Rocket Fuze



Fig. 286  
Inst.-Short Delay Impact



Fig. 287  
Type 1 Nose



Fig. 288  
Type 91 Time



Fig. 289  
Type 0 Time  
(red nose cap)



Fig. 290  
Type 91 Time  
(with setting ring)



Fig. 287  
30cm AP Base



Fig. 288  
Type 15th Year Mark 4

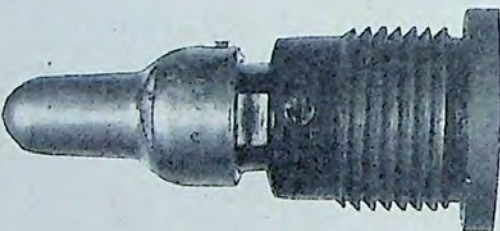


Fig. 285  
Type 15th Year Mark 1

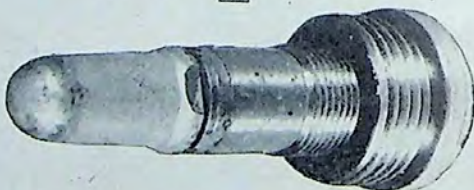


Fig. 284  
3rd Year Type Mark 1



Fig. 283  
Type 98 Time



Fig. 291  
Type 89 Time



Fig. 292  
30-second Time

## GRENADES

### HIGH EXPLOSIVE HAND GRENADES

#### Type 91 Grenade

This grenade can be recognized by the serrated cylindrical body with a fuze protruding from one end and a threaded opening at the base. A propellant charge container may be threaded into this opening when the grenade is to be fired from the Type 89 Grenade Discharger (Fig. 213). A finned tail stabilizer is attached when the grenade is to be used as a rifle grenade.

When thrown as a hand grenade the fuze is actuated as follows:

- (a) Turn down the exposed screw in the head of the fuze;
- (b) Remove the U-shaped safety pin;
- (c) Strike the fuze on a hard surface.

The delay time is 6 to 7 seconds.

#### Type 97 Grenade (Fig. 298)

This grenade is similar to the Type 91 except that it does not have an opening for the attachment of a propellant container or a tail stabilizer. The fuze is actuated in the same manner as the Type 91 but the delay is 4 to 5 seconds. A Type 91 grenade with an aluminum body, instead of steel, has been recovered.



FIGURE 298.



FIGURE 299.



FIGURE 300.

#### Type 99 (A) Grenade ("Kiska" type) (Fig. 299)

This is a smooth-sided cylindrical grenade with a fuze similar to the one used in the Type 91 and Type 97 grenades. A variation of this grenade (Fig. 300) has a waterproof metal cap threaded onto the flash guard.

To use as a hand grenade:

(a) Remove safety pin;

(b) Strike the fuze on a hard surface.

The delay is 4 to 5 seconds.

### **Type 99 (B) Grenade**

This is a smooth-sided cylindrical grenade of the same construction as the Type 99 (A), but smaller. It has a pull igniter fuze in the top. Never recovered.

### **Type 98 Stick Grenade (Fig. 301)**

This grenade is similar to the German "potato-masher," and consists of a steel case fixed on a wooden handle. Under the screw cap on the end of the handle is a pull string for the friction igniter.



FIGURE 301.



FIGURE 302.

### **Type 23 Pull Type Grenade (Fig. 302)**

This grenade has horizontal grooves running around the cylindrical body. There are two rings on each end of the body. On one end is fitted the fuze, covered by a threaded lead cap which is released by a thumb lever; underneath this cap is the pull string for the friction igniter.

### **Type 3 Conical Hand-Thrown Mine (Fig. 303)**

This is a hollow-charge grenade for use against tanks. The conical case is made of cloth with a wooden ring around the base. There is a hemp or grass tail and an impact fuze at the top of the grenade. If

this grenade fails to function, it may be in extremely sensitive condition and should not be handled. Several different sizes of conical mines have been recovered, some fitted with the Type 99 AP mine fuze.



FIGURE 303.

#### Type 4 Pottery Hand Grenade (Fig. 304)

This grenade is made of pottery and filled with Type 88 explosive. It is ball-shaped and is ignited by scratching a friction igniter with a scratch block. The delay is  $4\frac{1}{2}$  seconds. The entire grenade is encased in a rubber sack. Total weight 1 lb., maximum diameter, 3 inches.



FIGURE 304.

#### Experimental Hand-Thrown Mine (Fig. 305)

A hand-thrown A/Tk mine has been described in a captured document. The mine weighs  $3\frac{1}{2}$  lbs. and is  $4\frac{1}{4}$  inches in diameter. The body is made of aluminum and carries an all-ways action instantaneous impact fuze, and may be found in a very dangerous condition. The filling is *tanoyaku*.

#### Chemically Fuzed Grenade

This grenade has a cone-shaped, segmented cast-iron body fitted with a percussion chemical firing device. The percussion hammer, held up by a safety pin, is positioned over a small glass vial containing a sensitive explosive liquid. A length of safety fuse under the vial leads to a blasting cap set in Type 88 explosive. Over-all length is  $4\frac{1}{2}$  inches.

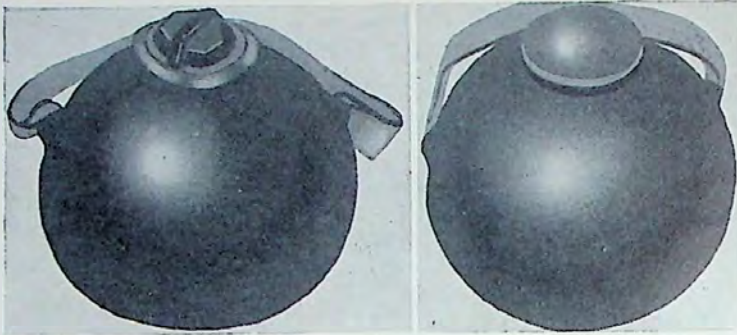


FIGURE 305.

To operate the grenade:

- (a) Remove the safety pin;
- (b) Strike the percussion hammer;
- (c) Throw immediately.

#### Sling Grenade (Fig. 306)

This is a black-bodied steel grenade which has a metal ring attached to its tapered wooden base plug. A protective metal cap and scratch block cover the friction-ignited fuze. The fuze incorporates a 4 to 5 second delay. Over-all length is  $5\frac{5}{16}$  inches.



FIGURE 306.



FIGURE 307.

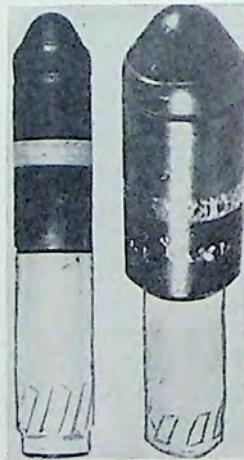


FIGURE 308.

To operate the grenade:

- (a) Remove the protective cap and scratch block.
- (b) Rub abrasive surface of scratch block against match head of fuze.
- (c) Throw the grenade directly by hand or by means of a line attached to the base ring.

**Type 91 Grenade (Fig. 307)**

This grenade can be fired from a rifle by removing the propellant container and screwing on a finned tail stabilizer.

**Type 99 (A) Grenade**

Fitted with a propellant container, this grenade may be fired from the Type 100 Discharger.

**Hollow Charge Rifle Grenades (Fig. 308)**

Two different sizes of this hollow-charge grenade have been recovered; a 30-mm. size 6½ inches long, and a 40-mm. size 7 inches long. Both sizes are fitted with a base impact fuze. The base of the grenade is pre-rifled for firing from a rifle discharger. If the grenade fails to function on impact, it will usually be found in a sensitive condition.



FIGURE 309.



FIGURE 310.

**Small Rifle Grenade Model 3 (Fig. 309)**

This grenade is similar in size and design to the Type 99 (A) grenade except that the fuze is instantaneous rather than containing a delay, and could not be substituted as a hand grenade fuze. This grenade is designed for firing from Type 39 and Type 99 rifles by use of a wooden bullet.

**1/2-Kg. Smoke Grenade (Fig. 310)**

This grenade may be thrown by hand or projected from a 50 mm. grenade discharger. The fuze is the same as that used in the Type 91 and 97 grenades. The grenade has a TNT burster charge and a WP main charge contained in a brass body. It may also be used for incendiary effect.



FIGURE 311.

**Incendiary Stick Grenade (Fig. 311)**

The body of this grenade is long and cylindrical with hemispherical ends. The wooden handle threads onto the base and the fuze to the other end. The Type 97 hand grenade fuze is used.



FIGURE 312.

**Small Incendiary Rifle Grenade Mod. 1 (Fig. 312)**

This is a light steel-bodied grenade filled with WP. The fuze is the Type 97 hand-grenade fuze. The tail section consists of a steel tube screwed onto the base of the body with four tail fins welded to the tube. The color is grey over-all with a red tip on the nose fuze and a purple body band.



. FIGURE 313.

**Frangible Incendiary Grenade (Molotov Cocktail) (Fig. 313)**

This grenade consists of a bottle into the top of which is fitted an all-ways action fuze. The fuze fits into the neck of the bottle in the manner of a crown stopper, and the neck is sealed by a rubber washer.

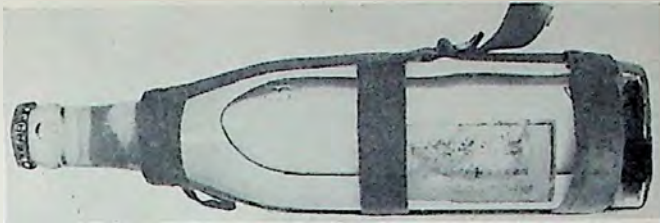


FIGURE 314.

### New Type Frangible Incendiary Grenade (Fig. 314)

This grenade also consists of a bottle, but it has no fuze. The neck is closed by a bottle cap. An igniter plate of red phosphorus is held to the base by an elastic strap and is ignited by the friction of impact. There are khaki colored rubber carrying straps around the bottle.



FIGURE 315.

### Frangible Smoke Grenade (Fig. 315)

This grenade is a flat bottomed spherical container made of clear glass. Though the filler is irritating to the skin as a liquid, in ordinary field concentrations the smoke is hardly irritating enough to cause coughing. Maximum diameter is  $2\frac{1}{2}$  inches.

### Rifle Smoke Grenade (Fig. 316)

The body of this grenade is painted silver and thoroughly waterproofed with coats of heavy lacquer and paraffin. It is used with a special adapter which fits over the end of the rifle barrel. Smoke escapes through the emission holes at the base. Over-all length  $8\frac{1}{2}$  inches.



FIGURE 316.

### Hydrocyanic Acid Frangible Grenades (Fig. 317)

These are round glass bowls filled with HCN. There are two types differing in minor detail. These grenades contain very strong systemic poison and should be treated with caution. Maximum diameter 4 inches.



FIGURE 317.

#### MORTAR GRENADES

- Type 89 HE.
- Type 89 Flare.
- Type 89 Smoke.
- Type 91 HE.

All of the above are fired from the Type 89 50-mm. grenade discharger. For a discussion of them, refer to the mortar section under Army ammunition (Fig. 213).

#### IMPROVISED GRENADES

Numerous improvised Japanese hand grenades have been encountered in recent campaigns. These have included:



FIGURE 318.

(1) Gas pipe, frequently scored, closed at both ends and fitted with a .22 cartridge case and safety fuse as a method of ignition.

(2) 25 mm. shell cases, filled with explosive, and fitted with a length of safety fuse or a pull igniter protruding from the top of the case.

(3) Aluminum or steel pipe closed with cement, filled with explosive and fitted with safety fuse.

(4) Heavy paper or braided cord container filled with explosive and ignited by means of a safety fuse (Fig. 318).

(5)  $\frac{1}{2}$ -kg. Army bombs removed from their containers, armed and thrown by hand.

One very effective weapon is an improvised conical grenade (Fig. 319). This grenade is constructed from the tail cone section of the Navy 30-kg. Practice bomb. The tail cone is removed, the space around the burster tube is filled with granular picric acid, and a grass

or hemp tail attached. The B-6(a) practice bomb tail fuze is fitted to the cone and is armed by hand. The grenade is then thrown at



FIGURE 319.

the target. This fuze has a light creep spring and will probably be in sensitive condition if found unexploded.

## ROCKETS

### Army Rockets

The Japanese Army was late in putting rockets into field use. They were first encountered in the hills east of Manila. The Army, however, has at present the most practical launcher. To date the 20-cm. rocket is the only size recovered. A 24-cm. rocket is mentioned in documents.

The Type 4 20-cm. rocket launcher (Fig. 320) consists of a metal tube on a mounting permitting fine adjustments in elevation and train. The launcher consists of three parts which can easily be disassembled for transporting. A rate of fire of from 1 to 2 rounds per minute can be maintained.

#### Type 4 20-cm. Rocket

Spin-stabilized:

Over-all length.....	37 in.
Weight.....	180 lbs.
Propellant.....	Ballistite.
HE filling.....	TNT.
Fuze.....	Type 100 mortar fuze
Range.....	About 3,000 yards.

There are two rounds differing slightly in external appearance. The motor of the older experimental round has a pronounced bour-relet (Fig. 321), the newer motor (Fig. 322) has an almost straight body.

Color and markings are the same as for ammunition.

### Navy Rockets

The Japanese Navy has in service use two kinds of HE and one incendiary rocket. Effectiveness of the ammunition is limited by the type of launcher used. Defects include flimsy construction, difficulty in accurate laying, and lack of mobility.

One kind of HE rocket employs No. 6 and No. 25 bombs propelled by rocket units. For the No. 6 size, the rocket unit is simply a motor with tail fins, which fits behind the bomb and pushes it during the rocket burning time. For the No. 25 bomb the rocket motor is attached in place of the tail cone. These rockets have the color and markings of Navy bombs.

The second kind of HE rocket is a conventional spin stabilized rocket design in two sizes, 20- and 45-cm. The 20-cm. rocket may employ a modified naval projectile for a warhead. The naval projectile color and markings are used.

The incendiary rocket is designed to be fired from a suicide motor boat. It is black overall with two yellow bands.

All rockets use a ballistite propellant consisting of a number of single perforated sticks.

JAPANESE NAVAL ROCKETS

	Japanese designation	Launcher	Projectile	Over-all length	Weight	Filling	Fuze	Range (approx.)	Fig. No.
Rocket propelled No. 6 bomb (Fin-stabilized).	Type 1 (refers to motor), Type 3 (refers to motor).	Wooden trough (19' long).	Type 97 No. 6 Land Bomb or Type 99 No. 6 Ordinary Bomb.	33" (motor only), 40" (motor only).	92 lbs. (motor for only).	Type 98	A-3 (n)	1,000 yds., 2,000 yds.	323 324
250-kg. Rocket Bomb (Fin-stabilized).	Special Mk. I Launching Rocket, Model 21.	Trough (22')	Type 98 No. 25 Land Bomb (Type 99 No. 25 Ordinary might be used).	118"	686 lbs. (less propellant).	Type 98	A-3 (n)	7,500 yds. observed 10,000 yds. documentary.	325
20-cm. Rocket (Spin-stabilized).	20-cm. Common Rocket.	Type 430 cm. Rocket Gun: Wooden trough (17') (Fig. 329) or steel barrel mounted on wheels (10') (Fig. 330).	Modified 20 cm. A-A/S projectile.	41"	198 lbs.	Type 91	Type 4 Rocket Fuze.	1,950 yds.	326
45-cm. Rocket (Spin-stabilized).	Experimental HV Rocket.	Wooden trough mounted on wheels (wood for one shot only) (Fig. 331).	Warhead designed for this round.	67.5"	1,514 lbs.	Type 95	Type 4 Rocket Fuze or Type 100 M or H Fuze (Army).	2,000 yds.	327
12-cm. Incendiary Rocket (Spin-stabilized).	12-cm. Incendiary Shrapnel Rocket.	Wooden trough fixed fore and aft on suicide boats. Later models adjustable in elevation.	Warhead designed for this round.	20.0"	51 lbs.	W.P. filled steel helmets Type 95 burstor.	Powder train in base—ignited by rocket.	2,000-3,000 yds.	328

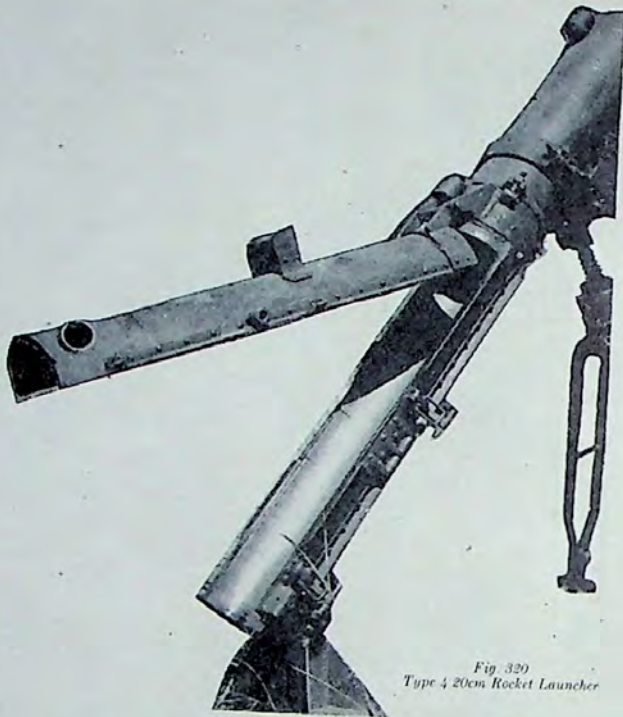


Fig. 320  
Type 4 20cm Rocket Launcher



Fig. 321  
Type 4 20cm Spin-Stabilized Rocket  
(Nose round)



Fig. 322  
Type 4 20cm Spin-Stabilized Rocket  
(Straight nose)

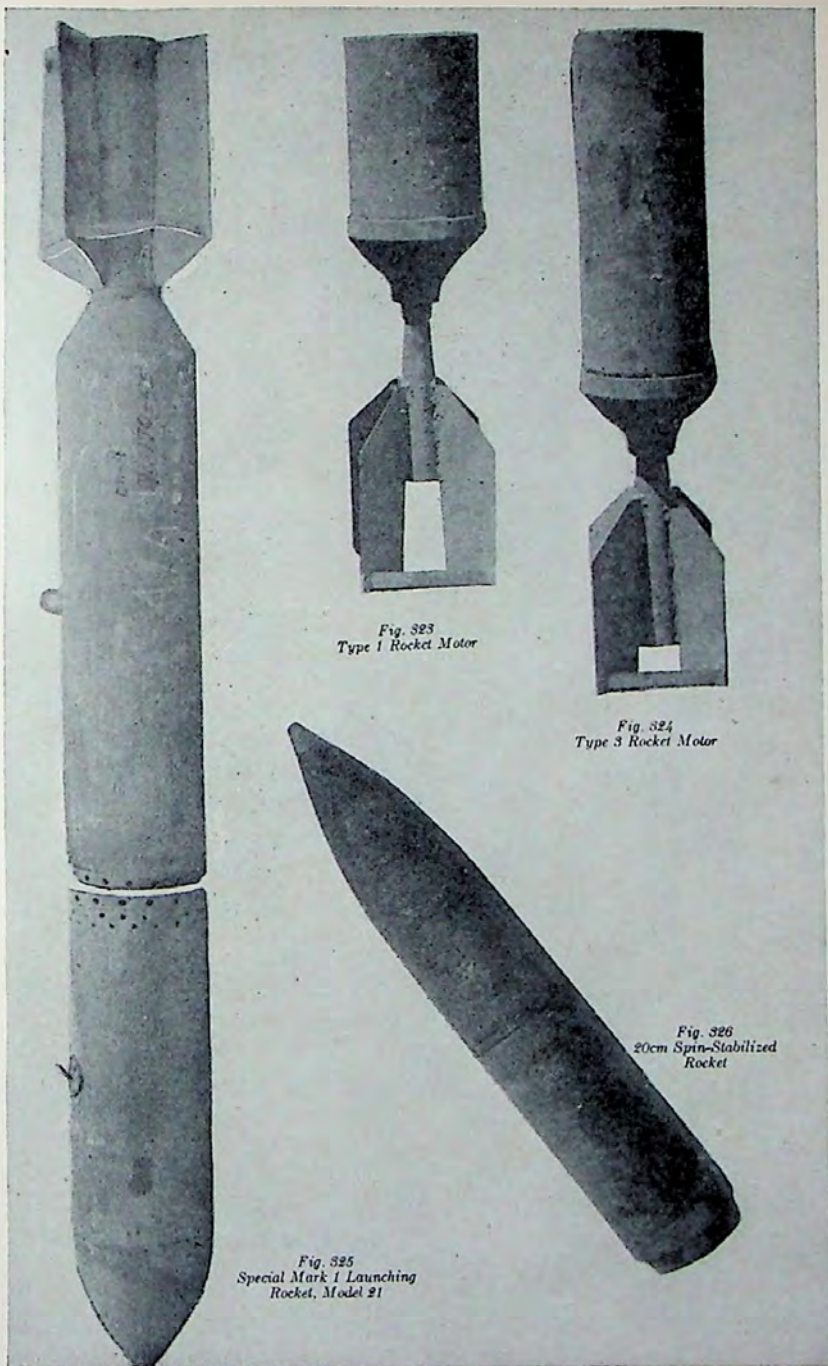


Fig. 323  
Type 1 Rocket Motor

Fig. 324  
Type 3 Rocket Motor

Fig. 326  
20cm Spin-Stabilized  
Rocket

Fig. 325  
Special Mark 1 Launching  
Rocket, Model 21

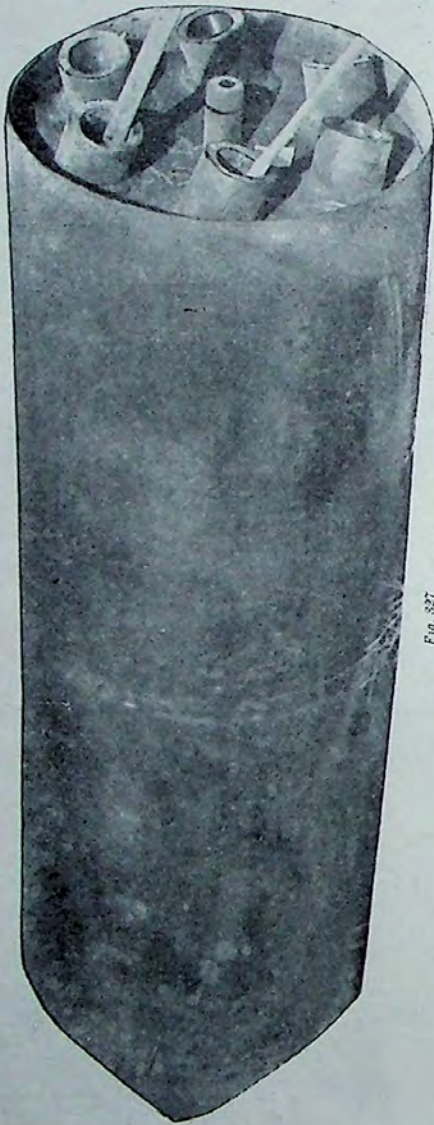


Fig. 327  
45cm Spin-Stabilized Rocket



Fig. 328  
12cm Spin-stabilized Rocket

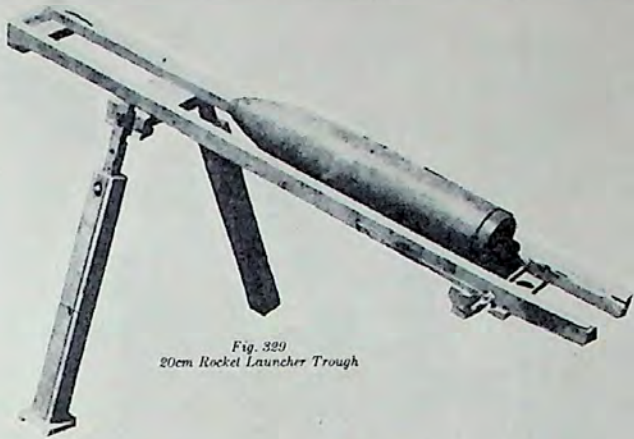


Fig. 329  
20cm Rocket Launcher Trough

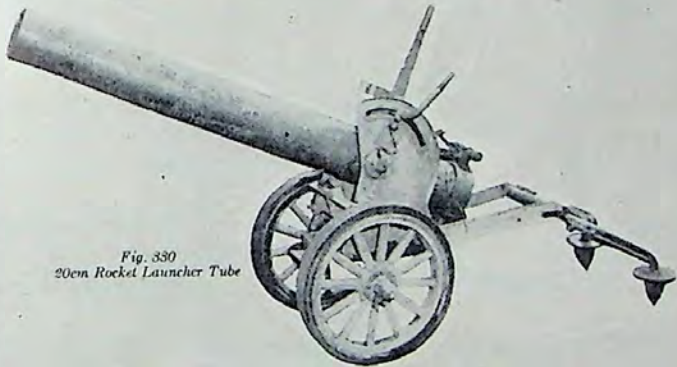


Fig. 330  
20cm Rocket Launcher Tube

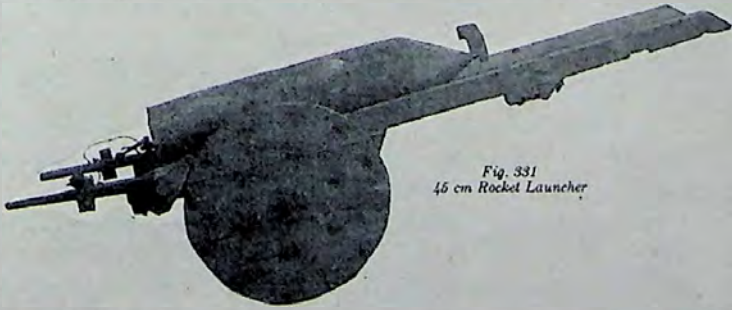


Fig. 331  
45 cm Rocket Launcher

## VI. LAND MINES AND BOOBY TRAPS

As expected when recent campaigns brought our forces against the Japanese in open country with highways and bridges, and in towns and cities, a greatly increased concentration of mining and booby-trapping has been encountered. Use of all types of land mines in particular has increased. Since the Japanese lacked any semblance of equality in armored forces and in many cases any effective antitank firepower, mining and suicide attacks have become a mainstay of their defense. On the basis of this experience and of information from captured documents, there is every reason to expect greater and greater emphasis on this type of warfare as the heart of the Empire is reached.

Three features of Japanese mining methods are especially important. The first is the relatively small number of standard production mines and the even smaller number of standard firing devices. As a result, the amount of field improvisation is great and adaptations of other ordnance, Japanese and Allied, are frequent.

The second is the common use of extremely large charges. Bombs, sea and beach mines, torpedoes, and depth charges which can no longer serve their original purpose are readily available for this use. The potential danger area of land mines is thus great.

The third is the emphasis on all types of controlled mines. Documentary evidence and a parallel development in the use of sea mines indicate that this type of mining will continually increase. Both electrical and pull wire controls are found. For priming, demolition equipment or fuze adaptations are used. As in other types of mining, the technique to date has been spotty. In some cases fields have been extensive, laid in patterns, with weather-proofed and concealed leads, and coordinated with observation and fire from pill boxes. At the other extreme there have been single mines, poorly concealed, fired by lanyard, with the operator exposed to enemy fire and very unlikely to escape the explosion of the mine.

One unusual use of the controlled mine field has been against enemy aircraft bombing from minimum altitude or strafing. Decoys are planted on airfields and the minefield detonated when the planes are low over the field.

Integration of all types of mine fields with defensive firepower is increasing.



Warning signs, to prevent their own personnel from walking into pre-set land mine fields and booby traps, are often used by the Japanese. Frequently these signs have been left standing and have served as a warning for Allied forces. Typical signs which may be encountered are shown above.

The purpose of this chapter is to give thorough coverage of all types of ordnance used as mines and booby traps (whether designed originally for this purpose or for something else). Thorough knowledge of this ordnance and of the principles involved in its use should suffice for dealing with the improvised mines and booby traps which are too varied and unstandardized to be completely listed in this book. Examples of typical improvised mines and booby traps are included.

In any classification of this subject there is overlapping of categories. Japanese tactics, which do not follow the patterns of the European war, increase the difficulties of definition. The organization used in this chapter offers convenient divisions which correspond roughly with groupings encountered in the field.

#### ARMY LAND MINES

**Type 93 "Tape Measure" Mine (Fig. 332).** Color: Tan; Weight: 3 pounds.

This is a circular metal container filled with picric acid. Threaded into the center of the top, over the fuze, is a small brass disc. Pressure on the mine will crush the top and force the small disc down on the fuze, breaking the shear wire and releasing the spring-loaded striker.



FIGURE 332.



FIGURE 333.

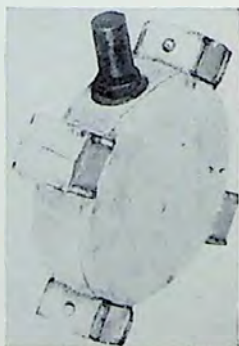


FIGURE 334.

Antitank and antipersonnel fuzes requiring 250 pounds and 25 pounds firing pressure, respectively, have been recovered. The A/P fuze has a black upper body (Fig. 333) and holes for two shear wires, while the A/Tk. fuze is of white metal with a single shear wire hole. Japanese documents report a third fuze which a pressure of slightly over 3 pounds will fire. The spring-loaded striker in this mine is of particular danger because the downward

force maintained by the spring may be sufficient to cause the fuze to fire when the shear wire becomes badly corroded.

The Japanese frequently reinforce the explosive power of this mine by stacking several mines or placing other charges around it. Of particular note is the fact that in Burma the Japanese have occasionally used an antilifting device with these mines. A box charge is buried below the mine and attached to it by a pull igniter. To date such instances of booby-trapping land mines are rare.

The fuzes have also been used to initiate prepared demolition charges or block-sections of explosive from Army bombs.

**Type 99 "Armor Piercing" Mine (Fig. 334).** Color: Tan; Weight: 2.7 pounds.

This is a circular canvas container filled with blocks of picric acid. Four magnets are attached around the circumference. The fuze threads into a pocket in the side. The mine is designed to be placed on the side of tanks or other metal vehicles. The fuze is initiated by depressing the fuze cap prior to placing the mine. The delay is 4-6 seconds.



FIGURE 335.



FIGURE 336.



FIGURE 337.

This mine has also been thrown as a hand grenade and planted, fuze cap up, as a land mine. Less than 5 pounds pressure initiates the fuze.

Since this mine, like the Type 93, has an inadequate charge, the mines are often used in pairs, held together by the magnets.

**Dutch "Mushroom" Mine** (Fig. 335). Color: Dark Tan; Weight: 9.5 pounds.

This mine, captured in quantity by the Japanese in Java, is easily recognized by the dome shape of the cover. A spring holds the cover off the fuze. Pressure on the lid forces the cover down upon the fuze. The shear wire retaining the spring-loaded striker breaks under pressure of 50 pounds and fires the mine.

**"Lunge" Mine** (Fig. 336). Color: Unpainted sheet metal; weight: 14.3 pounds.

This is a crudely constructed suicide antitank weapon. The mine is conical-shaped, filled with a poor grade of TNT or other substitute explosives, and contains an inner cone which gives a shaped-charge effect. A detonator or a blasting cap is seated in the top of the cone at the base of a guide-pipe welded to the top of the cone. A broom-stick-like handle 6 feet long, with a striker at the base, fits into the guide pipe. The attacker, lunging at the tank, drives the striker into the detonator initiating the charge. Three 6-inch legs provide the stand-off distance.

At least one fatal accident has occurred from failure of untrained personnel to recognize this weapon as ordnance. The accident resulted from an attempt to use a lunge mine as a tent pole.

**"Suction-Cup" Mine** (Fig. 337). Color: Black; Weight: 7 pounds 8 ounces.

This is a metal-encased 4-pound 7½-ounce cylindrical charge of RDX 53%/TNT 47% secured to the end of a 5-foot pole. Two suction cups on the charge container secure the mine to the target when pressed against it. Initiation is effected by two friction pull igniters which are lashed to the after end of the handle. The igniters set off two lengths of safety fuse with an estimated delay of 10 seconds, which in sequence set off two blasting caps, two lengths of primacord, two more blasting caps in the main charge, and the main charge.



FIGURE 338.

**5-Kg. Hemispherical Mine** (Fig. 338). Color: Black; Weight: 11 pounds.

To date this mine has not been recovered, but photographs appear in captured documents. It is designed for use as an antitank mine and is similar in shape to the Navy Small Model Mine. (See chapter III.) The Type 99 "Armor Piercing" Mine fuze fits in the top. The mine is to be placed against an armored vehicle, either by hand or by means of a pole or line.

## NAVY LAND MINES

**Antivehicle "Yardstick" Mine (Fig. 339).** Color: Dark Tan.

This is an oval-shaped, metal tube, 36 inches long. Contained within the tube are eight blocks of Shimose with up to four pressure fuzes fitting between adjacent blocks. A weight of about 300 pounds crushes the tube and forces the pressure head of the fuze downward to shear the shear wire and release the spring-loaded striker. A safety wire running the length of the tube through the fuzes is removed when the mine is armed.

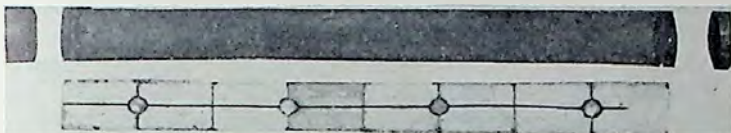


FIGURE 339.

These mines are often used to initiate larger charges such as bombs or depth charges.

**Type 3 (A) "Flowerpot" Mine (Fig. 340).** Color: Brown or Tan;  
Weight: 11.5 pounds.

A captured document reports this mine in two sizes; however, only the small size (8½ inches in diameter) has been recovered. The case of this mine is made of glazed ceramic material. It contains Type 88 Explosive in a rubber sack. The fuze is primarily made of black bakelite and threads into a rubber adapter in the top center. The mine is thus effectively nonmetallic. The fuze is initiated by pull or pressure. Approximately 22 pounds pull or 20–25 pounds pressure will fire it. This fuze has been found with the plunger spring removed. In this condition only 2–5 pounds pressure are necessary to fire it.

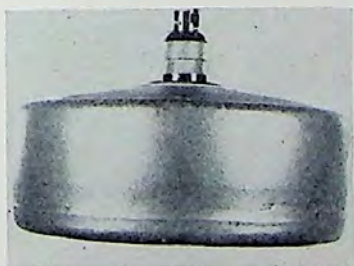


FIGURE 340.



FIGURE 341.

Three types of fuzes and adapters have been recovered (Fig. 341). One is packed with an attached green or dark brown trip line and has thread sizes identical to those of the Type 88 projectile fuze. The

second has different threads, no trip line, and a slightly smaller gaine. A third fuze resembles the second except for threads identical to those of the Type 88 projectile fuze. The adapters differ only in thread size. This fuze is the most effective Japanese standard initiating device. The fact that one type can be used in standard artillery and mortar shells adds to its importance.

**Type 3 (B) "Wooden Box" Mine (Fig. 342).** Color: Wood; Weight: 6.2 pounds.

This is a square wooden mine manufactured according to standard specifications. The filling is Type 88 and it uses the Flowerpot mine fuze. It is not as hard to locate with a detector as the Type 3 (A) but it is obviously more difficult to find than a conventional land mine.



FIGURE 342.



FIGURE 343.

**Antipersonnel Mine (Fig. 343)**

An antipersonnel mine made of serrated cast iron was recovered on Okinawa. An adapter plug and a cap with an opening for an igniter thread in the top of the mine. Type 88 Inst. projectile fuzes, and fuzes for the Type 99 and Type 3 (A) mines were found to fit the adapter. This is not definitely identified as Navy ordnance but it was recovered in storage with other Navy mines.

#### IMPROVISED LAND MINES

A great amount of Japanese minelaying is necessarily done with awkwardly improvised materials. This has been characterized by a certain amount of ingenuity, a poor understanding of the use of explosives, and an entire disregard for the safety of the personnel laying the mines. The following examples show typical improvisation.

### Floating Mine (Fig. 344)

A 2-gallon petroleum drum, two-thirds filled, has been floated down stream against a pontoon bridge. The air space in the can provides some buoyancy, but in addition a "life belt" consisting of a kapok-like material in a cloth sack partially encircles the drum. Pieces of bent steel wire, 12 to 18 inches long, stretch outward stiffly from the "life belt." These are probably designed to insure that the mine will foul the bridge. The mine is fired by safety fuse ignited when it is launched.

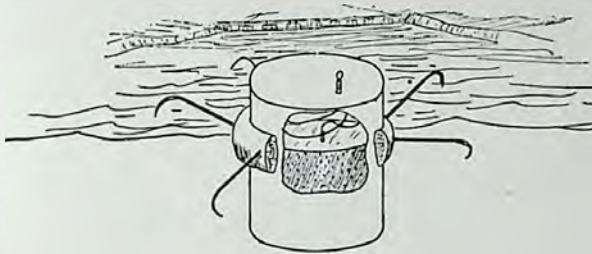


FIGURE 344.

### "Wooden Box" Mines

These are charges encased by many shapes and kinds of wooden boxes. Either improvised initiators or land mine fuzes, bomb fuzes (Fig. 345), projectile fuzes or hand grenades (Fig. 346), may be used to fire the charge.

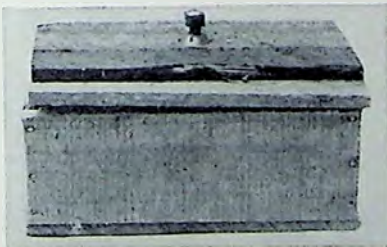


FIGURE 345.

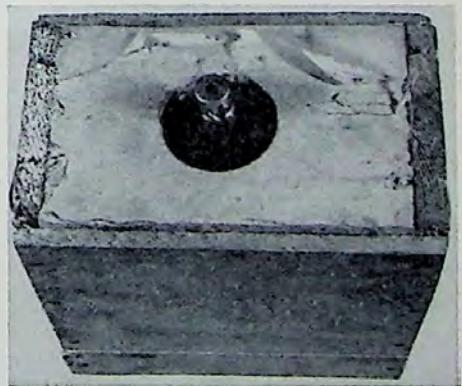


FIGURE 346.

### Pull and Pressure Box

This device, recovered on Tinian, is a wooden box, 1 foot square, containing 8 pounds of explosive. It was lightly covered with sand. Three trip wires led in a spider-web fashion from a pull igniter inserted in one end of the box. A pressure firing device protruded

above the top of the box, and was covered by a board, held off the box by a strip of bent tin. An estimated pressure of 40 pounds will fire the pressure device (Fig. 347).

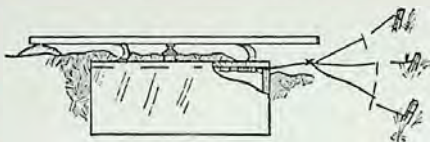


FIGURE 347.



FIGURE 348.

### “Sack” Mine (Fig. 348)

This is a standard prefabricated mine that has the outward appearance of a burlap sack. The charge is contained in a rubber bag inside the sack. A pull igniter fits into a small “booster” sack inside of the bag. The mine has been used as a trip wire trap, as a demolition charge, and with the pull igniter attached to the outer bag so that movement of the outer bag fires the mine.

In addition to these types of improvised explosive containers, many mines are laid which consist merely of an initiating device and any type of explosive charge, possibly with some metal added for fragmentation. The same types of initiators are used as in the other improvised mines.

### Burma Mine

A mine recently reported from Burma illustrates the extreme in crude improvisation. Two picric blocks and a hand grenade were buried with a blasting cap in one of the blocks. A wooden board with a nail driven through it was placed over the charge so that the nail rested inside the cap. Pressure on the board would drive the nail into the cap.

## NAVY ORDNANCE USED AS LAND MINES AND BOOBY TRAPS

### Beach Mines

Both the Small Model Mine and the Small Model Mine Model 2 (see Chapter III) play an important part in Japanese land mine tactics. The chemical horn contact firing mechanisms and the relatively large explosive charge combine to make these excellent anti-

tank and antivehicular mines. Even more than on beaches they have been used on roads, bridges, airstrips, in buildings, and in extensive fields to protect strongpoints (Fig. 349). They have been planted in patterns, sometimes with wires, cables, or steel bars connecting the horns to give a greater striking area. They also have been fired from control points either by direct electrical connection or by pull wires attached to the horns. In some cases these mines have been planted next to larger charges such as bombs and depth charges. In one such situation (Fig. 350) there was a possibility that removal of the beach mine would fire the depth charge. This is another of the few instances to date of booby-trapping of land mines.



FIGURE 349.

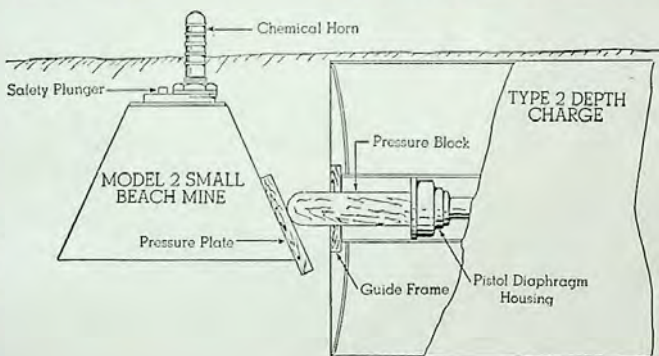


FIGURE 350.

## Depth Charges

Japanese Navy Type 2 Depth Charges (see Chapter III) have been used in various ways as land mines. Their large explosive charge makes them an especially effective menace in confined areas even though at times the ratio of charge to objective may be inefficient.

One way of adapting them as pressure-actuated mines makes use of the standard booster and detonator and parts of the Type 2 pistol. The striker is placed so that it rests upon the percussion cap. A wooden block is put into the central tube of the depth charge so that

it rests on the striker. A wooden pressure board on top of the block protrudes above the planted charge and is usually camouflaged. A downward force on the board drives the striker into the cap and explodes the mine (Fig. 351).

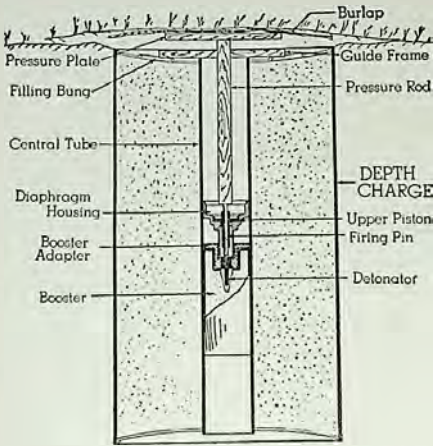


FIGURE 351.

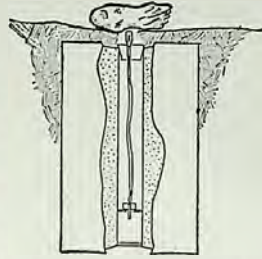


FIGURE 352.

This same arrangement is used when a weight is suspended above the pistol to be dropped when a trip wire is pulled. In another similar, though less successful arrangement, the pistol is suspended in the top of the tube to be dropped onto the cap.

Type 99 hand grenade fuzes have also been employed to initiate the charge by pressure. If a length of safety fuse is included in the rig, they can be, as Japanese documents suggest, initiated and rolled from high ground onto tank and infantry formations below (Fig. 352).

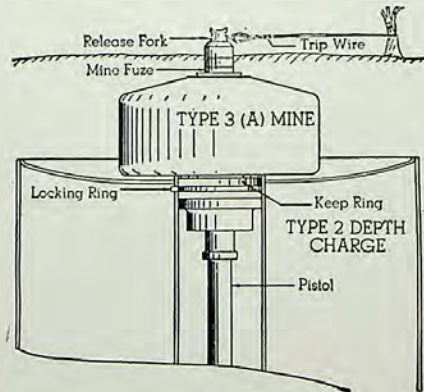


FIGURE 353.

Depth charges are used to reinforce the explosive power of other land mines, notably the Small Model Mine Model 2 and the Type 3 "Flowerpot" mine (Fig. 353).

With electrical priming or with pull igniters and pull wires they are encountered singly or in series as controlled charges.

### Sea Mines

The Japanese sea mine Type 3 Mk 1 Aircraft Mine Model 1 (JJ) (see Chapter III) has been found in an armed condition with wires attached to the horns. This enables it to be fired either by trip wire or by remote control (Fig. 354). Type 93 (JB) sea mines have been laid as electrically controlled land mines.

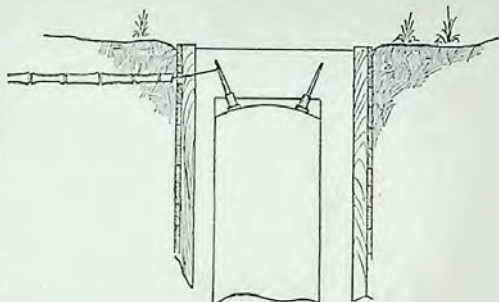


FIGURE 354.

### Mine Horns to Initiate Other Charges

A clever device guarding a roadblock approach utilized a depth charge and sea mine chemical horns (Fig. 355). The depth charge, buried in the ground, was electrically primed. Three leads from the cap ran above the ground to three chemical horns set in concrete blocks, and buried in the road. Impact of a vehicle would crush the horns and detonate the charge. A similar set-up was discovered with 500 pounds of dynamite replacing the depth charge. In some cases, a long steel tube was fitted over the mine horn to increase the possibility of the horn being crushed.

### Torpedo Warheads

The Type 3 Hydroplane warhead and exploder (see Chapter III) have been rigged as a trip wire booby trap. The hydroplane on its cable is strung out and secured. It may be set to fire when the cable is cut or when the cable is pulled and tension then released. This is a particularly dangerous mechanism.

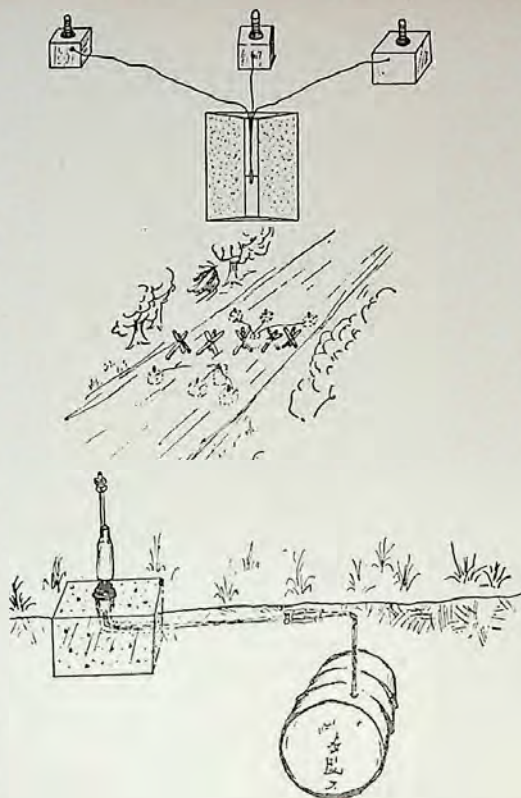


FIGURE 355.

The Type 90 Model 2 Torpedo exploder (see Chapter III) has been recovered with trip wire attached to the striker release sleeve. In addition, the exploder may be rigged so that removal of a nail or weight holding the spring-loaded bail down causes the exploder to fire (Fig. 356).



FIGURE 356.

Warheads have also been used as controlled mines, using either electrical firing or lanyard firing of a prearmed exploder.

### Bombs and Fuzes

Aircraft bombs are adaptable and convenient charges for use as land mines or booby traps. They may be used to reinforce the charges of other mines and traps. Simple friction

igniters are frequently used as initiators for trip or controlled charges.

Bomb fuzes have often been adapted for this use. The A-3 (a) has been wired electrically into light circuits (Fig. 357). On other occasions it has been fired electrically from a control point. It has been used as a trip wire trap. The shear wire was replaced by a pull pin to which was attached a trip wire. A heavy rubber band was looped over the fuze cap and around the fuze body. A pull on the trip wire withdraws the pin and the rubber band snaps the striker down upon the detonator (Fig. 358). Bombs are often buried nose up with the prearmed fuze protruding, serving as pressure devices.

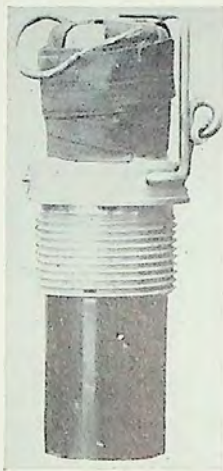


FIGURE 357.

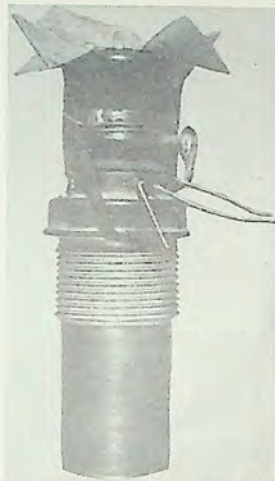


FIGURE 358.



FIGURE 359.

#### 40-Kg. Smoke Float Igniter

This device, used normally to set off the smoke float, is fired by pressure. Its use as a pressure igniter to set off an explosive charge is known (Fig. 359).

#### ARMY ORDNANCE USED AS LAND MINES AND BOOBY TRAPS

##### Army 120-Kg. Depth Charge

This charge, though designed for use on suicide crash boats, has also been used as a mine. (See Chapter III.) The charge is initiated by a pull igniter inserted in the central tube. It has been recovered with lines leading from the pull igniter to control posts, as well as rigged with trip wires. It has also been fired electrically by means of demolition charges planted beside it.

##### Bombs and Fuzes

Japanese Army bombs have been used much in the same way as Navy bombs. One variation, however, is that Army bombs have been buried with the nose down as well as up. The A-2 (b) is



FIGURE 360.

frequently encountered with vanes removed as a pressure igniter, both in bombs and with other charges. The B-1 (a) has been rigged with a rubber band as a pull trap (Fig. 360). The C-3 (a) chemical long delay fuze has been armed and fitted in a bomb as a delay-demolition charge. (See Chapter IV).

A U-shaped steel frame fits over the tail struts of a 30- or 50-Kg. bomb to convert it into a pull type controlled or trip wire mine. The spring-loaded hammer fires the armed tail fuze when the trip wire is pulled (Fig. 361). Friction igniters with detonators are placed in a bomb fuze pocket and fired by control or trip. Another pull firing mechanism, similar to that used in the Type 90 Flare and in the 120-Kg. Army depth charge, has been used both on Luzon and Okinawa. A spring-loaded striker is released when the wire is pulled (Fig. 362).



FIGURE 361.



FIGURE 362.

A/P and small GP bombs have been set in trees to be released by trip wires.

In several instances the igniter from the 1-Kg. "anarchist" bomb has been used as a booby trap initiator. (See Chapter IV.) Electrical remote control firing has also been used. In Lashio, for instance, several of the surviving buildings were mined with Army bombs wired for electric firing. The plan was to infiltrate after the buildings were occupied and fire the charges. It was defeated by a fortunate discovery of the leads.

## Hand Grenades

Japanese hand grenades have been used in a variety of ways.

A type 91 mortar grenade has been found suspended in a 75-mm. shell case (Fig. 363). Withdrawal of a suspending trip wire allows

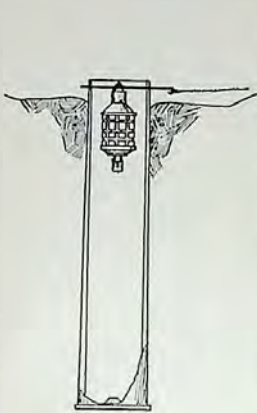


FIGURE 363.



FIGURE 364.



FIGURE 365.

the grenade to fall to the base of the shell case, setting off the impact igniter in the grenade fuze.

Another effective trap found in New Guinea consists of a Type 97 grenade wired together with a fuze 50-mm. mortar shell. The fuze of the grenade projects from one end of the assembly and the whole device is suspended by a string. A trip on the string releases the assembly to fall on the grenade fuze. Explosion of the grenade detonates the mortar (Fig. 364).

The mine made from a grenade and a coconut is a standardized field improvisation (Fig. 365). Grenades are used as igniters and boosters for many types of wooden box mines.

The pull type grenade and the stick grenade (see Chapter V) are easily and often adapted for various trip devices.

## Artillery Projectiles

The standardized procedure in the use of projectiles as land mines is to bury the projectiles, usually 75-mm. or 105-mm. sizes, nose up and use the Type 88 Instantaneous gun fuze. The fuze is disassembled and armed. In that condition a slight pressure will fire it. The Type 88 Short Delay Fuze with an added delay time has also been so used. These fuzes are often used to ignite prepared charges other than projectiles.

The 3d Year Type Japanese Army projectile time fuze has been modified so that ignition is accomplished by means of a pull cord in the nose (Fig. 366). While the fuze is described by the Japanese as for use in Aircraft Propaganda Bombs, it is readily adaptable for turning 75-mm. projectiles into booby traps.

Projectiles have been buried nose down with wooden blocks covering the base and a firing device in the nose actuated by downward pressure on the projectile (Fig. 367).

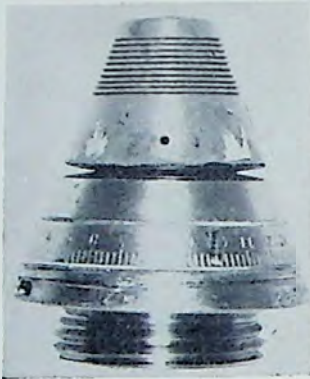


FIGURE 366.

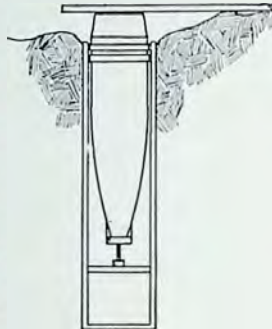


FIGURE 367.

Projectiles themselves are handy A/P charges. It may be expected that they will also be encountered fitted with standard pull igniters or with improvised pressure igniters. It should also be borne in mind that one type of Flowerpot mine fuze fits these sizes of Army projectiles.

The 70-mm. Barrage Mortar has been used effectively as a booby trap. The dangers of this mortar are discussed in the Army projectile section.

### **Bangalore Torpedo and Igniter**

The Bangalore torpedo with its convenient pull igniter can be employed as a trip wire booby trap. The igniter is frequently found set up with other charges. (See Chapter VI.)

### **ALLIED ORDNANCE USED AS LAND MINES AND BOOBY TRAPS**

The successful campaigns of early 1942 provided the Japanese with stocks of British and American ordnance. Additional quantities have subsequently been captured or recovered as duds. Adaptation of this material to these uses has been similar to the Japanese adaptation of their own ordnance. Burma, where the pinch of supplies has been felt, is where use of Allied ordnance has been greatest.

Examples are:

U. S. FRAGMENTATION BOMBS (Fig. 368).—The M40 23-pound parafrags have been buried nose up with armed M120 fuzes. The fuzes were covered with sheet iron. These bombs have also been rigged in trees to be released by a trip wire and to fire on impact.

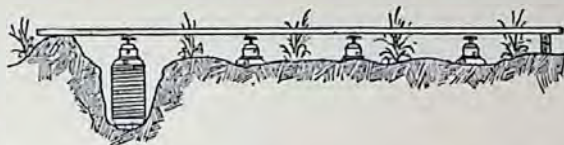


FIGURE 368.

U. S. GP BOMBS.—These have been used in bridge demolition charges and as charges for contact or controlled mines. Demolition equipment rather than United States bomb fuzes has been the means of firing.

BRITISH BOMBS.—GP and fragmentation bombs have been frequently used. A trip wire firing mechanism, manufactured in Burma, is one type initiator. Recently a new device was recovered in Burma to adapt these bombs to electric firing. It consists of a firing bridge and a Navy bomb gaine mounted in a bakelite fitting threaded to fit the nose pocket of the British bombs.

U. S. 150-MM. PROJECTILES.—According to documents the Japanese are planning to use 150-mm. shells with M46 fuzes modified to take a blasting cap. Spikes in a pressure board fire the cap which initiates the fuze and projectile (Fig. 369). By using an electric blasting cap, these projectiles can be used as controlled mines.

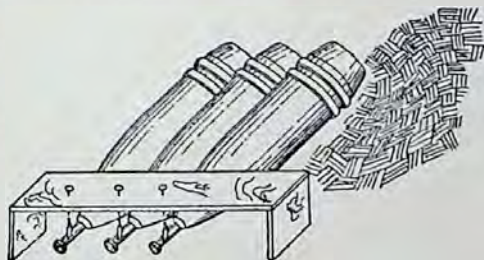


FIGURE 369.

HAND GRENADES AND MORTARS.—United States and British grenades are used in a variety of ways. By utilizing the hand-release firing mechanism they are used as pull traps with the trip wire attached to the safety pin. They have been placed under the armpit or between the legs of a corpse so that movement of the body would allow them to fall free and release the firing device.

A trap left at Myitkyina consisted of an American mortar shell and a British grenade laid together under a board so that the board rested on the release handle. Movement of the plank would allow the grenade to fire, thus setting off the mortar shell (Fig. 370).

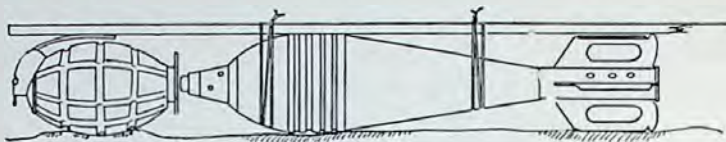


FIGURE 370.

LAND MINES.—Captured British Mk. V land mines were used in quantity in the Burma campaign.

#### TIME DELAY DEVICES

##### Demolition Clocks

Though by name demolition equipment, these devices belong in the field of time delay devices. They are becoming increasingly important in Japanese withdrawal tactics. The last three of these reported clocks have appeared for the first time in the Luzon campaign. In this campaign, too, the first known use of time charges in an ammunition dump was observed.

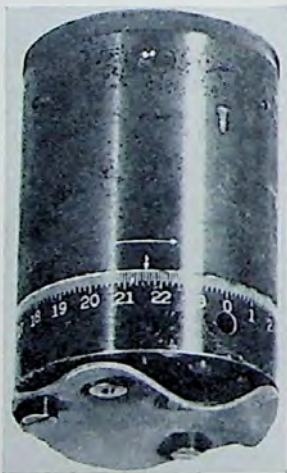


FIGURE 371.

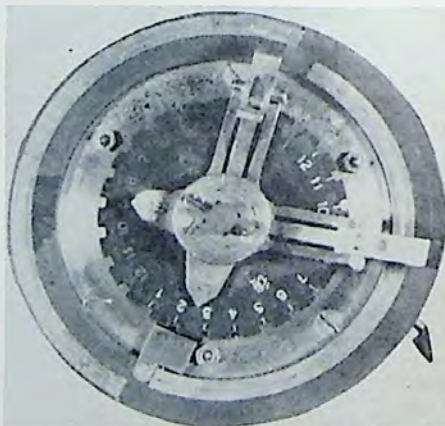


FIGURE 372.

##### Type 92 7-Day Clock (Fig. 371)

This was recovered by Australian forces at Alexishafen, Australian New Guinea. The maximum time setting is 7 days. Electric leads connect the contacts on the clock, through a battery to the placed charges. A day indicator indicates the number of days before the

clock will fire. In addition to firing electrically, the clock is capable of firing mechanically. Drawings show a groove in the bottom of the clock to receive a safety fuse, and it is assumed that a firing pin and primer are located inside the clock. For this reason, cutting the battery leads may not render the clock inoperative.

This clock was wired to a charge under the airstrip consisting of thirty 100-Kg. bombs and a large quantity of picric acid. The entire installation was under a turf-covered sheet of iron connected by a switch (wired in parallel to the clock) that would close the circuit if the iron was lifted or forced down.

#### **24-Hour Clock (Fig. 372)**

This clock is spring driven and wound by hand. It has time settings up to 24 hours in 1 hour increments. The dial revolves clockwise, carrying two bridging contact arms which close a circuit on completion of the set run.

#### **Type 99 Long Delay Clock (Fig. 373)**

This clock may be set at two hour increments up to 10 days 12 hours. It winds itself electrically every  $4\frac{3}{4}$  minutes. At the termination of its set run it allows a tit on the spring loaded bridging arm to drop into a notch on the dial, closing the firing circuit.

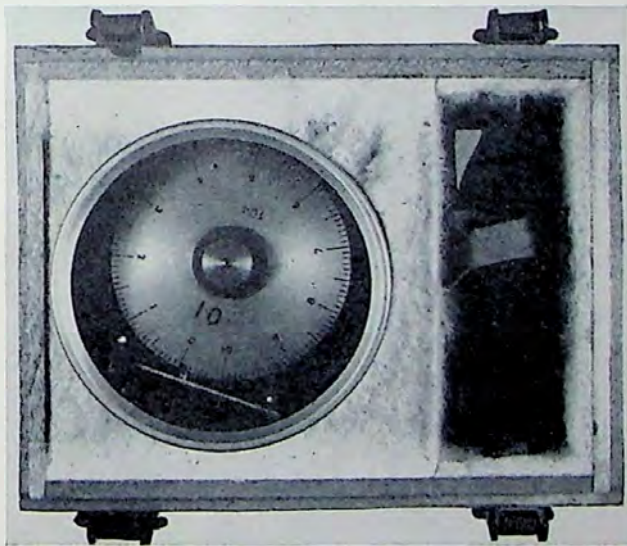


FIGURE 373.

#### **7 $\frac{1}{2}$ -Day Clock (Fig. 374)**

This clock is spring driven, hand wound, and apparently of European design. The clock face is graduated in one hour intervals from 0 to 7 days and 12 hours. When the set time has elapsed, a trigger is released

firing the spring-loaded firing pin. The striker opening is threaded internally to receive a cap and externally to fit into a prepared demolition block. This clock was found set in an ammunition dump.

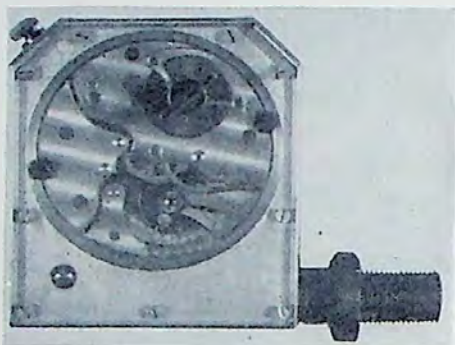


FIGURE 374.



FIGURE 375.

#### **Chemical Delay Firing Device (Fig. 375)**

The case of the device is made entirely of black bakelite. An ampoule of solvent is contained in the top, a striker and plastic retaining plug in the center, a delay train and booster in the bottom. When the ampoule is crushed, the striker spring is also compressed. After the solvent has acted on the retaining plug, the striker is freed and fires the device.

The solvent ampoule has not been recovered so the delay time is unknown. Navy bomb fuzes of similar design (C-1 (a)) have a delay between 17 and 24 hours.

A large factory-made wooden box demolition charge specially fitted to take this firing device has been recovered.

#### **Time Firing Device Mk. 1 (Fig. 376)**

This is a  $3\frac{3}{4}$ -inch lucite tube containing a spring loaded striker held up by a wire attached to a metal bridge in the top of the tube. To set the device, the end cap is removed, acid poured into the well through which the striker retaining wire runs, and the end cap replaced. After a certain delay the acid will eat through the wire allowing the striker to fire.

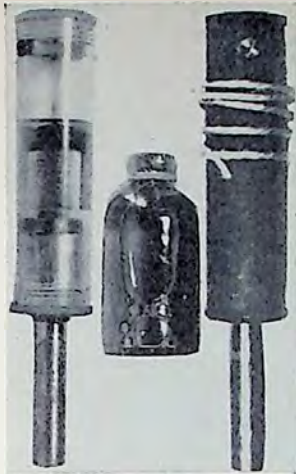


FIGURE 376.

This device has been found constructed of brown or white lucite. The brown tube contains a finer retaining wire and has a shorter delay. Tests show less than an hour delay for both devices.

A 2-inch explosive gaine threads into the base of the tube.

#### "SUCKER" TRAPS

In addition to mines and traps laid in more or less direct coordination with defensive tactics, in the European war, large numbers of traps were set mainly for the purpose of lowering enemy morale. These were the charges set in living quarters, on abandoned equipment, corpses, etc. Mention has already been made of the use of

hand grenades on corpses by the Japanese, but in general there has been little of this type of trapping in the Pacific.

Proper precautions should be observed, however, in all contact with buildings and equipment left by the enemy.

The following are four typical traps of this type which have been found in this theater.

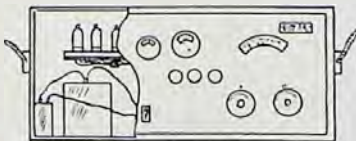


FIGURE 377.

#### Explosive Radio (Fig. 377)

All batteries except one were removed from a radio and the cavity filled with explosive. The electric circuit was closed when the switch was turned.

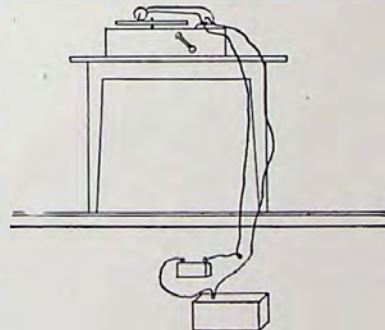


FIGURE 378.

#### Phonograph Charge (Fig. 378)

An electric contact on the pick-up assembly was so arranged that sufficient movement of the arm to play a record would close the

circuit and set off the charge, concealed with battery, under the floorboards.

**Explosive Telephone (Fig. 379)**

A pull igniter fitted to an explosive charge was found inside a telephone. The line from the igniter was secured to the crank of the telephone so that an attempt to ring would set off the charge.

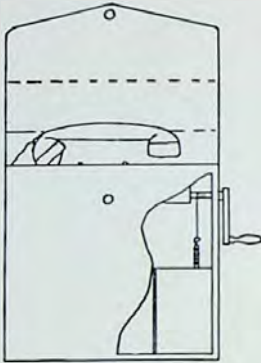


FIGURE 379.



FIGURE 380.

**“Tin Can” Booby Trap (Fig. 380)**

This is an explosive filled can made to resemble an ordinary food can. A friction pull igniter threads into the side of the can.

## VII. DEMOLITION EQUIPMENT

### INTRODUCTION

Japanese demolition equipment is similar in appearance, construction and operation to that used by the Allies. As a result, captured demolition gear lends itself readily to our uses, but it must be noted that age and storage conditions are not known, and the effects of tropical climate may reduce its usefulness. This section illustrates various items used in demolition, presenting them as the ordinary components of the explosive train.



FIGURE 381.

#### Safety Fuse Igniters

**TRIGGER TYPE** (Fig. 381). The igniter consists of housing, firing assembly and sear lever. A pull on the lanyard cocks the firing pin by compressing the spring, and the sear is forced under the firing pin, holding it in position. The device is on "safe" when the solid portion of the safety ring is rotated beneath the trigger. To fire the device, the safety ring is rotated until the cut-away portion is opposite the trigger. Depressing the trigger raises the sear, releasing the firing pin.

#### Pull Igniters (Fig. 382)

**Red Type:** A brass-bodied friction igniter with a red plastic outer sleeve.

**Black Type:** Longer and larger than the red igniter, with depressions on the body to give a firm grip.

**Type 99 Demolition Tube Igniter:** This device differs from the ordinary pull igniter in that it contains a seven-second delay train and houses a fulminate of mercury detonator assembly.

Several metal-bodied spring loaded pull igniters have recently been recovered. Although these are used to ignite such ordnance as depth charges and flares, they are readily adaptable for demolition use.



### Safety Fuse

Tan: Tan colored fuse  $\frac{7}{8}$  in. in diameter. Rate of burning is approximately 32 seconds per foot.

Black: Black colored fuse  $\frac{5}{16}$  in. in diameter. Rate of burning is the same.

White: White colored fuse  $\frac{3}{32}$  in. in diameter. Rate of burning is approximately 45 seconds per foot.

Type 1: Waterproof fuse with layers of silk, hemp, and cotton over the powder train; the outer surface is coated with white paint. Diameter is  $1\frac{1}{32}$  in.; rate of burning approximately 30 seconds per foot.

### Blasting Caps

FIGURE 382. NONELECTRIC.—(1) Copper-cased cap corresponding to U. S. No. 6. Cone-shaped base produces shaped-charge effect.

(2) Brass-cased cap closely resembling, but slightly longer than U. S. No. 6.

(3) Brass-cased cap longer and more powerful than any used by U. S. forces. Length is  $2\frac{3}{4}$  in.

ELECTRIC.—(1) Type 97: Brass-bodied outer case with fulminate of mercury filled plastic tube crimped into outer case. Length is  $3\frac{1}{4}$  in.

(2) Type 98: Construction and appearance is similar to Type 97.

(3) Platinum Wire Type: Inner tube contains a platinum wire bridge which ignites a gun-cotton compound. Used for detonating old-type explosive multiple charges.

(4) Unknown Type: This cap is mentioned in documents; length,  $3\frac{1}{8}$  in.

### Explosives

TYPE 97 DETONATING CORD.—The core is PETN, surrounded by wrappings of cotton, hemp, and waterproof layers, with a tan outer surface. Diameter is  $\frac{1}{4}$  in. and rate of detonation is 6 km/sec.

PLASTIC EXPLOSIVE.—Issued for field use in 4 oz. rolls 4 in. long, with three such rolls packed in a paper package. Explosive is light brown and contains 80% cyclonite.

PREPARED CHARGES.—The Japanese use three main explosives in demolition blocks: Pieric acid, *haishoyaku* (a combination of ammonium perchlorate, cyclonite, silicon carbide and paraffin) and *tanoyaku* (TNT/RDX). Dimensions of each block are 2 x 2 x 1 in., weight  $\frac{1}{4}$  lb. These blocks are used to make different size charges by joining them in strips, inserting in cans or binding together by bags.

**TNT AND PICRIC BLOCKS.**—These two blocks are identical in size and weight. One is made of pressed, wrapped grain TNT, and the other consists of pressed, wrapped, grain picric acid. Weight, 7 oz.; dimensions,  $2\frac{3}{4} \times 2 \times 1\frac{1}{2}$  in.; two holes are provided for the insertion of blasting caps.

**TNT AND PICRIC STICKS.**—These blocks are  $4\frac{1}{2}$  in. long cylinders weighing 7 oz. One stick consists of pressed, wrapped, grain TNT, and the other is pressed, wrapped, picric acid.

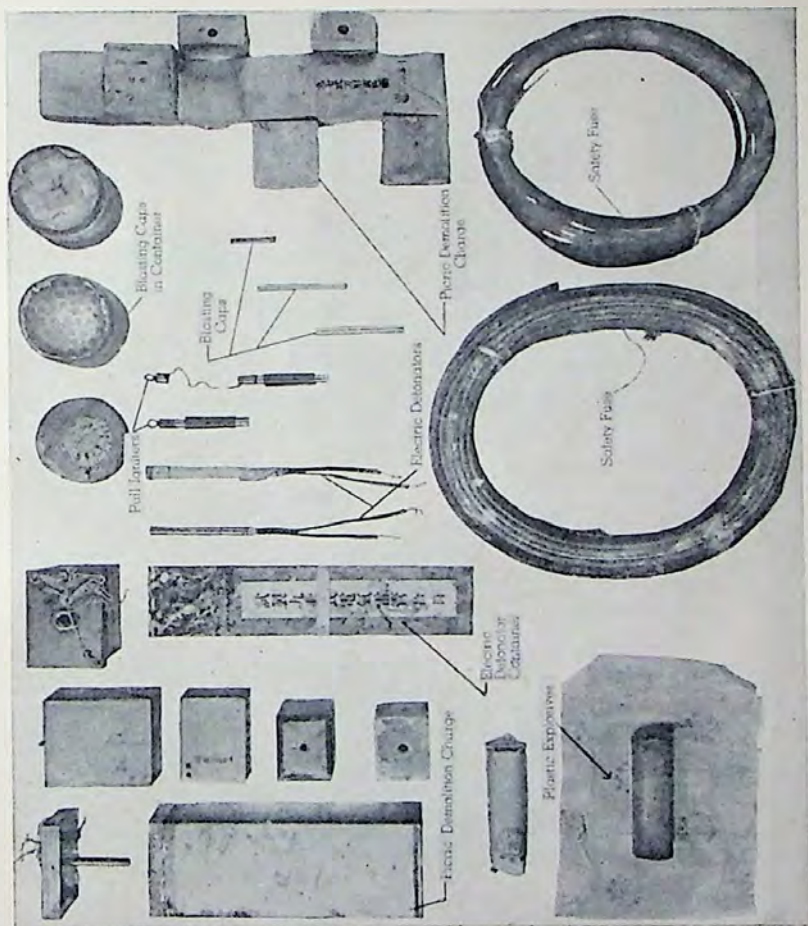


FIGURE 383.—Miscellaneous Demolition Equipment.

**DEMOLITION BLOCK.**—This charge is made up of four blocks of picric acid packed in a light metal container. The top block is twice the size of the others and contains a hole to receive the detonator. Weight, 2 lbs., 14 oz.

**DEMOLITION BLOCK.**—Three 7¼ oz. blocks and one 1-lb. block of grey-colored explosive. These blocks fit in a tin-plated steel container.

**DEMOLITION CAN.**—This charge consists of three pressed, wrapped, picric acid blocks in a rectangular zinc can.

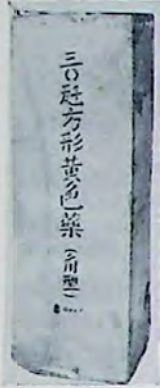


FIGURE 381.

**1-Kg. DEMOLITION CAN.**—This can is filled with cast wrapped picric acid. Strings are attached near the two primer seats to facilitate attachment of blasting caps.

**5-Kg. DEMOLITION CAN.**—Can filled with cast, wrapped, picric acid. Weight is 5.5 Kg. Two primer seats on the top and one on the side have strings attached to facilitate attachment of blasting caps.

**30-Kg. PICRIC BLOCK (Fig. 384).**—This charge contains 30 Kg. of picric acid. Charges are rounded or square.

**SUBSTITUTE EXPLOSIVES.**—(See table of Military Explosives, Chapter II.)

#### DEMOLITION TUBES

##### Bangalore Torpedo (Fig. 385)

This torpedo is a brown steel tube filled with cyclonite and TNT, with a cap at one end and a male plug threaded into the other. The fuze and locking collar are constructed of a light aluminum alloy. To assemble the torpedo, the pointed cover is threaded from the locking collar and replaces the cap on the male end of the torpedo. The plug is then removed from the female end of the tube and the locking collar with fuze body threads in to replace it. Several torpedoes can be threaded together to increase the length.



FIGURE 385.

To explode the torpedo, the safety pin is removed from the fuze head and the lanyard is pulled. The fuze contains an eight-second delay. Length (with fuze), 51 in.; diameter, 1½ in.; weight, 10 lbs.

The bangalore torpedo is used against barbed wire obstacles, mine fields, and for other demolition purposes. It may be rigged as a booby trap.

A bamboo tube, filled with explosive and fitted with a pull igniter (Fig. 386) has been utilized for emergency field demolition.



FIGURE 386.

#### **Finned Bangalore Tube (Fig. 387)**

This tube is similar to the bangalore except that it is made of two-piece body with fins attached to the after-body. The after-body section is so modified to fit into the barrel of the Type 98 projectile discharger. A combination instantaneous-short delay nose fuze fits into the tube. Length,  $78\frac{3}{8}$  in.; diameter,  $1\frac{1}{16}$  in.; weight, 17 lbs. 14 oz.



FIGURE 387.

#### **Type 99 Demolition Tube**

This tube weighs 35 Kg. and is 44 in. long. The fuze is actuated by a pull cord and has seven seconds delay.

#### **Obstacle Demolition Tube**

The tube is over 35 ft. long and weighs 102 Kg. The construction is similar to those above, but the fuze is actuated by electrical means. The exterior tube is colored light brown.

## VIII. PYROTECHNICS AND CHEMICAL ORDNANCE

### INTRODUCTION

This chapter covers pyrotechnic and chemical ordnance not included under other headings. Specific items include ground and aircraft flares, signals, smoke candles and smoke generators, ground and navigation markers, and gas sticks. The aircraft navigation sea markers, although not pyrotechnics, are included because they are used in the same manner as smoke floats, and from their shape could easily be mistaken for items of this type.

In handling these pyrotechnics, reasonable care must be exercised even though few contain large explosive charges. All pyrotechnics are a potential fire hazard and must be treated as such. Certain of the flares or smoke candles will explode with a violence approaching that of a high explosive if they have been overexposed to the weather or if the fire is confined. Special attention should be paid to markings on smoke candles since they are the only means of identifying vomiting or tear gas candles from those giving off harmless screening smoke.

Attempts should not be made to souvenir these items as many contain charges which are sensitive to friction or shock. Never pull on loose wires or cables or try to remove parachutes as they may be attached to friction igniters.

### ARMY FLARES

#### **Flares for 50-mm. Type 10th Year Flare Discharger (Fig. 388)**

All known flares of this type are included in sheet 6 of Appendix A. The flare cases,  $6\frac{1}{8}$  in. long, are heavy tan-colored cardboard. The color of the bands indicates the color of the flare and the number of stars is indicated by the number of bands. The base of the flare, with the attached propellant container, is constructed of yellow brass with tinfoil covered emission holes in the container. The top surface of the case is painted the characteristic color of the flare, and except in the case of the Black and Yellow Dragon flares, has raised symbols standing for the different types: small squares for white flares, triangles for green flares, and circles for red flares.

#### **50-mm. Tenth Year Type "A" Flare (Fig. 389)**

According to Jap labels, this device is to be fired from the Type 89 Grenade Discharger for use as a flare; however, the filling is of an

incendiary type which burns with an intense white flame. Length,  $6\frac{1}{4}$  in.

### 81-mm. Mortar Signal Flare

(a) GREEN TYPE.—Light iron cylindrical projectile 3 in. in diameter with eight raised bearing surfaces on the upper and lower portions of the case. The top has five green-colored circles on it. Attached to the base is a propellant container similar to the 50-mm. flares. Overall length,  $7\frac{3}{8}$  in.



FIGURE 388.



FIGURE 359.

(b) PARACHUTE SMOKE CYLINDER.—Identical to the 81-mm. green in appearance, except that a broken ring painted yellow is the identification mark on the top of the flare.

### Signal Cartridges

The following cartridges are fired from the Type 97 Very Pistol. They resemble the standard 12-gauge shot-gun shell.

Type	Wrapping color	Dimensions (inches)	Base diameter (inches)	Flame color
B	Green (no label)	$3\frac{3}{4} \times 1\frac{1}{2}$	$1\frac{3}{16}$	Blue-White.
L	Green (white label)	$3\frac{3}{4} \times 1\frac{1}{2}$	$1\frac{3}{16}$	Blue-Green.
K	White (white label)	$3\frac{3}{4} \times 1\frac{1}{2}$	$1\frac{3}{16}$	Lavender.
J	White (white label)	$3\frac{3}{4} \times 1\frac{1}{2}$	$1\frac{3}{16}$	Bright white.
A	Red (white label)	$3\frac{3}{4} \times 1\frac{1}{2}$	$1\frac{3}{16}$	Red.
A	Red and white (white label)	$4\frac{1}{16} \times 1\frac{1}{2}$	$1\frac{3}{16}$	Two pellets, red and green flame.

### Signal Rocket Mk. 1 (Fig. 390)

The projectile is similar to the common commercial fireworks rocket. The brown cardboard cylinder is attached to a stick, to the end of which is fixed a 6½ ft. length of rope. A pull tab in the base of the rocket container covers a length of fuse which is lit to fire the rocket. Over all length, without rope, 25 in.



FIGURE 390.

### Type 93 4-cm. Signal Flare (Fig. 391)

Two types: (a) Trailing white stars, brassy body; (b) Green comet, tin-colored body; over-all length, 7½ in., diameter, 1½ in. At the base of the cylinder are points for fixing the flare in the ground. The flare has a base friction striker which ignites a safety fuse. The safety fuse, in turn, sets off the propellant charge, which blows out the paper parachute and black flare powder container, at the same time igniting the safety fuse leading to the burster charge which starts the flare mixture.



FIGURE 391.



FIGURE 392.

### Safety Fuse Flare (Fig. 392)

This flare, 3½ in. long and 1¼ in. in diameter, is housed in a cylindrical paper container closed at the base with a wooden plug to which a short length of safety fuse is attached. Above the plug is a small expelling and ignition charge which blows the flare and its red paper parachute out of the container. The flare burns for 23 seconds. It is possibly fired from the 30-mm. rifle grenade discharger.

## NAVY FLARES

### Navy Hand Signal Flare (Fig. 393)

This cylindrical cardboard container is filled with a flare mixture and fixed on a wood handle. The signal is ignited by pulling a metal wire which extends down the tube. A label with both English and Japanese writing on it is pasted on the container, indicating that the item was probably manufactured for use as a distress signal prior to the war. Length, 12½ in. ,

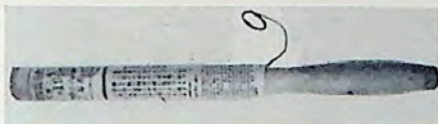


FIGURE 393.



FIGURE 395.



FIGURE 394.

### Illuminating Flare Bomb (Fig. 394)

This flare body has a conical shape with a hemispherical nose welded to the body and weighted for ballistic purposes. Two spring carrying handles are fitted to the body. The flare is ignited by a pull igniter in the base and burns with a brilliant greenish-yellow flame. Flares which have failed to function should be handled with care as they burn with intense heat. Length, 22½ in., diameter, 6¼ in.

### Type 96 Floating Landing Flare (Fig. 395)

This is a light sheet metal flare bomb with four sheet metal fins and a brass nose parabolic in shape. The flare produces an extremely bright white light and is used as a means of signaling landing spots during the night. It is dropped from airplanes and due to its hollow construction will float in water. A pull igniter in the nose ignites a length of safety fuse which fires the quickmatch in the after end setting off the flare mixture. Length, 16¼ in., diameter, 5 in.



FIGURE 396.

### Ground Signal Flares (Fig. 396)

These cylindrical cardboard containers, filled with red, white or green flare composition, are used to signal aircraft from ground stations. Openings at the top of the flare indicate the color of the flare composition: Three—green; four—white; eight—red. A pull igniter for setting off the flare composition is in the base. Length, 3¾ in., diameter 1¼ in.



FIGURE 397.



FIGURE 398.



FIGURE 399.



FIGURE 400.

### Type 94 Float Flare (Fig. 397)

This grey-colored flare is of soldered tinplate construction throughout. A lead weight in the nose and a buoyancy chamber in the rear section keep the flare upright in the water. The flare has water inlet holes in the nose and the side, sealed by a tear-off strip, and a removable end cap. Before dropping, the tear strip and end cap are removed. After impact with the sea, water enters through the nose inlet, wets the calcium carbide in the forward end and acetylene gas is generated. Simultaneously, water enters through the side inlet hole, wets the calcium phosphide in the after end of the flare and generates phosphine. The acetylene gas passes out through the tail opening and is there ignited by the phosphine gas which is spontaneously inflammable in

the air. Length, 12 in., diameter,  $2\frac{1}{2}$  in. A factory variation, painted black with an additional lead weight soldered to the exterior of the nose to cause the flare to float at an angle, has been recovered. It is 14 in. long, 3 in. in diameter.

#### **Type 94 Mod. 1 Float Flare (Fig. 398)**

This is a larger flare than the Type 94. It is painted bright yellow and has box-type struts supporting the tail fins. Preparations for dropping the flare and the principles of generating gas and ignition are the same. Length,  $20\frac{1}{4}$  in., diameter,  $4\frac{1}{2}$  in.

#### **Type 94 Model 2 (Fig. 399)**

This is a smaller version of the Type 94. It is painted grey over-all. The methods of dropping and ignition are the same. Length,  $9\frac{1}{2}$  in., diameter,  $2\frac{1}{2}$  in. A similar flare  $13\frac{1}{4}$  in. long has been reported.

#### **Type 0 Model 1 (Fig. 400)**

This marker is similar in construction and operation to those listed above. Over-all length,  $13\frac{1}{4}$  in., diameter,  $2\frac{1}{2}$  in., weight 2 lbs.  $\frac{3}{4}$  oz.

### **ARMY SMOKE PYROTECHNICS**

#### **Smoke Candle**

Exclusive of self-projecting and floating smoke candles, all smoke candles are of the same basic construction, differing only in size and filling. This type candle consists of a cylindrical sheet metal container with a removable metal cover held in place by adhesive tape. The cover protects a match head in the top of the candle and contains a wooden scratch block. To ignite the candle, the scratch block is rubbed against the match head which, after a few seconds delay, ignites the main filler. The candle is thrown to, or placed at the spot where smoke is desired. Details of individual candles are given in tables and photographs beginning on page 255.

#### **Self-Projecting Candles**

All self-projecting candles are of a similar type. Differences in dimensions and filling are shown in the table and photographs beginning on page 255. In general, self-projecting candles consist of an outer tube sealed at one end by a wooden block with protective metal covers held on each end with adhesive tape. The smoke mixture is contained in a snug-fitting inner container. A match head in the block at the base of the candle is ignited by the scratch block contained in the top metal cover. This ignites a delay fuze which sets off the propelling charge and shoots the inner smoke container outward. A delay element is ignited by the explosion and in turn starts the smoke mixture. A rod encircles the candle and extends along the length of the candle to form a spike which is inserted into the ground to support the candle at the desired angle for firing.

### Type 94 Floating Smoke Candle (Fig. 401)

This candle consists of a cylindrical metal tube equipped with a supporting ring to which a rubber tube is attached by means of two lugs. The body is painted grey with a white label or brown with a white band. The filling is either Berger Mixture (Type 94 A), or HC (Type 94 B). When in use, the rubber tube is inflated to support the candle in the water. A metal top covers the fuze pocket which is closed with a wing nut during shipment. The fuzes are shipped separately.



FIGURE 401.



FIGURE 402.

Two types of firing mechanism may be used. One type is the ordinary hand grenade igniter without the blasting cap detonator; this gives a delay of about 8 seconds. A friction igniter initiated by a small piece of wood painted with abrasive may be used. This produces a delay of up to 30 seconds. The candle burns for about  $3\frac{1}{2}$  minutes, and gives off a dense cloud of white smoke which hangs close to the surface of the water. Length  $31\frac{1}{4}$  in., diameter  $3\frac{1}{4}$  in.

### NAVY SMOKE PYROTECHNICS

#### 40-Kg. Floating Smoke Generator (Fig. 402)

This generator is a grey welded steel drum 14 in. high and 12 in. in diameter. On the top are two carrying handles, a filling hole, the fuze and ignition system, and the spray tube which extends inside to the

bottom of the drum. An inflated rubber tube may be attached to the eight lugs on the sides of the drum to float the generator in water. In operation, the safety pin in the firing assembly is removed and the plunger is struck to explode the detonator and ignite the fuse. This fires a wick and starts the combustion of a slow-burning charge. As pressure from this burning builds up in the upper part of the drum, the FS mixture in the lower part is forced out through the emission tube. Upon contact with air, a dense white cloud is formed.

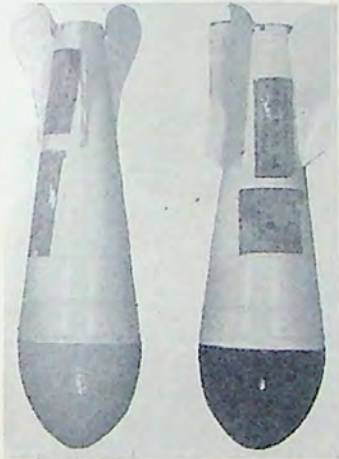


FIGURE 403.

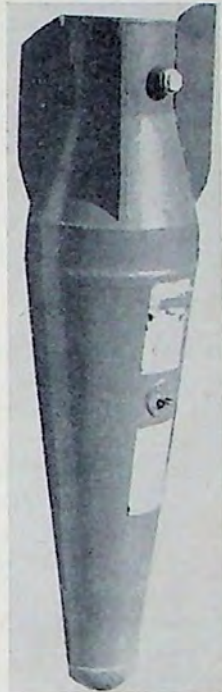


FIGURE 404.



FIGURE 405.

### Smoke Float (Fig. 403)

This float has a streamline shape with an over-all length of  $18\frac{1}{2}$  in. and maximum diameter of  $3\frac{3}{4}$  in. Three rounded tail fins are soldered around the after part of the body. A removable cap on the tail covers the smoke outlet and also the ring attached to a pull igniter by means of which the main filler is initiated. It has been found with both black and yellow smoke fillers. It is used as an aircraft navigation marker and must be dropped from a height of less than 700 meters.

### Floating Smoke Flare (Fig. 404)

This is a large aircraft-laid spotting smoke flare. The 51 in. long bluish-grey metal container holds an ejection charge, parachute,

pull igniter and delay train, and the smoke compound. The flare is ignited by the D-3 (a) aerial burst fuze with cup vanes which fits into the side fuze pocket of the flare. The parachute slows the descent of the flare and the delay train permits the flare to return to the surface of the water before the smoke compound is ignited.

#### **Type 2 Target Indicator (Fig. 405)**

This bomb is a fuzeless black bakelite container filled with FM (titanium tetrachloride). The tail fins are made of sheet steel and the bomb is closed by a paper nose cap filled with iron filings. A sealed glass tube closes the after end. A steel ring held to the body by a tin strip is for suspension. If dropped from a high altitude the case will rupture on impact and release the FM mixture. If the case does not rupture the glass tube in the tail may break allowing the FM to be ejected by air pressure within the bomb. Length 17 in., diameter 3 in., weight 3 lbs. 14 oz.

### **NAVY NAVIGATION MARKERS**

#### **Type 0 Model 1 (Fig. 406)**

This marker has an aluminum painted cylindrical sheet metal body with a weighted ogival nose section and a conical sheet metal tail fitted with four fins. Passing through the nose section and running the length of the body is a wooden plunger held in place with tape. Impact with the water forces this plunger aft, pushing out the wooden base plate and freeing the aluminum powder filler to form a film on the surface of the water. Markers with a brass nose cup weighted with lead or with a steel nose plug have been observed. Length 12½ in., diameter 3 in., weight 3 lbs. 11 oz.

#### **Type 0 Model 2 (Fig. 407)**

This marker is similar to the Model 1 except that it is painted yellow overall and is filled with a dark green powder which makes a green slick on the water.

#### **Type 2 Model 11 (Fig. 408)**

This is a larger version of the Type 0 Model 1 sea marker. It is filled with aluminum powder. Length 22 in., diameter 5 in., weight 18 lbs.

#### **“Cardboard” Type**

This marker is filled with aluminum powder and is similar to the Type 0 Model 1 marker except that it is constructed entirely of cardboard and has no wooden plunger. Instead, a paper sealing disc over the nose plug opening bursts on impact and releases the filling. Weight 3 lbs., 8 oz.



FIGURE 406.



FIGURE 407.



FIGURE 408.

#### MISCELLANEOUS

##### Aerial Burst Containers

Paper spherical containers filled with flare, smoke or HE mixtures have been recovered, and flak reports indicate their use over the China coast. All are aerial burst, and are believed to be launched from metal tubes of varying sizes.

##### FLARE BALL (Fig. 409)

This is a large round cardboard container with a dome top covering a paper-wrapped black powder fuse and a dome bottom containing a black powder charge in a celluloid cup. The main container carries a cluster of 12 flares attached to a large green tissue parachute. The flare cluster is bedded in a quantity of cottonseed which fills most of the lower half of the sphere. A pull wire permits removal of the top dome and allows access to the fuse for ignition. Diameter 9 in., weight 9 lbs.

##### SMOKE BALL (Fig. 410)

This container is similar in size, appearance, and operation to the flare, but it is filled with 80 smoke pellets packaged around a black powder charge in a silk bag. The upper section of the sphere is filled with cottonseed. In view of the large quantity of black powder contained in the flare, it should be handled with care. Diameter 9 in., weight 9½ lbs.



FIGURE 109.



FIGURE 110.

#### H. E. BALL

This is a slightly smaller white cardboard sphere containing three picric explosive units, each in a tin container and each fitted with a paper parachute. A pull igniter in the top of each unit detonates the explosive when an airplane comes in contact with the parachute shrouds. This container is domed only at the end from which the safety fuze emerges. The fuse leads to a black powder bursting charge.



FIGURE 111.

#### SIGNAL BALL (Fig. 411)

These green paper containers carry a short length of fuse, a black powder bursting charge, sand ballast and a paper parachute. A red paper flag has been found suspended below some of the parachutes. This container is not domed at either end. Diameter  $4\frac{1}{2}$  in., weight  $11\frac{1}{2}$  oz.

#### Signalling Shell No. 2 (Fig. 412)

The shell is made up of a small light bulb shaped pressed paper container fitted into a brass truncated cone base. The sphere contains iron filings and black powder, the latter ignited by a length of safety fuse which is ignited by the propelling charge contained in the base. The cone has a primer cap in its base. The method of firing is not known. Maximum diameter  $2\frac{3}{8}$  in., weight 6 oz.

**Type 2 Model 1 Torpedo Marker (Fig. 413)**

This marker is secured to practice torpedoes and the fiber closing plugs removed from tubes located on the top of the marker. As the torpedo travels through the water, water passes into one tube and forces a trail of green dye from the other. Length 13 in., diameter  $3\frac{1}{16}$  in.



FIGURE 412.



FIGURE 413.



FIGURE 414.

**Mk. 1 Incendiary Cylinder "A" Large (Fig. 414)**

This charge is used by Japanese bomb disposal squads in an attempt to obtain a low order detonation and subsequent burning of unexploded bombs. The charge is a thin-walled grey metal container filled with a mixture of commercial thermitite. An igniter with a delay fuze of approximately 5 minutes fits in a well in the top of the charge.



FIGURE 415.



FIGURE 416.

### **Type 89 Tear Gas Stick (Fig. 415)**

These sticks are packaged in a grey metal cylinder 7 in. long and 2 in. in diameter. White labels are fastened to the cover and the side of the package. The container carries 20 brown sticks  $5\frac{1}{2}$  in. long and 20 metal quills for sticking in the ground. The sticks are ignited by a match and burn like punk.

### **Navy Special Sneezing Gas Stick (Fig. 416)**

Twenty tan sticks,  $3\frac{3}{4}$  in. long and  $\frac{3}{8}$  in. in diameter are packed in a yellow cylindrical cardboard box. The box is  $5\frac{3}{4}$  in. high and  $2\frac{3}{8}$  in. in diameter. Each stick is wrapped in wax paper and may be ignited with a match. The sticks give off a gas, probably DC, that causes sneezing and vomiting.

## **ARMY AIRCRAFT PARACHUTE FLARES**

### **Type 90 Small Model (Fig. 417)**

This flare is dropped from an airplane and is ignited by a pull igniter when the parachute opens. It burns for 2 minutes and 40 seconds with an intense greenish-white flame. The flare and cotton parachute are packed in a split, hinged cardboard cylinder held closed by an end cap. When the flare is used the end cap is removed, allowing the cylinder to swing open releasing its contents.

### **Type 90 Wing Flare (Fig. 418)**

This flare is fired from the wing of a plane by means of an electrical igniter. It burns with a bright white flame for approximately 1 minute and is presumably used for night landings. Length  $7\frac{1}{6}$  inches, diameter 2 inches.

### **Types 1 and 2 Parachute Flares (Fig. 419)**

The flare case is constructed of cold rolled steel, painted black, and fitted with a single hinged Army type lug for horizontal suspension. It fits a 15- or 30-Kg. bomb station. An aerial burst nose fuze initiates a black powder charge and the flash ignites the flare composition. The expanding gases expel the parachute and burning flare composition out the base of the case, allowing the parachute to open. The flare burns with a greenish-white light for an estimated  $1\frac{1}{2}$  to 3 minutes. The difference between Type 1 and 2 is not known. Length 37 in., weight  $29\frac{1}{2}$  lbs.

### **Type 3 Parachute Flare (Fig. 420)**

This flare is of cold rolled steel construction painted dull red. It is of the correct size to fit a 50 Kg. bomb station and appears similar to the Navy Type O Parachute Flares. The aerial burst nose fuze ignites a black powder charge which ignites the illuminant. The expanding

gases propel the illuminant and parachute out the base of the container. The flare burns with a bright white light for over 3½ minutes. Length 42¼ in.



FIGURE 417.



FIGURE 418.



FIGURE 419.



FIGURE 420.

### NAVY AIRCRAFT PARACHUTE FLARES

#### Type 0 Parachute Flare (Fig. 421)

This flare is a rolled tinplate cylinder. Three colors are known: (1) A white cylinder with a red band at the base—burns white to red, (2) a white cylinder with a green band—burns white to green, (3) a grey cylinder with a white band around the base marked with 3 red stars—burns white to red stars. A pull igniter in the top of the flare initiates a 5-second delay train which fires a small black powder charge. This charge simultaneously ignites the flare and blows the parachute and flare mixture out of the base. Length 11½ in., diameter 2 in.

#### Model 2 Mod 1 Parachute Flare (Fig. 422)

This flare is similar to the Army Type 90 Small Model Flare. The container is of sheet metal with a removable cap fitted on the para-

chute end. Removal of the cap exposes a pull igniter. When the igniter cord is pulled, a delay train is ignited and fires a black powder charge at the base of the flare. The black powder ignites the illuminant and the expanding gases blow the flare and parachute from the container. Length  $25\frac{1}{8}$  in., diameter  $3\frac{1}{8}$  in., weight 10 lbs.  $\frac{3}{4}$  oz.

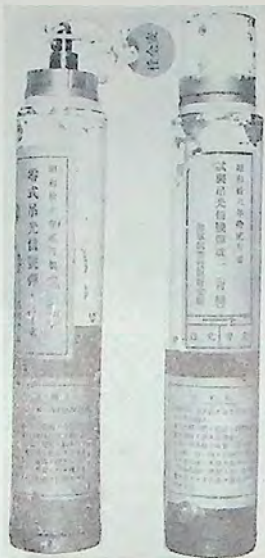


FIGURE 421.



FIGURE 422.

### Type 0 Parachute Flare Series

There are five flares in this group, employing the same case and illuminant and varying only in details of ejection, ignition, and suspension. Tactically the development is toward flares for release at high altitudes.

The case is of sheet steel construction, grey over-all with a red band just below the end cap. The illuminant burns from  $3\frac{1}{2}$  to 4 minutes. Length  $42\frac{1}{2}$  in., diameter  $6\frac{3}{4}$  in., weight 86 pounds.

#### Type 0 Model 1 (Fig. 423)

In this flare the aerial burst nose fuze ignites the illuminant directly and the expanding gases force the illuminant and single parachute out the base of the container. This is a flare designed to be dropped from low levels and ignition is immediate.

#### Type 0 Model 1 Mod 1 (Fig. 424)

This flare has the same dimensions and external appearance as the Type 0 Model 1 except for the addition of a white band around the nose indicating a 10-second ignition delay. The illuminant is ejected

by a black powder charge in the nose of the container. A second small parachute is included to steady the flare prior to ejection.



FIGURE 423.



FIGURE 421.



FIGURE 425.



FIGURE 426.

#### **Type 0 Model 2 (Fig. 425)**

This flare is identical in appearance, construction and operation with the Type O Model 1, except for the addition of the ejection charge and 0.2-second ignition delay. This flare is slightly shorter and has an over-all length of  $38\frac{1}{2}$  in.

#### **Type 0 Model 3**

This is known from documents only. It is supposed to be a high altitude flare.

#### **Type 0 Model 3 Mod 1 (Fig. 426)**

This is a flare for use from high levels. A black band around the nose indicates a long ignition delay of 85 seconds. A second small parachute is added to steady the flare in flight prior to ignition.

#### **Experimental Model 11**

This is a larger flare of longer burning time and greater intensity than any of the Type O flares. It is painted grey over-all with a red

band above the end piece. Burning time is 4 minutes 40 seconds. Length 45 in., diameter  $9\frac{1}{4}$  in., weight 110 pounds. Two variations exist:

OGIVAL-SHAPED NOSE (Fig. 427). This flare has a 10 second ignition delay and operates like the Type O Model 1 Mod. 1.



FIGURE 427.



FIGURE 428.

CONE-SHAPED NOSE (Fig. 428). This is a high altitude flare and operates like the Type O Model 3 Mod. 1.

FLARES AND SMOKE CANDLES

Designation	Color and markings	Type smoke	Length (inches)	Diameter (inches)	Weight (lbs.)	Fig. No.
ARMY						
Type 94 Large Smoke Candle A.....	Gray Body, White Label.	Berger mix.....	18	6	42	429
Type 94 Large Smoke Candle B.....	Brown Body, White Band.	H.C.....	31	1 5/8	35	430
Type 94 Subst. Smoke Candle A.....	Unpainted Metal.....	Berger mix.....	9 1/2	2 1/4	1	431
Type 94 A Small Smoke Candle.....	Gray or Dark Green to Dark Brown Body, White Label or Band.	Berger mix.....	7		2.2	
Black Smoke Candle.....	Checkered Brown Paper.....	Berger mix.....	5	1 1/2	17 1/2	482
Type 94 Floating Smoke Candle (A).....	Gray with white label or brown with white band.	H.C.....	31	3	13 1/2	
Type 94 Floating Smoke Candle (B).....	Gray with white label or brown with white band.	H.C.....	31	3	13 1/2	
Type 95 Metal Self-projecting Smoke Candle.....	Unpainted or Gray Body Thing Spike.....	Red Smoke mix.....	6 1/4	2 1/2	1.6	
Type 96 Self-projecting Smoke Candle.....	Gray Body, Red Band.....	H.C.....	8 1/2	2 1/2	3	
Type 99 Self-projecting Smoke Candle.....	Gray Body, White Longitudinal Line—Jap. Characters—Range Spike.....	H.C.....	8 1/4	2		
Type 98 Small Vomiting Gas Candle.....	Gray or Brown Body, Red Band.....	D.C.....	7 1/4	2 1/4	.6	433
Type 93 Medium Vomiting Gas Candle.....	Gray Body, Red Band.....	D.C.....	8 1/4	4 1/8		
Type 97 Medium Vomiting Gas Candle.....	Brown Body, Red Band.....	D.C.....	10	4 1/2	4.4	
Type 96 Medium Vomiting Gas Candle.....	Brown Body, Red Band Hinged spike on side.....	D.C.....	9	4 1/2	3.3	434
Type 100 Large Vomiting Gas Candle.....	Brown Body, Red Band.....	D.C.....	18 1/2	8	29	435
Type 88 Self-projecting Vomiting Gas Candle.....	Brown Body, Red Band.....	D.C.....	8	2	1.6	436
Type 87 Self-projecting Vomiting Gas Candle.....	Brown Body, Red Band.....	D.C.....	8 1/4	2	1.6	437
Type 100 Self-projecting Vomiting Gas Candle.....	Brown Body, Red Band.....	D.C.....	8 1/4	2	2.25	438
Type 89 Tear Gas Candle.....	Gray Body, Green Band.....	C.N.....	7 1/4	2 1/4	1.5	439
Type 83 Persistent Gas Indicator.....	Gray Body, White Label.....	Liquid filling simulates persistent agent for training; oil of wintergreen odor.	6	2 1/2	1.4	
NAVY						
1-Kc. Smoke Candle, Mod. 3.....	Varnished body, labels on top and side.....	Berger mix.....	29 1/2	2 3/4	3 1/2	440
1-Fg. Smoke Candle, Mod. 4.....	Varnished body, labels on top and side.....	Berger mix.....	31 1/2	2	2.2	
1-Eg. Smoke Candle, Mod. 6.....	Varnished body, labels on top and side.....	Berger mix.....	31	2	2.2	
1-Kc. Smoke Candle, Mod. 7.....	Varnished body, labels on top and side.....	H.C.....	31 1/2	2	2.2	
1-Eg. Smoke Candle, Mod. 8.....	Gray body, labels on top and side.....	Berger mix.....	31 1/2	6	22	441
Red Colored Smoke Candle, Mod. 2.....	Varnished body, labels on top and side.....	Red dye and smoke mix.....	31 1/2	2 1/4	4.42	442
Blue Colored Smoke Candle, Mod. 1.....	Varnished body, labels on top and side.....	Blue dye and smoke mix.....	31 1/2	2 1/4	4.43	443
Small Tear Gas Candle (A).....	Varnished body, labels on top and side.....	C.N.....	29 1/2	2 1/2	2.14	444
Large Tear Gas Candle (A).....	Varnished body, labels on top and side.....	C.N.....	29 1/2	3	2.15	445

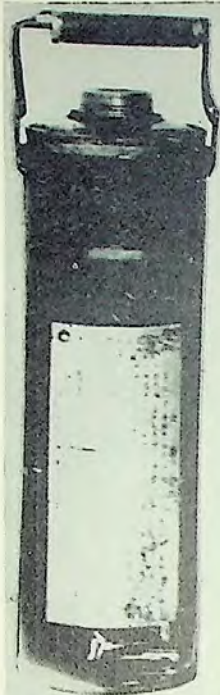


Fig. 429



Fig. 430



Fig. 431



Fig. 432



Fig. 433



Fig. 434

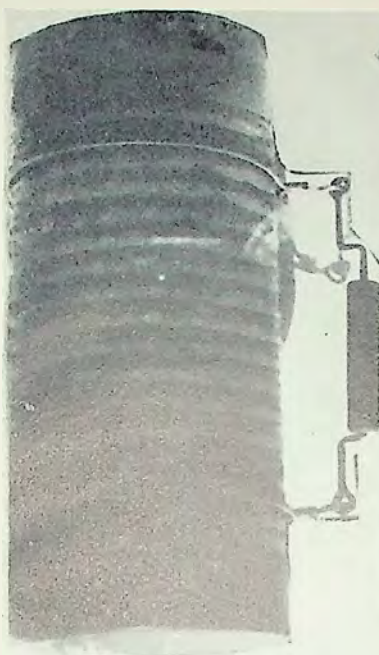


Fig. 435

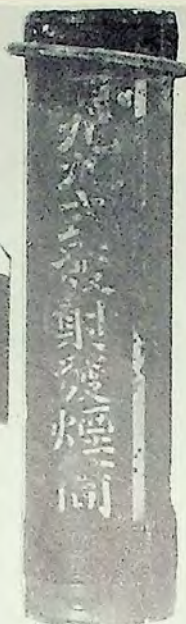


Fig. 436

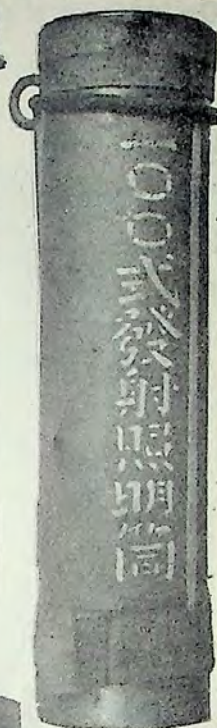


Fig. 437



Fig. 438

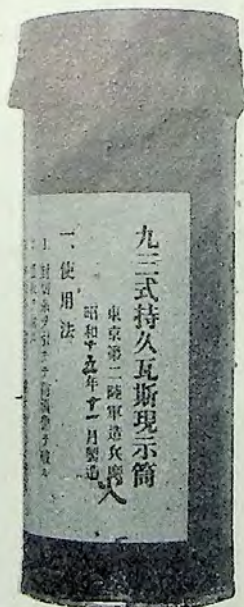


Fig. 439



Fig. 440

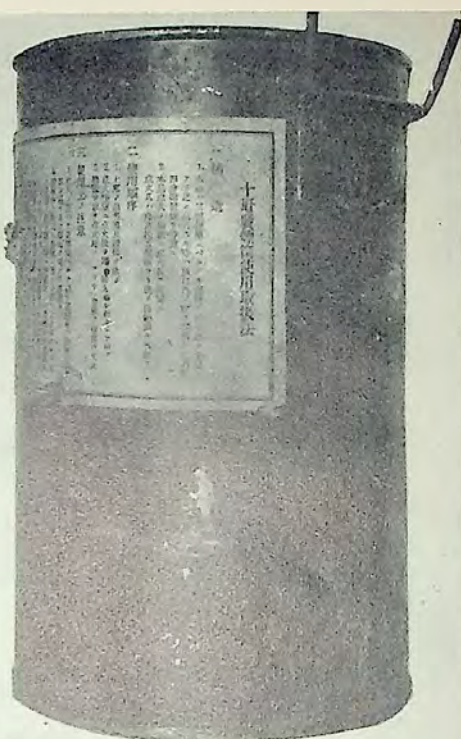


Fig. 441



Fig. 442



Fig. 443



FIGURE 414

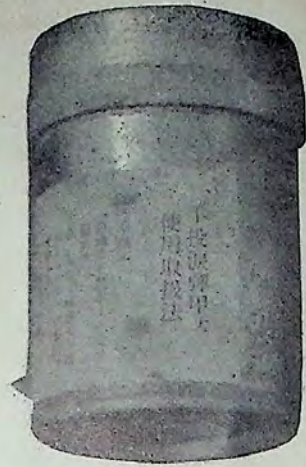


FIGURE 445

APPENDIX A

Color Sheets for Identification of Japanese  
Ammunition

## ERRATA

Following are listed correct colors for certain rounds shown incorrectly on the color sheets:

## SHEET 1

HO 103 12.7-mm. H. E. I.: Single purple band at cannellure.  
 HO 103 12.7-mm. H. E. I. Italian: Body red, no band at cannellure.  
 Type 97 20-mm. H. E. I.: Green band above yellow band at center of body.  
 20-mm. German #2 HET (SD): Blue band above red band at center of body.  
 20-mm. German #6 HEI: Green band above red band at center of body.  
 HO 203 37-mm. #1 HEI: Brass nose fuze.

## SHEET 2

Type 97 20-mm. #1 HET: Green band above yellow at center of body.  
 Type 94 37-mm. #4 AP: Upper band, yellow.  
 Type 97 37-mm. #4 AP: Lower band, white.  
 Types 90 & 97 57-mm. #5 Sub. HE: Tip on nose, red.  
 Type 41 Mt. Gun #2 Vomit gas: Gray body color, both projectiles.  
 Type 94 Mt. Gun #4 Liquid Incend.: Body color gray; nose tip red.  
 Type 90 Field Gun #2 Type 90 HE-LP: Projectile at right, two copper rotating bands below yellow band.  
 Type 88 Field/AA Gun #1 Type 90 HEAA (LP): Projectile at right, copper band above yellow band.  
 Type 88 Field/AA Gun #2 Type 90 HL: Projectile at right, red body, red nose tip, white band at base.

## SHEET 3

90 mm. breech loading mortar #2: Green band at center of body.

## SHEET 4

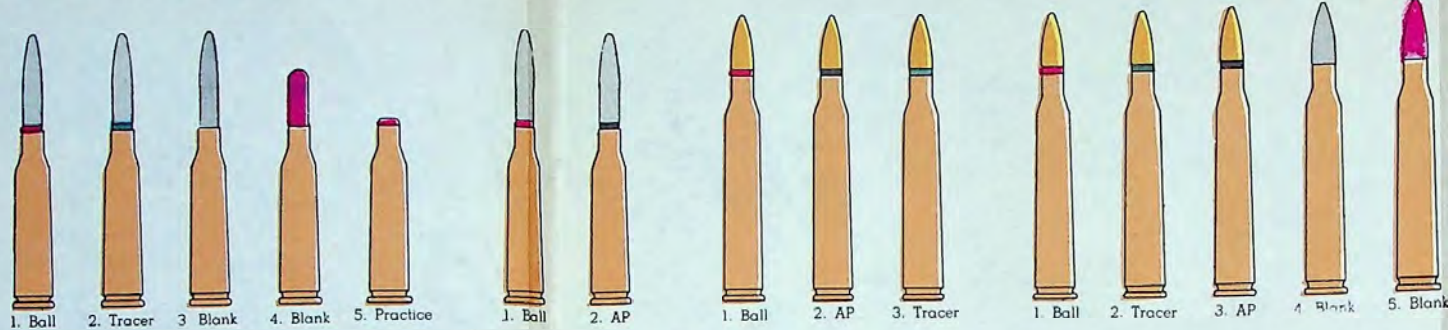
Type 2 13 mm. ACMG #3: Body of projectile, yellow.  
 Type 99 Mk. I 20-mm. #8 and #14, and Type 99 Mk. II 20-mm. #5: Wide white band at center of body.  
 Type 99 Mk. II 20-mm. #2 and #3: Body, red.  
 Type 96 25-mm. AA gun #5 and #6: Body, orange.  
 Type 96 25-mm. AA Gun #10: Gray body below white tip.  
 Vickers type 40-mm. #2: Body, dark red.

## SHEET 5

Type 10 yr. 12-cm. 45 cal. #2: Projectile fuze and same as #1.  
 Type 10 yr. 12-cm. 45 cal. #3: No white band on nose.  
 Type 11 yr. and Type 3 yr. 12-cm. #3: Brass fuze in nose.  
 Type 11 yr. and Type 3 yr. 12-cm. #6: Two brass bands around body.  
 Type 11 yr. and Type 3 yr. 12-cm. #7: Projectile body black over-all.  
 Type 11 yr. and Type 3 yr. 12-cm. #9: Blue body, yellow band, aluminum fuze in nose.  
 14-cm. 50-cal. bag gun #1 & #2: Red nose tip.  
 14-cm. 50-cal. bag gun #3: Aluminum fuze in nose.  
 15.5-cm. bag gun #1: Aluminum fuze in nose.  
 15.5-cm. bag gun #2: Body white over-all, yellow band.

## SHEET 6

90-mm. Mortar #4 Incend.: Blue band below red band on nose.  
 81-mm. AA Mortar #2 Flare: Body gray over-all.

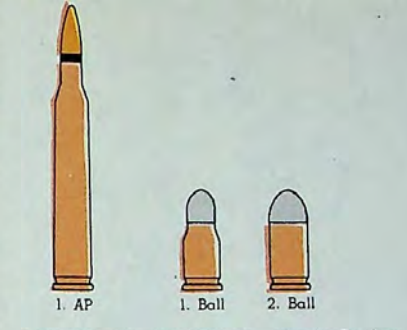


Type 38 6.5mm for Rifle and LMG

Type 38 6.5mm Modified  
(Indicated by (G) on package)

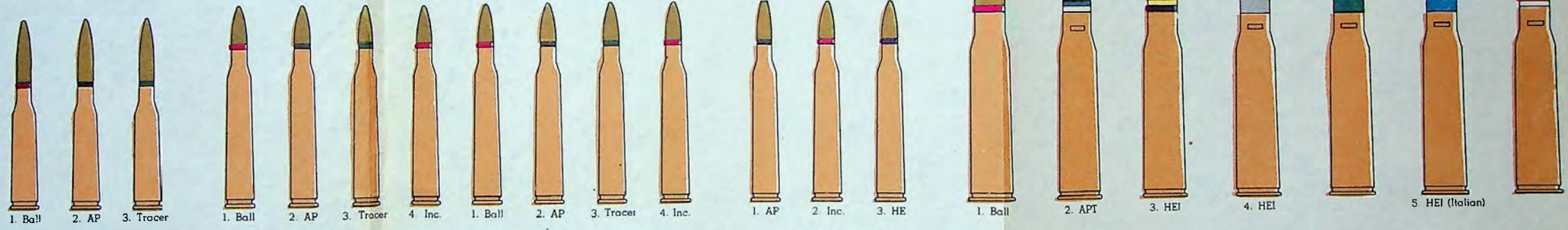
7.7mm for Type 1 and 92 HMG

Type 99 7.7mm for Rifle and MG



7.92 for Bren MG 8mm for Pistol and Sub-Machine Gun 9mm for Revolver

Aircraft Machine Guns



6.5mm for ACMG

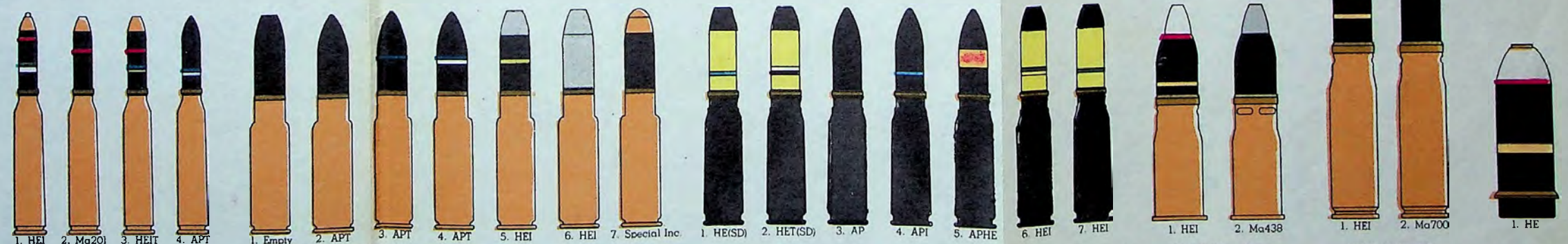
Type 89 7.7mm for ACMG

Type 92 7.7mm for ACMG

7.92 for Flexible ACMG

Ho103 (Browning Type AMG)

Aircraft Cannon



Type 97 20mm Flexible AC

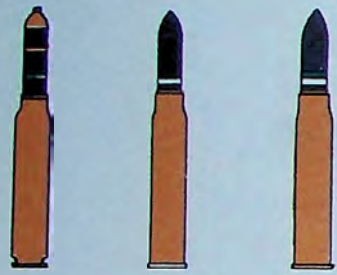
HoS 20mm AC

20mm for German MGIS

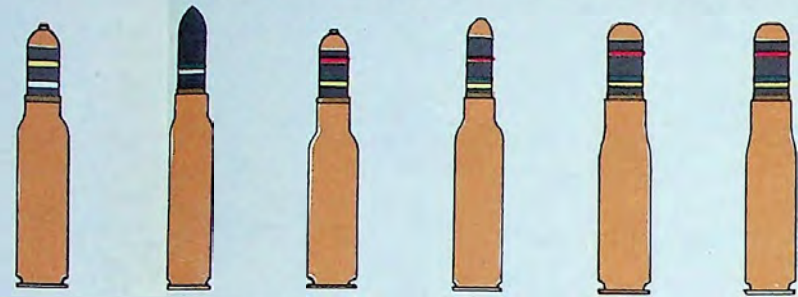
Ho203 37mm AC

Ho204 37mm AC

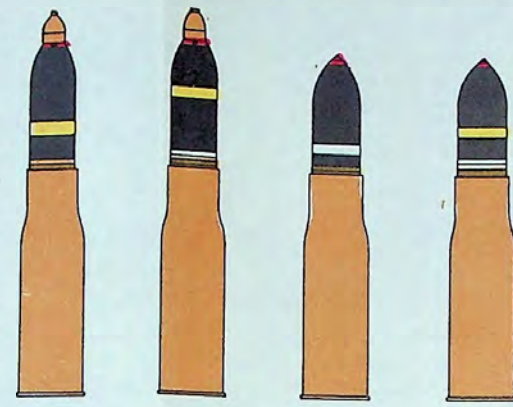
Ho301 40mm AC



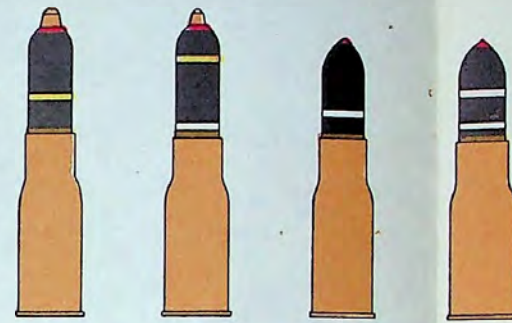
1. HET  
2. APT  
3. APT  
Type 9/ 20mm AT Gun



1. HET  
2. APT  
3. HET  
4. HET(SD)  
5. HET(SD)  
6. IT  
Type 98 20mm AA/AT Gun



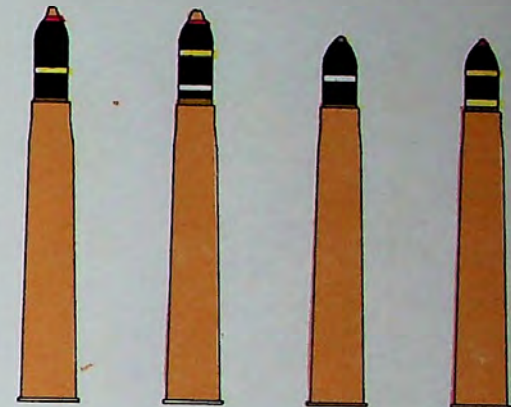
1. HE  
2. HE  
3. AP  
4. AP  
Type 98/100 37mm Tank Gun  
Type 94 AT Gun



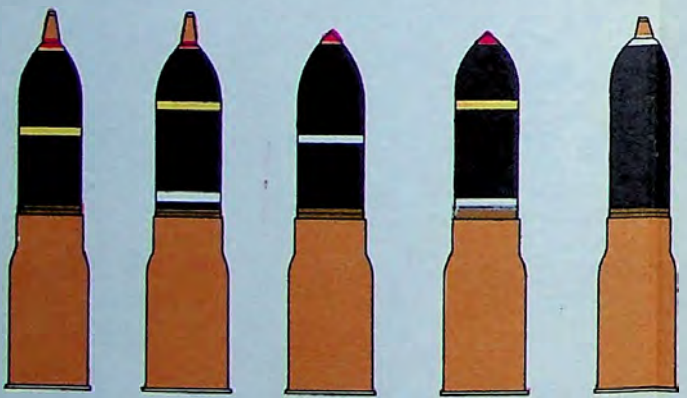
1. HE  
2. HE  
3. AP  
4. AP  
Type 94 37mm Tank Gun



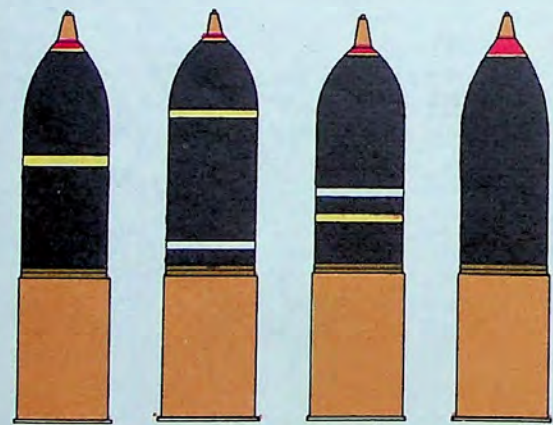
1. HE  
Type 11th Year  
37mm AT Gun



1. HE  
2. HE  
3. AP  
4. AP  
Type 97 37mm AT Gun

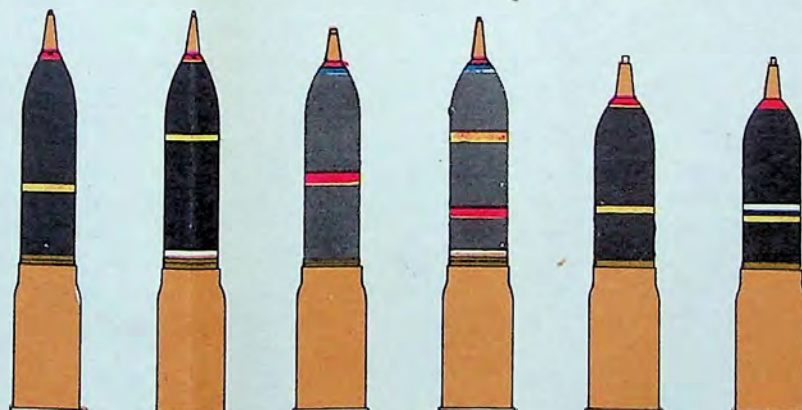


1. HE  
2. HE  
3. AP  
4. AP  
5. Subst. HE  
Types 90 and 97 57mm Tank Guns

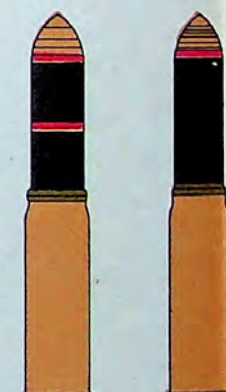


1. HE  
2. HE  
3. HEAT  
4. Subst. HE  
Type 92 70mm Infantry Howitzer

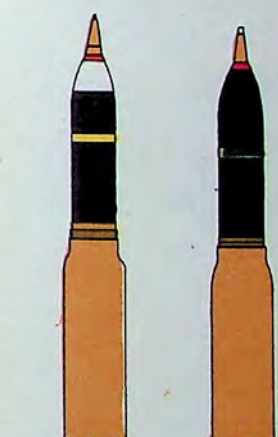
75mm



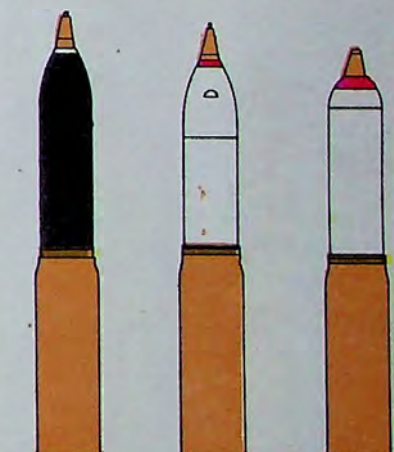
1. Type 94 HE  
2. Vomit Gas  
3. Type 2 HEAT  
Type 41 Mountain Gun



1. Type 38 Shrapnel

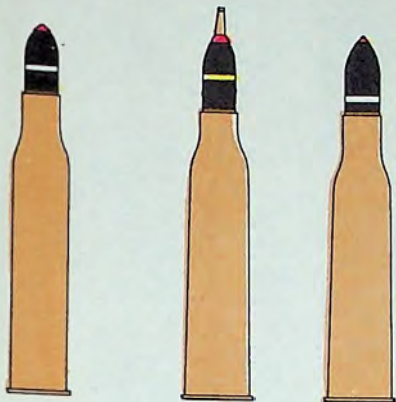


2. Type 98 Mod. HE  
3. HE "B"  
Type 94 Mountain Gun  
Type 38 Field Gun Group



4. Liquid Inc.  
5. Type 90 Smoke

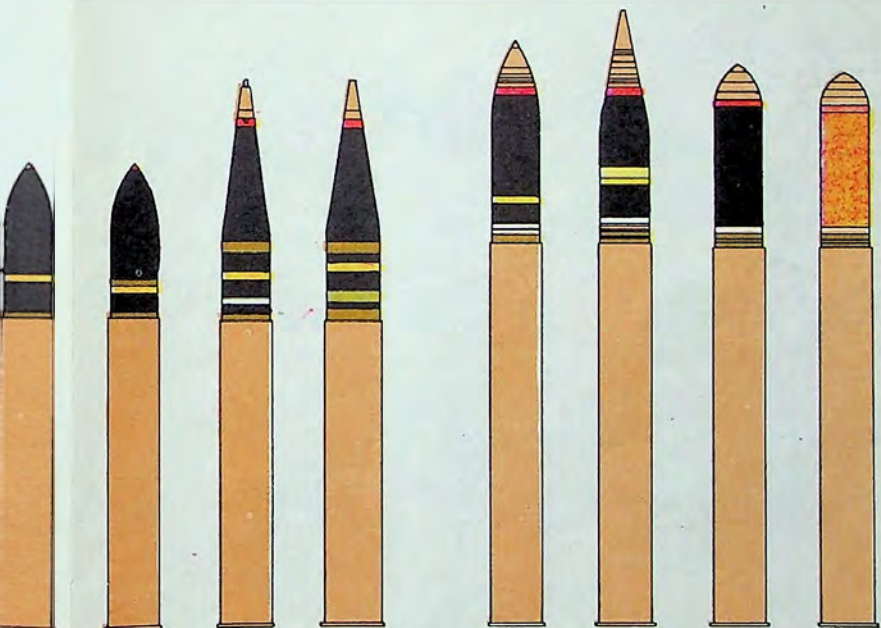
Note: Many projectiles are interchangeable with cases for the different guns. The gun in each instance is identified by the case design.



1. AP  
Type 1 37mm AT Gun  
Type 1 37mm Tank Gun

1. HE  
Type 1 47mm Tank Gun  
Type 1 47mm AT Gun

2. AP



1. Type 1 AP

2. Type 90 HE (Long-pointed)

Type 90 Field Gun

1. Type 90 HE AA (LP)

2. Type 90 Illuminating

Type 88 Field/AA Gun  
Type 88 Field/AA Gun (Special)



1. HE(LP)

Type 99 88mm AA Gun



1. 2-piece HE



2. 1-piece HE

90mm Breech Loading Mortar



1. Case



2. Shrapnel



3. AP

Type 38 120mm Howitzer



1. Case



2. HF



3. HE



4. Smoke



5. APHE

Type 96 150mm Howitzer



6. HE(LP)



7. HE(LP)



1. Case



2. HE(LP)



3. HE(LP)



4. HE

Type 38 150mm Howitzer



1. HE(LP)

Type 14th Year 105 AA Gun



2. HE(LP)



1. Case



2. HE(LP)



3. HE(LP)



4. HE



5. HE

Type 91 105mm Howitzer



1. HE



2. HE

Type 4th Year 150mm Howitzer



1. Case



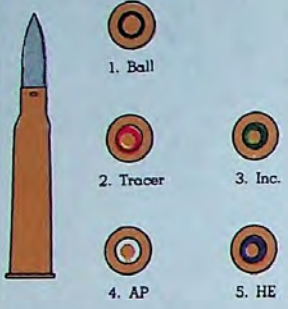
2. AP(Long)

Type 7th Year 300mm Howitzer

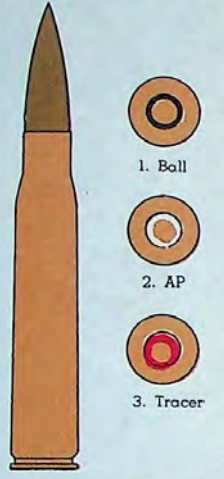


3. AP(Short)

Small Arms

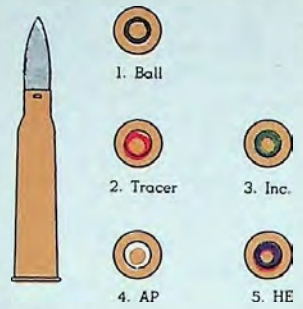


7.7mm for Type 92 Ground MG

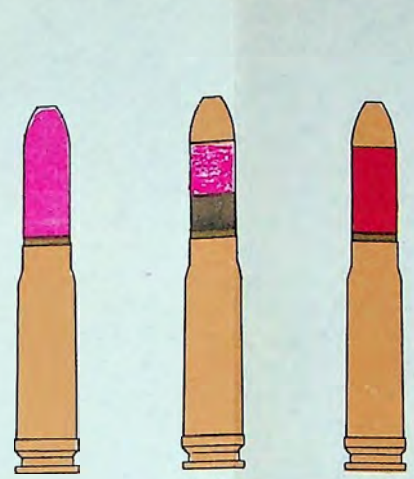


13mm for Type 93 AA/AT Gun

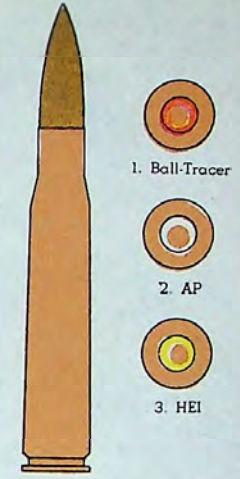
Aircraft Machine Guns



7.7mm for Types 12th Year and 97 ACMG

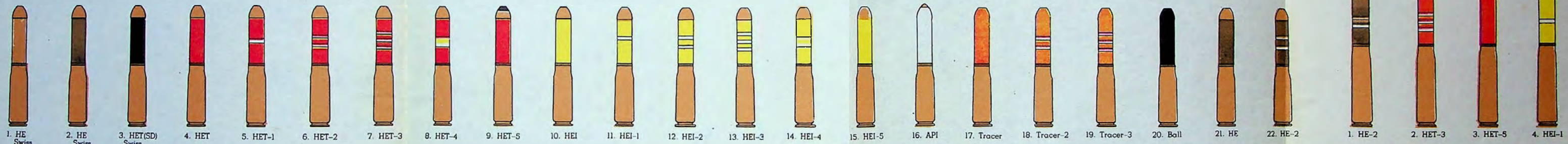


Type 2 13mm ACMG



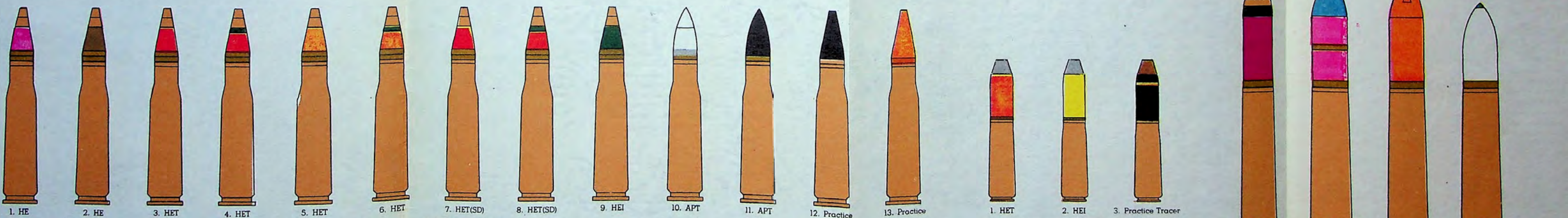
Type 3 13.2mm ACMG

Aircraft Cannon



1. HE Swiss, 2. HE Swiss, 3. HET(SD) Swiss, 4. HET, 5. HET-1, 6. HET-2, 7. HET-3, 8. HET-4, 9. HET-5, 10. HEI, 11. HEI-1, 12. HEI-2, 13. HEI-3, 14. HEI-4, 15. HEI-5, 16. API, 17. Tracer, 18. Tracer-2, 19. Tracer-3, 20. Ball, 21. HE, 22. HE-2, 1. HE-2, 2. HET-3, 3. HET-5, 4. HEI-1

Type 99 Mark I 20mm AC

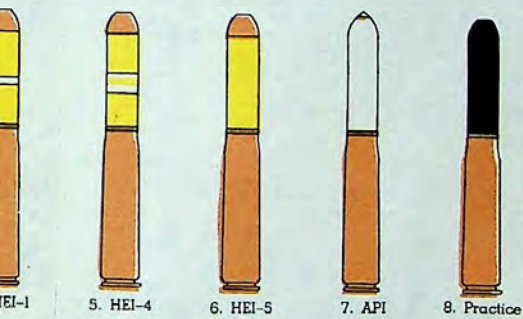


1. HE, 2. HE, 3. HET, 4. HET, 5. HET, 6. HET, 7. HET(SD), 8. HET(SD), 9. HEI, 10. APT, 11. APT, 12. Practice, 13. Practice, 1. HET, 2. HEI, 3. Practice Tracer, 1. HE, 2. HE(Brit), 3. HET, 4. AP

Type 96 25mm AA Gun

Type 2 30mm AC

Vickers Type 40mm AA and AT Gun



HEI-1

5. HEI-4

6. HEI-5

7. API

8. Practice

Type 99 Mark II 20mm AC



1. HE

Short 5cm Gun



1. HE

Type 3rd Year 8cm 40 Caliber Dual-Purpose Gun



2. HE

8cm 40 Caliber Gun



3. HE



1. Case



2. HE



3. Practice



4. Practice



5. Spotting



1. HE

Type 98 10cm Dual-Purpose Gun



2. Dummy

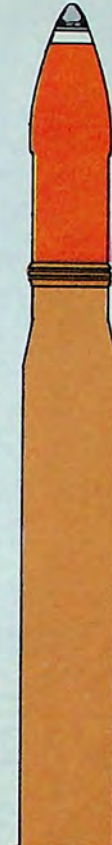


1. Mod 1 HE

Type 10th Year 12cm 45 Caliber Dual-Purpose Gun



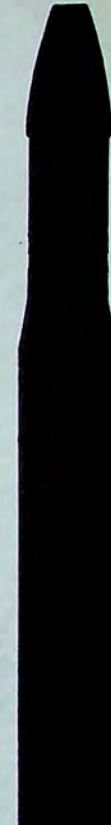
2. Mod 2 HE



3. Inc. Shrapnel



4. Spotting



5. Dummy



1. HE (capped)



2. HE (uncapped)



3. HE



4. Illuminating

14cm 50 Caliber Bag Gun



1. HE

Vickers & Son Maxim Ltd. 15cm Semi-Fixed Gun and 15cm 50 Caliber Bag Gun



2. HE



3. HE



4. Illuminating



Practice



1. HE



2. AP



3. Illuminating

15.5cm Bag Gun



1. AP

Mark 2 20cm 50 Caliber Dual-Purpose Bag Gun



2. HE

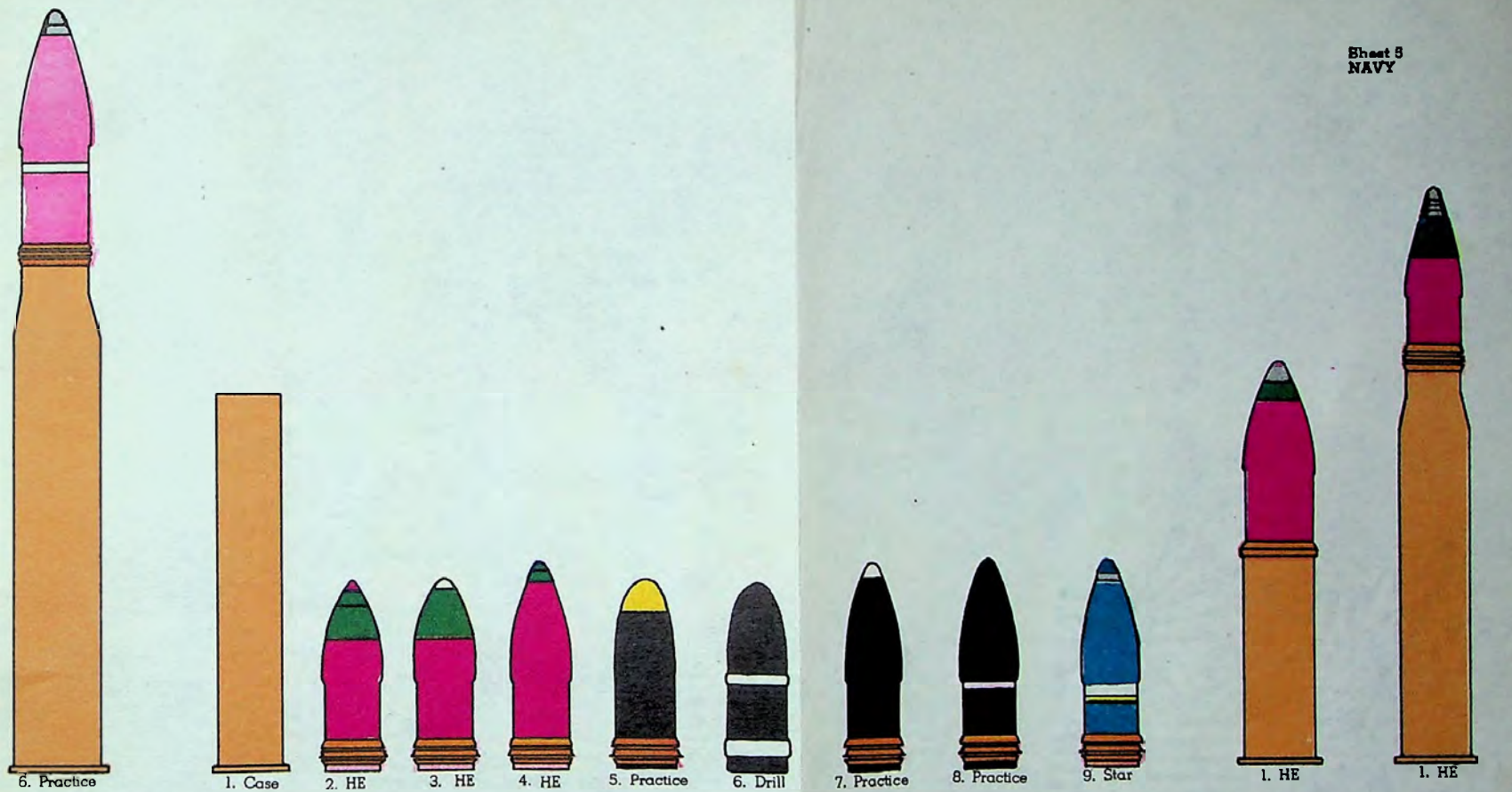


1. Case



2. HE

Short 20cm AA and AS Gun



6. Practice

1. Case

2. HE

3. HE

4. HE

5. Practice

6. Drill

7. Practice

8. Practice

9. Star

1. HE

1. HE

Type 11th Year 45 Caliber and Type 3rd Year 12cm 45 Caliber Gun

12cm Short AA  
or AS Gun

12.7cm 40 Caliber  
Dual-Purpose Gun

Mortar Projectiles



1. HE  
320mm Spigot Mortar



1. Type 96 HE



2. Type 87 HE



1. HE  
120mm Mortar



1. Type 94 HE



2. Type 94 HE



3. Type 94  
Semi-steel HE



4.  
Incendiary



5. Gas



Navy HE



1. Type 97 HE



81mm Mortar



150mm Mortars

90mm Mortars



1. HE  
70mm Mortar



1. HE  
50mm Mortar



1. Type 89 HE



2. Type 89 HE



3. HE  
(Navy markings)



4. Type 95 Smoke



5. Type 91 HE



6. Smoke



7. Type 89 Flare



8. 10th Year Flare

50mm Grenade Discharger

Hand Grenades



1. Type 99 HE



2. Types 91,97 HE



3. Type 97  
Aluminum



4. Type 4 Pottery



5. Type 23 Pull



6. Type 98 Stick



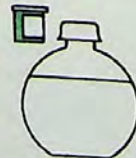
7. Incendiary  
("Molotov Cocktails")



8. Incendiary



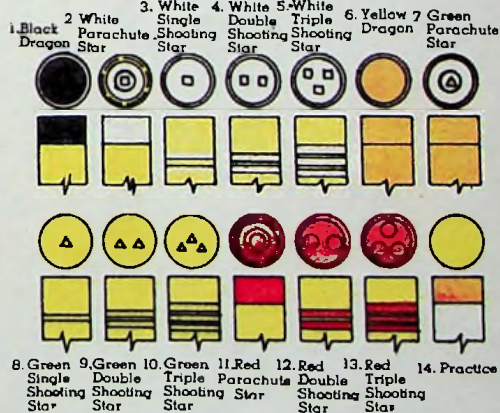
9. Type 3 Conical



10. Smoke



11. Gas Glass Containers



1. Black Dragon Star  
2. White Parachute Star  
3. White Single Shooting Star  
4. White Double Shooting Star  
5. White Triple Shooting Star  
6. Yellow Dragon Star  
7. Green Parachute Star  
8. Green Single Shooting Star  
9. Green Double Shooting Star  
10. Green Triple Shooting Star  
11. Red Parachute Star  
12. Red Double Shooting Star  
13. Red Triple Shooting Star  
14. Practice Star  
15. Practice

50mm Signal Flares



Type 100 HE



81mm Mortar Signal Flare



1. Parachute Smoke



2. Green Flare



1. HE



3. Smoke

81mm AA Mortar



1. 30mm



2. 40mm



3. Smoke



4. HE



4. Inc.



5. HE

Rifle Grenades

