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DECLASSIFIED
E.O. 11652, Sec. 3(E) and 5(D) or (E)
OSD letter, May 3, 1972
By: MBG NARS, Date 2/22/74

PHOTOGRAPHIC
INTELLIGENCE
CENTER - REPORT **6**
CONFIDENTIAL

Japanese

S H I P P I N G

**AIR INTELLIGENCE GROUP, DIVISION OF NAVAL INTELLIGENCE
OFFICE OF THE CHIEF OF NAVAL OPERATIONS, NAVY DEPARTMENT**

**OPNAV-16 · VP 106
MAY 1945**



JAPANESE SHIPPING

PHOTOGRAPHIC INTELLIGENCE REPORT NUMBER
PHOTOGRAPHIC INTELLIGENCE CENTER
NAVY YARD, WASHINGTON 25, D.C.

FOREWORD

This study is designed primarily to provide photographic interpreters with a ready reference for the identification of Japanese ships.

The accurate identification of ships is invaluable in planning attacks, tracing ship movements, and estimating the enemy's losses and capabilities.

This study will be supplemented by additional information as it becomes available.



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INTRODUCTION

This publication is a compilation of the most recent drawings and information as of the date of issue. Where confidential sources or those of lower classification are available for ships sunk, these ships have been deleted from the text. Thus, the warship section is believed to be a fairly reliable and up-to-date list of units afloat, whereas, the merchant ship section contains nearly all known ships, since little information is available concerning units sunk. As further sinkings are released, they will be listed in supplements to this volume.

This book has been written and prepared by photographic interpreters with the interpretation viewpoint in mind throughout. It is believed to be in the most usable form, but its value will depend on the proficiency attained by the individual through practice.

It was not intended that this publication should replace the fund of statistical data which is already available. Instead, it should be used in conjunction with the following reference material.

1. A Statistical Summary of the Japanese Navy - O.N.I. 222-J (Confidential)
2. Japanese Merchant Ships - O.N.I. 208-J, Revised (Restricted) with Supplements:
 - No. 1. Alphabetical Index Based on Hepburn Spelling (Restricted)
 - No. 2. Far Eastern Small Craft (Restricted)
 - No. 3. Standard Classes of Japanese Merchant Ships (Confidential)

In addition to the foregoing essential references, the following list gives other sources which the interpreter may find it necessary to consult.

1. United States Naval Vessels - O.N.I. 54 Series (Restricted)
2. Warships of the British Commonwealth - O.N.I. 201 Series (Restricted)
3. Japanese Naval Vessels - O.N.I. 41-42 (Restricted)
4. Photographic Interpretation Handbook (Restricted) - for procedure for measuring on oblique photographs.
5. Ship's Speeds From Aerial Photographs - Photographic Interpretation Center - Report 44 (Confidential)
6. Shipbuilding - Photo Industrial Study No. 7 (Confidential)
7. Merchant Ships - Talbot - Booth - for merchant ships of all nations.

This Center is indebted to all military and naval personnel whose valuable assistance made this publication possible, particularly to the Technical Intelligence Center of O.N.I. (OP-16-PT) for their untiring efforts in supplying the drawings used herein.

SECTION 1

GENERAL

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SHIP TONNAGES

TONNAGE DEFINITIONS

In referring to the tonnages of ships, confusion often results due to the various systems of tonnage in use for the different types of ships. Warships are always listed by displacement tonnage and merchant ships by deadweight tonnage, gross tonnage, net tonnage, etc. The accepted systems in use today list warships by Standard Displacement Tonnage and merchant ships by Gross Tonnage. Occasionally, however, the only available information will give the tonnage of a ship in one of the infrequently used systems. It is therefore necessary for the interpreter to have a clear understanding of the various tonnage systems.

TONNAGE OF WARSHIPS

Warships are always listed in displacement tonnage, which is the weight of water displaced by the ship, or the actual weight of the ship, the two being equal. Obviously, the displacement of a ship will vary directly with the degree of loading, and it was in this respect that there was a lack of agreement prior to the Washington Conference of 1921-1922. Previous to that time, each nation established its own rules for tonnage determination, using various degrees of loading. Some nations calculated tonnage with full crew, stores, water, and the fuel supply aboard, while other nations used varying percentages of these totals. This unsystematized tonnage is called the Normal Displacement, and may still be found where more recent information is not available. When limitations were imposed on the size of the ships, it became necessary to specify the method of calculating displacement. The resultant tonnage is known as *Standard Displacement*, i.e., total weight except for fuel and reserve feed water, and is measured in metric tons (1000 kg. = approximately 2200 lbs.)

TONNAGE OF MERCHANT SHIPS

GROSS TONNAGE - this is a measure of cubic capacity and is the system used for all merchant ships. One gross ton equals 100 cubic feet of

permanently enclosed space, i.e., hull, deck houses, passenger space, etc.

NET TONNAGE - a refinement of gross tonnage, eliminating the non-earning spaces, i.e., engine rooms, crew space, water ballast tanks, etc. Dock, harbor, and port charges are usually made on net tonnage.

DEADWEIGHT TONNAGE - the actual weight in tons of cargo, fuel, and ballast that a ship will carry when down to the load line. This varies in any given ship according to the season, being greater in the warmer season than in the colder season. Hence, tonnages, by this system are given in MEAN DEADWEIGHT.

Miscellaneous Tonnage Systems - There are numerous other systems for calculating tonnages of merchant ships, but they are only used in specific instances and are of no value to the photo interpreter. A few examples include Panama Canal Tonnage, Suez Canal Tonnage, Freight Tonnage, etc.

RELATION BETWEEN TONNAGE FIGURES

STANDARD DISPLACEMENT - GROSS TONNAGE.

Warships and naval auxiliaries are always listed in terms of standard displacement. Occasionally, however, it will be found more practical when totalling shipping in a harbor or convoy to be able to convert the standard displacement of naval auxiliaries to gross tonnage. For this conversion, sixty (60) percent of the standard displacement will approximate the gross tonnage. Although this figure will also apply to warships, they are *never*, repeat, *never* expressed in terms other than displacement.

DEADWEIGHT-GROSS TONNAGE

The following table of ratios is based on average figures, therefore, conversions from one tonnage system to the other using these ratios will give the approximate tonnage only. These

ratios only apply to Freighters and Freighter-Transports.

Length	Ratio of dwt to gross
200'	1.42 to 1
250'	1.53 to 1
300'	1.55 to 1
350'	1.54 to 1
400'	1.48 to 1
450'	1.40 to 1
500'	1.34 to 1

For tankers, use a ratio of 1.13 for small ships and 1.52 for medium and large types. No figures are included for transports because their cargo space is such a small percentage of their total space that deadweight tonnage is not indicative of their relative sizes.

NET - GROSS TONNAGE

Progress in ship design causes an ever-changing relation between net and gross tonnage. As greater speeds are demanded by the trade, more engine room space is required, resulting in a larger ratio of gross to net tons. Similarly, greater range requires that more space be devoted to fuel and stores, thus reducing the net tonnage. Increased boiler efficiency, however, results in an increase in the net tonnage or a decreased gross to net tonnage ratio. The average ratios of gross to net tonnage for oceangoing vessels are as follows:

Freighters and Freighter Transports	1.63
Transports	1.72
Tankers	1.69

RULE - OF - THUMB

In order to summarize the relationship between the various tonnage systems for merchant ships, the following, long used and fairly reliable formula is quoted:

100 net tons = 160 gross tons = 240 deadweight tons.

NAMING OF SHIPS

BATTLESHIPS - Named for provinces, e.g., MUTSU, NAGATO, ISE, etc. The recently sunk YAMATO, which was the newest of the Japanese battleships, derived her name from an old word for "Japan."

AIRCRAFT CARRIERS - Named for birds and dragons, e.g., HOSHO signifies the "Flight of the Great Bird in the Skies".

HEAVY CRUISERS AND FORMER BATTLE CRUISERS - Named after mountains, e.g., ATAGO, NACHI, MYOKO, etc. The KONGO, HARUNA, etc. are former battle cruisers now classed as battleships, hence they were named for mountains.

LIGHT CRUISERS - Named for rivers, e.g., KUMA, TAMA, OI, etc.

DESTROYERS - First class destroyers are named in relation to astronomical and earthly phenomena, e.g., HIBIKI (echo), IKAZUCHI (thunder), AKEBONO (dawn), etc. Second class destroyers derive their names from plants, e.g., MOMO (peach), HINOKI (cypress), HAGI (bush-clover), etc. Special Service Ships are named after land projections and points which are guiding points in navigation, e.g., MURTO, SUNOSAKI, TSURUGISAKI, etc.

TRANSLITERATION

There are two methods in use for the transliteration of Japanese words into English spelling. The Hepburn System is followed in this publication as it more nearly approaches the phonetic spelling than does the Kokutai (Japanese official) System.

The following list of syllable equivalents is included to enable the interpreter to reconcile the two systems.

HEPBURN

KOKUTAI

FU	HU
TSU	TU
CHI	TI
CHA	TYA
CHO	TYO
CHU	TYU
JI	ZI
JA	ZYA
JO	ZYO
JU	ZYU
SHI	SI
SHA	SYA
SHO	SYO
SHU	SYU

EXAMPLES:

HEPBURN

KOKUTAI

FUSO	HUSO
JUNYO	ZYUNYO
CHOKAI	TYOKAI
TSUGA	TUGA
FUJIKAWA	HUZIKAWA

SHIPPING REPORTS

Standardization of shipping reports presents a difficult problem due to varying conditions, requirements, and practices at sea and in the field. For example, a first phase report sent by dispatch will necessarily be more concise than one produced in mimeographed form. Certain minimum specifications should be set forth for first phase reports, however, and the amount of information which is deemed necessary for a third phase report should be clearly outlined. These two outlines represent the minimum and maximum forms, respectively, for shipping reports, and it becomes a matter for the individual interpreter to apply these standards to his own set of conditions. Also included is a suggested form for second phase reports. The example used throughout this section is based on a report produced by Central Interpretation Unit, Allied Air Forces, Southwest Pacific Area on Rabaul Shipping.

FIRST PHASE

Outline (Minimum requirements)

Naval Vessels - include total number, classification by type, important units present and noteworthy changes.

Merchant Vessels - include total number, total gross tonnage, and important units present.

Harbor Activity - state whether it is normal, increased, or decreased.

Damage - rough assessment of damage, if any.

Note: Tonnage estimations for the merchant ships may be made from JMST for first phase reports.

Example

"Rabaul Shipping, 8 October, 1943, 280Y, 19 naval vessels including 1 CL, 10 DD's, 1 AS, 5 SS's, 1 PG, 1 AM. CA SUZUYA departed since 4 October. 20 M/V's, 105,000 g.t. including 3 FTA, 3 FTB, and 2 8000-10000 g.t. S/A/L. Activity normal."

SECOND PHASE

In some cases, second phase reports will be nearly as extensive as the type outlined here for

third phase reports, in general, however, a second phase report should be a detailed listing of the naval vessels and a tonnage classification of merchant vessels. The following is a suggested form which may be expanded where deemed advisable.

Outline:

Warships: Identification of all units possible with pertinent notes regarding damage, changes, etc.

Merchant Vessels: Grouping by JMST with readily apparent identifications and damage notes.

Harbor and Small Craft: Give total count.

Harbor Activity: More specific statement than that included in first phase report.

Notes: Tonnage estimations for units not identified should be made on basis of length. The following figures give the average length - tonnage conversions for Japanese ships excluding the new standard types: (Interpolate for intermediate lengths)

o.a. length (feet)	Gross Tons
163	500
190	800
206	1,000
270	2,000
318	3,000
359	4,000
388	5,000
415	6,000
436	7,000
456	8,000
473	9,000
489	10,000

These conversion figures are most reliable under 6,000 g.t. Larger units show more variation, but they are more readily identified.

Example:

Rabaul Shipping, 8 October 1943, Mission No. 280Y. There are nineteen (19) naval vessels present in the harbor consisting of:
1 CL - SENDAI Class

10 DD's - 1 FUBUKI Class, 2 ASASHIO Class, 2 MUTSUKI Class and 5 MINEKAZE, KAMIKAZE, or MUTSUKI Class.

5 SS's - 3 "I" Class and 2 RO - 100 Class.

1 AS - CHOGEI

1 PG

1 AM

The CA SUZUYA has departed since the coverage of 4 Oct. 1943.

There are twenty (20) merchant vessels present having an approximate total of 110,400 gross tons.

Freighters

Baker 1 ship 5500 g.t.

Freighter - transports

Able 3 ships 24000 g.t.

(KUNIKAWA Maru, GOSHU Maru, and KANO Maru)

Baker 4 ships 26700 g.t.

(FUJIKAWA Maru Class, YAMABIKO Maru, KEISHO Maru and damaged YAMAGIRI Maru)

Charlie 9 ships 33700 g.t.

(Including SENKO Maru and JOHORE Maru)

Stack - Aft

Able 2 ships 18500 g.t.

(Including NARUTO)

Baker 1 ship 2000 g.t.

(AMAKASU Maru Class) _____

20 ships 110400 g.t.

There are approximately 200 harbor and small craft present. The total tonnage of merchant shipping represents a decrease of 44,000 gross tons since 4 Oct. and is a continuation of the decline in activity noted during the past few weeks.

SHIPPING REPORTS

THIRD PHASE

The third phase report is designed to include all possible intelligence regarding shipping which can be derived from the photographs. The following outline is believed to contain all points which should be incorporated into these reports.

Outline:

(Overlay or mosaic should be included showing reference numbers to be used in ship tabulation)

A. Summary

1. Naval Vessels - total number, classification by type, important units present and noteworthy changes.
2. Merchant Vessels - total number and gross tonnage, important units present and noteworthy changes.
3. Harbor and other Small Craft - harbor craft count and small craft count, separately.

B. Detail

1. General discussion covering pertinent overall information which is not included below.
2. Naval Vessels
 - a. Arrivals
 - b. Departures
 - c. Tabulation of type, overall length, identification and comments, including activity.
3. Merchant Vessels
 - a. Arrivals
 - b. Departures
 - c. Tabulation showing JMST type, gross tonnage, overall length and remarks including activity, movement within harbor, armament notes, and other pertinent observations.
4. Harbor and Small Craft
 - a. Harbor Craft - detailed list of cranes, dredges, pile-drivers, tugs, yard oilers, and fuel barges.
 - b. Small Craft - total count of miscellaneous small craft including barges, lighters, luggers, sea trucks, Sugar Dogs, etc. Include discussion of any unusual types.

Example:

Subject: Shipping
 Locality: Rabaul, New Britain
 Sortie Reference: 280Y 16-19, 30-41
 Date: 8 Oct. 1943
 Last Coverage: 4 Oct. 1943

Summary:

Nineteen (19) naval vessels observed consisting of CL SENDAI, 10 DD's, 5 SS's, 1 AS, 1 PG, and 1 AM. The CA SUZUYA has departed since 4 Oct. 1943. Twenty (20) merchant vessels present having a total of approximately 110,400 gross tons. The HIE Maru and GOKOKU Maru have departed since 4 Oct. Seven large freighter - transports and two large tankers have remained since 4 Oct. There were approximately 200 small craft present. The only harbor craft observed were two fuel barges.

Detail:

The destroyers were again observed in their normal anchorages. On 4 Oct. they had moved far up into the harbor but present coverage shows them in their usual positions off Lakunai and Vulcan.

Naval Vessels:

Arrivals since 4 Oct. 1943

3 DD's MINEKAZE, KAMIKAZE, or MUTSUKI Class
 2 DD's ASASHIO Class
 1 SS "I" Class
 1 PG

Departures since 4 Oct. 1943

1 CA SUZUYA
 3 DD's FUBUKI Class
 2 SS's RO-100 Class
 3 PC's

Naval Vessels Present

NO.	TYPE	O.A.	REMARKS
A	SS	320'	I Class
B	SS	320'	I Class
C	CL	535'	SENDAI
D	DD	336'	MUTSUKI Class
E	DD	361'	ASASHIO Class
F	DD	336'	MUTSUKI Class
G	AM	240'	
H	DD	336'	MINEKAZE or KAMIKAZE class
I	DD	361'	ASASHIO - two small craft alongside

SHIPPING REPORTS

				NO.	TYPE	GROSS TONNAGE	O.A.	REMARKS
J	DD	336'	KAMIKAZE or MUTSUKI Class - getting underway.	1	FT/C	3560	365'	Similar to EIFUKU Maru
K	DD	336'	MINEKAZE, KAMIKAZE or MUTSUKI Class - alongside YAMABIKO Maru	2	FT/C	2400	310'	2 MLC's on deck.
				3	S/B/S	1950	285'	AMAKASU Maru Class, two lighters alongside
L	DD	387'	FUBUKI Class - length does not check with reference material.	4	FT/C	2800	325'	Sistership to #6. Two large gun platforms one forward one aft.
				5	F/B	5500	400'	Forward hatches open, one lighter alongside.
M	DD	336'	MINIKAZE or KAMIKAZE Class alongside YAMABIKO Maru	6	FT/C	2800	325'	
N	SS	180'	RO - 100 Class	7	FT/A	6860	508'	KUNIKAWA Maru; nil activity
O	AS	400'	CHOGEI - has steam up, but not underway.	8	FT/C	4472	384'	SENKO Maru. Booms swung out, lighters alongside, all hatches open.
P	SS	330'	I Class	9	S/A/L	10000	525'	Tanker, U/I
Q	PG	270'		10	FT/B	7500	456'	FUJIKAWA Maru Class, likely KAZUURA or FUJIKAWA
R	DD	336'	MINEKAZE, KAMIKAZE or MUTSUKI Class	11	FT/C	2500	315'	This is probably a repair ship aiding in work on JOHORE Maru
S	SS	180'	RO - 100 Class	12	FT/C	5000	410'	U/I and not in 208-J
				13	S/A/L	8500	470'	NARUTO, navy tanker of SHIRETOKO Class.
				14	FT/A	8500	466'	GOSHU Maru, large gun platforms
				15	FT/C	6182	432'	JOHORE Maru, repair ship KOMABASHI still alongside
				16	FT/C	4000	357'	Similar to BANDOENG Maru Class
				17	FT/B	5879	435'	KEISHO Maru, two lighters alongside
				18	FT/A	8572	477'	KANO Maru; nil activity
				19	FT/B	6798	460'	AR YAMABIKO MARU; 2 DD's alongside
				20	FT/B	6440	456'	Damaged YAMAGIRI Maru

Merchant Vessels:

Arrivals since 4 Oct. 1943
 FTC - u/i 2400 g.t.
 FTC - u/i 2800

 5200 g.t.

Departures since 4 Oct. 1943
 T/A HIE Maru 11,600 g.t.
 FT/A GOKOKU Maru 10,200
 FT/A TOSAN Maru 8,700
 3 FB u/i 17,000
 S/B/S AMAKASU Maru
 Class 2,000

 49,500 g.t.

Thus, there has been a decrease in the merchant shipping amounting to approximately 44,300 g.t. since 4 Oct. 1943. This decrease is consistent with the decline which has been observed in Rabaul Harbor during the past few weeks.

MEASUREMENTS FROM PHOTOGRAPHS

Precise measurements, when possible, are an essential part of shipping interpretation. For first and second phase reports, when a closer approximation of tonnage than that given by JMST is desired, fairly accurate measurements are indispensable. (See "Shipping Reports" for length-tonnage figures). In third phase work, measurements often must be relied upon for final identifications. Accurate lengths must be determined for new types of ships recognized, and many of the older types of warships are found to vary from the given lengths, either due to alterations or because the previous information has been erroneous.

VERTICALS

Measurements of ships on vertical photographs can be made to a good degree of accuracy, i.e., within less than five feet, providing scales are determined carefully. Altitude and focal length will not give a sufficiently precise scale and should only be used where an approximate length is the best which can be obtained. The best method for shipping interpretation is to use the known length of a prominent and easily identified ship in the photographs. Here again, however, care must be exercised due to scale variations caused by tip and tilt. It is advisable to check scale throughout the length and breadth of any photograph on known ships in order to determine the direction and amount of variation.

When careful reliable measurements have indicated that a ship's length varies from that given in the reference material, that fact should be noted in the interpretation report. A good example of a faulty length existed in the case of FUBUKI Class destroyers. Listed at 379'6" o.a., continual discrepancies have proven the true length to be approximately 390' o.a. In the past, this particular error has led to many difficulties, but by repeatedly noting this variation, a value for the true length was eventually determined.

In the identification of merchant ships, overall lengths are of prime importance in many cases. In addition, it is often helpful to use the position of features on the ship, i.e., the distance of the bridge from the bow, the stack from the bow, the mainmast from the bow, etc. This is particularly helpful where a ship is found to be one of several very similar classes

and the position of one of these features may be the only distinguishing characteristic. It should be noted, however, that this method is tedious and time-consuming and should be resorted to only when there are no obvious identifying features.

OBLIQUES

There are two methods described in the Photographic Interpretation Handbook for plotting from single oblique photographs. They are the Canadian Grid Method and the Base Map Method. These two techniques are applicable to ships when certain ideal conditions exist and may be used for obtaining waterline measurement.

The required conditions are:

1. Visible horizon - horizon must be in upper quarter of photograph for practical results.
2. Focal length.
3. Precise altitude.

With small focal lengths, both methods can be used as described in the Handbook. With large focal lengths however, the working area for the Base Map Method becomes so great as to be impractical. It then becomes necessary to reduce the distance from the true horizon to the base line or isoline. (Isocenter remains fixed). The placing of this new base line is done in the same manner as that used for the construction of the ground line in the Canadian Grid Method. (P.I. Handbook pg. 11.05, Section 11)

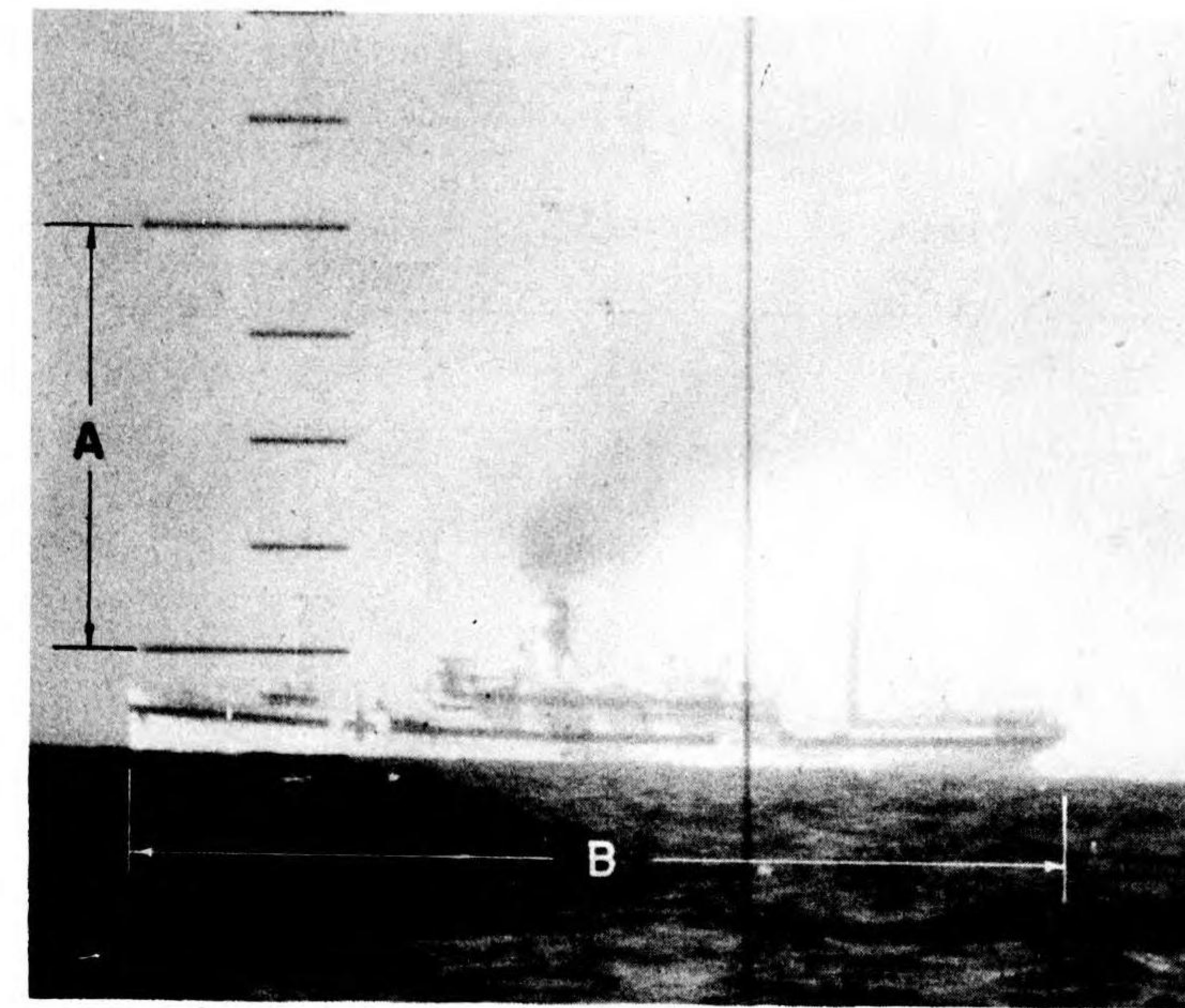
SUBMARINE PHOTOS

Recently there has been devised a method for obtaining approximate measurements from submarine photos. This method is expressed by the formula,

$$H = .017 \times R \times \frac{B}{A}$$

where:

H = object length or height
R = range
B = image size
A = distance on film between one degree on telemeter scale
.017 = constant



The range (R) is the only information needed in addition to the photograph itself, and will be found either on the title strip or in the mission data sheets. In view of the fact that this range is estimated, it becomes the chief source of error for this method.

Image size (B) and measurement of one degree (A) can be scaled in any convenient units since they are expressed in the formula as a ratio and not as absolute values. The full field of the telemeter scale covers 8°, but only part of this will show on the photographs. Each degree on the scale is further divided into quarters.

A second source of error in this method is the target angle. Fortunately, most photographs will be taken at nearly 90° to the course of the ship, but if there is any deviation from this angle, it will result in a low value for the ship's length. Errors introduced by target angle and range may be additive or they may compensate each other.

The following example will serve to show the application of this method;

Given Range - 4500 yds.
 $H = .017 \times 13,500' \times \frac{.231'}{.103'}$

H = 515' o.a.
Ship is AH. ASAHI MARU, approximately 500' o.a.

EVALUATION OF DETAIL

In photographs of fair or poor quality, the interpreter will encounter considerable difficulty in distinguishing and recognizing individual features. At first, the superstructure will seem to be welded into an homogeneous mass, turrets will lack definition and all masts will look alike, if they can be distinguished at all. As in any other activity, the best teachers are practice and experience and in shipping interpretation, there is no substitute. It is possible, however, to describe a few of the more common features and the clues to their recognition with the hope that they will prove of some assistance to those being introduced to shipping interpretation.

SHADOWS

A. General Notes

1. Shadows on the water - in many cases, well defined shadows have been cast on the water, providing an excellent means of placing superstructure features and defining mast types. In addition, bow and/or stern types can often be determined, an additional aid to identification.
2. Comparative heights of features - comparative shadow lengths will often help in determining the stack when it may be confused with searchlight platforms, in placing superstructure features or in deciding whether or not turrets are superfiring.

B. Naval Vessels

Due to their more complex superstructures, naval vessels will not display as clear definition of shadow as will merchant vessels, but features which stand above the main portion of the superstructure and those on open deck areas will cast fairly well defined and usable shadows.

1. Breaks of decks - shadows will show such features as forward torpedo wells, break of upper deck aft, and the shape and arrangement of the after islands.
2. Masts - shadows often will help in determining position of mainmast.
3. Turrets - main use of shadows with regard to turrets is in determining whether or not they are superfiring, an essential feature for destroyer identification.

4. Stacks - they often cast distinctive shadows due to their height or on such ships as the heavy cruisers, their size and shape.

C. Merchant Vessels

1. Breaks of decks

- a. Storm decks - in high altitude photographs, shadows often become the only means of detecting storm decks. A word of caution should be introduced here, however. When the sun is high, the shadow cast by the crosspiece on kingposts may be confused with a break of the deck. The latter will extend completely across the deck, however, whereas the former will be much shorter.
- b. Forecastle and Poop Decks - shadows will aid in their determination.
- c. Winch Houses - when present, they cast a well defined shadow near the masts.

2. Masts - shadows cast often help in determining types and positions. Do not confuse boom shadows with mast shadows. The latter will always be in the same direction on any given photograph while the former may be at any angle to the centerline of the ship.

APPEARANCE OF FEATURES

A. Turrets

It is not always necessary to distinguish individual turrets in order to identify a ship. The comparative shapes of masses will often suffice for determination of the turret arrangement. For example, the CA TONE will have two masses forward, one small and one large, while the CA's NACHI Class and TAKAO will have only the single large mass. If the interpreter becomes well acquainted with the turret arrangements he can expect to encounter, he will have no difficulty in recognizing them, regardless of definition.

B. Islands

The same lack of definitions of turrets may be applied to island features. It also should be noted that smaller features such as gun tubs can modify the shapes of these islands as seen in vertical photographs. Here

again, the best way to overcome this difficulty is by becoming well acquainted with the island arrangement of various ships.

C. Stacks

Almost without exception, a stack will appear as a black spot on a photograph. In many cases, at least a hint to the general shape of the stack will be seen.

- D. Torpedo tubes - on many destroyers, the torpedo tubes themselves will not be seen, but the spacing of other features will give a definite clue to the number of banks for which space is available.

- E. Breaks in Hull Outlines - such features as overhanging gun sponsons will show up remarkably well in vertical photographs. When a ship is near the edge of a photograph, this feature will be seen most clearly on the outer side.

- F. Catapults - they will be hard to discern on most ships, particularly if they are near the sides of the ship. Centerline catapults, such as that on the CA AOBA, will often appear as a line on the photograph.

- G. Miscellaneous Gear - the great amount of gear such as depth charges, light AA, paravanes, etc., which is often found on the after deck of smaller warships will appear on photographs either with a symmetrical pattern or give an irregular mottled effect. The pattern produced by this gear will often help identifications. The KAIBOKANS are a good example of this feature.

SPEED OF SHIPS

CHARACTERISTICS OF THE WAVE PATTERN

The outer limits of the waves (the cusp locus) form an angle of $19^{\circ} 28'$ with the direction of travel, regardless of the size, shape, or speed of the ship (except in shallow water when the angle increases).

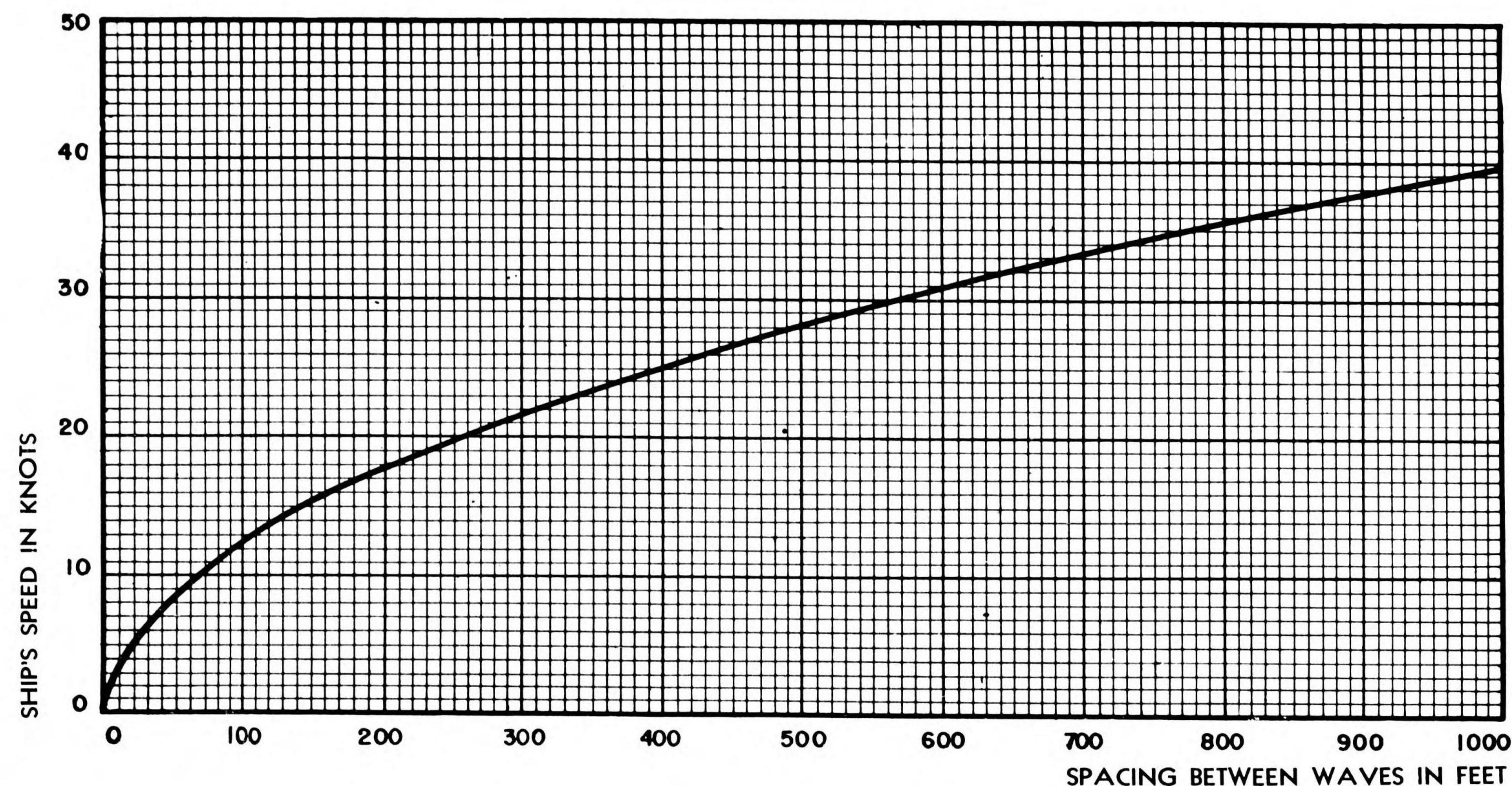
There are two distinct systems of waves, called transverse and diverging systems.

These two systems of waves meet on the straight line boundaries of the disturbed region to form the cusps which are equally spaced. The speed of the ship is proportional to the square root of the cusp spacing, "D" or of the spacing of the waves along any straight line drawn from the bow through the wave system.

METHODS FOR DETERMINING SPEED ON A STRAIGHT COURSE

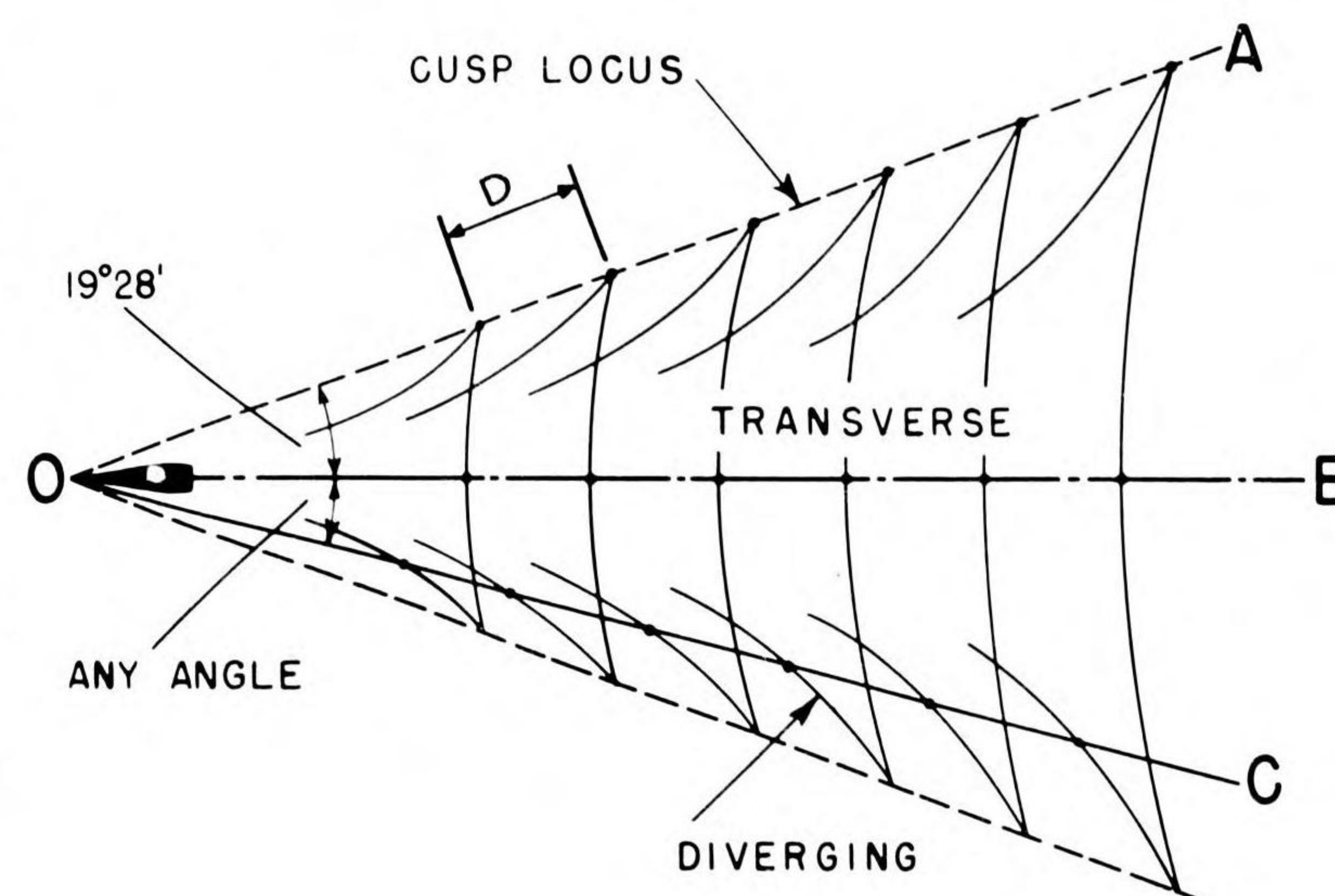
The principal methods used for determining speed on a straight course from aerial photographs are based on measuring the spacing of the waves created by the motion of the vessel. Although in most photographs the typical wave pattern at the outer boundary is sufficiently visible to measure, there are situations where the system of waves well inside the outer limit are much clearer. These systems can be measured as they are part of the same wave pattern. The stern or transverse waves can, likewise, be measured. As a check, it is often feasible to determine speed by making independent calculations from several methods.

Note that these methods are not accurate for shallow water. For a discussion of the shallow water effect and for speeds of ships while turning, see Photographic Interpretation Center - Report 44 on "Ship's Speeds from Aerial Photographs".



GRAPH A

MEASUREMENT ALONG $19^{\circ} 28'$ LIMIT



METHOD I

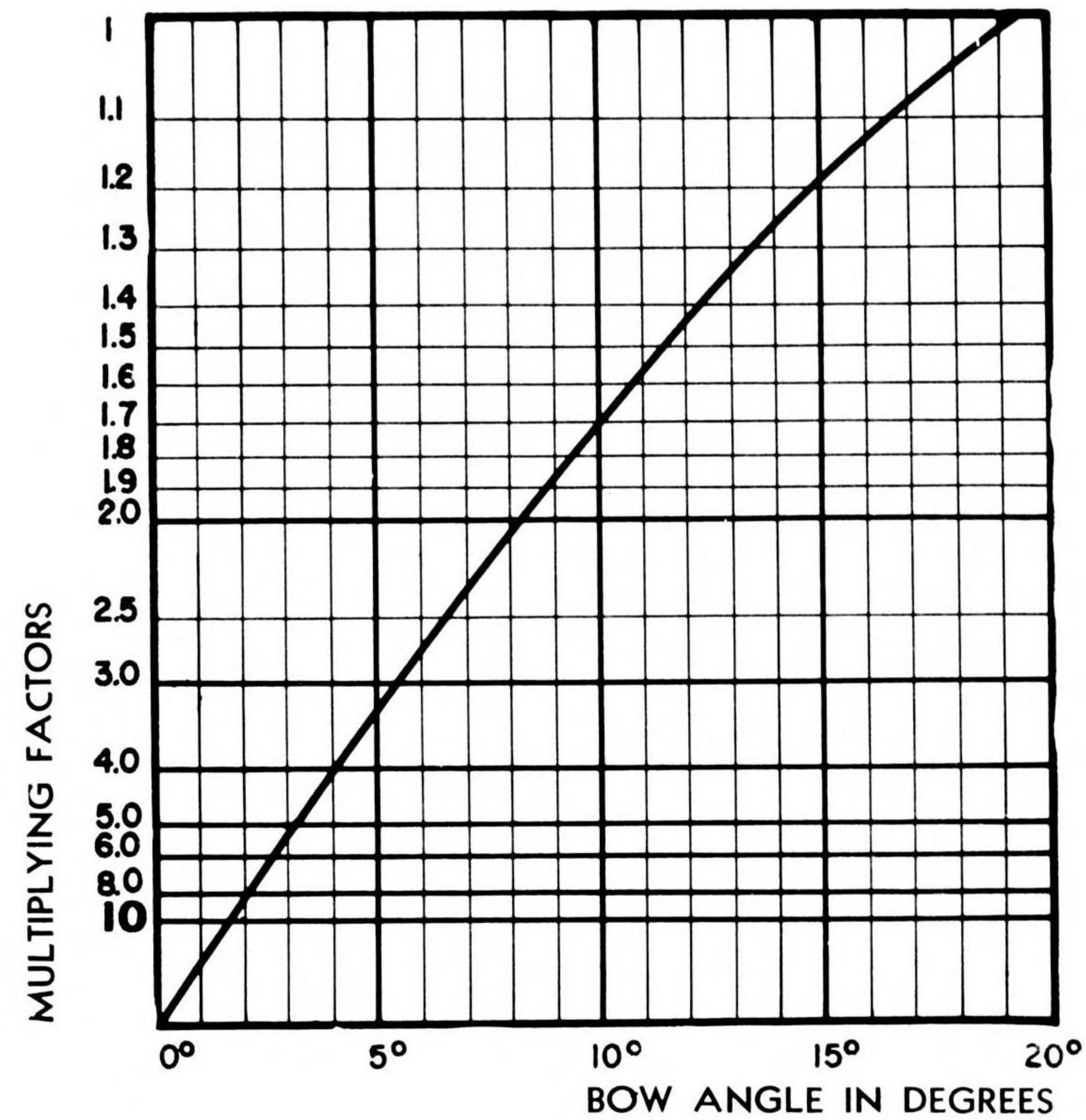
Choose a group of five to ten cusps, the first and last of which are clearly defined.

Measure the distance from the first to the last wave along a line passing through the bow and making an angle of $19^{\circ} 28'$ with direction of motion; line "O.A." on drawing.

Divide this distance by the number of wave intervals, to obtain the average wave spacing, "D".

Enter this average wave spacing into Graph A and determine the speed.

SPEED OF SHIPS



GRAPH B MEASUREMENT ALONG A LINE INSIDE 19° 28' LIMIT

METHOD 2

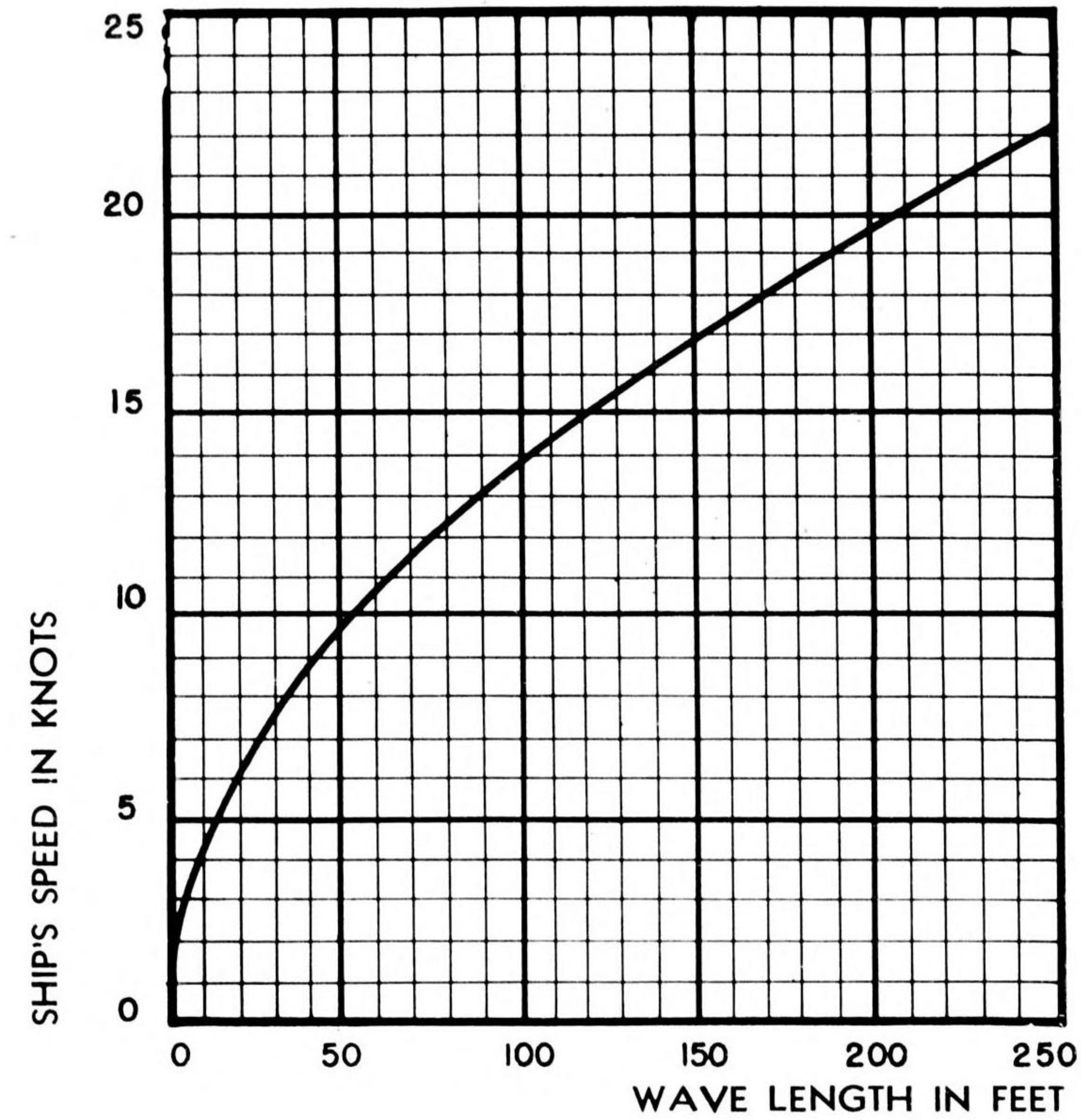
Choose a group of five to ten diverging waves, the first and last of which are clearly defined.

Measure the distance from the first to the last wave along any line "O.C." passing through the bow and measure the angle this line makes with the direction of motion.

Divide this distance by the number of wave intervals, to obtain the average wave spacing.

From Graph B determine the appropriate multiplying factor corresponding to the angle chosen, and multiply the average wave spacing by this factor.

The speed can be determined when the resulting product is entered into Graph A.



GRAPH C MEASUREMENT ALONG TRANSVERSE WAVES

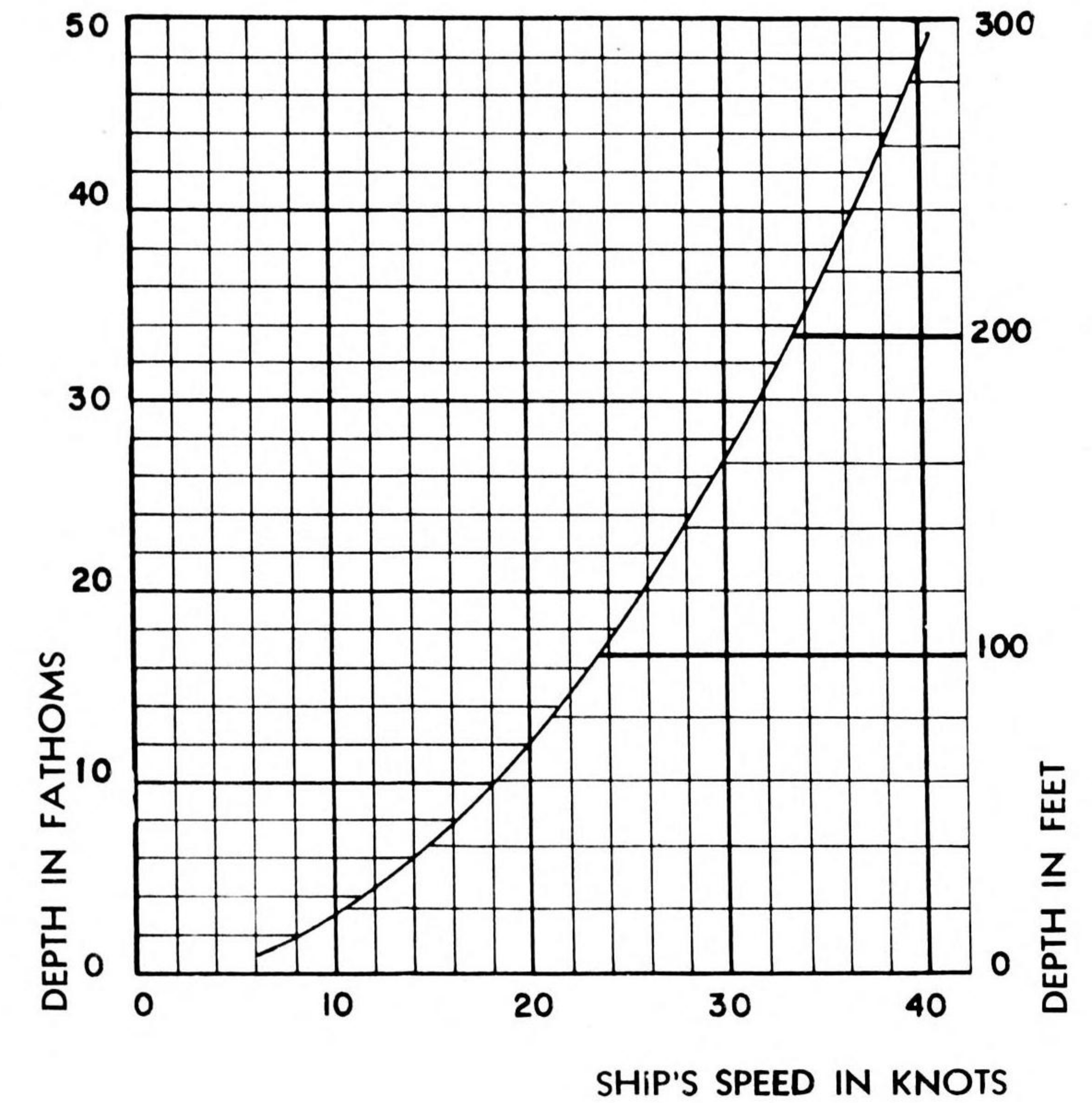
METHOD 3

Choose a group of five to ten transverse waves, the first and last of which are clearly defined.

Measure the distance from the first to the last wave along the direction of motion; line "O.B." on drawing.

Divide this distance by the number of intervals to obtain the average wave spacing.

Enter this value in Graph C and determine the speed.



GRAPH D MINIMUM DEPTH FOR GIVEN SPEED

Graph D is included here to show the minimum depth for which this system is applicable.

SYMBOLS

PRINCIPAL COMBATANT TYPES

BB Battleship
CC Battle Cruiser
CB Large Cruiser
CVB Aircraft Carrier, Large
CV Aircraft Carrier
CVL Aircraft Carrier, Light
CVE Aircraft Carrier, Escort
CVS Seaplane Tender
MAC Merchant Aircraft Carriers (AKV)
CA Heavy Cruiser
OCA Cruiser, Second Line
CL Light Cruiser
CL(T) Training Cruiser
DD Destroyer
ODD Destroyer, Second Line
SS Submarine
OSS Submarine, Second Line
SM Minelaying Submarine

MINOR COMBATANT TYPES

ACL Auxiliary Cruiser
XCL Auxiliary Cruiser
BM Monitor
CM Minelayer
XCM Converted minelayer
DM Light Minelayer
DMS High-speed Minesweeper
AM Minesweeper
AN Netlaying Ship
DE Destroyer Escort Vessel
TB Torpedo Boat
PF Frigate
PE Eagle Boat
PG Gunboat, Sloop
PGE Corvette
PC Submarine Chaser
PCE Patrol Craft, Escort (BEC)
PCER Patrol Craft, Escort Rescue
PCS River Gunboat
PT Motor Torpedo Boat (MTB)
PTC Motor Torpedo Boat, Subchaser (MAS)
PY, PYc Yacht
SC Submarine Chaser
SCS Submarine Chaser, Small

NAVAL AUXILIARIES, TENDERS

AD Destroyer Tender
AH Hospital Ship
AS Submarine Tender
XAS Converted Submarine Tender
ASR Submarine Rescue Vessel
AR Repair Ship
ARB Battle Damage Repair Ship
ARG Internal Combustion Engine Repair Ship
ARH Hull Repair Ship
ARL Landing Craft Repair Ship (LSE)
ARS Salvage Vessel
XARS Converted Salvage Vessel
ARV Aircraft Repair Ship
AV Seaplane Tender
XAV Converted Seaplane Tender
AVD Destroyer Seaplane Tender
AVP Small Seaplane Tender
AGP Motor Torpedo Boat Tender

CARGO AND FUEL SHIPS

AC Collier
AE Ammunition Ships
AF Provision Storeship
AK Cargo Ship
AKA Attack Cargo Ships (LSI)
AKN Net Cargo Ship
AKS Stores Issue Ship
AKV Cargo Ship and Aircraft Ferry (MAC)
AO Oiler
AOG Gasoline Tanker
AWK Water Tanker, Distilling Ship (AW)

TRANSPORTS

AP Troop Transport (LSP)
APA Attack Transport (LSI)
APD High-speed Transport
APH Wounded Evacuation Transport
APM Mechanized Artillery Transport
APR Rescue Transport
APS Transport Submarine
APV Aircraft Transport
XAPV Converted Aircraft Transport
AGC Amphibious Force Flagship (LSH)

SMT Special Military Type

MISCELLANEOUS AUXILIARIES

AG Miscellaneous Auxiliaries
AGS Surveying Ship
ARC Cable Ship
IX Unclassified

DISTRICT CRAFT

AMc Coastal Minesweeper
HDL Harbor Defense Launch
ML Motor Launch
MGB Motor Gunboat (PGM)
RML Rescue Motor Launch
YAG Miscellaneous District Auxiliaries
YMS Motor Minesweeper (MMS)
YMT Motor Tug
YN Net Tender
YNg Gate Tender
YNT Tug Class Net Tender
YP District Patrol Vessel
YT Harbor Tug
CMc Coastal Minelayer
YCM Controlled Minelayer

BASE CRAFT

AB Crane Ship
ABD Advance Base Dock
ABSD Advance Base Sectional Dock
AFD Mobile Floating Dock
APL Barracks Ship
APc Coastal Transport
ARDC Concrete Repair Dock
ARD Floating Drydock
ARV Aircraft Repair Ship
ATA Ocean Ship Auxiliaries
ATF Ocean Tug, Fleet
ATO Ocean Tug, Old
ATR Rescue Tug
AVC Catapult Lighter
AVR Aircraft Rescue Vessel
AMB Harbor Minesweeper

SYMBOLS

BARGES

YCD Fueling Barge (LBO)
YOG Gasoline Barge
YO Fuel Oil Barge
YOS Oil Storage Barge
YPK Pontoon Storage Barge
YS Stevedoring Barge
YSR Sludge Removal Barge
YTT Torpedo Testing Barge
YW Water Barge (LBW)

LIGHTERS

YA Ash Lighter
YC Open Lighter
YCK Open Cargo Lighter
YCV Aircraft Transport Lighter
YF Covered Lighter
YFT Torpedo Transport Lighter
YG Garbage Lighter
YLA Open Landing Lighter

BARGES

YCF Car Floats
YD Floating Derrick
YGD Degaussing Vessel
YDT Diving Tender
YE Ammunition Tender
YFB Ferryboat
YFD Floating Drydock
YHB Houseboat
YHT Heating Scow
YM Dredge
YPD Floating Pile Driver
YR Floating Workshop
YRD (H) Drydock Workshop-Hull
YRD (M) Drydock Workshop-Machinery
YSD Seaplane Wreck Derrick
YSP Salvage Pontoon

LANDING CRAFT AND SHIPS

LBE Landing Barge, Emergency Repair
LBF Landing Barge, Flak
LBK Landing Barge, Kitchen
LBO Landing Barge, Oiler
LBW Landing Barge, Water
LBV Landing Barge, Vehicle
LCA Landing Craft, Assault
LCA (HR) Landing Craft, Assault (Hedgerow)
LCC Landing Craft, Control
LCE Landing Craft, Emergency Repair
LCF Landing Craft, Flak
LCG Landing Craft, Gun
LCH Landing Craft, Headquarters
LCI Landing Craft, Infantry
LCM Landing Craft, Mechanized
LCN Landing Craft, Navigational
LCP Landing Craft, Personnel
LCP (N) Landing Craft, Personnel (Nested)
LCP (R) Landing Craft, Personnel (Ramped)
LCP (SY) Landing Craft, Personnel (Survey)
LCP (U) Landing Craft, Personnel (Utility)
LCR Landing Craft, Rubber
LCS Landing Craft, Support
LCS (R) Landing Craft, Support (Rocket)
LCT Landing Craft, Tank
LCT (A) Landing Craft, Tank (Armored)
LCT (R) Landing Craft, Tank (Rocket)
LCV Landing Craft, Vehicle
LCVP Landing Craft, Vehicle Personnel
LCW Landing Craft, Air Propelled
LSB Landing Ship, Bombardment
LSC Landing Ship, Carrier (Derrick-hoisting)
LSD Landing Ship, Dock
LSE Landing Ship, Emergency Repair (ARL)
LSF Landing Ship, Fighter Direction
LSG Landing Ship, Gantry
LSH Landing Ship, Headquarters (AGC)
LSI Landing Ship, Infantry (APA)
LSM Landing Ship, Medium
LSP Landing Ship, Personnel (AP)
LSS Landing Ship, Stern-chute
LST Landing Ship, Tank
LSV Landing Ship, Vehicle
LVT Landing Vehicle, Tracked
LVT (A) Landing Vehicle, Tracked (Armored)

EVASIVE ACTION

Photographic interpreters are often questioned as to the meaning of evasive tactics observed in aerial photographs and whether or not future maneuvers are predictable. On several occasions interpreters have made statistical studies from photographs to determine the direction of the initial turn of individual ships, and in each study, an initial turn to port was found to be employed in approximately sixty-five percent of the cases. Unfortunately, this information does not warrant drawing any definite conclusions and is presented here for whatever value the individual can derive from it.

Of far greater value is a captured document which has recently come to light. The following excerpts from the JICPOA translation of the Japanese Navy Bureau of Education Publication, "Methods of Evading Torpedo and Bombing Attacks," are believed to contain the fundamentals of tactics employed by Japanese task forces subjected to air attack. Although the Japanese document was originally published in June, 1942, the general principles laid down are probably still applicable, and have agreed fairly well with actual observations.

INTRODUCTION

1. Ships maneuver radically, but in accordance with a definite plan.
2. Carriers go into tight circles, while screening ships spread out to allow sea room and to lessen the risk that a ship may be hit by a torpedo aimed at another. They turn into the incoming attack and throw up a heavy anti-aircraft barrage, particularly over the escorted ship, using light anti-aircraft weapons against low flying aircraft.

TORPEDO ATTACK

1. Evasion of torpedo attack by single ship:
 - a. Before actual attack, zig-zag to conceal base course.

- b. When planes have deployed to attack positions, turn in their direction if possible and carry out other maneuvers needed to hinder the enemy's use of his full offensive power.

2. Evasion of torpedo attack by a formation
 - a. Every effort should be made to spread out before attack begins. If this is impossible, simultaneous turn must be executed.

LEVEL BOMBING ATTACK

1. The plane must make a straight and level run, but as this run can be made in less time than it takes the ship to maneuver, evasive action must be started before plane begins run.
2. Evasion by a single capital ship
 - a. Put on maximum speed
 - b. Zig-zag to conceal base course
 - c. Head into attacking aircraft, if possible
 - d. When aircraft reaches "begin evasion point", the ship should carry out sharp maneuvers and continue them until bomb lands.
3. Evasion by a formation
 - a. Simultaneous turn (45° - 90°)
 - b. Alternate ships turn in different directions
 1. At same angle or
 2. Each ship at 30° greater than predecessor.
4. Heavy Cruisers - same as for capital ships, using maximum speed and full rudder.
5. Light Cruisers and other light, easily maneuvered ships - same as for capital ships, using maneuverability to fullest extent. If caught in close formation, starboard column to starboard, port to port, with lead ships turning 50° and each succeeding ship 10° more than predecessor. If there is a destroyer leader present between and at the head of the columns, she will turn 45° to

starboard.

6. Low speed ships - begin to use rudder as soon as enemy is detected and execute continued series of turns in same direction.

DIVE BOMBING

1. The theory behind evasive maneuvers during this type of attack is to prevent plane from getting a good starting point for the dive. A series of sharp successive turns are recommended, possibly followed by zig-zag ("Special Snake-like Maneuver").

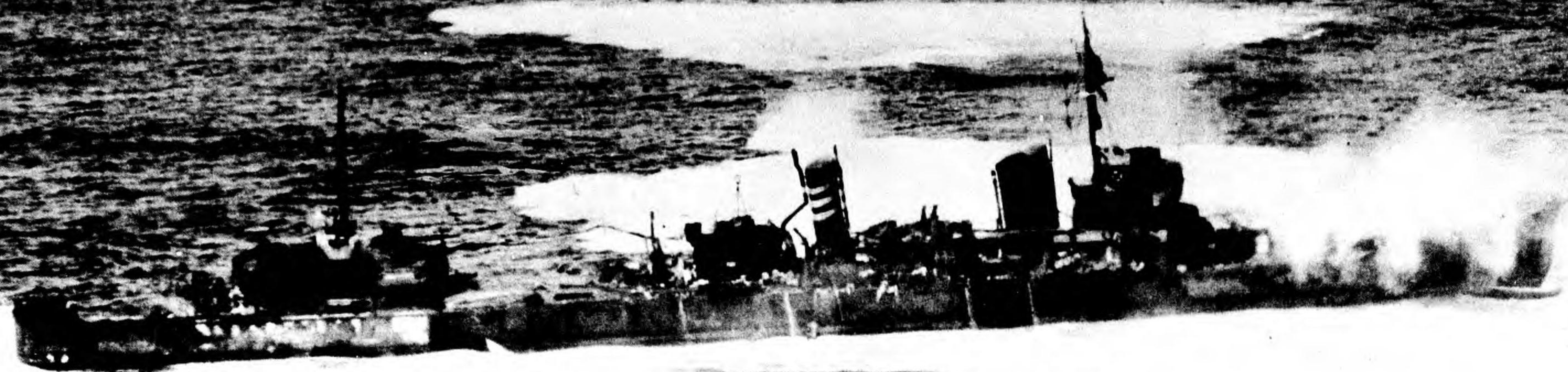
TYPE OF ATTACK NOT CLASSIFIED

1. Special "Snake-like Maneuver" until "begin evasion point" is determined, at which time specialized maneuvers will be started.

SECTION 2

WARSHIPS

~~CONFIDENTIAL~~



WARSHIPS

INTRODUCTION

This section is designed to give the interpreter a two-way classification of major fleet units. Reading across the pages, the fleets of the United States, Japan, and Great Britain are compared, whereas the vertical direction provides for the identification of the units within each fleet. The organization used is that which has always been employed for Japanese ships, with the allied ships being inserted in their appropriate places. The only omissions in this comparative identification section occur in the British destroyers. Due to their complexity and the large number of classes, only those which are typical of the fleet units have been included. It is believed that the destroyers shown will give the interpreter sufficient information for recognition of all units which will be operating in the Pacific.

At the end of the destroyer section, a chart has been included giving the identification features of Japanese destroyers. The purpose of this chart is to group the identifying features in such a way as to enable the interpreter to begin with any one feature and immediately eliminate certain classes. When this has been done, the chart will then tell him what features to look for to make the final identification.

The pages on Minor Combatants and Auxiliaries and those dealing with Ordnance and Radar conclude the warship section and are prefaced by introductory remarks.

JAPANESE FLEET STATUS

The formidable Japanese Fleet which struck Pearl Harbor has been diminished to such an extent that it is no more than a poorly balanced task force today. This is not intended to imply that the enemy's sea power has been completely erased. The remainder of the Japanese Navy is still a potential threat in the Pacific, but losses have been far too heavy for the shipyards to keep pace.

Prior to 1944, Japan's heaviest losses were in the destroyer and minor combatant categories, although some major units had been eliminated. Since the beginning of our invasion of the Marianas Islands, all categories have suffered severe losses and today, the Japanese Navy is operating with greatly reduced forces. For example, there are five battleships afloat, of which only one mounts sixteen inch guns. Three aircraft carriers are operational and three more are building, while only two CVL's remain afloat. One old line CVE is still afloat and six to eight more are building, of which three or four have probably been completed. Of the heavy cruisers, six are still afloat, but two of these were damaged in 1944 and have not been repaired. The number of light cruisers has been reduced to about eight or nine, of which only two are modern units. Destroyers and smaller units have suffered even heavier losses, so that today they cannot be used in the correct proportion to larger units.

HULL SHAPES

The interpreter will find that as his proficiency increases, he will have an ever-developing tendency to use hull shapes as an aid to identification. Not only will the shape indicate the type of ship, but in many instances the shape will actually be employed for the final determination. Familiarity with hull shapes is not a matter which can be described in a few sentences, nor can it be expressed in arithmetic ratios to any usable extent. The interpreter should observe hull shapes continually in his study of shipping, noting the small refinements as well as general outlines.

Rather than attempt to choose a standard shape for each type of ship, it will be left to the individual to study the various shapes for each type shown in the following pages. In general, note the following outlines:

Battleships - heavy beam gives "fat" appearance.

Heavy Cruisers - continuous curve, forward and aft.
Light Cruisers - less curvaceous than heavy cruisers; outline approaches that of the destroyers in many cases.
Destroyers - straight sides amidships.
Submarines - "cigar-shaped".

NATIONAL CHARACTERISTICS

United States Navy

All recent designs have displayed a well streamlined superstructure, with the emphasis on pyramiding the various elements. This has resulted in a compactness of features on nearly all types of ships.

Royal Navy

Characterized by angular lines without streamlining, resulting in blocklike superstructures. Masts are light and stacks uncluttered.

Japanese Navy

Typified by widely spaced elements and a variety of features not employed by other navies, e.g., the pagoda bridge-mast of the battleships, the heavy raked, trunked forestack of the heavy cruisers, etc.

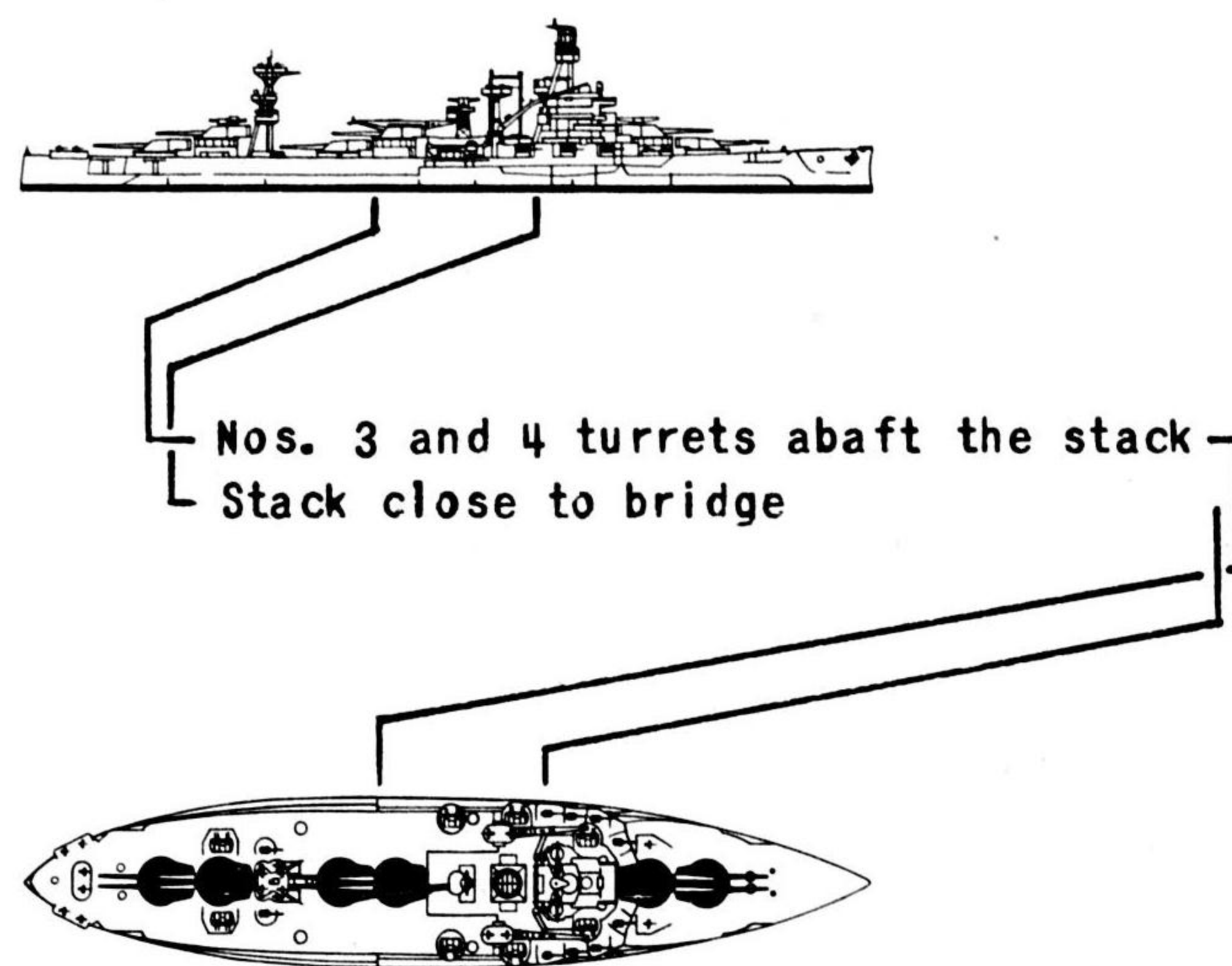
BATTLESHIPS

6-5 TURRETS

UNITED STATES

ARKANSAS

554' o.a.



Nos. 3 and 4 turrets abaft the stack
Stack close to bridge

With the sinking of the FUSO and YAMASHIRO in the Second Battle of the Philippines, the only six-turret battleships remaining as such in the Japanese Navy were eliminated. The two ships of the ISE Class previously had been altered and now have four main battery turrets (shown on p. 2.05). Hence, there should be no difficulty in distinguishing our ARKANSAS from any of the Japanese battleships. In long oblique views, where the individual turrets cannot be differentiated, the grouping of the superstructure will suffice for distinguishing this class from the Japanese battleships.

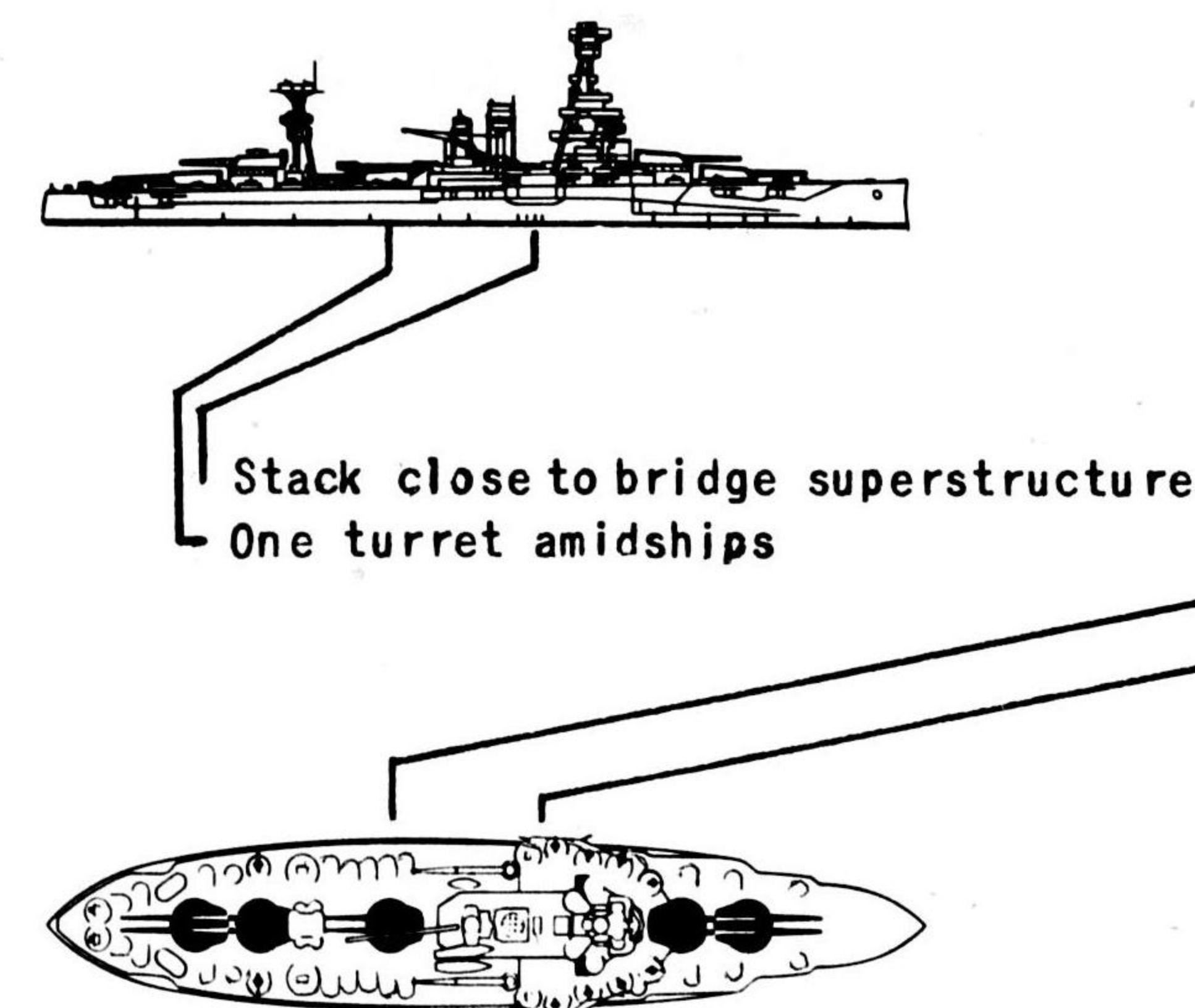
UNITED STATES

NEW YORK Class

573' o.a.

NEW YORK

TEXAS



Stack close to bridge superstructure
One turret amidships

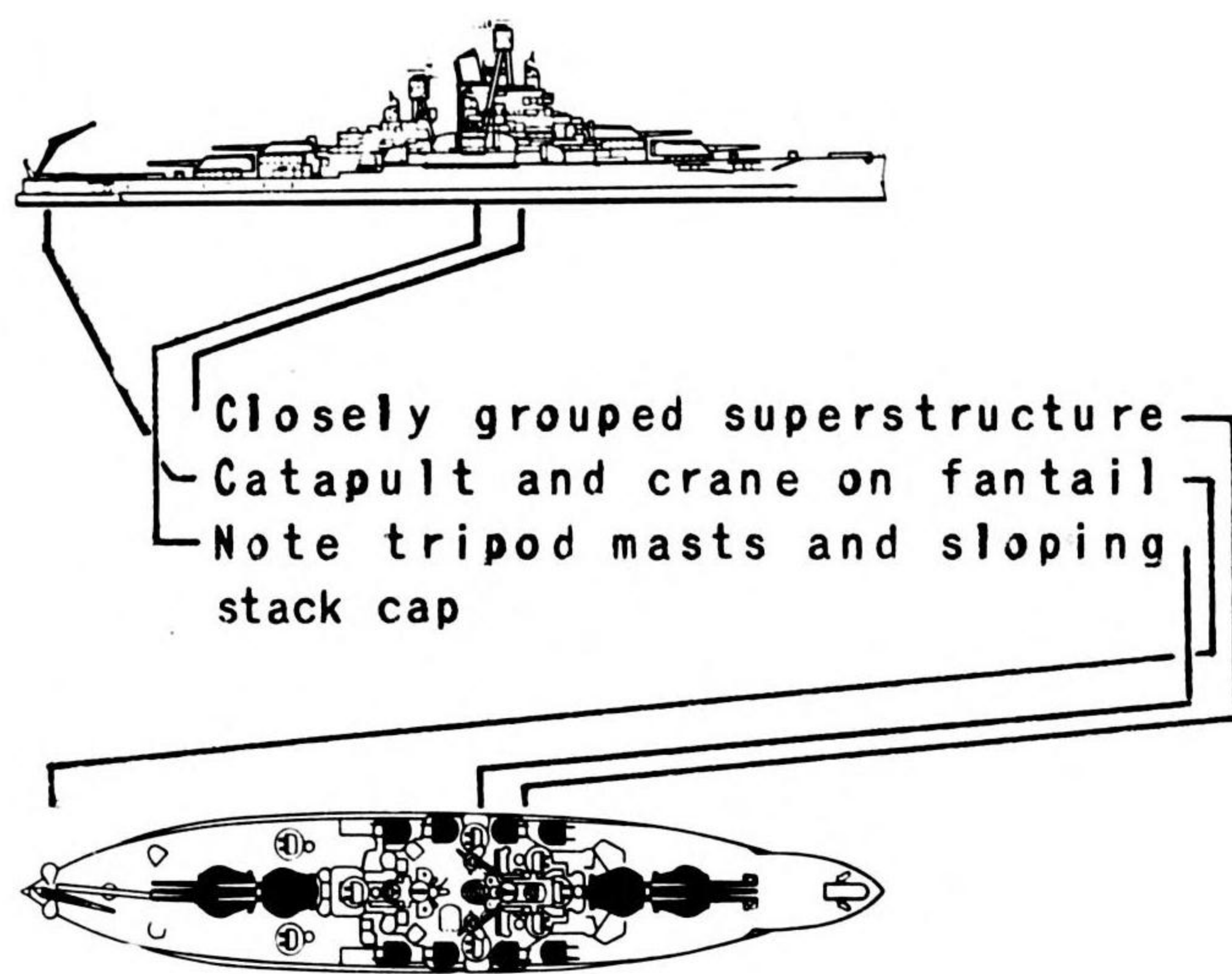
There is no battleship in the Japanese Navy comparable in the number of turrets to the NEW YORK Class. Here again, for long oblique photos, this class can be distinguished from the Japanese battleships by the spacing of the superstructure features.

BATTLESHIPS

4 TURRETS

UNITED STATES

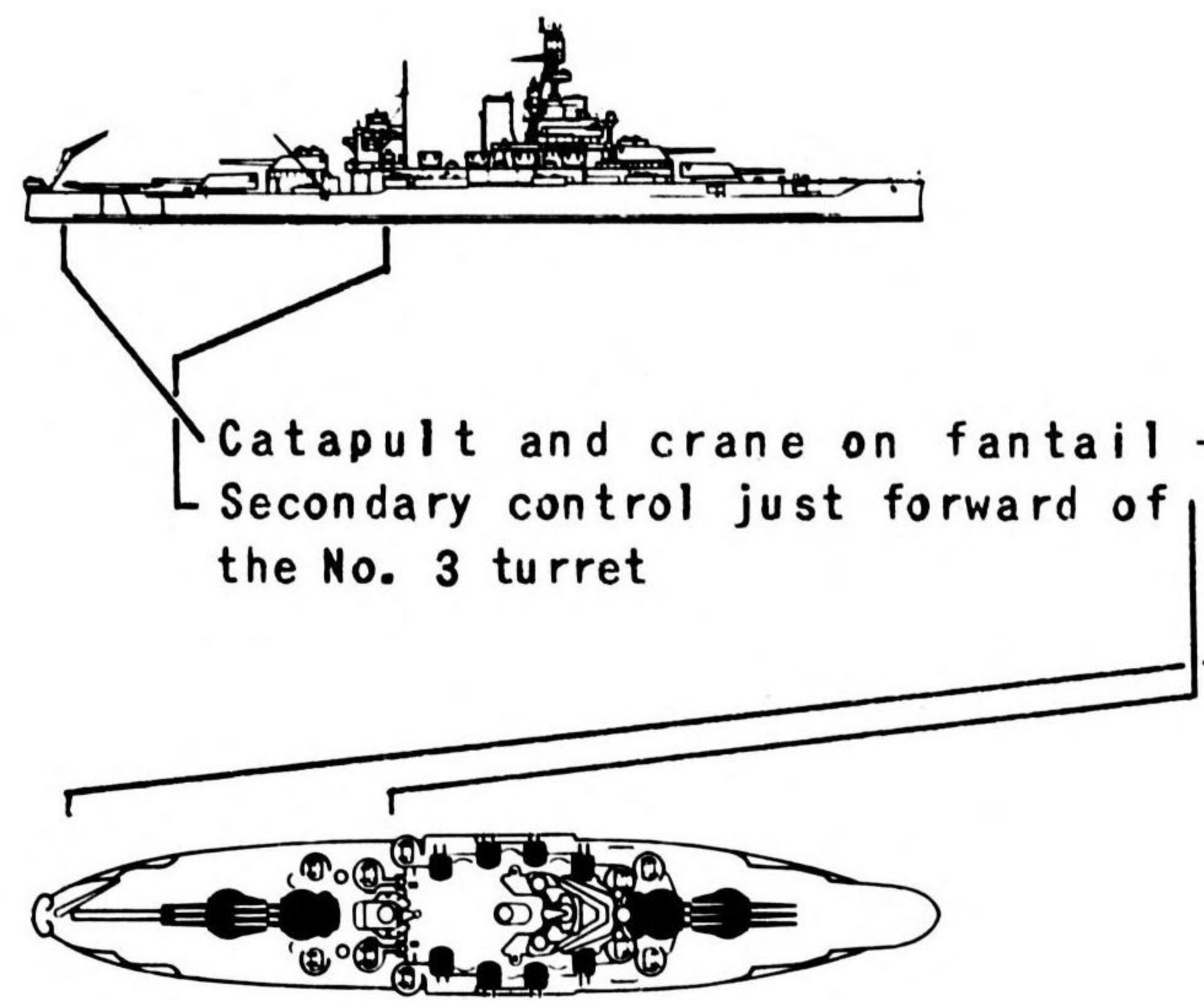
NEVADA 575' o. a.



Closely grouped superstructure
Catapult and crane on fantail
Note tripod masts and sloping stack cap

UNITED STATES

PENNSYLVANIA 600' o. a.



Catapult and crane on fantail
Secondary control just forward of the No. 3 turret

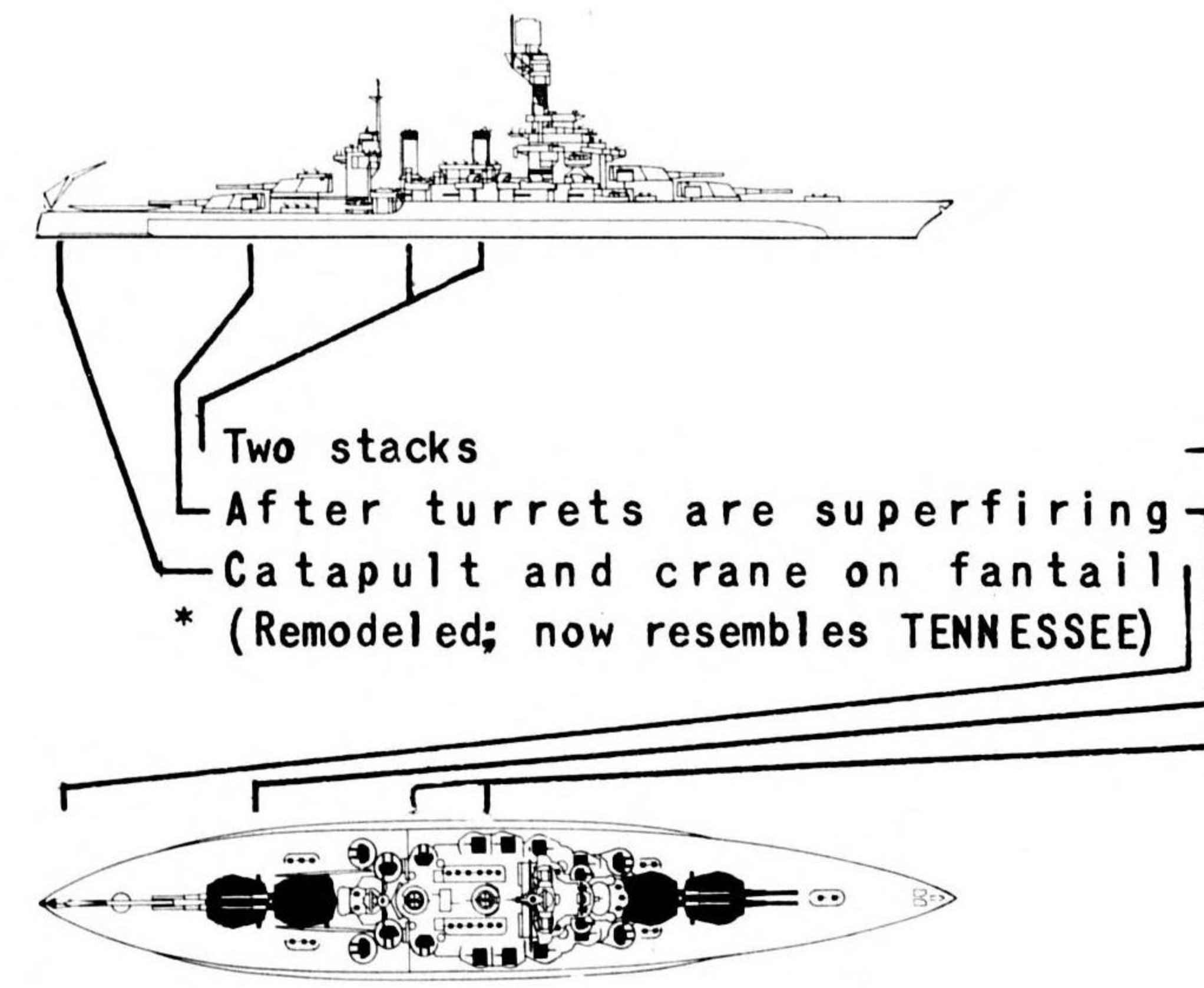
UNITED STATES

COLORADO Class 624' o. a.

COLORADO

MARYLAND

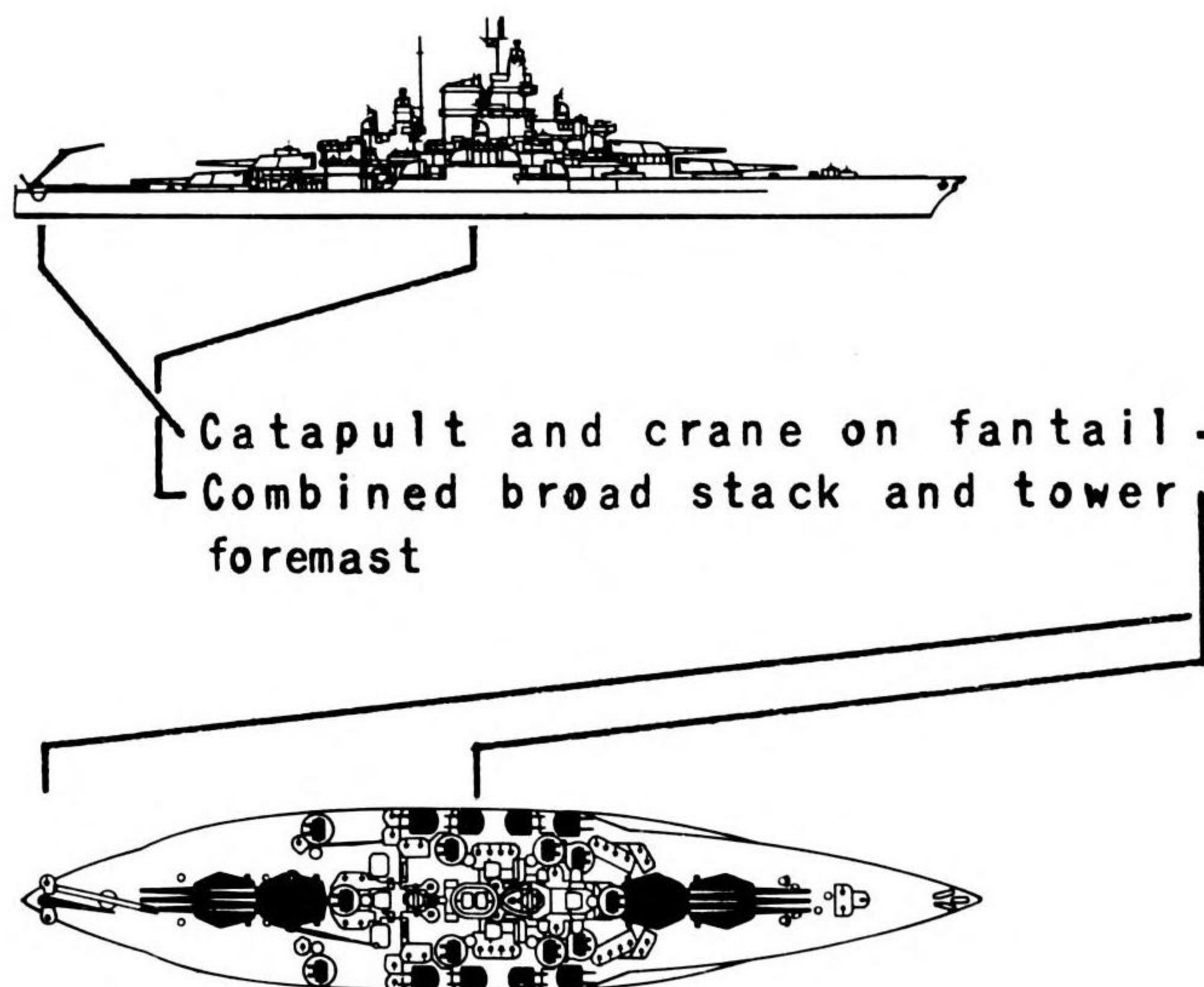
WEST VIRGINIA *



Two stacks
After turrets are superfiring
Catapult and crane on fantail
* (Remodeled; now resembles TENNESSEE)

TENNESSEE Class 624' o. a.

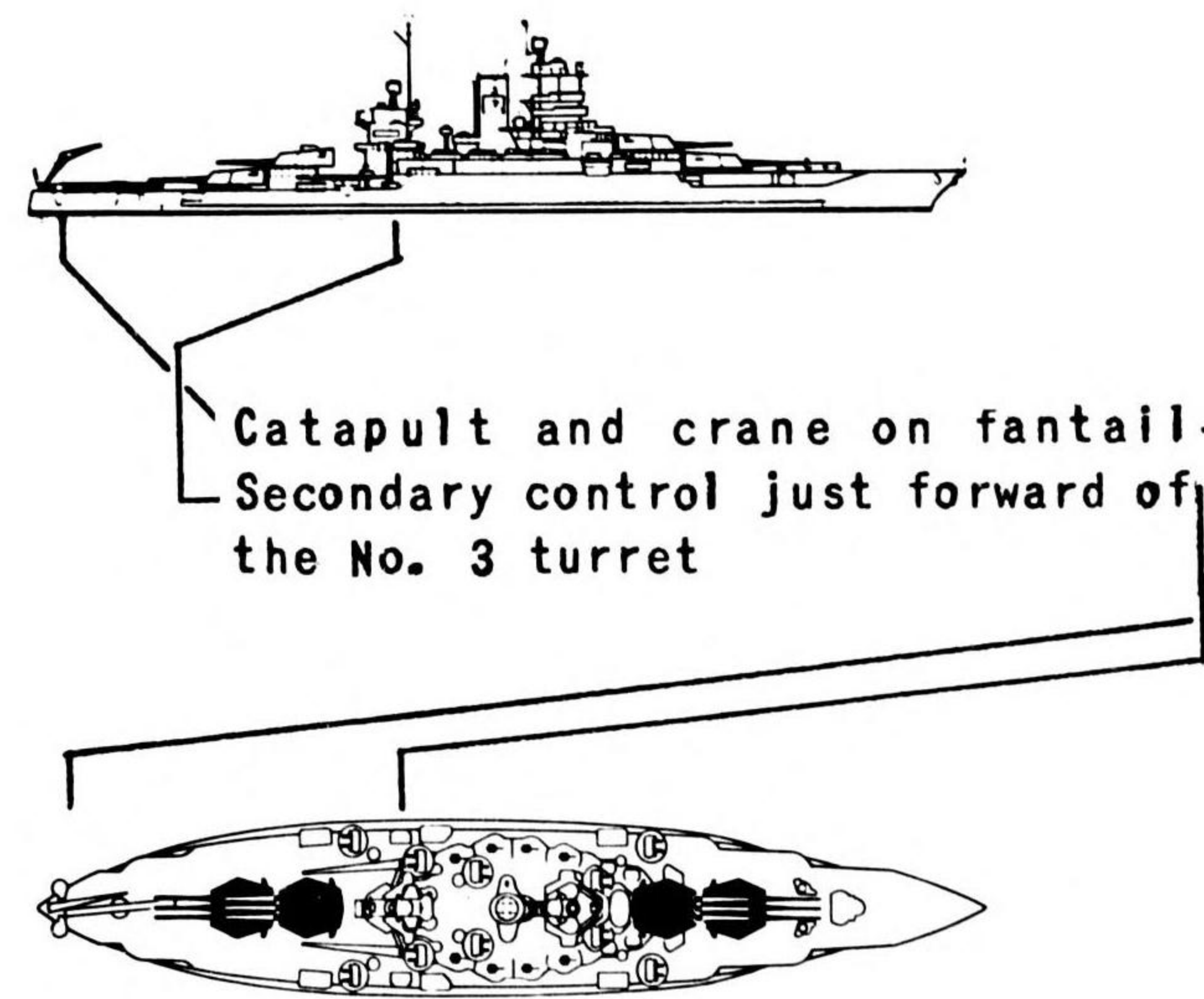
TENNESSEE
CALIFORNIA



Catapult and crane on fantail
Combined broad stack and tower foremast

NEW MEXICO Class 624' o. a.

NEW MEXICO
MISSISSIPPI
IDAHO



Catapult and crane on fantail
Secondary control just forward of the No. 3 turret

Characteristic of all Japanese battleships which still remain afloat is the tall pagoda bridge-mast. Some allied ships carry tripod or tower foremasts but neither approaches the pagoda type in height or complexity. Another characteristic of all older Jap battleships is the wide spacing of the superstructure features which makes them notably different from our remodeled four turret battleships.

Note that all American four turret battleships have the catapults and cranes on the fantail and all have superfiring turrets, while on the KONGO Class the catapult is between the Nos. 3 and 4 turrets and on the NAGATO forward of the No. 3 turret. British battleships carry the catapults just abaft the stack.

The two ships of the ISE Class formerly carried six turrets, but they have been altered as shown, and increased in length. The addition of this aircraft deck aft will serve as a ready means for identification of this class. The best means for identification of the KONGO Class and the NAGATO is the spacing of the after turrets.

BATTLESHIPS

4 TURRETS

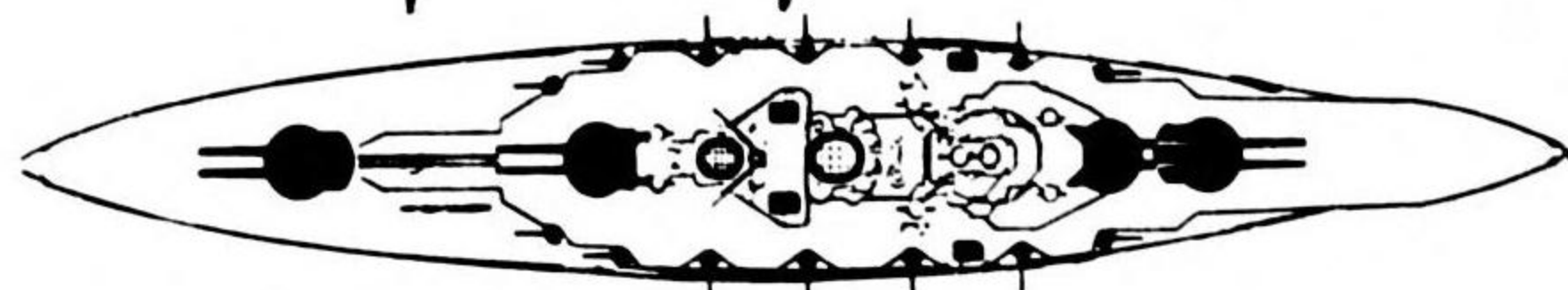
JAPAN

KONGO Class 704' o. a.

KONGO
HARUNA

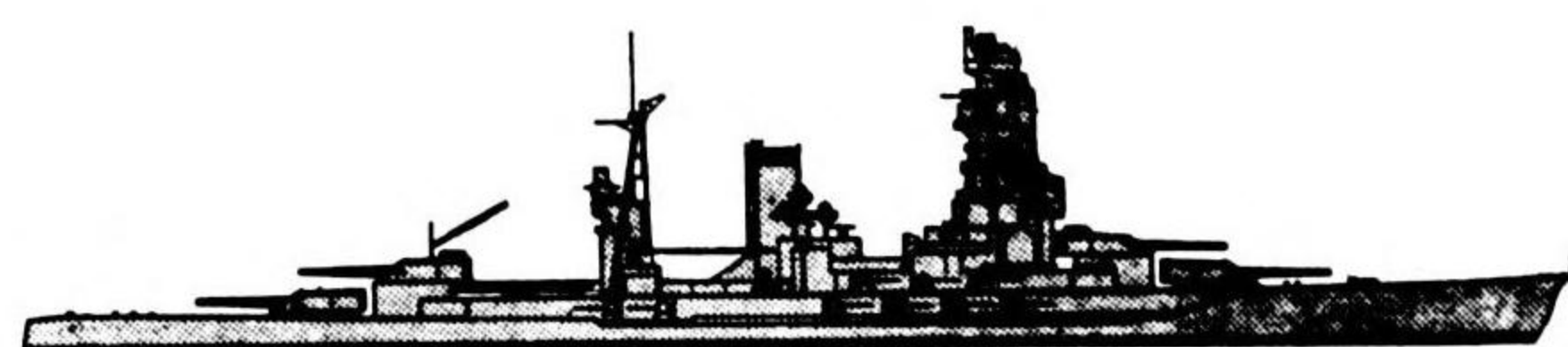


Only two-stack BB's in Jap Navy
After turrets separated by catapult

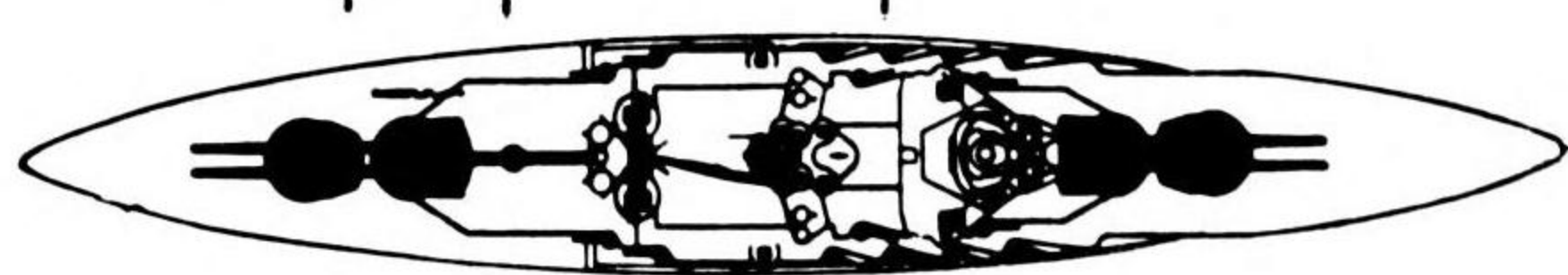


NAGATO

700' o. a.



After turrets superfiring
Catapult forward of No. 3 turret
Stack separated from bridge



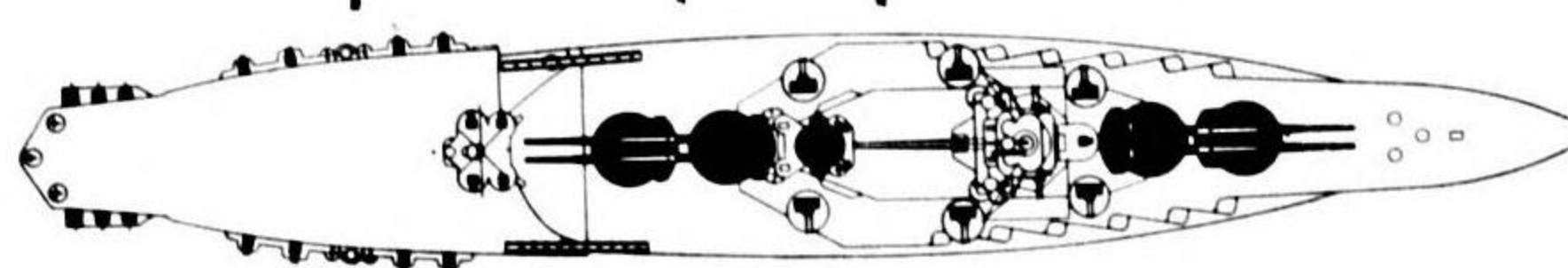
JAPAN

ISE Class 715' o. a.

ISE
HYUGA

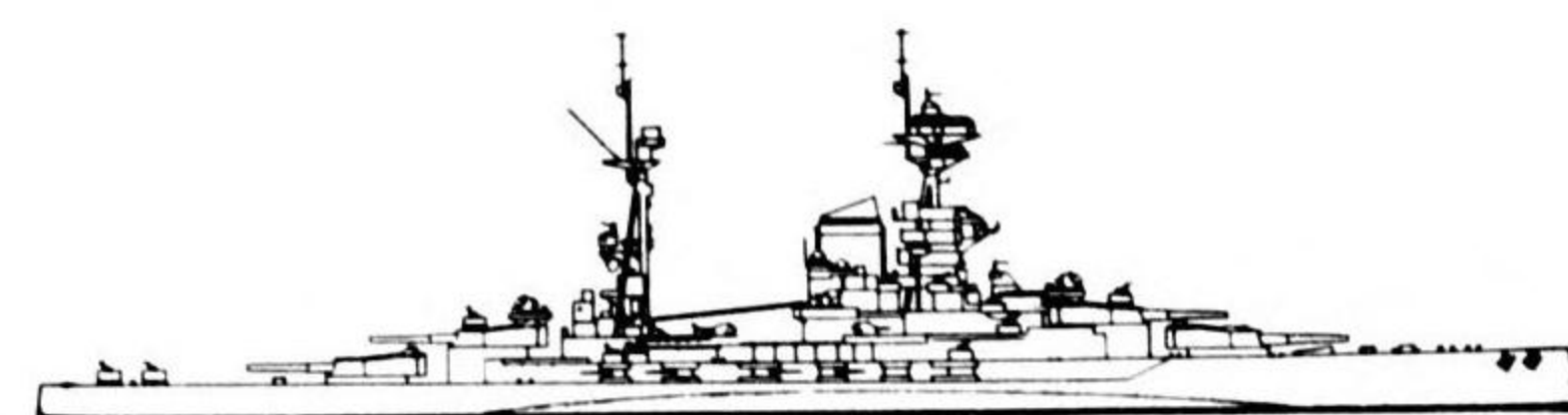


After turrets replaced by aircraft deck
Amidships turrets are both abaft stack and are superfiring
Stack separated from bridge

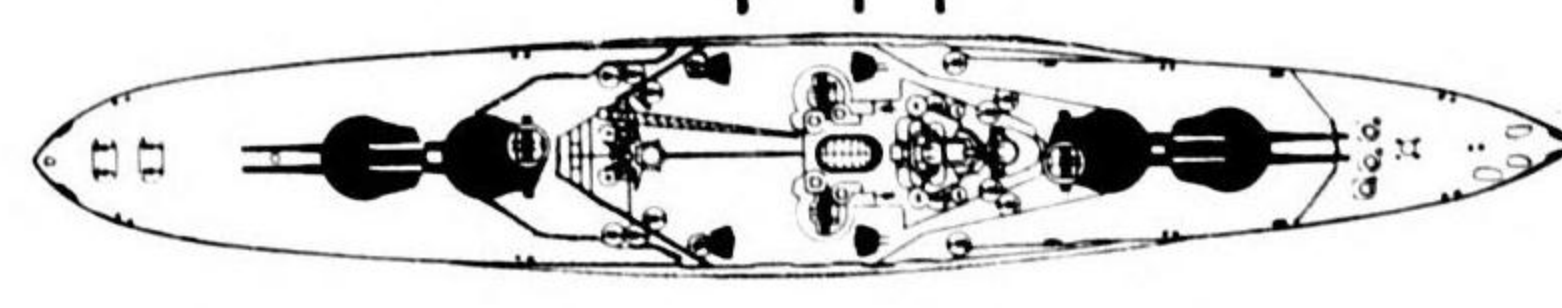


ROYAL SOVEREIGN Class 621' o. a.

ROYAL SOVEREIGN RESOLUTION
REVENGE RAMILLIES



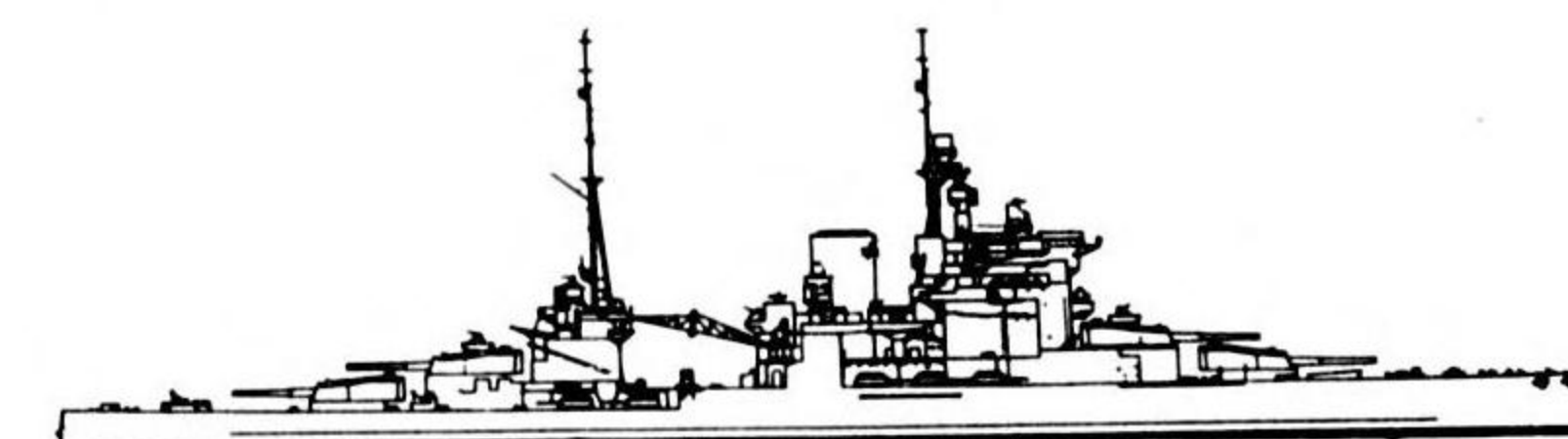
Stack just abaft bridge
Light tripod bridge-mast
Boat deck abaft stack



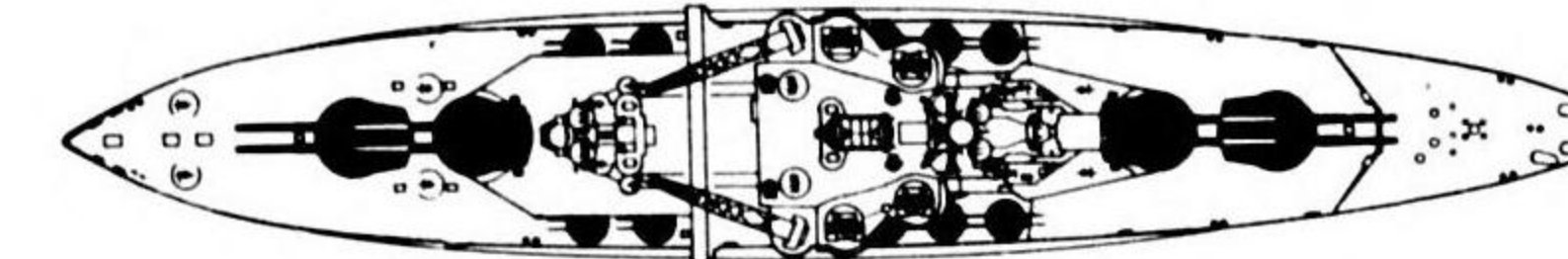
GREAT BRITAIN

QUEEN ELIZABETH Class

QUEEN ELIZABETH 646' o. a.
VALIANT 646' o. a.
WARSPITE * 645' o. a.

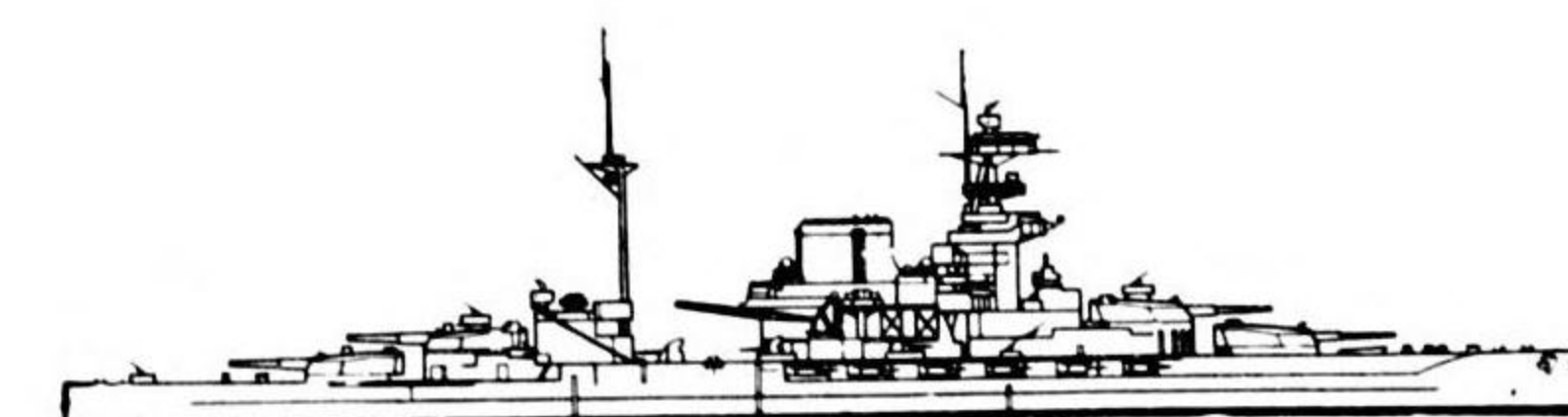


Stack just abaft bridge
Massive tower bridge
Catapult well abaft stack
* (Differs slightly, see ONI 201)

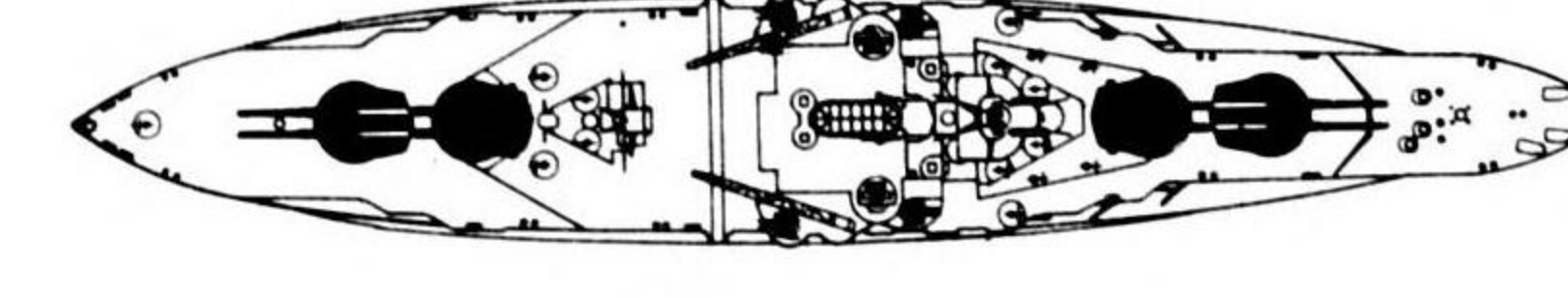


QUEEN ELIZABETH Class

MALAYA 640' o. a.



Broad stack just abaft bridge
Massive tower bridge
Catapult well abaft stack



BATTLESHIPS—LARGE CRUISER

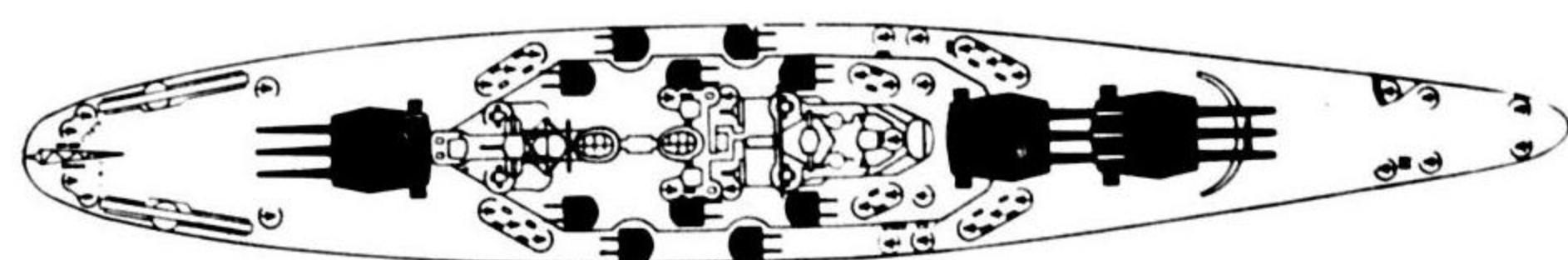
3 TURRETS

UNITED STATES

NORTH CAROLINA Class	741' o.a.
NORTH CAROLINA	
WASHINGTON	

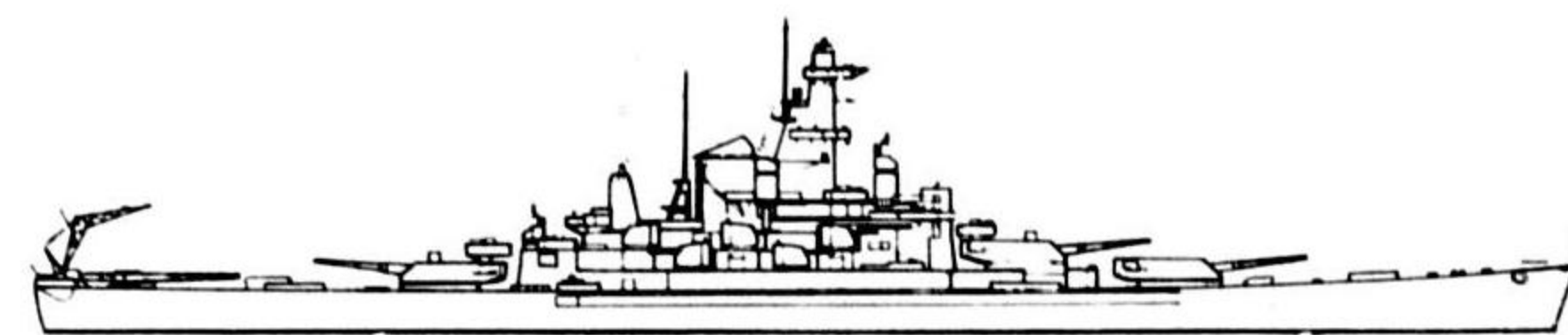


Two large upright stacks widely separated from tower-foremast

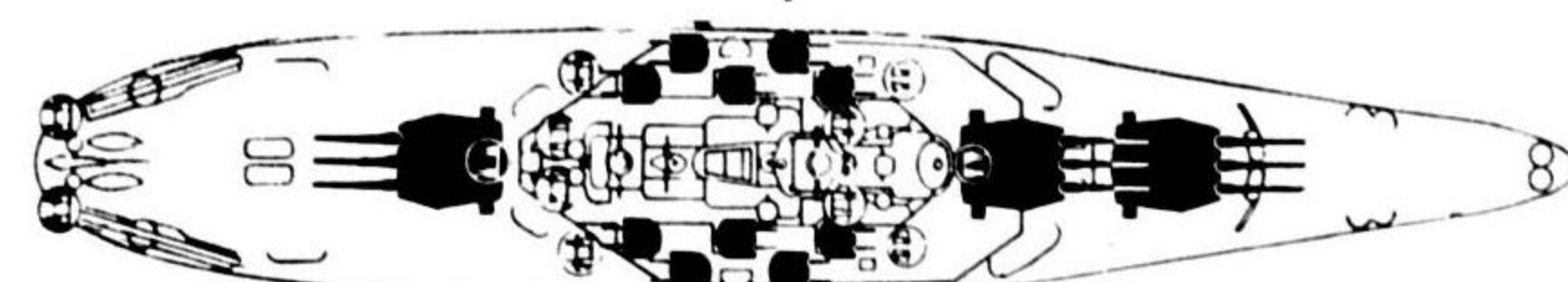


UNITED STATES

SOUTH DAKOTA Class	680' o.a.
SOUTH DAKOTA	MASSACHUSETTS
INDIANA	ALABAMA

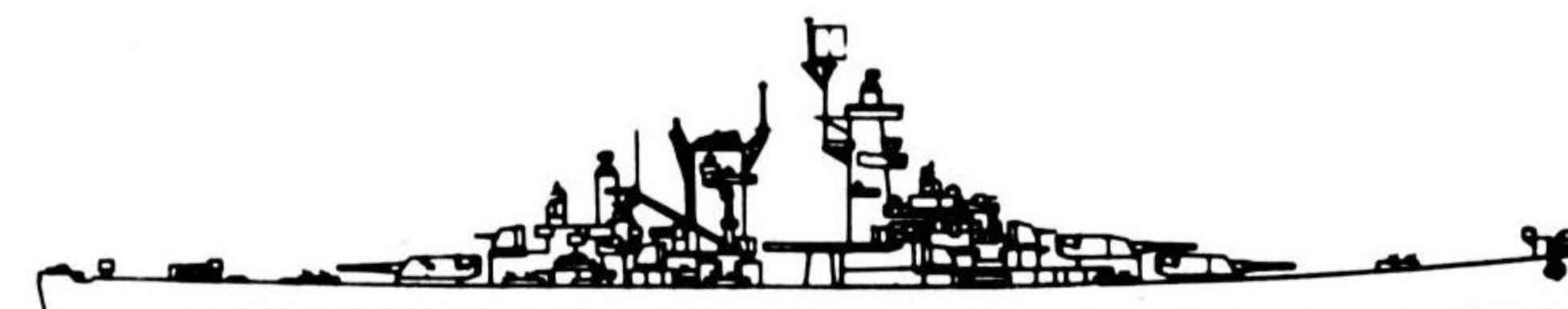


Combined tower-foremast and broad stack

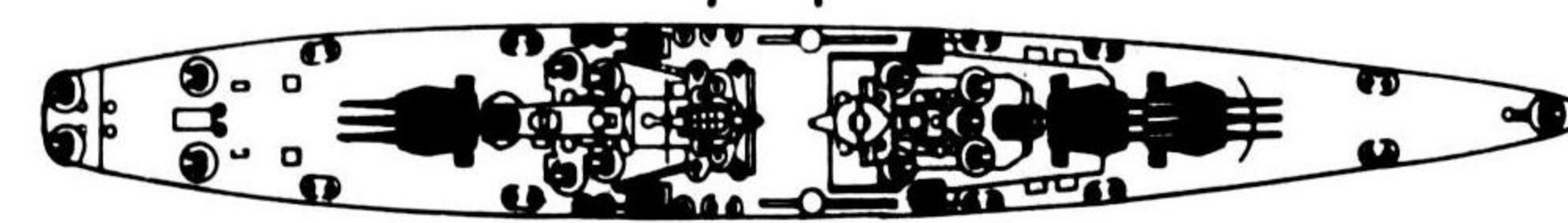


UNITED STATES

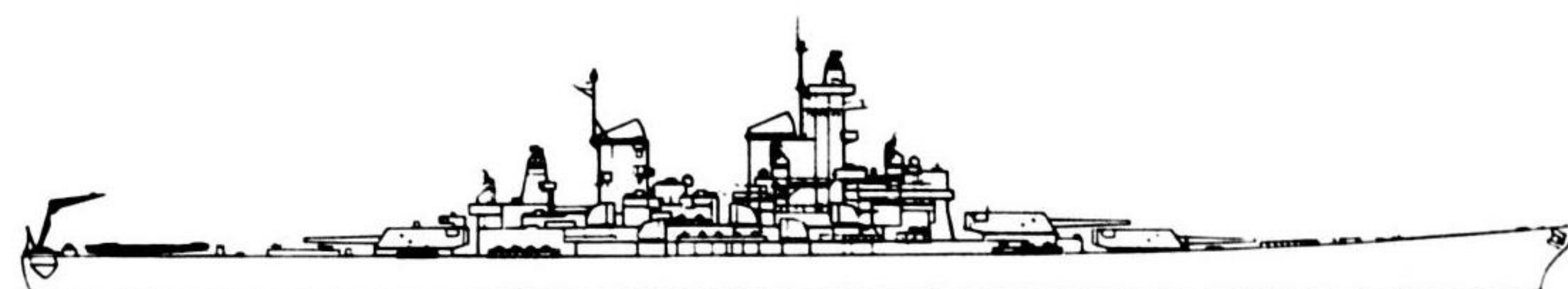
ALASKA Class	808' o.a.
ALASKA	
GUAM	
HAWAII	



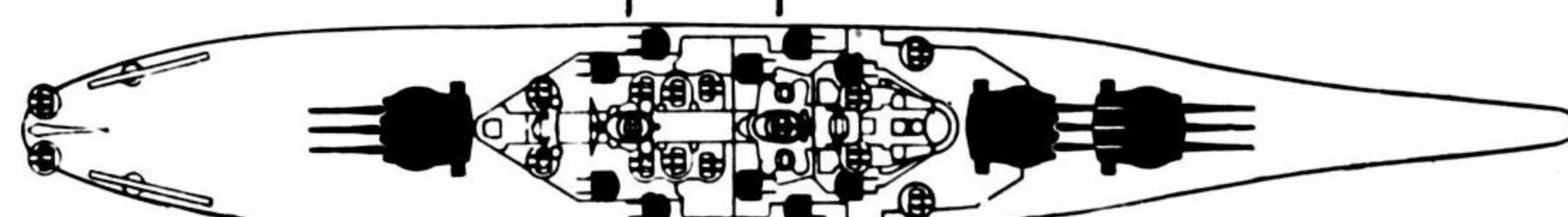
Single stack, widely separated from tower-foremast
Catapults and hangars amidships



IOWA Class	887' o.a.
IOWA	MISSOURI
NEW JERSEY	WISCONSIN



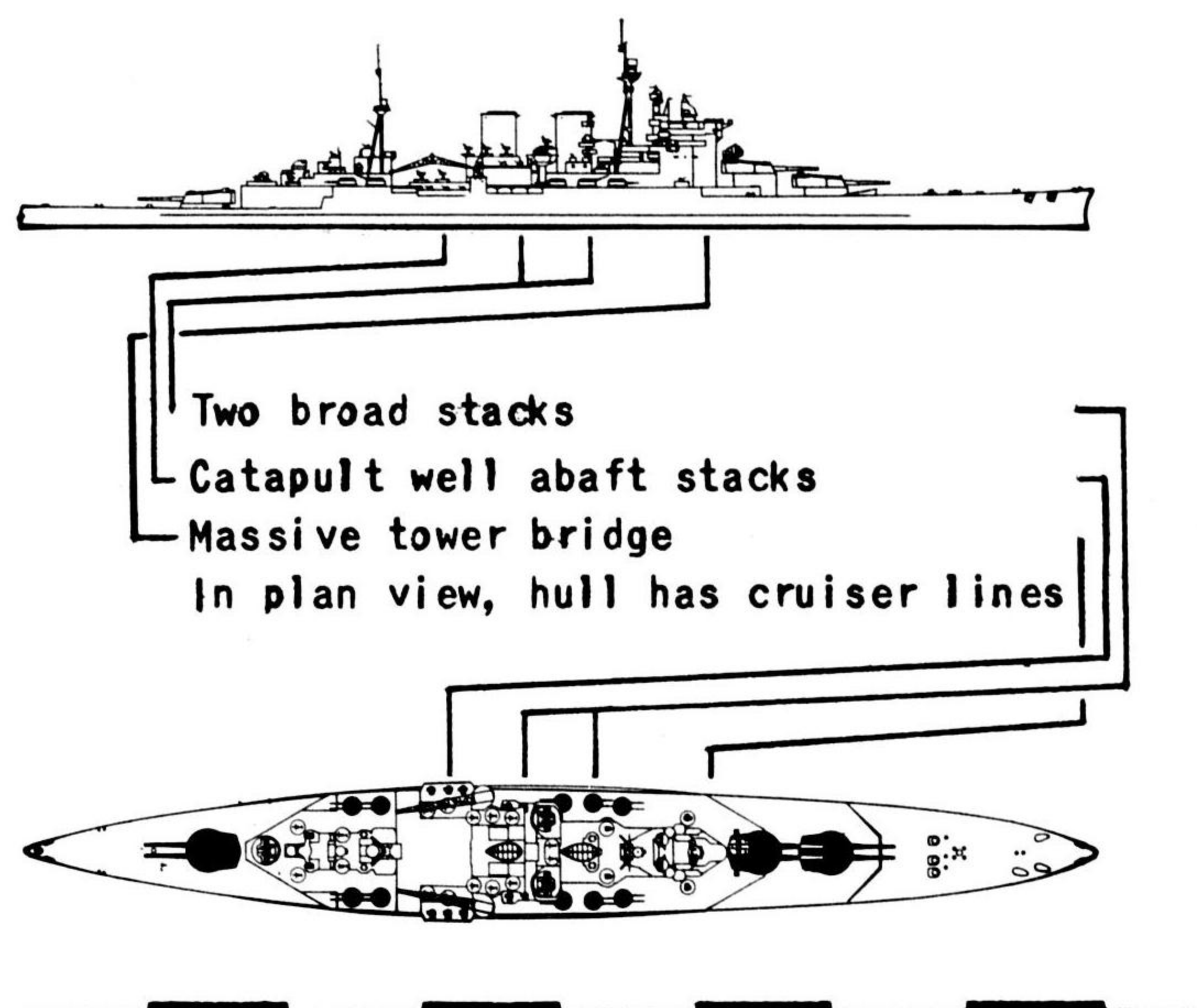
Two wide stacks, No. 1 combined with tower-foremast



BATTLE CRUISER—BATTLESHIPS
3 TURRETS

GREAT BRITAIN

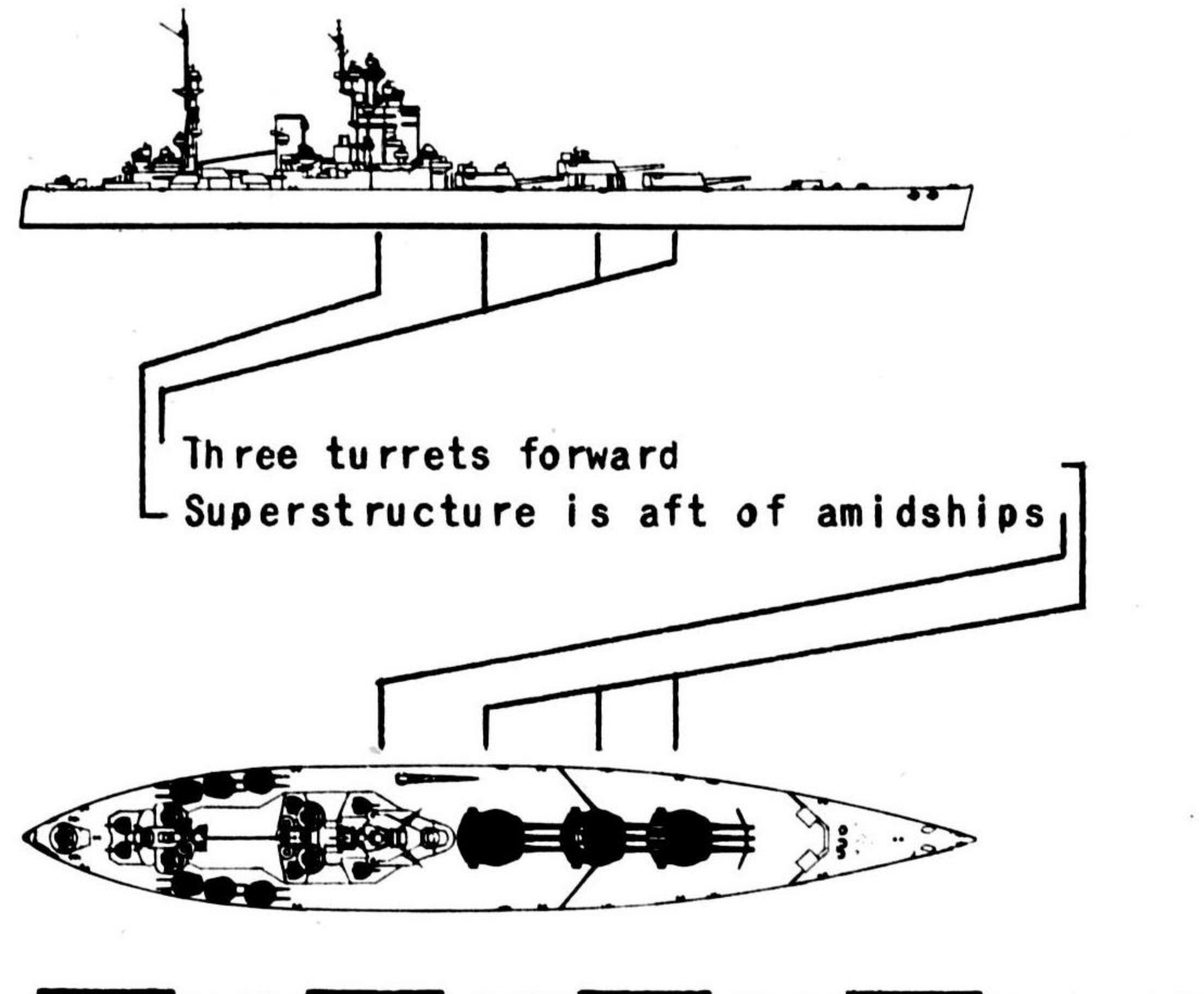
RENOWN 794' o.a.



GREAT BRITAIN

NELSON Class 710' o.a.

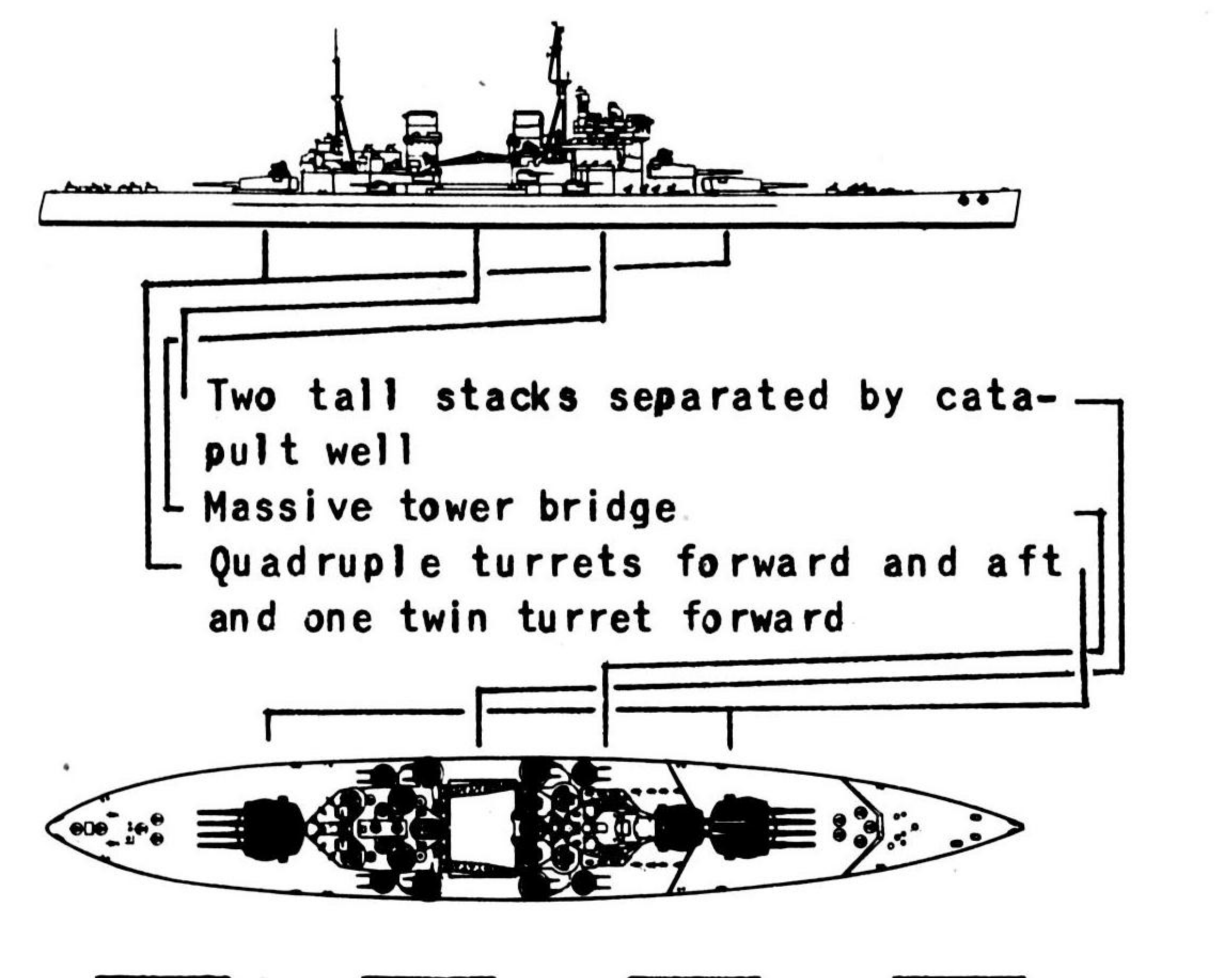
NELSON
 RODNEY



GREAT BRITAIN

KING GEORGE V Class 745' o.a.

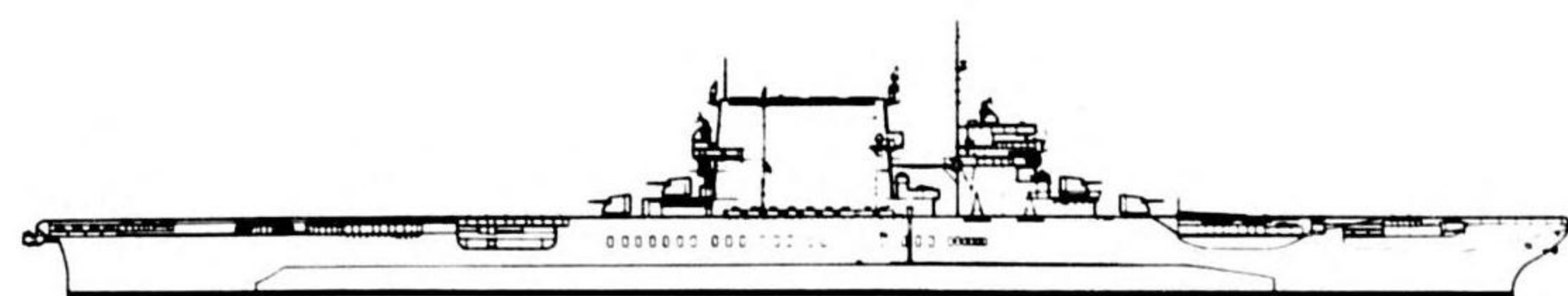
KING GEORGE V ANSON
 DUKE OF YORK HOWE



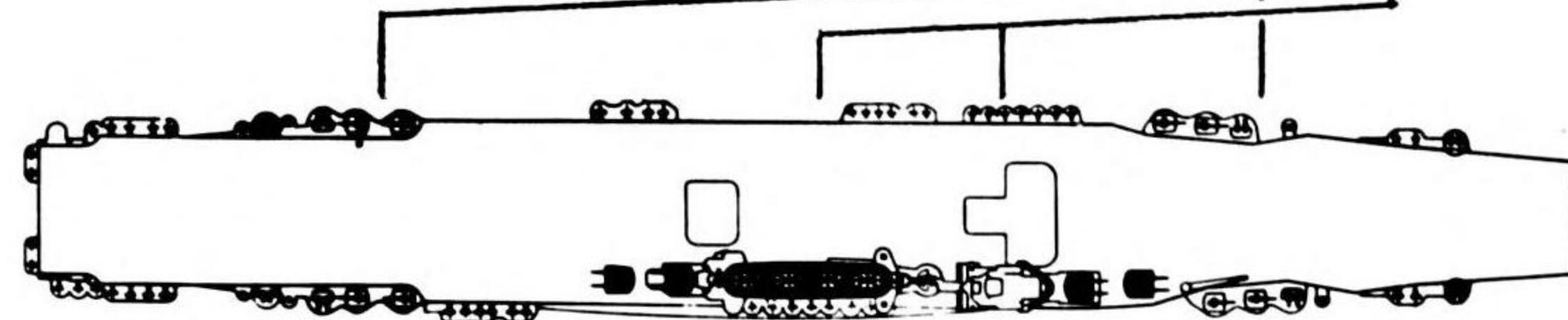
AIRCRAFT CARRIERS

UNITED STATES

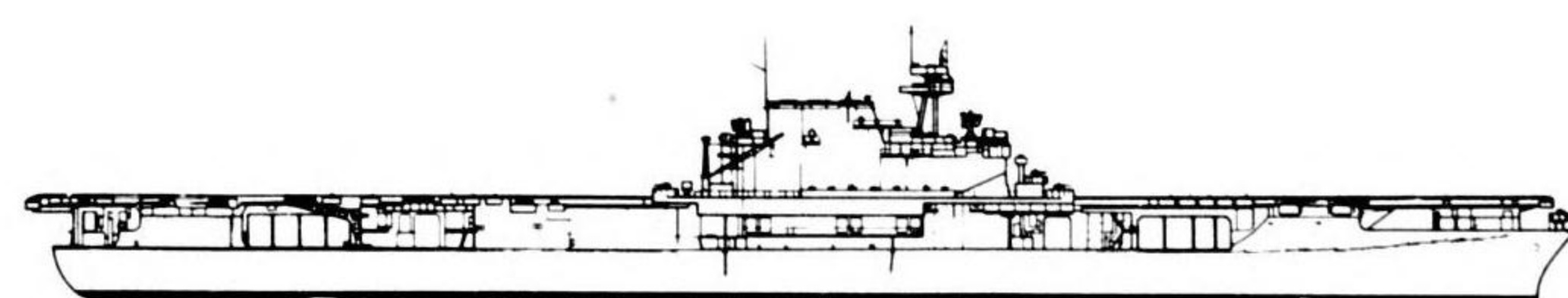
SARATOGA 910' o. a.



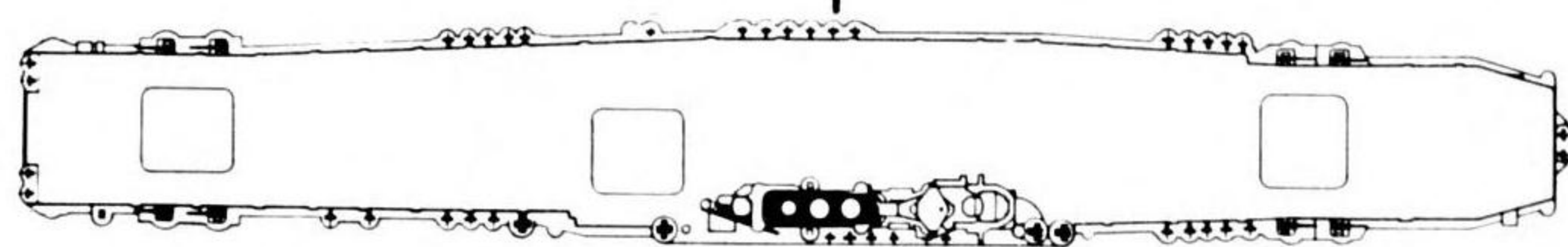
Note very large stack and separate bridge
Integral hull and flight deck
Note irregular shape of flight deck



ENTERPRISE 825' o. a.

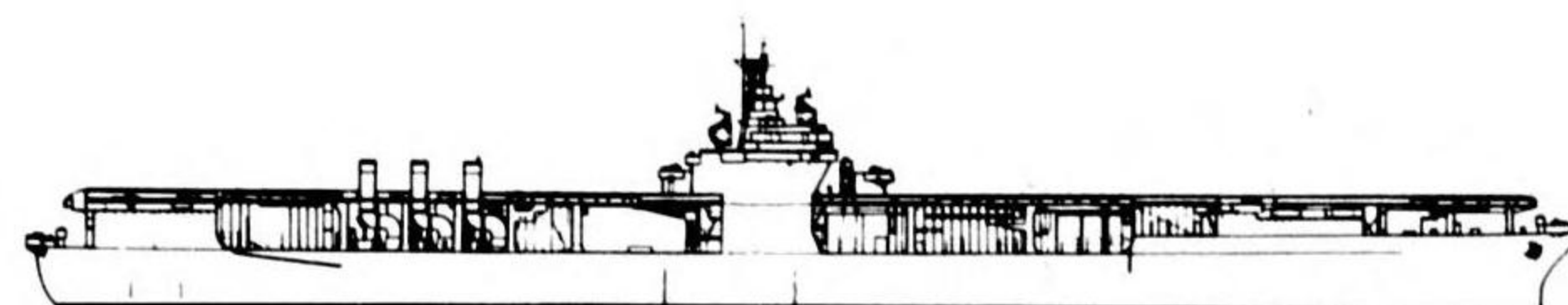


Long, high superstructure combined with large stack
Rectangular flight deck

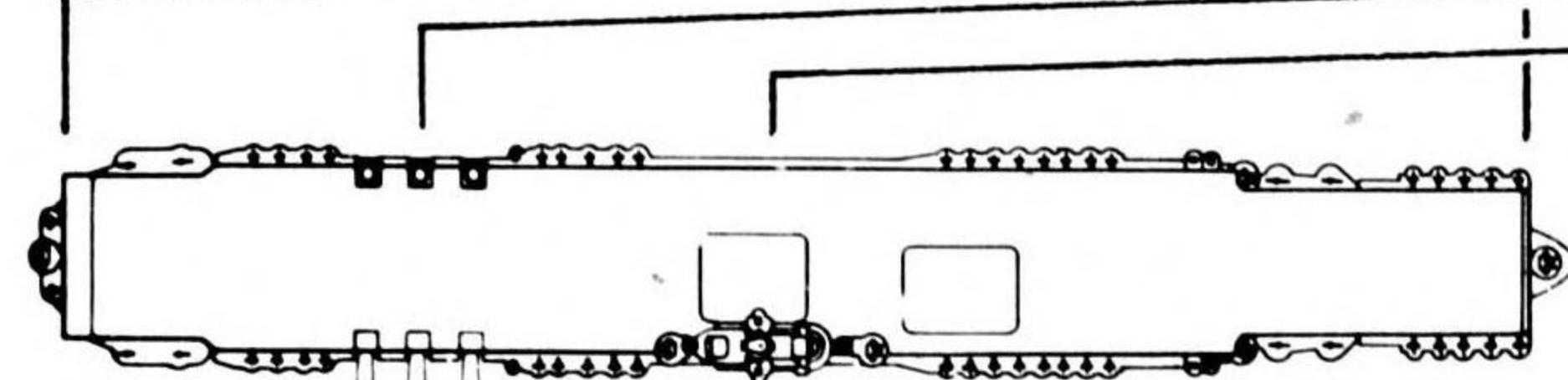


UNITED STATES

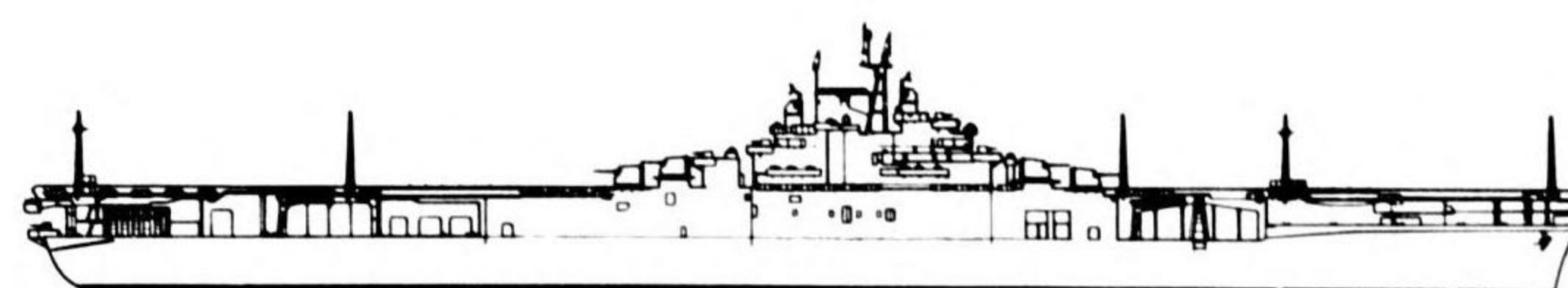
RANGER 772' o. a.



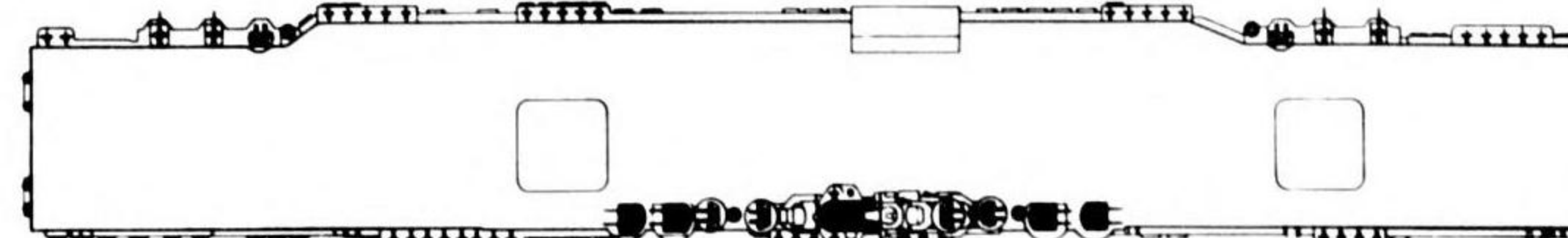
Small pyramidal superstructure
Six stacks, port and starboard, swing outboard
Flight deck short of full length at bow and stern



ESSEX Class 885' o. a.
16 Ships

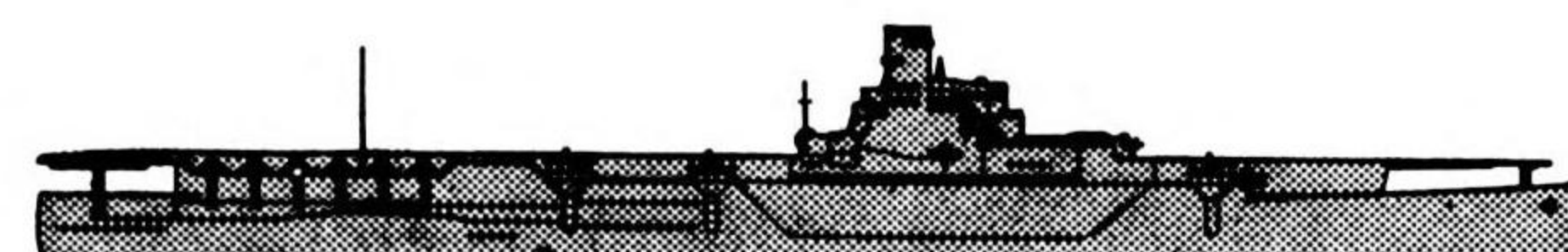


Long, pyramidal superstructure
Small stack
Rectangular, full length flight deck

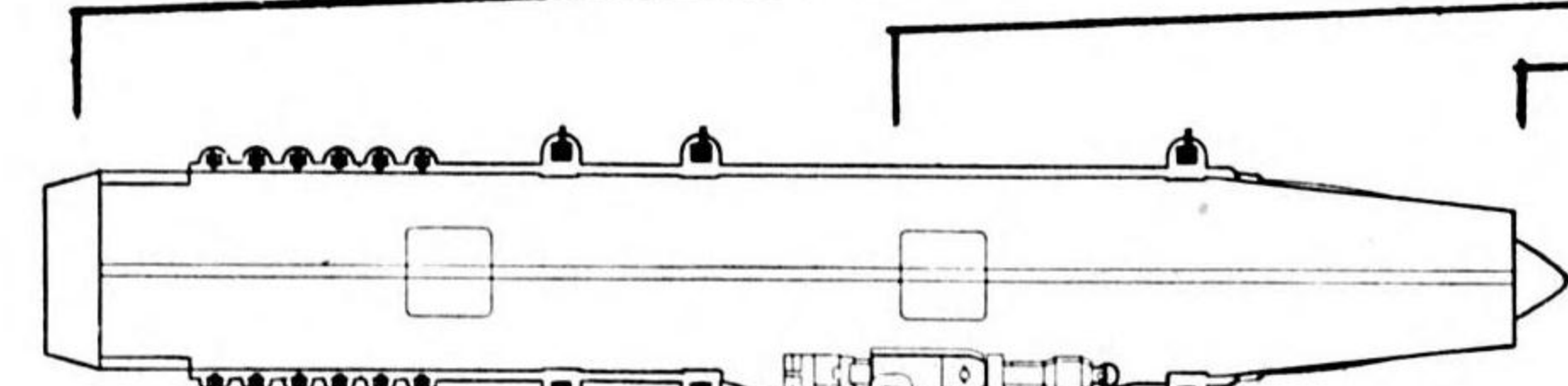


JAPAN

HAYATAKA 745' o. a.



Small pyramidal superstructure with combined outboard stack
Flight deck angular aft
Flight deck tapered forward and short of bow



With the sinking of the CV ZUIKAKU in the Second Battle of the Philippines on October 25, 1944, the last of the pre-war operational carriers was eliminated.

Little information is available concerning the new UNRYU Class, but a provisional plan drawing is included here along with the probable names of the units in the class. Additional information on this class will be issued in supplement form as it is received.

The HAYATAKA will present no great difficulty for identification, either in vertical or oblique photographs. Compare the plan of the flight deck and the silhouette of the island superstructure with those of the allied carriers, noting particularly the height of the stack above the island and the taper of the forward end of the flight deck on the HAYATAKA.

AIRCRAFT CARRIERS

JAPAN

UNRYU Class approx. 740' o.a.

- AMAGI
- KATSURAGI
- ASO
- KASAGI
- IKOMA

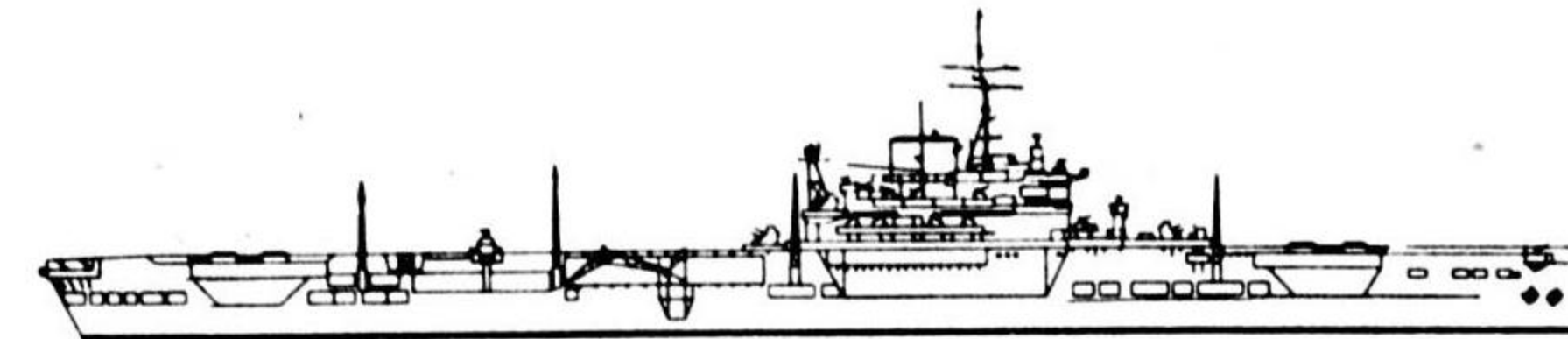
This plan drawing was made from photographs of NAGASAKI taken 17 Nov. 1944 before the flight deck had been completed. All information on this class is provisional.



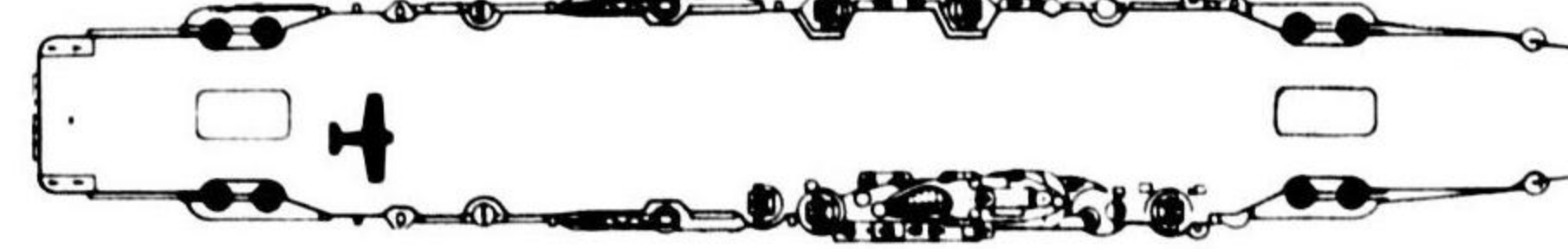
GREAT BRITAIN

ILLUSTRIOUS Class 740' o.a.

- ILLUSTRIOUS
- VICTORIOUS
- FORMIDABLE

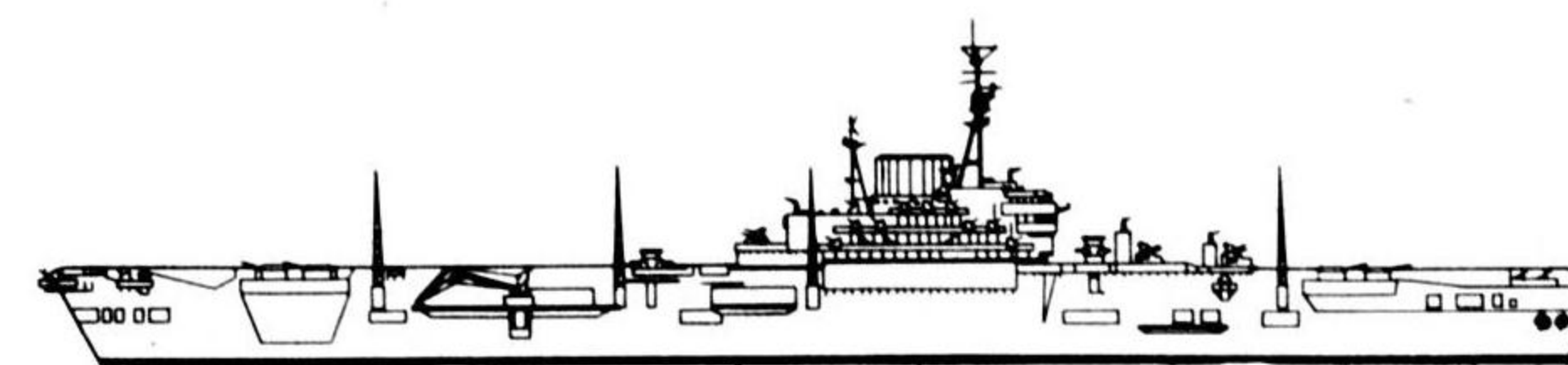


High superstructure combined with short asymmetrical stack
Note shape of flight deck
Integral hull and flight deck forward

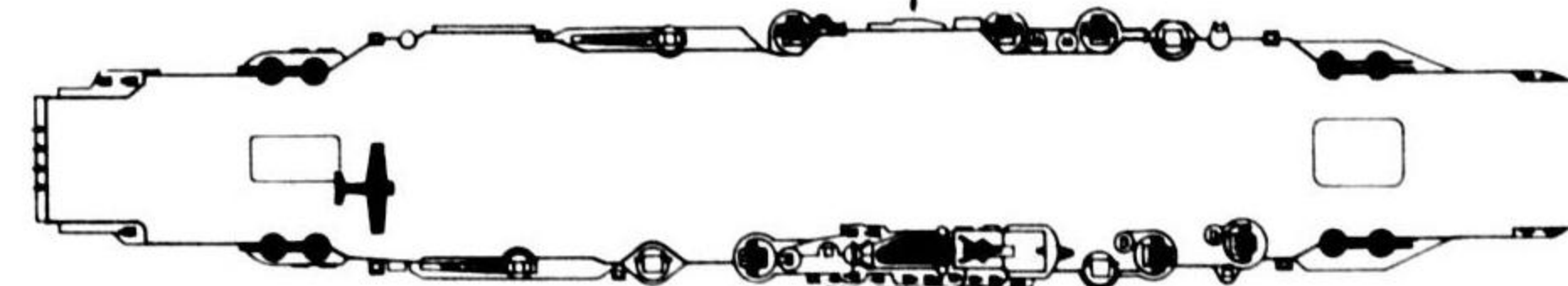


IMPLACABLE Class 760' o.a.

- IMPLACABLE
- INDEFATIGABLE



Large combined stack-bridge island
Irregularly shaped flight deck with squared ends
Integral hull and flight deck



GREAT BRITAIN

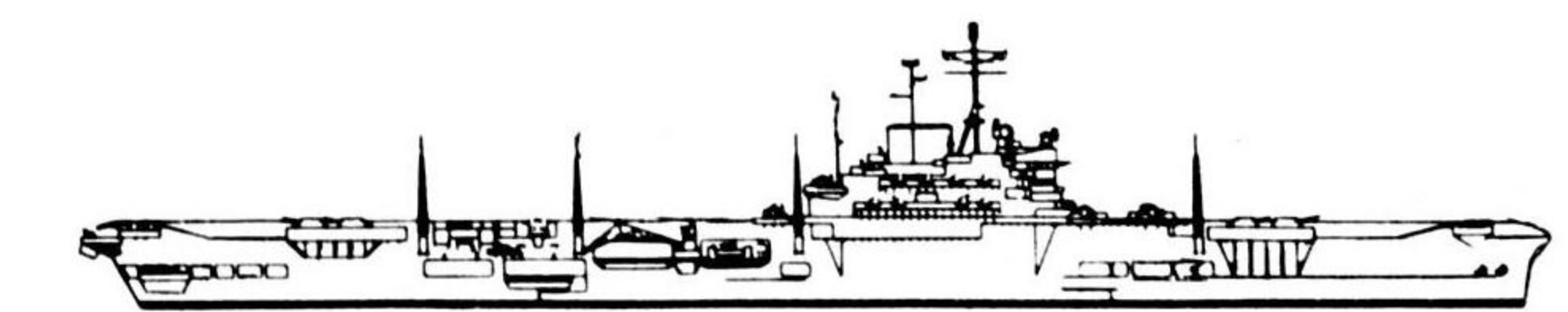
FURIOUS 787' o.a.



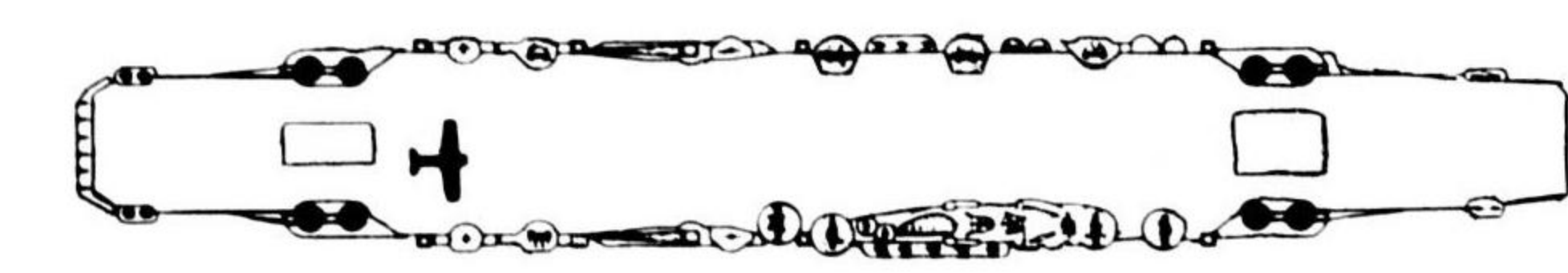
Flight deck short of stern
Flight deck far short of bow and rounded forward
Small superstructure



INDOMITABLE 750' o.a.



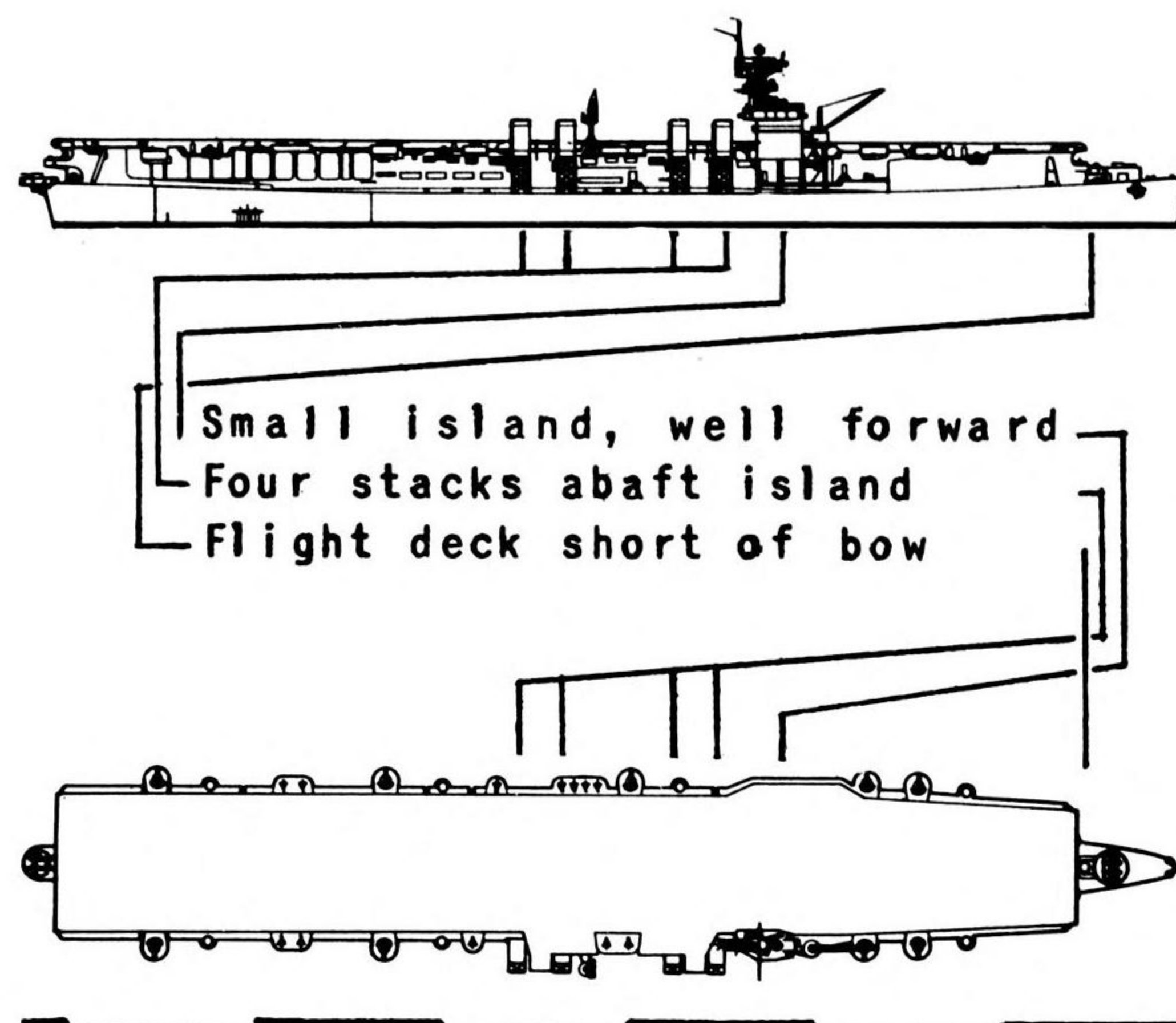
Note slight variations from ILLUSTRIOUS Class, particularly shape of flight deck



AIRCRAFT CARRIERS LIGHT

UNITED STATES

INDEPENDENCE Class			610' o.a.
INDEPENDENCE	SAN JACINTO	MONTEREY	
BELLEAU WOOD	BATAAN	LANGLEY	
COWPENS		CABOT	



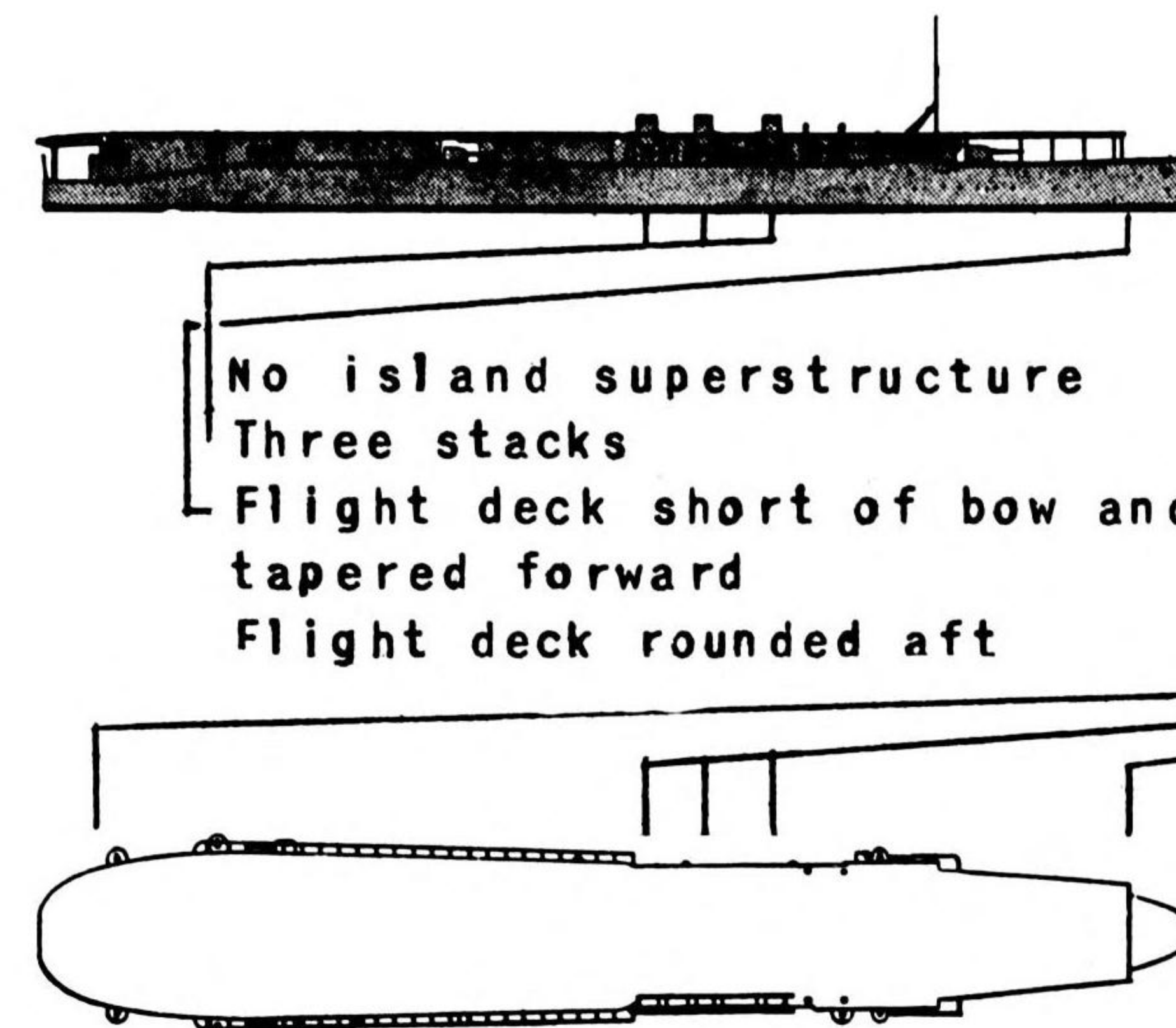
Small island, well forward
Four stacks abaft island
Flight deck short of bow

The CVL HOSHO is the only carrier in the Japanese fleet which has survived three and one half years of war, but this phenomenon has taken place merely because she was retired to training duties early in the war. Three stacks, the rounded after end of the flight deck and the lack of any island superstructure will identify this ship.

The RYUHO is the only remaining unit of the ZUIHO Class. The drawings used here were made from photographs of the ZUIHO, but the RYUHO will probably vary somewhat in details and her length is probably 689' o.a. or greater. Note the shape of the flight deck, the landing check-points and the lack of any island superstructure.

JAPAN

HOSHO	552' o.a.
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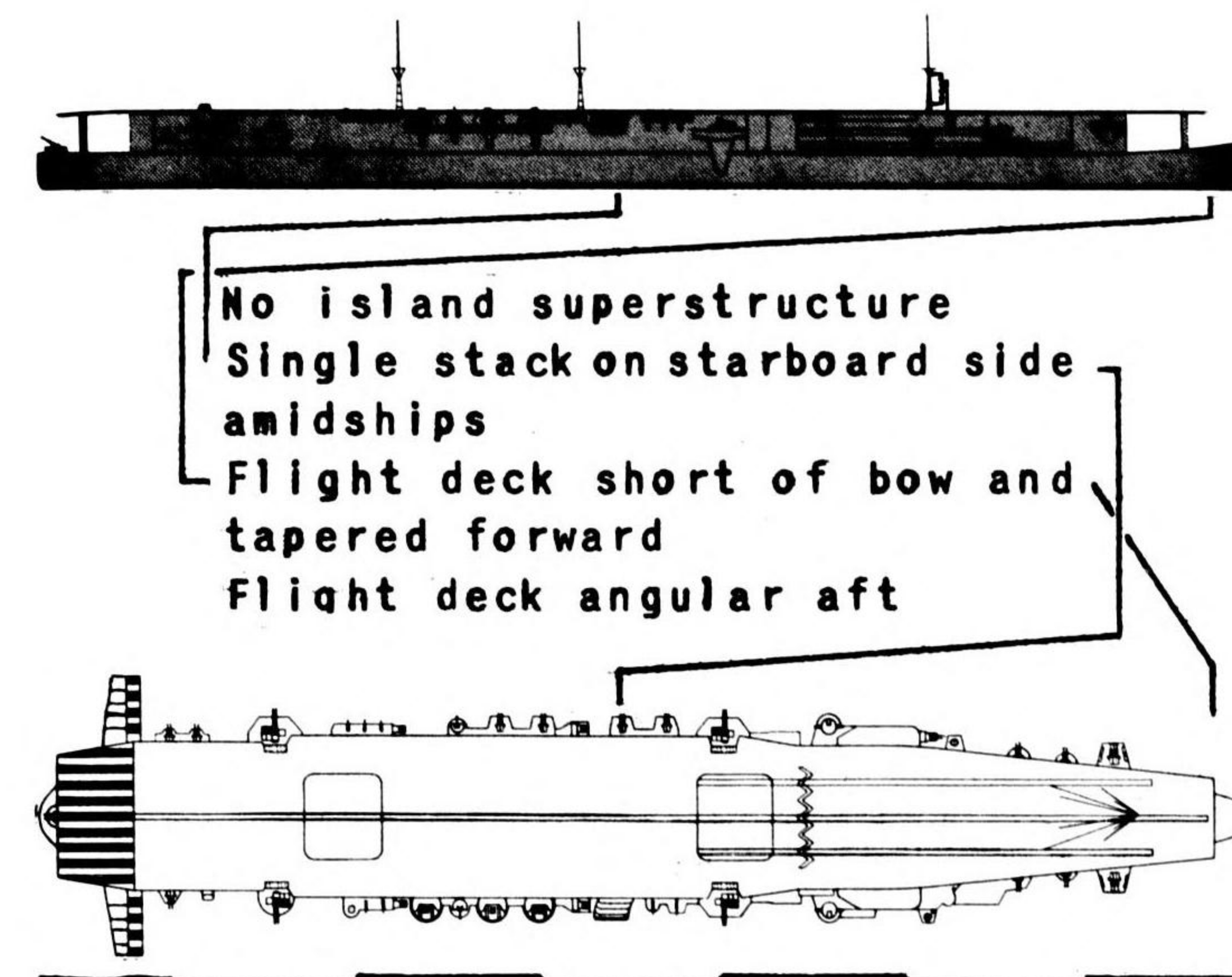


No island superstructure
Three stacks
Flight deck short of bow and tapered forward
Flight deck rounded aft

ZUIHO Class	668' o.a.
--------------------	------------------

RYUHO

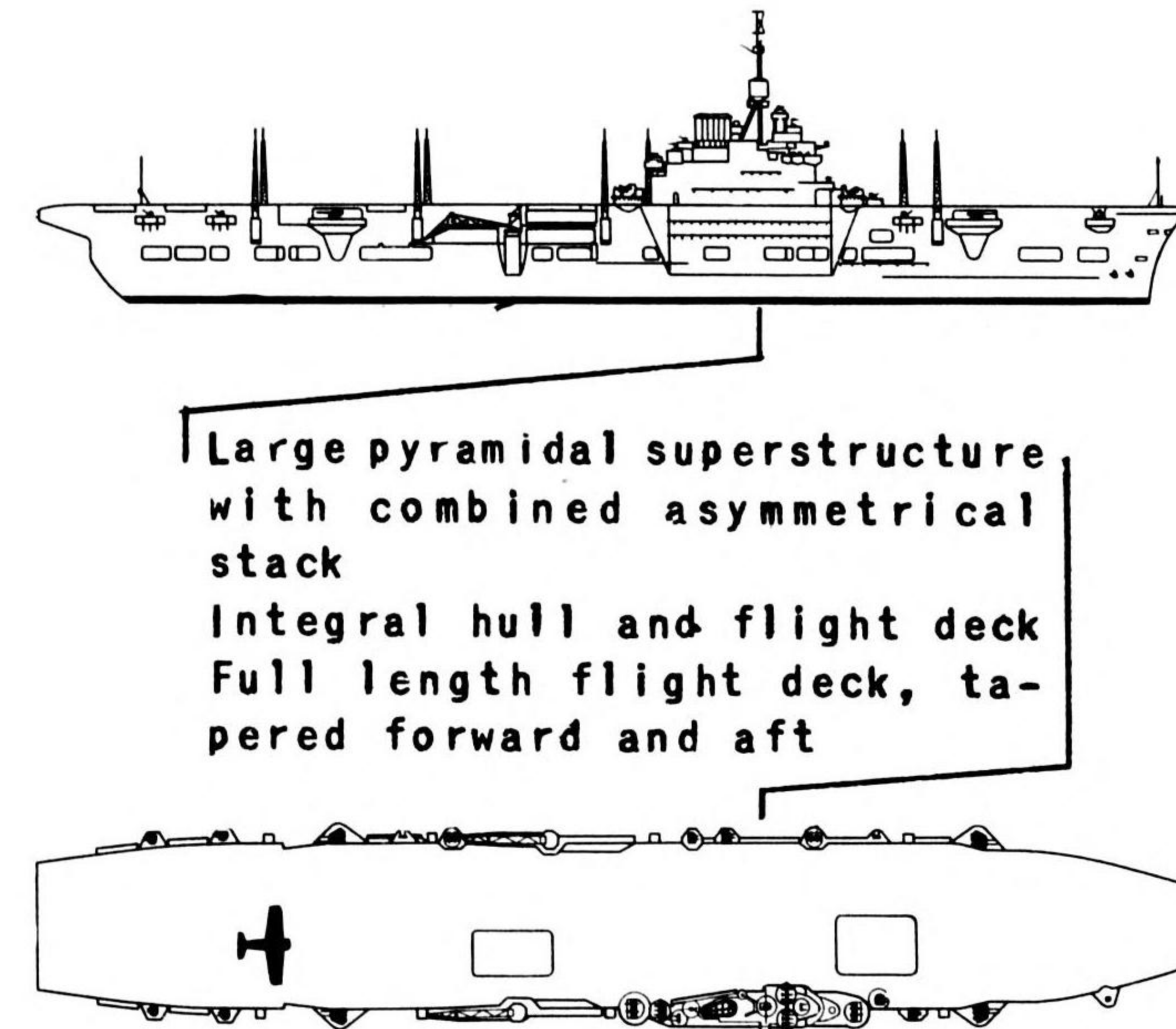
Drawings are of ZUIHO (sunk)
RYUHO may differ in details
and length probably 689' o.a.



No island superstructure
Single stack on starboard side amidships
Flight deck short of bow and tapered forward
Flight deck angular aft

GREAT BRITAIN

UNICORN	640' o.a.
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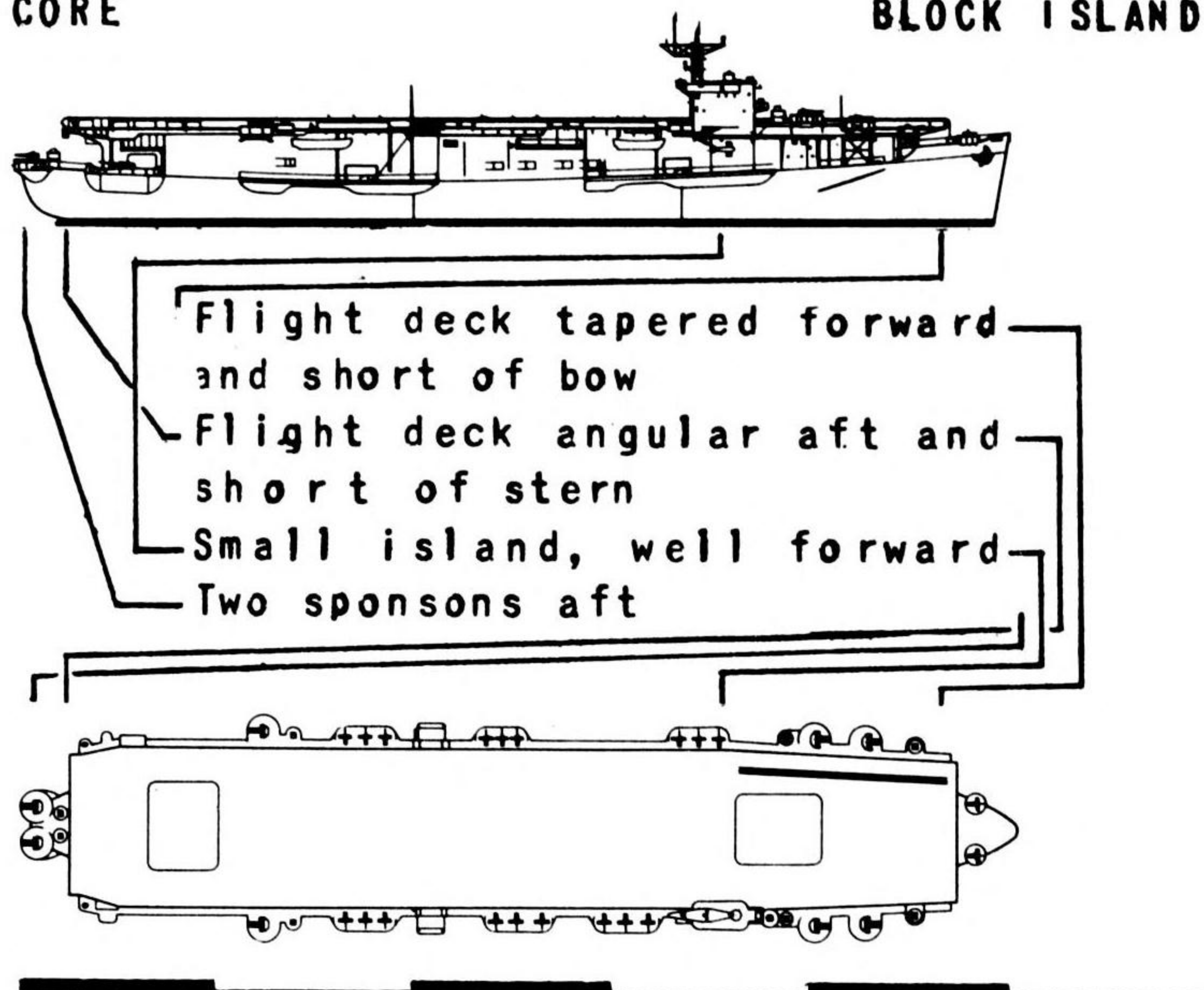


Large pyramidal superstructure with combined asymmetrical stack
Integral hull and flight deck
Full length flight deck, tapered forward and aft

AIRCRAFT CARRIERS ESCORT WITH SUPERSTRUCTURE

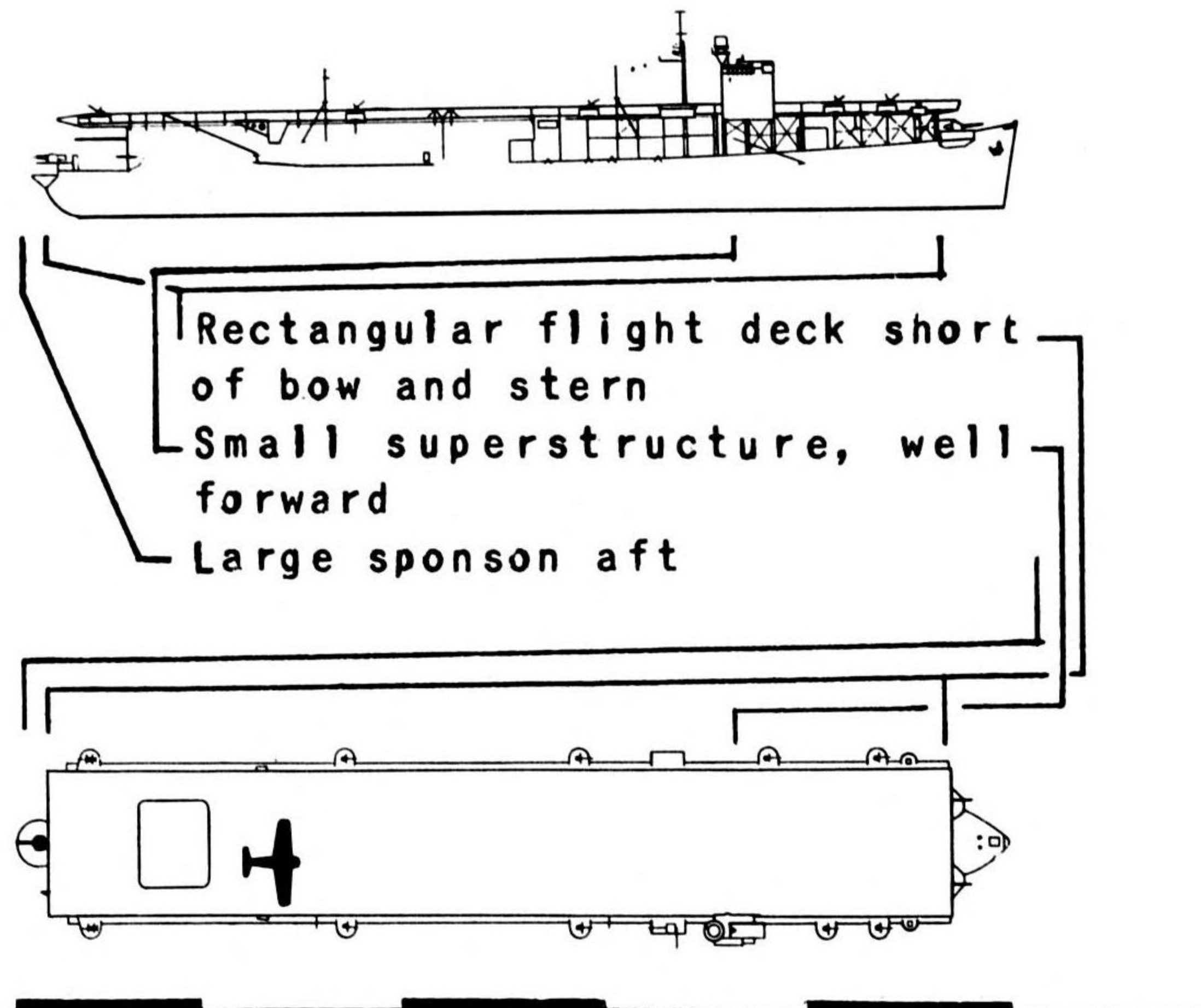
UNITED STATES

BOGUE-PRINCE WILLIAM Class			494' o.a.
BOGUE	BRETON	NASSAU	
CARD	CROATAN	ALTAMAHA	
COPAHEE	PRINCE WILLIAM	BARNES	
CORE		BLOCK ISLAND	



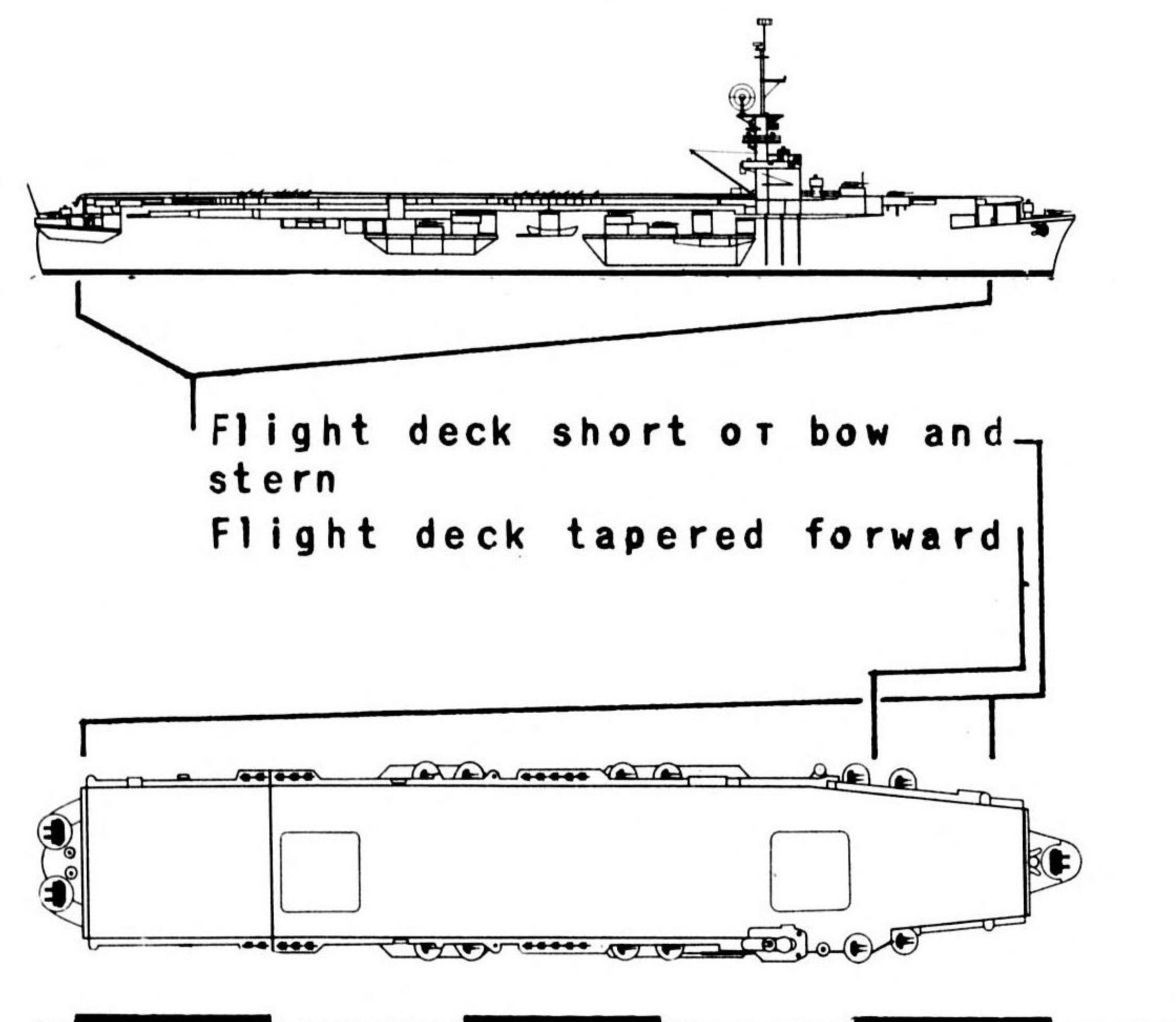
UNITED STATES

CHARGER	492' o.a.
British BITER same as CHARGER	

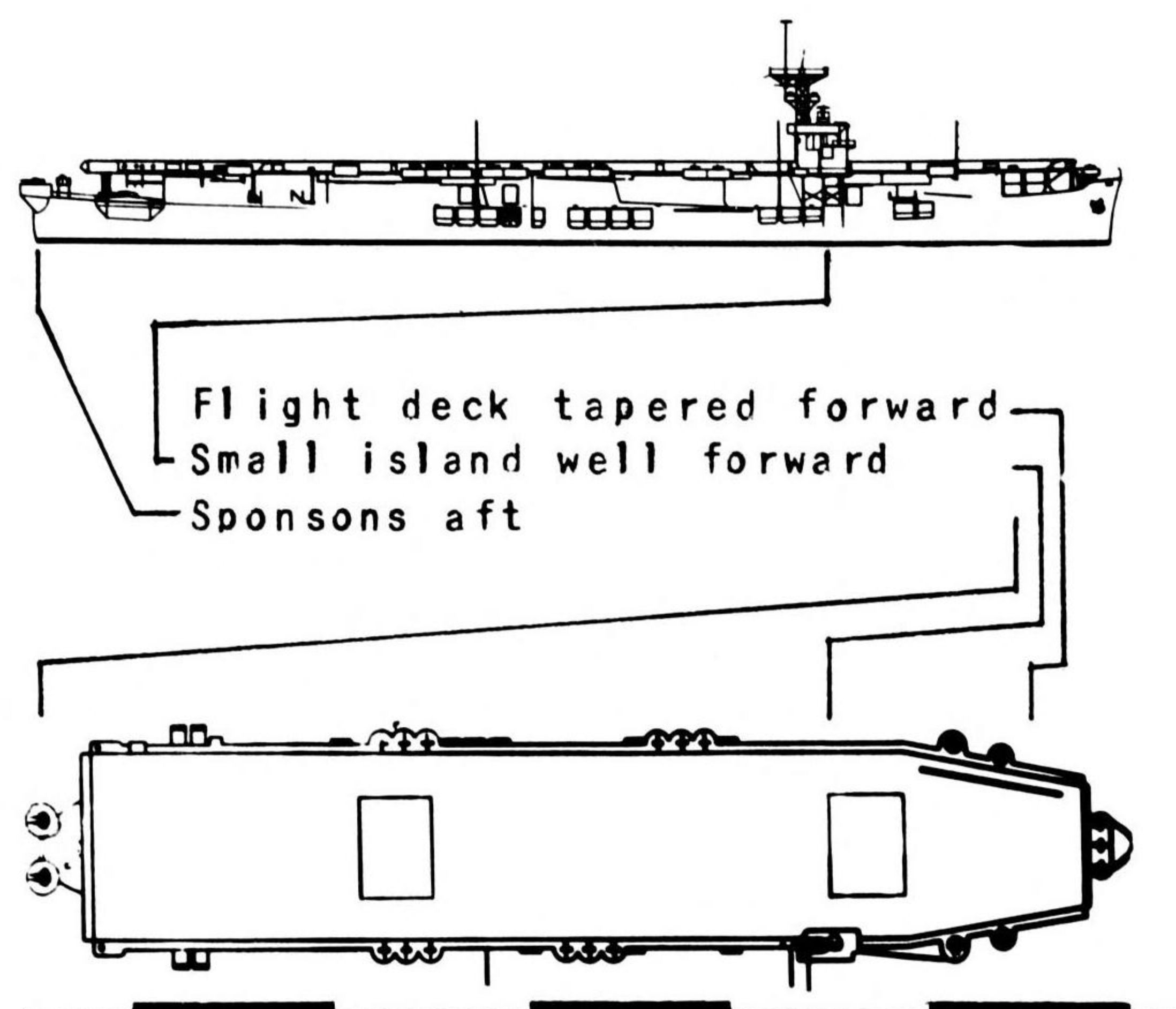


UNITED STATES

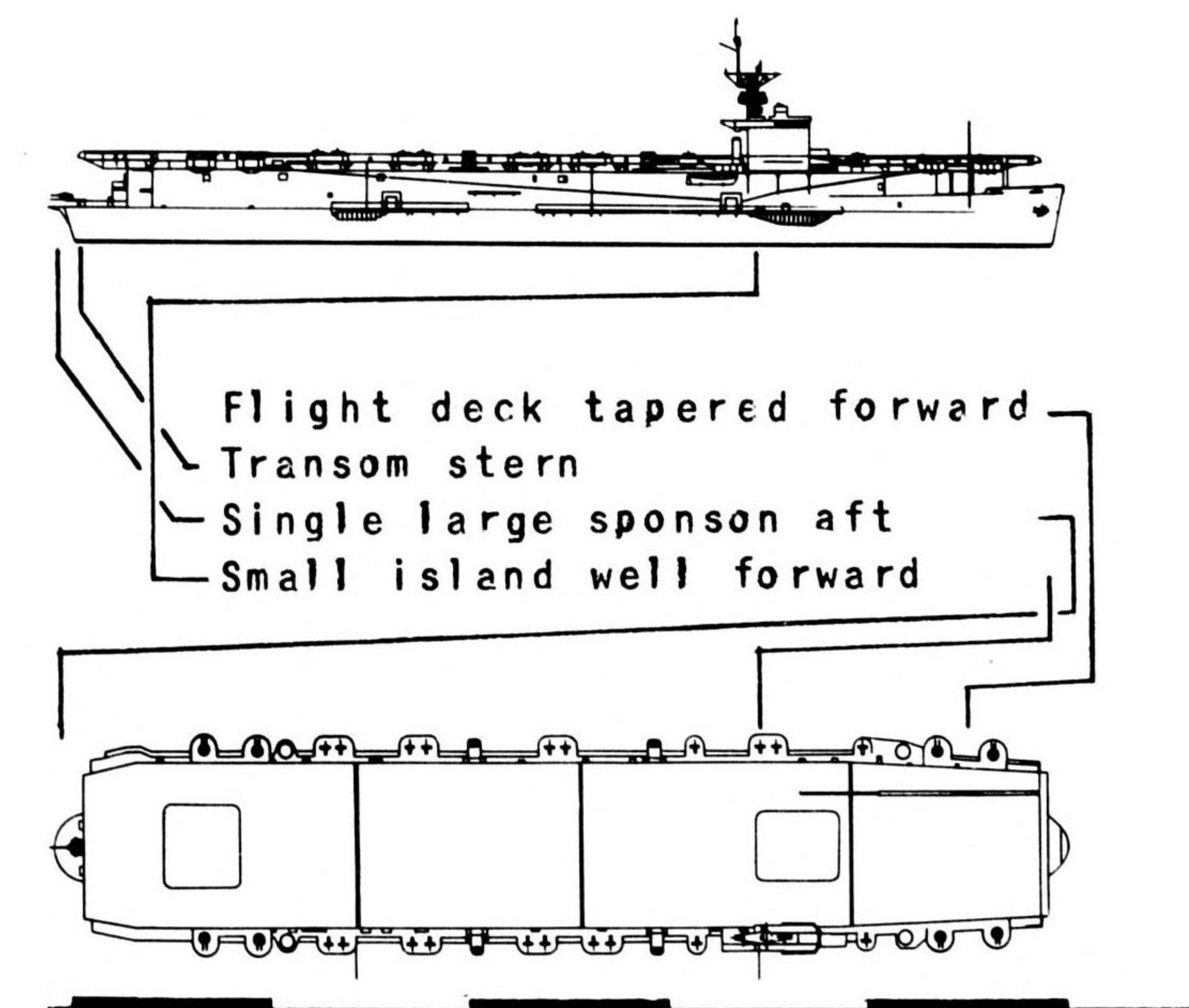
COMMENCEMENT BAY Class	533' o.a.
15 ships	



SANGAMON Class	553' o.a.
SANGAMON	CHENANGO
SUWANEE	SANTEE



CASABLANCA Class	510' o.a.
50 Ships	

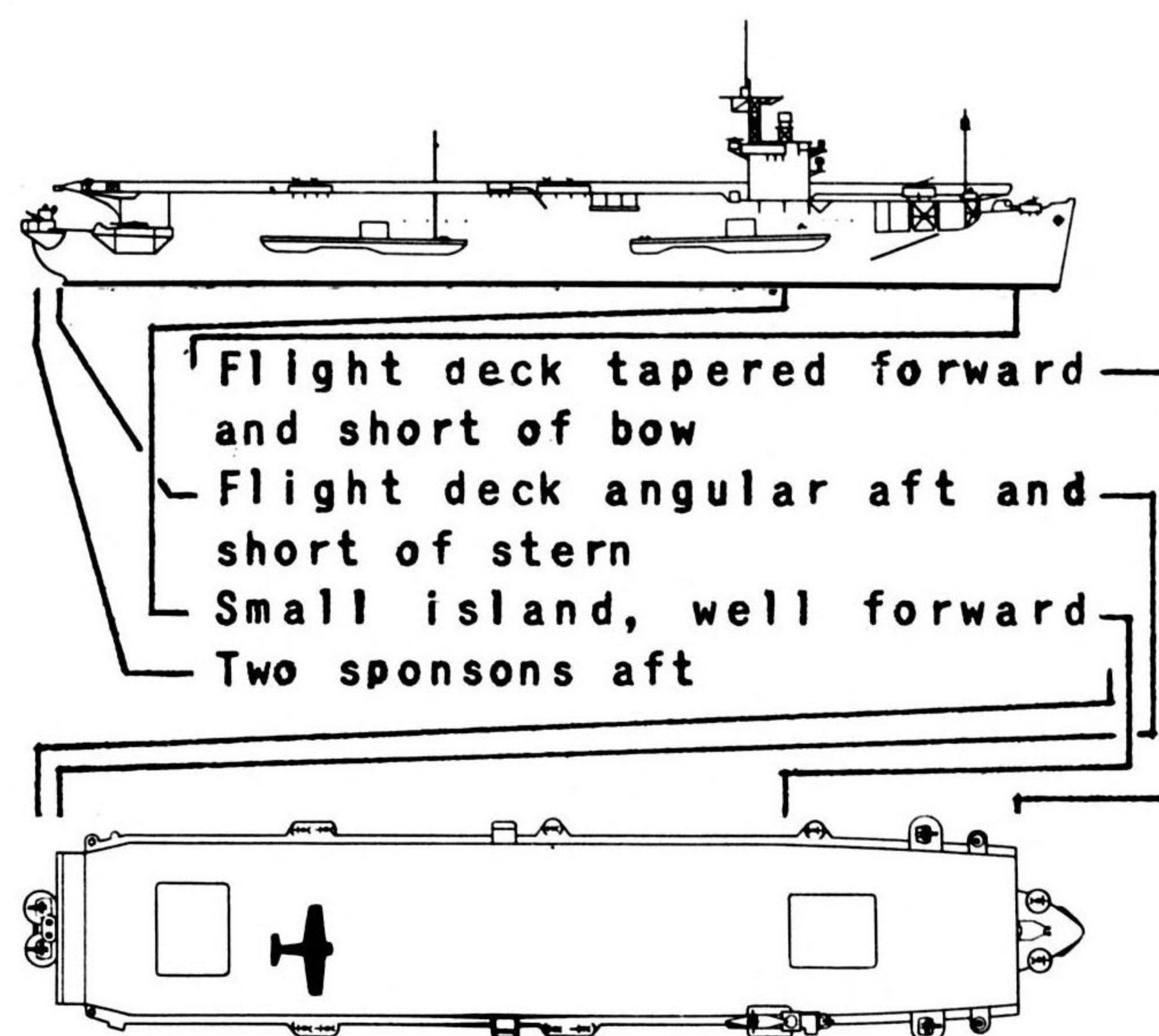


AIRCRAFT CARRIERS ESCORT WITH SUPERSTRUCTURE

GREAT BRITAIN

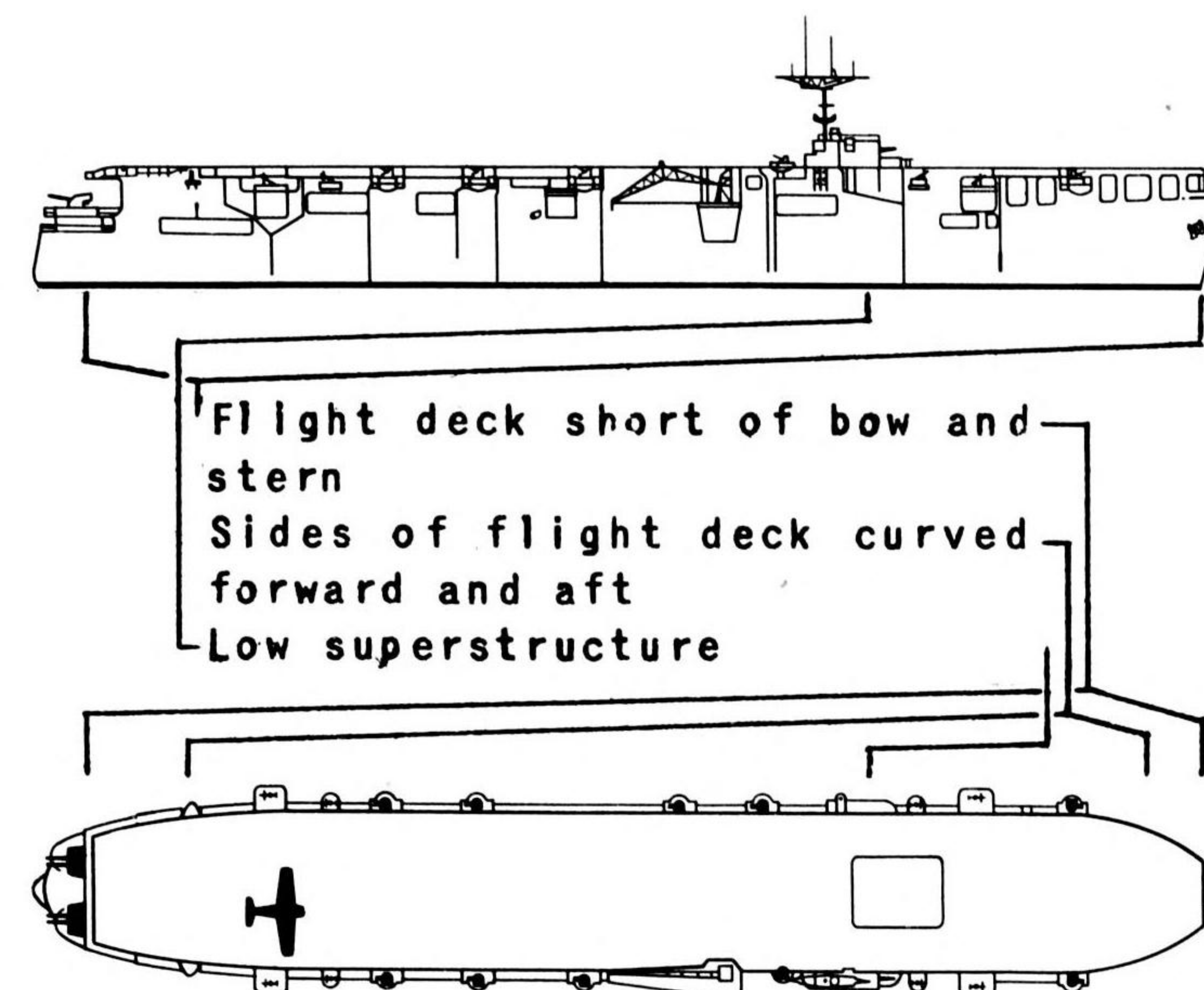
BATTLE-SMITER Classes 492' o.a.

34 Ships



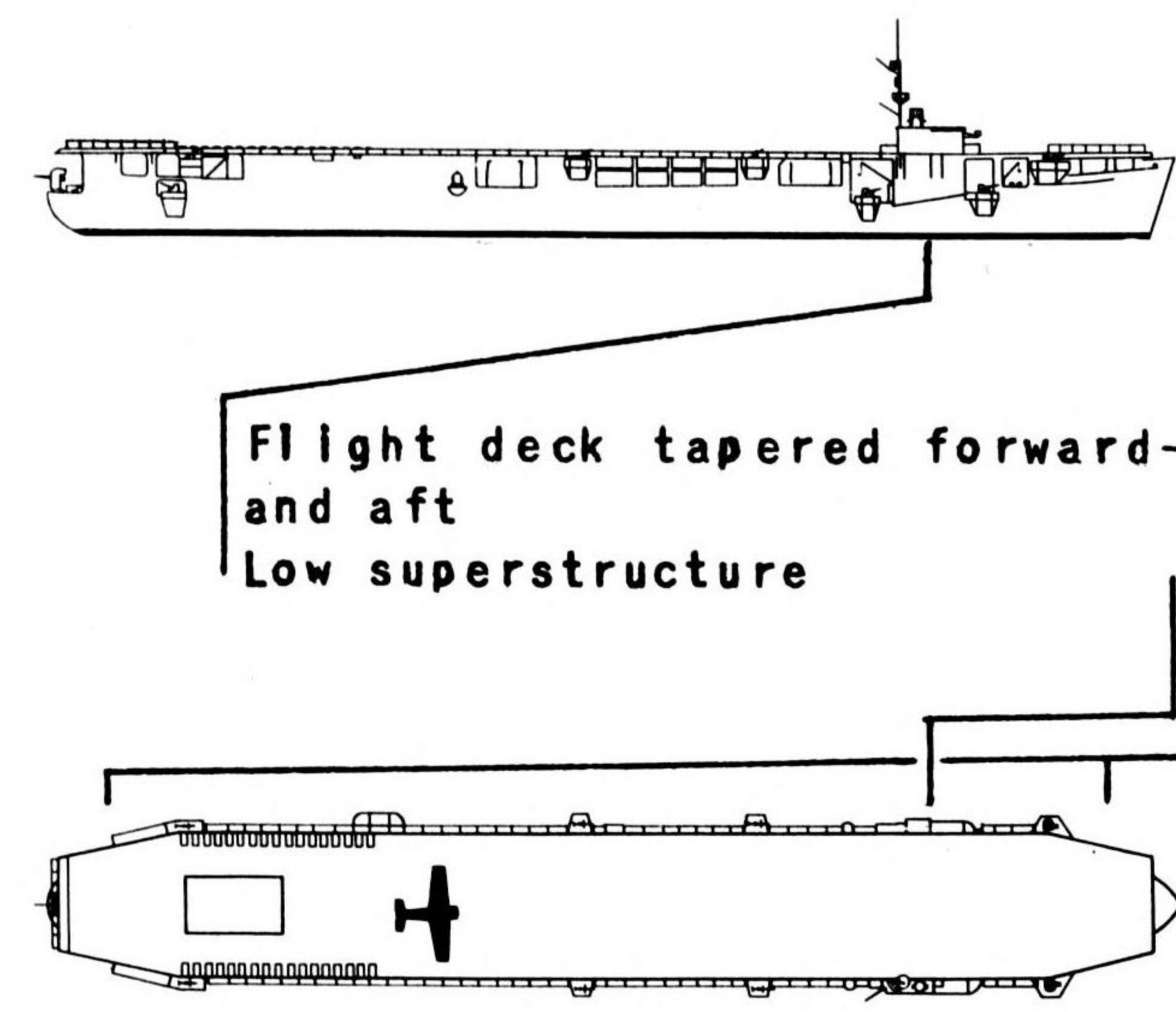
GREAT BRITAIN

PRETORIA CASTLE 592' o.a.



GREAT BRITAIN

ACTIVITY 512' o.a.

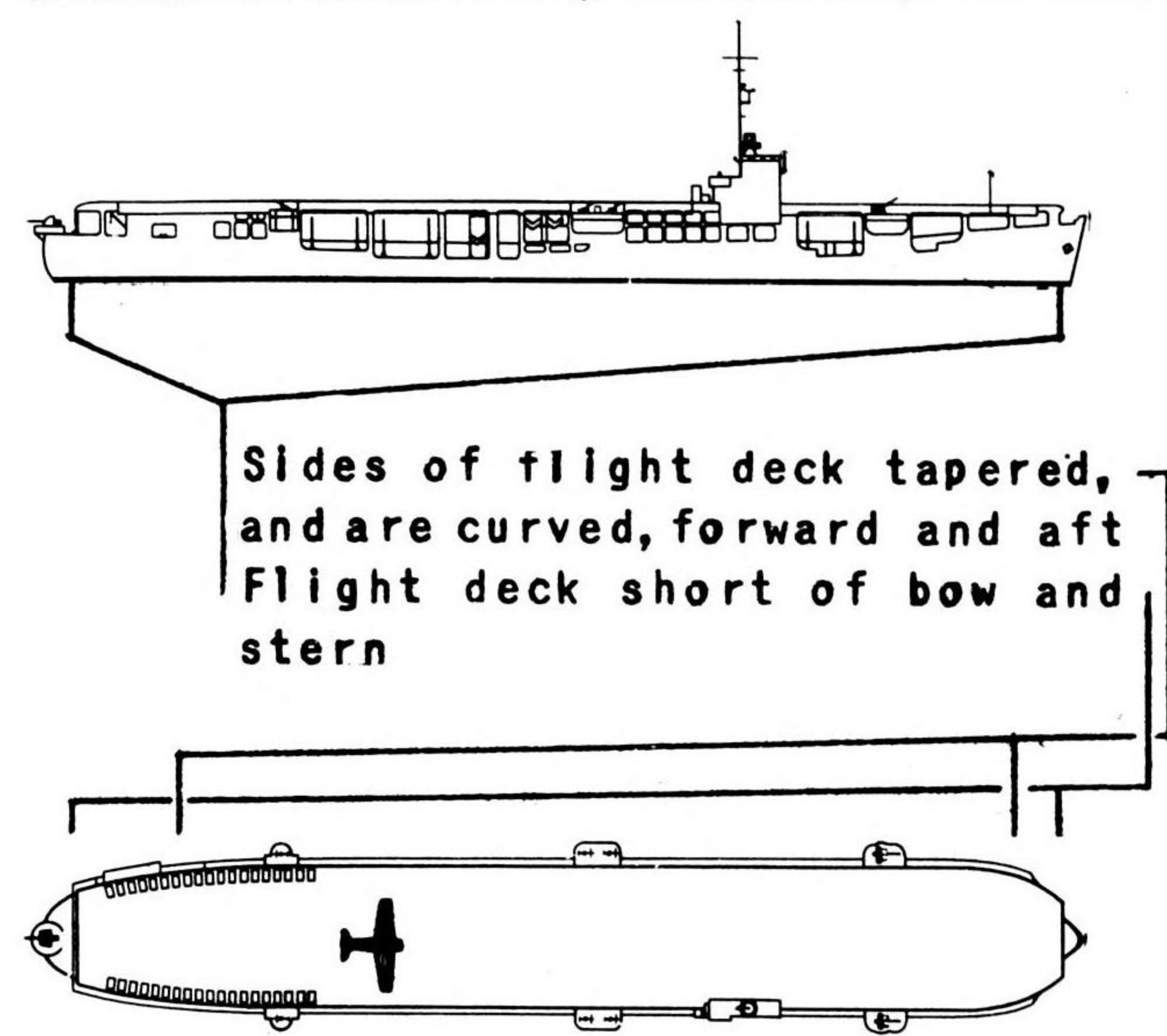


MERCHANT AIRCRAFT CARRIERS

ACAVUS Class 463' - 466' o.a.

EMPIRE MACCABE Class 463' - 466' o.a.

EMPIRE MACALPINE Class 417' - 430' o.a.



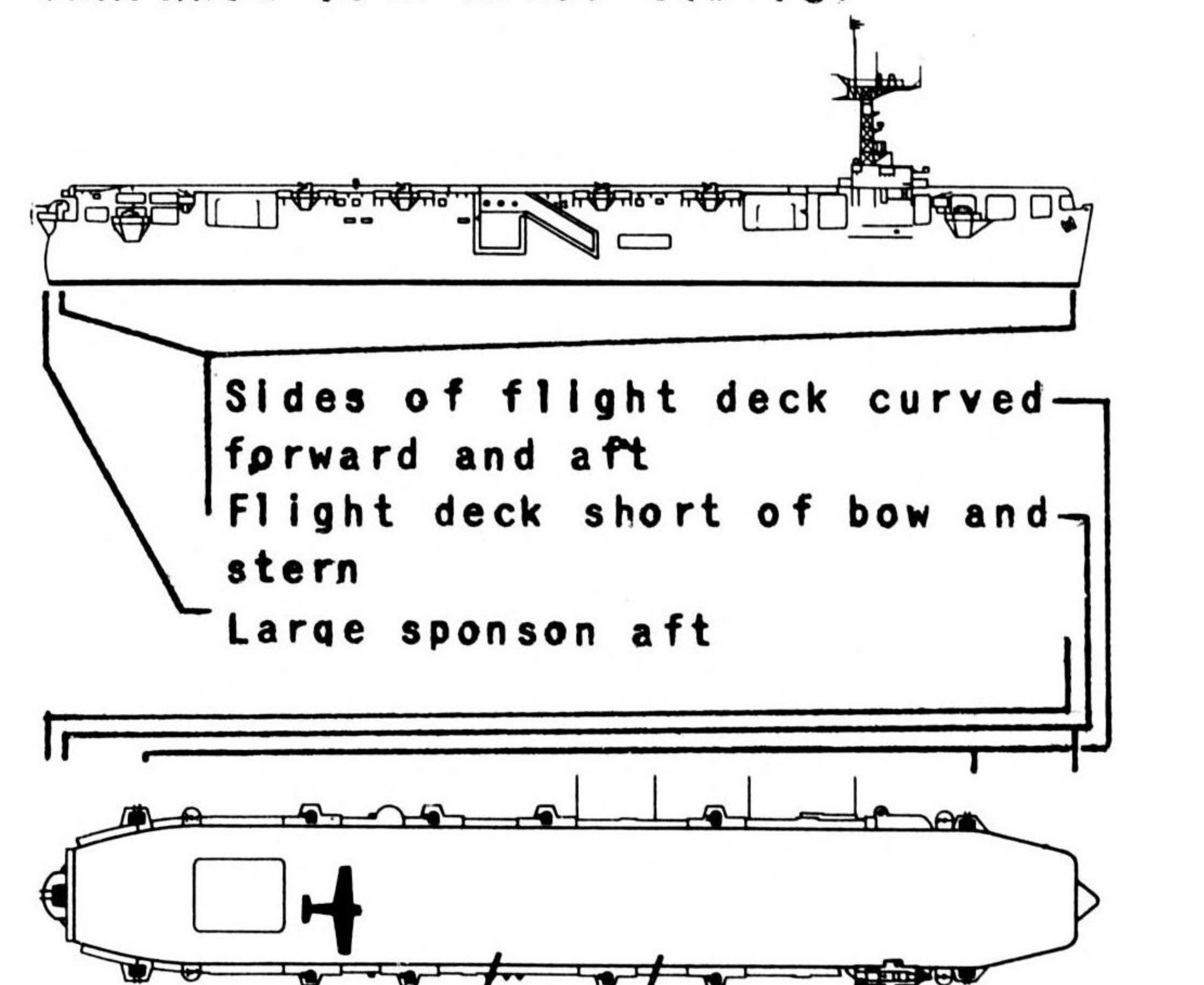
NAIRANA Class

524' o.a.

NAIRANA

VINDEX

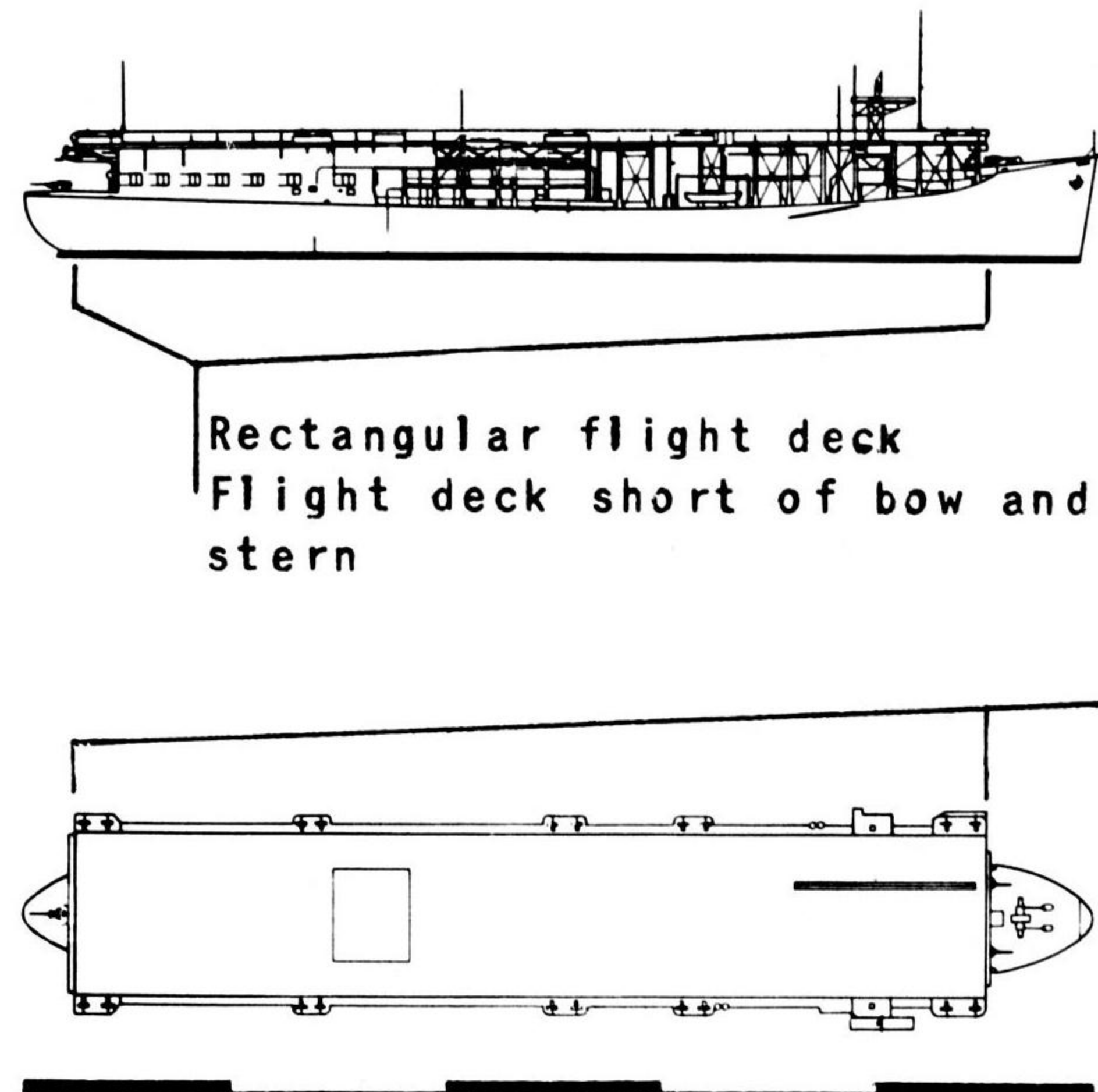
CAMPANIA (540' o.a.) similar



AIRCRAFT CARRIERS ESCORT NO SUPERSTRUCTURE

UNITED STATES

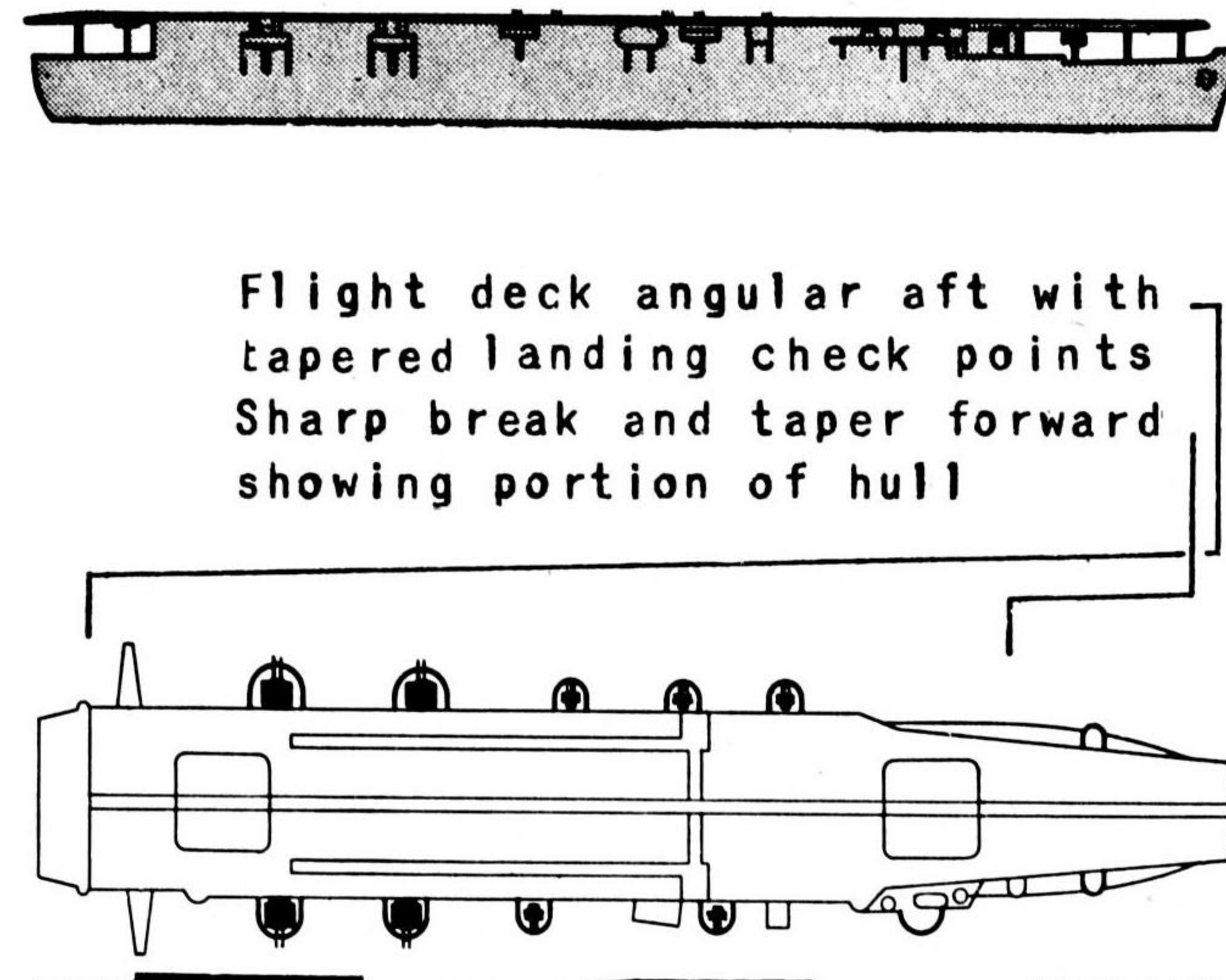
LONG ISLAND 492' o.a.
British ARCHER same as LONG ISLAND



Rectangular flight deck
Flight deck short of bow and stern

JAPAN

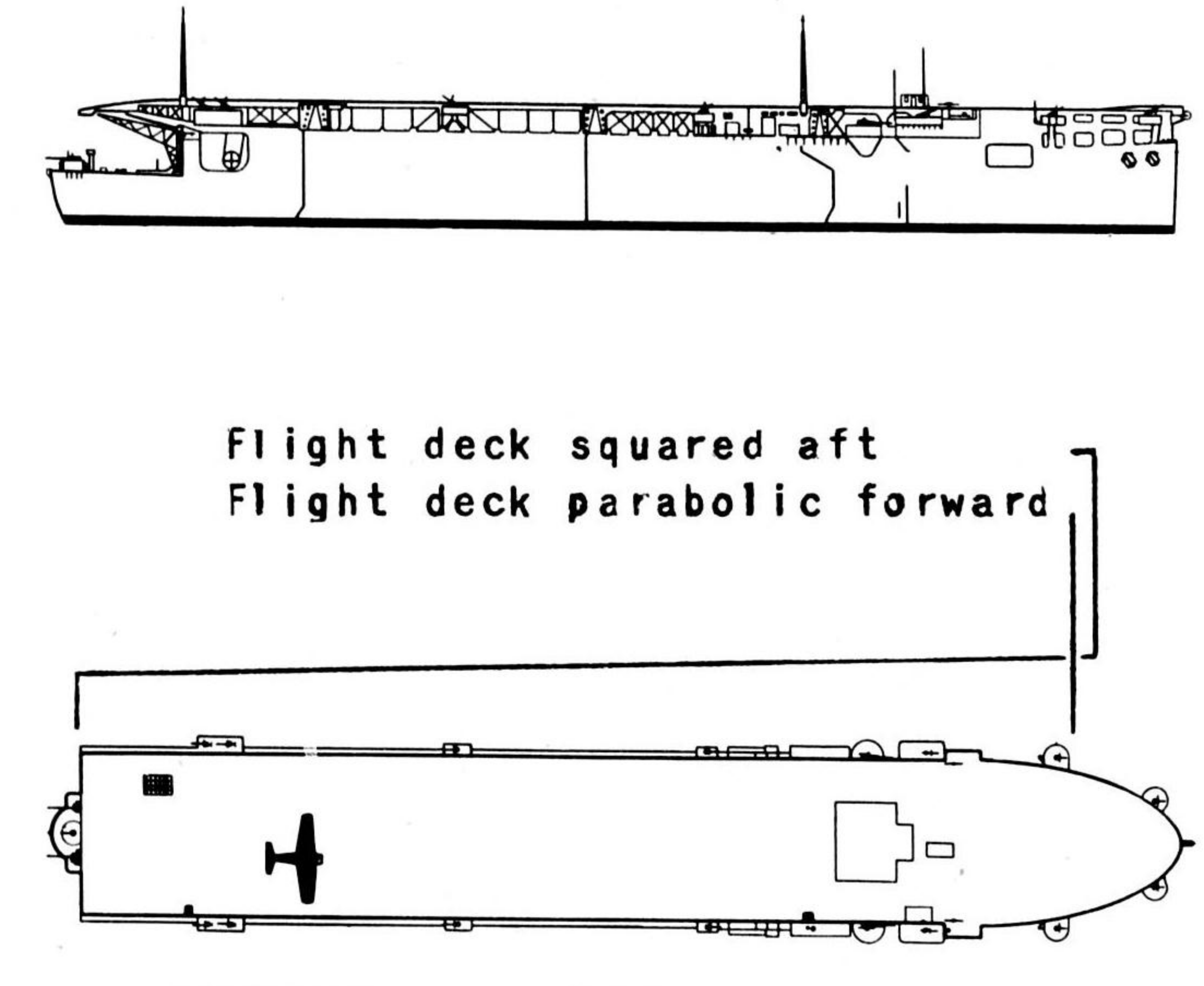
KAIYO 548' o.a.



Flight deck angular aft with tapered landing check points
Sharp break and taper forward showing portion of hull

GREAT BRITAIN

ARGUS 567' o.a.



Flight deck squared aft
Flight deck parabolic forward

The CVE KAIYO, converted from the passenger liner ARGENTINA MARU, follows the general pattern of Japanese CVL's and CVE's, i.e., she has no island superstructure. She also has the landing check points aft and a tapered flight deck forward which exposes a portion of the hull.

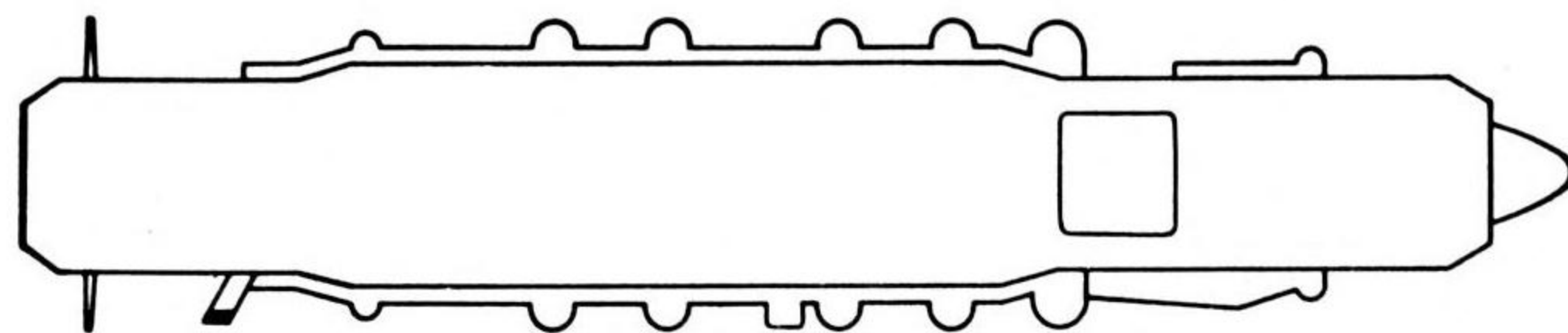
The Allied CVE's having no island superstructure show marked differences in the shapes of their flight decks. Note the rectangular deck on the LONG ISLAND and the parabolic shape forward on the ARGUS. Neither of these Allied types have the landing check points which have been so prominent on Japanese CVE's.

AIRCRAFT CARRIERS ESCORT

NEW CONSTRUCTION

Japan's need for aircraft protection for her rapidly diminishing merchant fleet has led to an increased carrier construction program with particular emphasis on escort carriers. Photographic coverage of Yokohama and Kobe have shown that two new types are under construction.

KOBE TYPE CVE



At the Kawasaki Shipyard, Kobe, three of these ships and two probably of this type have been observed. One of these CVE's is known to have been completed and one other is probably operational. A third unit is fitting out and the two probables are on the ways in early stages of construction.

These CVE's have the following characteristics:

o.a. length: 535'

Width of flight deck: 75'

Elevators: one forward

Stack: single stack well aft on starboard side,
below the level of the flight deck

Sponsons: seven sponsons, port and starboard

Note shape of flight deck

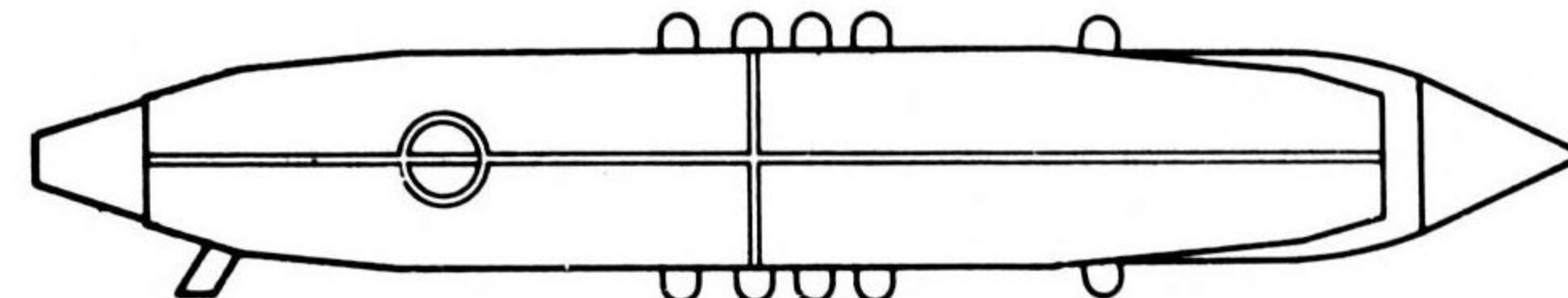
Landing check points aft

No island structure observed

The stack position together with the appearance of the hulls not yet having flight decks, indicates that these CVE's are being built on tanker or stack-aft freighter hulls. The length and hull shape is not that of any of the known standard types, however.

The shape of the flight deck will differentiate this type from both the KAIYO and the allied CVE's without island superstructures.

YOKOHAMA Type "MAC" Ships



Patterned after the British "Merchant Aircraft Carriers", this small carrier is more appropriately designated "MAC" rather than CVE. Three of this type have been observed fitting out and at least two more are believed to be under construction.

These MAC's have the following characteristics:

o.a. length: 520'

Length of flight deck: 410'

Stack: single stack well aft on starboard side
below the level of the flight deck

Sponsons: five sponsons, port and starboard

Flight deck stops short of bow and stern and does not overhang hull

No elevators observed

No island structure observed

These "MAC" ships are built on standard modified hulls (Type TL, Modified) and will be capable of carrying a cargo of bulk oil as well as a complement of aircraft.

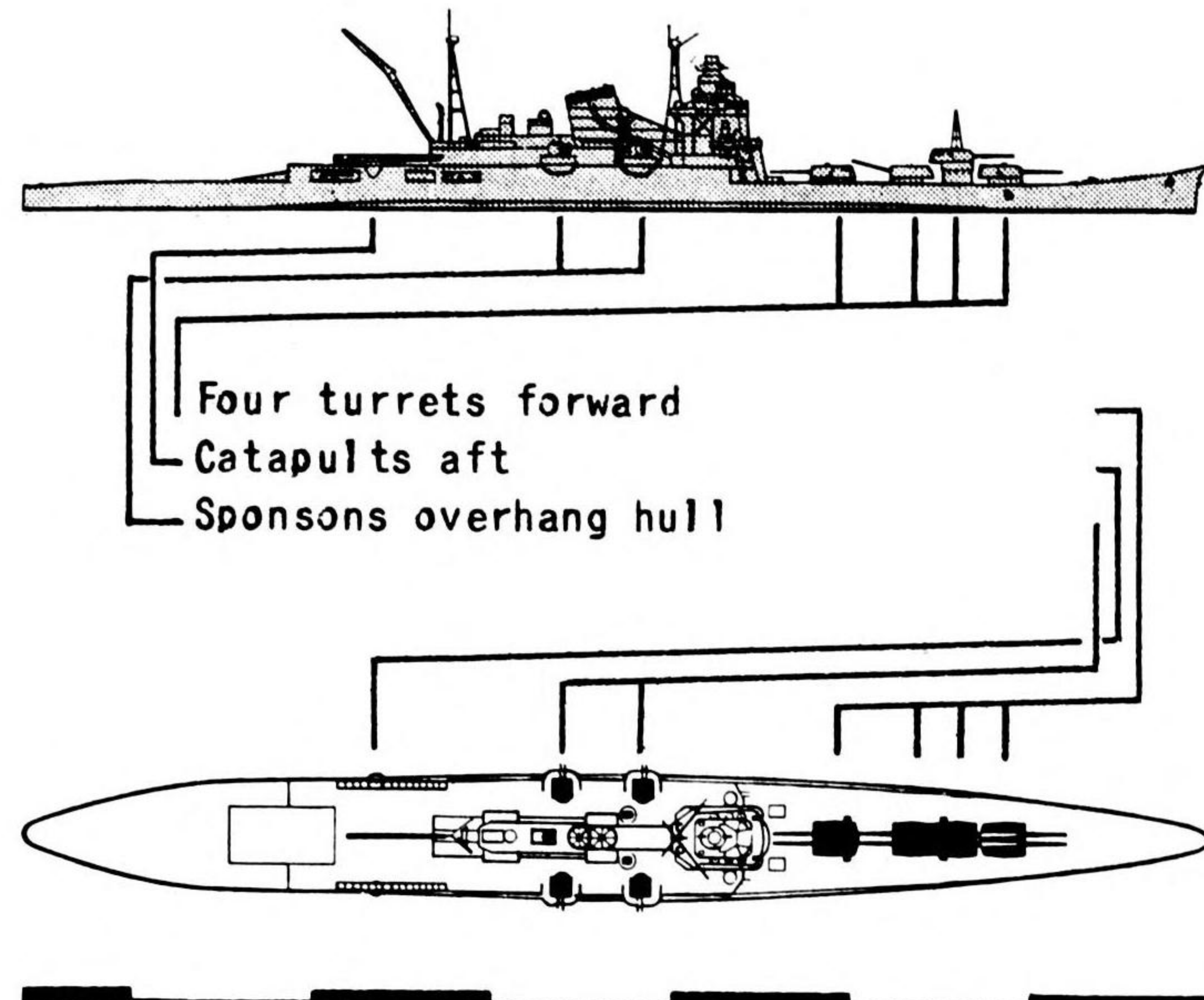
The shape of the hull and flight deck and the lack of an island structure will readily segregate these ships from the British "MAC" ships and from other allied and Japanese escort carriers.

HEAVY CRUISERS

4-3 TURRETS FORWARD

JAPAN

TONE 658' o. a.



All Japanese heavy cruisers except the AOBA carry three or four main battery turrets forward. The only Allied cruisers having similar arrangements are several United States light cruisers with three turrets forward, but they may be identified quite readily by their transom sterns, catapults and cranes on the fantail and the lack of the heavy, trunked forestack characteristic of Japanese heavy cruisers.

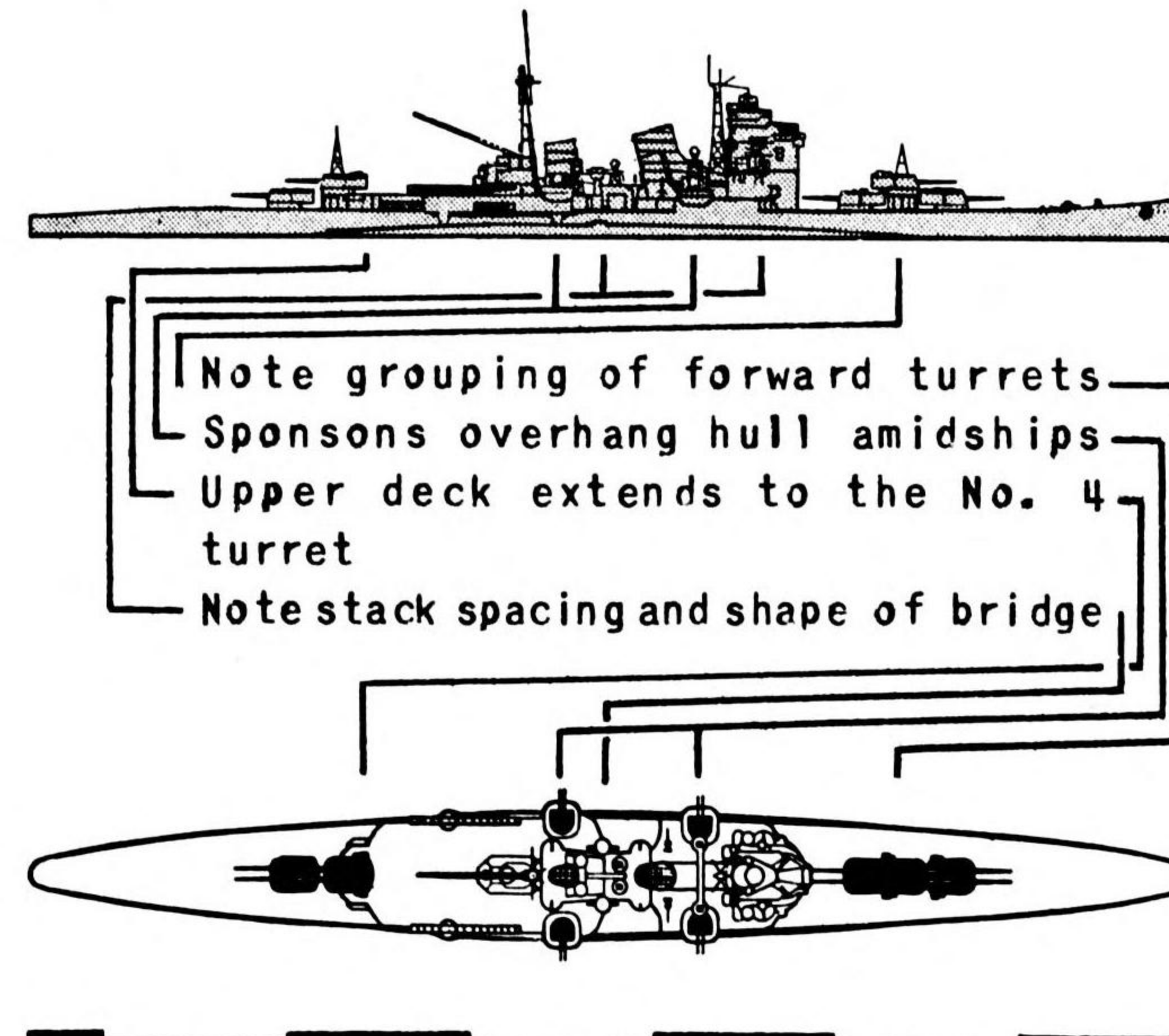
The forward turret arrangement of the TONE will suffice for identification of this ship. In the NACHI and ATAGO Classes the presence or absence of overhanging sponsons amidships is the best feature to use in vertical photos, since any irregularities in the hull outline stand out clearly. Care must be exercised by the interpreter in using this feature, however, as an ATAGO was photographed on one occasion with the amidship's torpedo tubes turned outward, giving the appearance of the sponsons of the NACHI Class; only close study showed them to be angular rather than rounded and not in the right positions for the NACHI sponsons.

~~CONFIDENTIAL~~

JAPAN

NACHI Class 656' o. a.

HAGURO
MYOKO
ASHIGARA

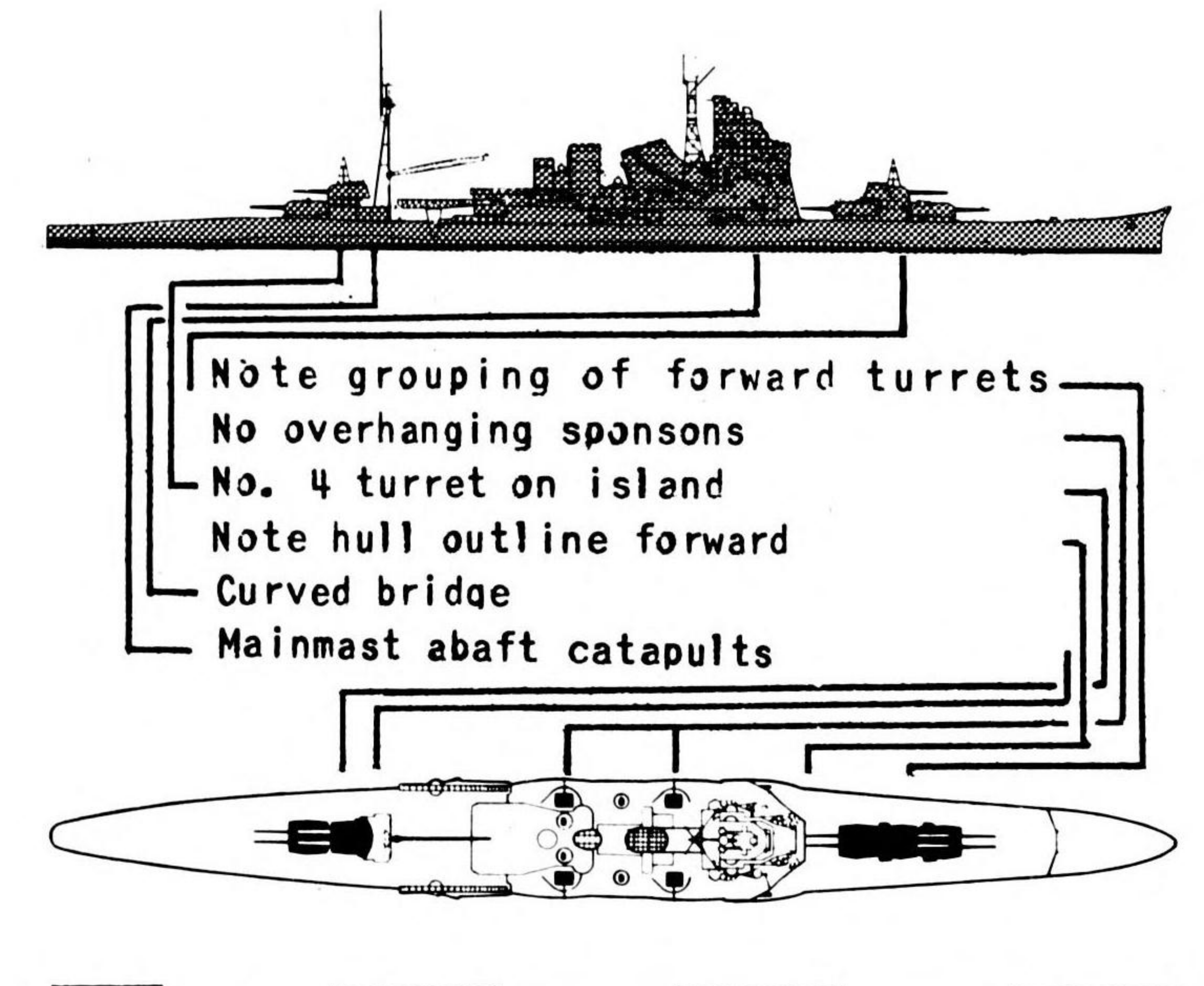


Other features may be used for determining these two classes. In the ATAGO Class, the No. 4 turret is on a separate island, while in the NACHI Class, the upper deck continues aft to the No. 4 turret. The unusual hull shape forward on the ship of the ATAGO Class is another good feature for identification, but here again care must be exercised because slightly oblique or distorted photos of the NACHI Class may give a similar effect.

JAPAN

ATAGO Class 657' o. a.

TAKAO

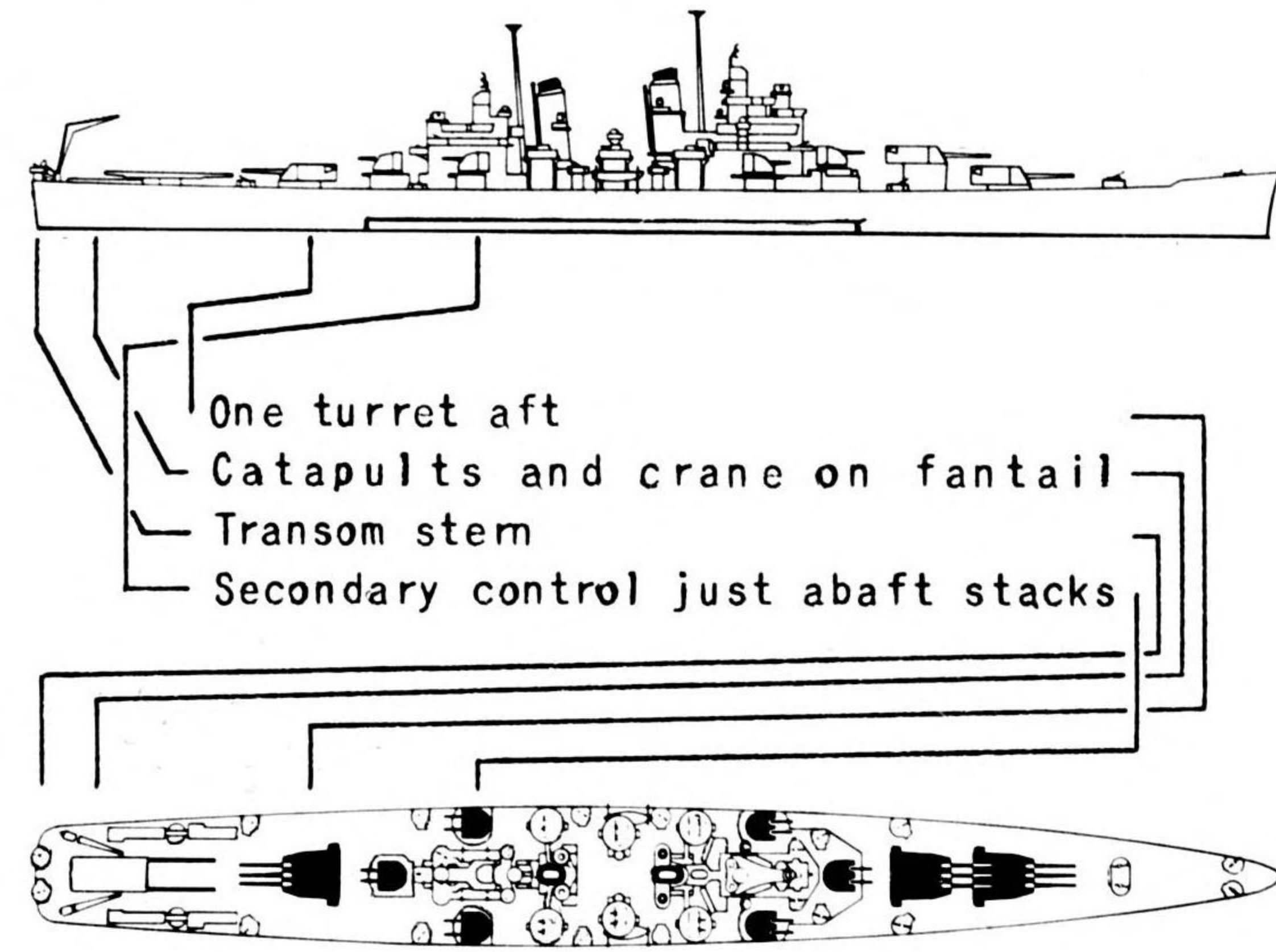


HEAVY CRUISERS

2 TURRETS FORWARD

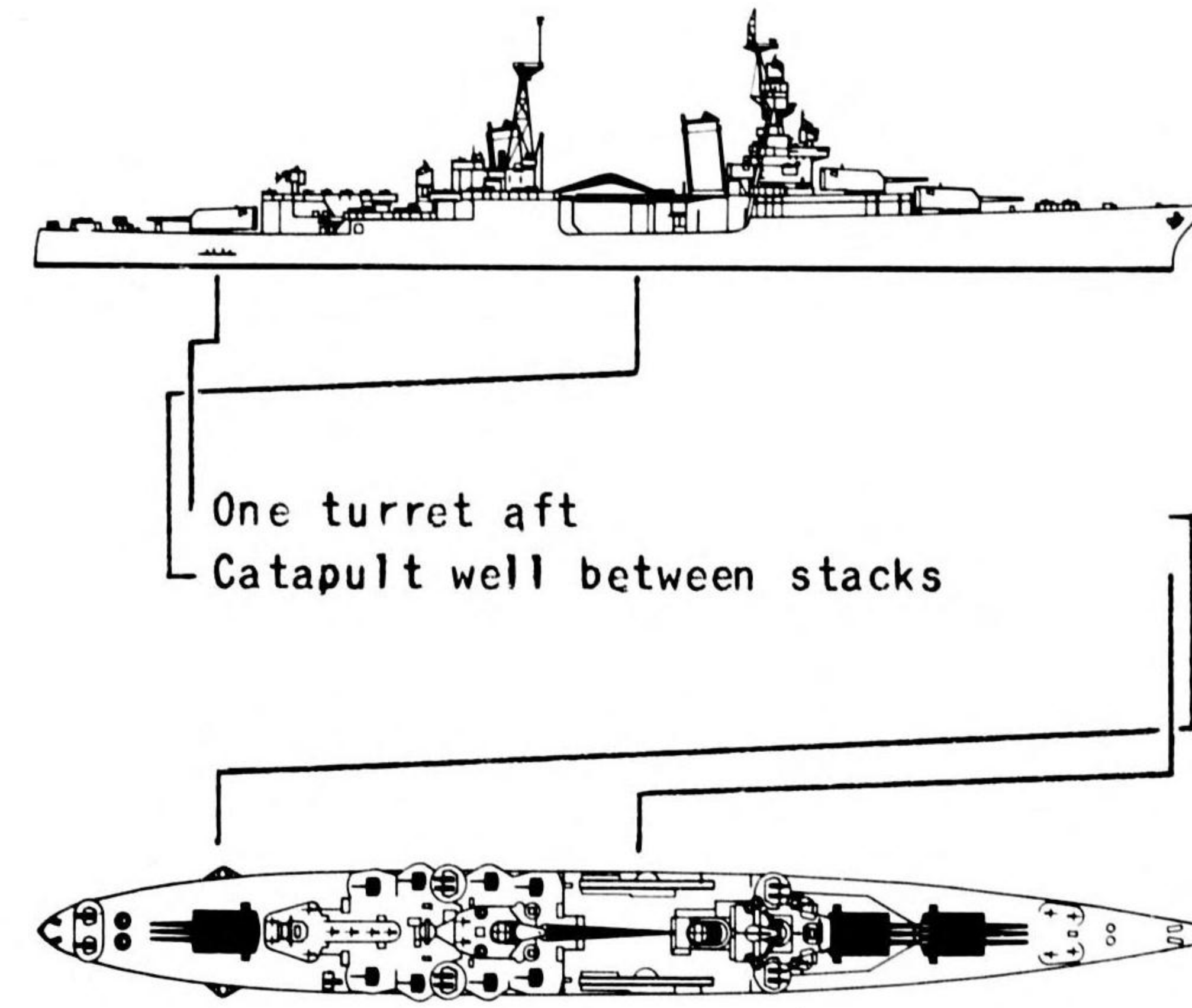
UNITED STATES

BALTIMORE Class 673' o.a.	
BALTIMORE	PITTSBURGH
BOSTON	ST. PAUL
CANBERRA	QUINCY



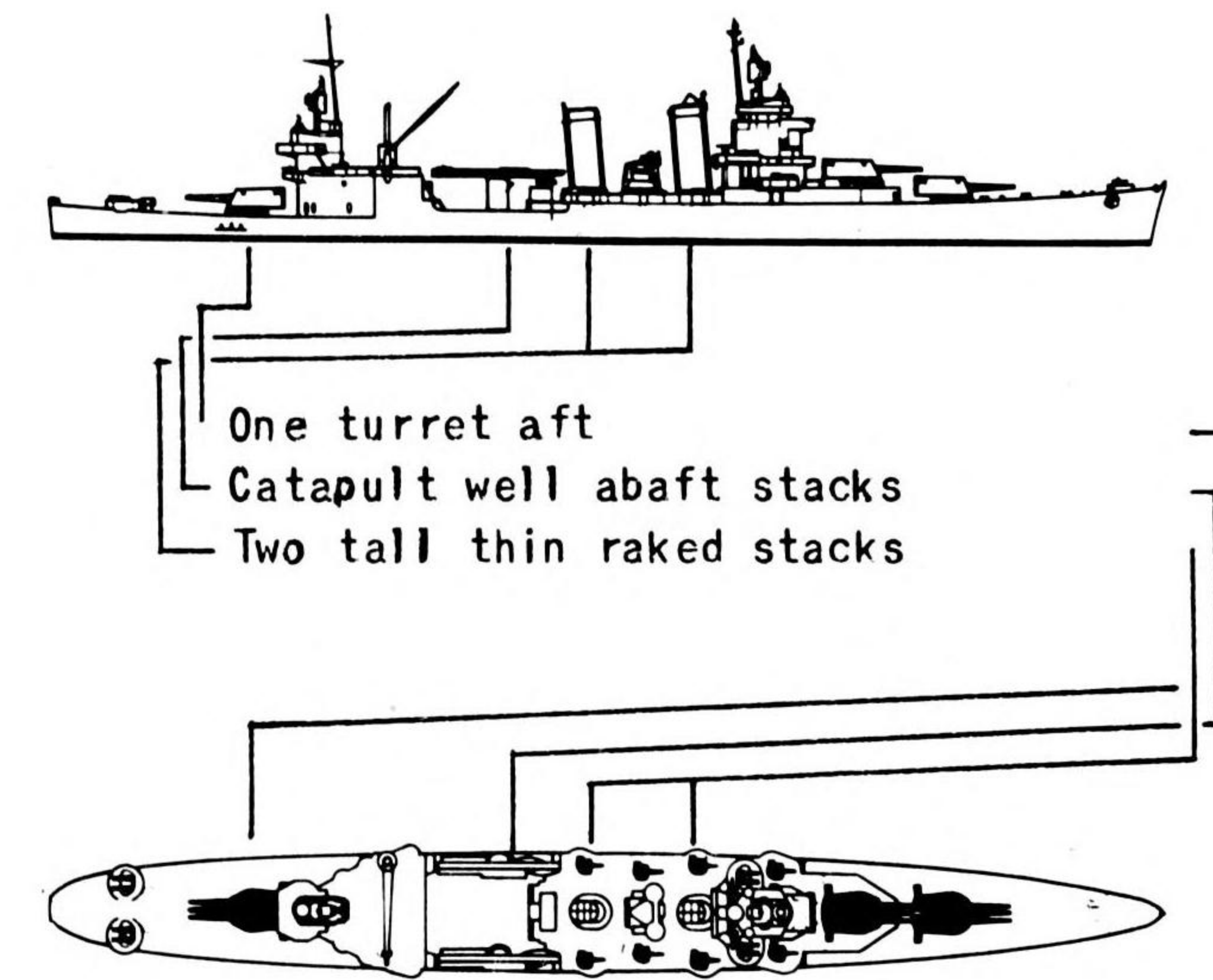
UNITED STATES

PORTLAND Class 610' o.a.	
PORTLAND	
INDIANAPOLIS	

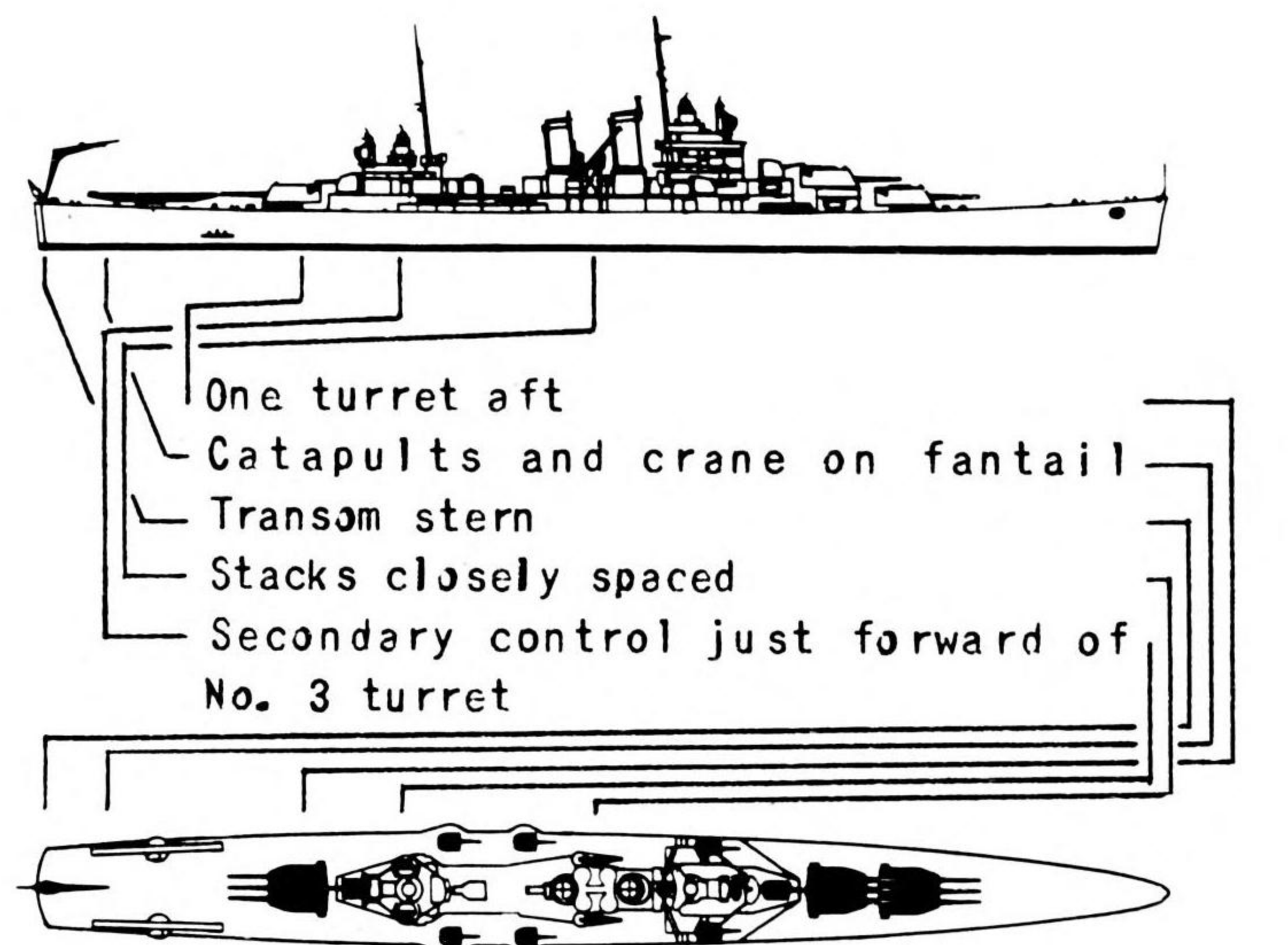


UNITED STATES

NEW ORLEANS Class 580' o.a.	
NEW ORLEANS	TUSCALOOSA
MINNEAPOLIS	SAN FRANCISCO

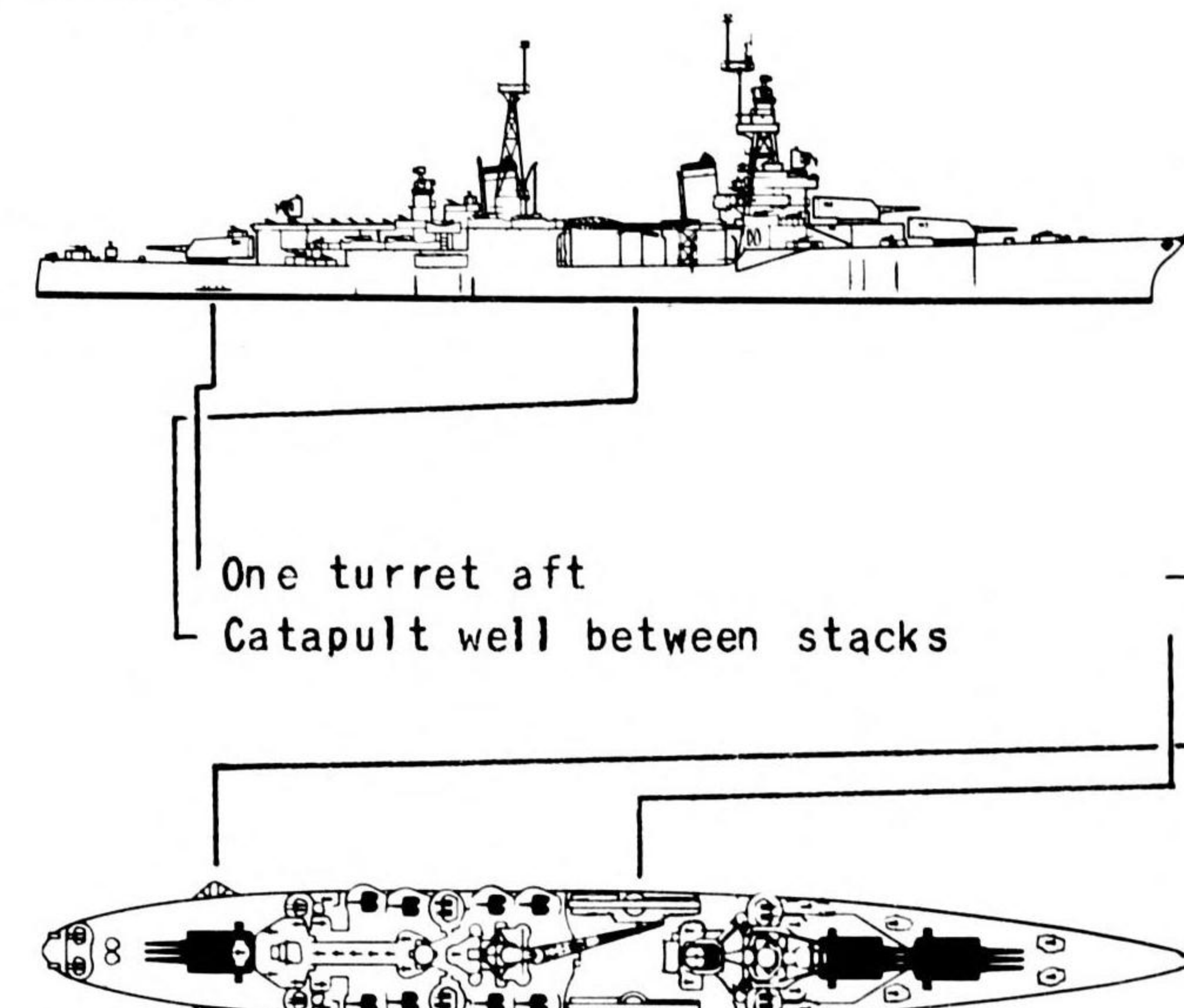


WICHITA	608' o.a.
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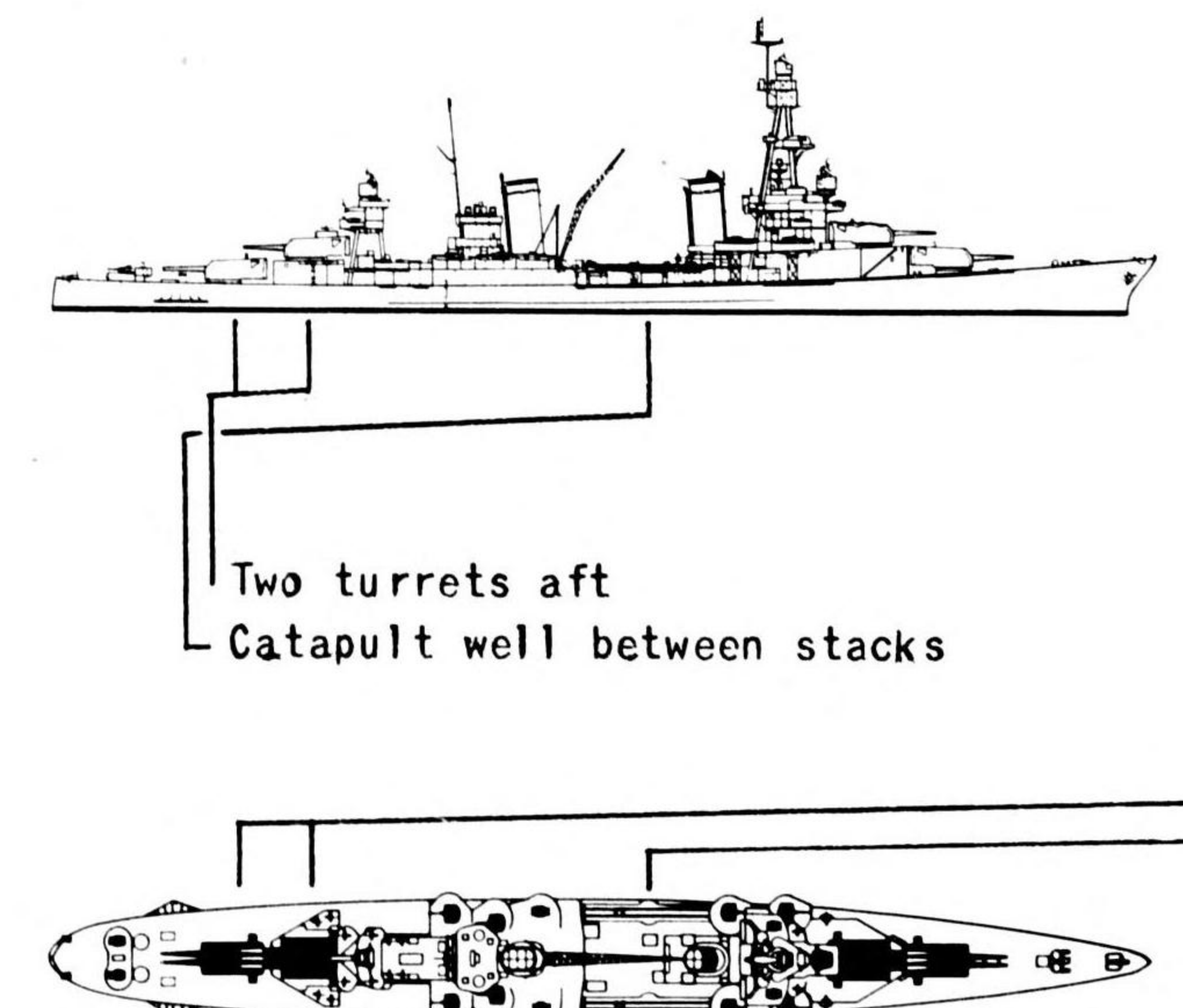
NORTHAMPTON Class 603' o.a.	
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CHESTER
 LOUISVILLE
 AUGUSTA



PENSACOLA Class 585' o.a.	
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PENSACOLA
 SALT LAKE CITY

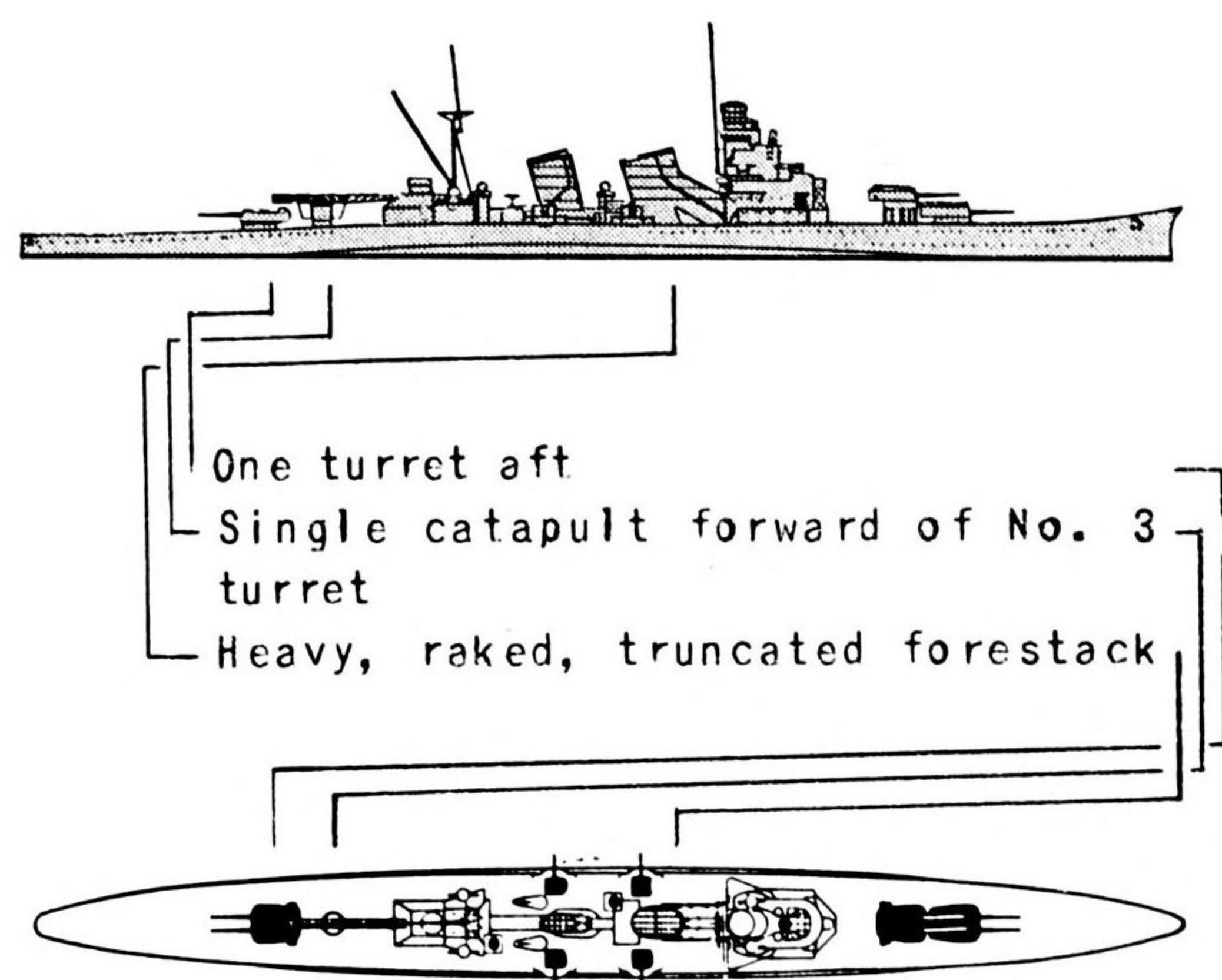


HEAVY CRUISERS

2 TURRETS FORWARD

JAPAN

AOBA	598' o. a.
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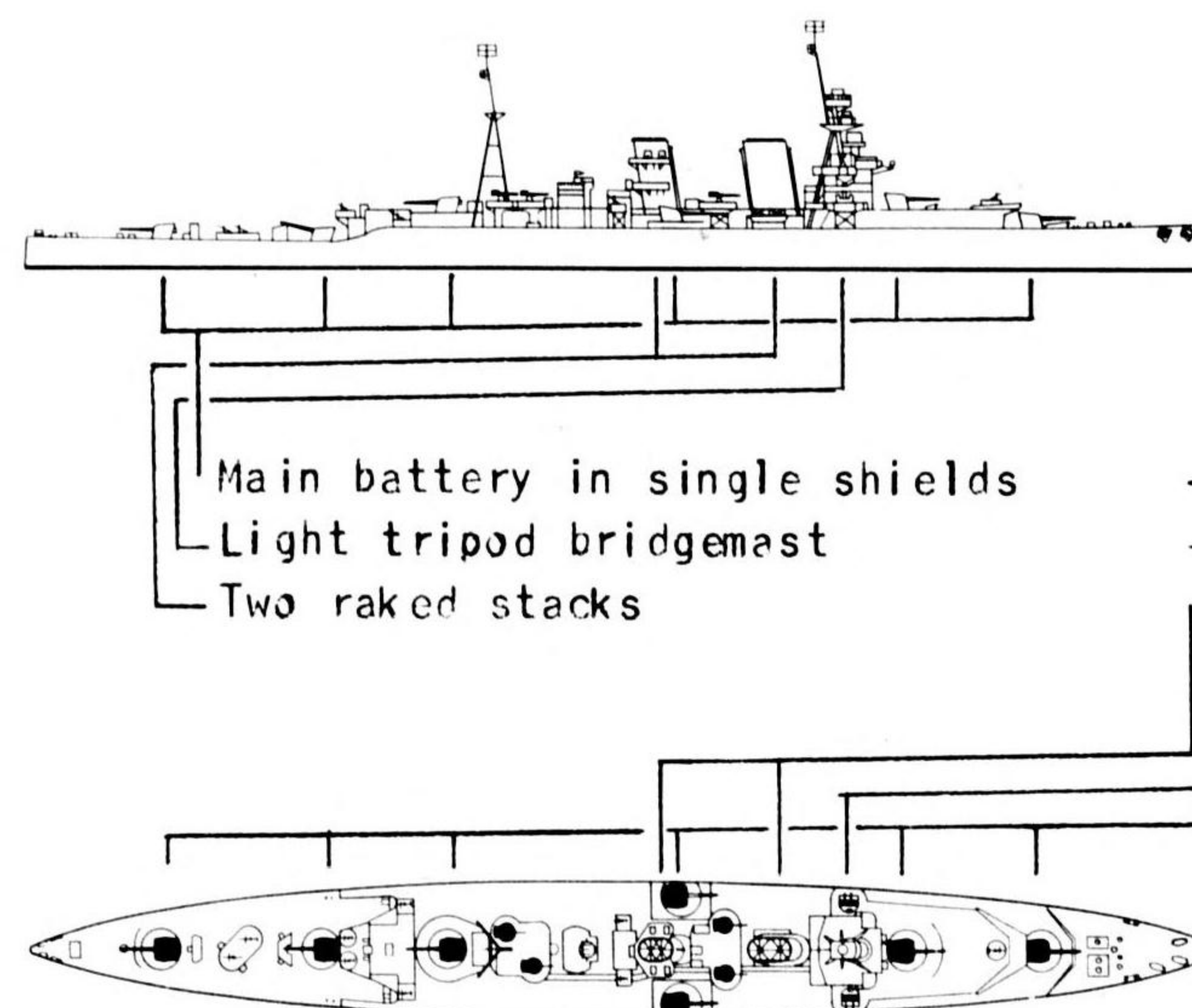
- One turret aft
- Single catapult forward of No. 3 turret
- Heavy, raked, truncated forestack

The AOBA, oldest of the Japanese heavy cruisers, can be readily distinguished from the ships of the British and United States Navies by several features. As do the other Jap heavies, the AOBA carries the heavy, raked, truncated forestack found in no other fleet. Secondly, the AOBA carries a single catapult just forward of the No. 3 turret. In addition, the AOBA may be segregated easily from the R.N. cruisers shown in this group, as the latter all carry two turrets aft or have single shield mounts. Note that all United States heavy cruisers have two slightly raked stacks.

GREAT BRITAIN

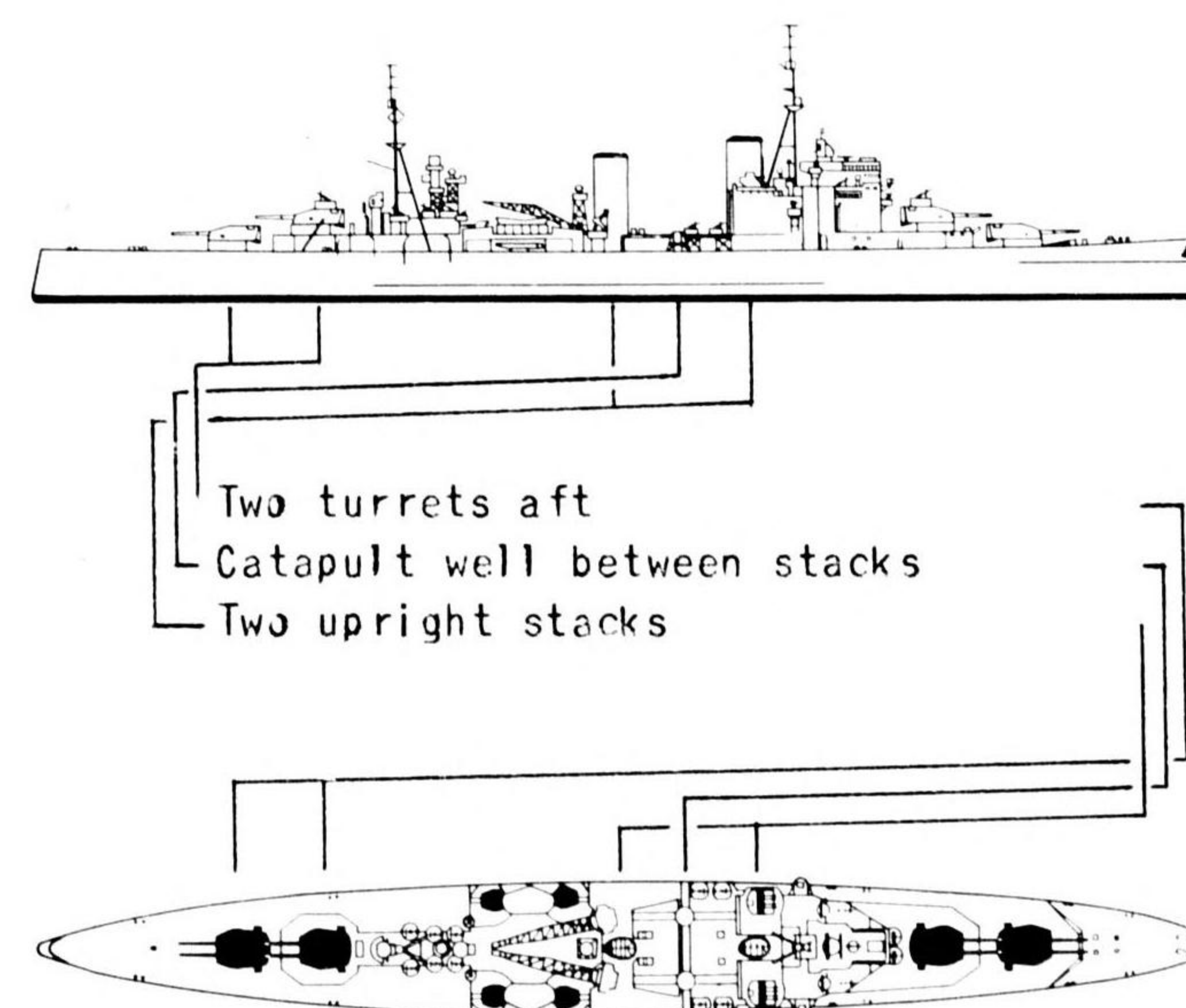
HAWKINS Class	605' o. a.
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HAWKINS
FROBISHER



- Main battery in single shields
- Light tripod bridgemaat
- Two raked stacks

LONDON	630' o. a.
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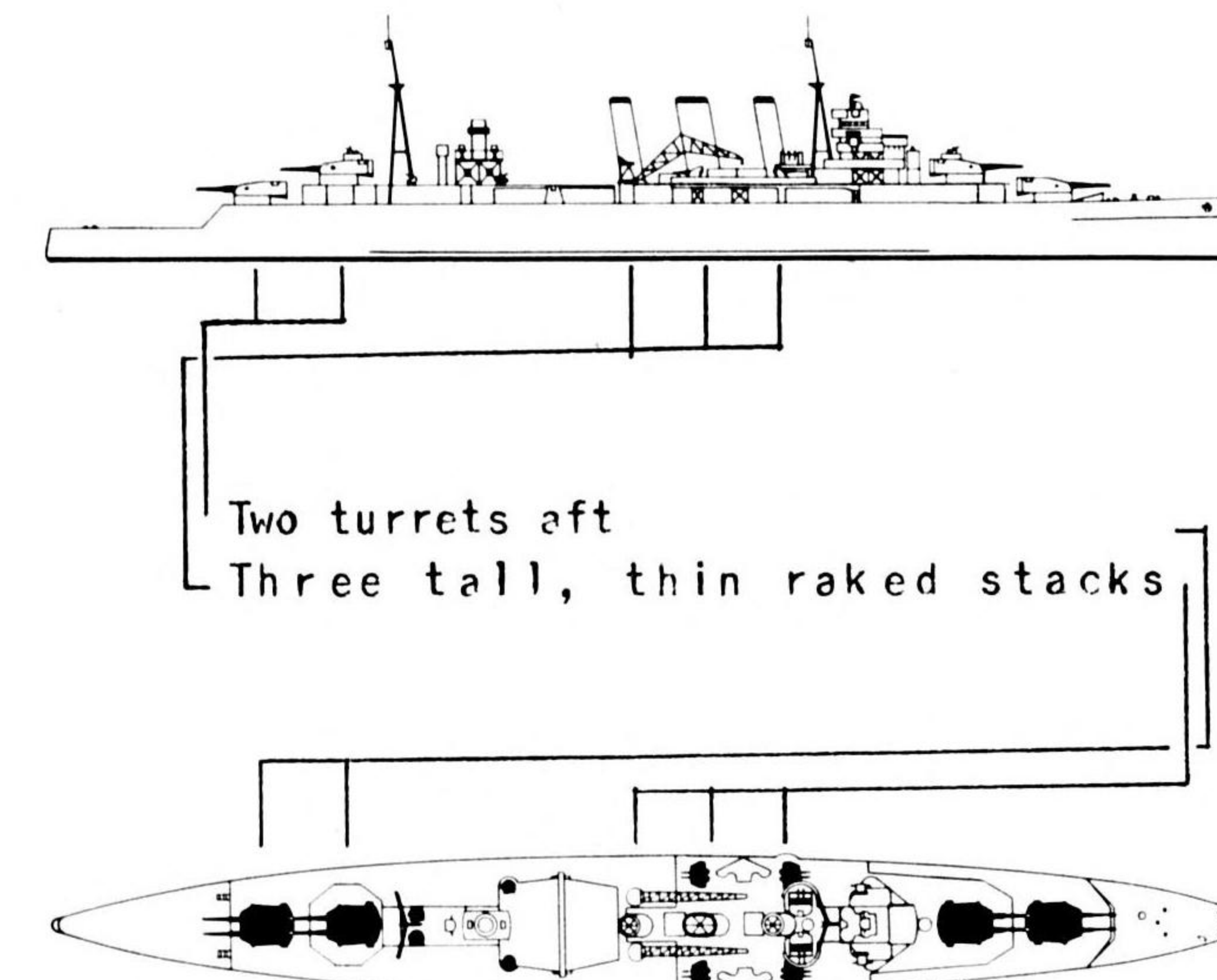


- Two turrets aft
- Catapult well between stacks
- Two upright stacks

GREAT BRITAIN

KENT Class	630' o. a.
------------	------------

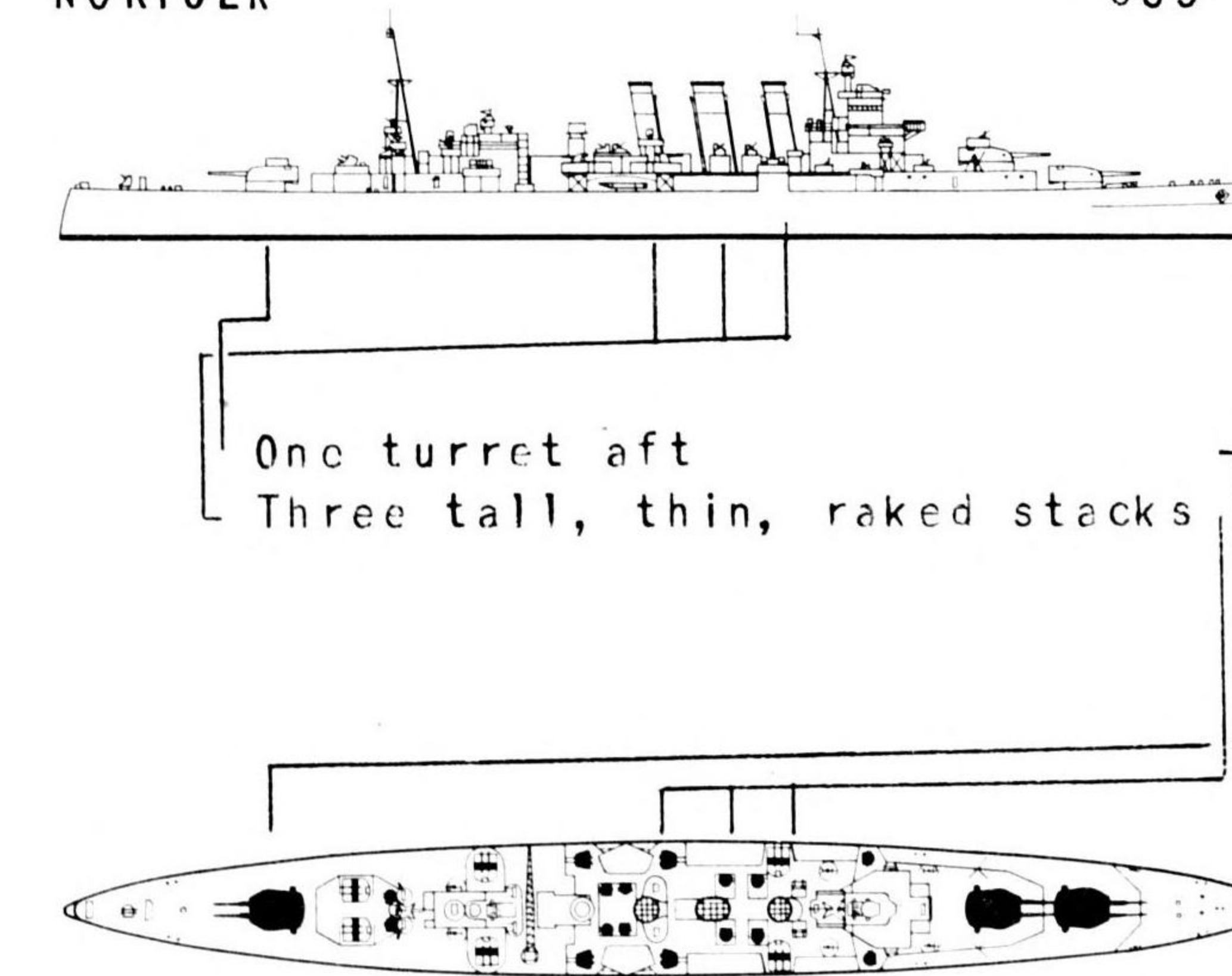
KENT CUMBERLAND
AUSTRALIA (R.A.N.) SUFFOLK
BERWICK



- Two turrets aft
- Three tall, thin raked stacks

DEVONSHIRE Class - NORFOLK	
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DEVONSHIRE	630' o. a.
SUSSEX	630' o. a.
SHROPSHIRE (R.A.N.)	630' o. a.
NORFOLK	635' o. a.



- One turret aft
- Three tall, thin, raked stacks

LIGHT CRUISERS

4-3 STACKS

The United States' OMAHA Class light cruisers constitute the only operational four-stackers larger than destroyers. Units of the old flush-deck destroyer classes are still operating with both the United States and British fleets, but these can be easily differentiated from the OMAHA Class by a comparison of size and/or superstructure, and by the lack of turrets and catapults on the old destroyers.

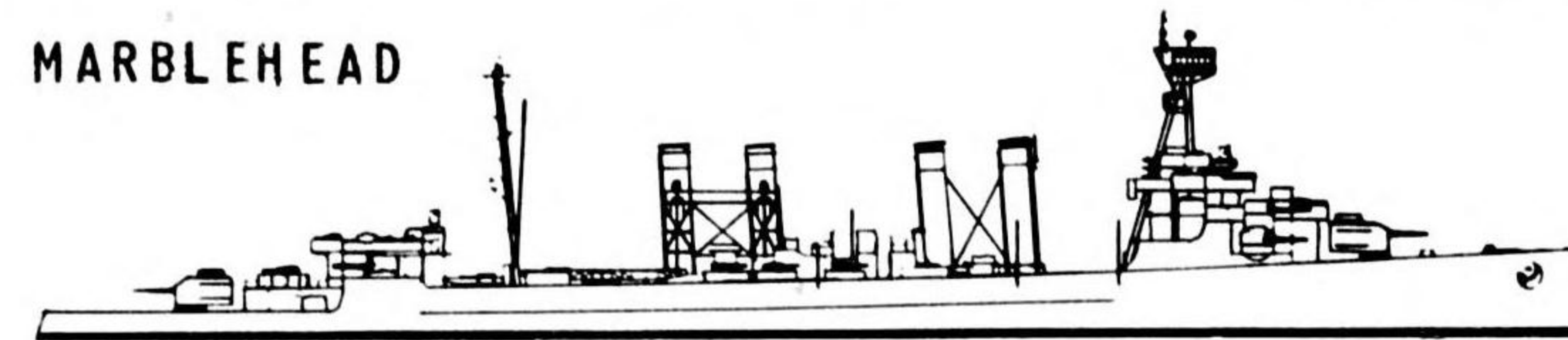
The problem of distinguishing Japanese from British three-stack light cruisers is quite simple in view of the radical differences in the stacks and in the superstructure, deck, and main battery arrangements.

The difficulty for interpreters, however, concerns the differentiation of the KUMA and NATORI Classes. This confusion resulted largely from a lack of knowledge of the refitting of these classes, but the information which has now been accumulated has remedied this situation. Originally the basic differences between these classes was in the shapes of their bridges and the positions of the breaks in the upper-decks aft. Anti-flare caps on the stacks are not an identifying feature for either class, but only for two ships of the KUMA Class (see annotations on drawings). The shapes of the bridges remain as a good identification feature for these classes, but no general statement can be made for either class in regard to the upper-deck arrangement, due to the wide variation in the refitting of the ships.

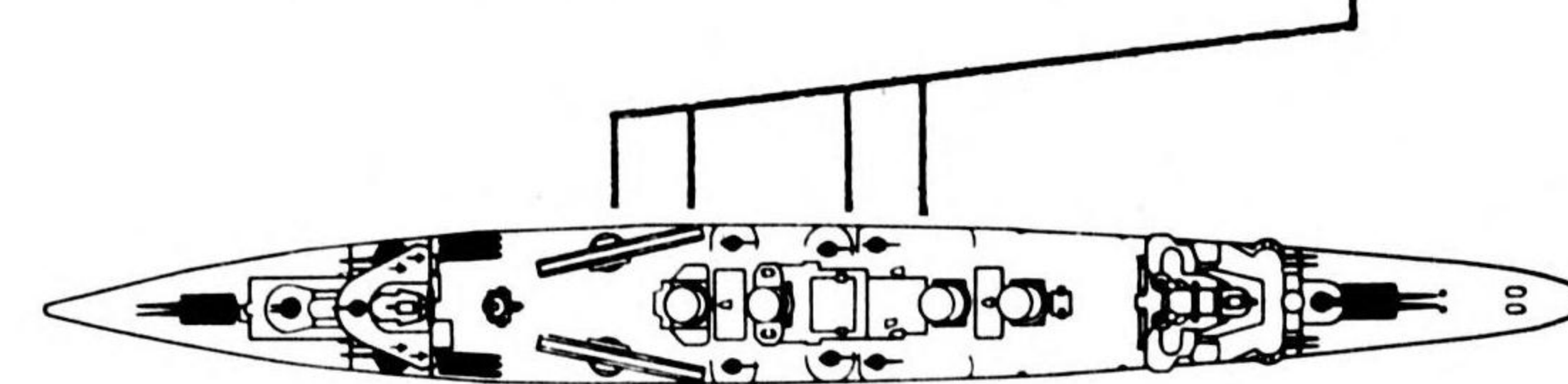
The shape of the deck, new torpedo tube mounts and anti-torpedo bulges, and removal of catapults are also features which should be used, as they will help determine the class, the type of refit, and possibly even the actual ship name.

UNITED STATES

OMAHA Class			608' o.a.
OMAHA	RICHMOND	DETROIT	
MILWAUKEE	CONCORD	MEMPHIS	
CINCINNATI	TRENTON	RALEIGH	
MARBLEHEAD			

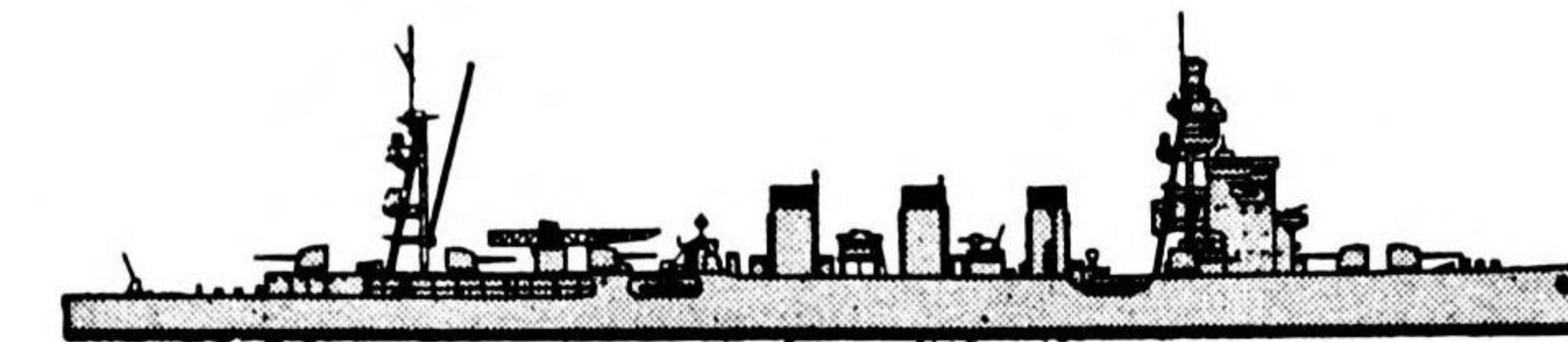


Four stacks are only identification feature needed for this class

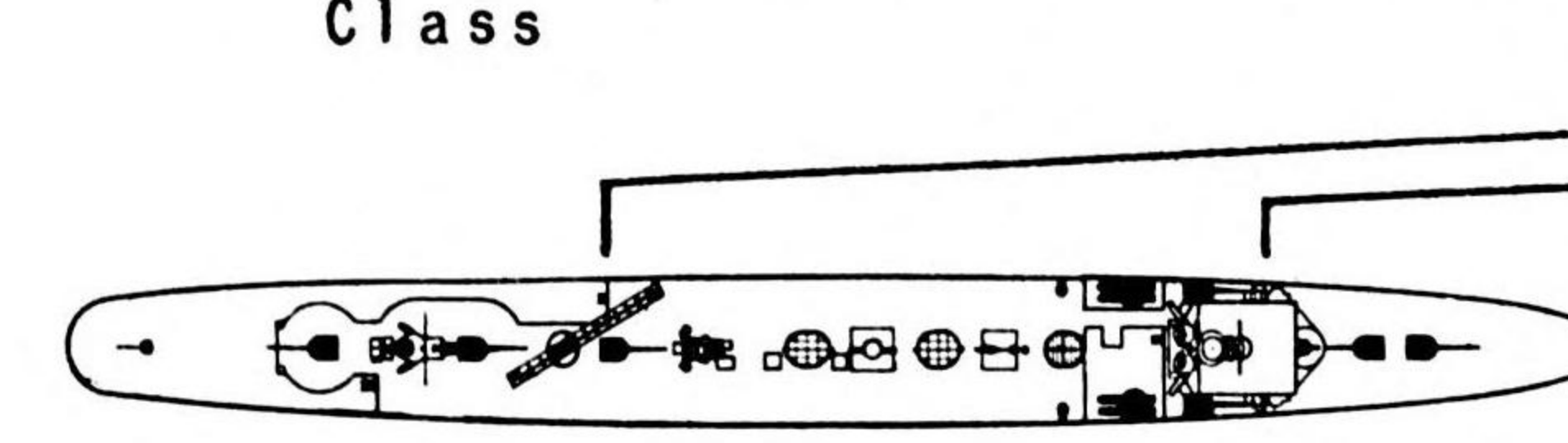


JAPAN

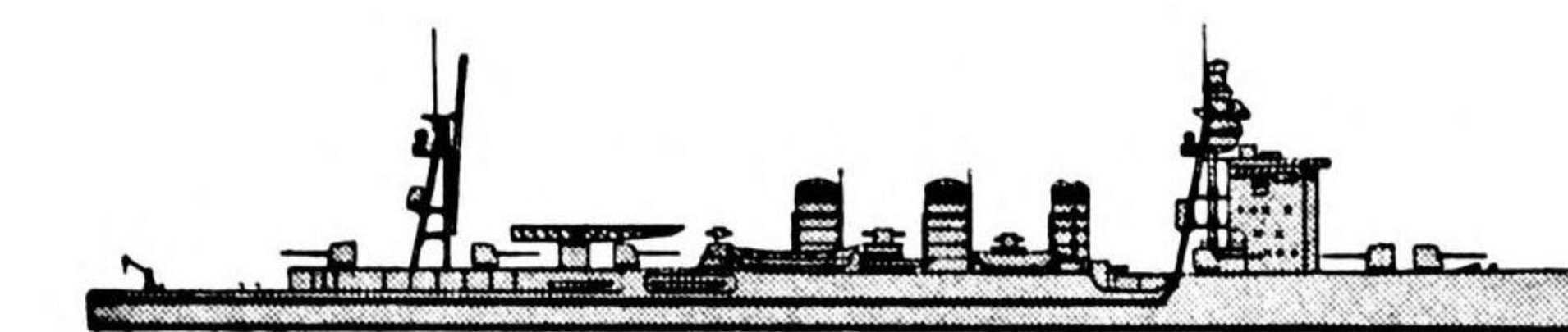
NATORI Class		535' o.a.
KINU		
ISUZU		
ABUKUMA		



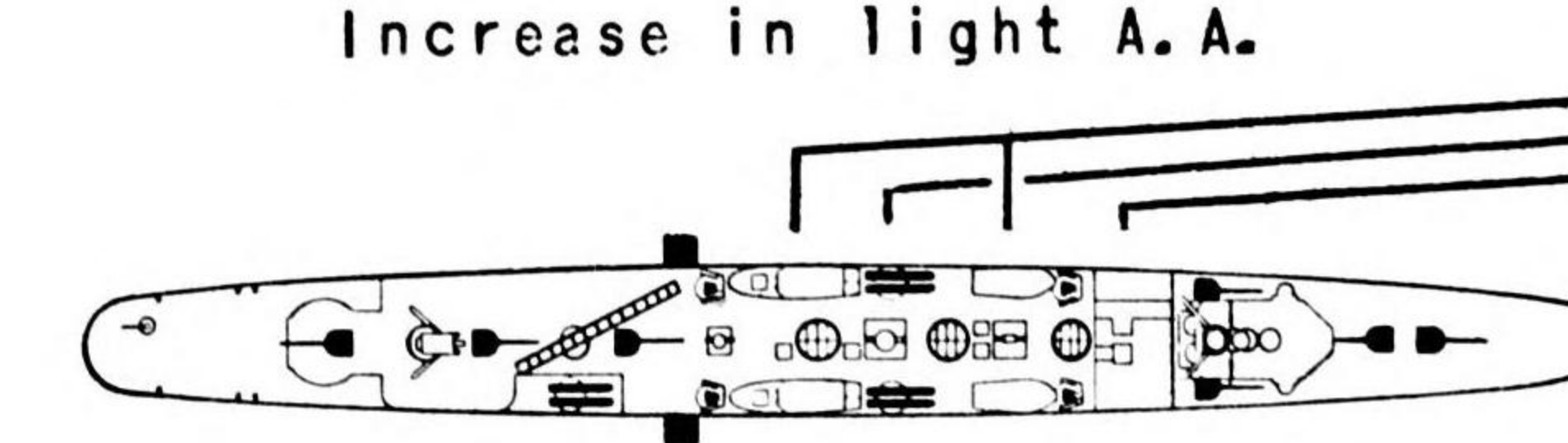
Upright stacks
Break in upper deck is further forward on port side
Bridge broader than on KUMA Class



NATORI Class (Refit)		535' o.a.
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Upper deck rebuilt aft
New T.T. well on stbd. side
Torpedo tubes removed from well
New T.T. mounts on upper deck
Landing craft carried
Increase in light A.A.



LIGHT CRUISERS

3 STACKS

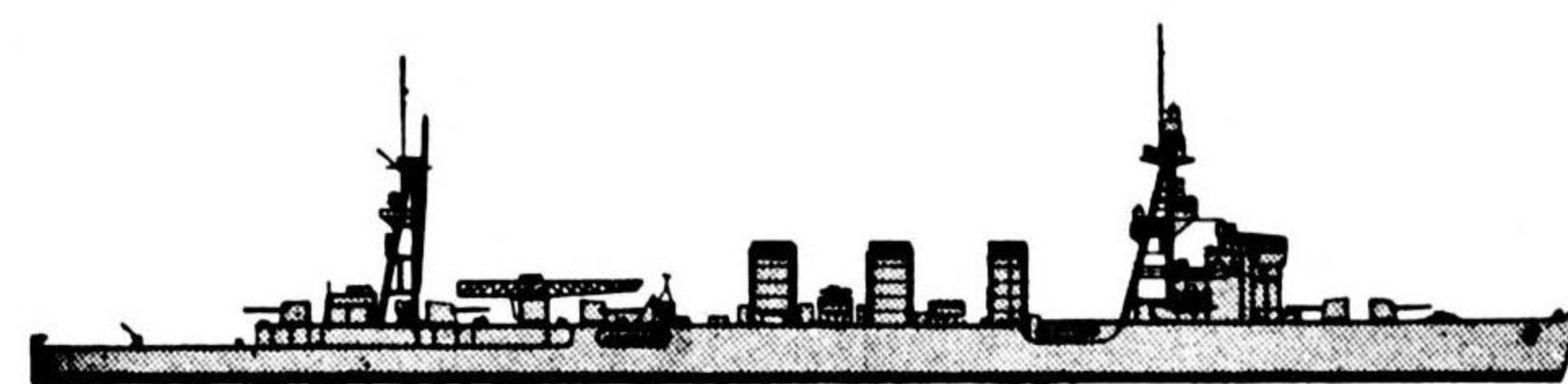
JAPAN

KUMA Class 535' o. a.

KUMA

TAMA

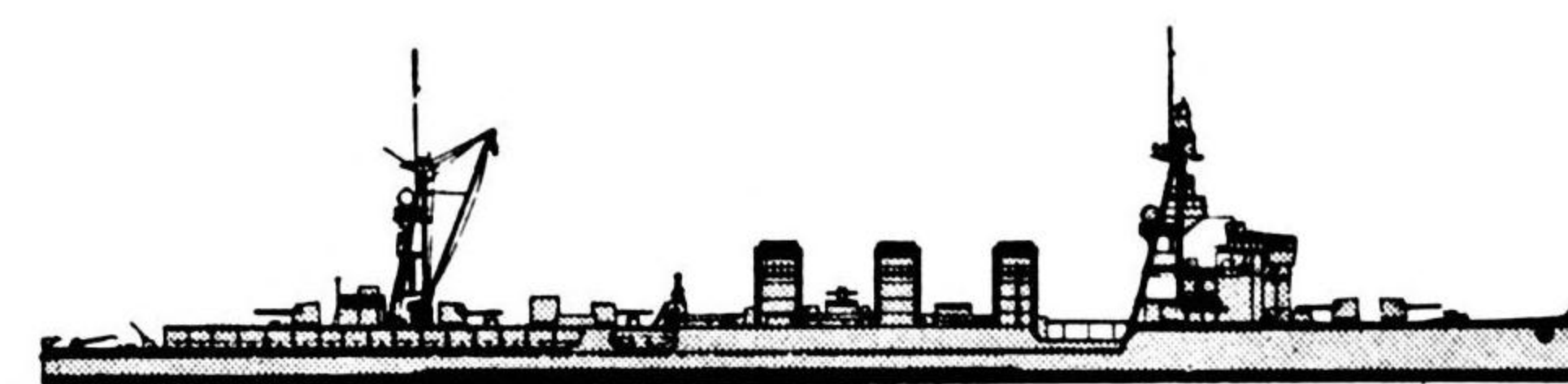
01



Upright stacks
Break in upper deck is further forward on starboard side
Bridge smaller than on NATORI
Anti-flare caps on KUMA only; others have straight stacks



KUMA Class (Refit) 535' o. a.



Anti-torpedo bulges added
Upper deck extended aft and runs completely athwartships
Catapult removed
Torpedo tubes removed from well
Six quadruple T. T. mounts added

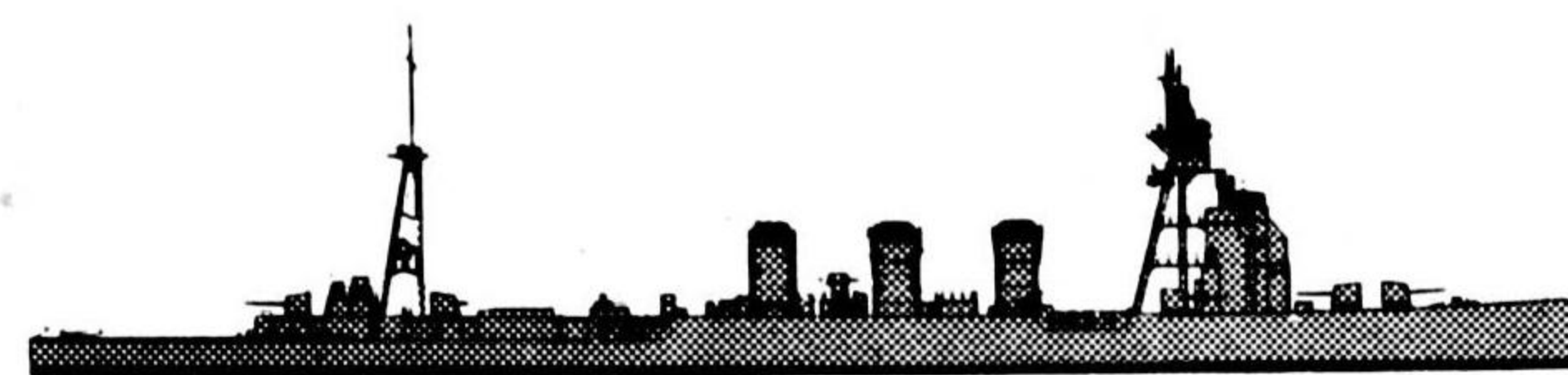


~~CONFIDENTIAL~~

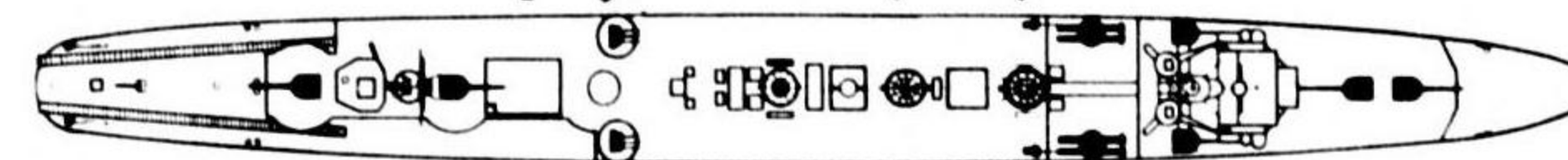
JAPAN

KUMA Class (Refit) 535' o. a.

KISO



Catapult and gunshield removed
2 x 25mm. triple AAMG added
Anti-flare caps on No. 1 and No. 2 stacks only

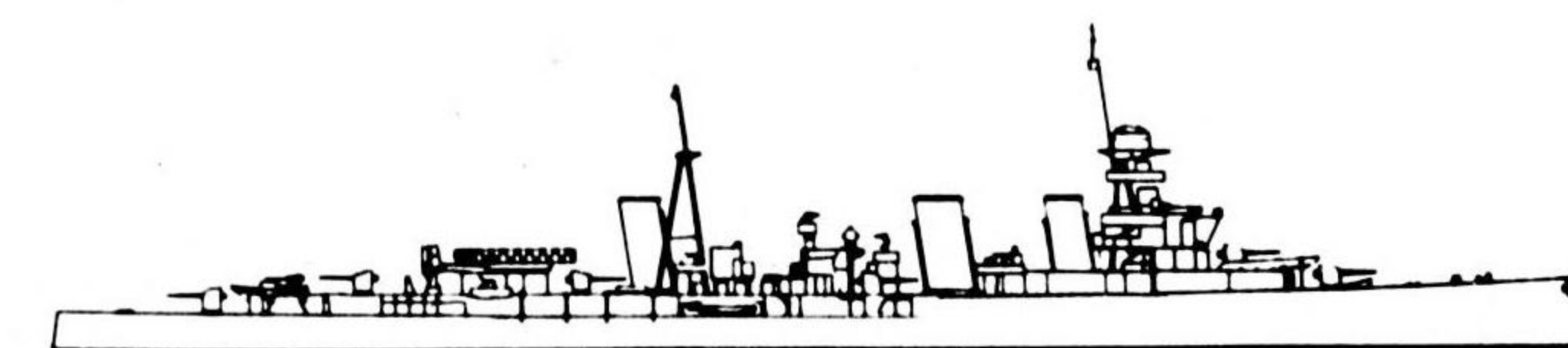


GREAT BRITAIN

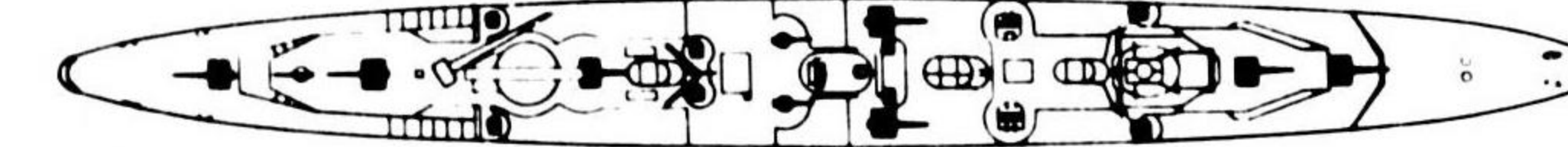
EMERALD Class 570' o. a.

EMERALD

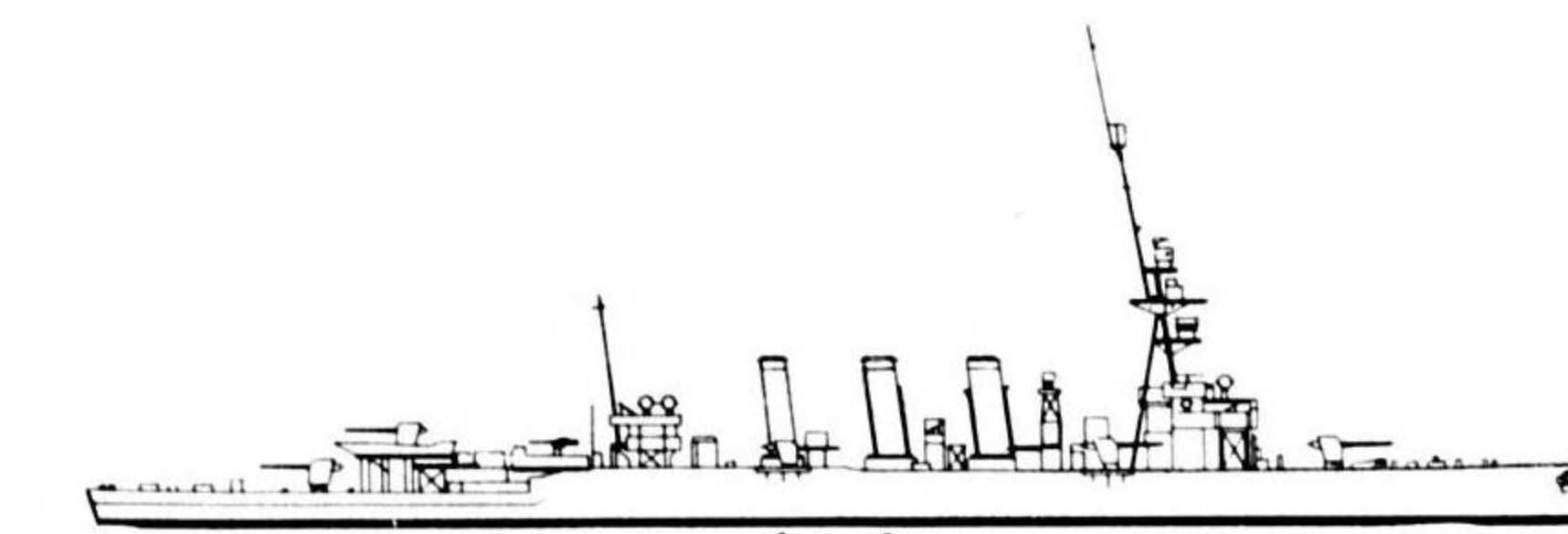
ENTERPRISE



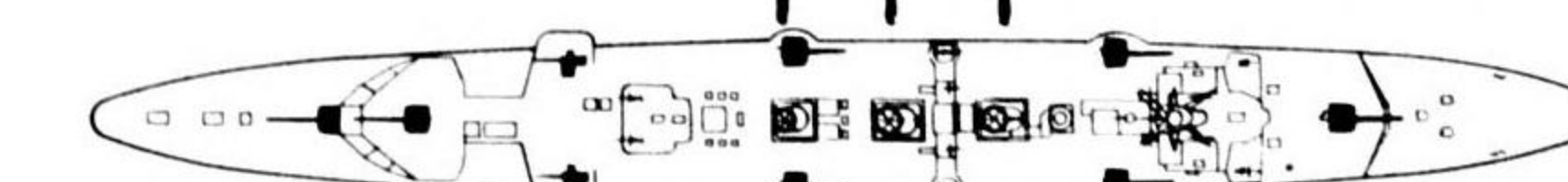
Three raked stacks, irregularly spaced
Mainmast just forward of No. 3 stack
Compare arrangement of main battery with Jap CL's



ADELAIDE (R.A.N.) 463' o. a.



Three tall, thin, raked stacks evenly spaced
Compare arrangement of main battery with Jap CL's

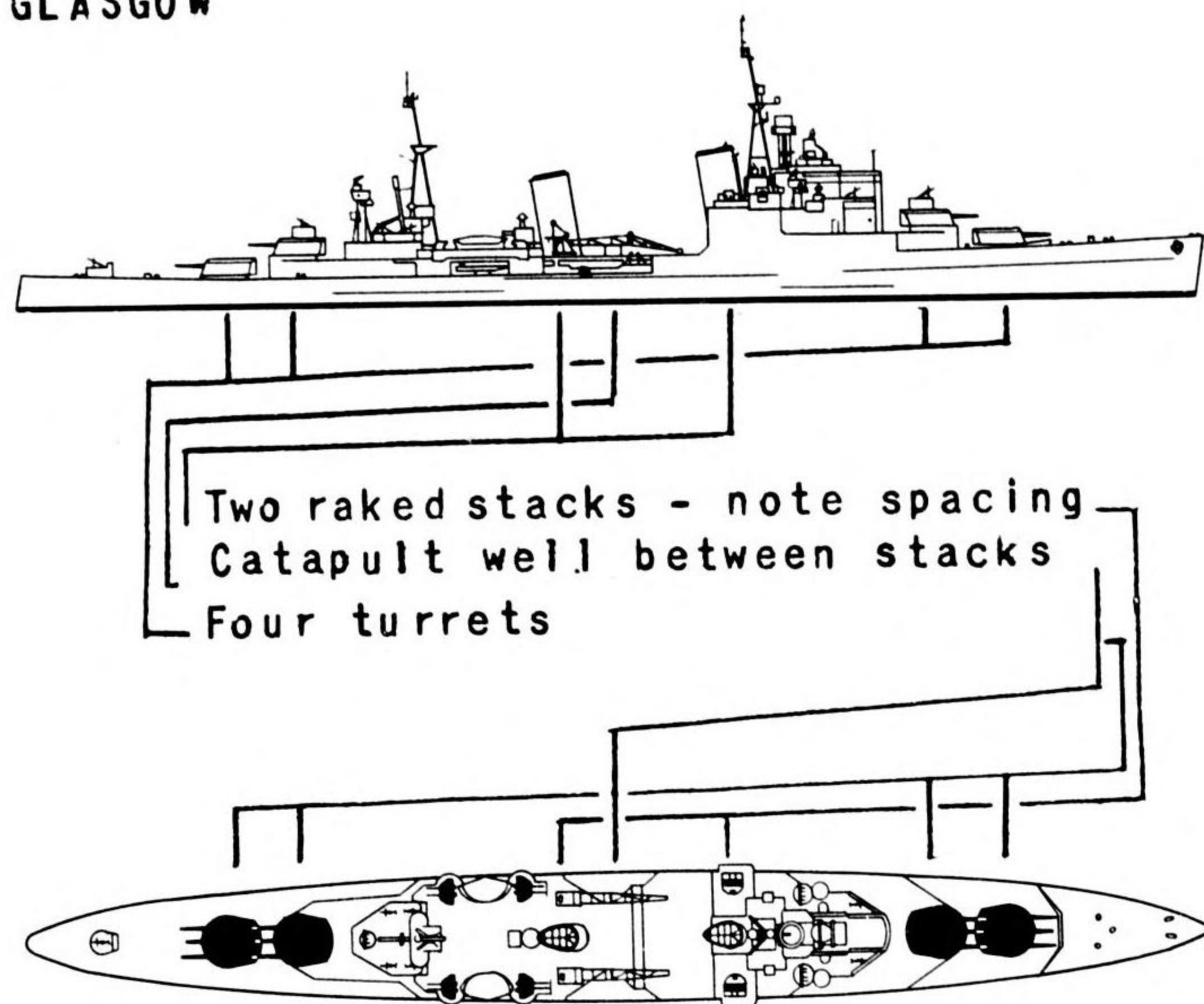


LIGHT CRUISERS

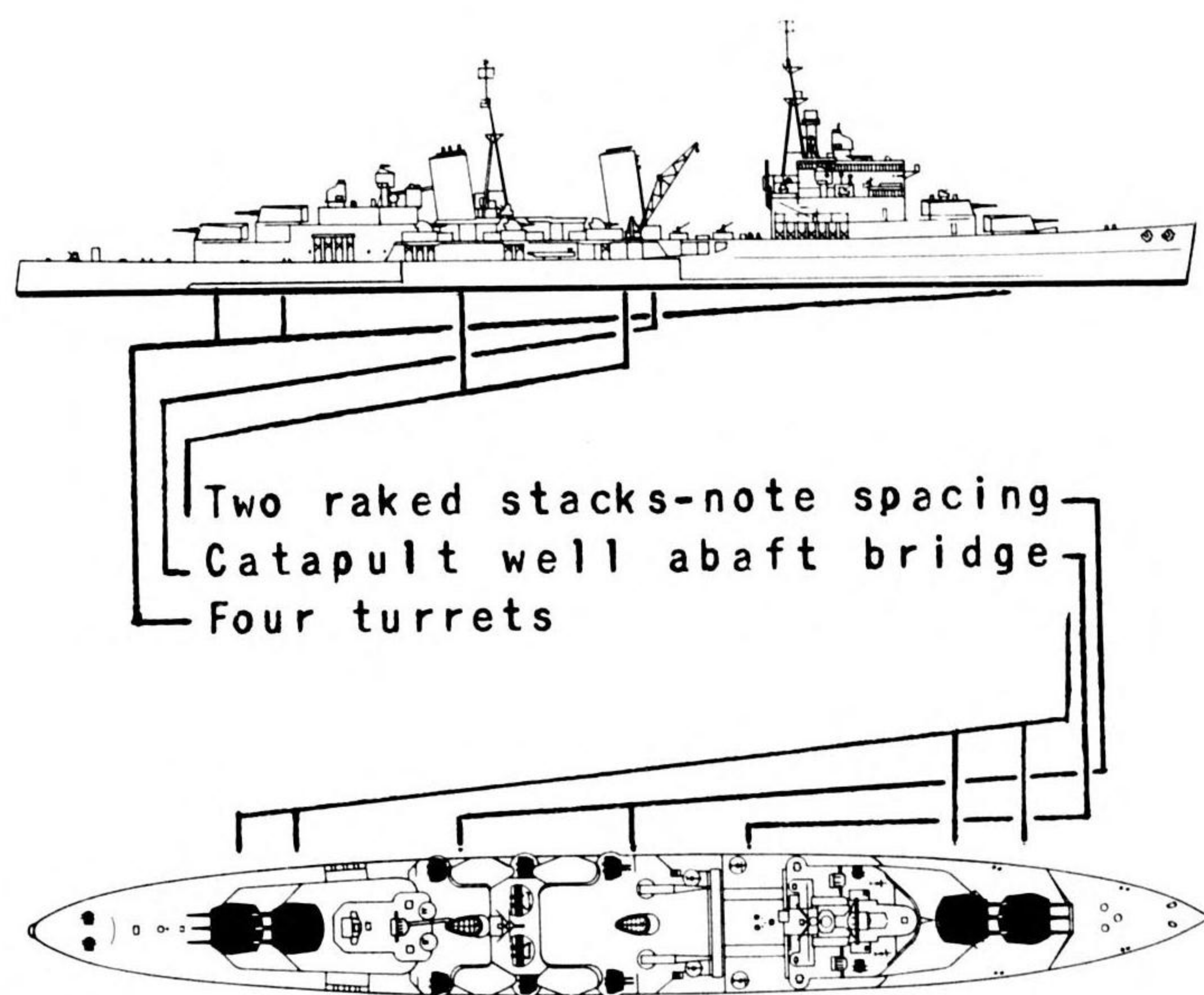
2 STACKS

GREAT BRITAIN

SOUTHAMPTON Class		592' o.a.
NEWCASTLE	BIRMINGHAM	
SHEFFIELD	LIVERPOOL	
GLASGOW		

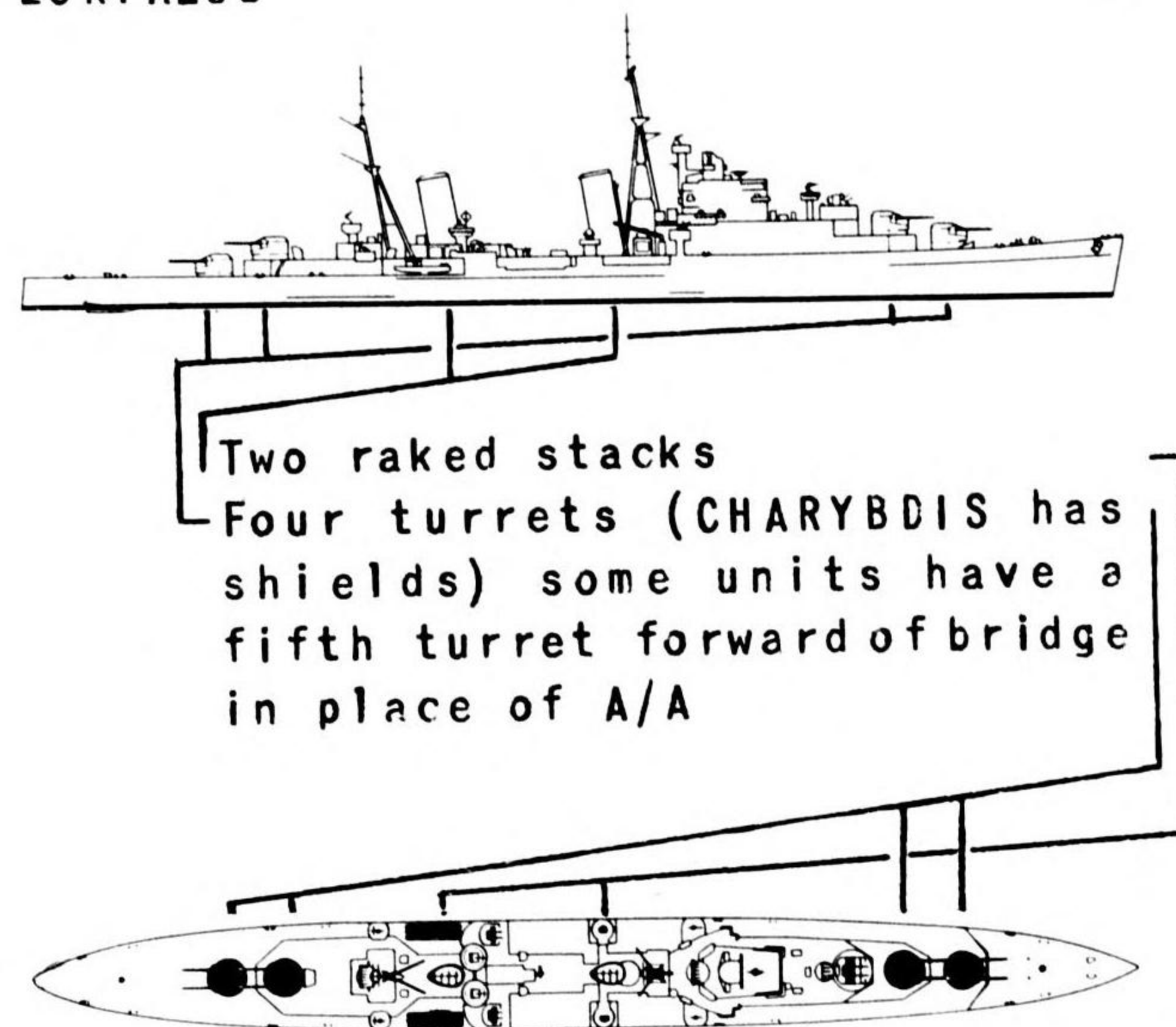


BELFAST 614' o.a.



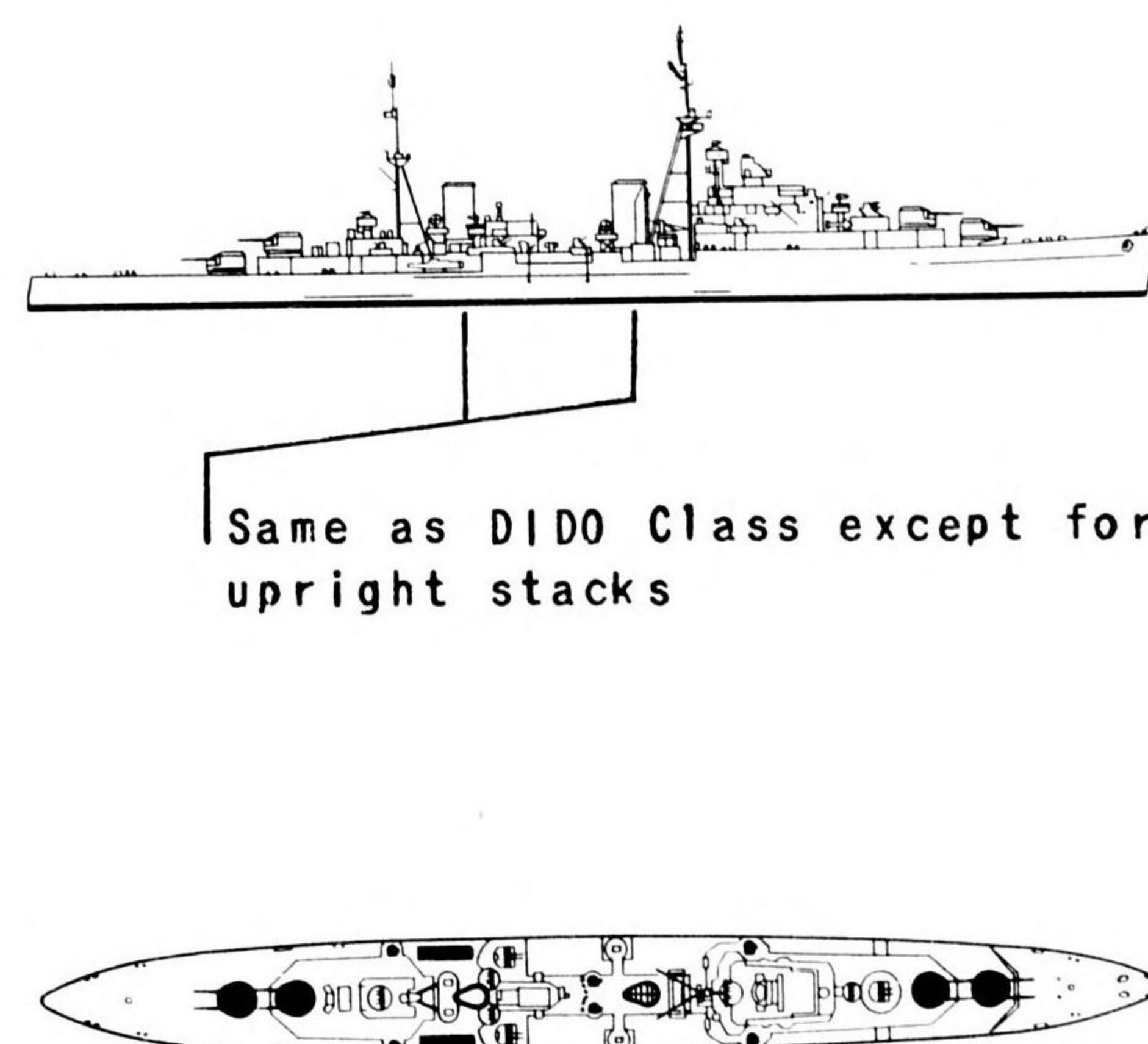
GREAT BRITAIN

DIDO Class			512' o.a.
DIDO	CLEOPATRA	SIRIUS	
PHOEBE		SCYLLA	
EURYALUS		ARGONAUT	



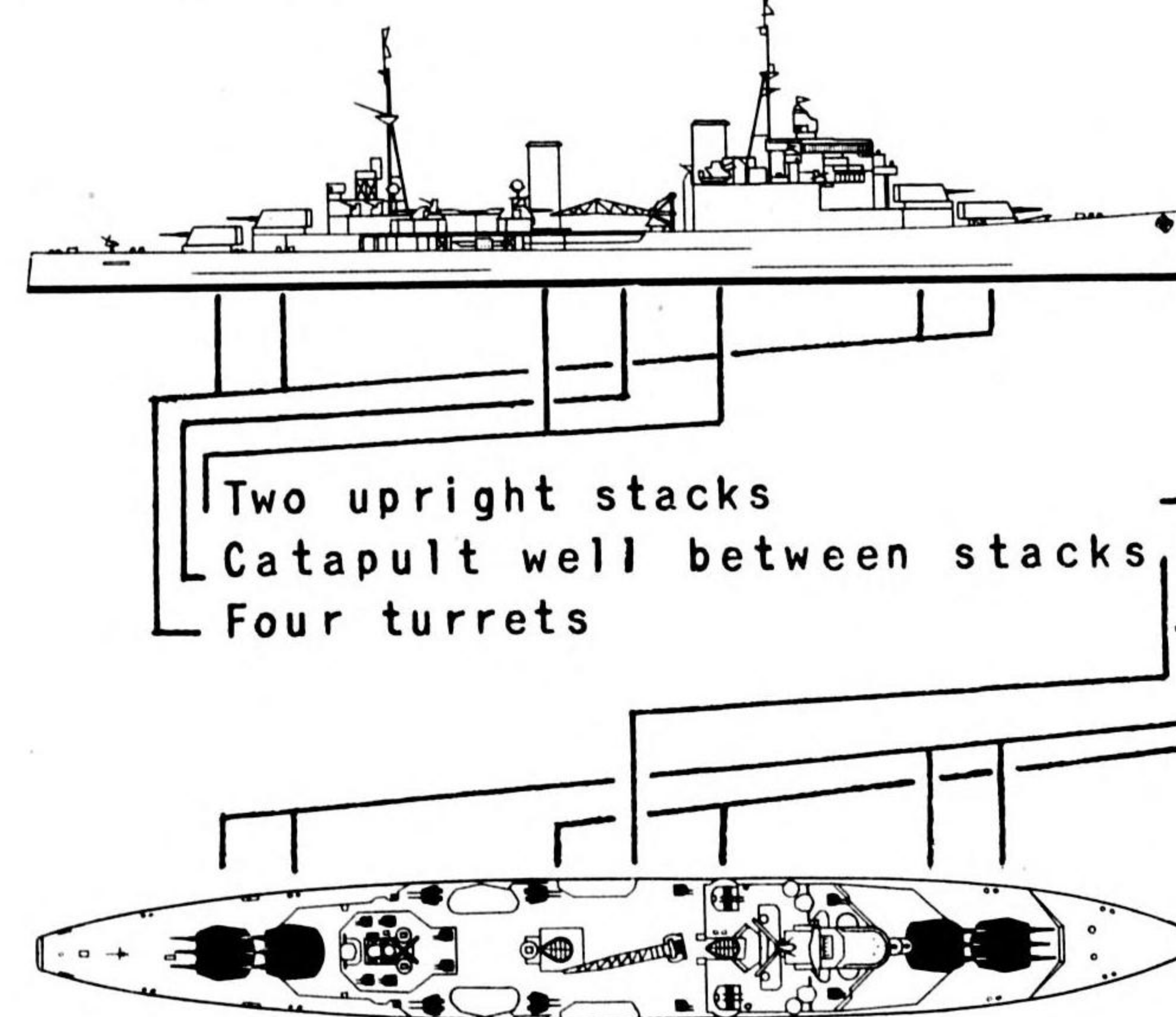
ROYALIST Class 512' o.a.

ROYALIST	DIADEM
BLACK PRINCE	BELLONA

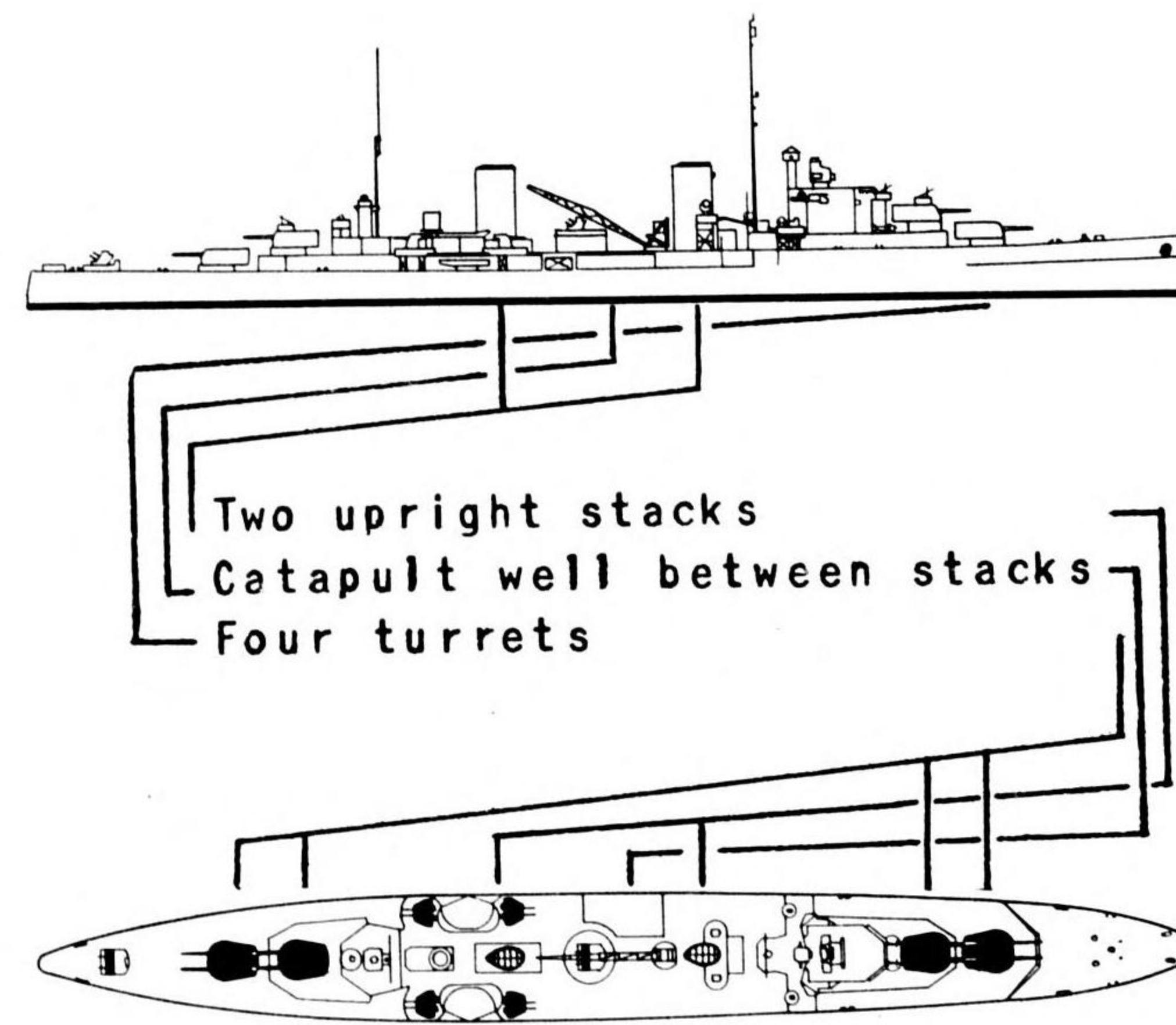


GREAT BRITAIN

FIJI Class		556' o.a.
NIGERIA	JAMAICA	
KENYA	GAMBIA (R.N.Z.N.)	
MAURITIUS	BERMUDA	



HOBART (R.A.N.) 562' o.a.

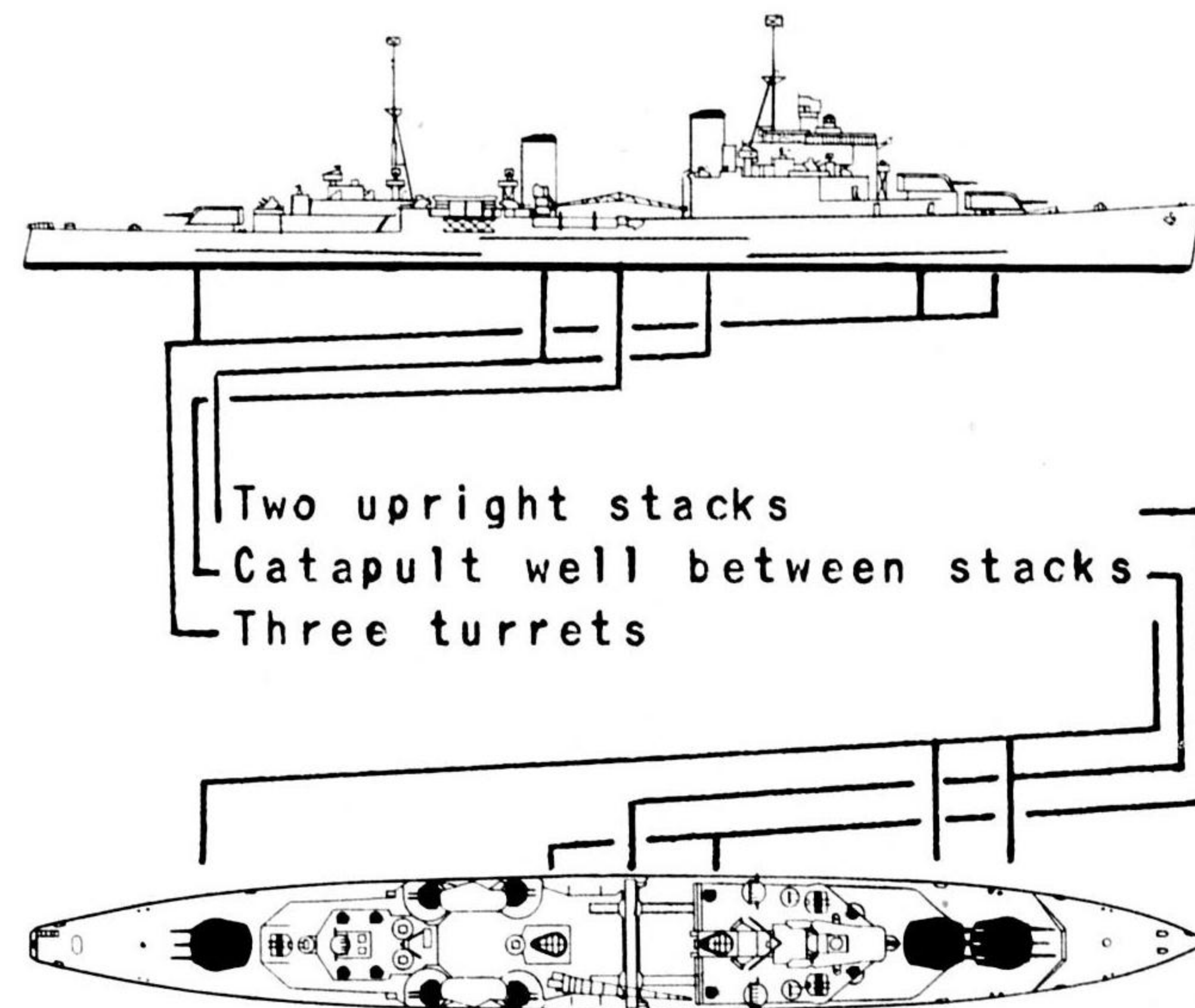


LIGHT CRUISERS

2 STACKS

GREAT BRITAIN

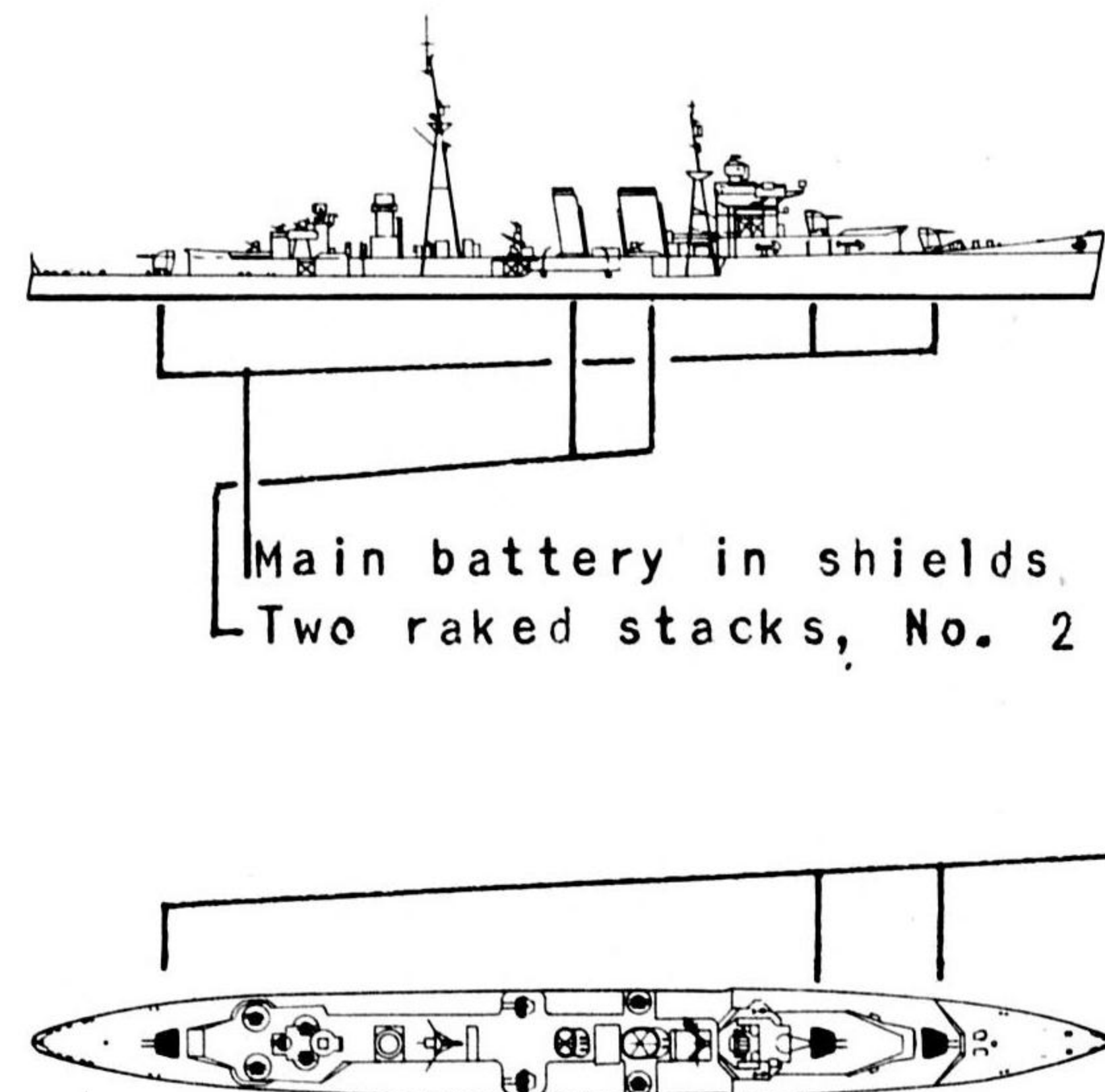
UGANDA-SWIFTSURE Classes		556' o.a.
UGANDA (R.C.N.)	ONTARIO (R.C.N.)	
NEWFOUNDLAND	SWIFTSURE	
CEYLON		



Two upright stacks
Catapult well between stacks
Three turrets

GREAT BRITAIN

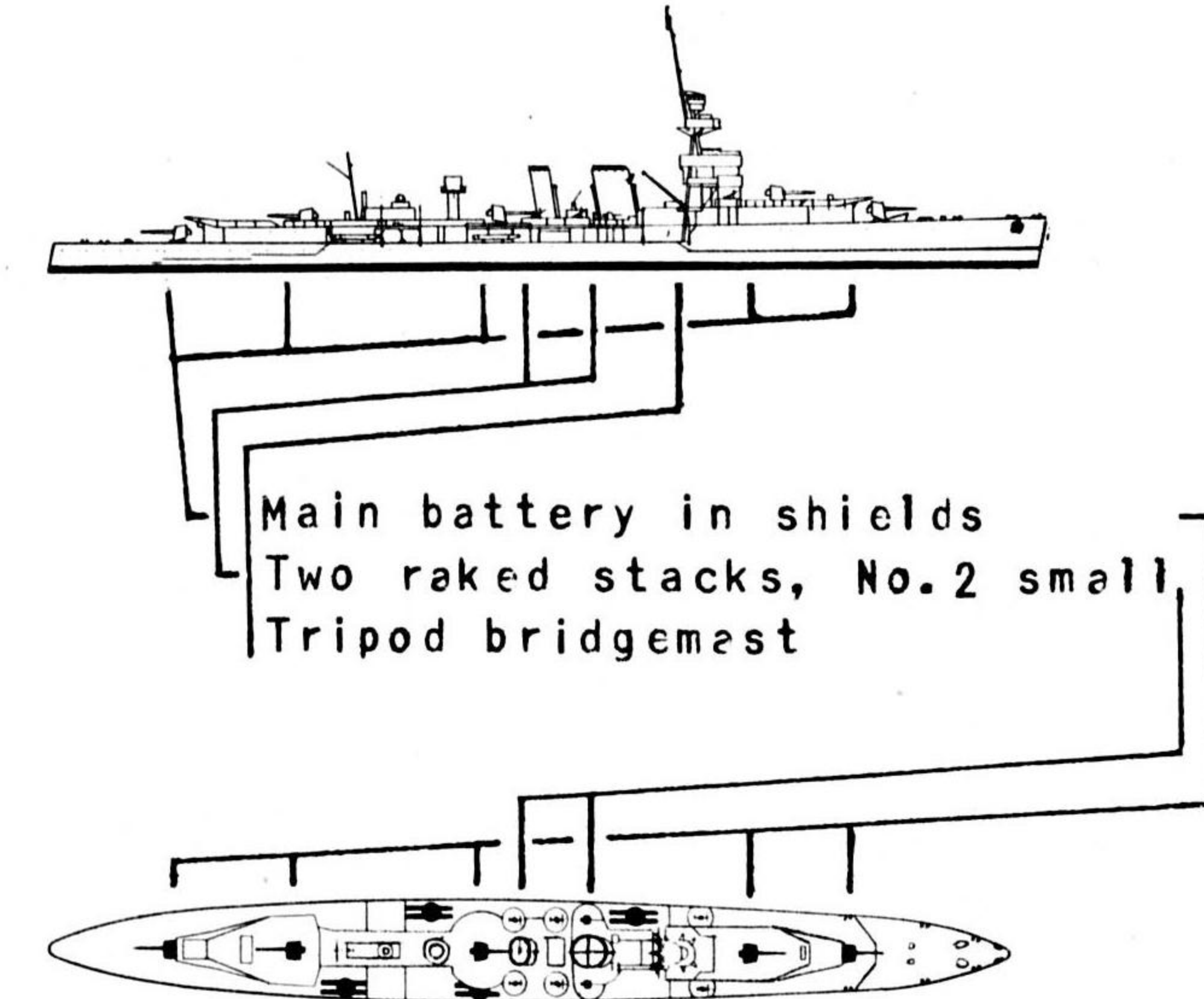
CARLISLE Class		450' o.a.
CARLISLE		
CAPETOWN		
COLOMBO		



Main battery in shields
Two raked stacks, No. 2 small

GREAT BRITAIN

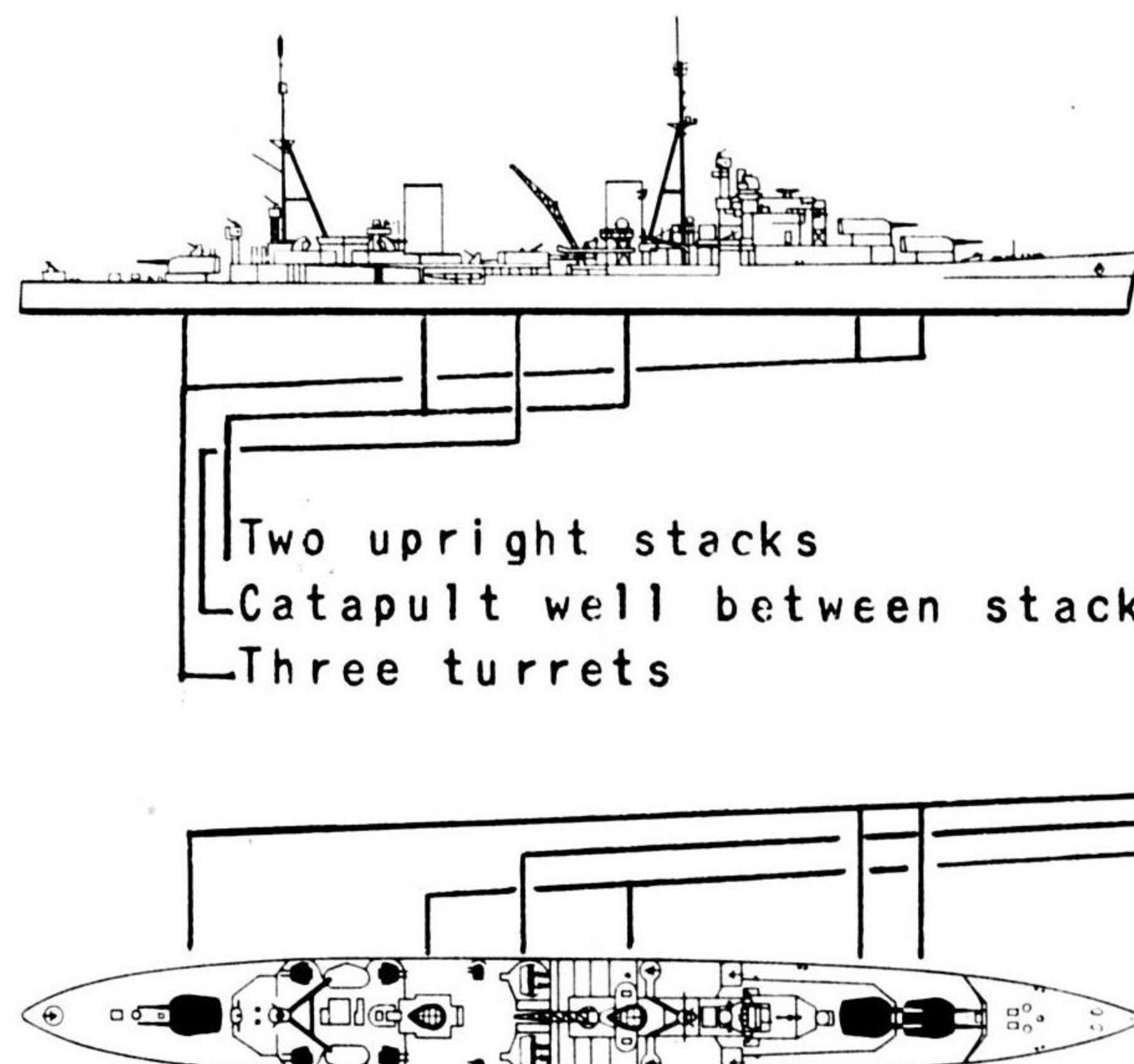
CERES-CALEDON Classes		450' o.a.
CERES	CALEDON	
CARDIFF	CARADOC	
CURACAO		



Main battery in shields
Two raked stacks, No. 2 small
Tripod briggemast

ARETHUSA Class		506' o.a.
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ARETHUSA
AURORA

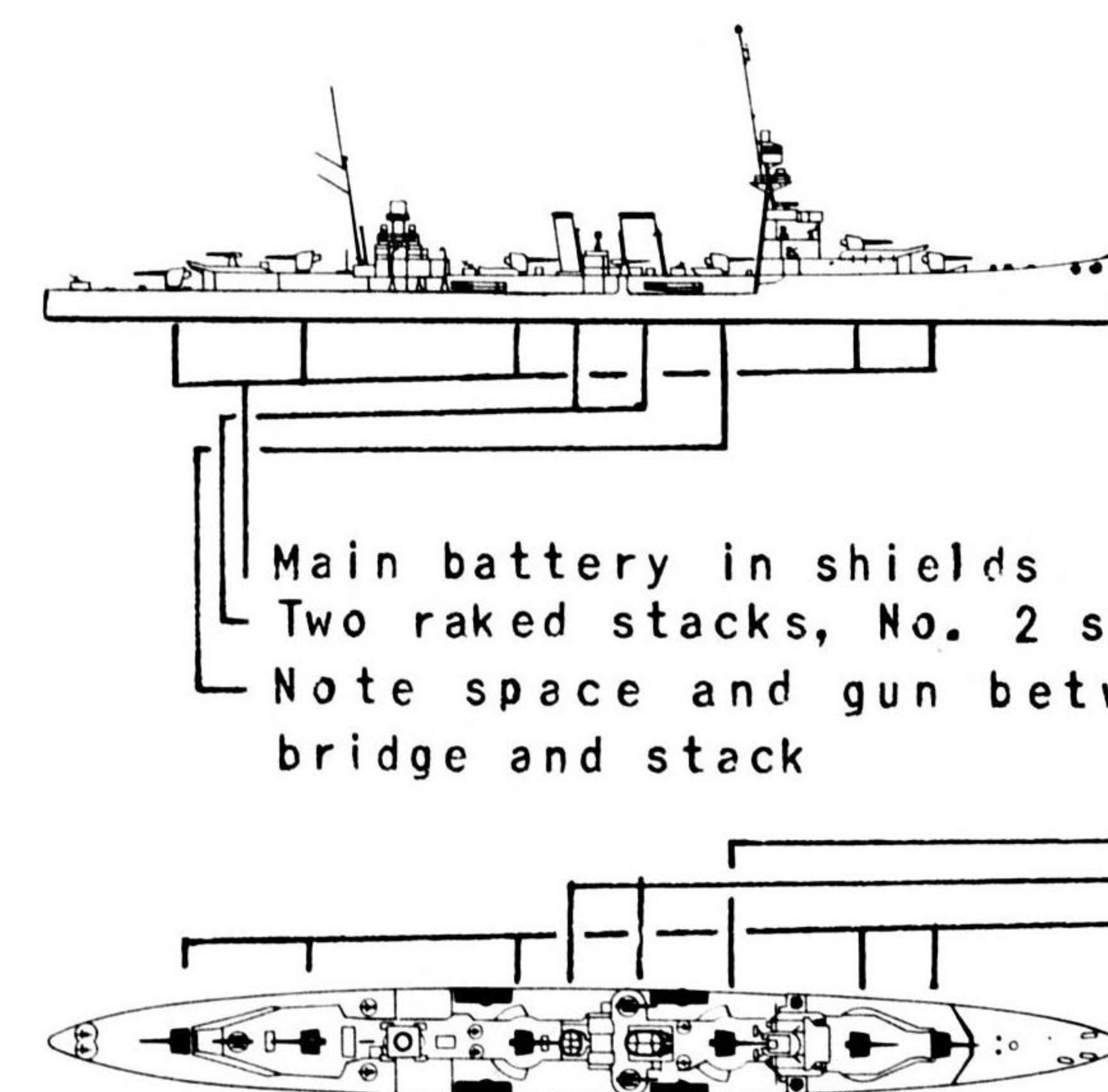


Two upright stacks
Catapult well between stacks
Three turrets

"D" Class		471' o.a.
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CONRAD
CAUNTLESS
DURBAN.

DESPATCH
DIOMEDE
DELHI



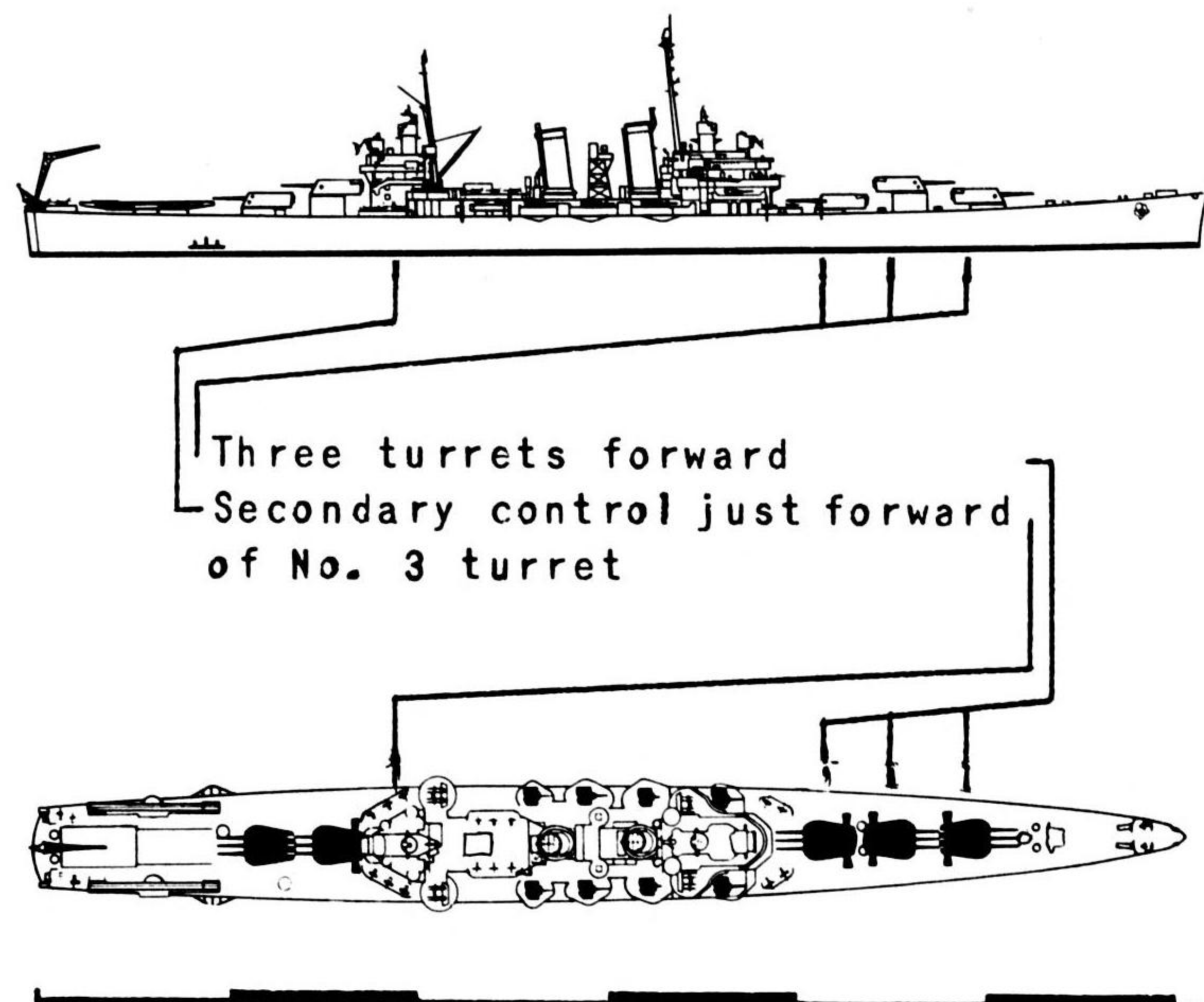
Main battery in shields
Two raked stacks, No. 2 small
Note space and gun between
bridge and stack

LIGHT CRUISERS

2 STACKS

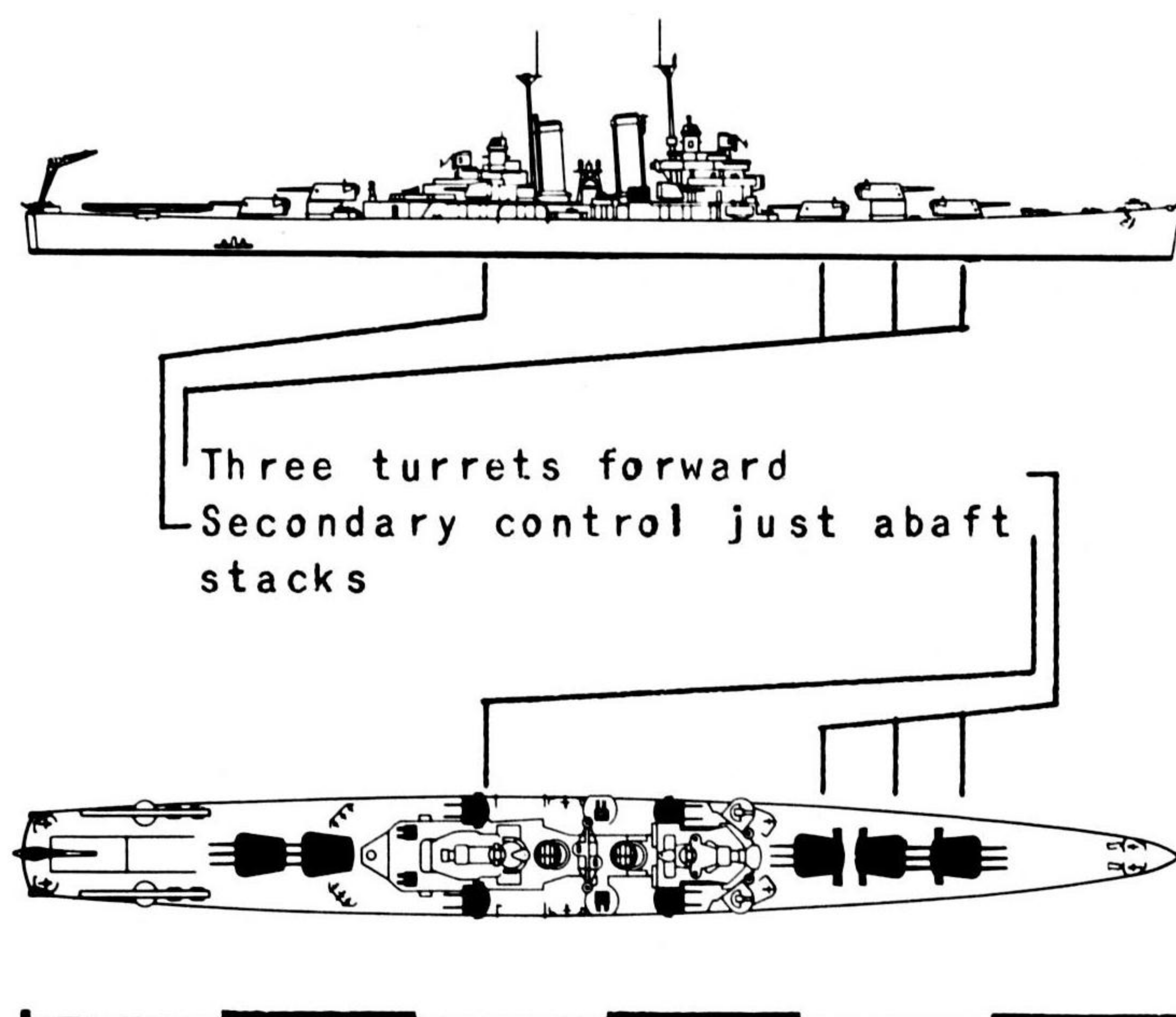
UNITED STATES

BROOKLYN-PHOENIX Classes		608' o.a.
BROOKLYN	NASHVILLE	PHOENIX
PHILADELPHIA		BOISE
SAVANNAH		HONOLULU



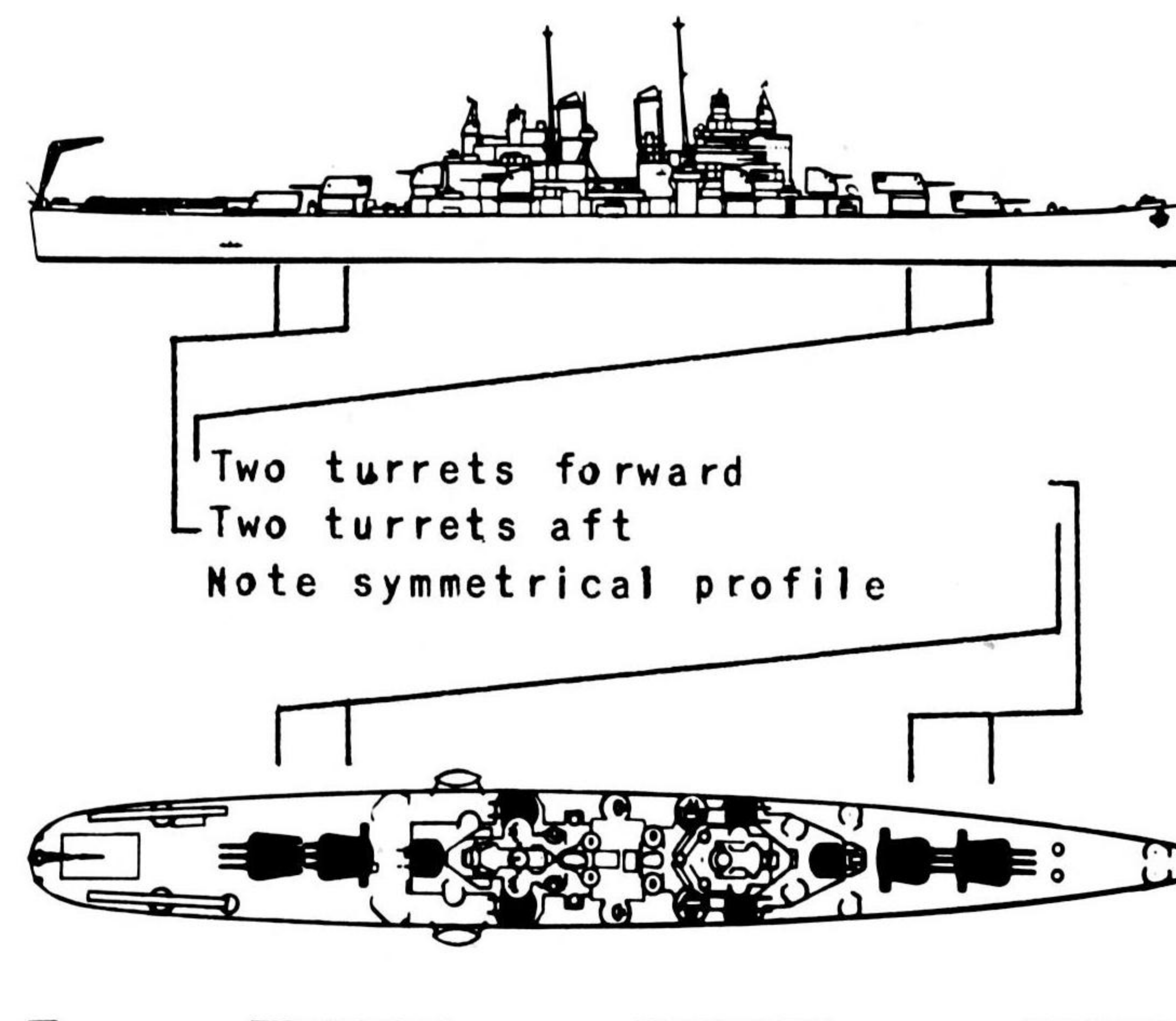
UNITED STATES

ST. LOUIS	608' o.a.
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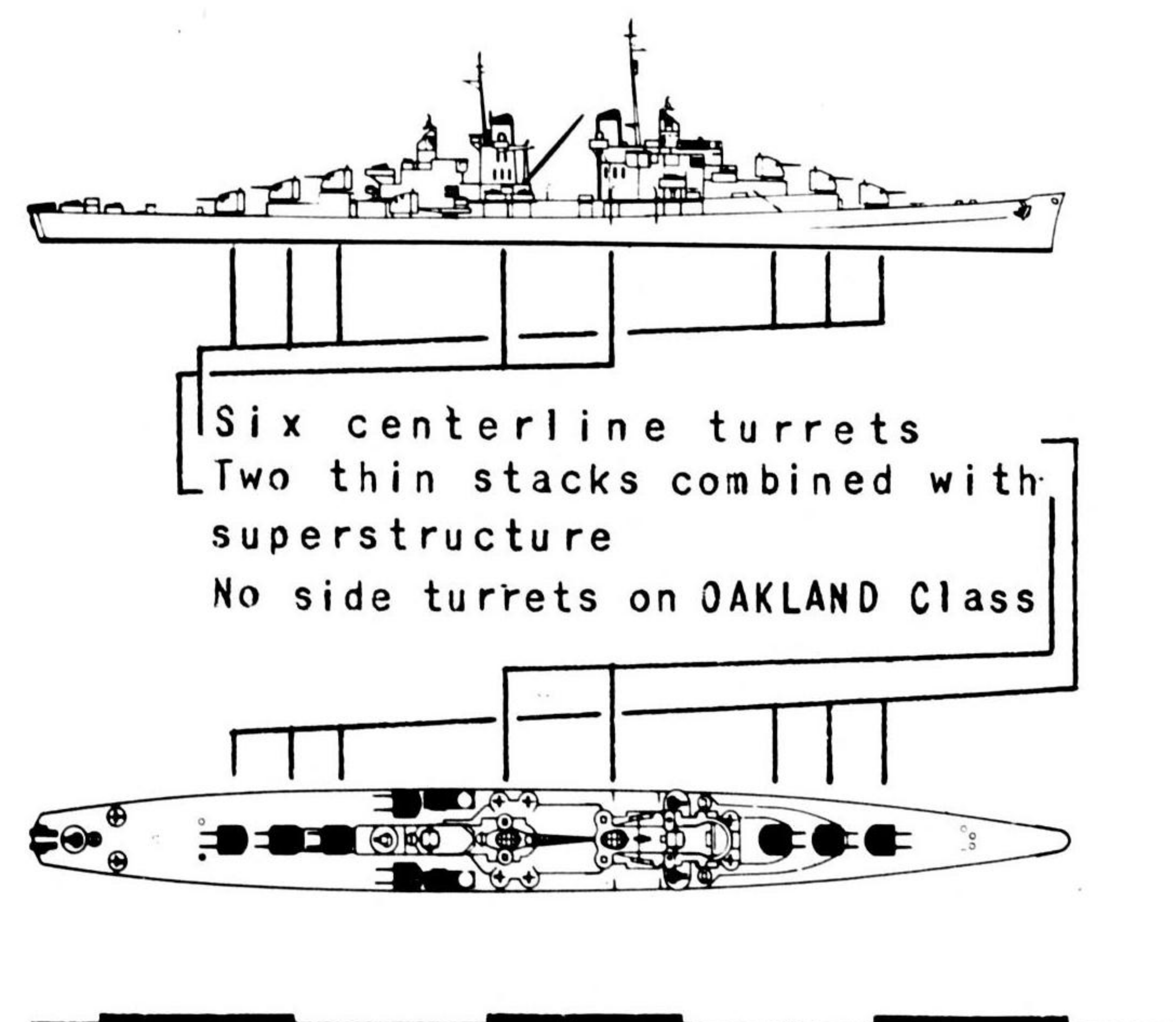


UNITED STATES

CLEVELAND-VINCENNES Class	610' o.a.
17 Ships	



ATLANTA-OAKLAND Classes	541' o.a.
SAN DIEGO	OAKLAND
SAN JUAN	RENO
FLINT	TUCSON

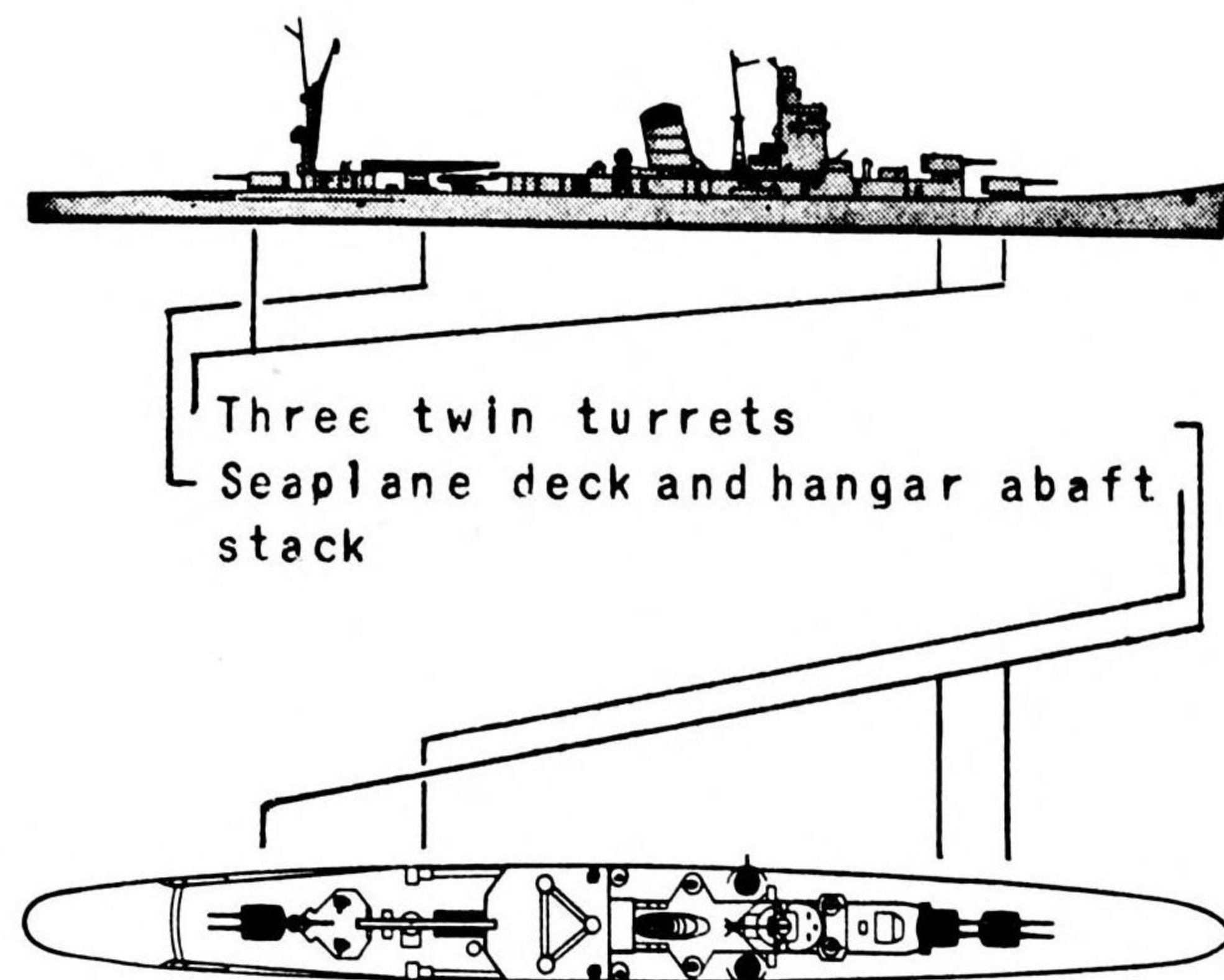


LIGHT CRUISERS

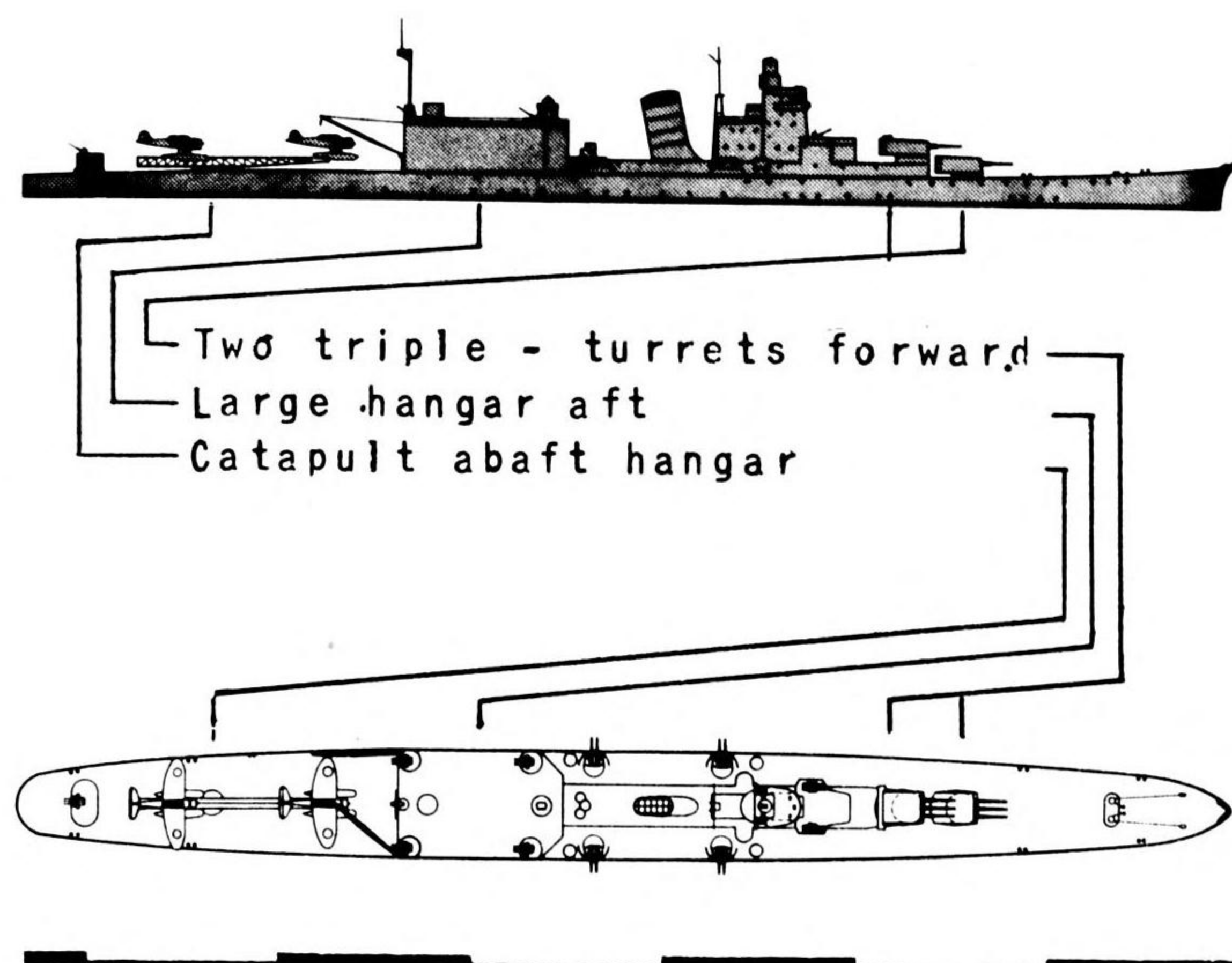
1 STACK

JAPAN

AGANO Class	550' o. a.
YAHAGI	
SAKAWA	

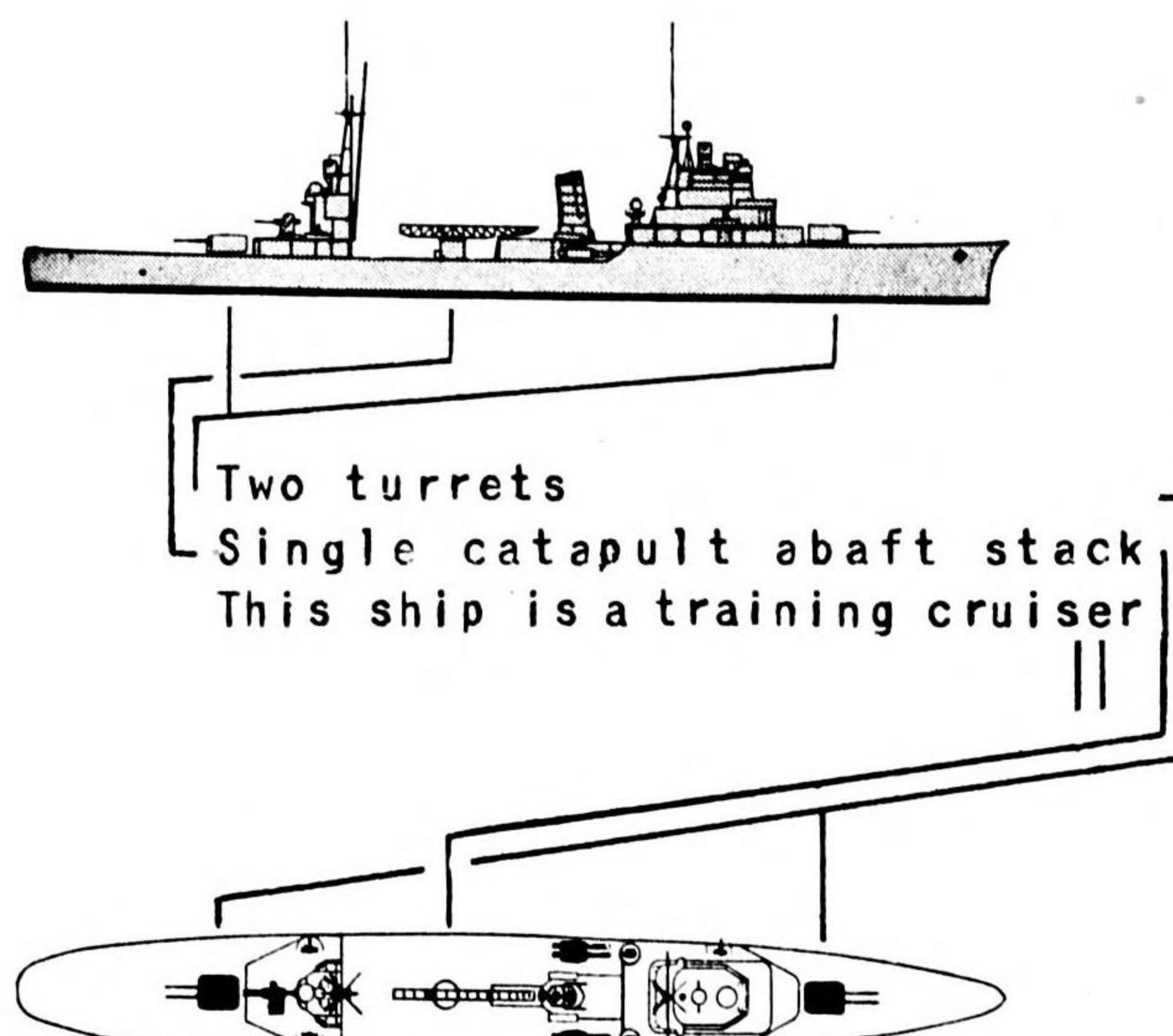


OYODO 620' o. a.



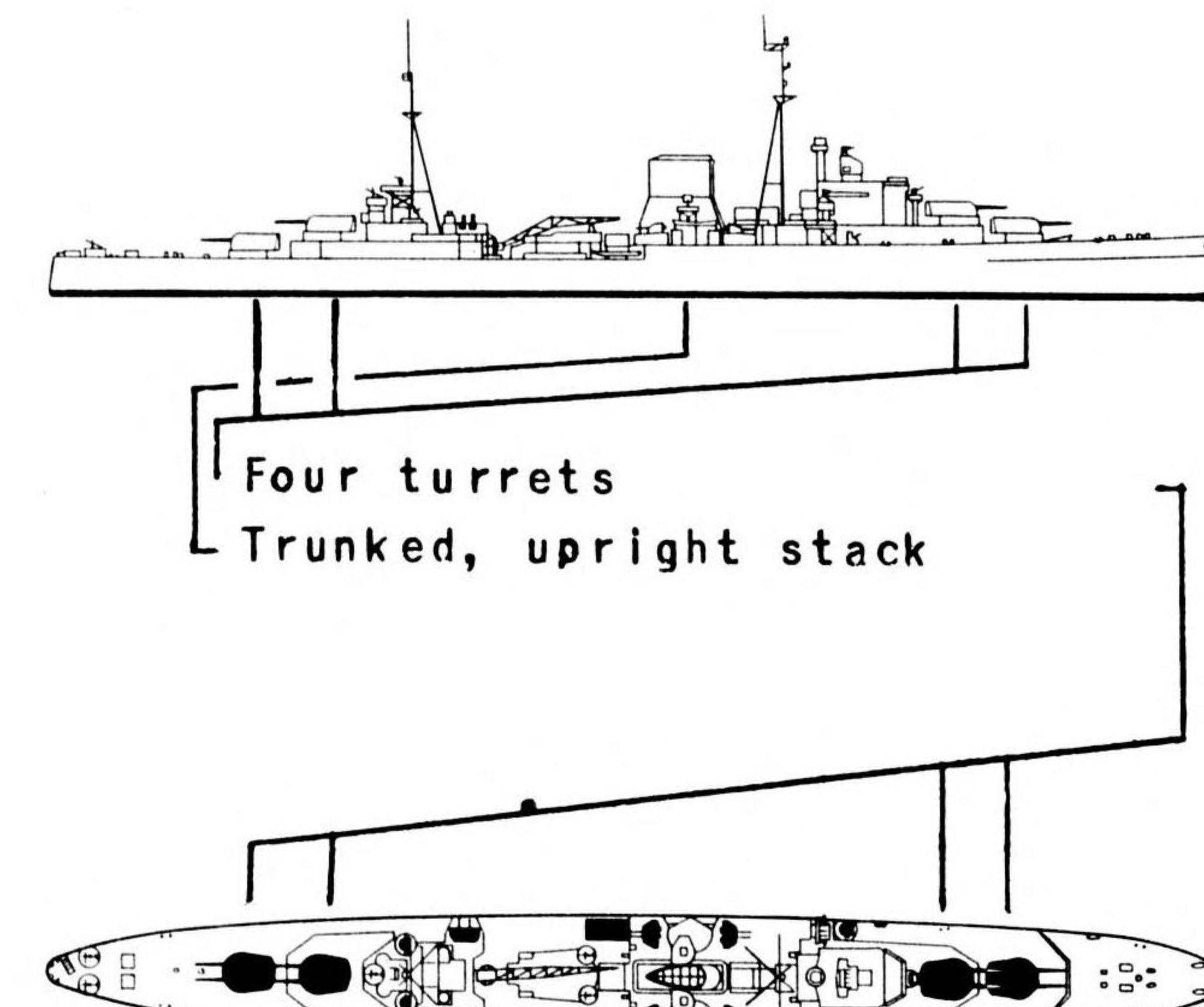
JAPAN

KASHIMA	452' o. a.
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GREAT BRITAIN

LEANDER Class	555' o. a.
LEANDER (R. N. Z. N.)	ORION
ACHILLES (R. N. Z. N.)	AJAX



In view of the fact that nearly all British and United States light cruisers have two stacks, there is little possibility of confusion with Japanese CL's. The only allied light cruisers which bear a resemblance to any Japanese ships are the ST. LOUIS and the units of the BROOKLYN-PHOENIX Classes, which have the same forward turret arrangement and the same number of stacks as the NACHI and ATAGO Classes of Japanese heavy cruisers. In all other respects, however, they differ, i. e., type of stacks, type of superstructure, transom sterns vs. cruiser sterns, over-all length, etc.

On the basis of turrets alone, the single stack light cruisers can be easily identified. There is one feature of the AGANO Class, however, which is even more apparent than her large turrets, i. e., the seaplane deck abaft the stack. The great difference in over-all lengths between the KASHIMA and the LEANDER Class is a good feature for distinguishing these ships. Thus, with the combination of these features, there should be no difficulty

in identifying the single stack light cruisers.

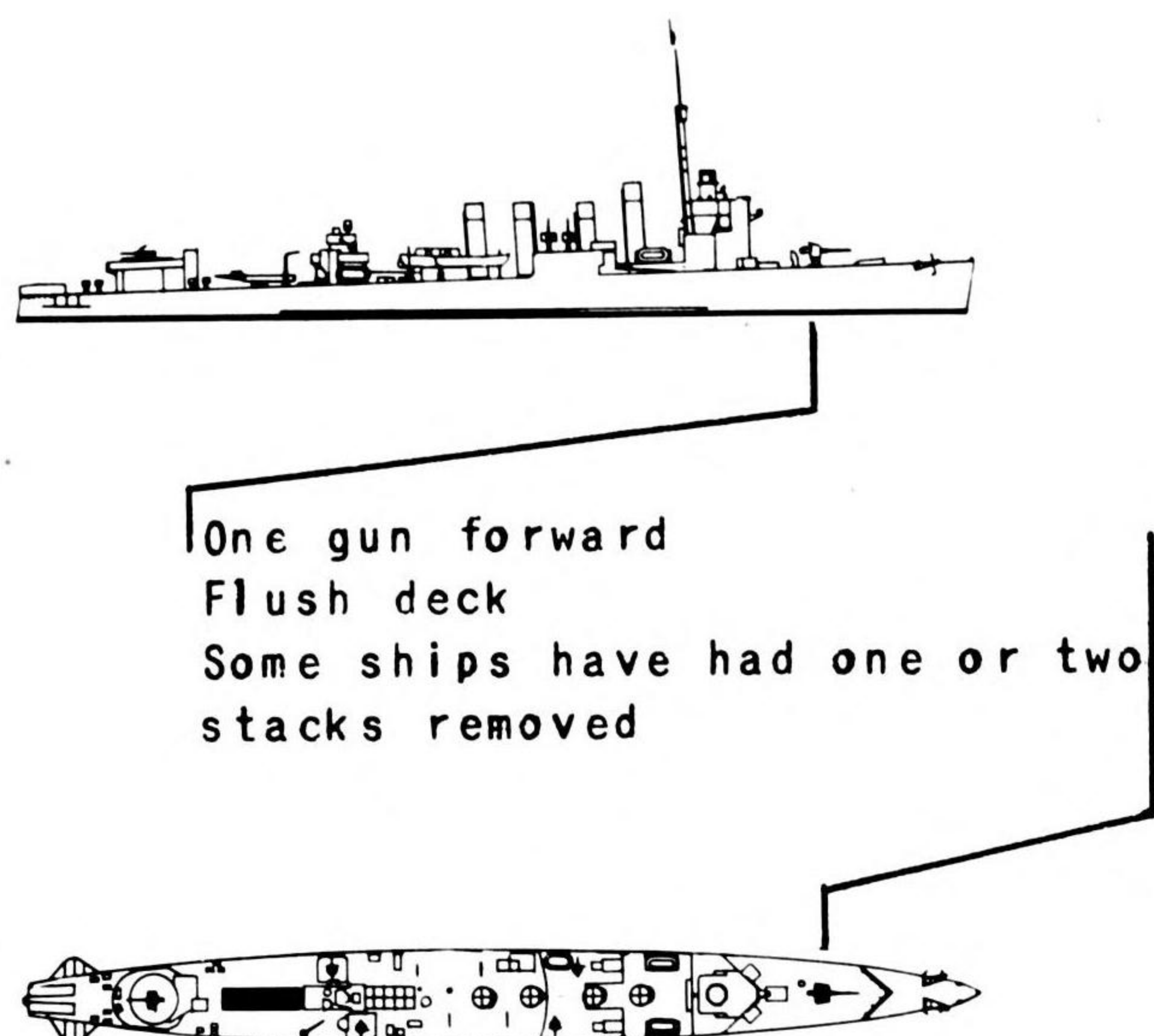
According to recently published information, only one ship of the AGANO Class, either YAHAGI or SAKAWA, remains afloat.

DESTROYERS

4 STACKS—2 STACKS (2 SMALLER THAN 1)

UNITED STATES GREAT BRITAIN

FLUSH DECKERS - TOWN Class 314' o. a.



One gun forward
Flush deck
Some ships have had one or two stacks removed

Of the original flush-deck destroyers built by the United States in 1917-1921, few have been retained as destroyers, and these few have nearly all been altered to three stacks and have a modified armament arrangement. The majority of units are now operating as APD's and AVD's in which cases the two forward stacks have been removed, or as DM's or DMS's for which duty the No. 4 stack has been removed. In all cases, the armament has been radically altered.

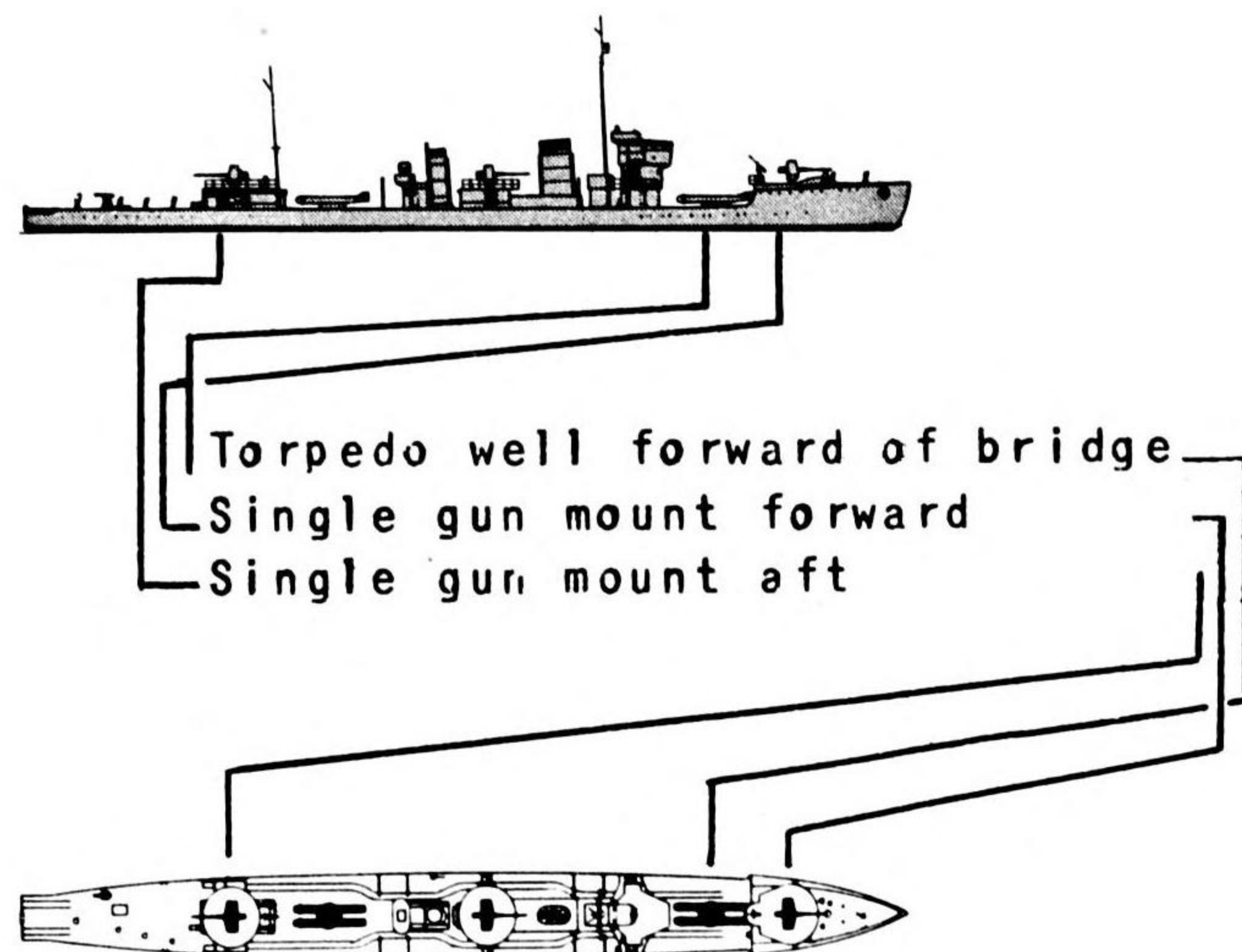
Fifty of these ships went to the United Kingdom in 1940 (TOWN Class) and although alterations have been made including reduction in the number of stacks in some cases, they retain their original appearance more than any others.

Another four-stack destroyer not shown here is high-forecastled, "1000 tonner", the U. S. S. ALLEN, which is still on Fleet duty.

One of the old four-stackers, the STEWART, was captured by the Japanese at Soerabaja and is probably operating with their fleet.

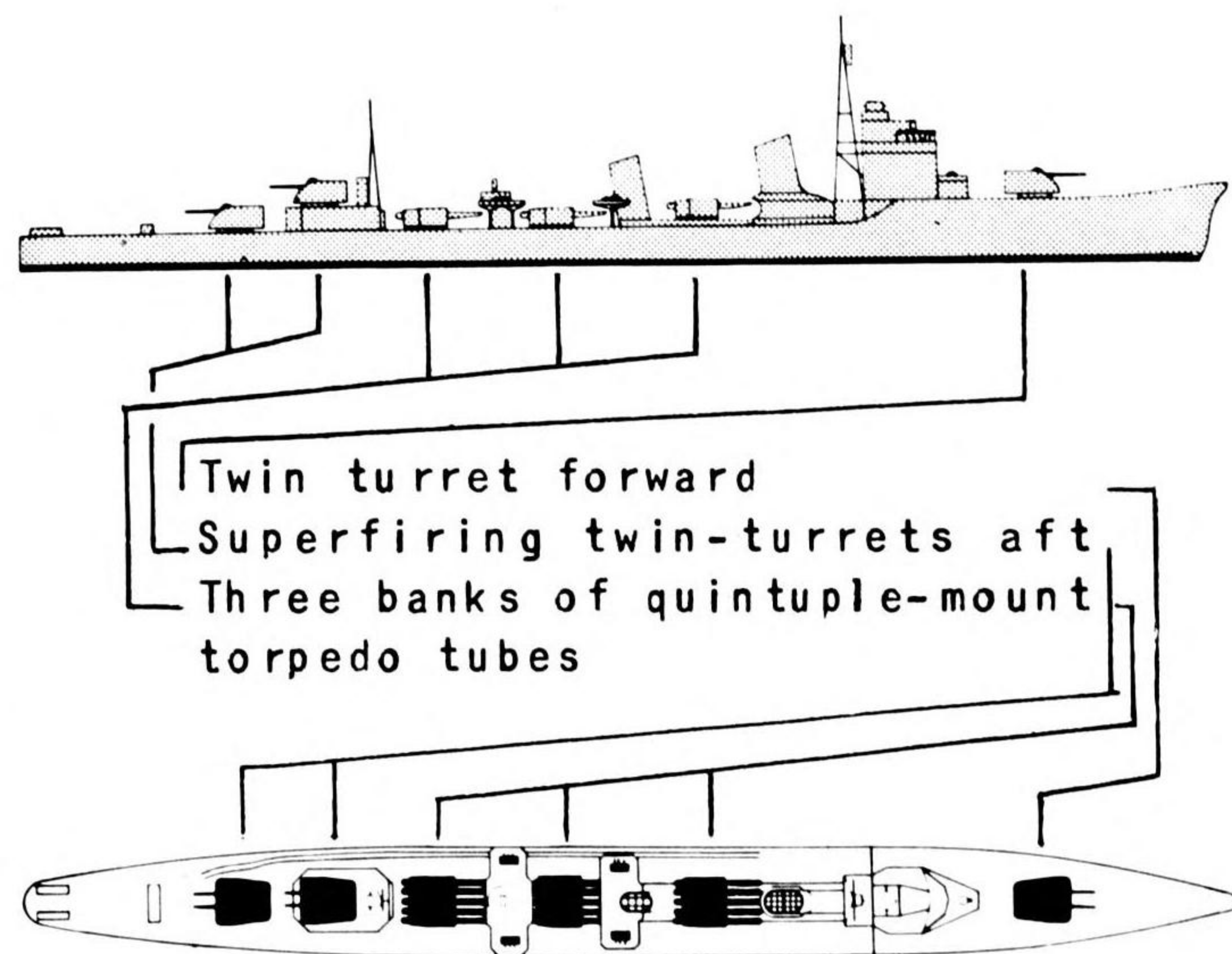
JAPAN

KURI-WAKATAKE Class 287' o. a.



Torpedo well forward of bridge
Single gun mount forward
Single gun mount aft

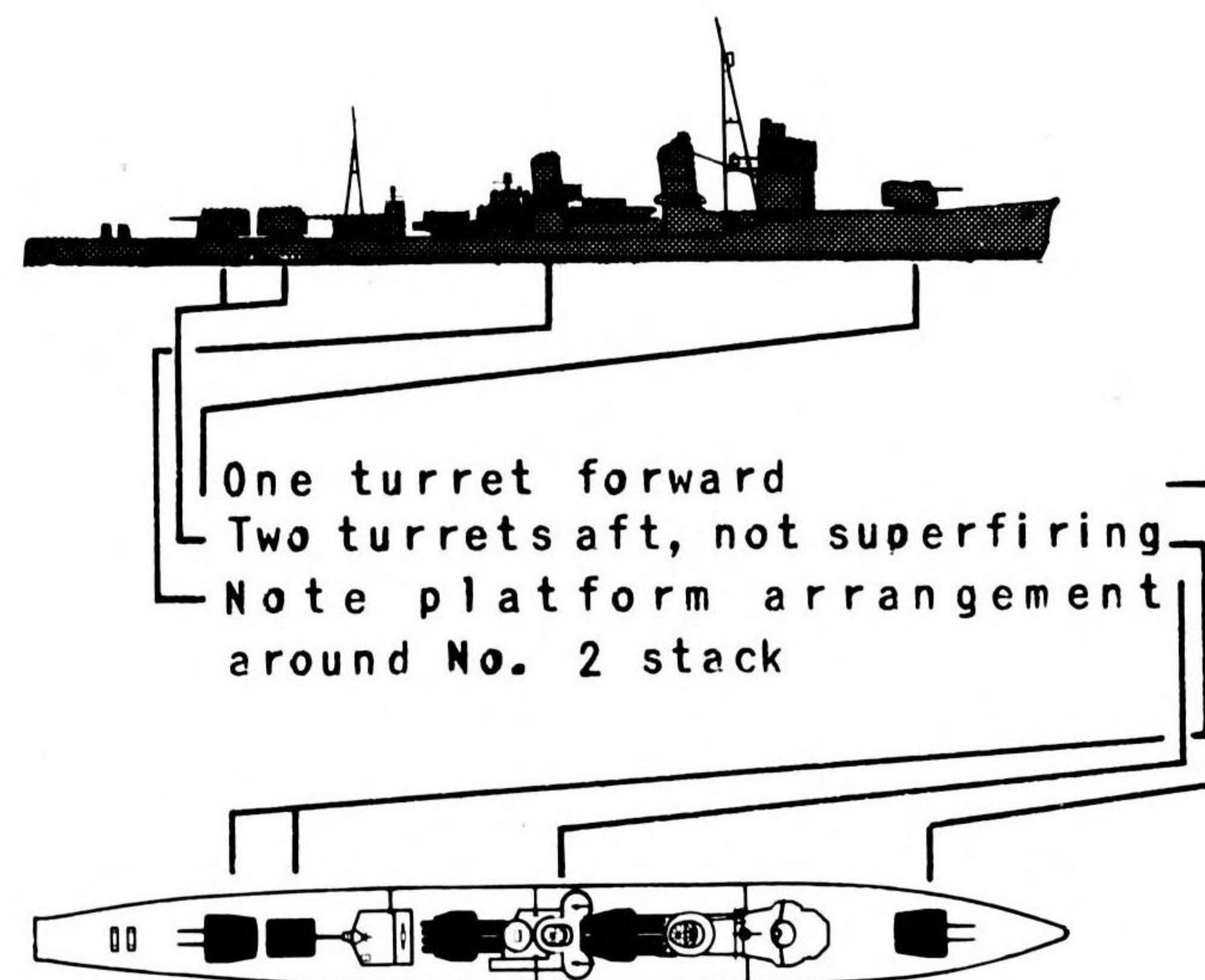
SHIMAKAZE Class approx. 415' o. a.



Twin turret forward
Superfiring twin-turrets aft
Three banks of quintuple-mount torpedo tubes

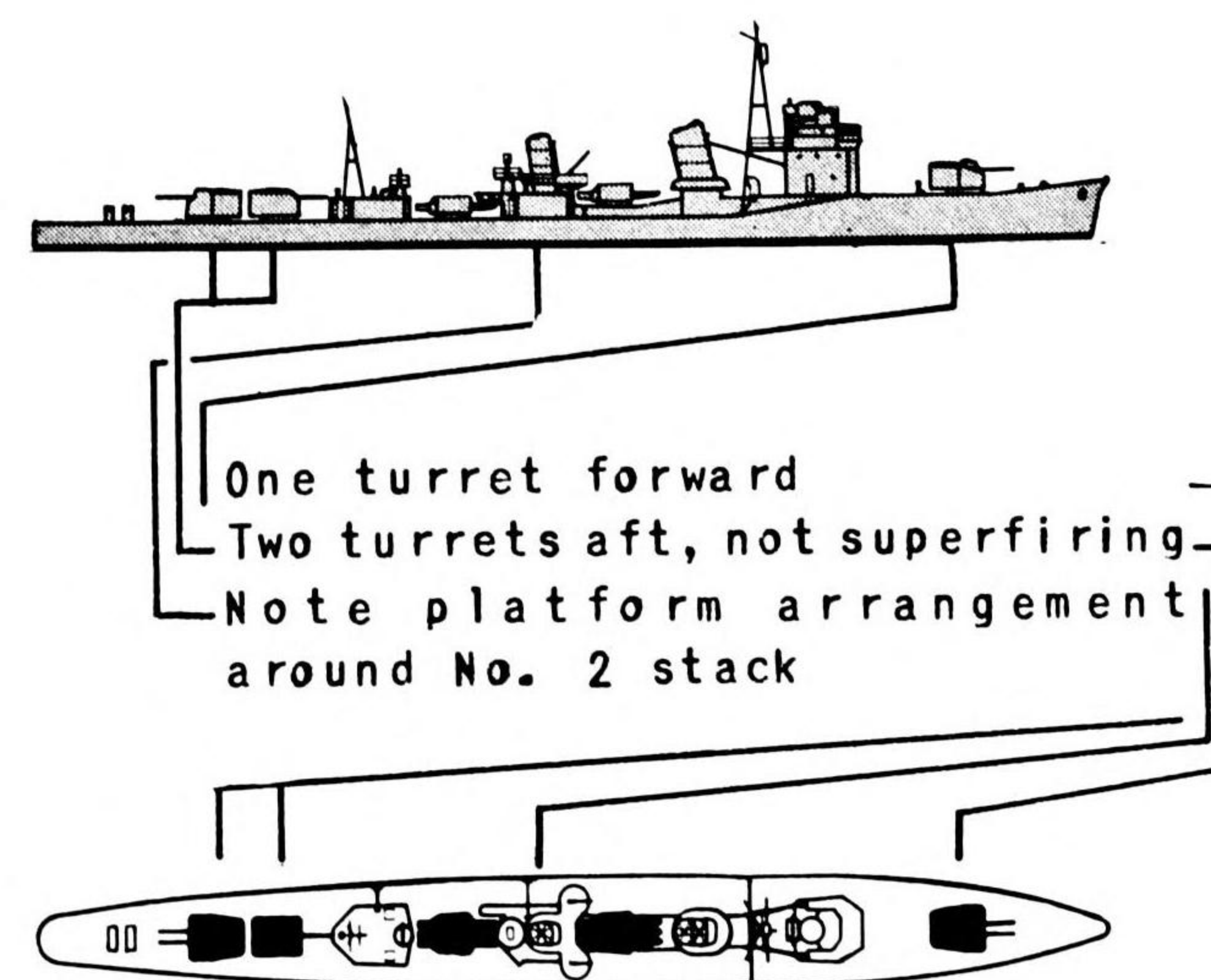
JAPAN

SHIGURE Class 341' o. a.



One turret forward
Two turrets aft, not superfiring
Note platform arrangement around No. 2 stack

HATSUHARU Class 344' o. a.



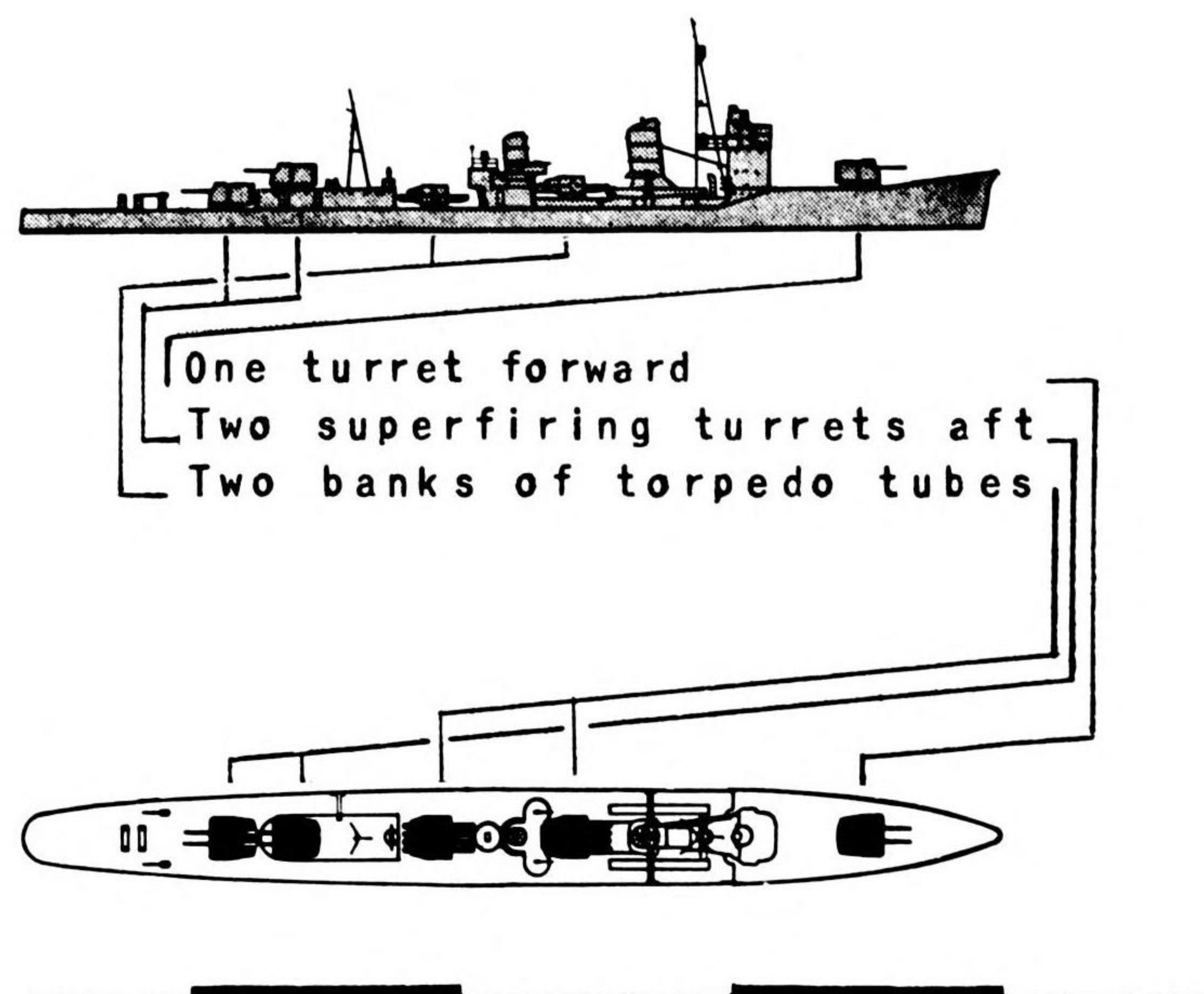
One turret forward
Two turrets aft, not superfiring
Note platform arrangement around No. 2 stack

DESTROYERS

2 STACKS (2 SMALLER THAN 1)

JAPAN

ASASHIO-KAGERO Class 362' o. a.



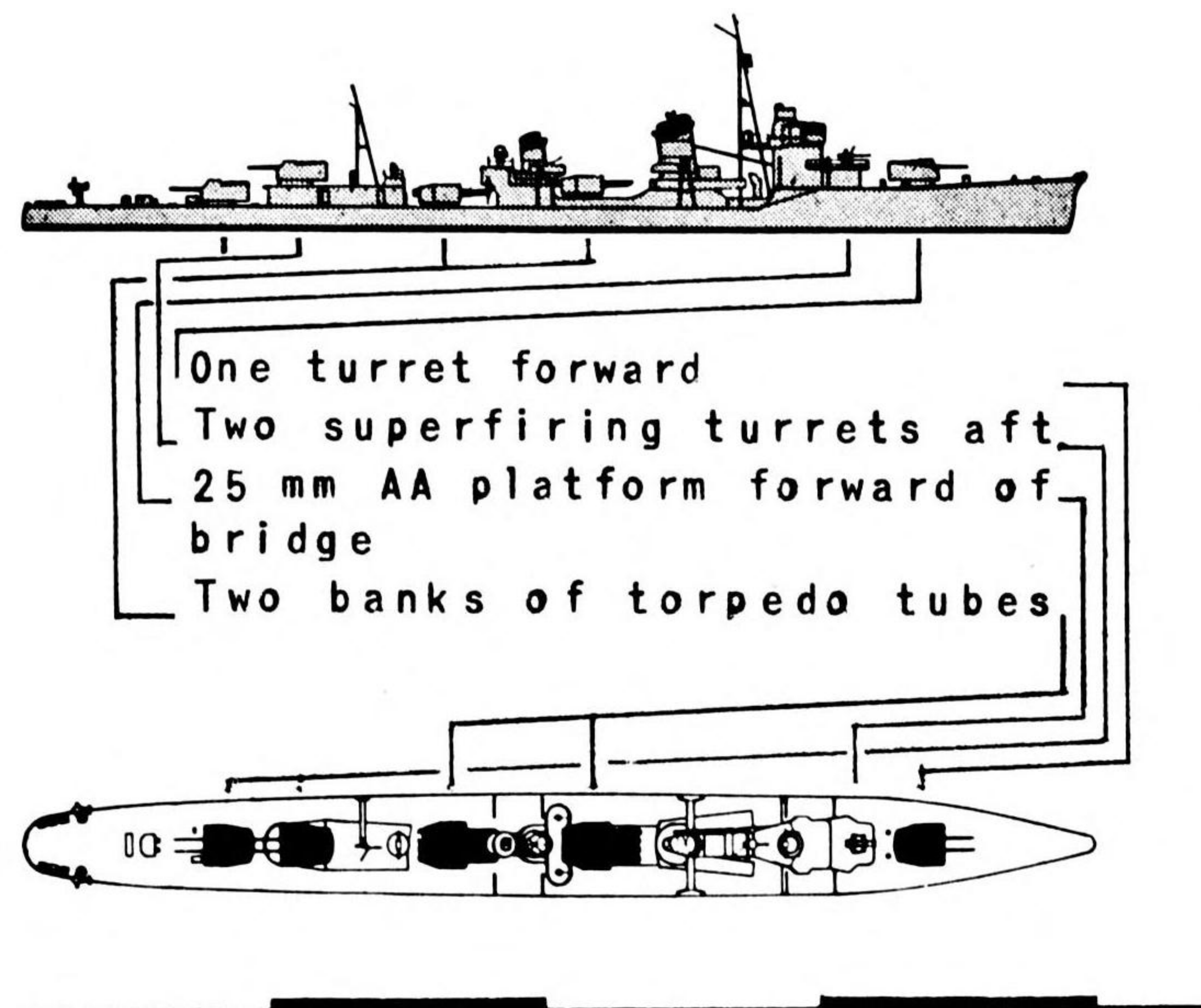
For the destroyers having the No. 1 stack of greater diameter than the No. 2 stack, there should be no problem in nationality. The TRIBAL Class constitute the only British or American destroyers having this feature and these ships carry two twin mounts forward while the Japanese ships have a single mount or a single turret forward.

Actual class identification for the Japanese ships of this sub-division is somewhat difficult due to strong similarity between several of the classes. The SHIGURE and HATSUHARU Classes are the most difficult to differentiate as they are identical in all major features, even the lengths being too nearly equal to use as a feature for positive identification. In good quality, large scale photos the shapes of the platforms around the No. 2 stack will serve to classify these ships. Note that the longest platform is on the starboard side on the SHIGURE Class and on the port side on the HATSUHARU Class. If the photos do not show this feature, both classes should be listed

~~CONFIDENTIAL~~

JAPAN

TAKANAMI Class 382' o. a.



in the interpretation report.

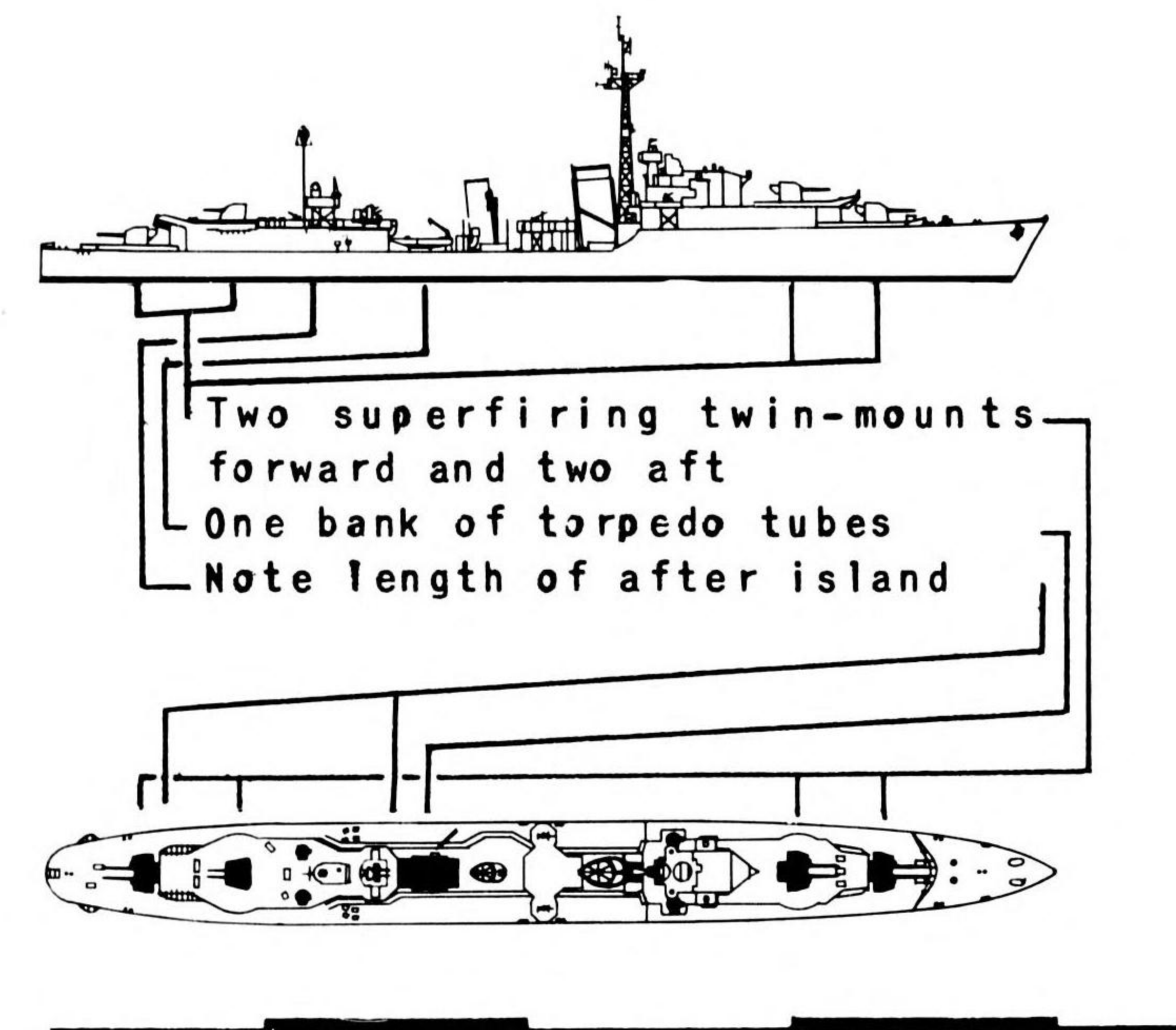
ASASHIO and TAKANAMI Classes will also be confusing, but the difference in overall length will suffice for differentiation of these classes. In addition, note that the TAKANAMI Class has an AA platform forward of the bridge.

The KURI-WAKATAKE Class presents no difficulty. The overall length and the torpedo well forward of the bridge will readily distinguish these ships from the other Japanese destroyers having small No. 2 stacks. The squared stern will also aid in the identification of this class.

The reported SHIMO Class of destroyers has now been identified as an alteration of the TAKANAMI Class, on which the No. 2 turret has been replaced with light AA.

GREAT BRITAIN

TRIBAL Class 377' o. a.



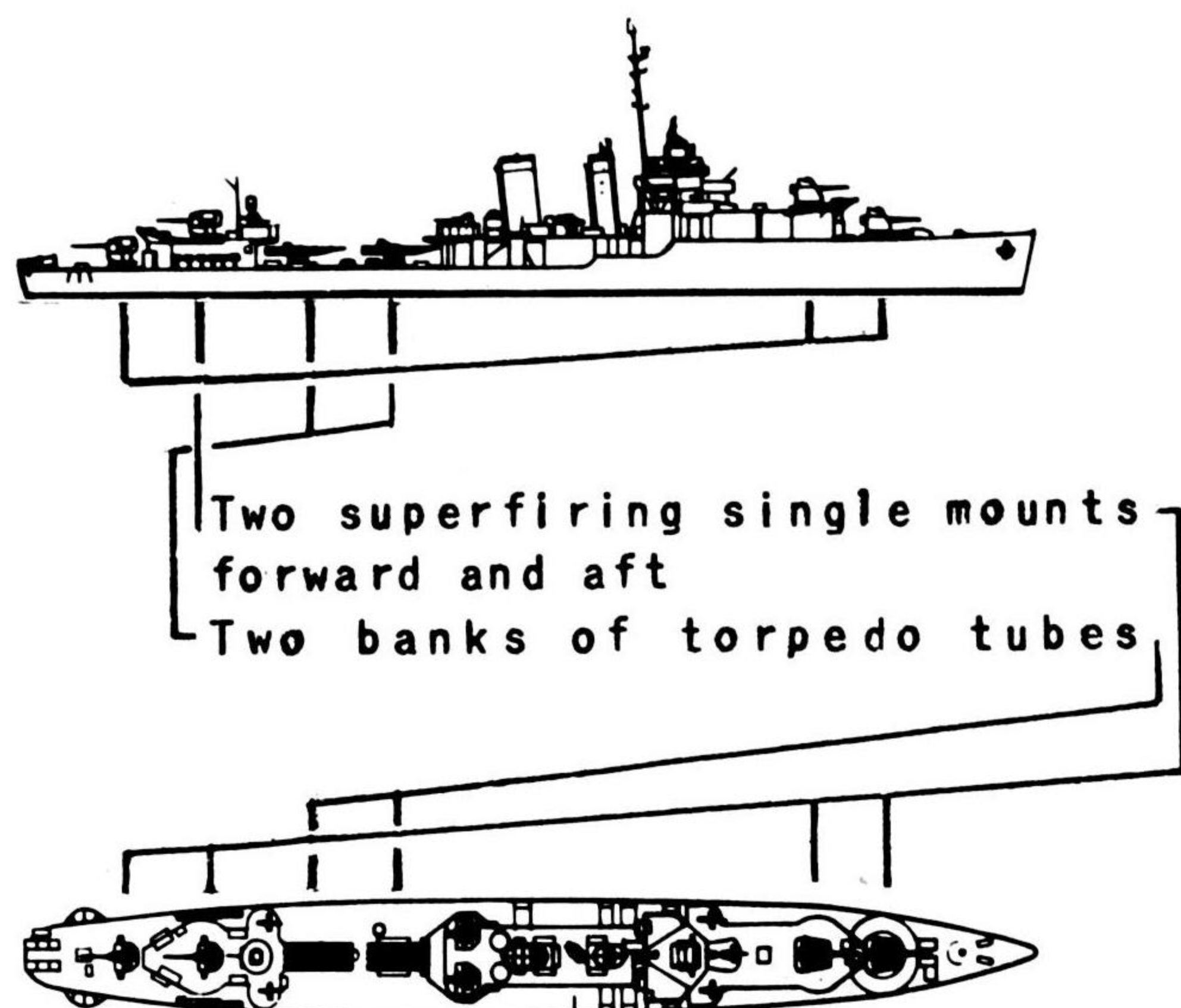
DESTROYERS

2 STACKS (2 LARGER THAN 1)

UNITED STATES

FARRAGUT Class

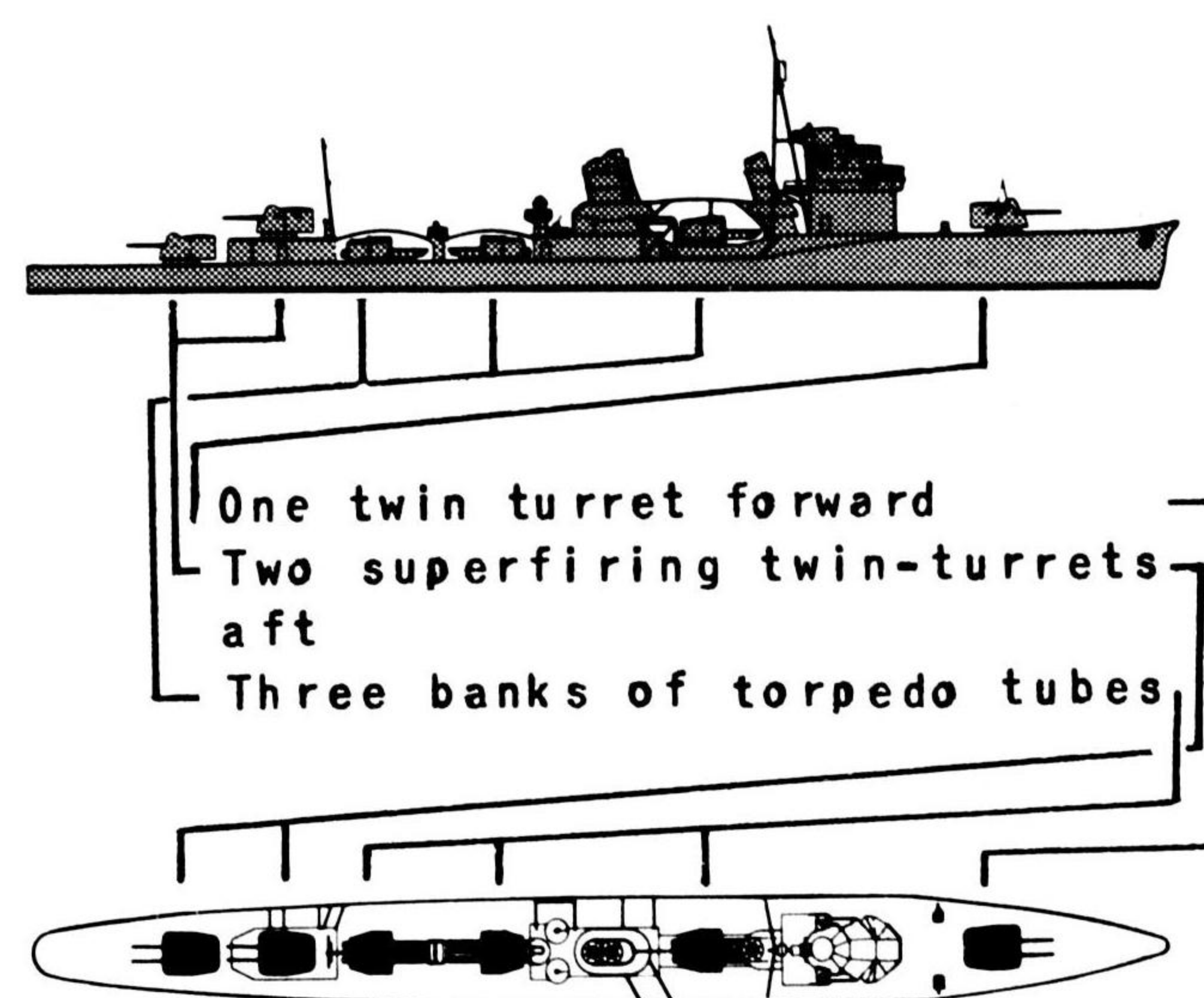
341' o. a.



JAPAN

FUBUKI (HIBIKI) Class

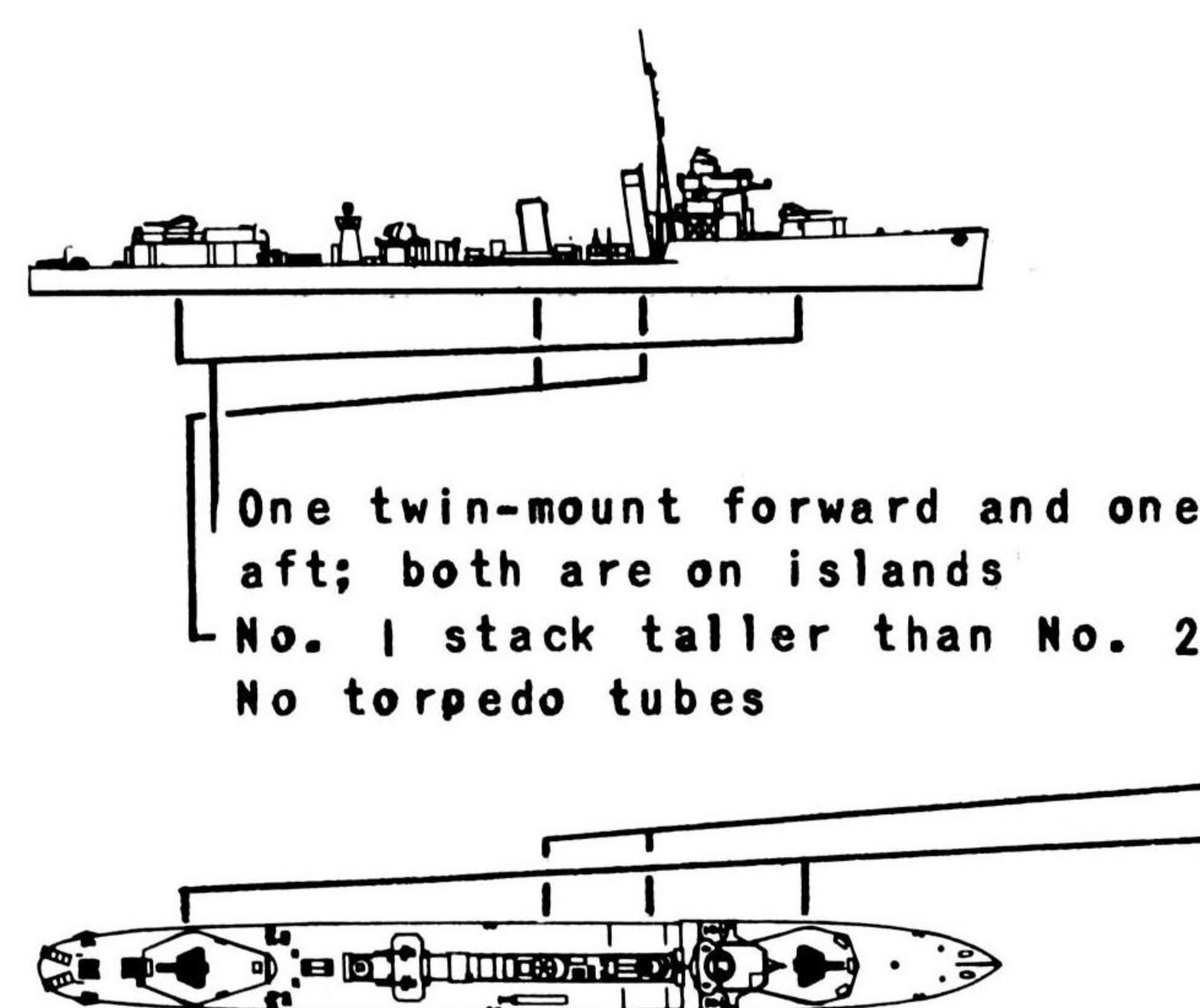
390' o. a.



GREAT BRITAIN

ADMIRALTY "V" and "W" Classes

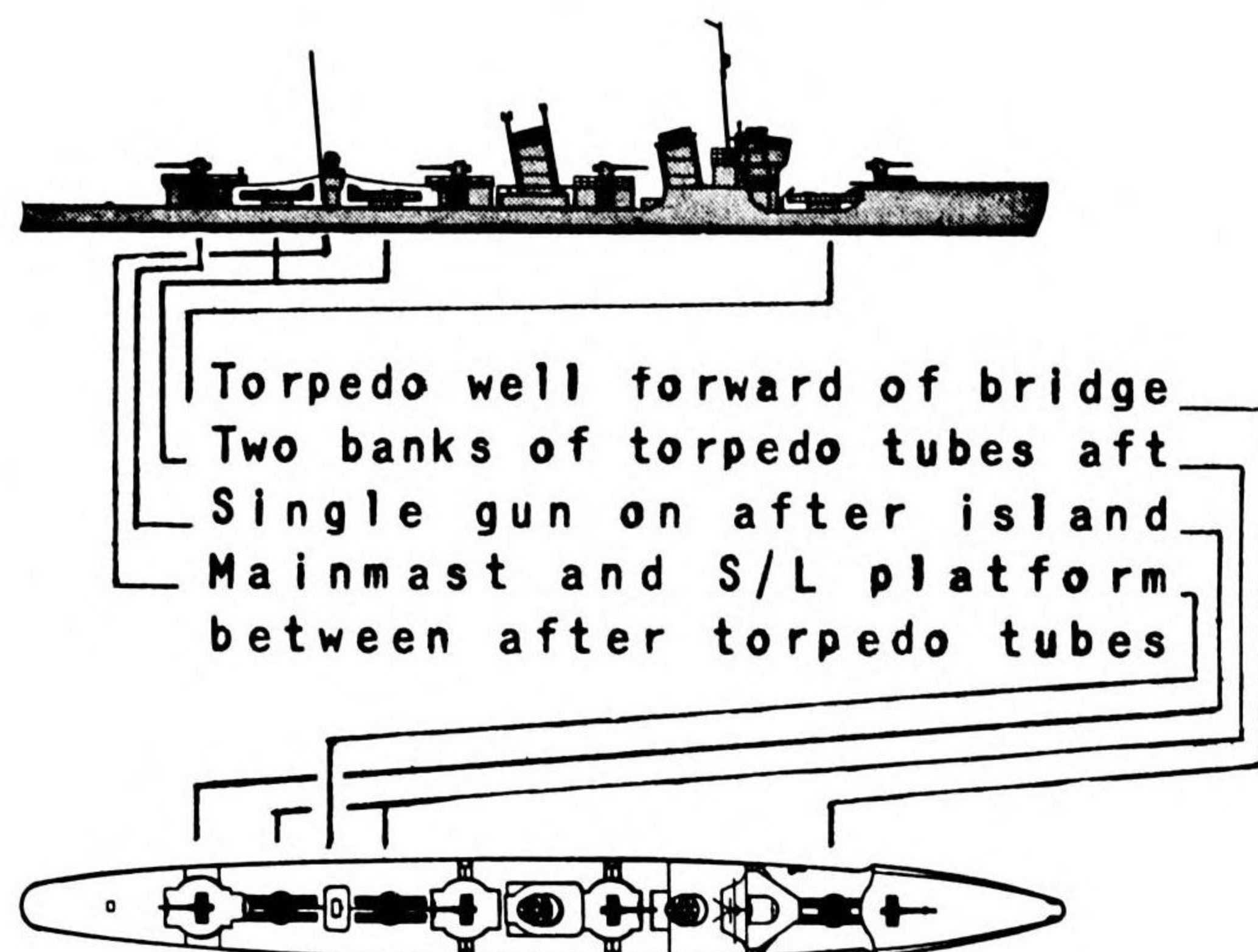
312' o. a.



The HIBIKI Group of the FUBUKI Class constitute the only Japanese destroyers having the No. 2 stack of greater diameter than the No. 1 stack. These ships may be readily differentiated from Allied destroyers having similar stacks on the basis of overall length, number of banks of torpedo tubes, or main battery armament. Note also that the guns on the ships of the HIBIKI Group are in twin mounts in weather turrets.

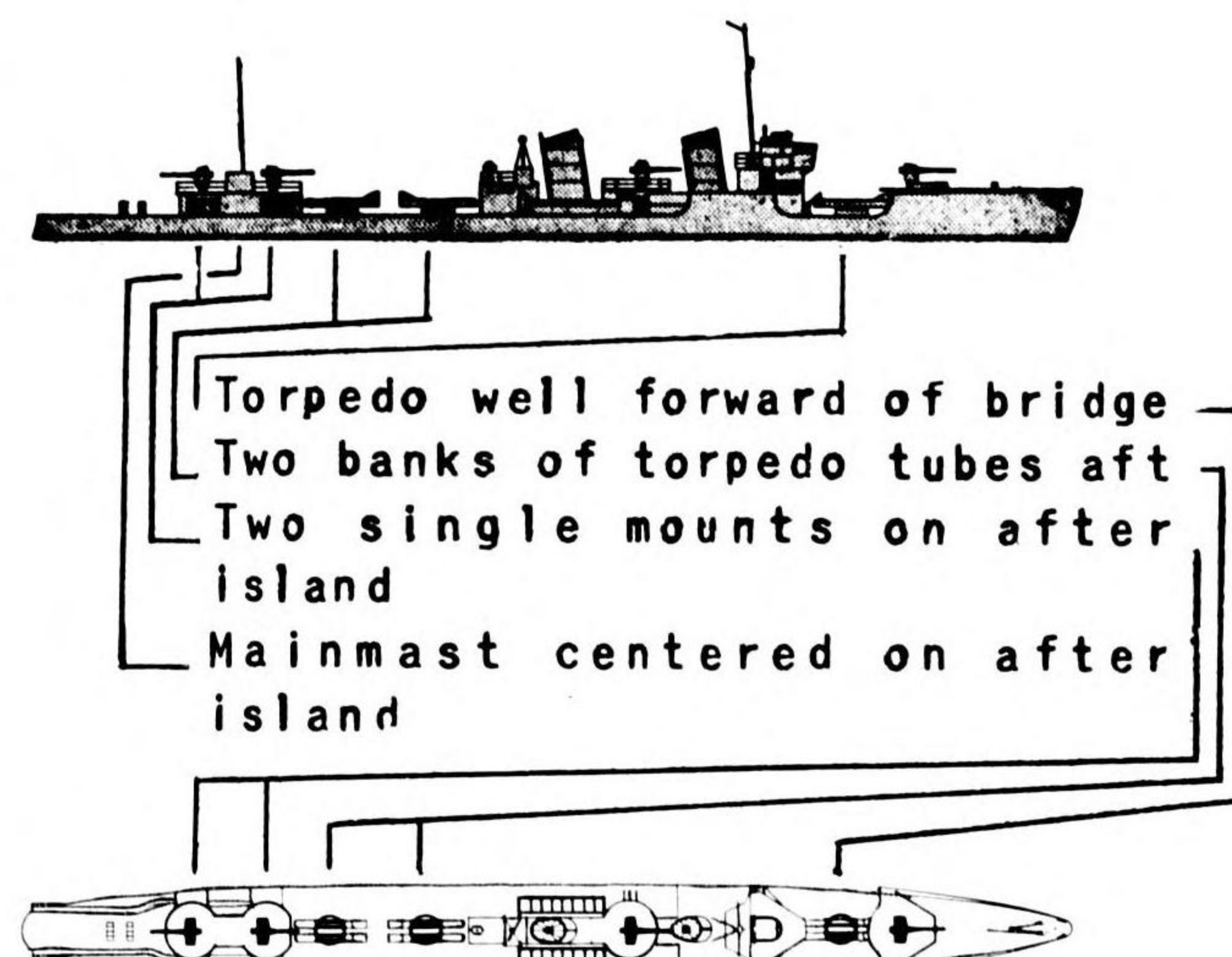
JAPAN

MINEKAZE Class 336' o. a.



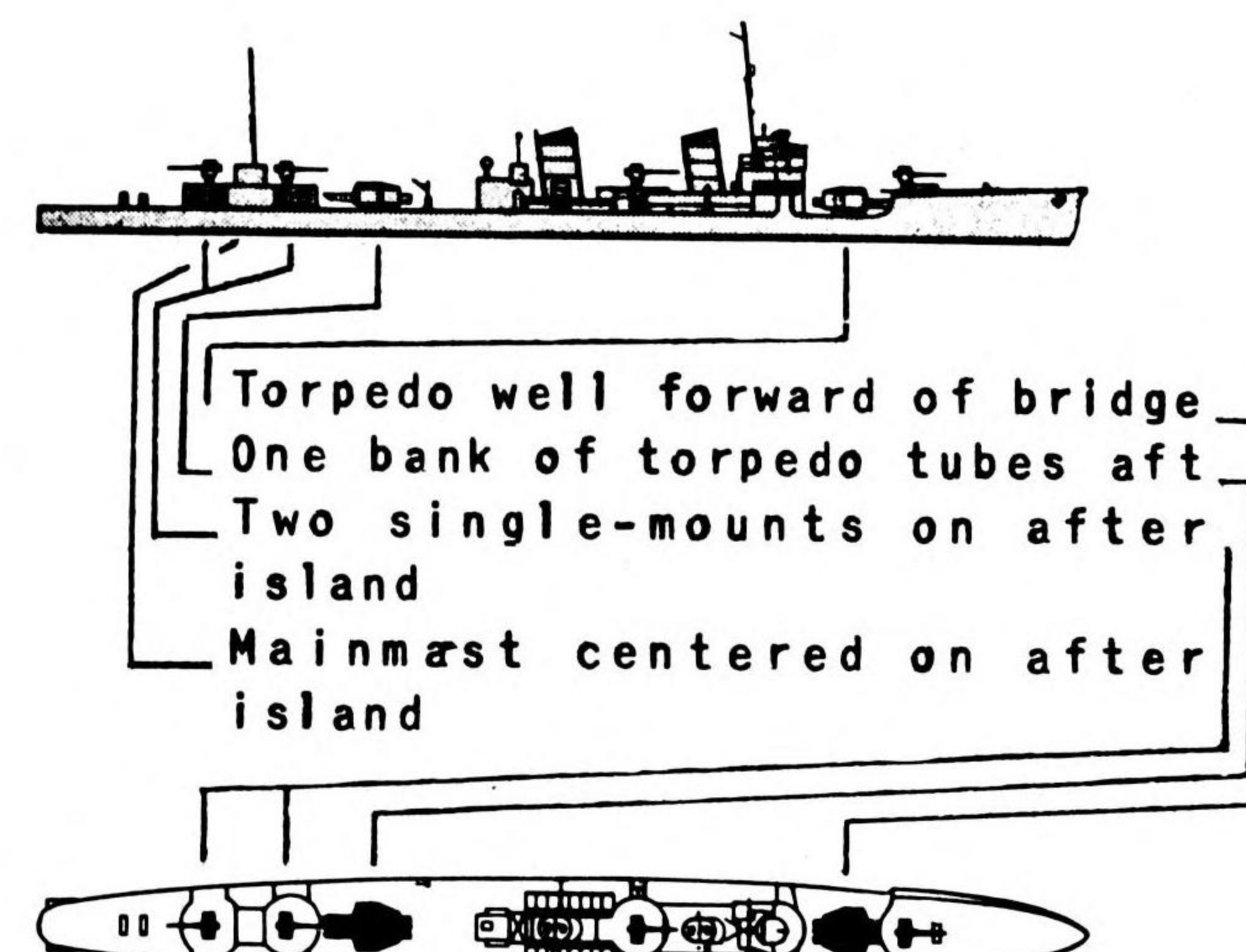
JAPAN

KAMIKAZE Class 336' o. a.

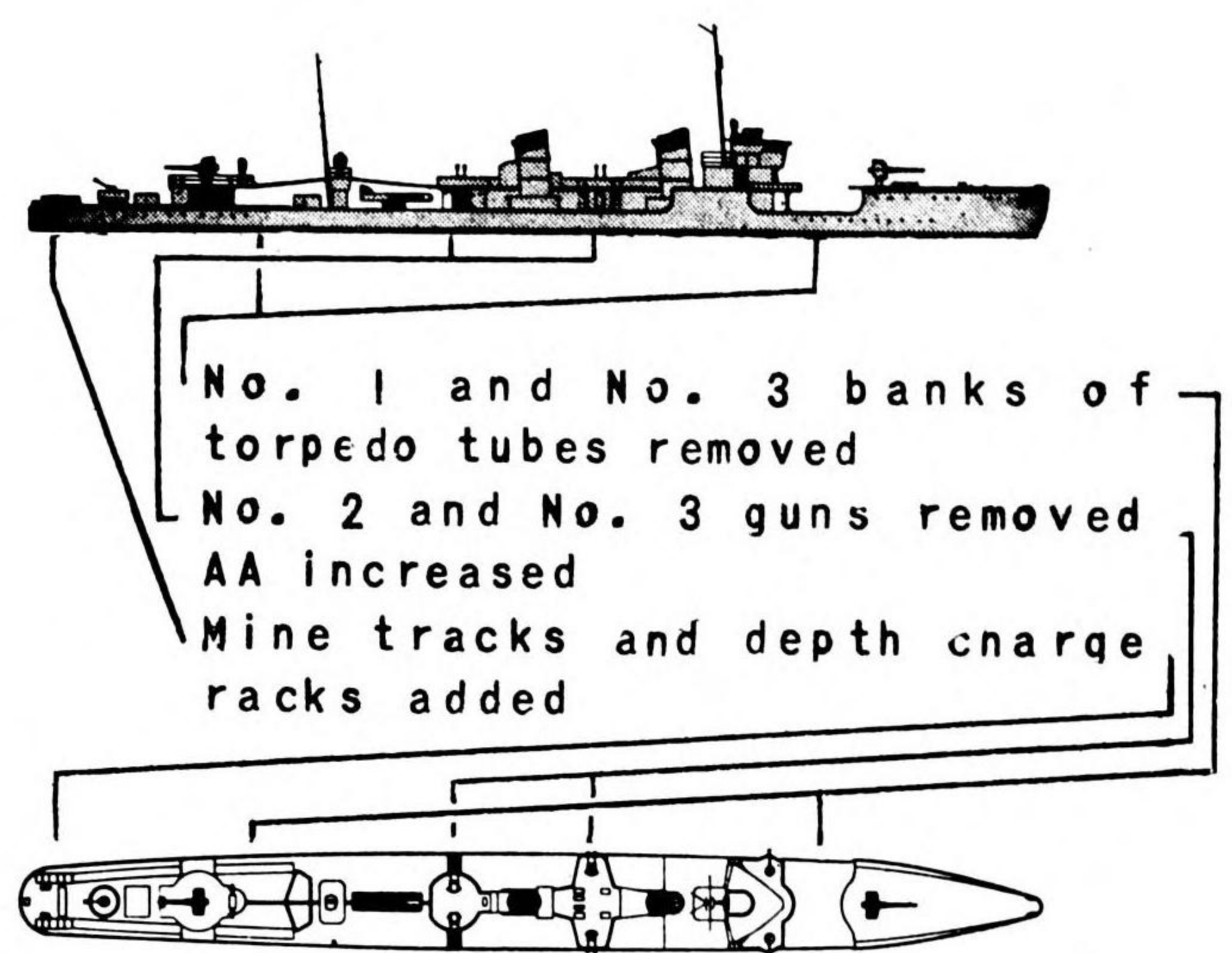


JAPAN

MUTSUKI Class 336' o. a.



MINEKAZE Class (Refit) 336' o. a.



These older Japanese destroyers are characterized by the torpedo well forward of the bridge, a feature not found on British or American units, and found on only one other Japanese Class (KURI-WAKATAKE). As shown previously, the latter can be easily identified by overall length, the relative stack sizes, or the armament.

Differentiation of the classes shown here is not difficult, if the photos are of sufficiently good quality to show the general superstructure features. It is not necessary, for example, to actually observe the guns on the after island. The size and shape of the island itself will tell the interpreter if two mounts are or were ever present. Similarly, it is not necessary to see the stick mainmast on the MINEKAZE Class, as the box-like searchlight platform between the after torpedo tubes provides sufficient evidence and is more readily observed. Note also that the spacing of the superstructure features aft on the MUTSUKI Class does not allow enough deck area for the installation of a second bank of torpedo tubes.

As is the case with the other destroyers, the

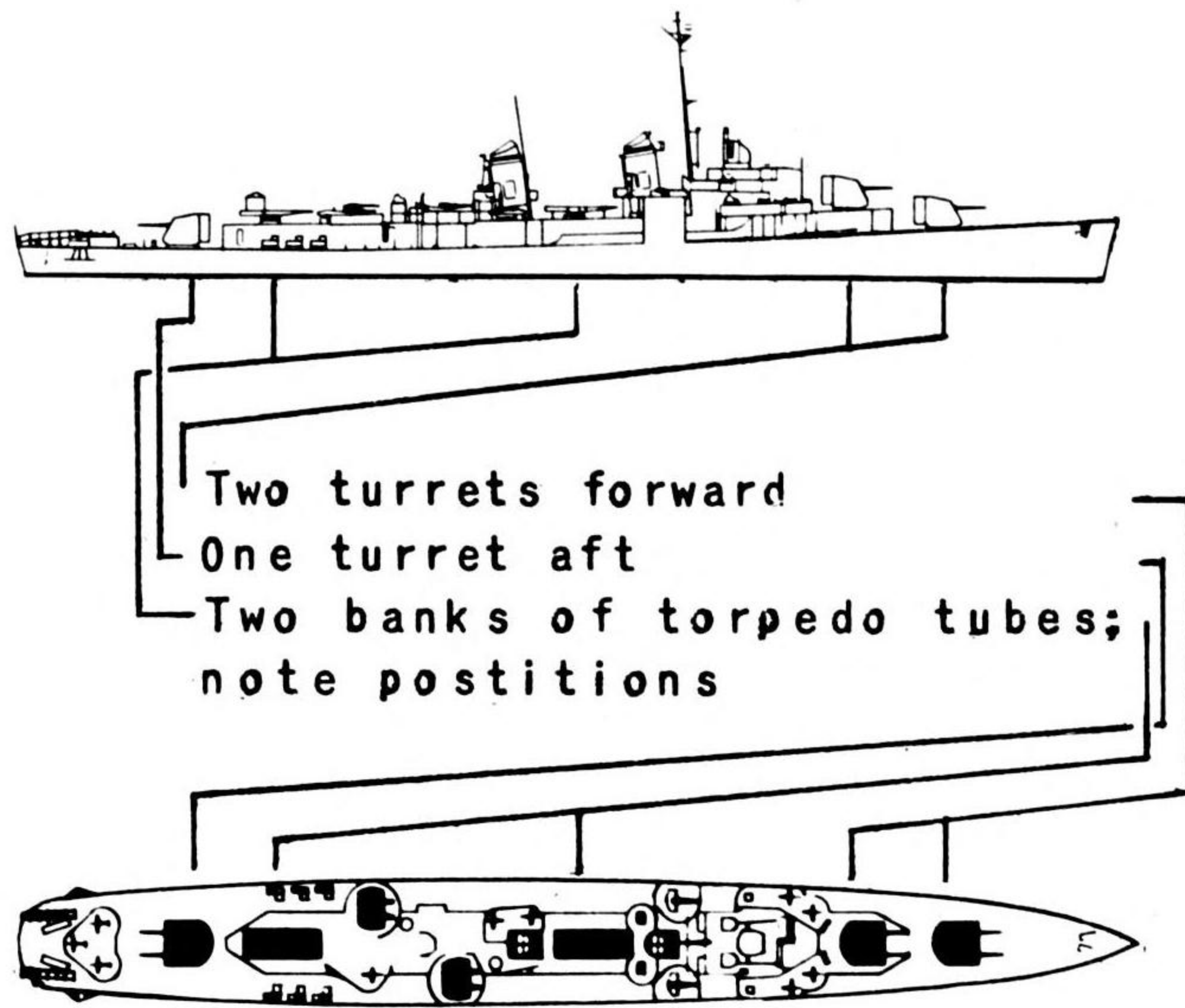
best general feature for differentiating American and Japanese units having two stacks of approximately equal size is the main battery armament forward. Except for the PORTER Class refits, all American ships in this sub-division have two mounts or turrets forward, while the Japanese units have only one. The PORTER Class refits, as well as the British "A" to "I" Classes, have raised AA decks forward of the bridge, which readily segregates these ships from the Japanese destroyers. Note also that the PORTER Class refits carry a single-turret on the after island.

DESTROYERS

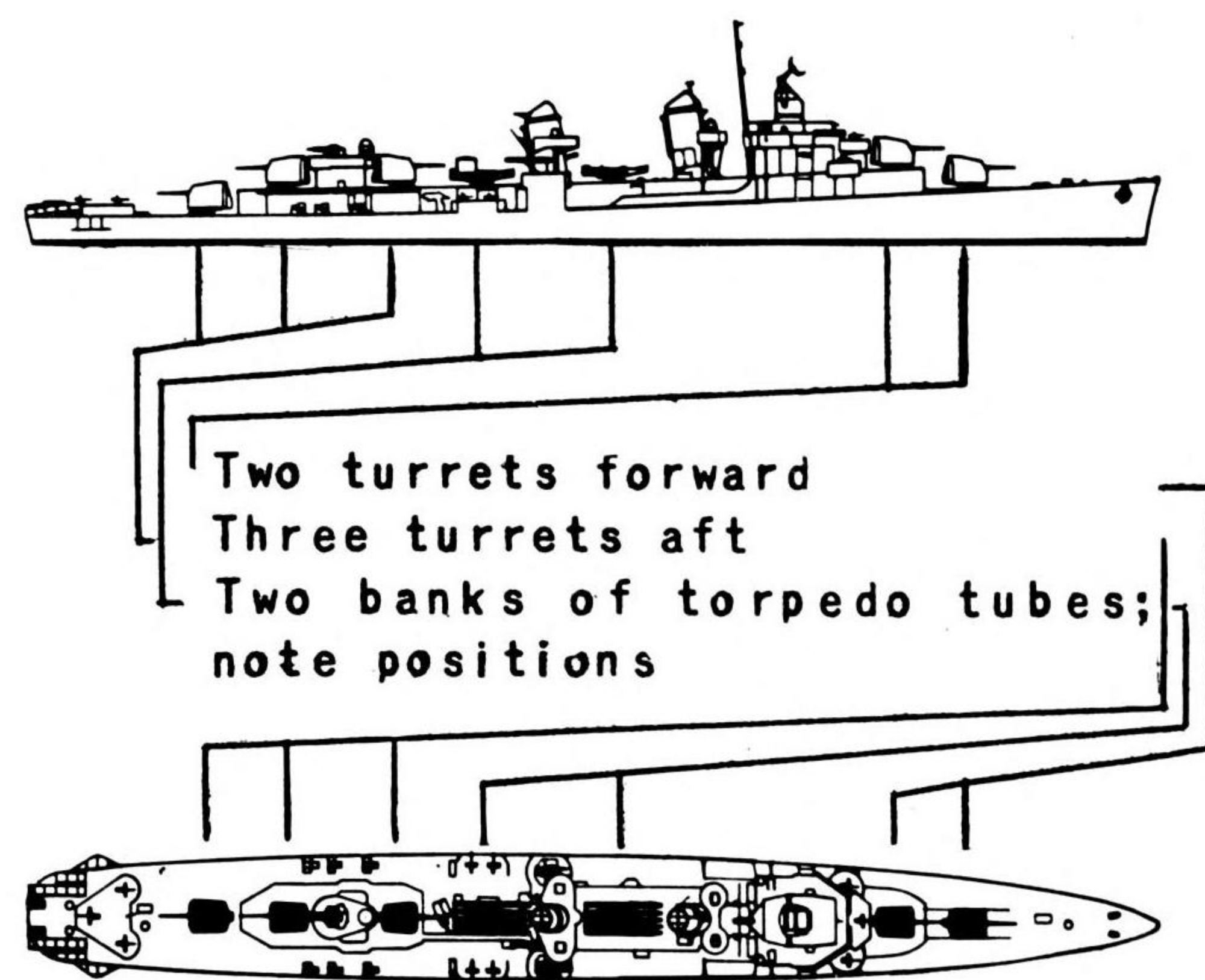
2 STACKS (EQUAL)

UNITED STATES

SUMNER Class 376' o. a.

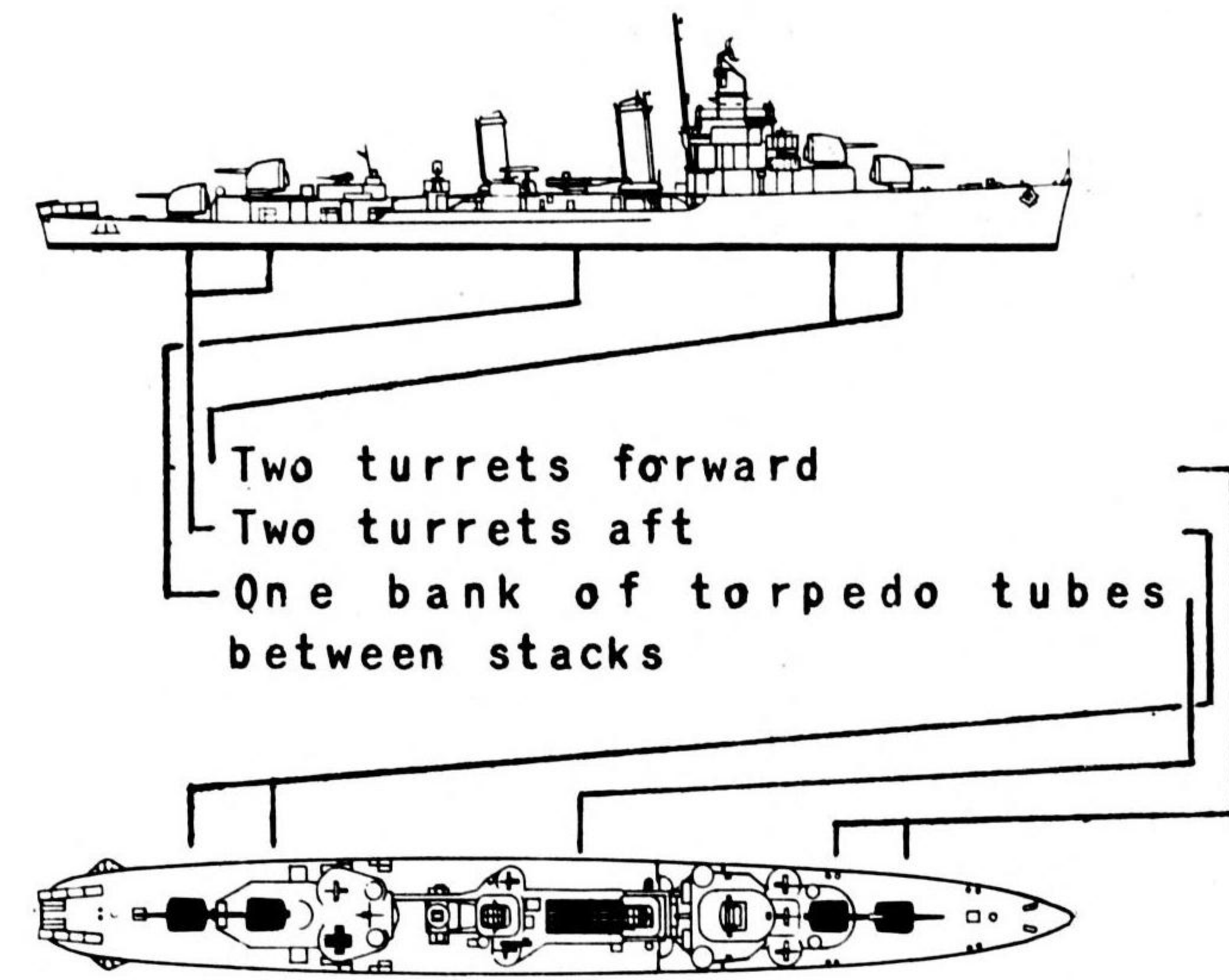


FLETCHER Class 376' o. a.

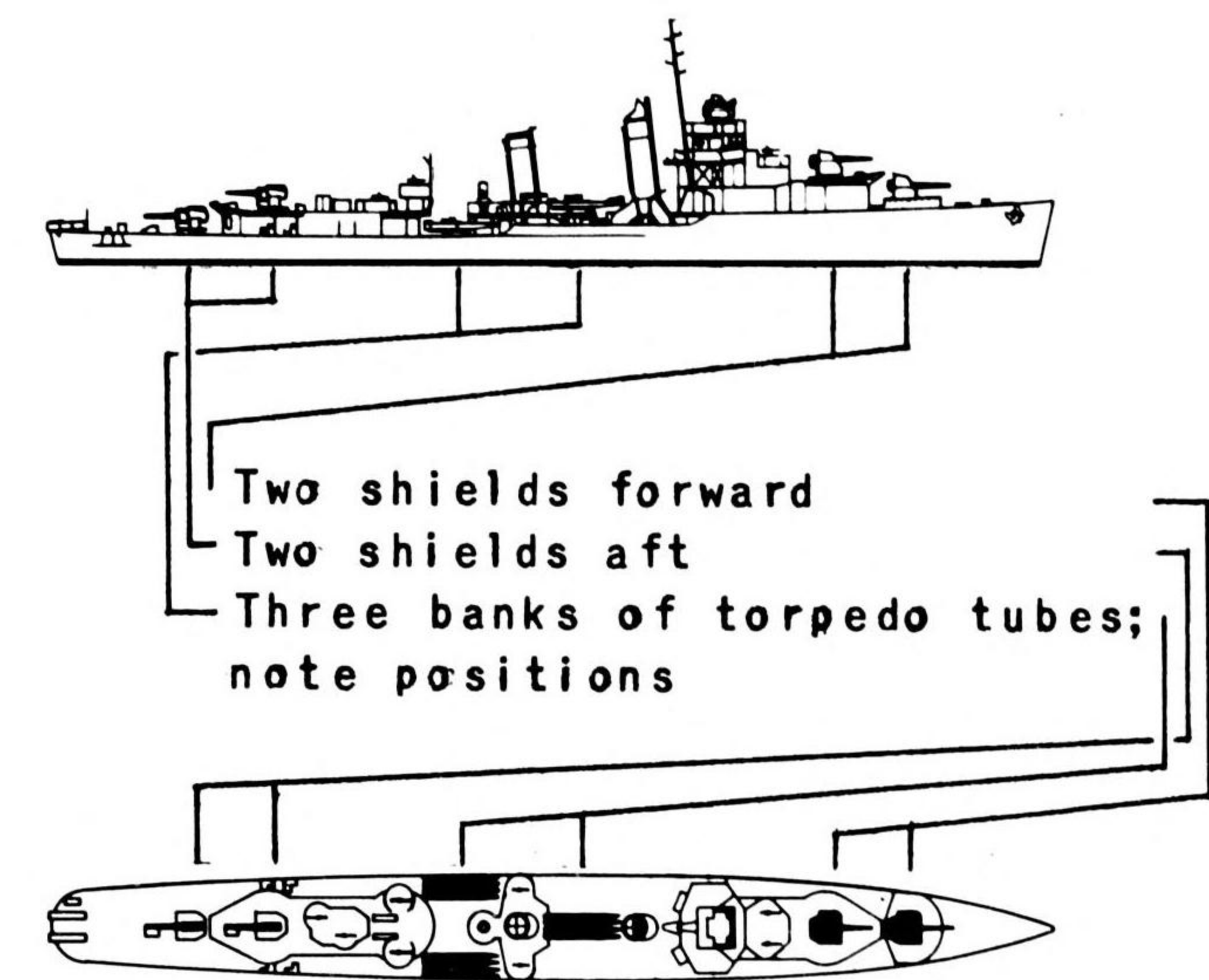


UNITED STATES

BENSON-LIVERMORE Classes 348' o. a.

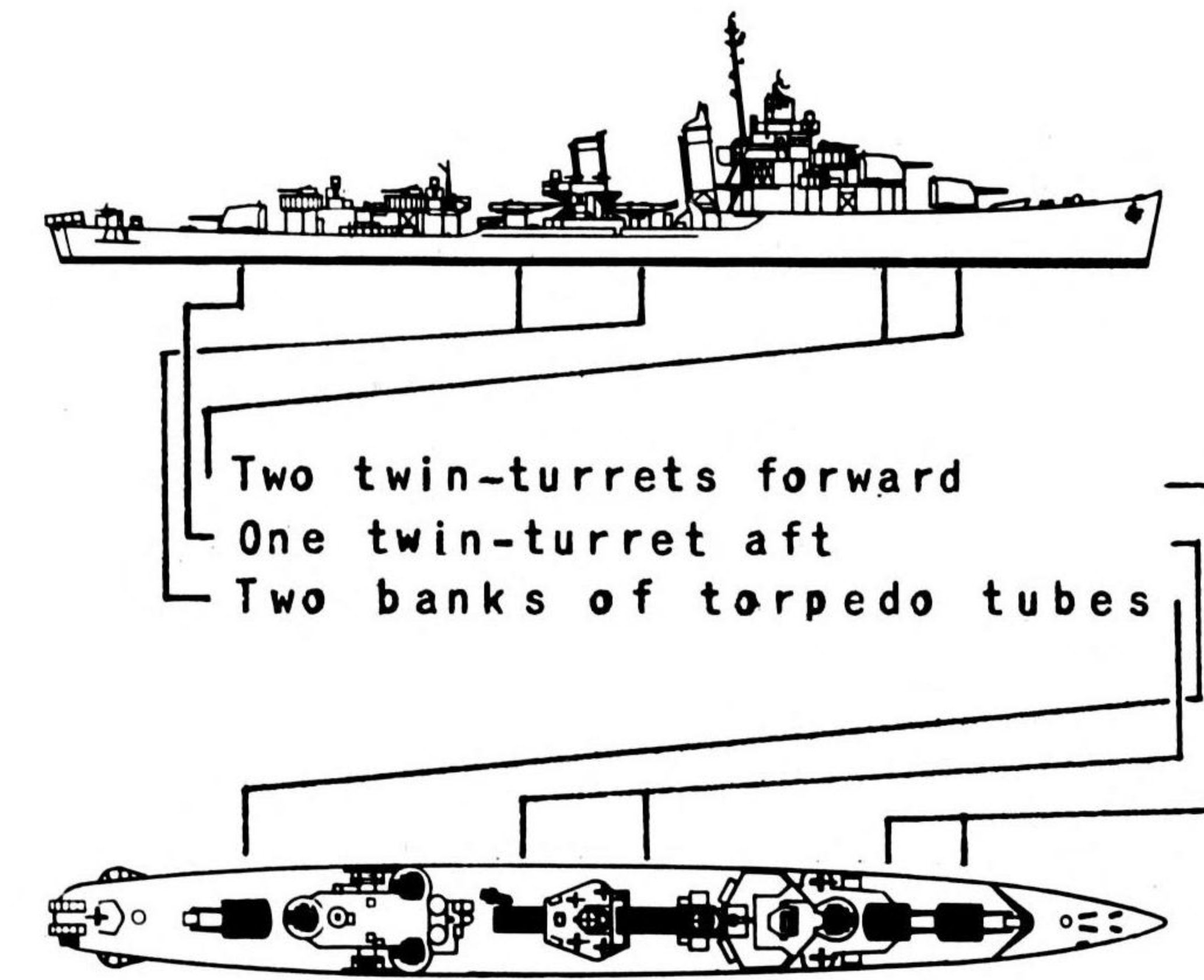


MAHAN-DUNLAP Classes 341' o. a.

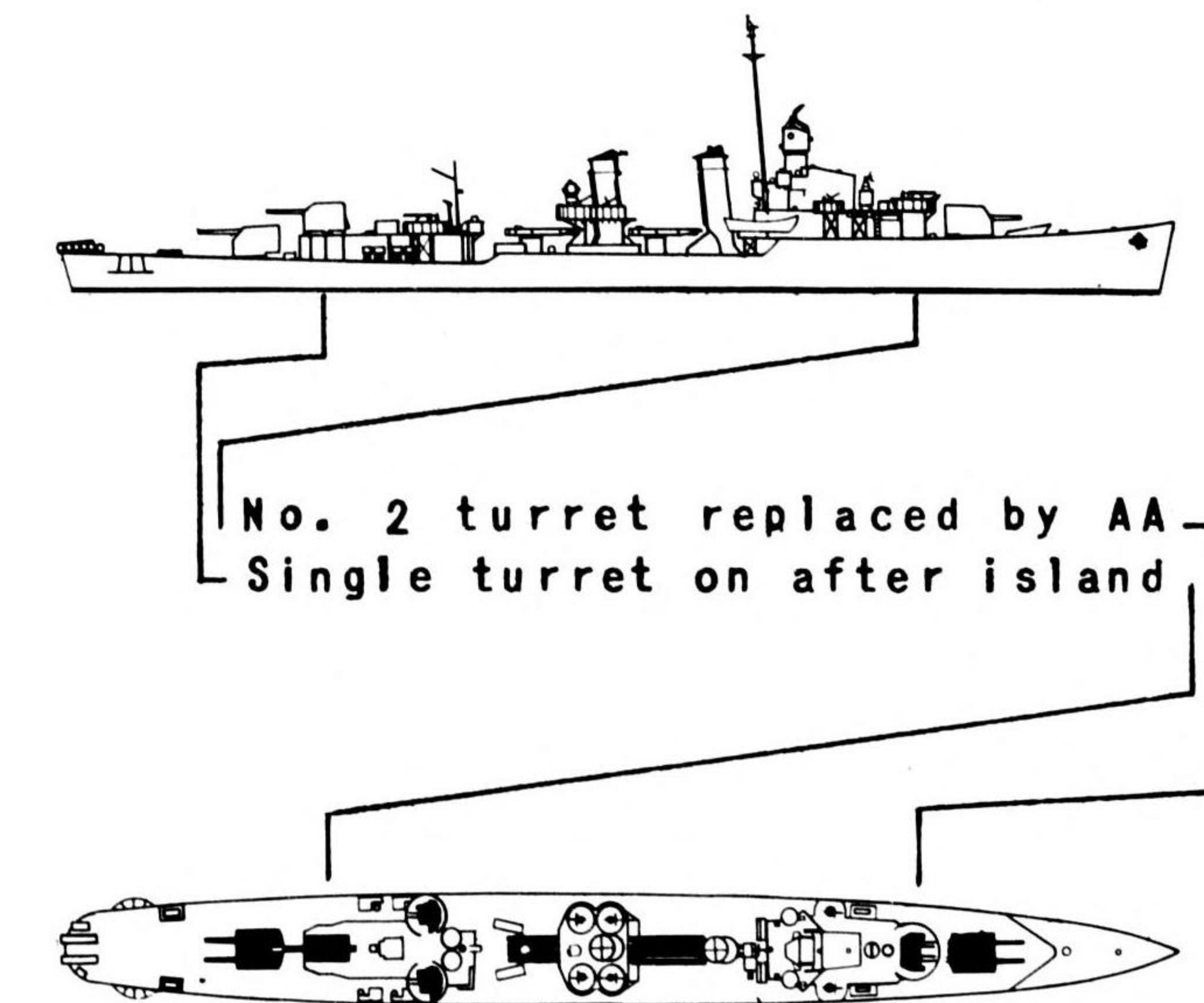


UNITED STATES

PORTER Class 381' o. a.



PORTER Class (Refit) 381' o. a.

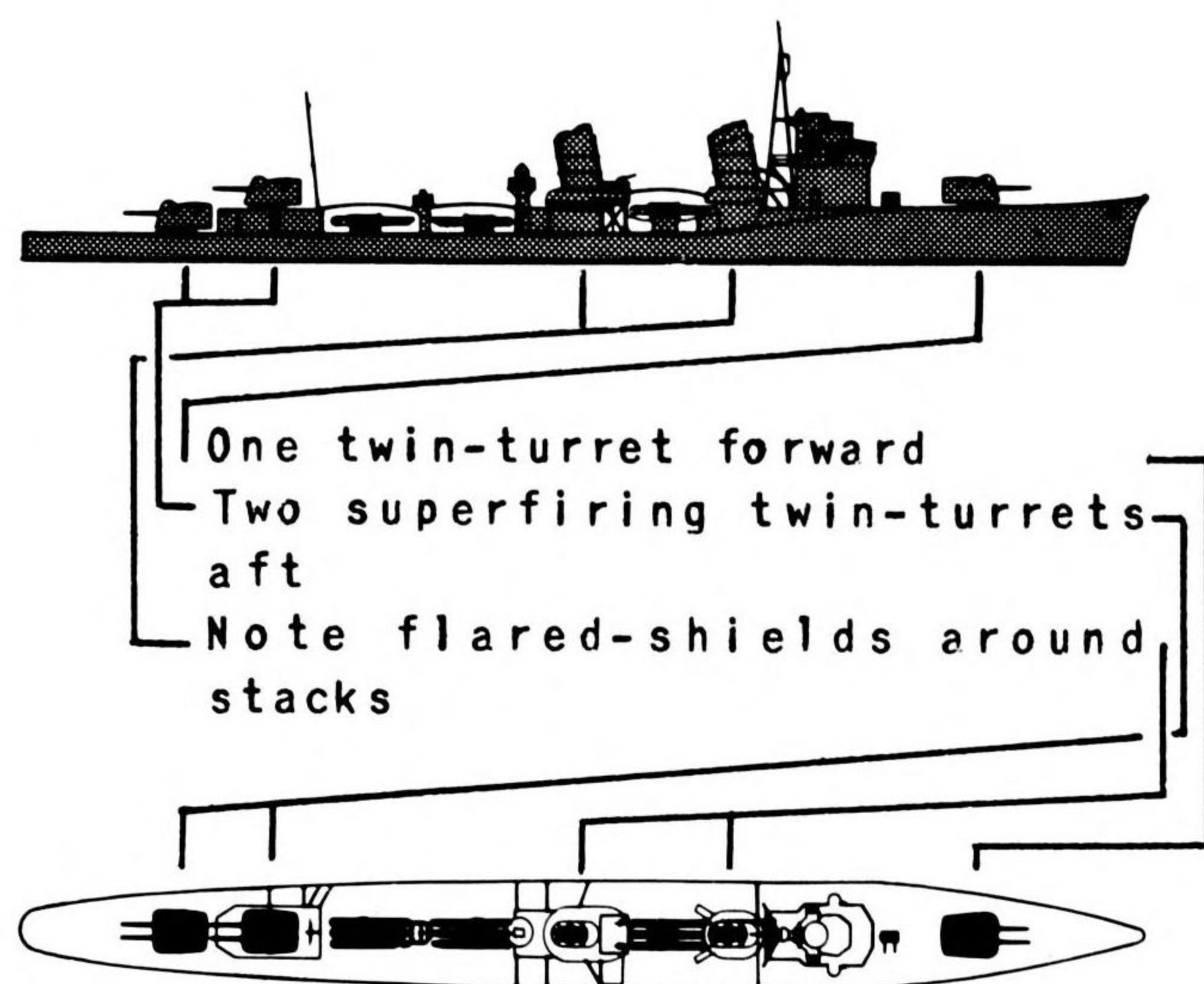


DESTROYERS

2 STACKS (EQUAL)

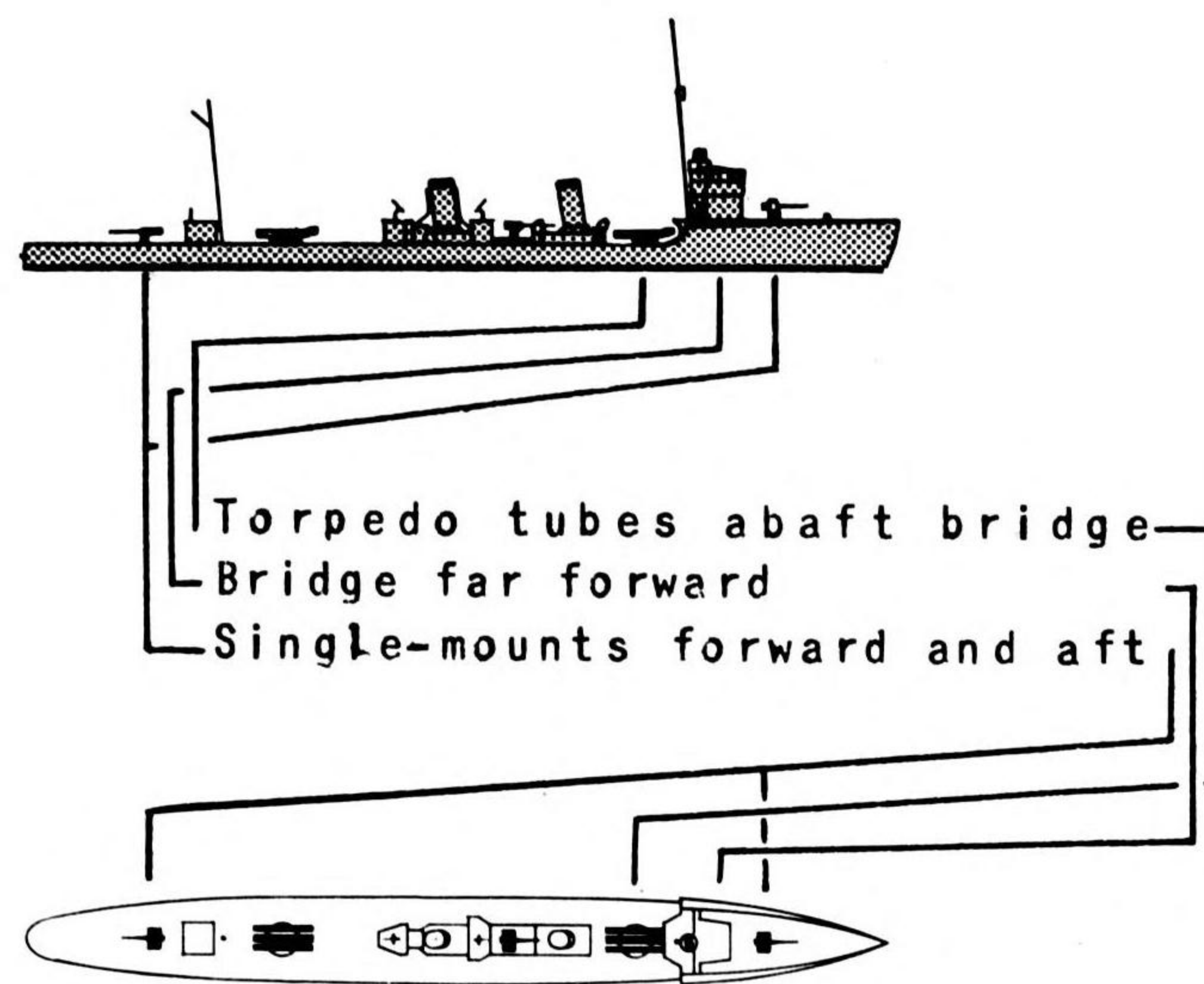
JAPAN

FUBUKI (AMAGIRI) Class 390' o.a.



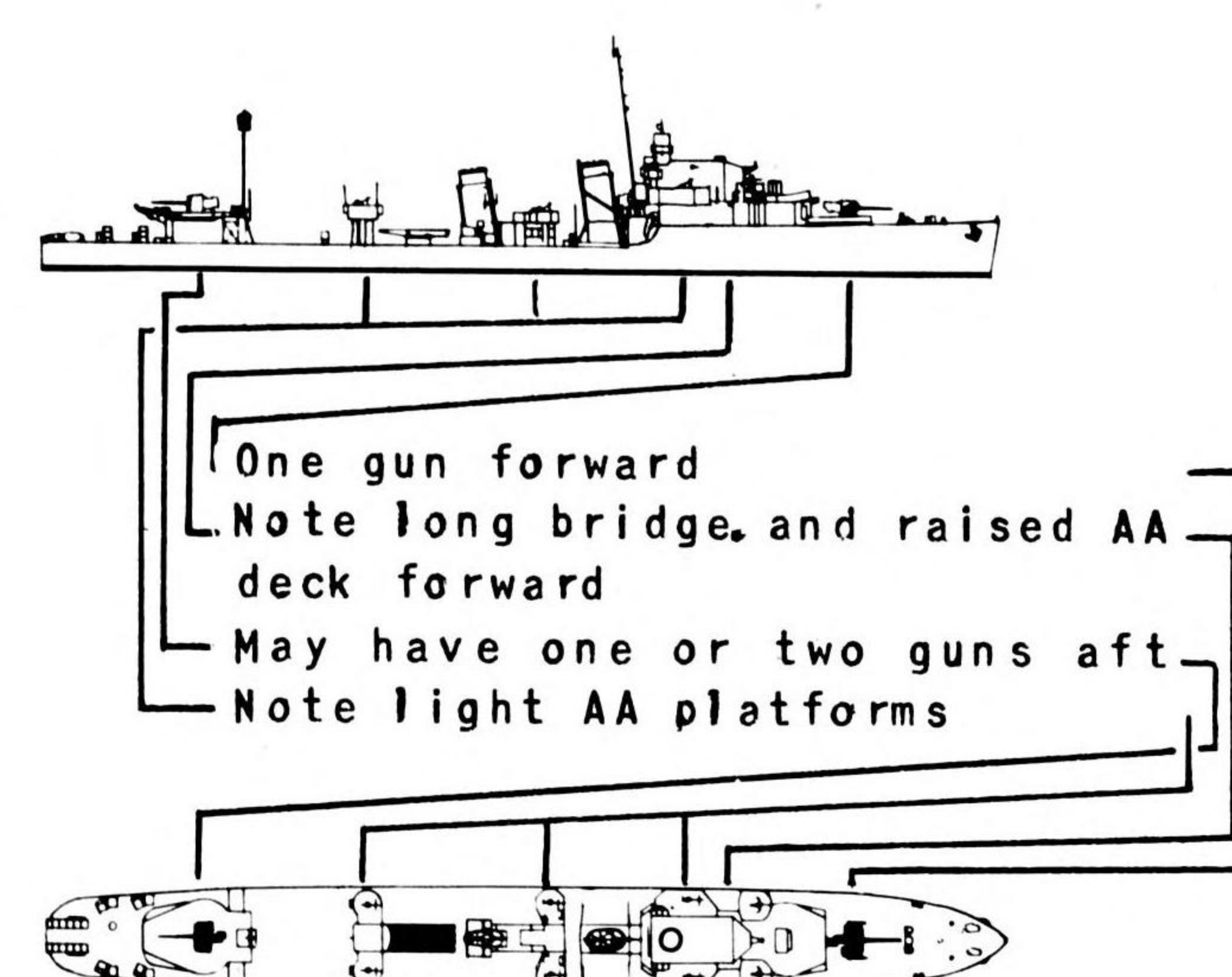
JAPAN

MOMO Class 287' o.a.

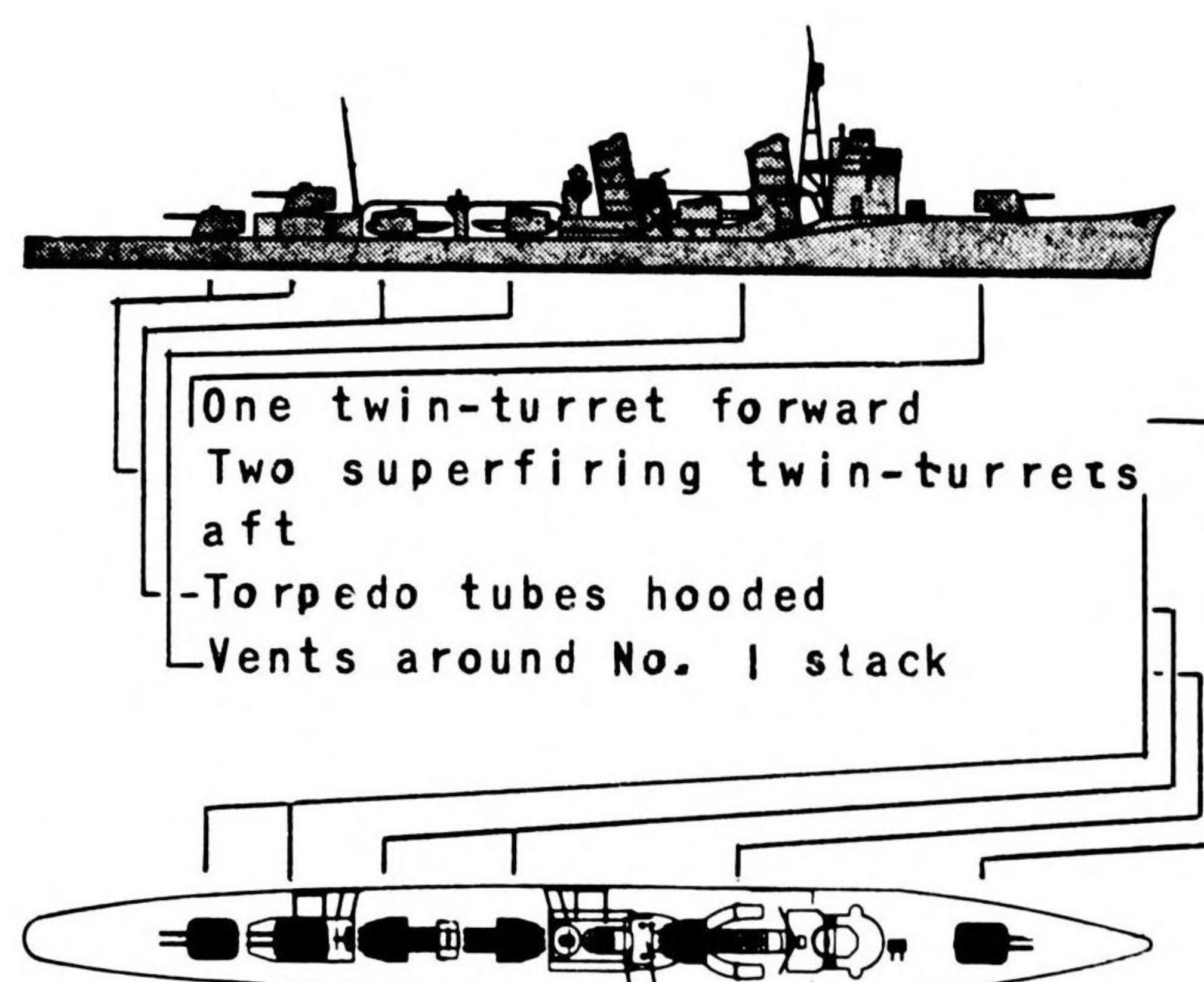


GREAT BRITAIN

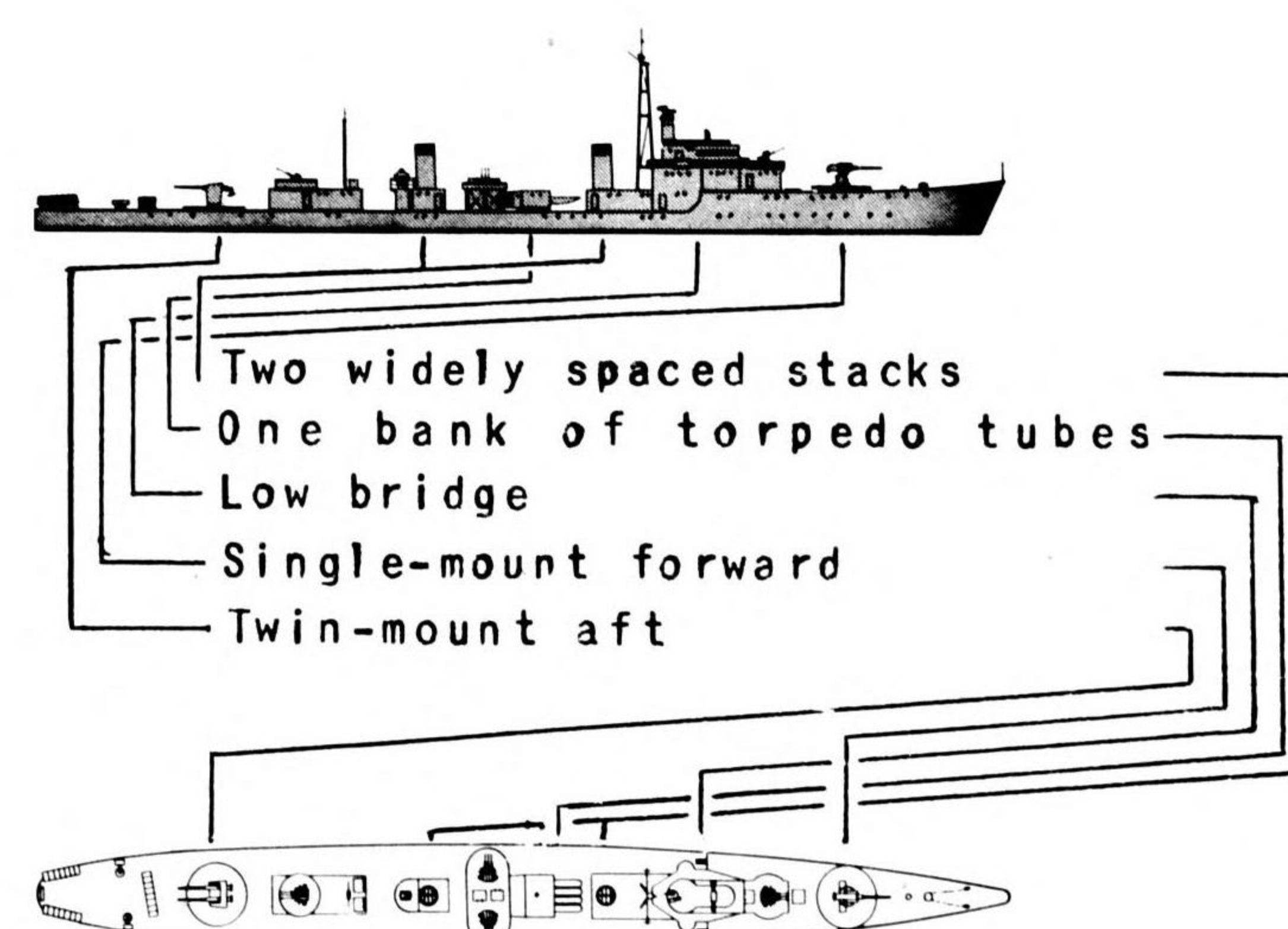
"A" to "I" Classes 323' o.a.



FUBUKI (SHINONOME) Class 390' o.a.



MATSU Class Approx. 320' o.a.



The only difficulty which will be encountered with these Japanese destroyers lies in distinguishing the two groups of the FUBUKI Class. This separation requires fairly large scale photographs due to the necessity of using minor features. Note that the SHINONOME Type has hooded torpedo tubes and vents around the No. 1 stack. The AMAGIRI Type has open torpedo mounts and "doughnut-shaped" shields around the stacks. If these features cannot be determined, both types should be mentioned in the interpretation report.

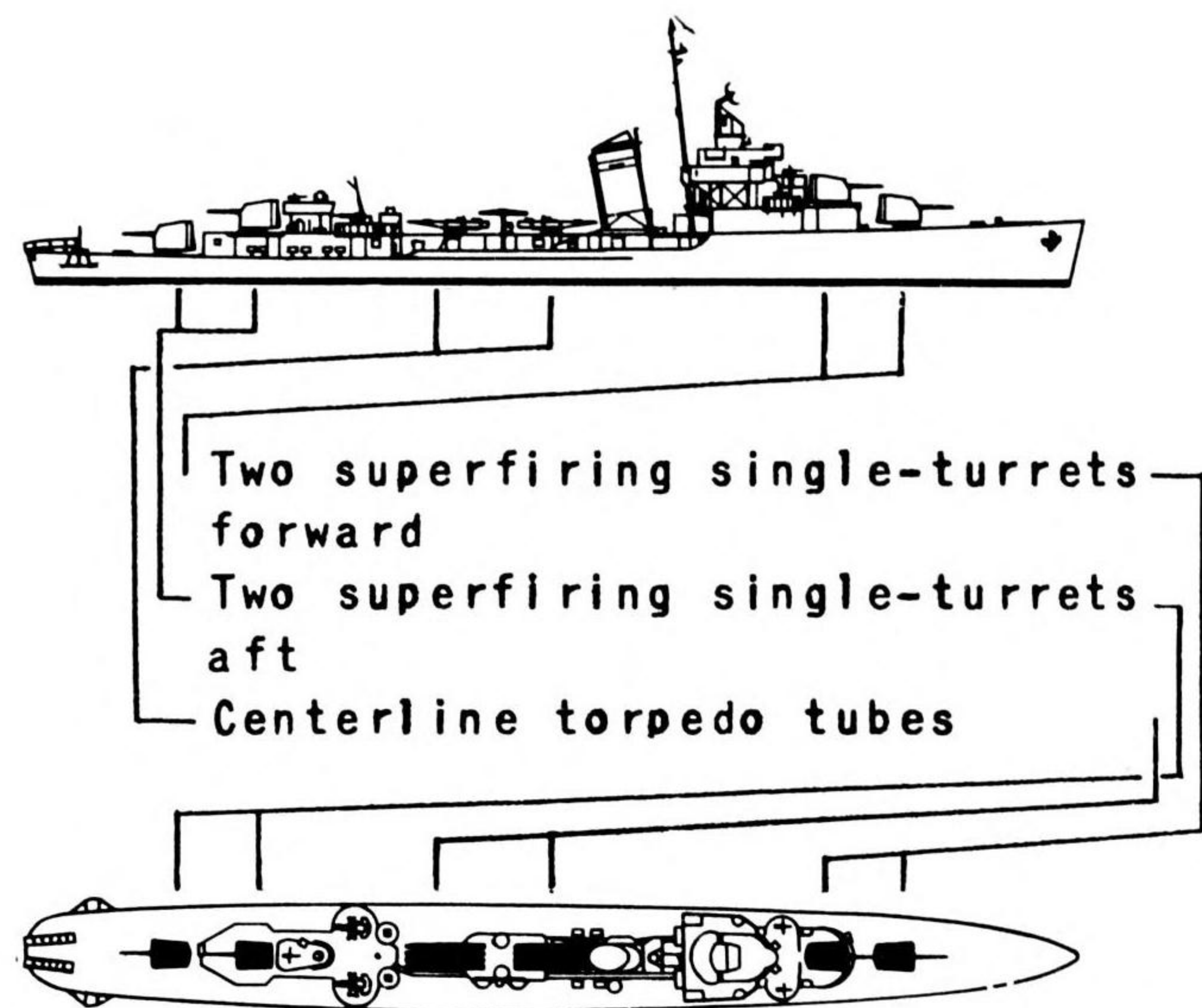
Recently, a refit of AMAGIRI Type has been observed in which the No. 2 turret has been replaced with light AA and an AA platform has been added forward of the bridge. This alteration is consistent with the general practice which seems to have been adopted to increase the defense against aircraft. Some TAKANAMI Class destroyers have shown a similar type of refit and many of the older ships have had their light AA increased.

DESTROYERS

1 STACK

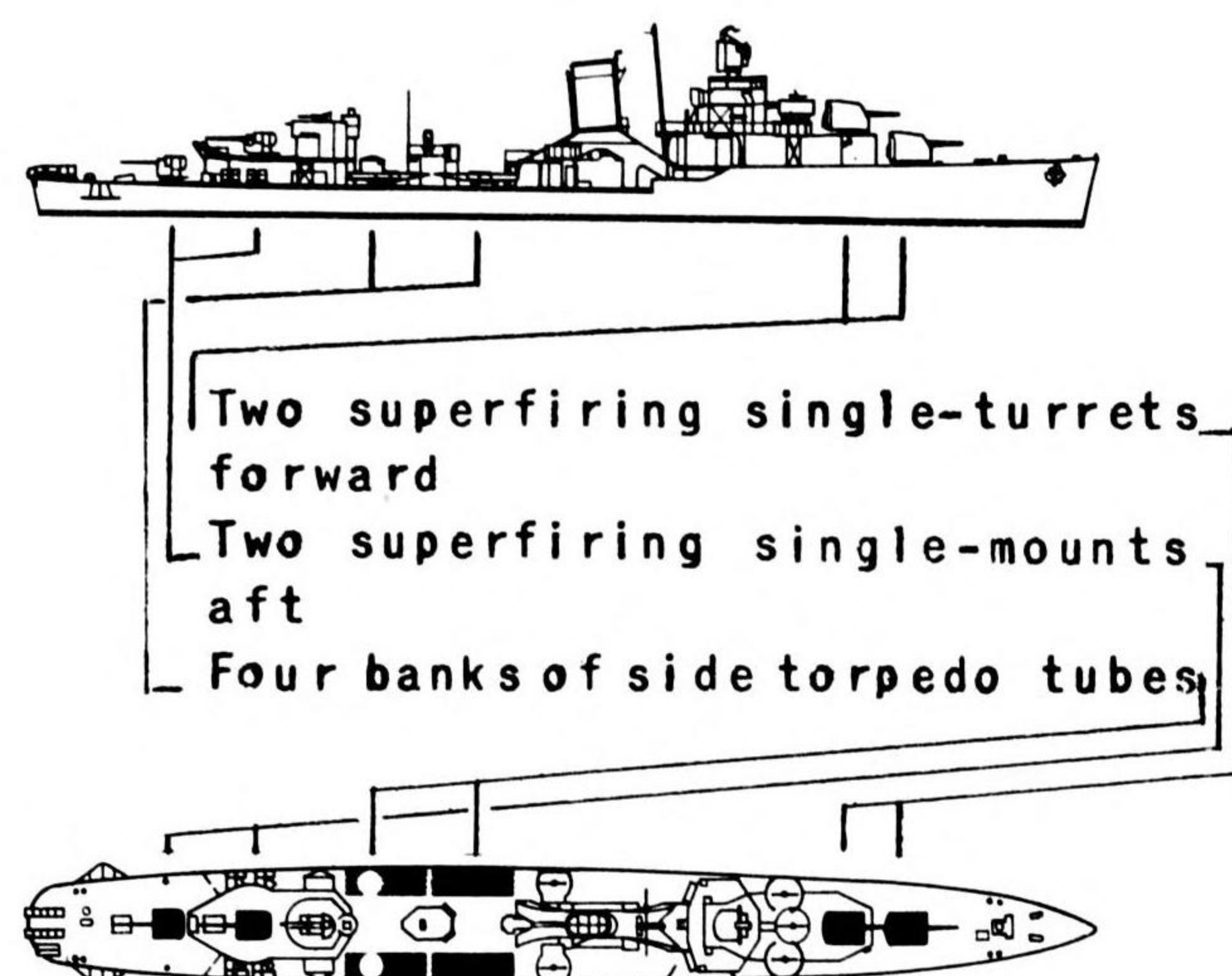
UNITED STATES

SIMS Class 348' o. a.



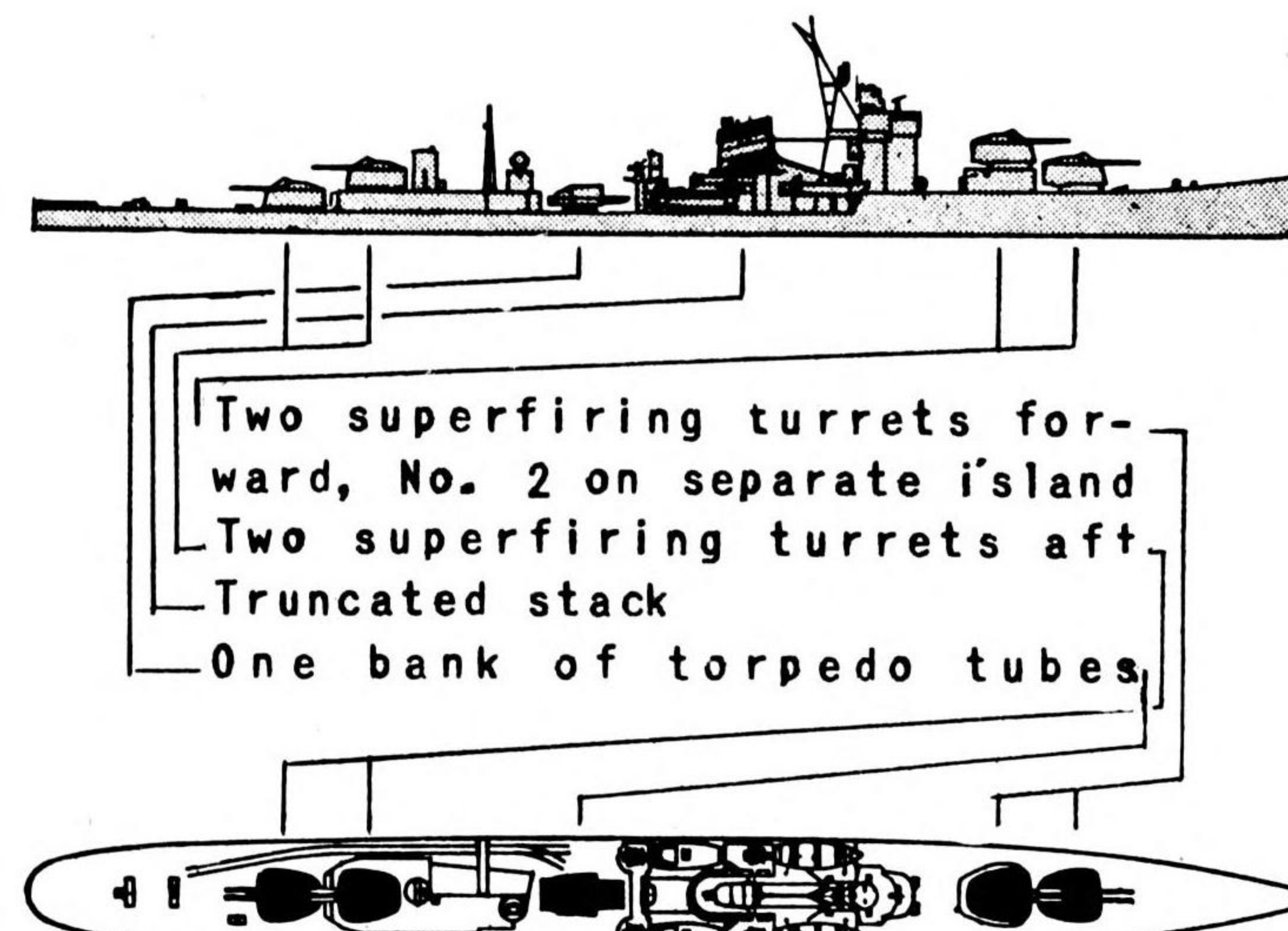
UNITED STATES

GRIDLEY-BAGLEY Classes 341' o. a.

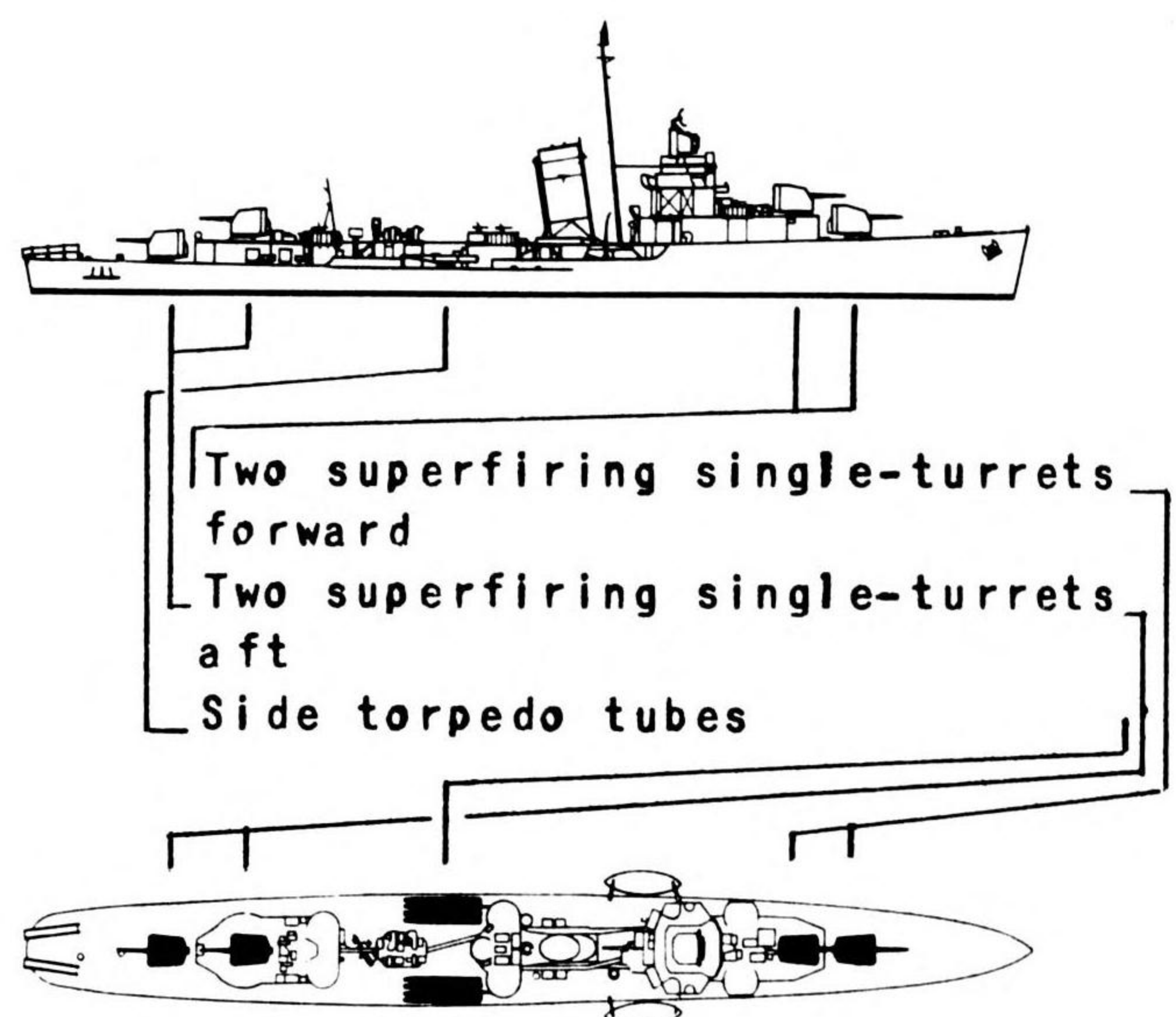


JAPAN

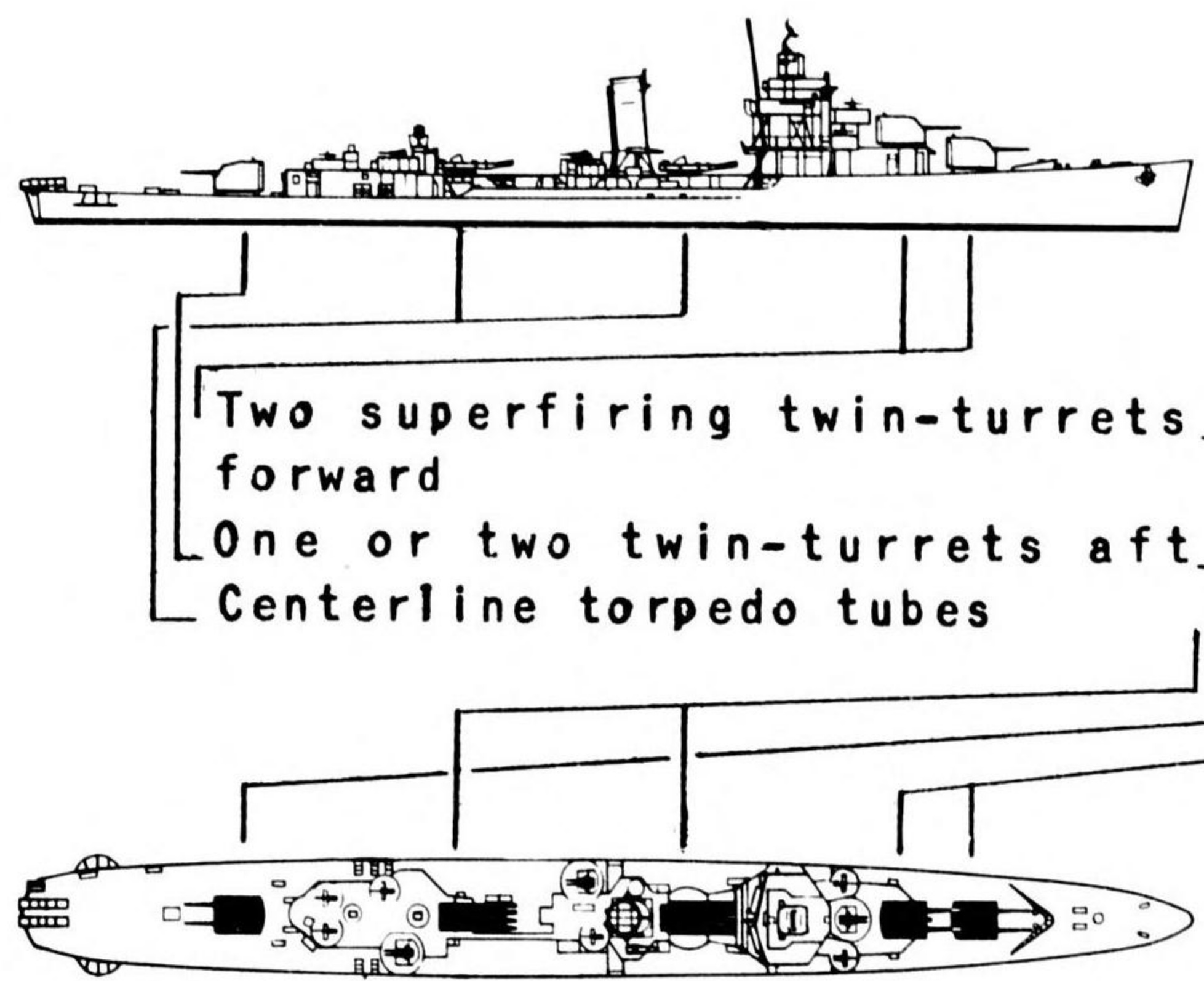
TERUTSUKI Class 435' o. a.



BENHAM Class 341' o. a.



SOMERS Class 381' o. a.



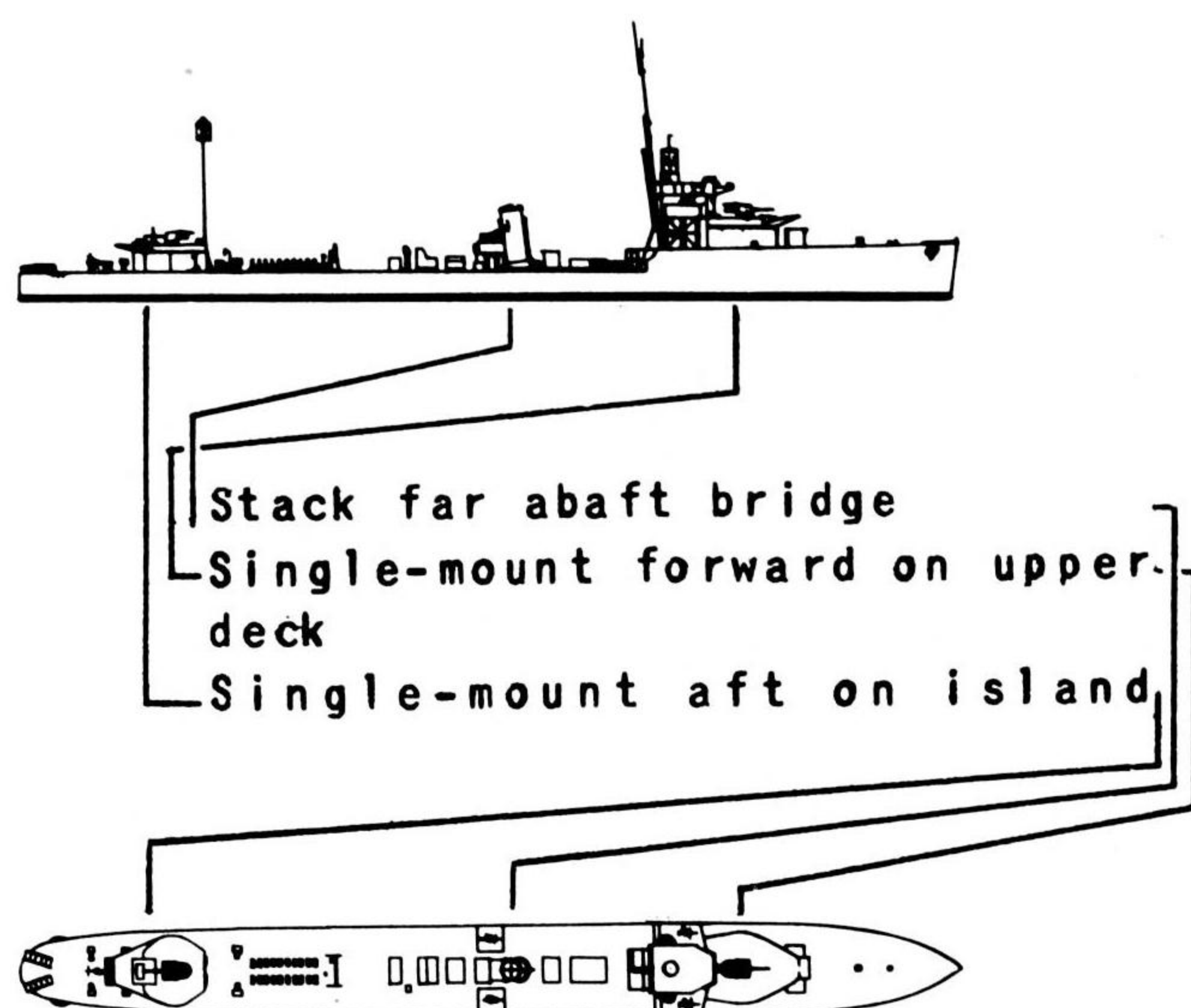
The TERUTSUKI Class of destroyer leaders is the only exception to the general rule of "Two stacks; one mount forward" for Japanese destroyers. Identification of this class is relatively simple, however. Note that the No. 2 turret is on a separate island rather than on an upper deck extending forward of the bridge, which is the case with the American and British destroyers. The turtle-back, streamlined shape of the TERUTSUKI's turrets is also characteristic as is the trunked stack. Furthermore, the length exceeds that of any other destroyer afloat.

DESTROYERS 1 STACK

GREAT BRITAIN

OLD ONE-STACKERS

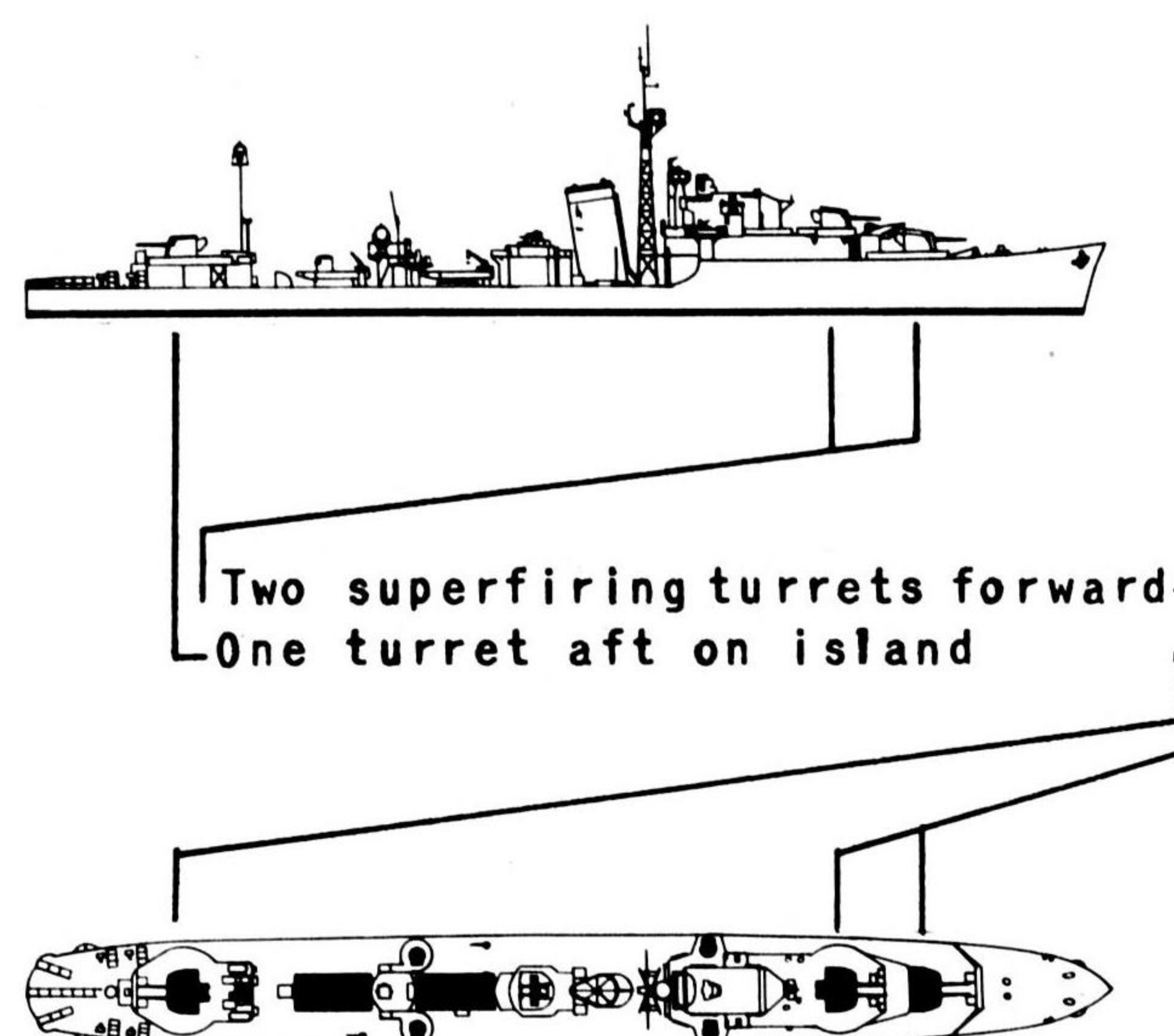
312' o. a.



GREAT BRITAIN

"J", "K", and "N" Classes

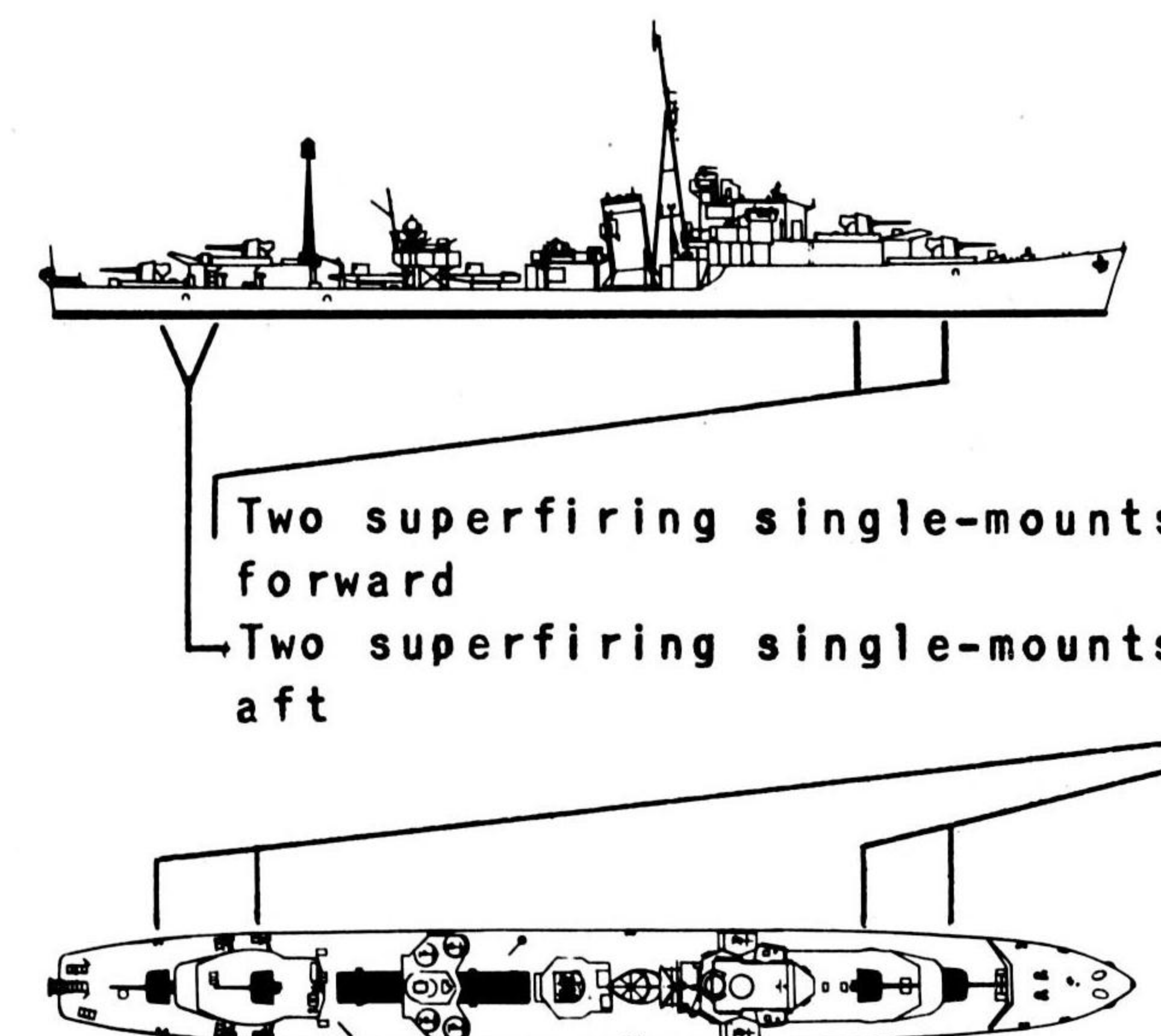
357' o. a.



GREAT BRITAIN

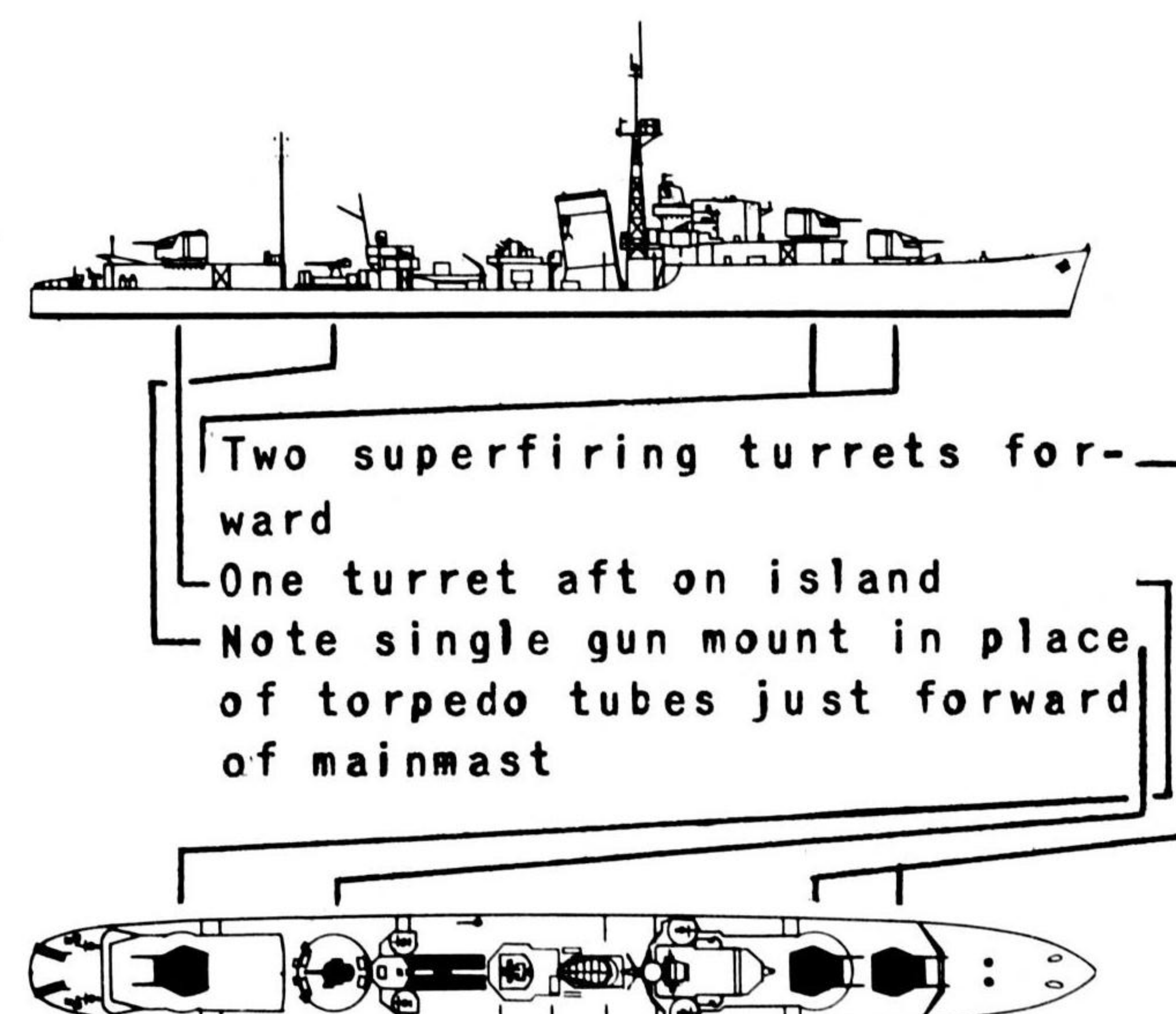
"Q" and "R" Classes

358' o. a.



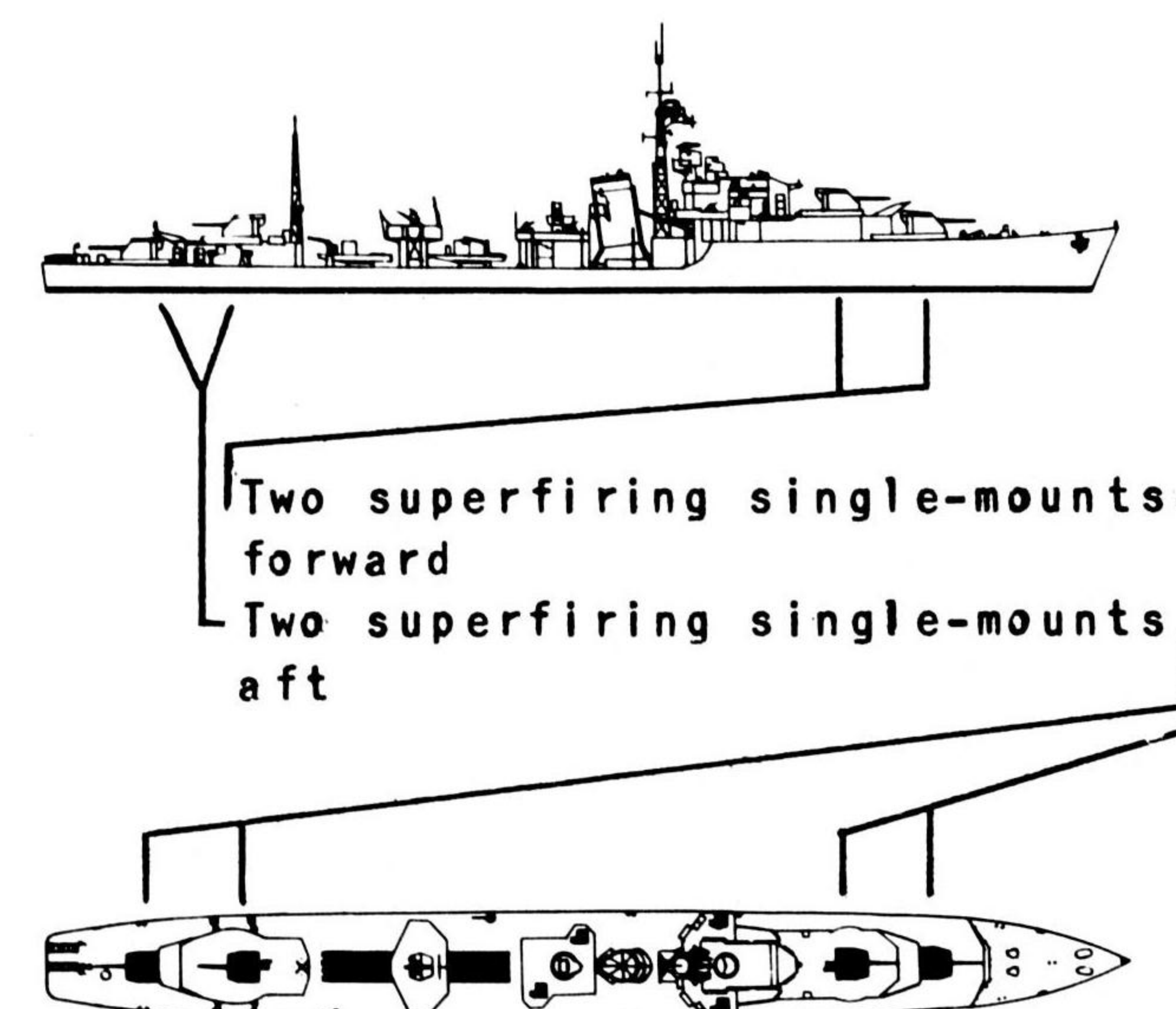
"L" and "M" Classes

363' o. a.



"S" - "Z" Classes

363' o. a.



DESTROYERS — JAPAN

CHARACTERISTICS CHART

DESTROYER CLASS	O. A. LENGTH	STACKS					MAIN BATTERY							BANKS OF TORPEDO TUBES **					REMARKS
		Two stacks- equal size	Two stacks- #2 small	Two stacks- #1 small	One stack	Forward			Aft *				One forward of bridge	One abaft the bridge	One between stacks	One abaft the stacks	Two abaft the stacks		
						One turret	Two turrets	One single shield	Two turrets superfiring	Two turrets on main deck	One turret aft	One single shield						Two single shields	
KURI - WAKATAKE (ODD)	287'		X					X					X			X		Gun between stacks	
MOMO (ODD)	287'	X						X						X		X		Gun between stacks. Bridge well forward	
MINEKAZE	336'	X						X					X				X	Gun between stacks. Mainmast between aft torpedo tubes.	
MINEKAZE (Refit)	336'	X						X								X		Gun between stacks removed. A/A substituted. Two TT removed.	
KAMIKAZE	336'	X						X					X				X	Mainmast between after guns	
MUTSUKI	336'	X						X					X			X		Some may have aft TT removed.	
HATSU HARU	344'		X			X					X				X	X		Platforms around #2 stack extend further aft on port side.	
SHIGURE	341'		X			X					X				X	X		Platforms around #2 stack extend further aft on starboard side.	
ASASHIO - KAGERO	362'		X			X			X						X	X		Note similarity to TAKANAMI Class	
FUBUKI																			
SHINONOME Group	390'	X				X			X						X		X	Hooded TT mounts Vents around #1 stack	
AMAGIRI Group	390'	X				X			X						X		X	Open TT mounts Stacks flared due to shield at base	
AMAGIRI (Refit)	390'	X				X					X				X		X	#2 Turret replaced by AA; AA added at mainmast and between TT's	
HIBIKI Group	390'			X		X			X						X		X	Hooded TT mounts	
TAKANAMI	382'		X			X			X						X	X		Similar to ASASHIO but with AA forward of bridge. No. 2 turret removed from some.	
TERUTSUKI (DL)	435'				X				X								X	"Turtle-back" turrets	
MATSU	app rox. 320'	X				X									X			Widely spaced stacks are identifying feature.	
SHIMAKAZE	415'		X			X			X						X		X	Probably quintuple-mount torpedo tubes.	

* The single gun shields referred to apply only to those placed on the after islands in the case of the MINEKAZE, KAMIKAZE, and MUTSUKI classes. It is quite possible that extra guns can be placed on the main deck aft, but such additions should not be counted in classifying the ships. Such alterations should be noted in photo interpretation reports.

** This indicates the number of banks or sets of torpedo tubes and does not refer to the number of tubes in each set. Banks may consist of two, three, four or five tubes.

MINOR COMBATANTS AND AUXILIARIES

The following section includes only the minor combatants and auxiliaries of the Japanese Fleet. Due to the existence of a great number of types in the allied fleets, no attempt is made to compare them with the Japanese. Instead, the enemy ships are separated into general categories and then identifying features are indicated. It is suggested that ONI 54 Series (U.S. Naval Vessels) and ONI 201 Series (Warships of the British Commonwealth) be consulted for information on the minor combatants and auxiliaries of the two allied fleets.

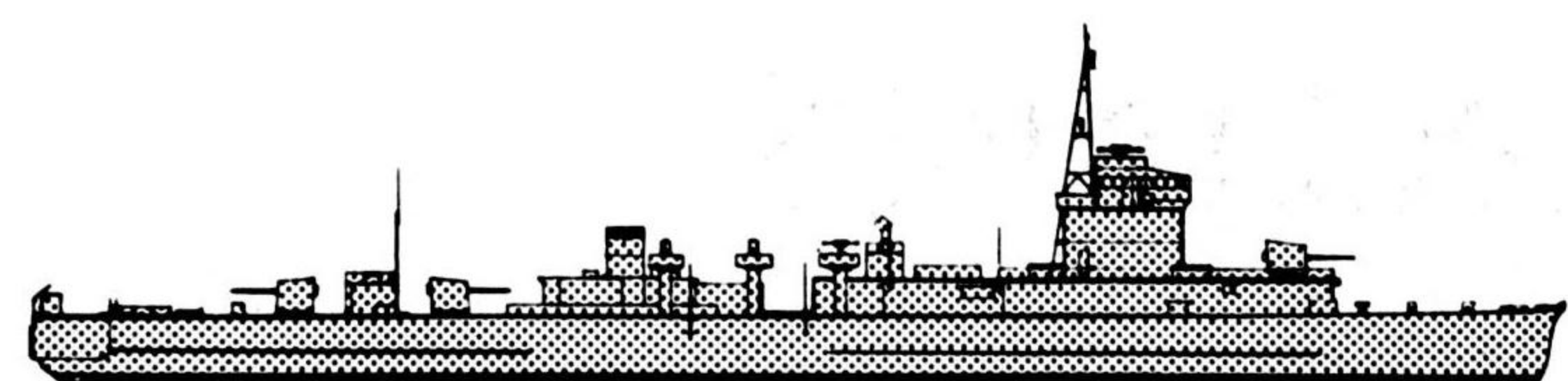
All auxiliaries which were converted from or resemble merchant ships are included in Section 3 of this book, rather than here. To the photographic interpreter, they always will be merchant vessel types. Ships falling in this category will include hospital ships, naval tankers, merchantmen converted to auxiliaries and naval auxiliaries built with merchant ship lines.

In conclusion, since this book is not intended to reproduce information which is already in its most useful form for the photographic interpreter, small craft have been excluded. O.N.I. 208 J (Revised) Supplement No. 2 (Far Eastern Small Craft) covers this subject far more completely than could be done here. Similarly, there is little to be added to the subject of OBB's, OCL's, and OCA's. ONI 222 J (Statistical Summary of the Japanese Navy) is recommended for information about those ships.

MINECRAFT

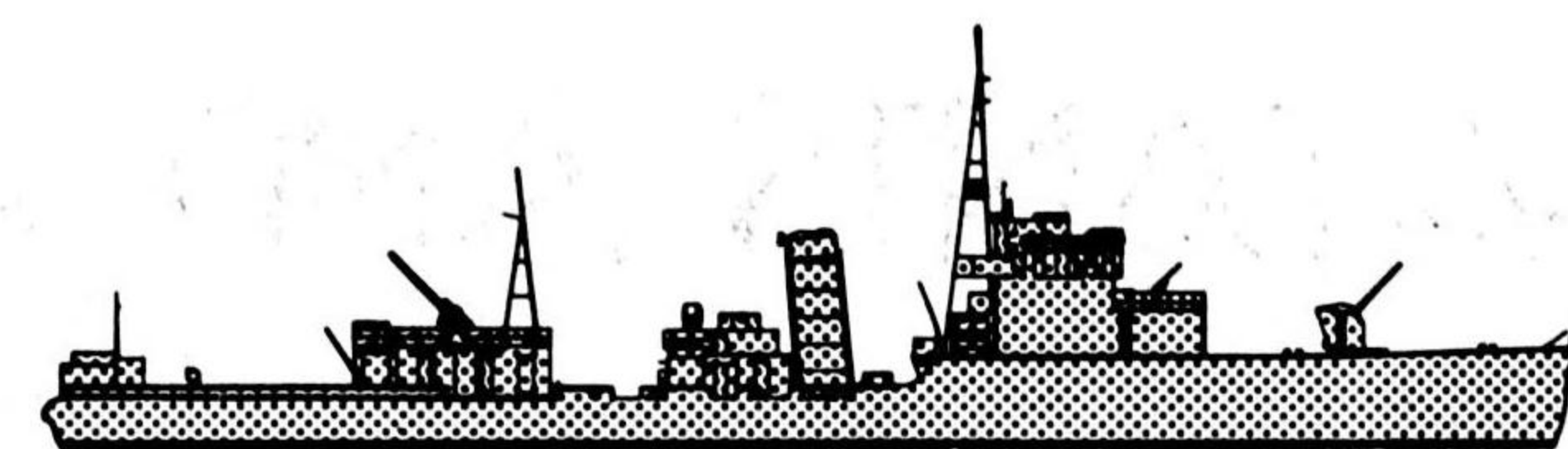
JAPAN

CM ITSUKUSHIMA 339' o.a.



- Square stern
- Single low stack aft of amidships
- Single shield forward on upper deck
- Two single shields aft

CM YAEYAMA approx. 290' o.a.



- Square stern
- Single tall stack
- Single shield forward
- A.A. deck forward of bridge

CM SHIRATAKA approx. 275' o.a.

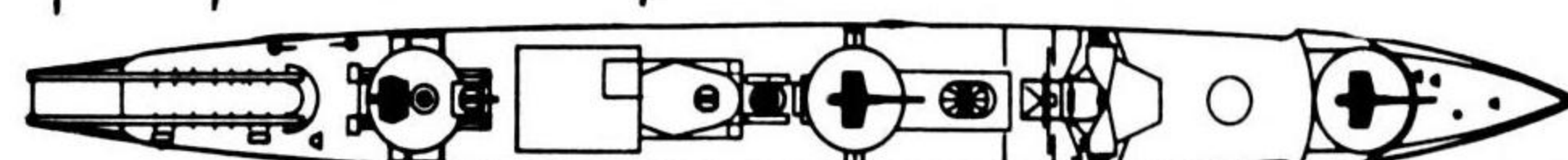


- Square stern
- Single thin stack
- Single shields forward and aft

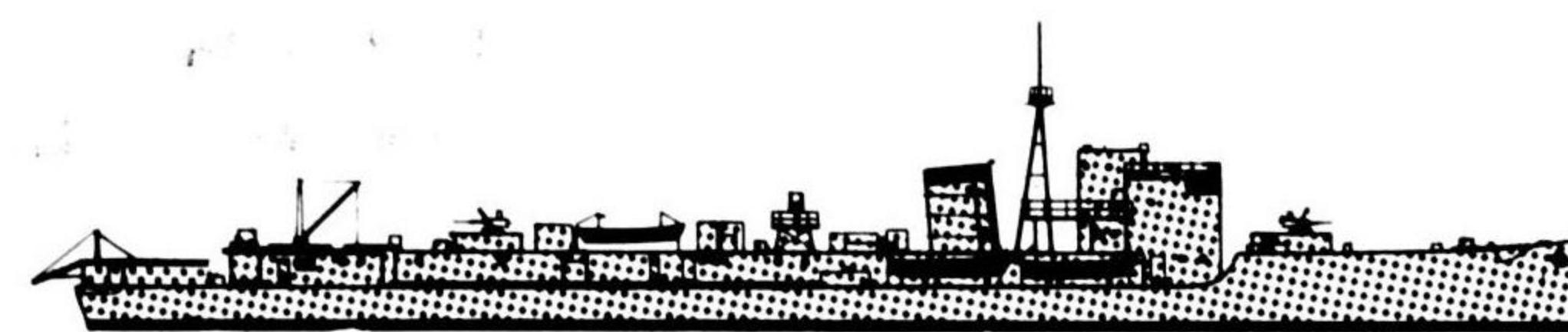
DM KURI-WAKATAKE Class approx. 292' o.a.
Conversion of ODD Class



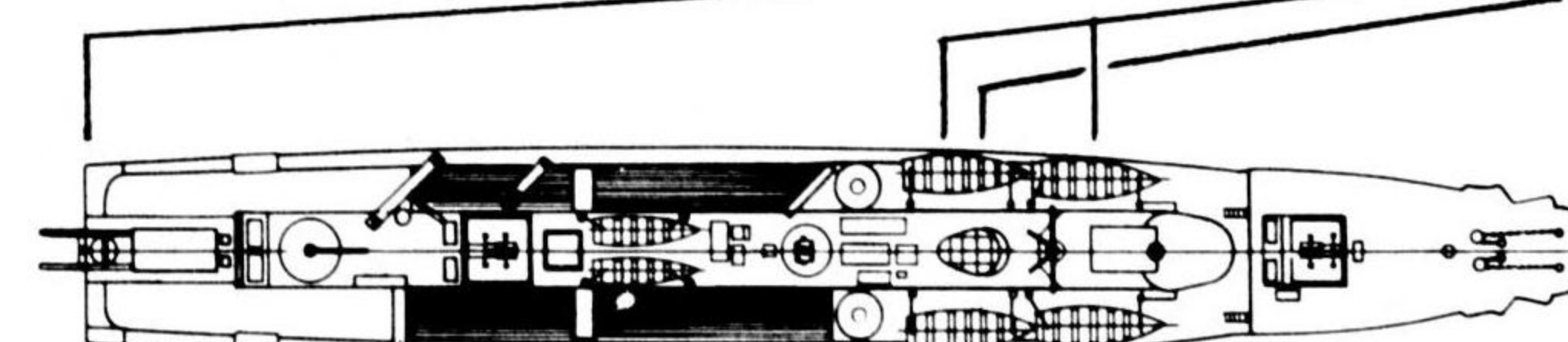
- Torpedo tubes removed; deck added at No. 2 position
- Stern extended, o.a. increased
- Some or all of armament replaced by AA
- Mine tracks aft



CM HATSUTAKA Class 307' o.a.



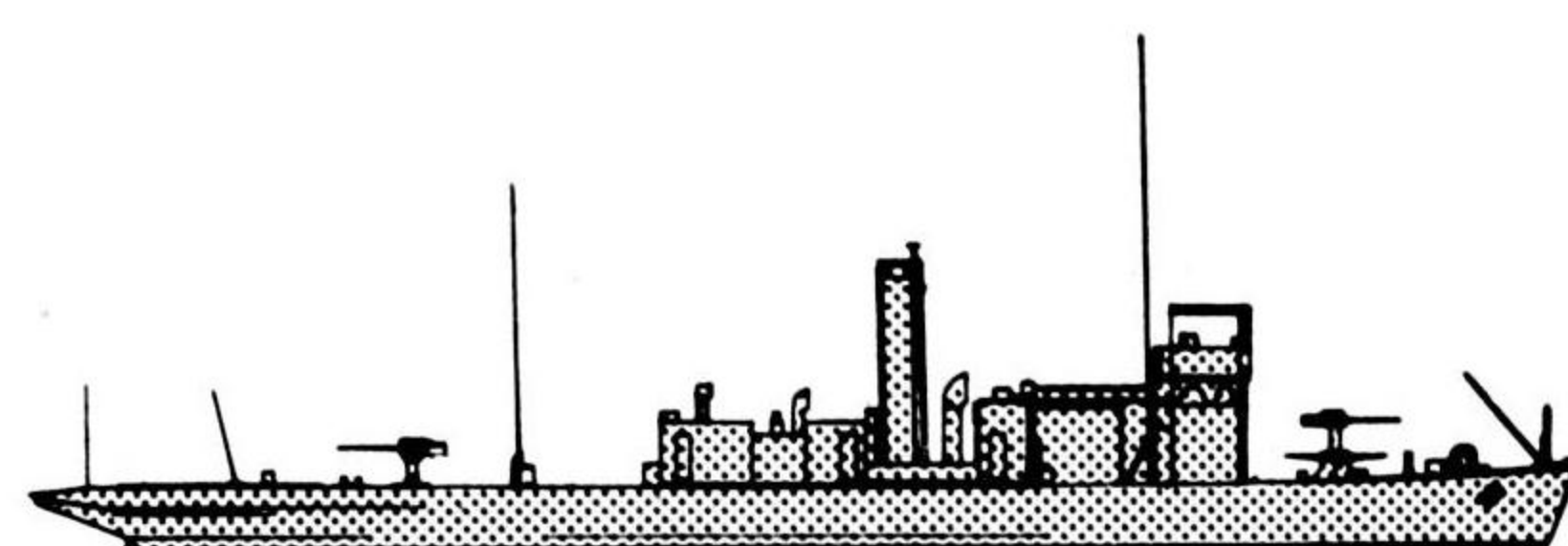
- Square stern
- Single broad stack
- Four boats, port and starboard of stack
- AA armament only



MINECRAFT

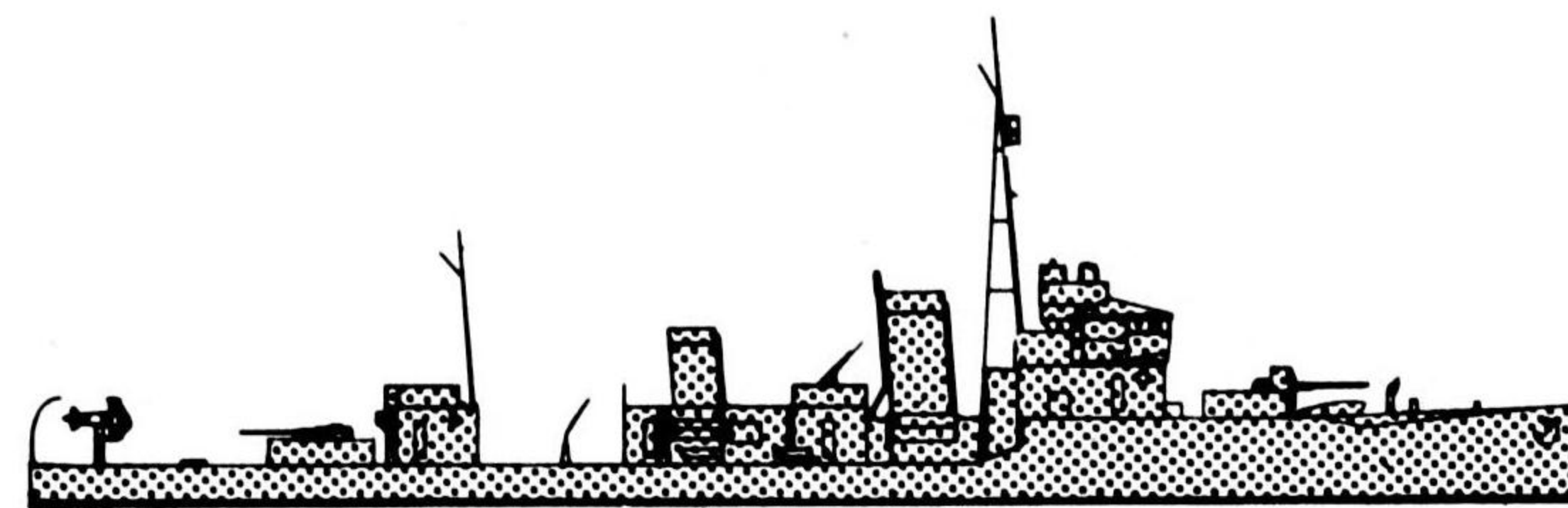
JAPAN

CMc TOSHIMA Class approx. 178' o. a.



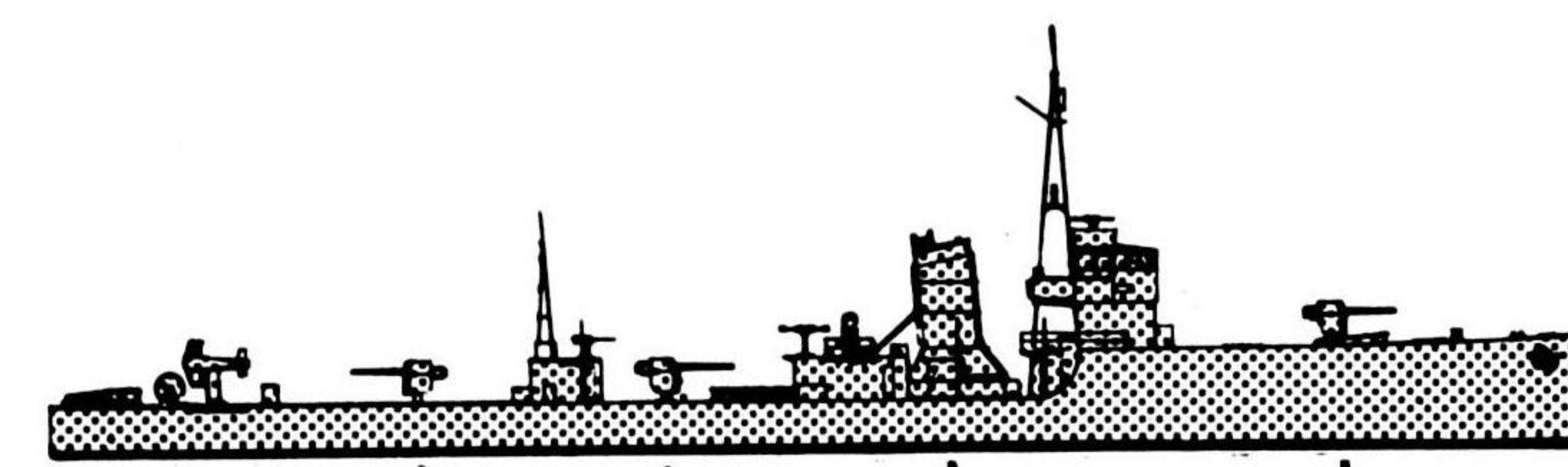
Single, tall thin stack
Clear after deck
Small bridge well forward

AM No. 1 Class approx. 240' o. a.



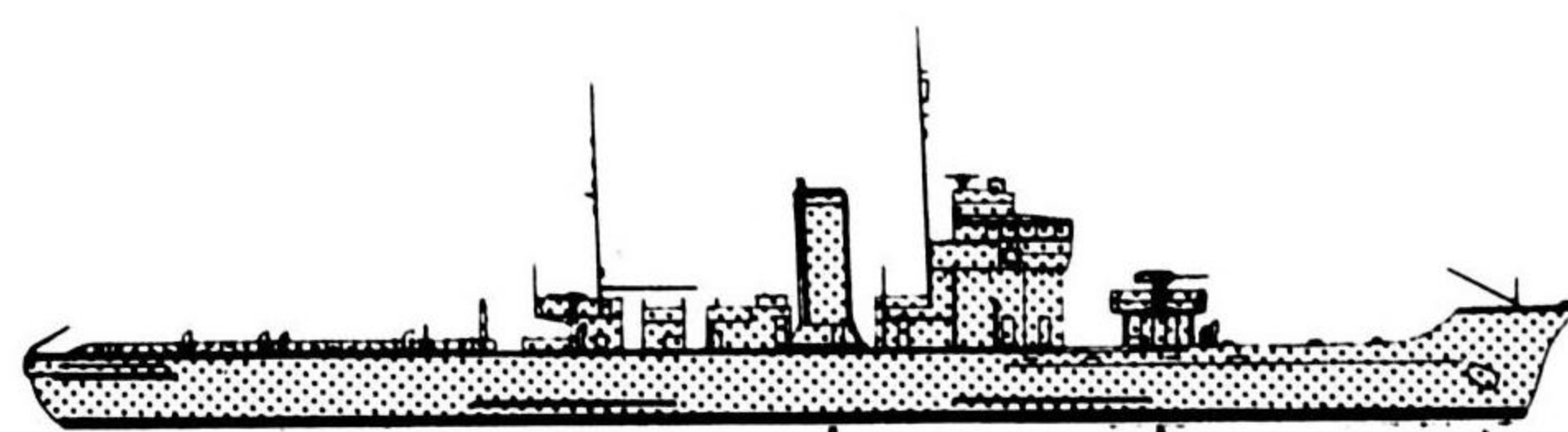
Two stacks, No. 2 small
Single gun mounts forward and aft

AM No. 7 Class 235' o. a.



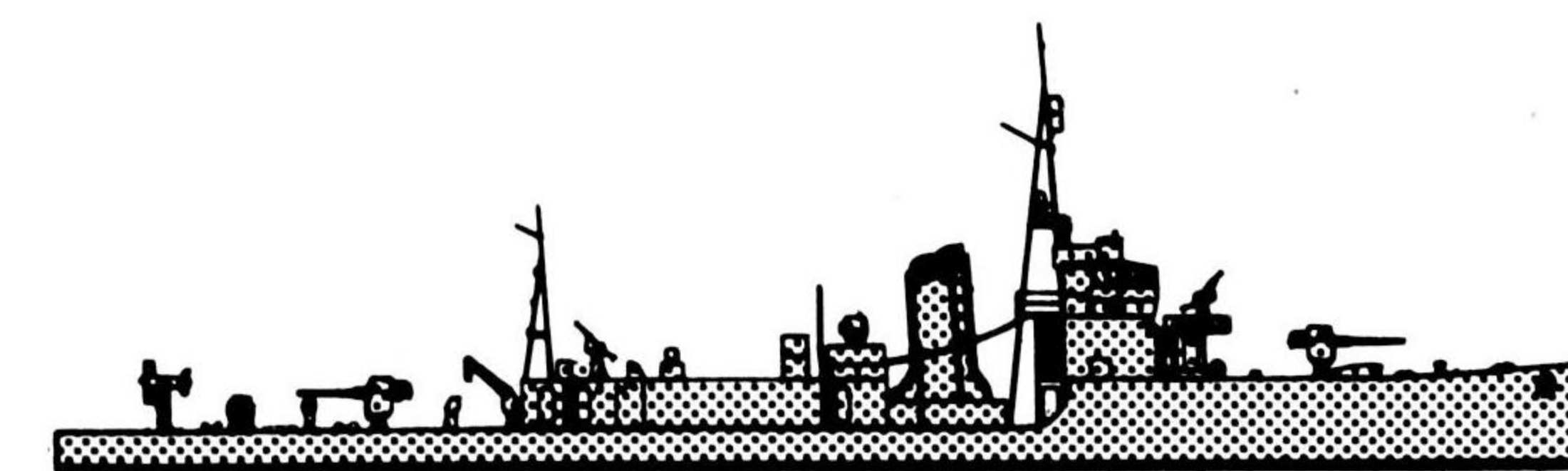
Single stack
Single gun mounts, forward, amidships and aft

CMc TSUBAME Class 207' o. a.

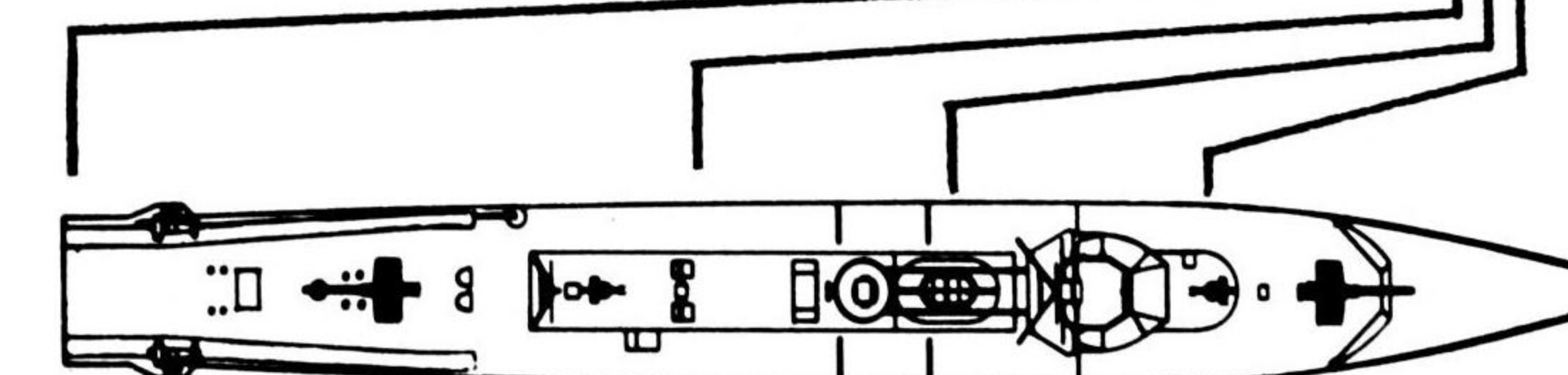


Single stack
Short, raised forecastle
Long, clear after deck
Single gun mount on platform forward

AM No. 13 Class 237' o. a.



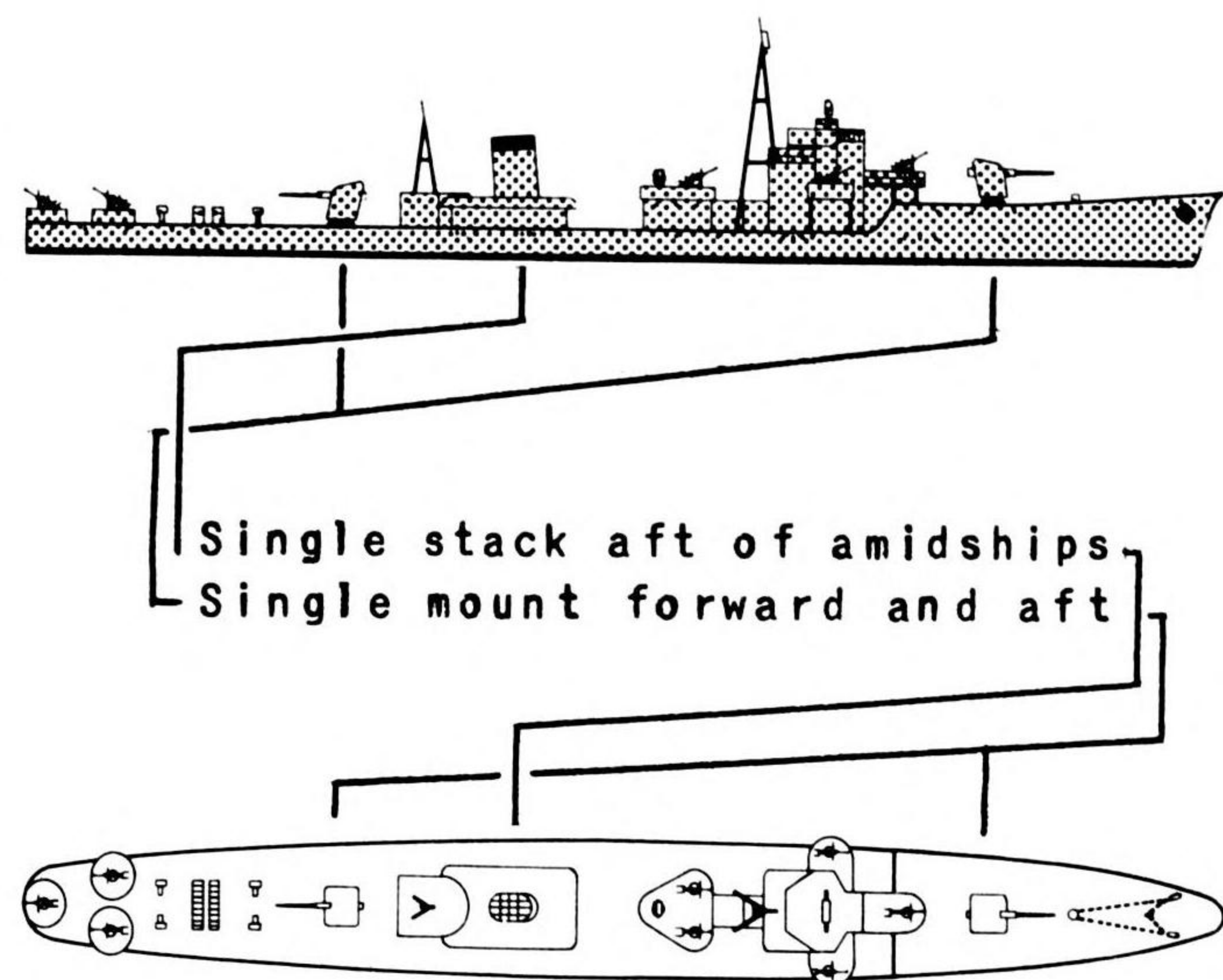
Square stern
Single stack
Long island amidships
A.A. platform forward of bridge



PATROL AND ESCORT VESSELS

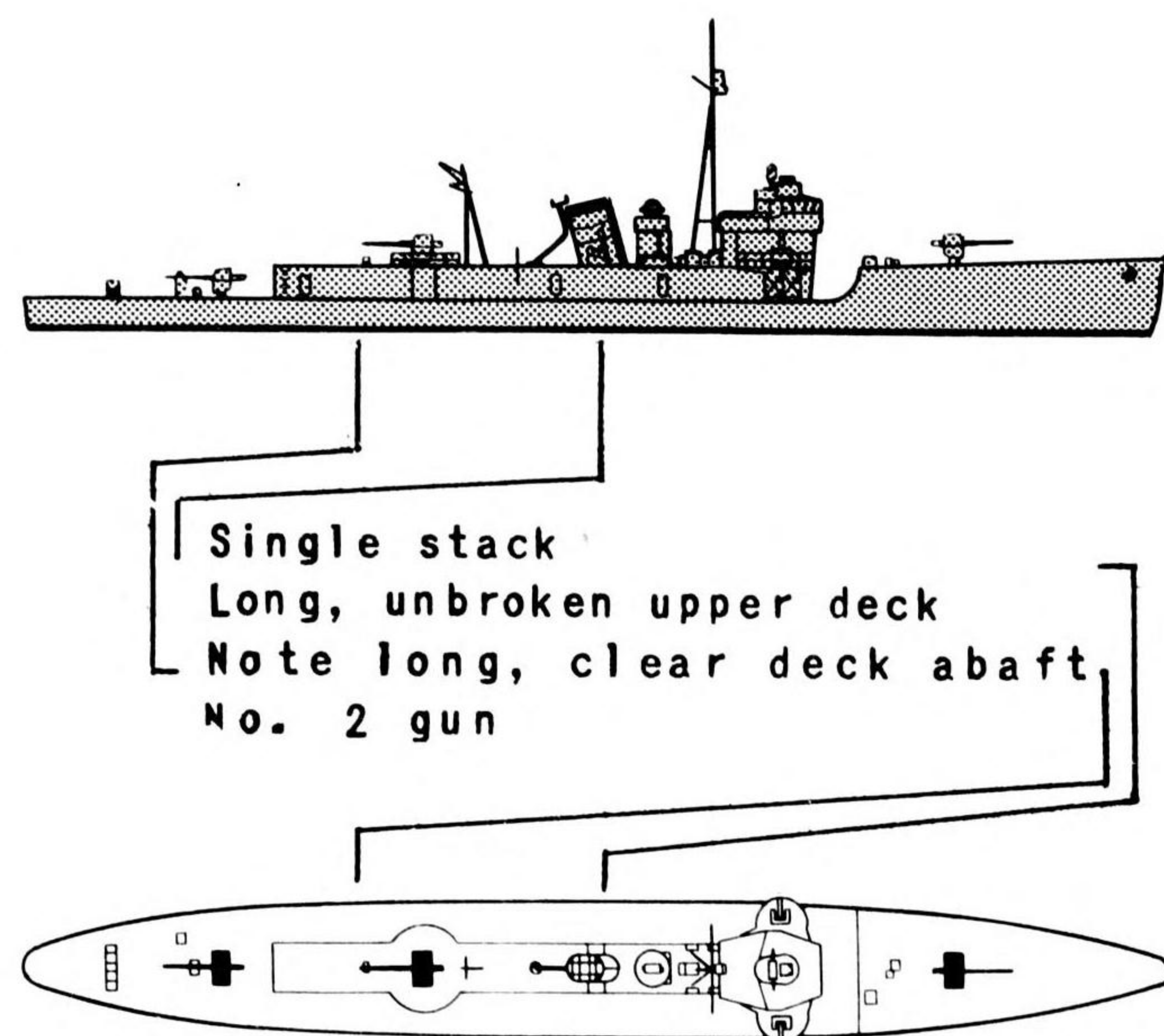
JAPAN

DE UN-1 Class 260' o. a.



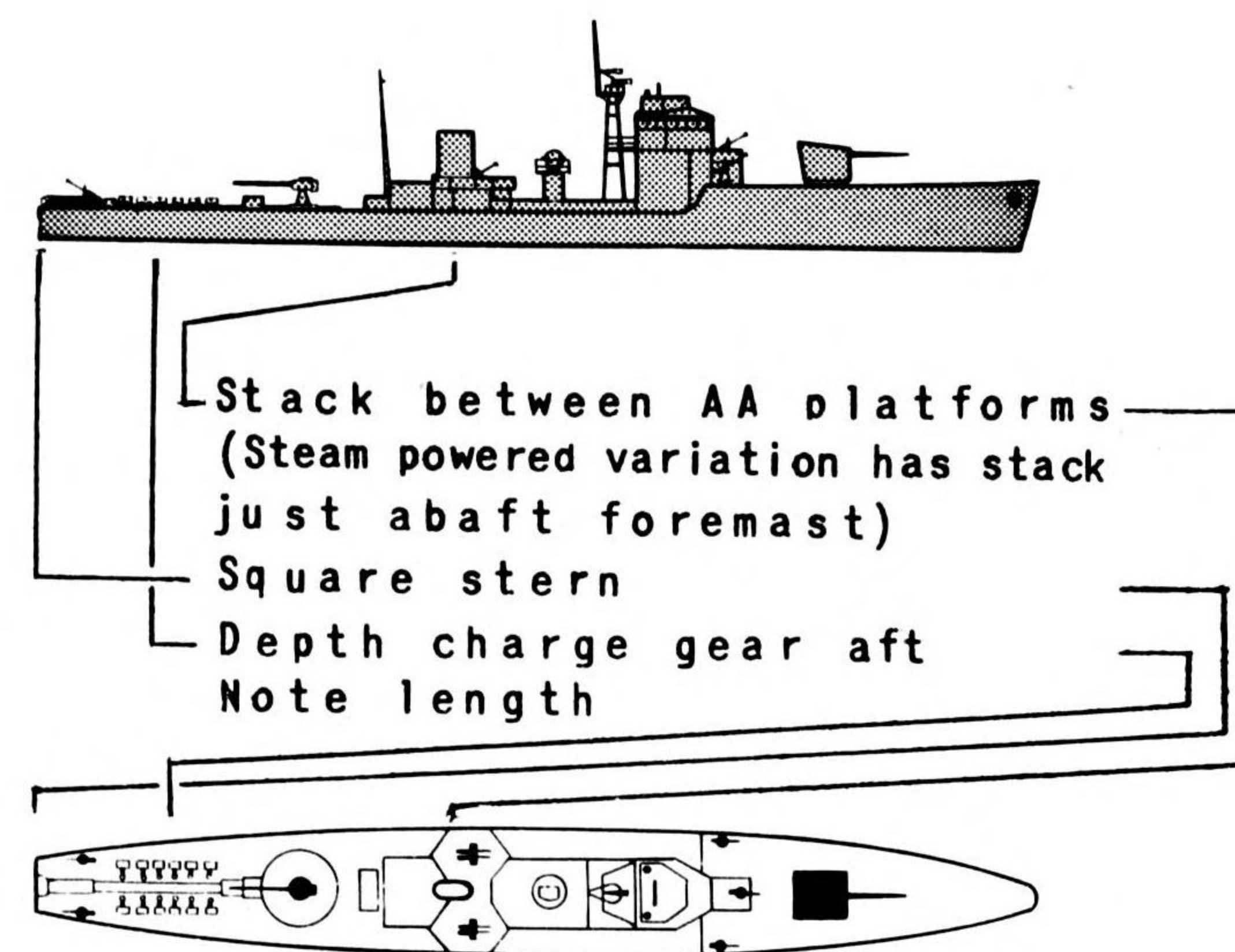
Single stack aft of amidships
Single mount forward and aft

PF SHIMUSHU Class 255' o. a.



Single stack
Long, unbroken upper deck
Note long, clear deck abaft
No. 2 gun

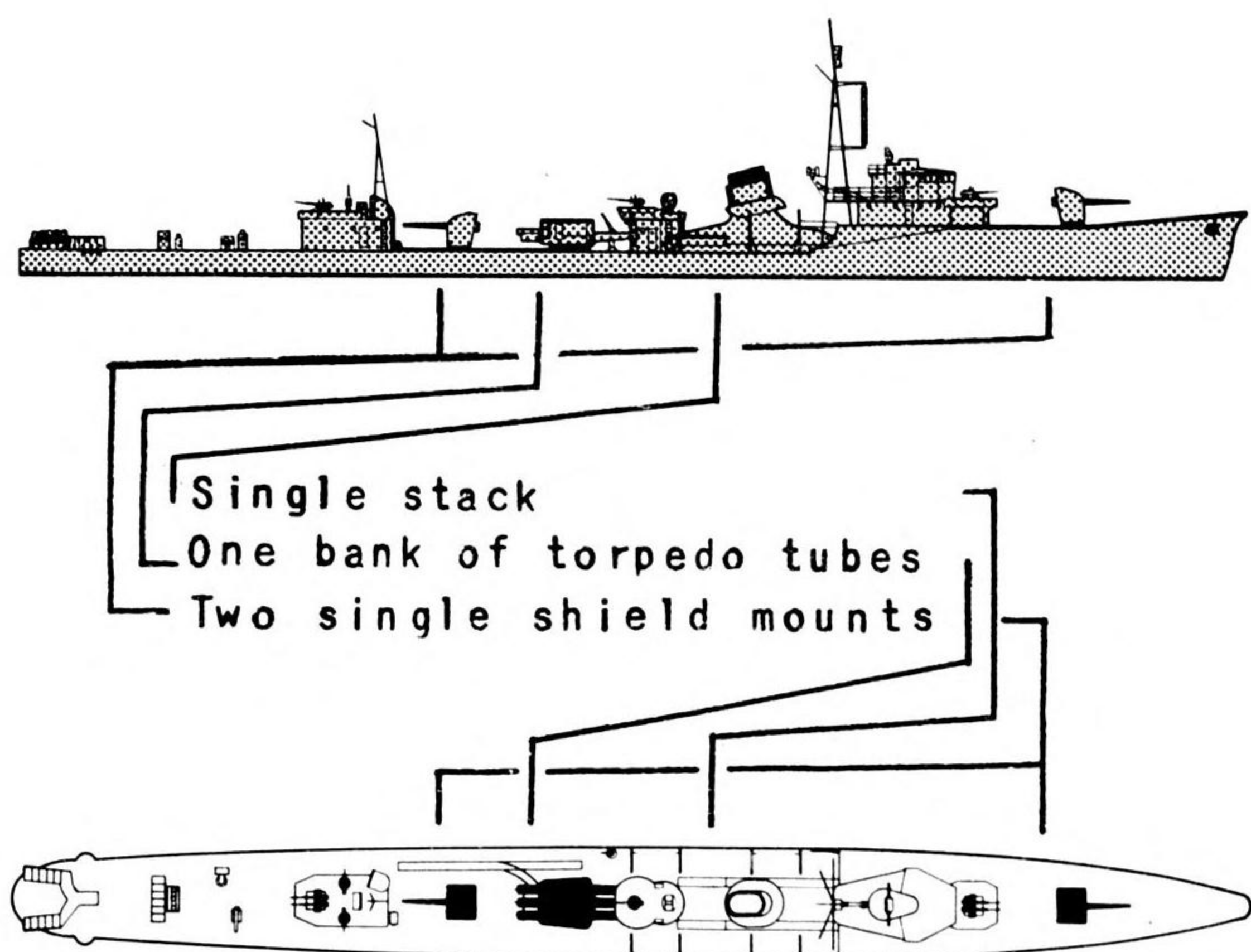
PF KAIBOKAN No. 1 Class 220' o. a.



Stack between AA platforms
(Steam powered variation has stack
just abaft foremast)
Square stern
Depth charge gear aft
Note length

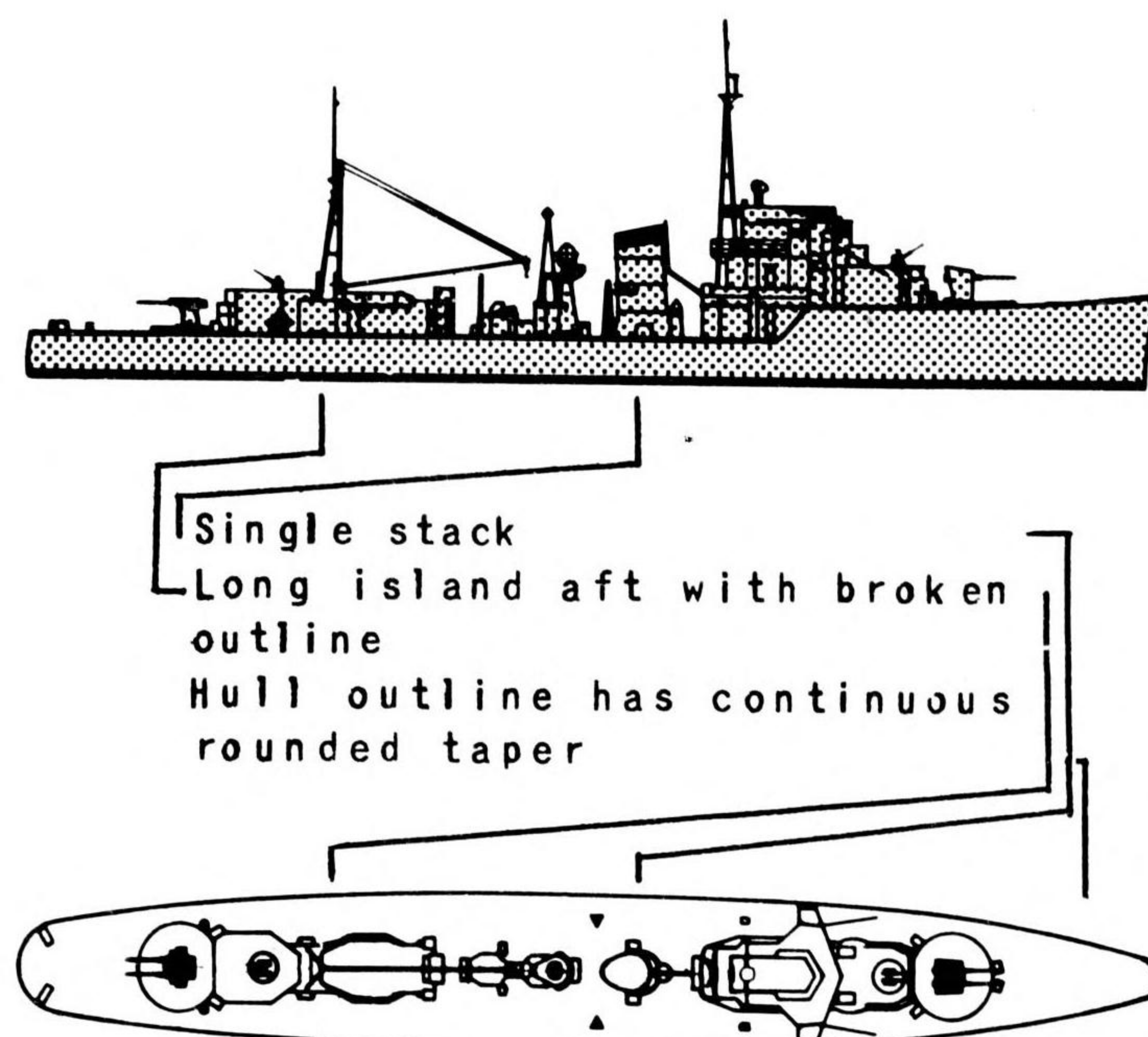
TB CHIDORI Class 269' o. a.

TB OTORI Class 278' o. a.



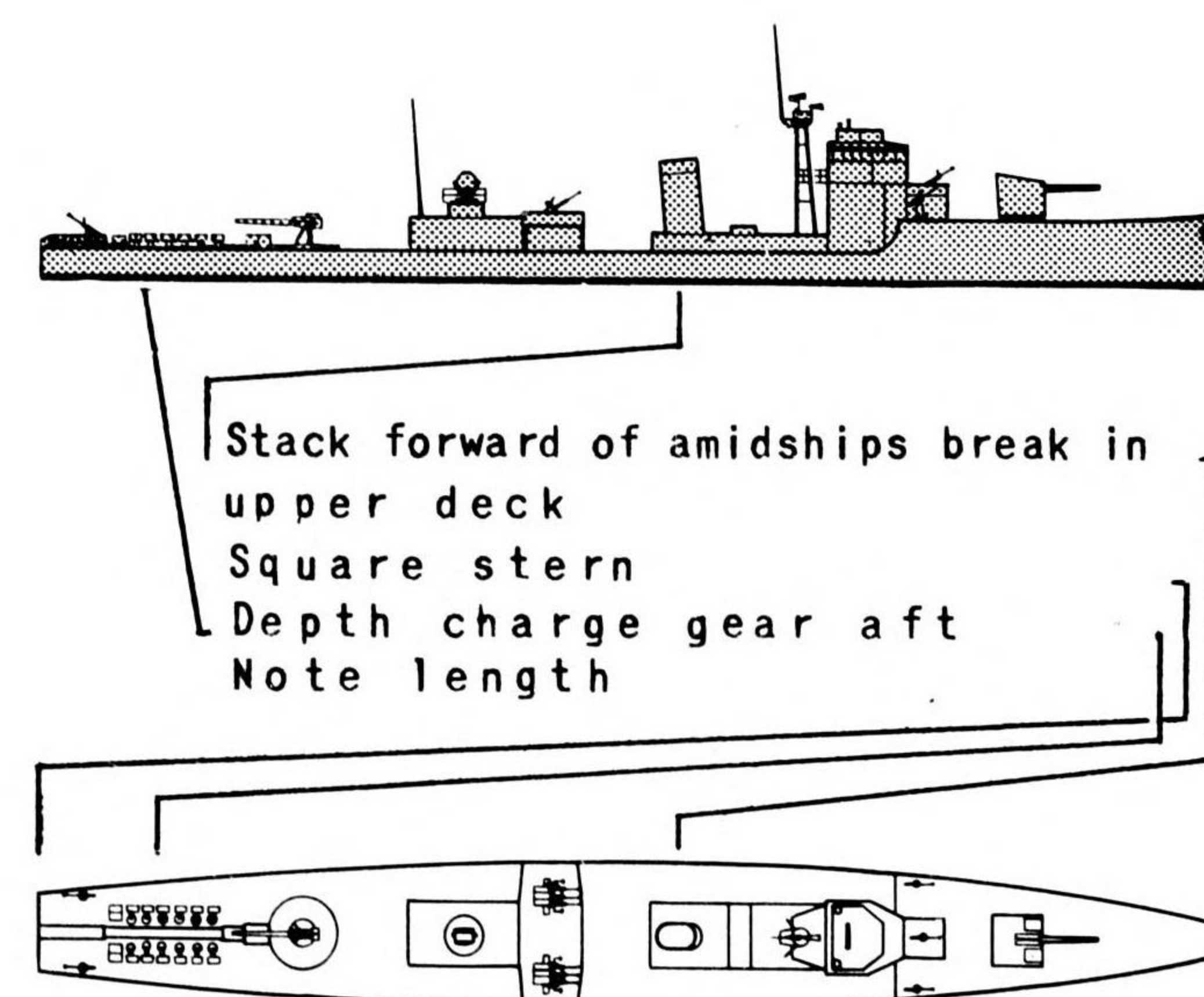
Single stack
One bank of torpedo tubes
Two single shield mounts

PF MIKURA Class 275' o. a.



Single stack
Long island aft with broken
outline
Hull outline has continuous
rounded taper

PF KAIBOKAN No. 2 Class 260' o. a.

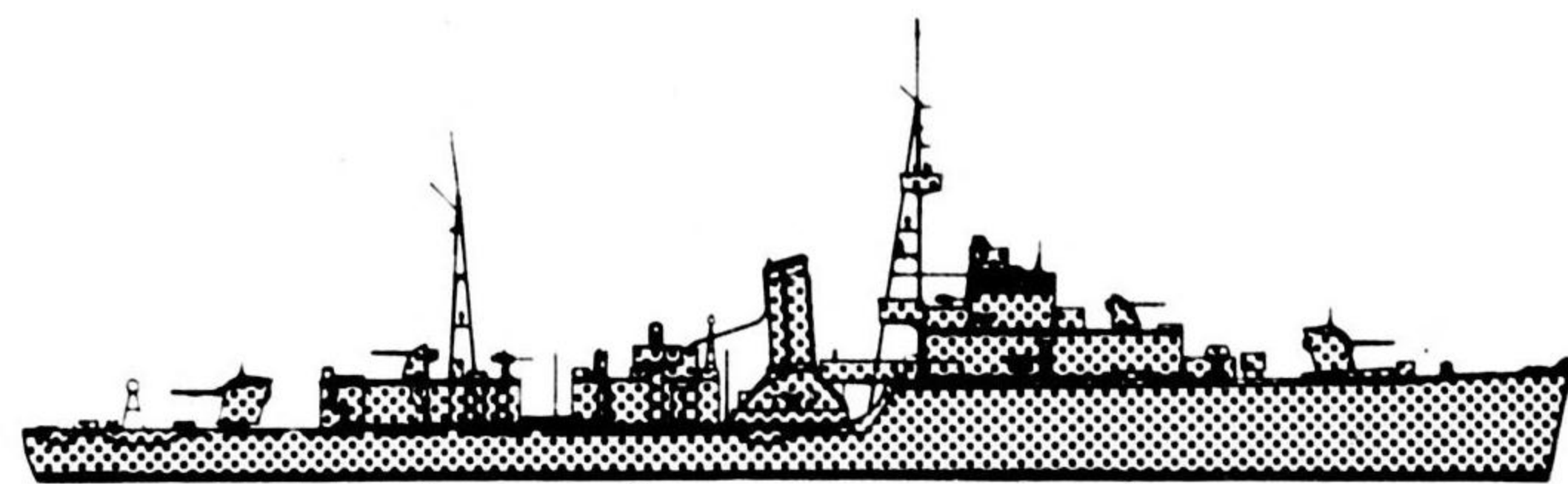


Stack forward of amidships break in
upper deck
Square stern
Depth charge gear aft
Note length

PATROL AND ESCORT VESSELS

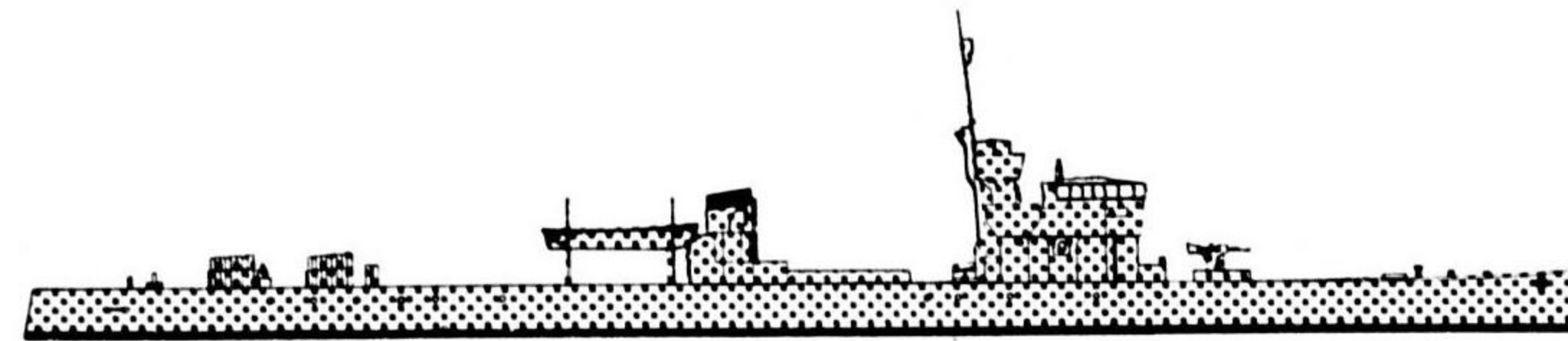
JAPAN

PG HASHIDATE Class 264' o. a.



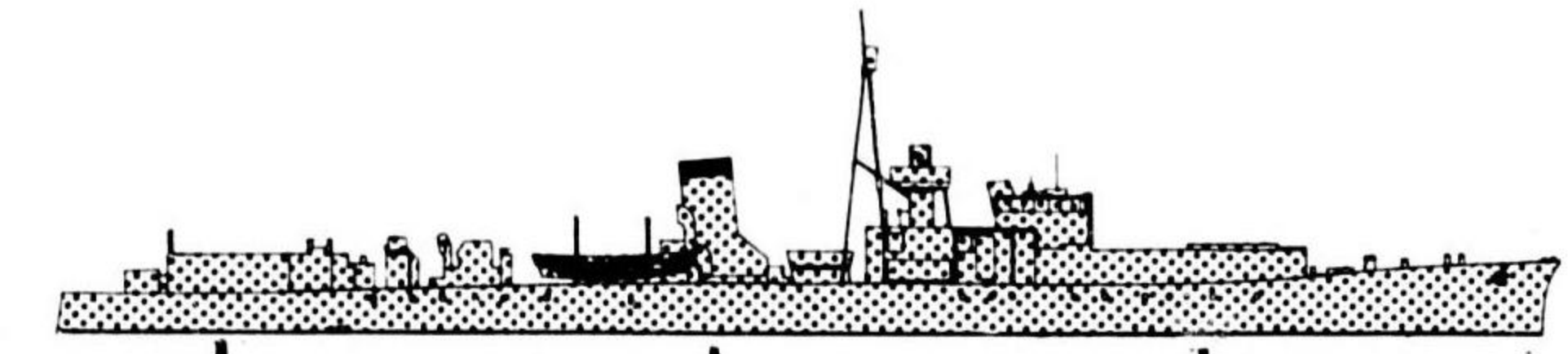
- Single stack amidships
- Gun deck forward of bridge
- Two separate islands abaft stack

PC 1 Class 213' o. a.



- Single stack aft of amidships
- Wide separation between stack and bridge
- Note minor variations within this class

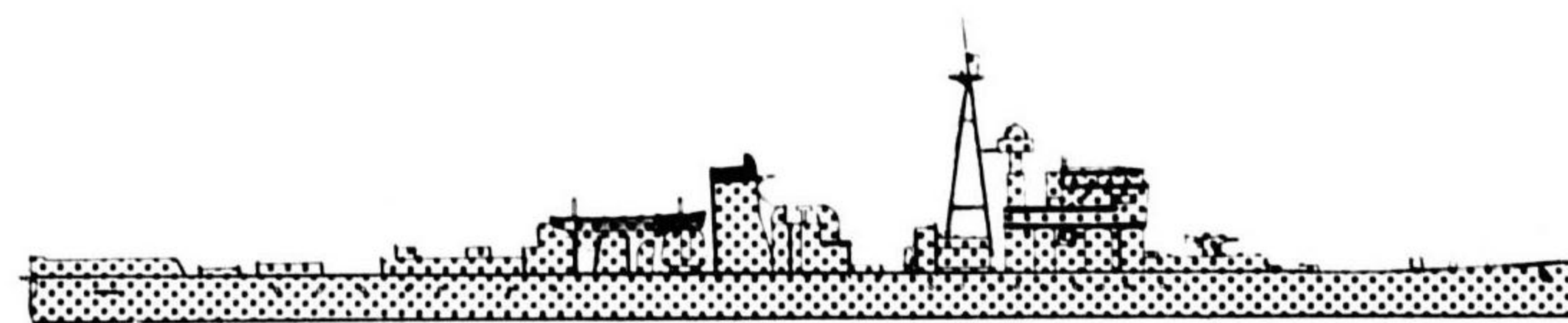
PC 4 Class 178' o. a.



- Single stack aft of amidships
- Long upper deck forward of bridge
- Island aft

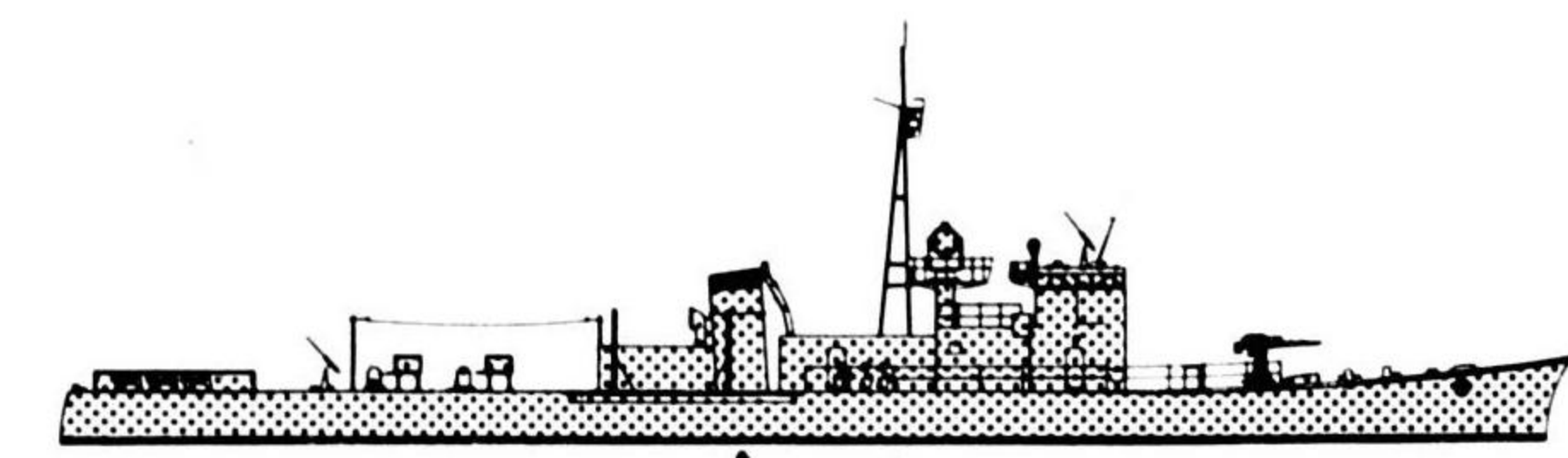
The new PF's have been designated as KAIBOKAN (Sea Defense Vessel) Nos. 1 and 2 Classes. In addition to the diesel-powered KAIBOKAN No. 1 shown here, there is a steam powered version which differs by having her stack just abaft the foremast. KAIBOKAN No. 2, approximately 260' o.a., may be confused with DE UN-1 as well as with the other KAIBOKAN. Note the stack position, the square stern and the depth-charge gear on the PF, features which should differentiate these two ships.

PC 1 Class 213' o. a.

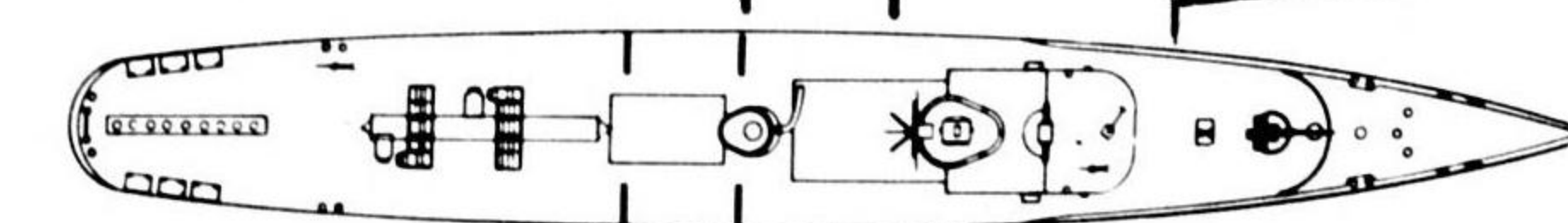


- Low raised deck forward of bridge
- Tripod mast and separate S/L platform
- Note additional superstructure features abaft bridge and abaft stack

PC 13 Class 170' o. a.



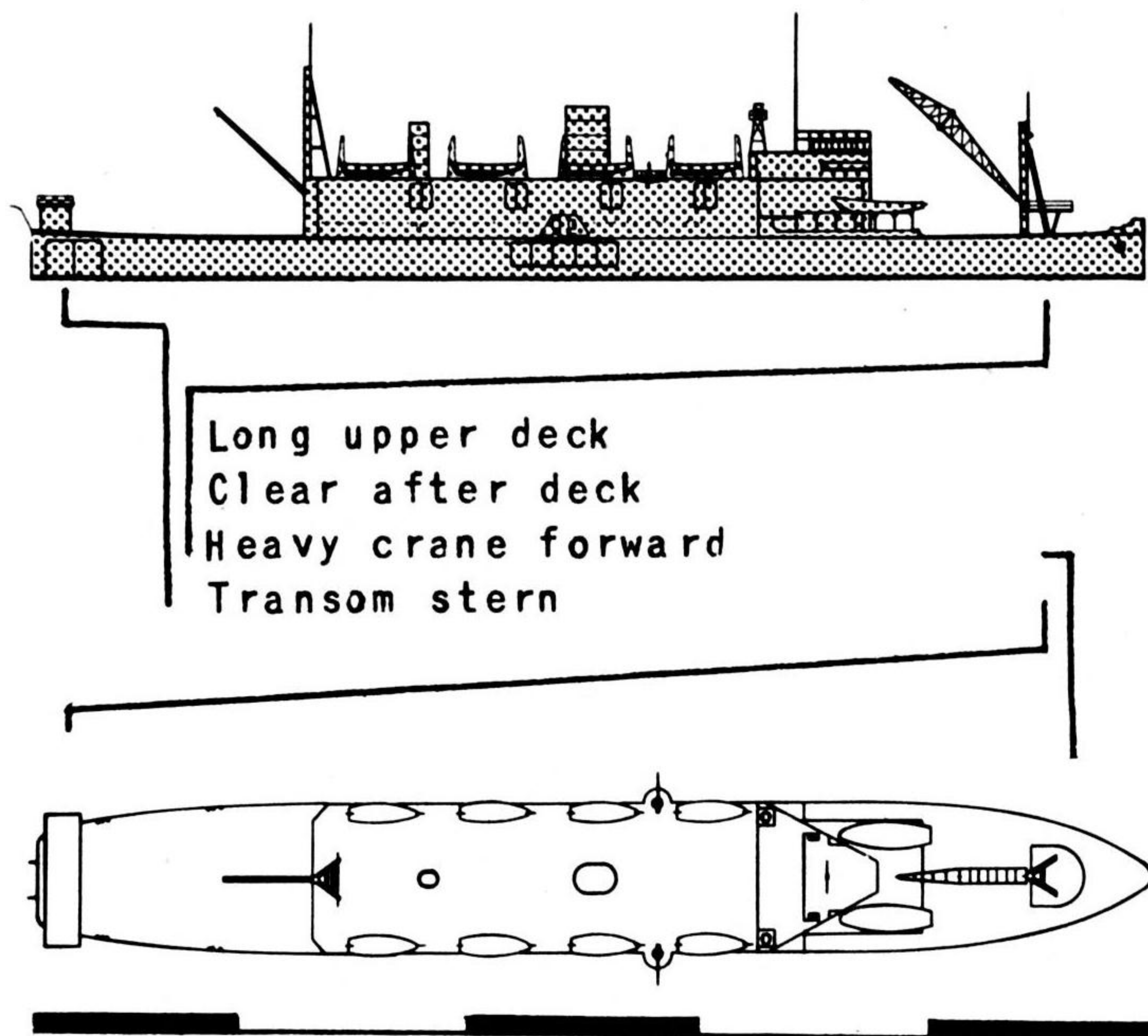
- Single stack aft of amidships
- Upper deck between bridge and stack
- Note continuous taper of hull outline



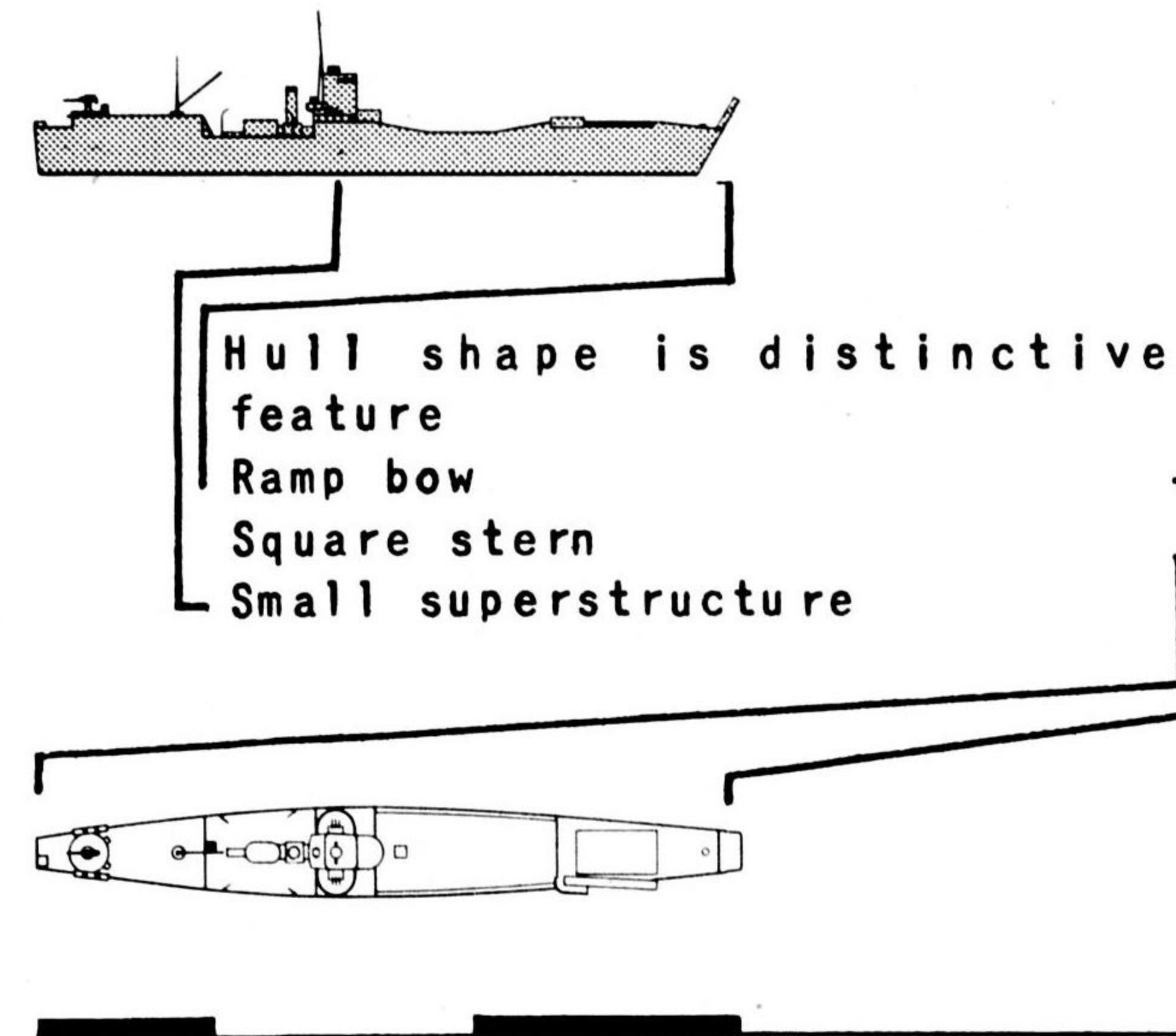
LANDING SHIPS - SUB CHASERS

JAPAN

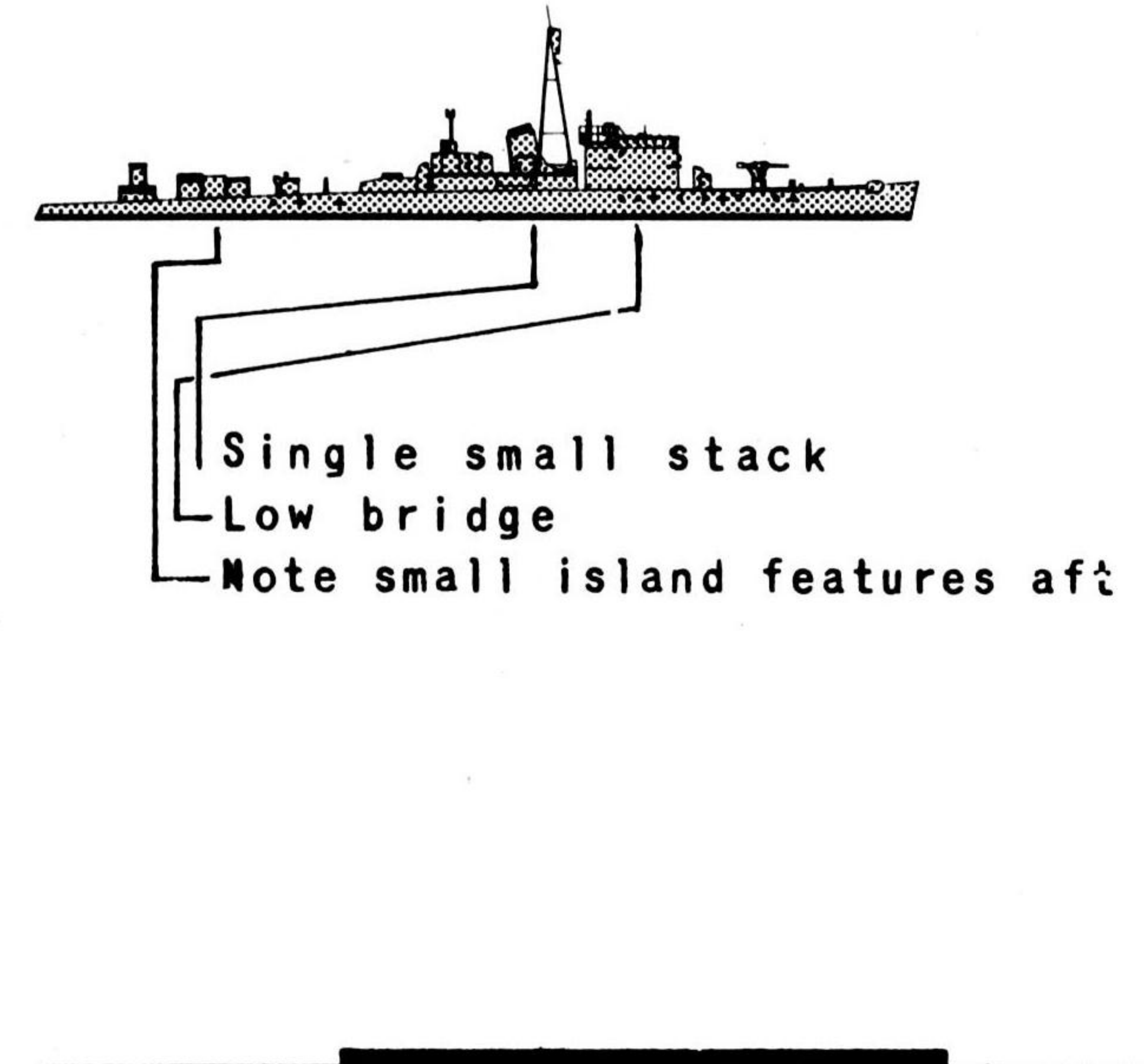
LSV - 1 480' o. a.



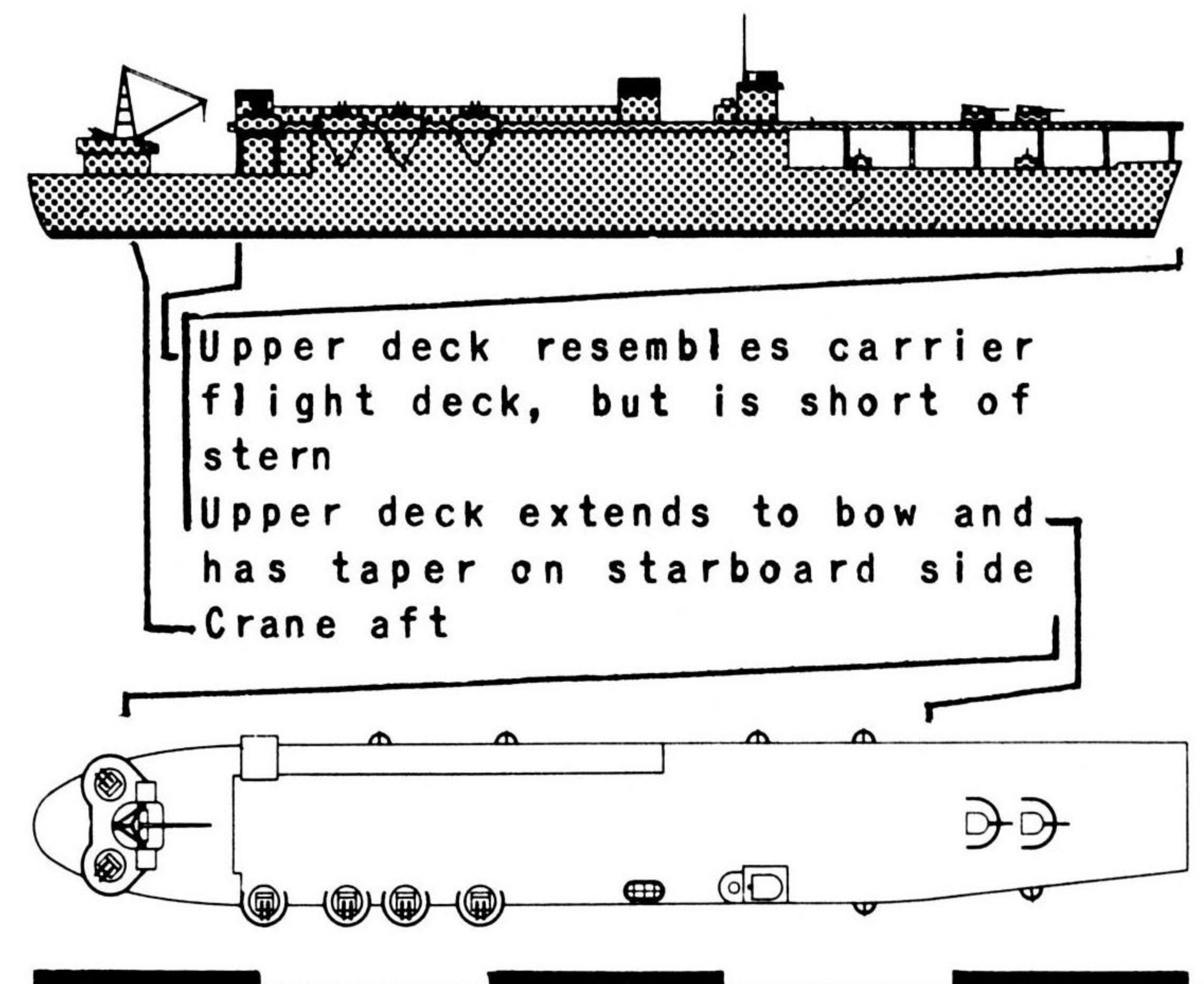
LST 264' o. a.



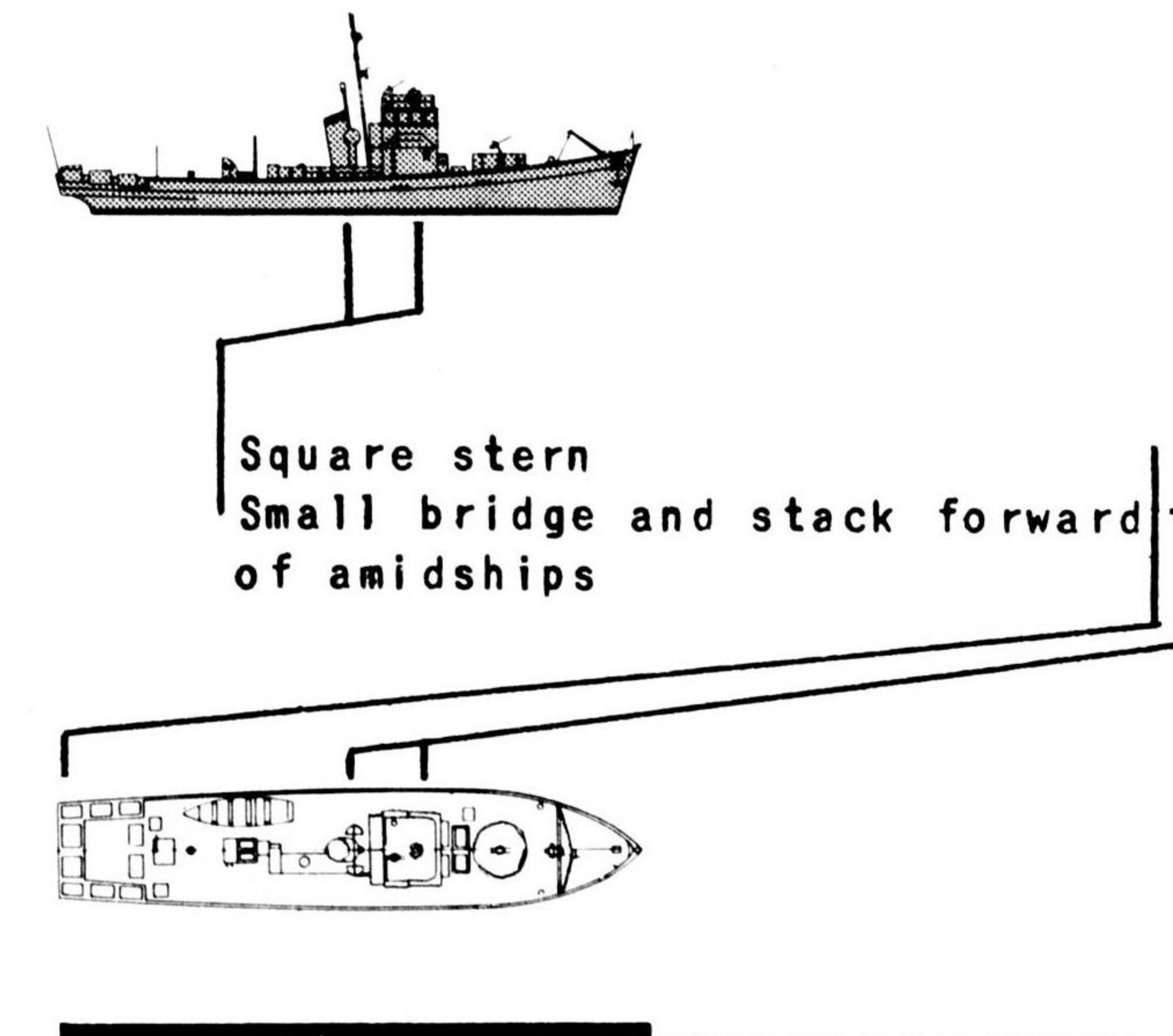
SCS 51 Class 146' o. a.



LSV AKITSU MARU 493' o. a.



SCS 1 Class 97' o. a.

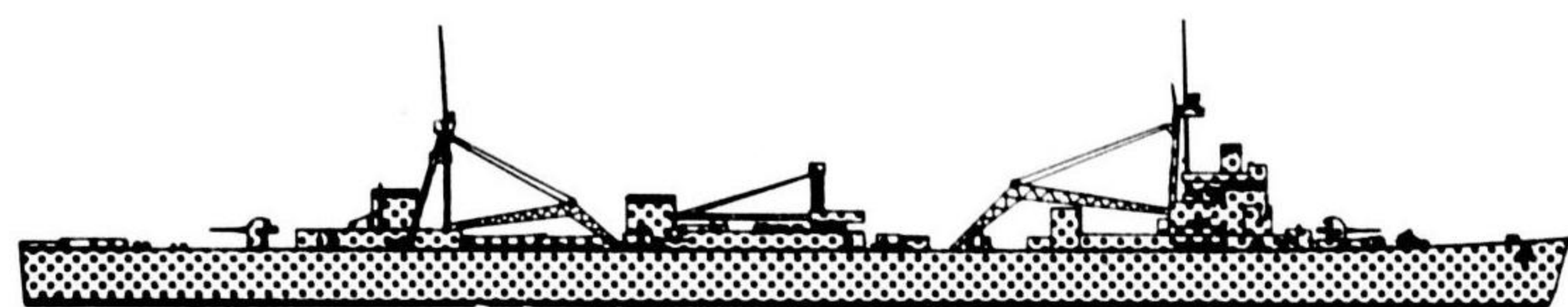


AUXILIARIES

JAPAN

AR AKASHI

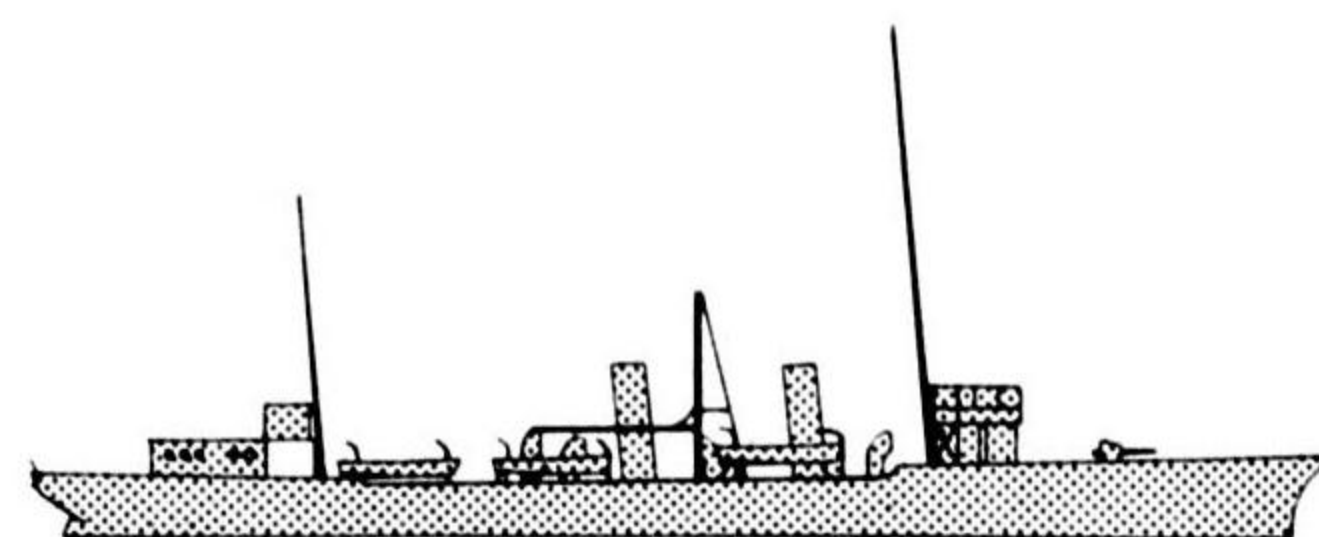
500' o. a.



Two stacks, well aft and widely separated
 Small bridge well forward
 Two heavy cranes

AGS YODO

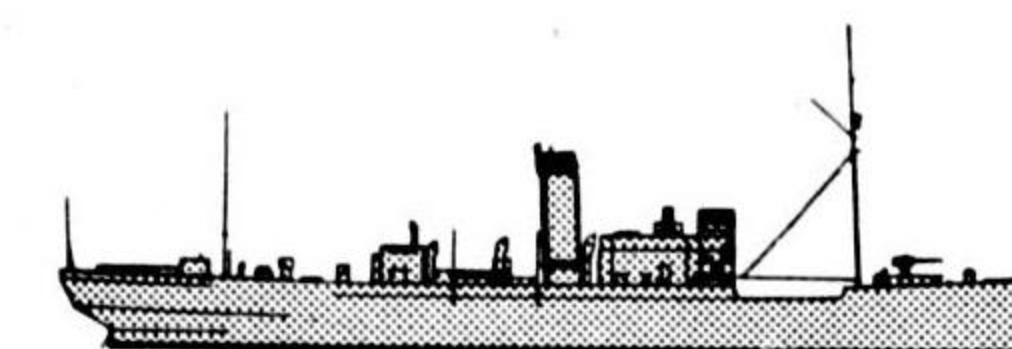
300' o. a.



Two raked stacks amidships
 Short, low bridge
 Island aft

AS KOMABASHI

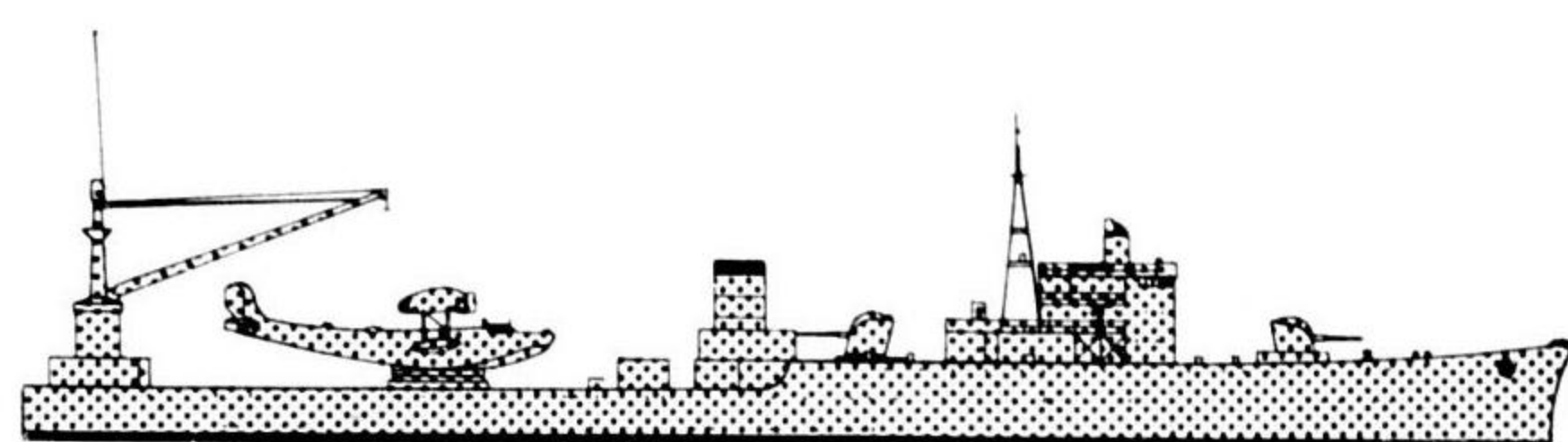
227' o. a.



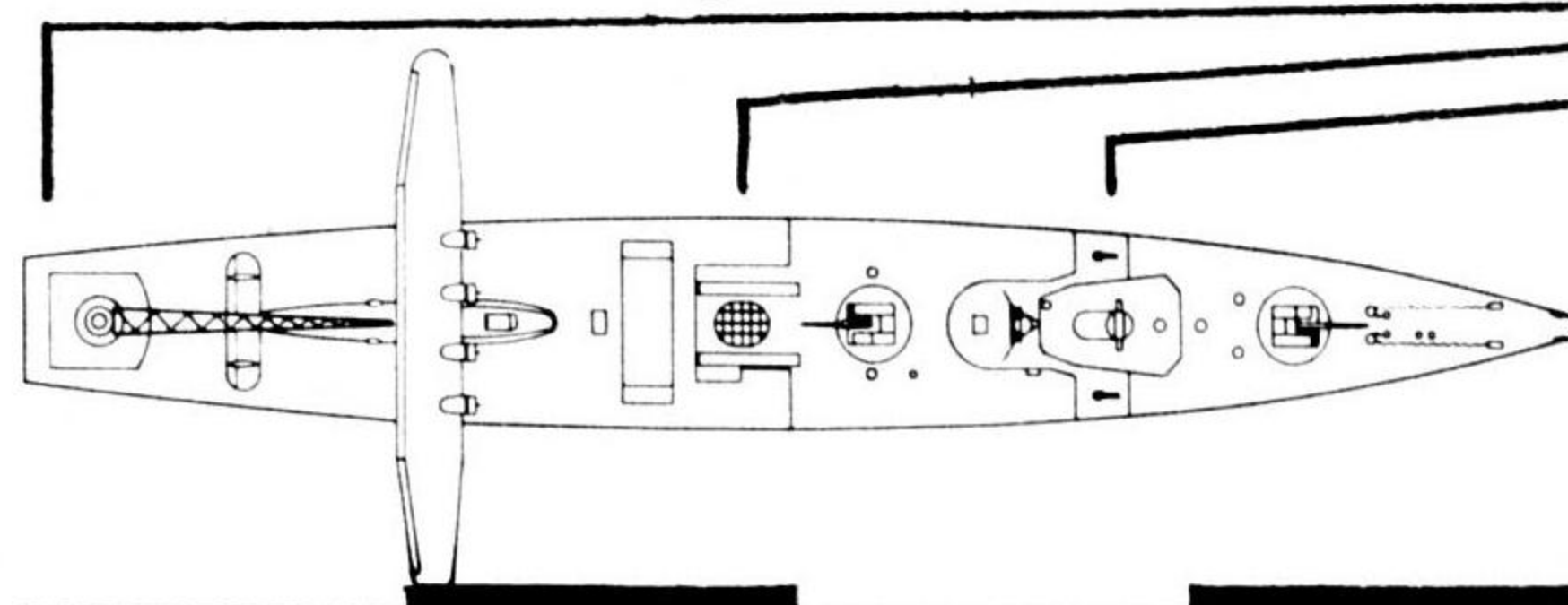
Tall, thin stack amidships
 Low bridge
 Hatch forward of bridge

AV TAKACHIHO

392' o. a.

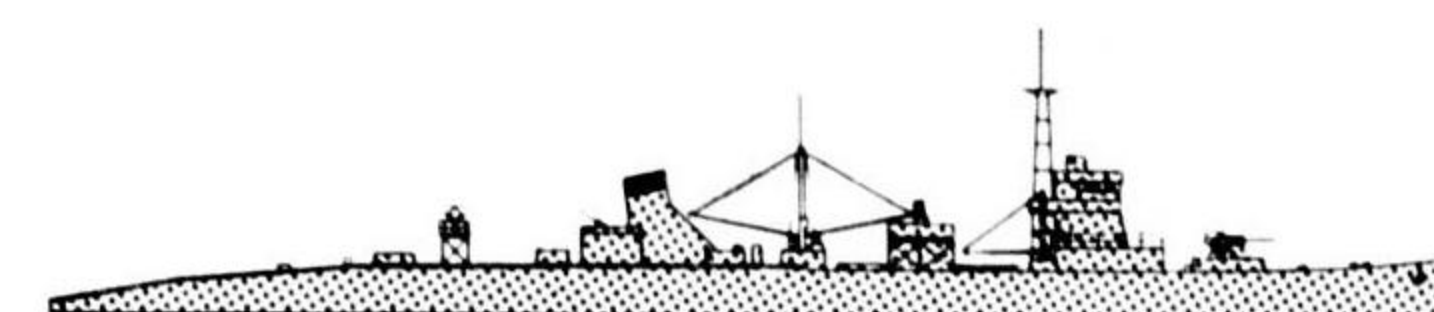


Single stack aft of amidships
 Transom stern
 Bridge well forward
 Wide separation between stack and bridge

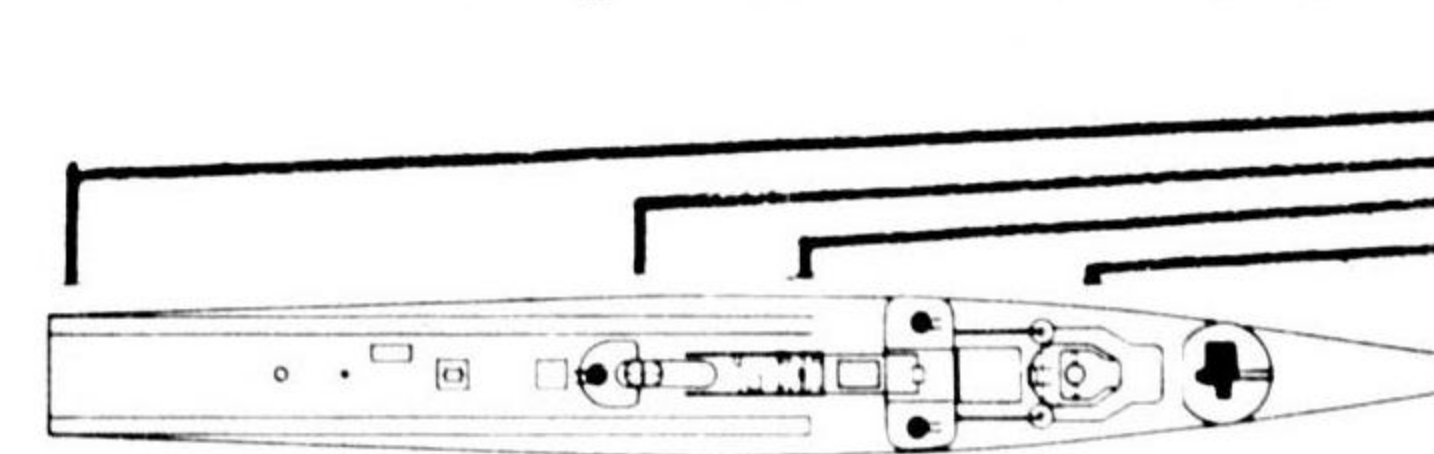


New APD

320' o. a.

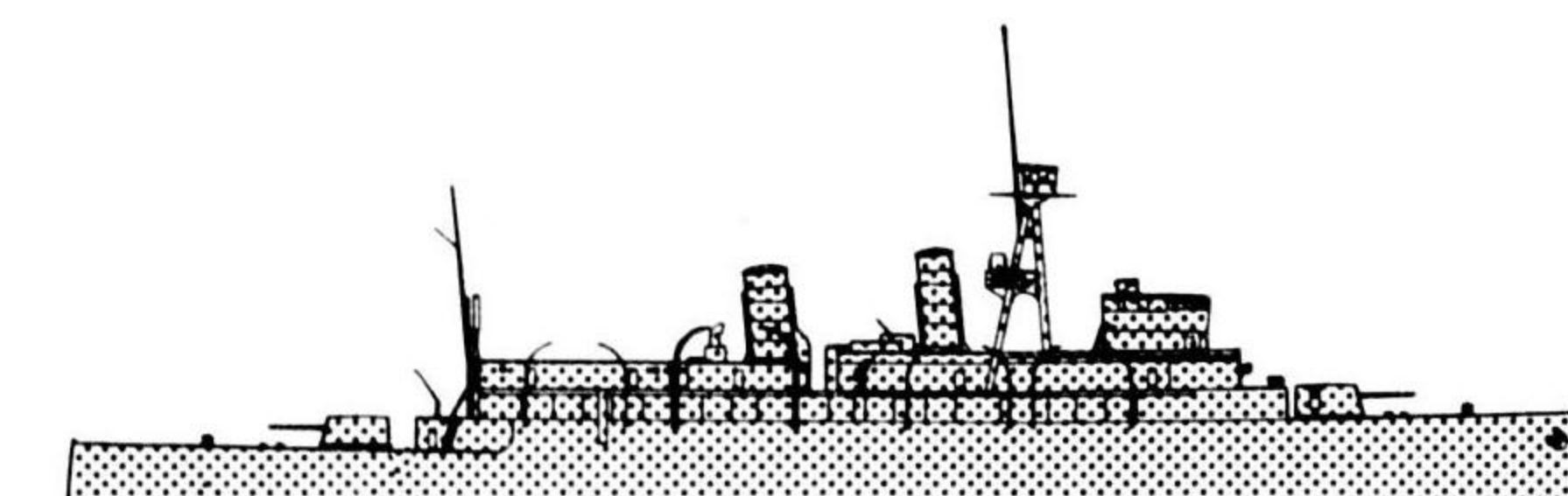


Square, ramp-like stern
 Single stack aft of amidships
 Stern tracks begin forward of mainmast
 Bridge well forward

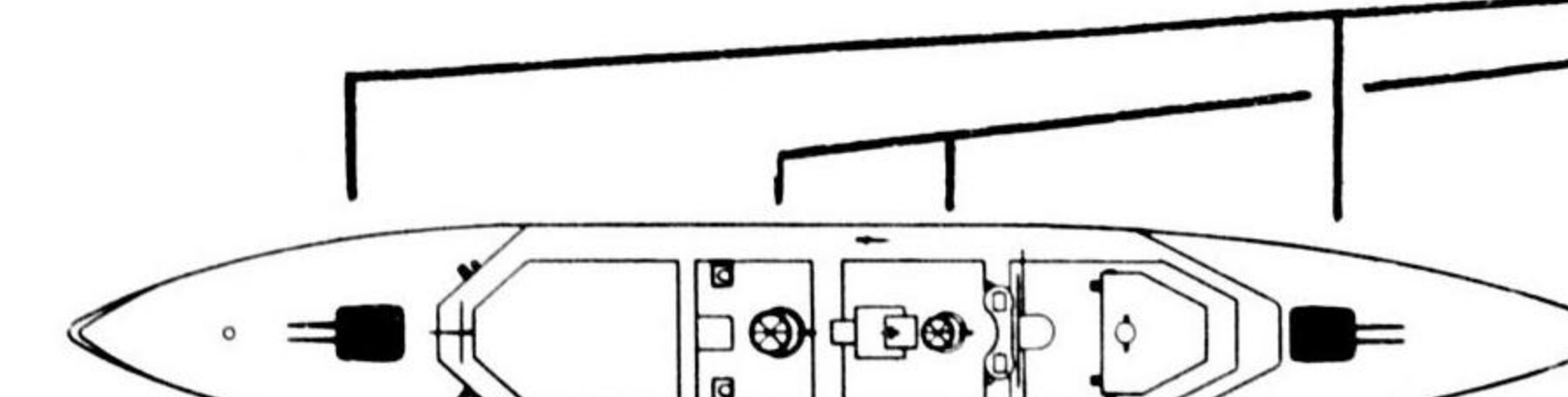


AS CHOGEI

approx. 400' o. a.



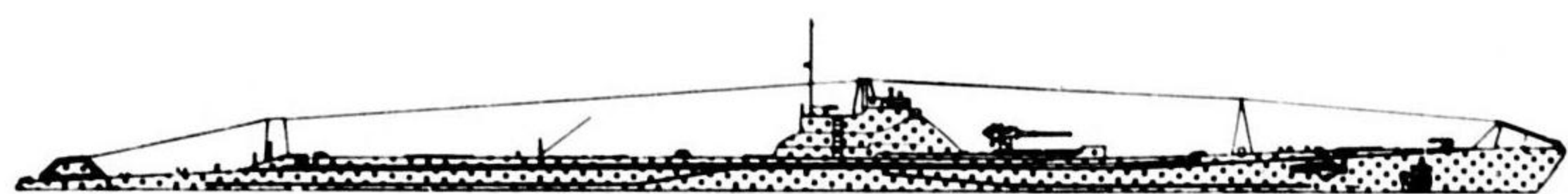
Two stacks
 Transport-like superstructure
 Cruiser stern
 Two turrets



SUBMARINES

JAPAN

"I" Classes		300' -373' o.a.	
I-1 Class	320' o.a.	I-151	300' o.a.
I-5	320' o.a.	I-152	321 o.a.
I-6	323' o.a.	I-153 Class	331' o.a.
I-7, I-8	359' o.a.	I-161 Class	321' o.a.
I-9 Class	373' o.a.	I-168 Class	343' o.a.
I-15 Class	357' -359' o.a.	I-176 Class	335' o.a.



Conning Towers on most classes are rounded forward



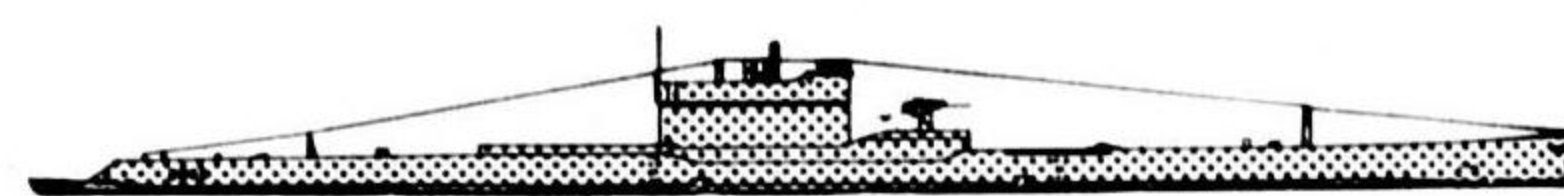
I-121 Class 280' o.a.



Overall length is distinctive feature for this class



"RO" Classes		232' -255' o.a.	
RO-26 Class	244' o.a.		
RO-29 Class	244' o.a.		
RO-33 Class	248' o.a.		
RO-35 Class	255' o.a.		
RO-51 Class	232' o.a.		
RO-57 Class	238' o.a.		
RO-60 Class	250' o.a.		



Conning Towers on all classes are vertical forward



RO-100 Class 180' o.a.



Overall length is distinctive feature for this class



MIDGET TYPES		41' and 80' o.a.	
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Two distinct types known
 PEARL HARBOR TYPE 41' o.a.
 SYDNEY HARBOR TYPE 80' o.a.



Submarine identification has always presented a difficult problem to the photo interpreter. Differences between the various classes and even between the submarines of different nations are found in features which are too small to be of appreciable value to the interpreter. Conning tower shapes, hatch arrangements, guns, net cutters, etc. show little variation in high altitude photos. Length alone has been an aid to classification, but the close range of overall lengths prevents precise identification. Except for the I-121, RO-100 and Midget classes, which have distinctive lengths, submarines should usually be listed in reports as "I" or "RO" class, unless measured lengths of other classes are extremely reliable.

In addition to the types shown here, a new Japanese Army supply submarine has been reported and designated the YU class, with an overall length of 131 feet. There is also a self-propelled cargo tube approximately 80' o.a. which is semi-submersible and resembles a surfaced submarine.

ORDNANCE AND RADAR

The primary purpose of this section is to assist the interpreter in describing and illustrating new type ships and alterations of known types. It is not intended to be a complete treatise on the subject, but is only to provide the interpreter with a quick reference for equipment commonly observed on Japanese ships. For more complete information, consult "A Statistical Study of the Japanese Navy" (O.N.1.222-J) and "Japanese Electronics" (Photographic Intelligence Center, Report No. 1)

The pages devoted herein to armament apply to warships and, in part, to merchant ships. Unfortunately, there is little information available on merchant ship armament, but a few general statements can be made. Early in the war, Japanese merchant ships were equipped with varying degrees of defensive armament, for the most part inadequate. Those guns which were installed were of all types including obsolete naval guns, automatic weapons and, in some instances, even field artillery pieces. The most noteworthy characteristic of the armament on merchant vessels in the early part of the war was their haphazard arrangement. There seemed to be no standardization and guns were placed in a highly asymmetrical manner, a feature which still may be observed on many ships.

In general, the armament situation for Japanese merchant ships has greatly improved, due primarily to the diminishing merchant fleet and the deflation of the empire. The largest type which is now used on merchant ships is the 20 cm. (8") "short", a cross between a howitzer and a true naval gun. Similar to this is the 12 cm. (4.7") "short". Both guns are reported to be "triple purpose", i.e., they can fire anti-aircraft barrages, mortar shells against surface targets, and depth charges.

Other types which may be observed on merchant ships include 5.5"/50 single-purpose, 5"/50 in shielded or open mounts, 4.7"/45 single-purpose shield mounts, the 3"/40 naval gun which is the most common type used on merchant ships, and all smaller types ranging down through the automatic weapons.

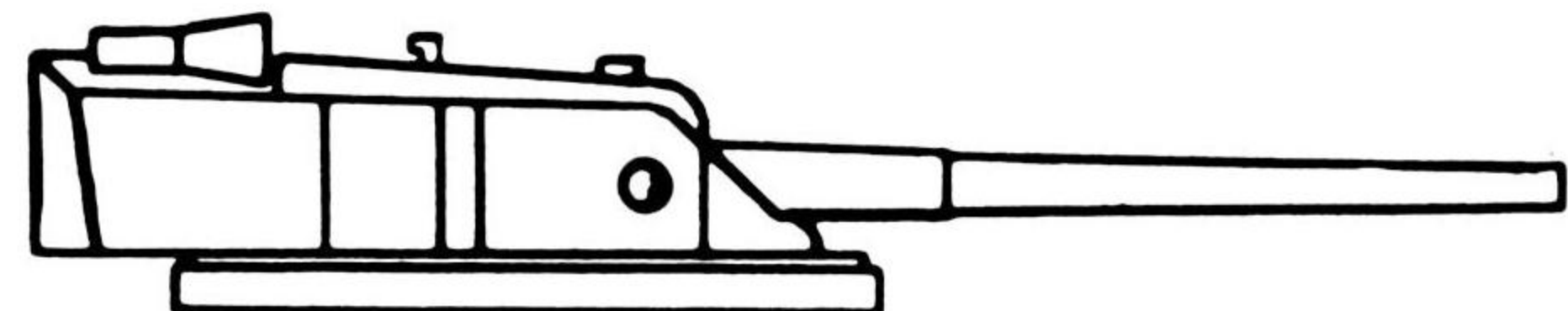
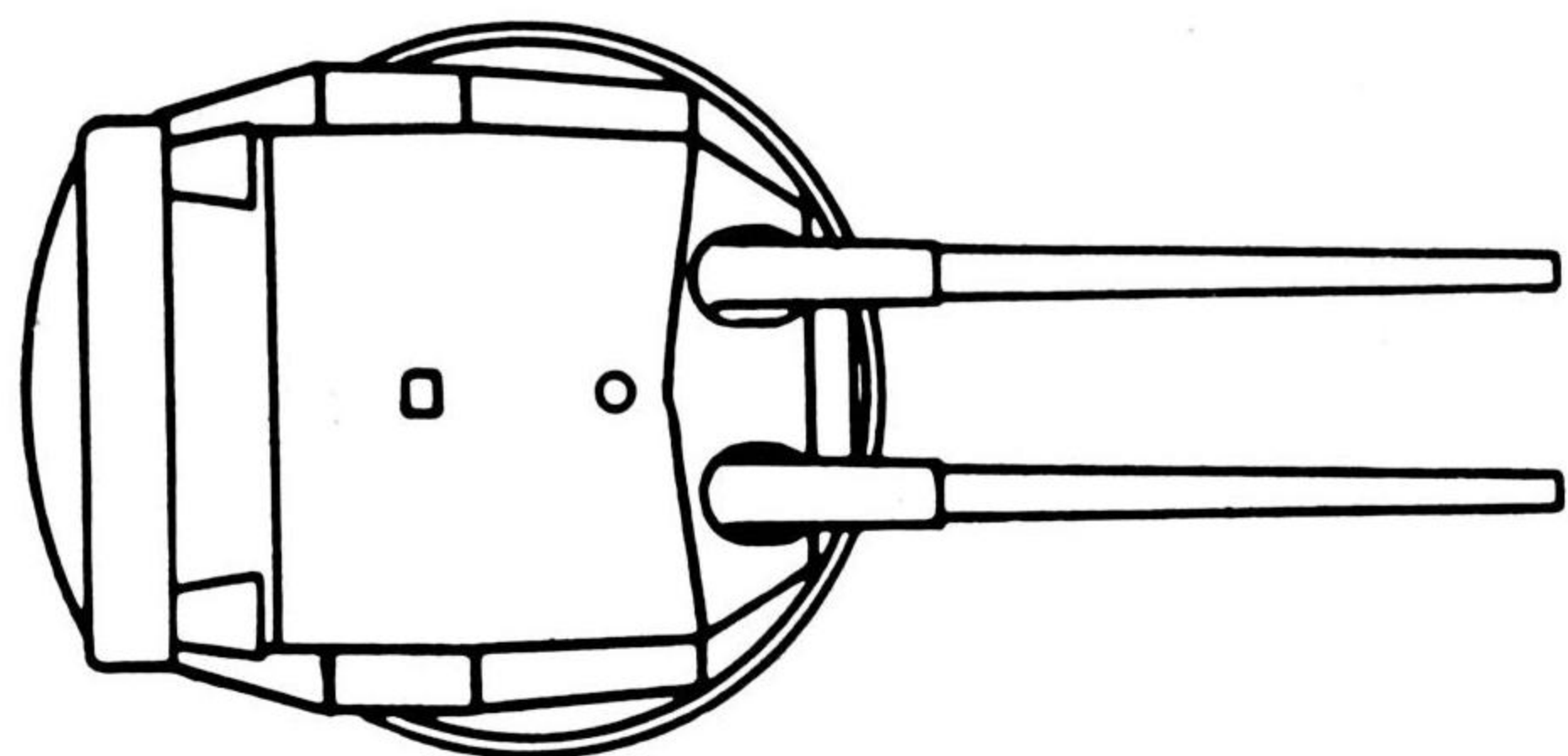
The most noteworthy development in merchant ship armament has been found on several new special types of ships, believed to be designed for amphibious operations. These ships mount ten 75mm AA guns and probably carry fire control radar. Unfortunately, there is little information available on these ships at the present time, but when the details are known, this data will be included in a supplement to this publication.

Typical examples of covered and open torpedo tube mounts are shown, including the new quintuple mount observed on the SHIMAKAZE Class destroyers.

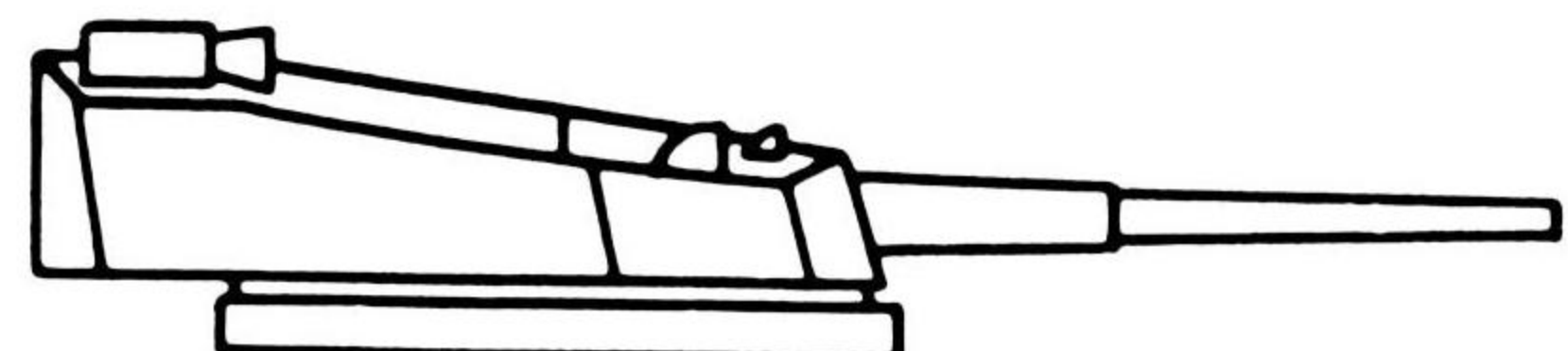
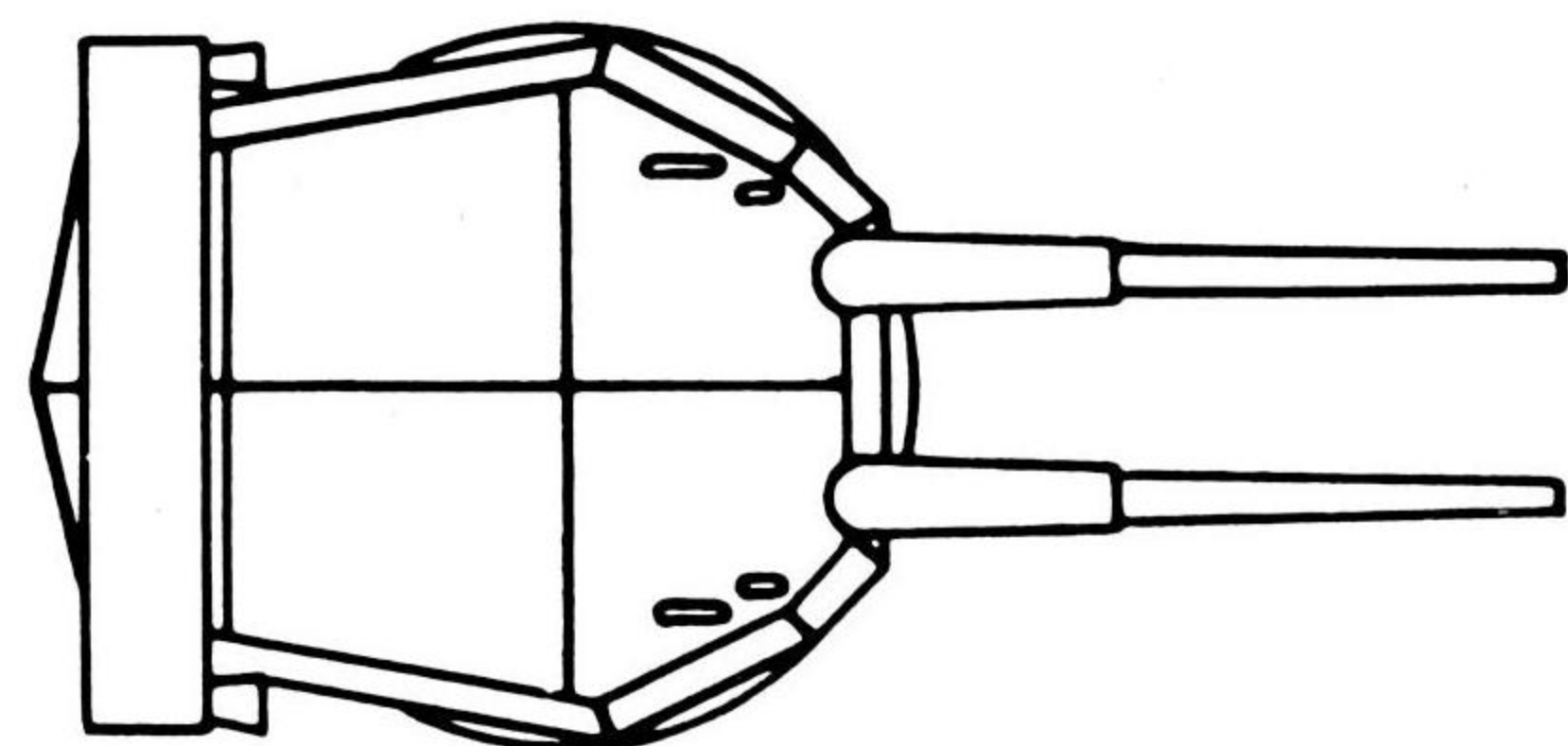
The section is concluded with illustrations and notes on the four known types of shipborne radar in use by the Japanese.

0 10 20 30 40 50
SCALE IN FEET

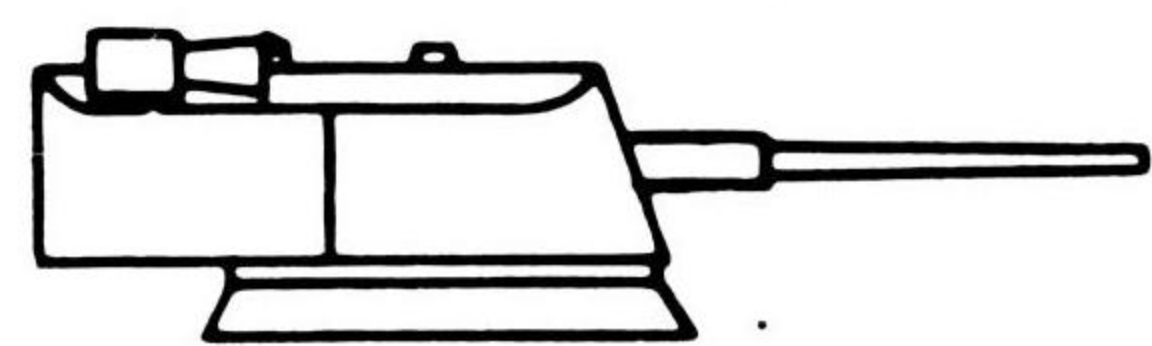
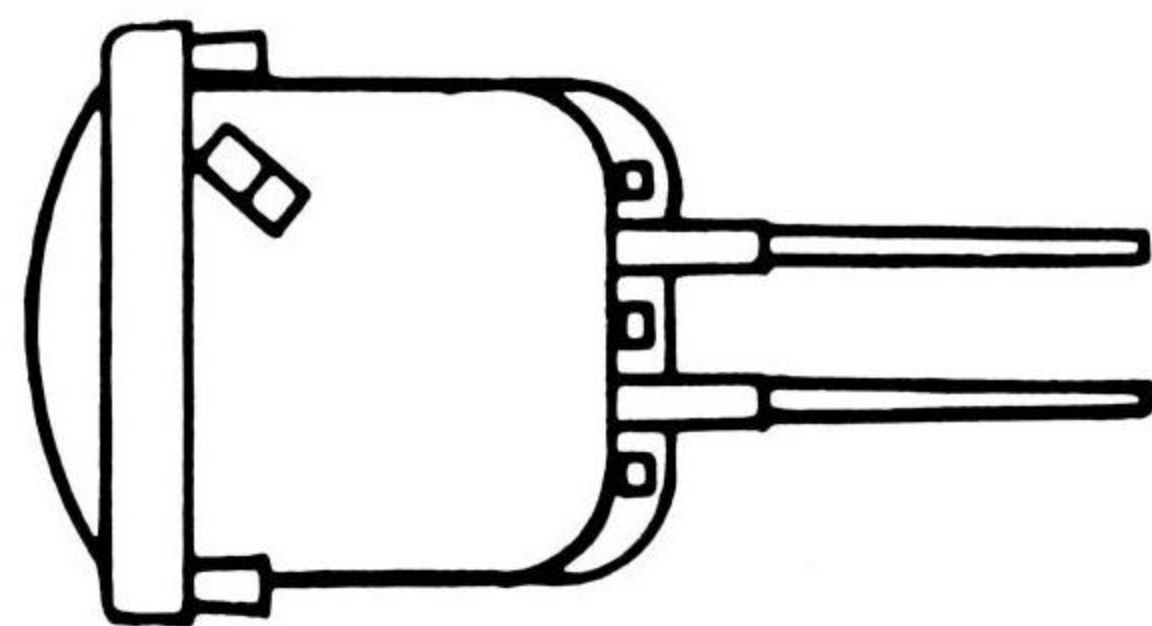
NAVAL GUNS



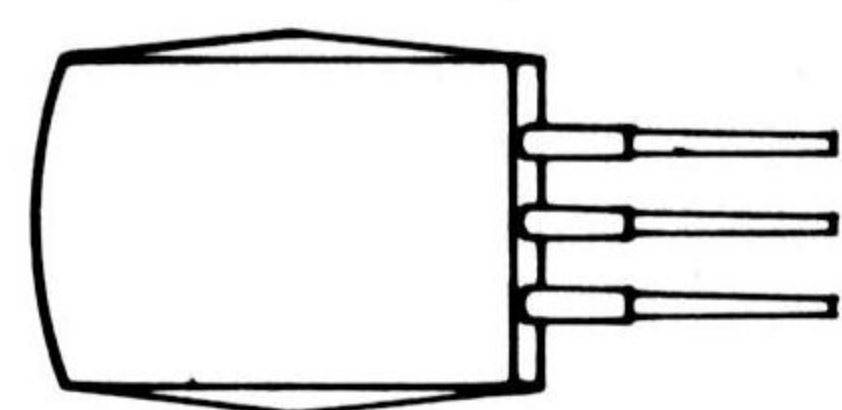
16" - 45 Cal. twin
BB NAGATO



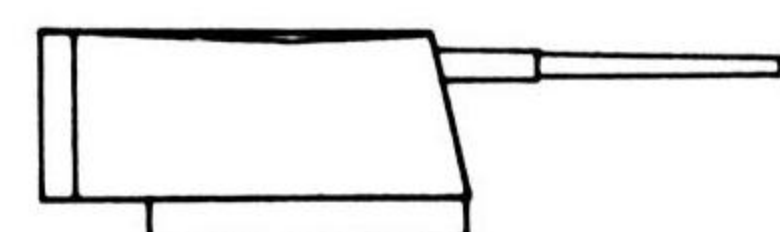
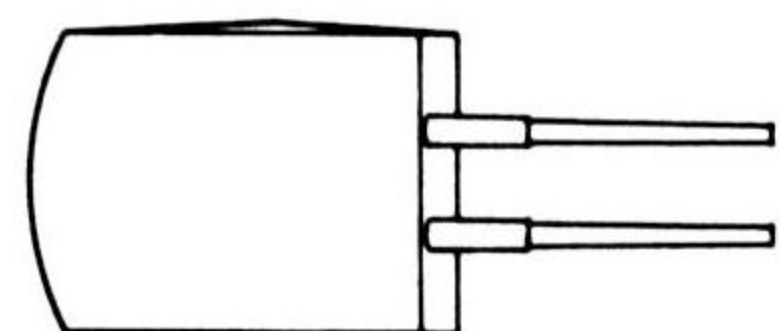
14" - 45 Cal. twin
BB ISE and KONGO



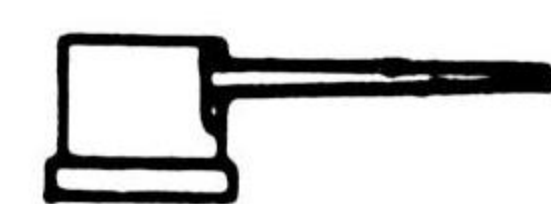
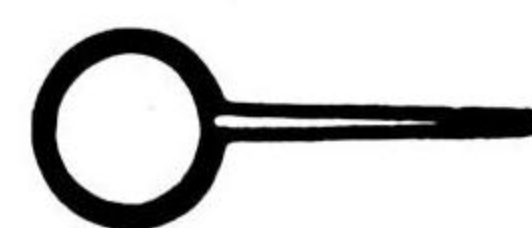
8" - 50 Cal. twin
Heavy Cruisers



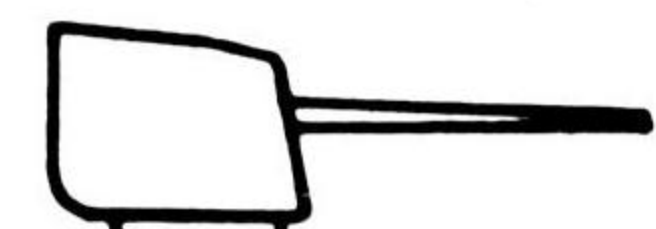
6" - 50 Cal. triple
CL OYODO



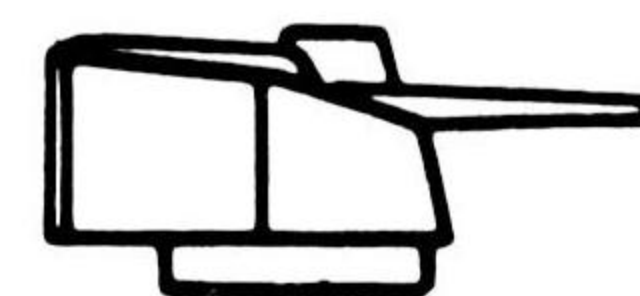
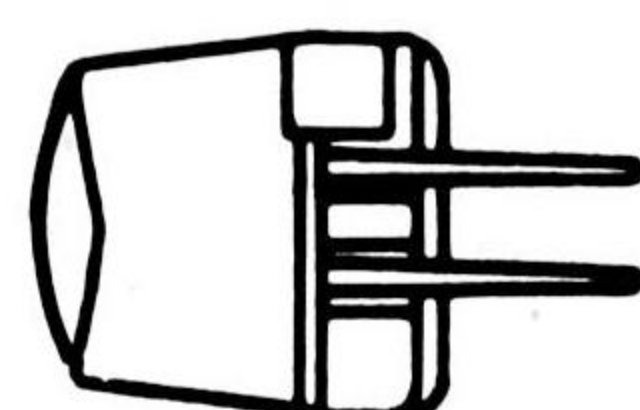
6" - 50 Cal. twin
CL AGANO Class



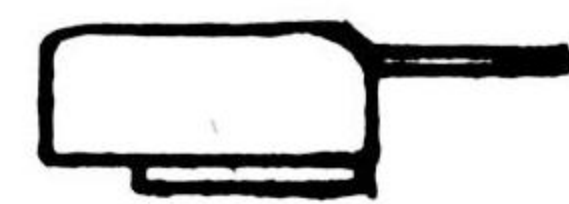
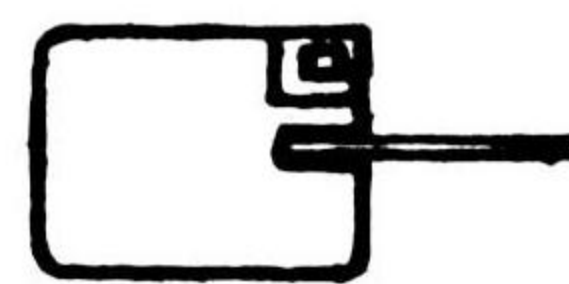
6" - 50 Cal. casemate
BB KONGO



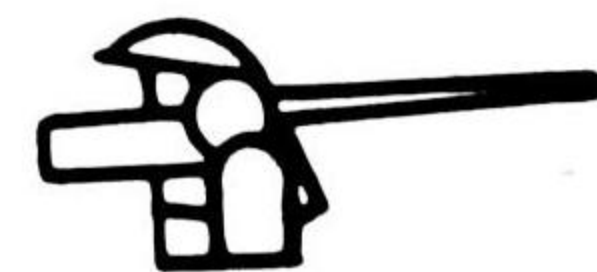
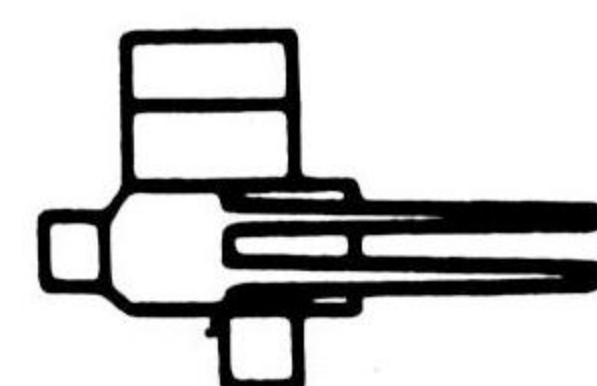
5.5" - 50 Cal. single
Light Cruisers and
CVL HOSHO



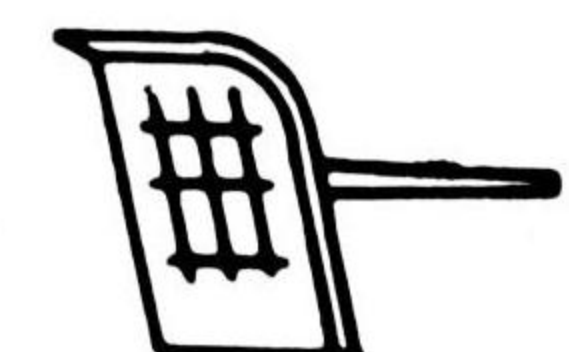
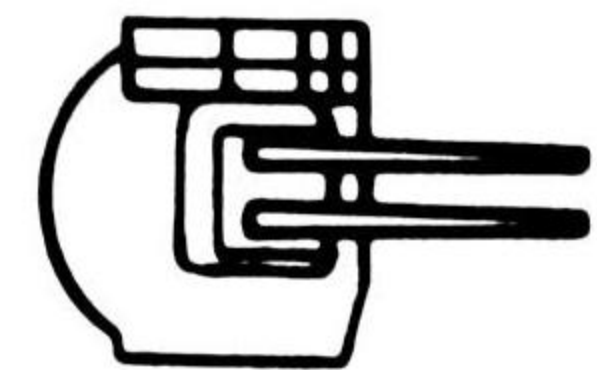
5" - 50 Cal. twin
Destroyers



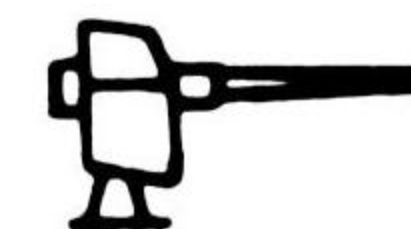
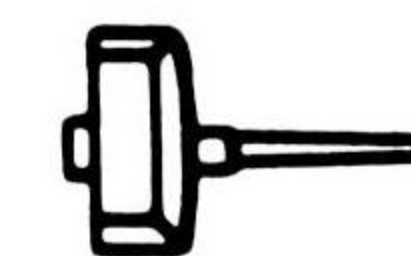
5" - 50 Cal. single
Destroyers



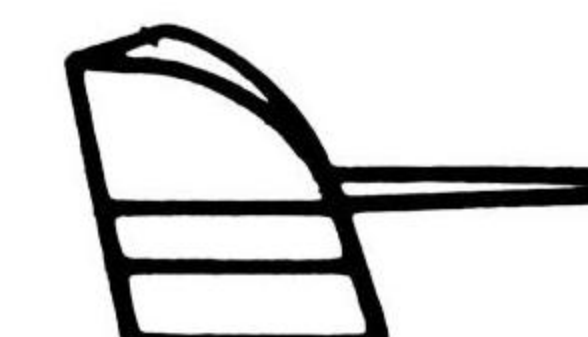
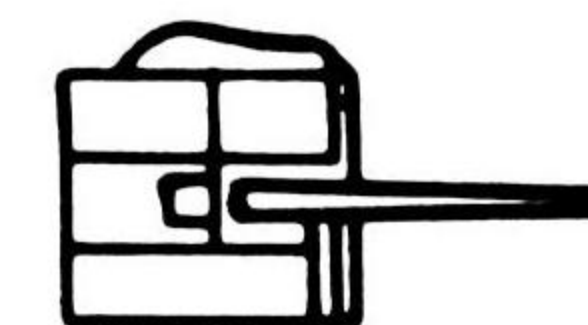
5" - 40 Cal. twin AA
BB, CV, DD MATSU



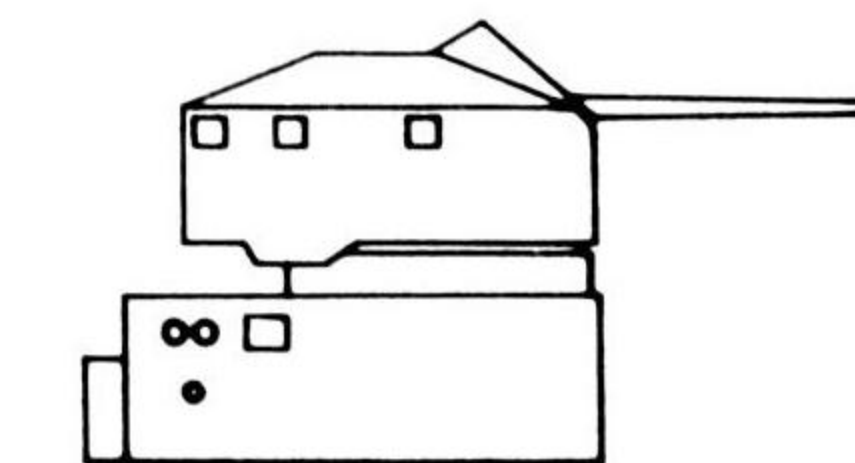
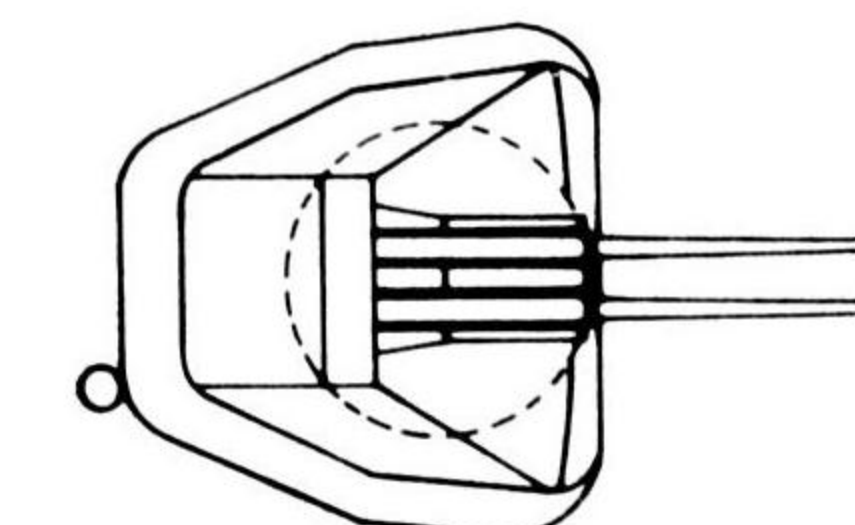
4.7" - 50 Cal. twin AA
CA TONE, NACHI



4.7" - 45 Cal. single
Old Destroyers

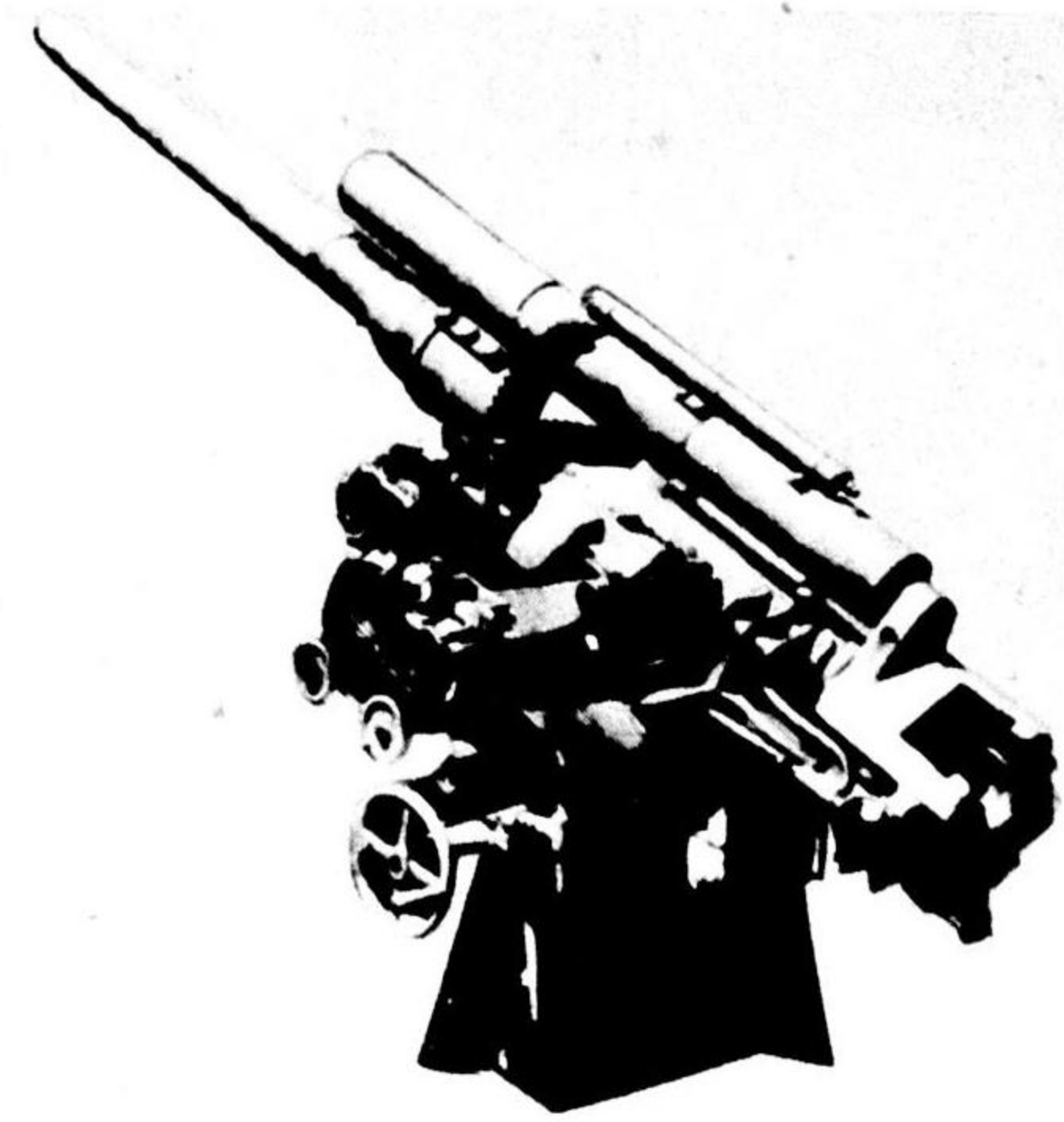


4.7" - 45 Cal. single AA
CA TAKAO, AOBA



4" - 50 Cal. twin AA
DD TERUTSUKI

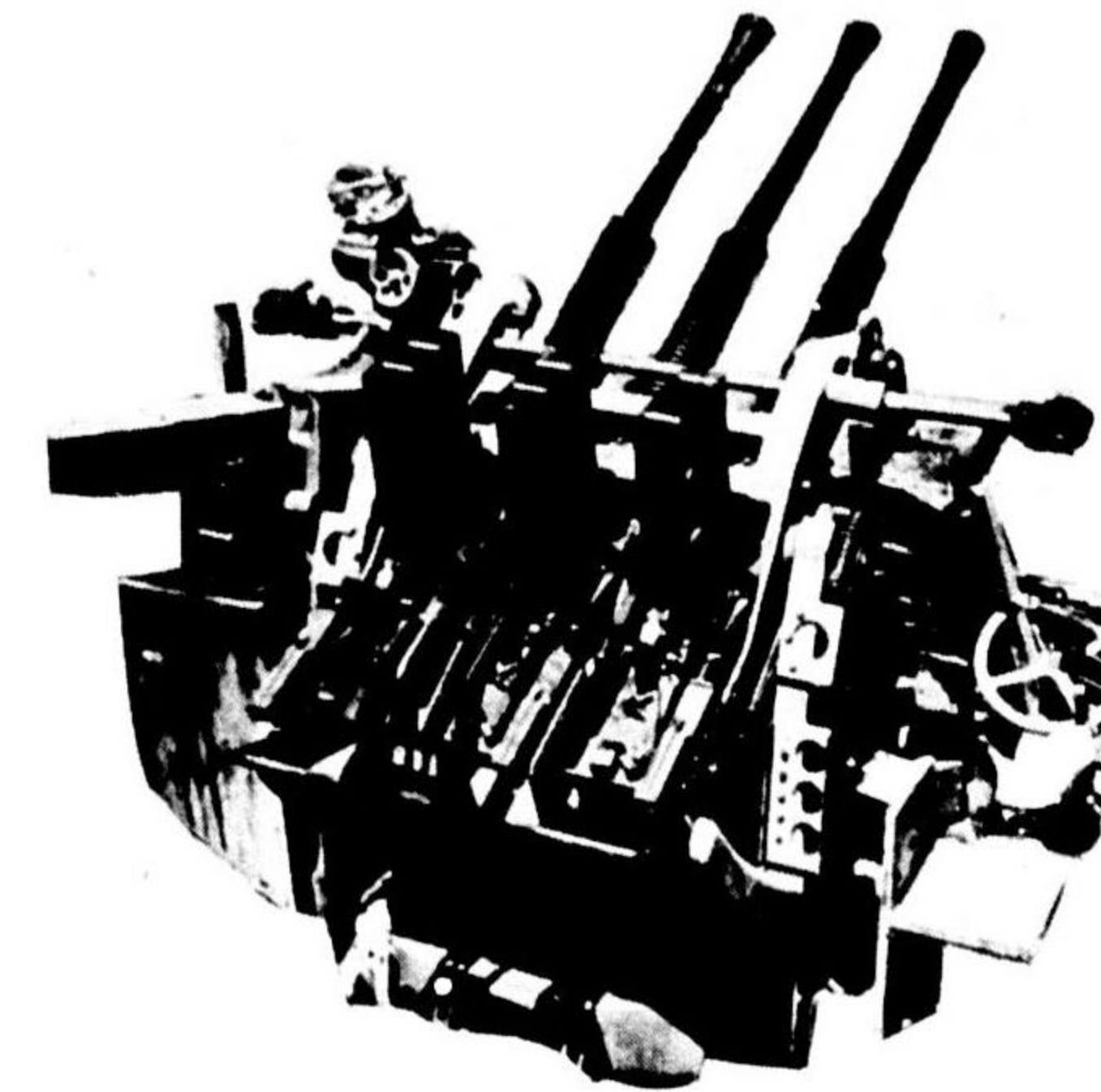
NAVAL GUNS



3" - 40 cal. single
Misc. warships and MV



40 mm. AA
All types of ships
(also appears in single
mounts)



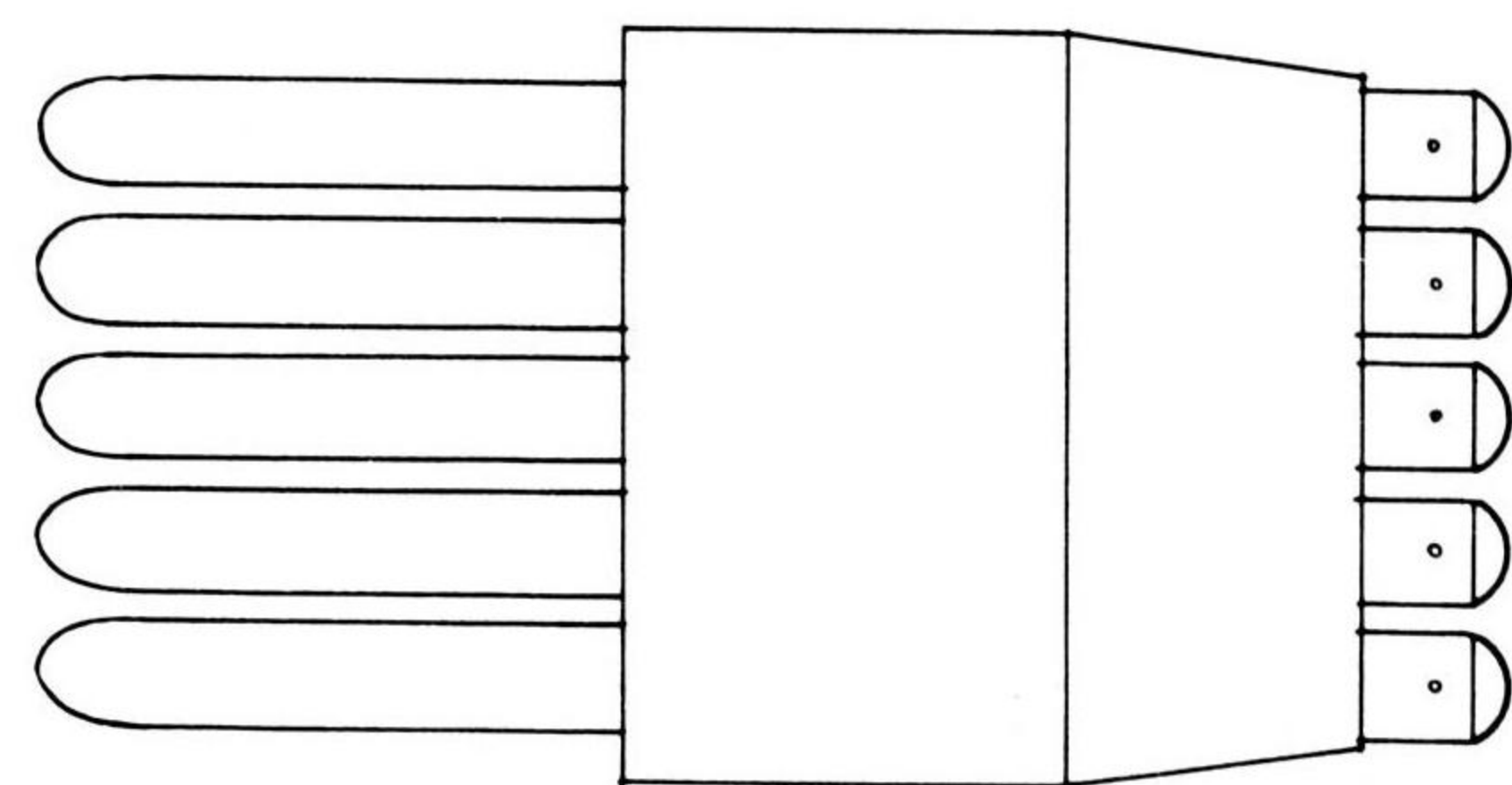
25 mm. AA
All types of ships
(also appears in single
and twin mounts)



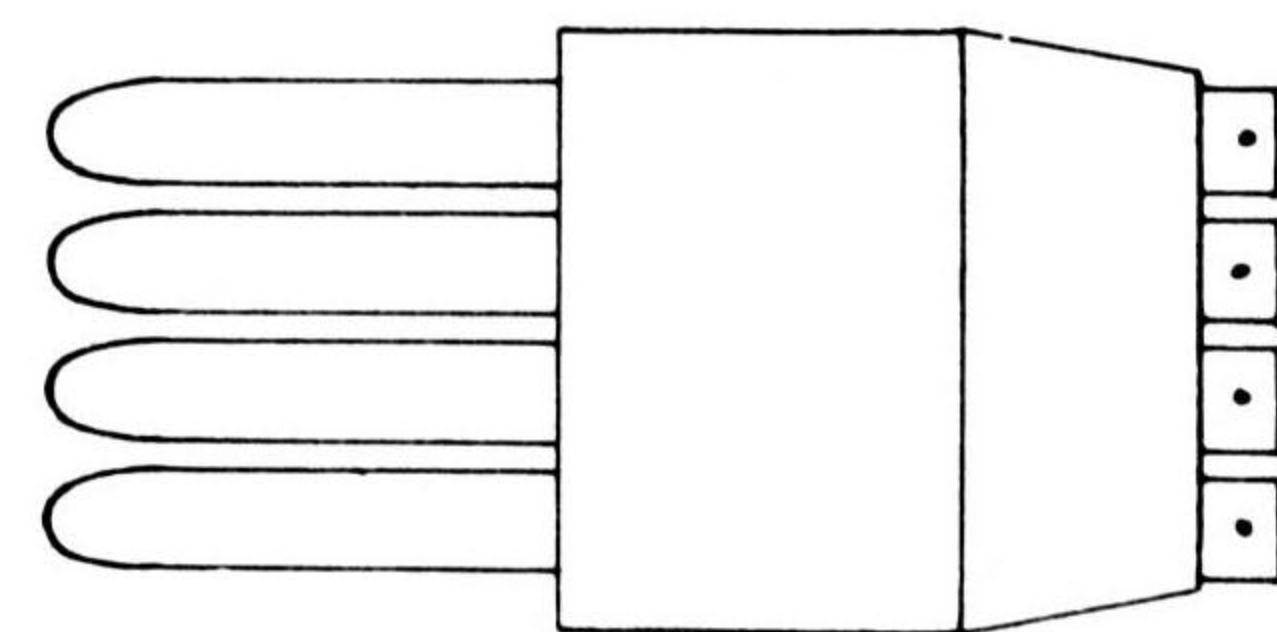
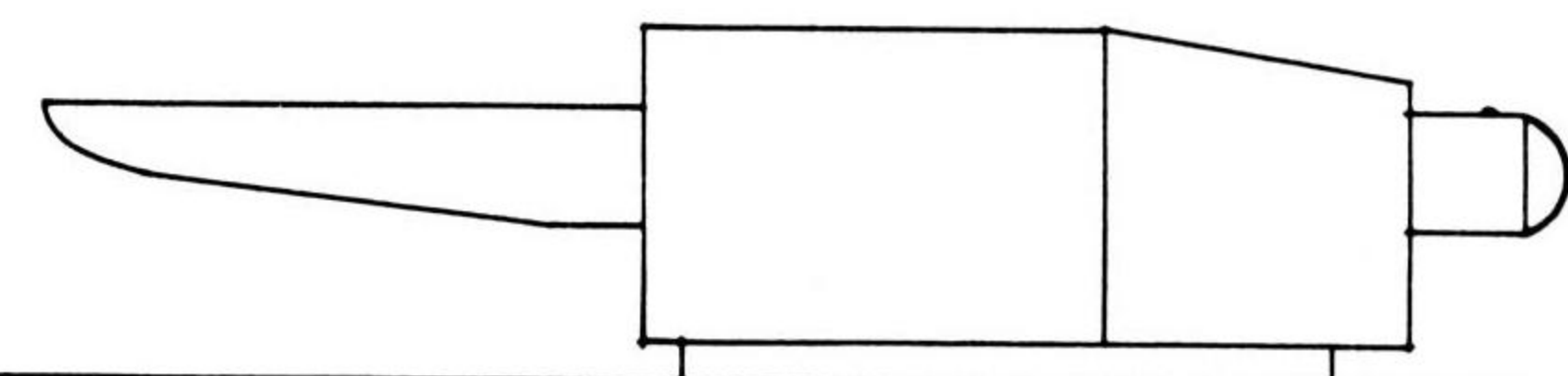
13.2 mm. AA
All types of ships
(also appears in single
mounts)

TORPEDO TUBE MOUNTS

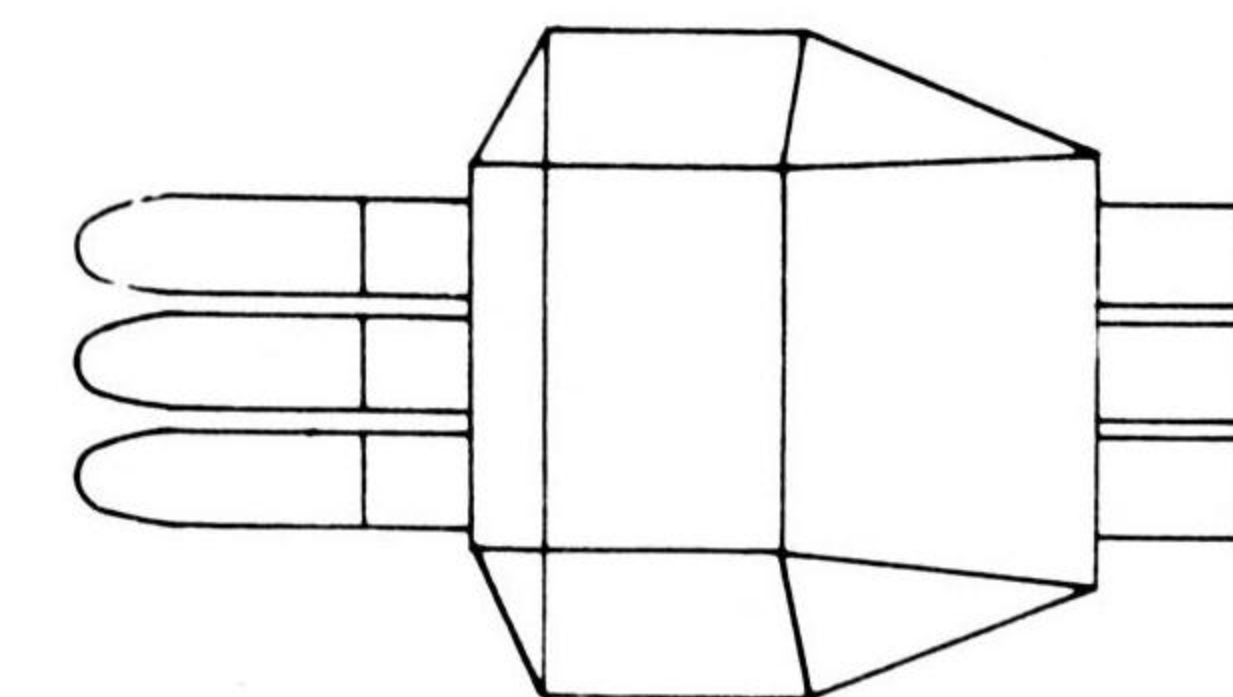
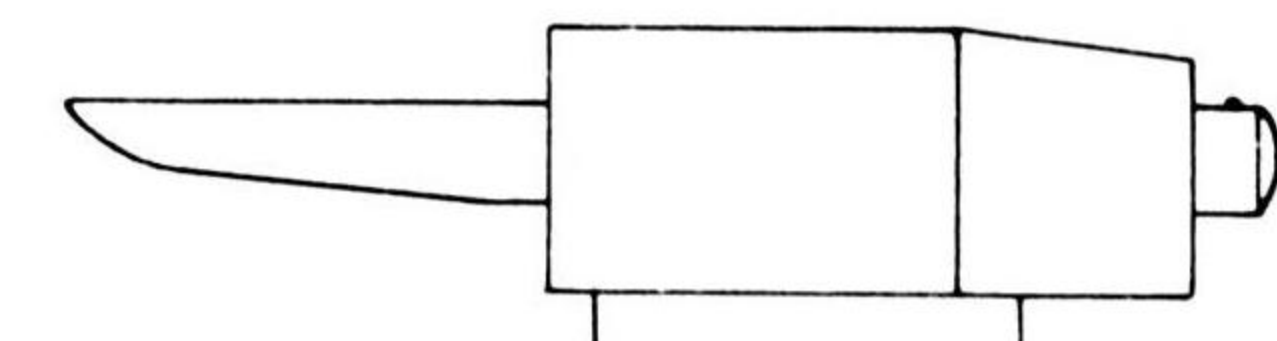
Quadruple, triple and twin torpedo tube mounts may be fitted with either 24" or 21" tubes and may be either covered or open. It is reported that most cruisers and destroyers have been refitted with 24" tubes.



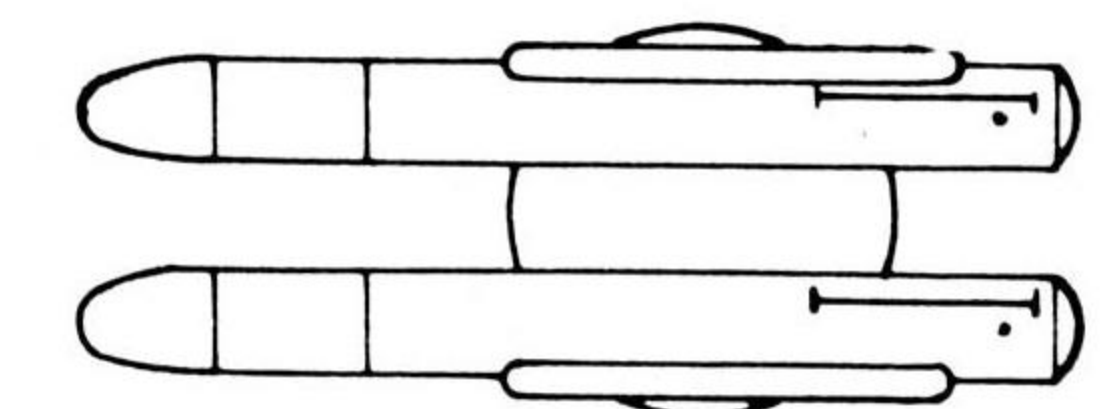
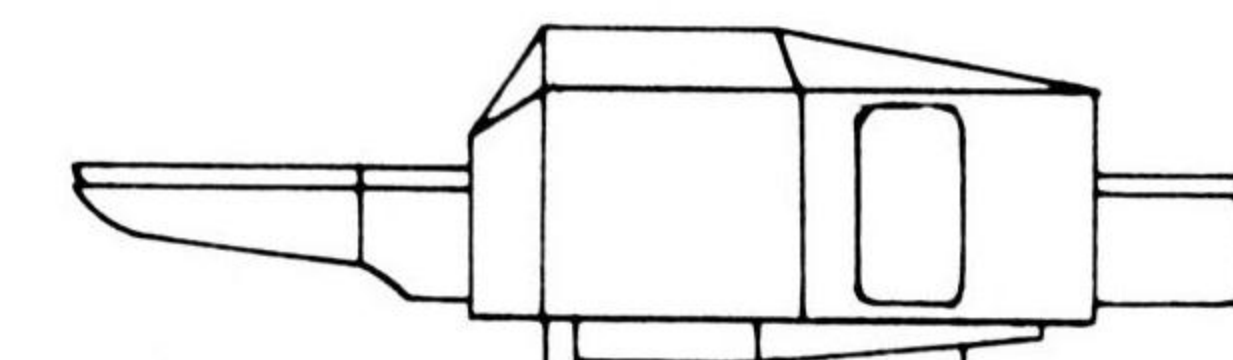
QUINTUPLE MOUNT
24" tubes - observed on DD SHIMAKAZE



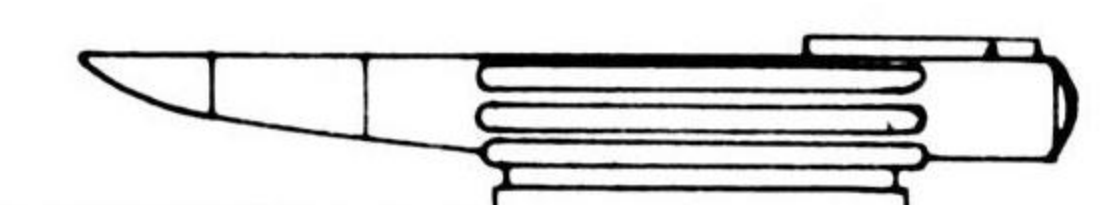
QUADRUPLE MOUNT
Typical 21" mount



TRIPLE MOUNT
Typical 21" mount

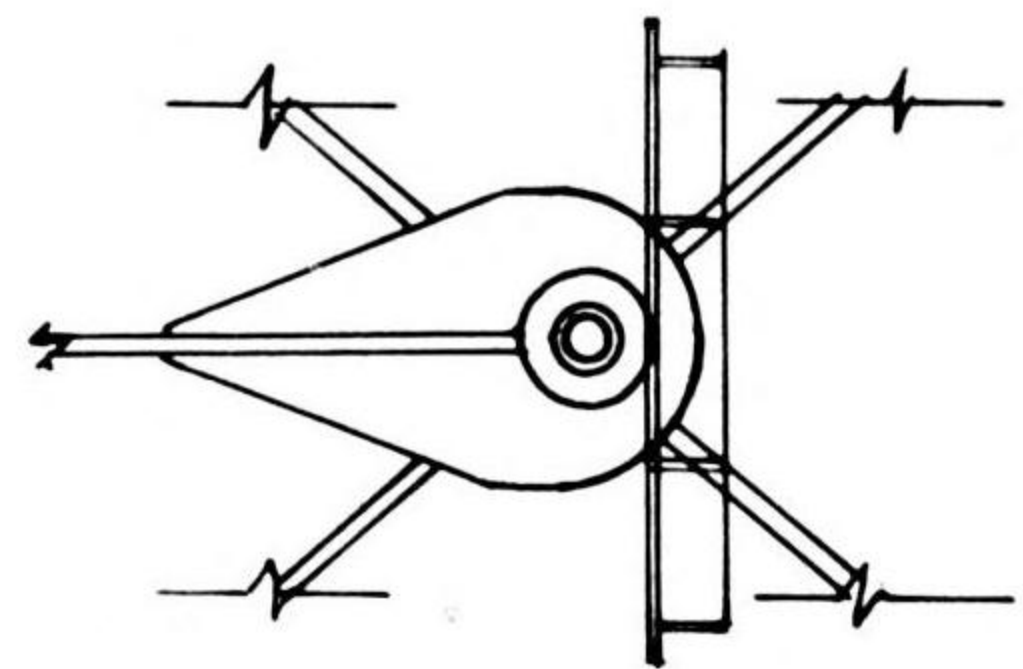


TWIN MOUNT
Typical 21" mount

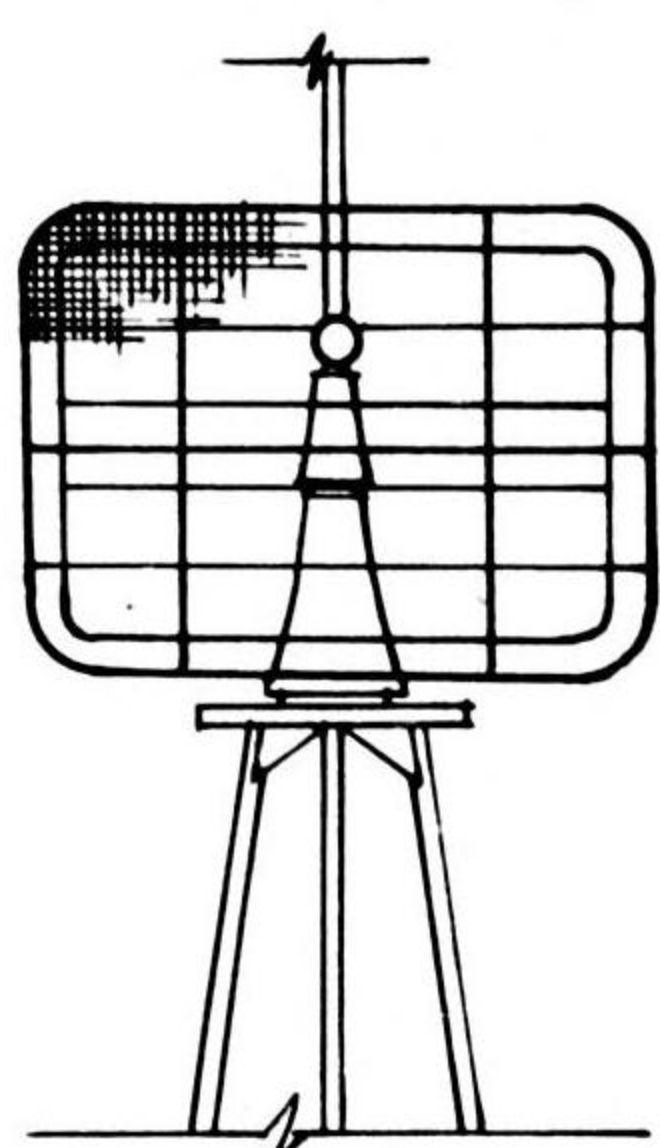
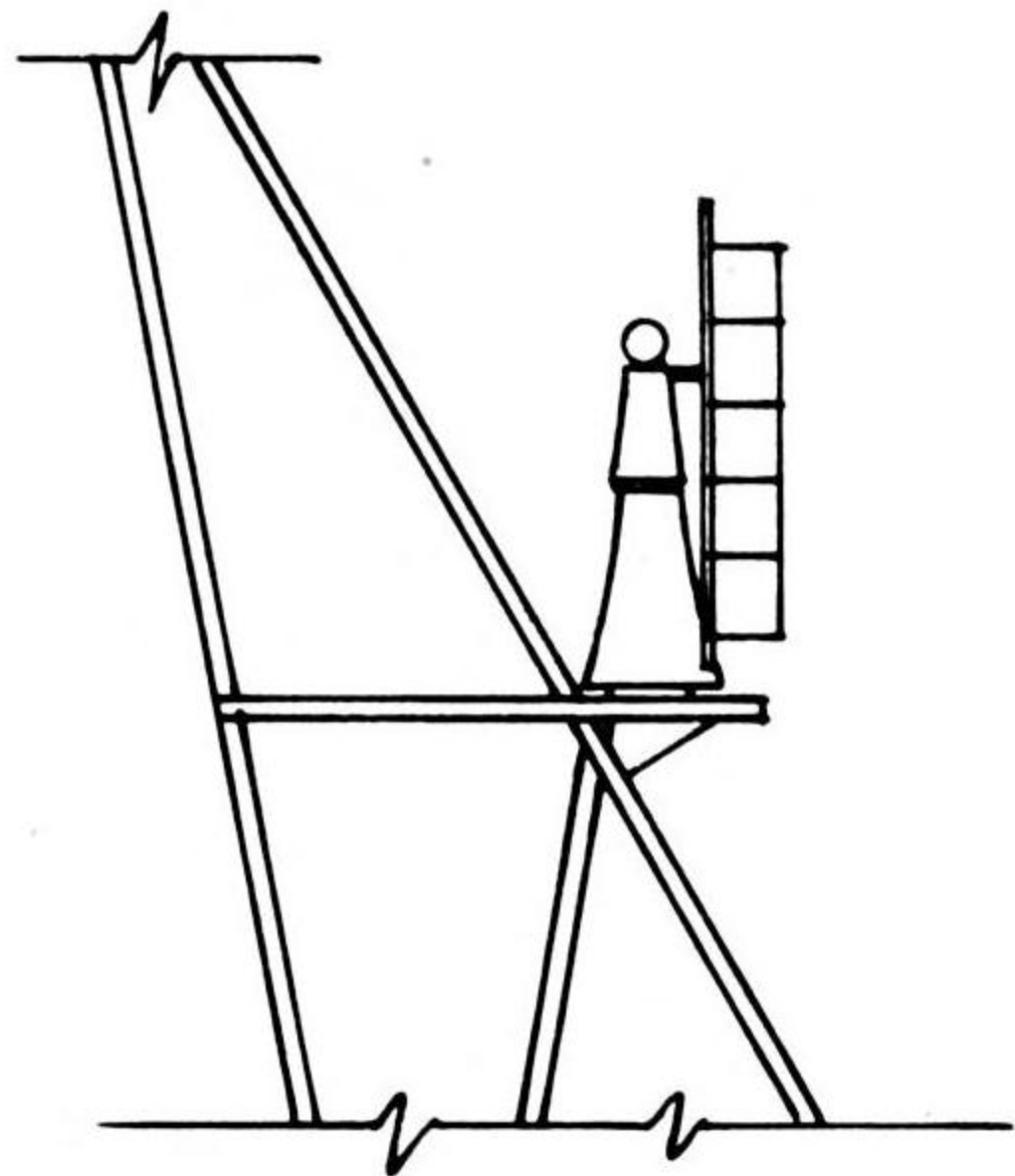


SHIPBORNE RADAR

MATTRESS Type (mark 2, model 1)



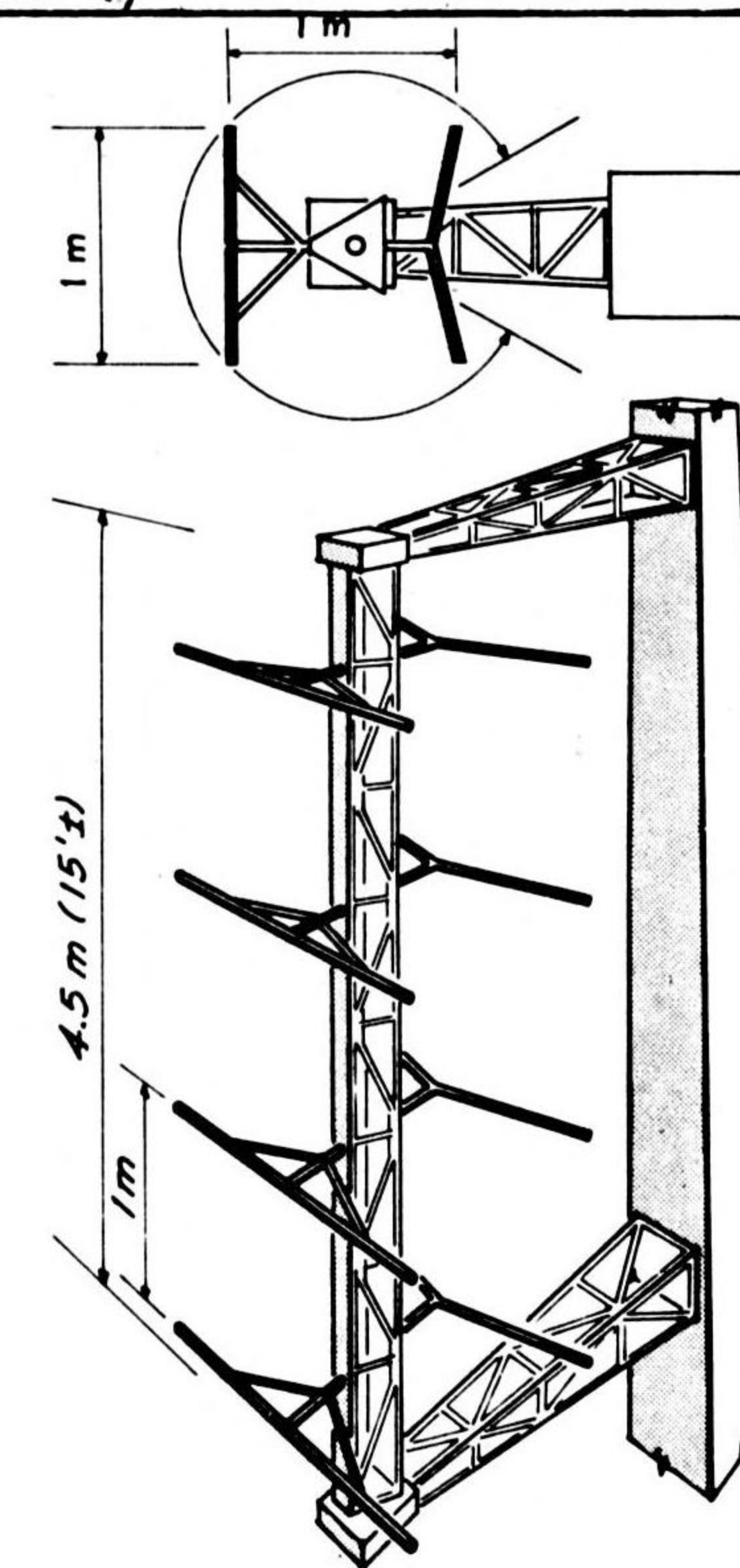
Antenna 14' x 7' x 1.67'
 Location Usually on foremast or, on CV's, on island superstructure
 Use Surface search
 Max. range 100 n.mi.



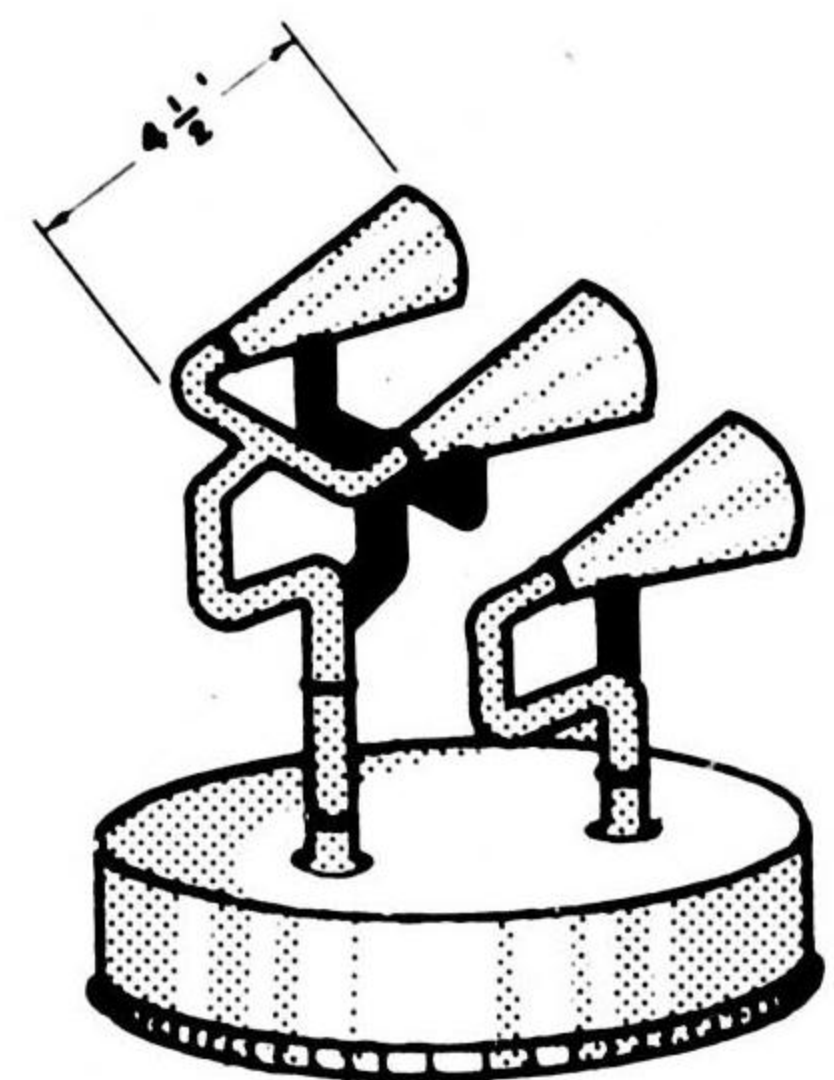
Ship type
 Has been observed on CV's, CA NACHI Class and DD TERUTSUKI Class

LADDER Type (reportedly designated mark 2, model 4)

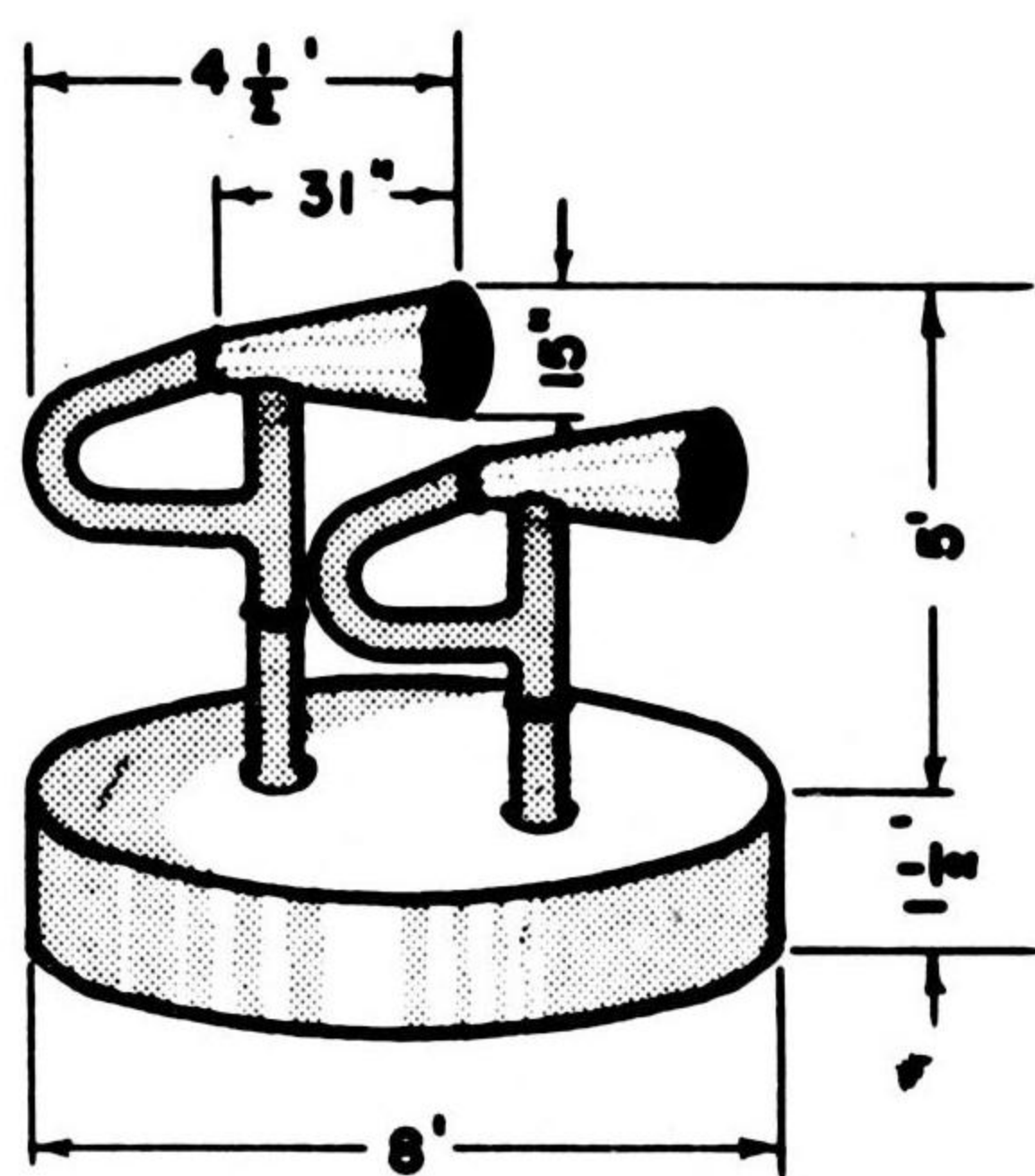
Antenna Series of one-meter dipoles
 Location Usually on mainmast
 Use Air search
 Max. range 60 n.mi.
 Ship type Has been observed on CVL ZUIHO, CA's NACHI and ATAGO Classes and DD's TERUTSUKI, SHIMAKAZE, TAKANAMI and FUBUKI (AMAGIRI) Class



HORN Types (mark 2, model 2 and modification 2)

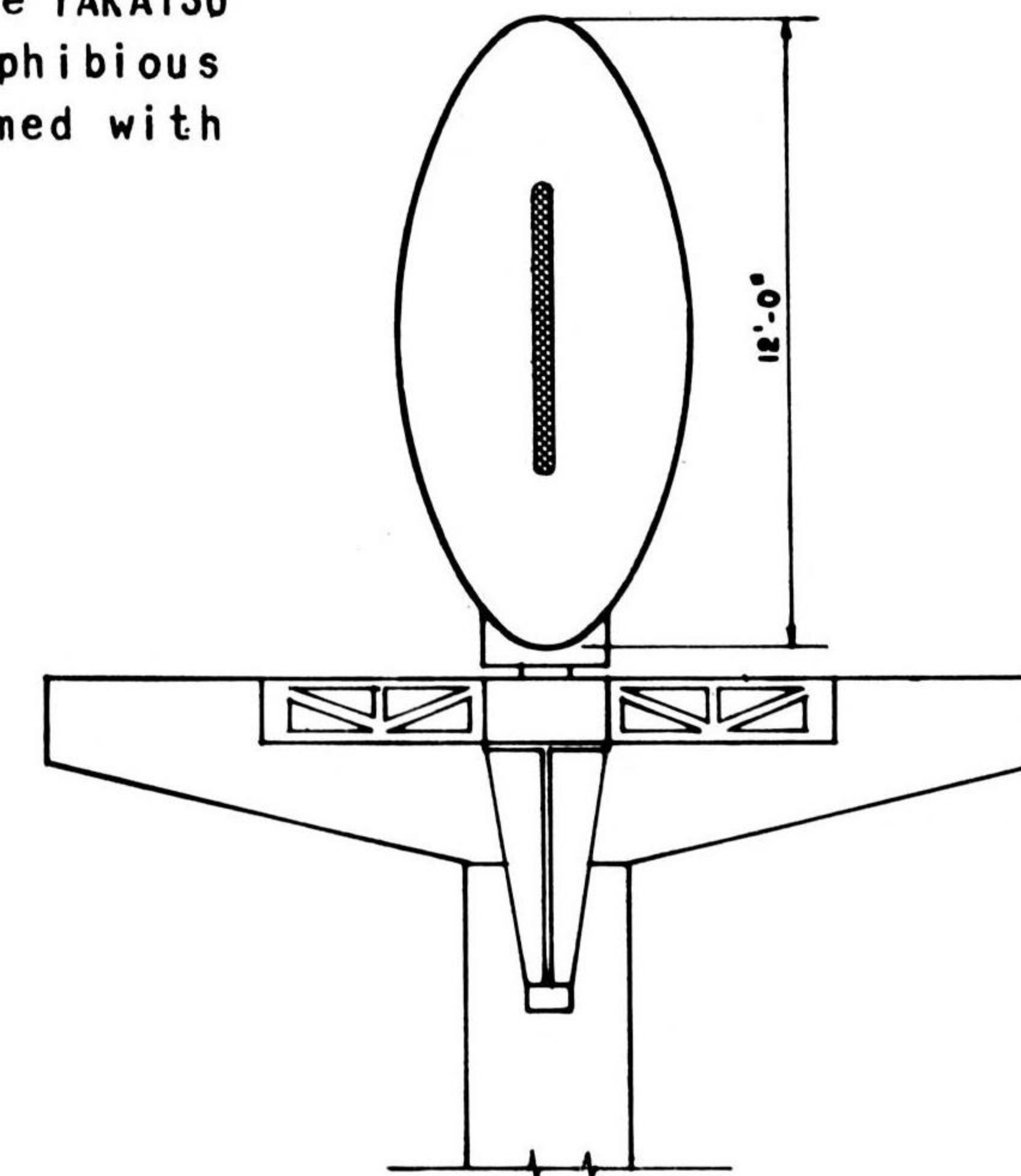


Antenna Electromagnetic horns
 Location Atop bridge
 Use Double: surface search
 Triple: surface fire control
 Max. range 25 n.mi.
 Ship type Has been found on an APD



NEW UNIDENTIFIED TYPE

This is a provisional drawing of what may be a new air-search or anti-aircraft fire control radar. It was observed on the foremast of a ship reported as the TAKATSU MARU, a special type ship for amphibious operations, which is heavily armed with 75 mm. AA guns.



TERMINOLOGY

SECTION 3

MERCHANT SHIPS

TERMINOLOGY

Abaft - Behind or to the rear of any part of a ship.

Athwart - At right angles to the center line of a ship.

Beam - The greatest width of a ship.

Boom - A heavy spar for handling cargo; usually attached to the base of a mast or kingpost.

Bowsprit - A spar extending forward from the bow of a ship.

Bulwark - The light plating or wooden extension of the ship's sides above the upper deck, giving protection against weather.

Catwalk - Narrow, exposed foot-bridge connecting the hull islands.

Davit - A device for carrying, raising, and lowering lifeboats.

Deckhouse - An isolated element of a ship's superstructure which may occur on the poop, at the base of a mast, etc.

Engine house - That portion of the superstructure surmounted by the stack (used here in Fox and Sugar divisions).

Fantail - The part of the stern of the ship extending abaft the stern post.

Flush deck - A continuous main deck having no breaks, such as raised forecastle or poop decks.

Fore - Adjective used as a prefix indicating forward or leading position.

Forecastle - A raised island at the forward part of a ship.

Hatch - An opening in a deck through which cargo may be handled; also smaller openings for personnel or ventilation.

Hull - The shell or body of a ship, including islands, but excluding built-on structures, such as deckhouses and superstructure.

Kingposts - Two posts placed athwartships used to support derrick booms.

Outboard - Toward the side of the vessel or outside the vessel entirely.

Phonetic Alphabet - A way of speaking letters so that they will be clearly understood; for example, A is "Able", B "Baker", etc.

Poop deck - The partial raised deck and after structure at the stern over the main deck of a vessel.

Rake - A term denoting fore and aft inclination from the vertical. This applies to masts, stacks, bows, etc.

Rig - A general description of a ship's upper works.

Sampson Post - A single kingpost.

Stem - Extreme forward part of a vessel's bow.

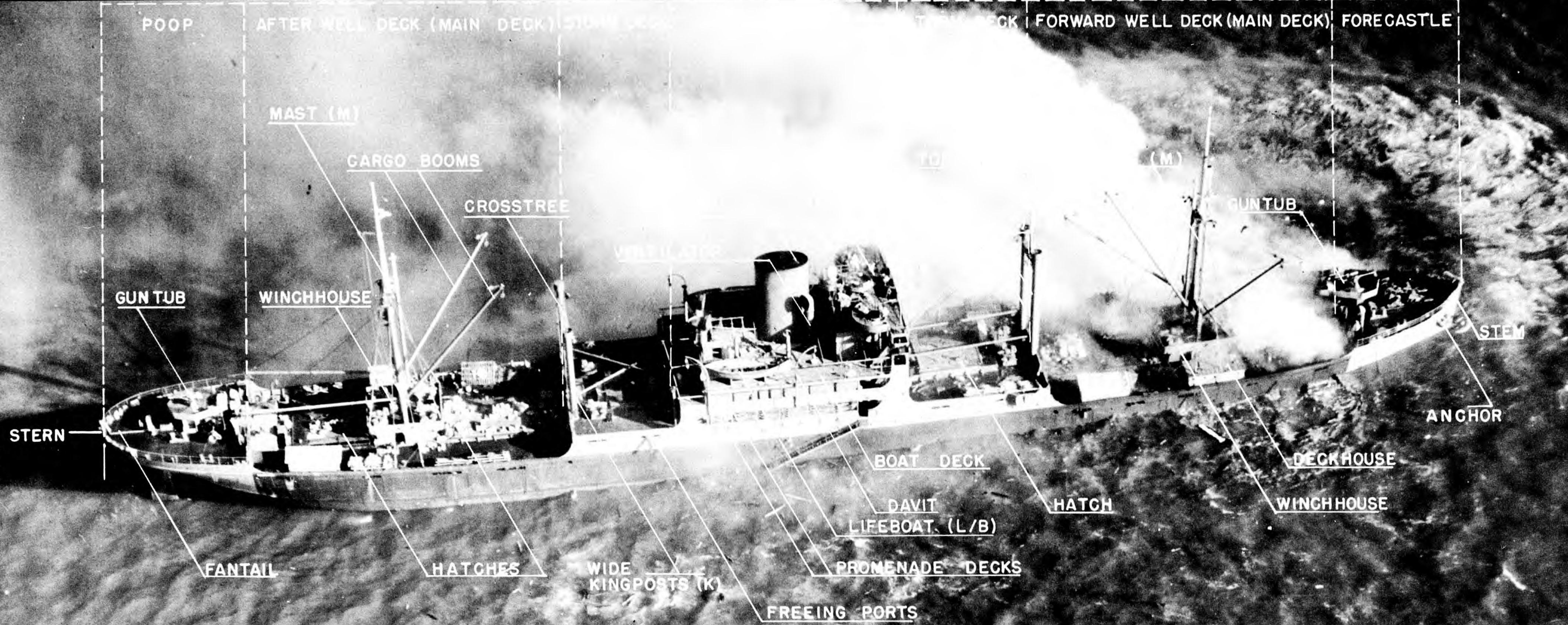
Storm deck - The extended portion of the center island forward or aft of the superstructure.

Superstructure - A structure or structures built above the ship's hull. Includes pilothouse, bridge, engine house, etc.

Topmast - A mast extending above the crosstree on kingposts; an extension of a stick mast.

Well deck - An area of weather deck situated between the hull islands.

Winch House - A deckhouse at the base of a mast or kingpost for housing cargo winches.



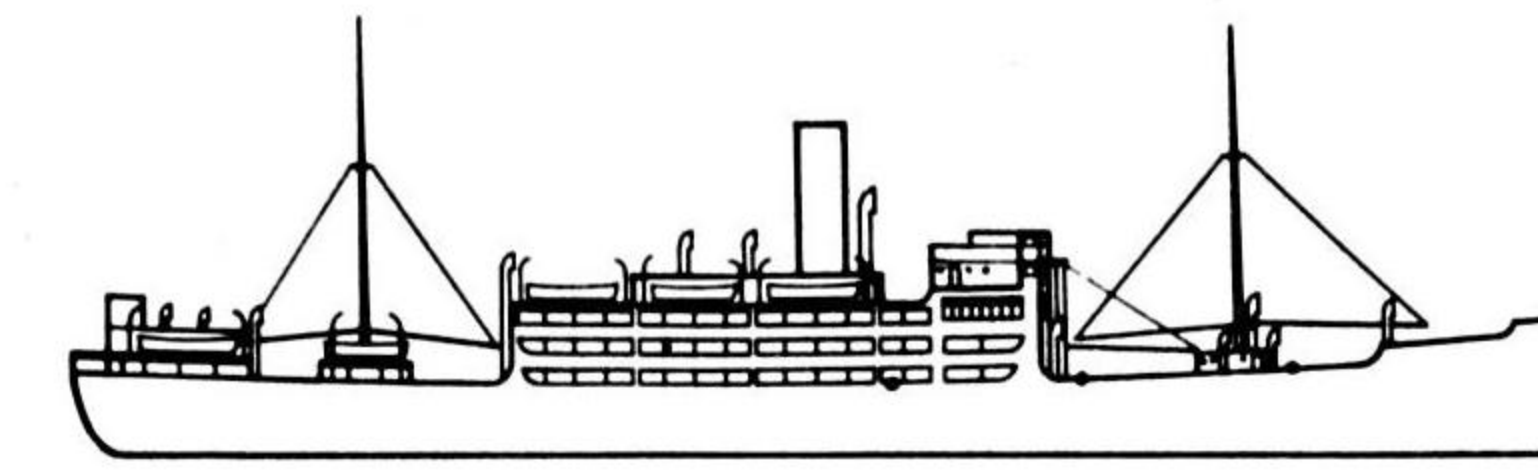
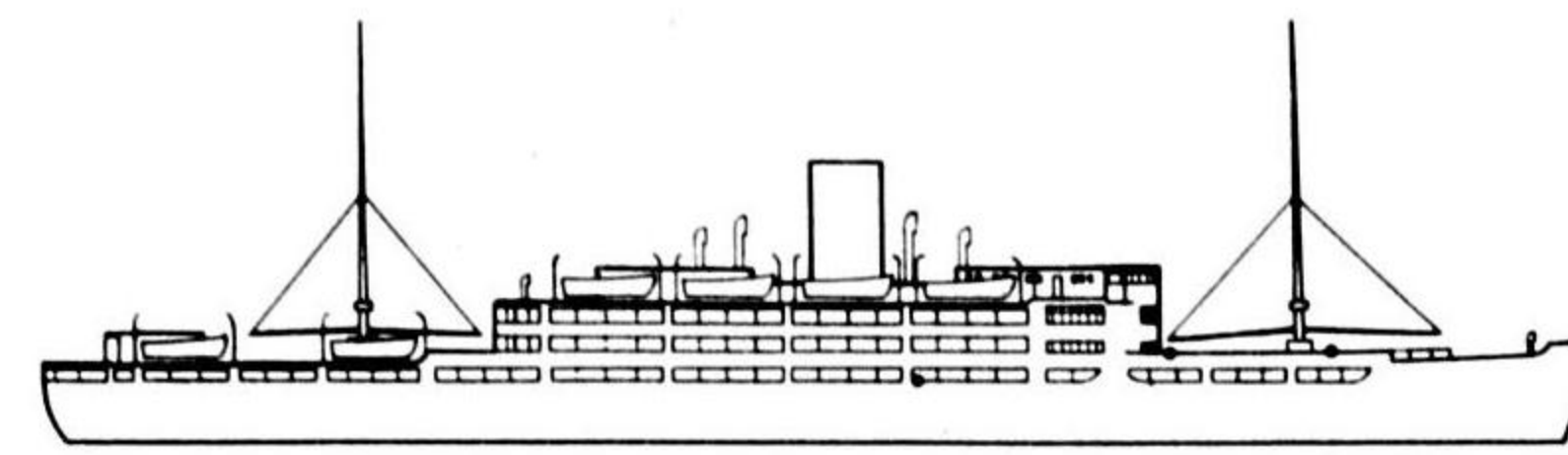
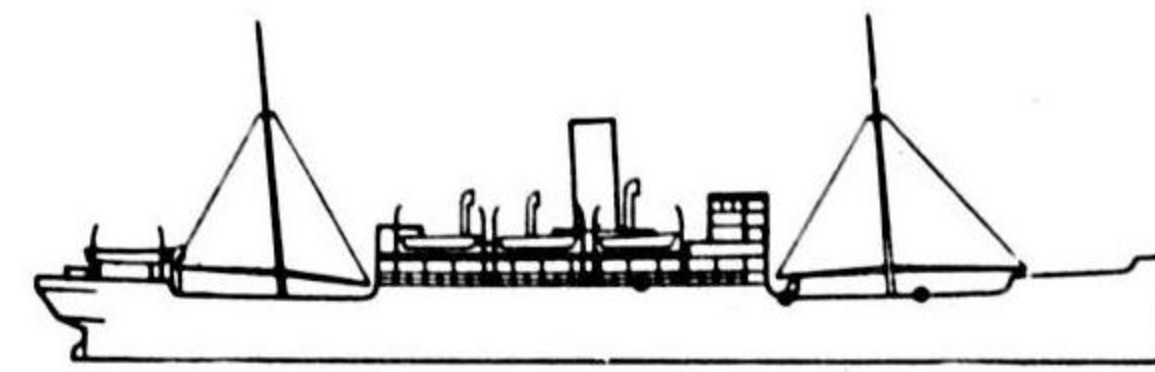
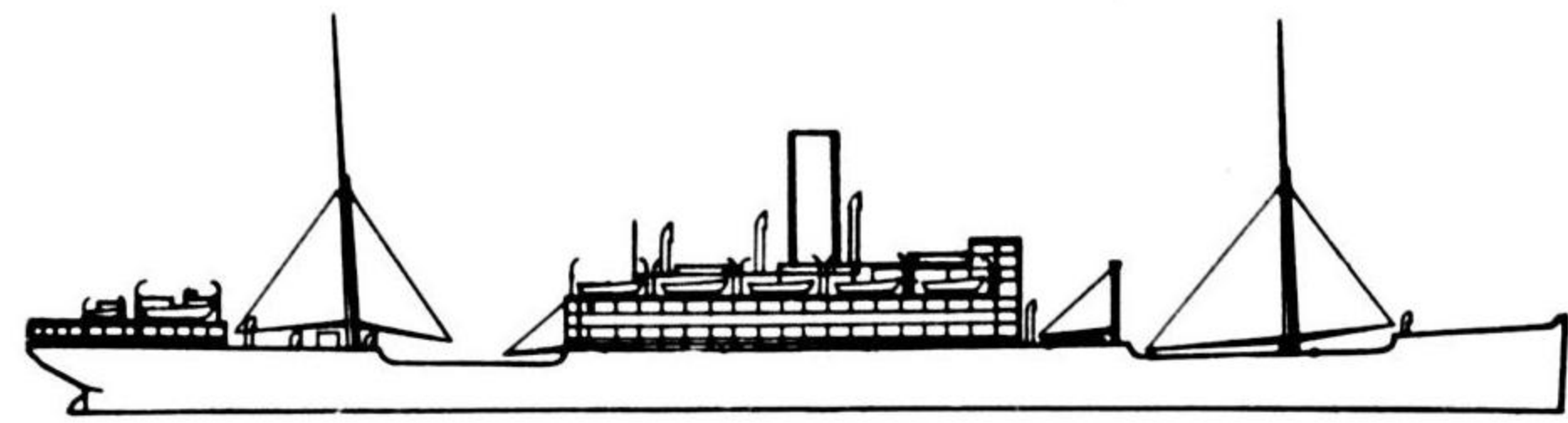
MERCHANT SHIPS

TRENDS IN DESIGN

PRE-WORLD WAR 1

PRE-WORLD WAR 2

TRANSPORTS



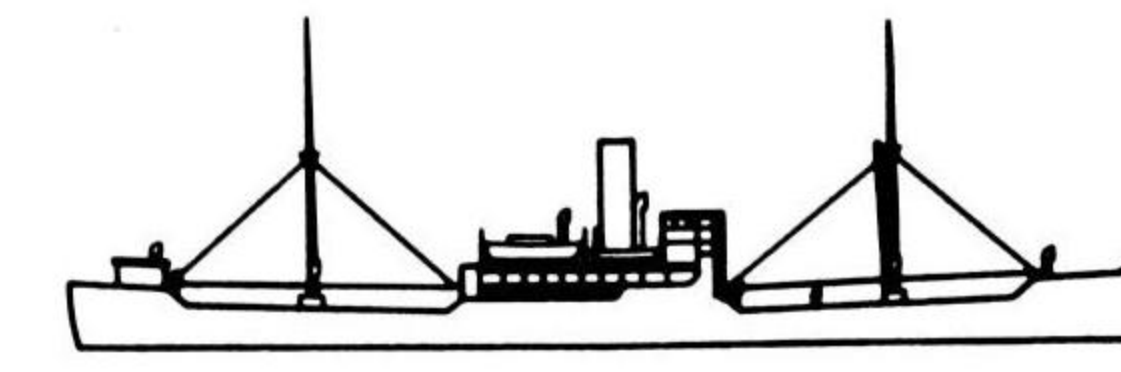
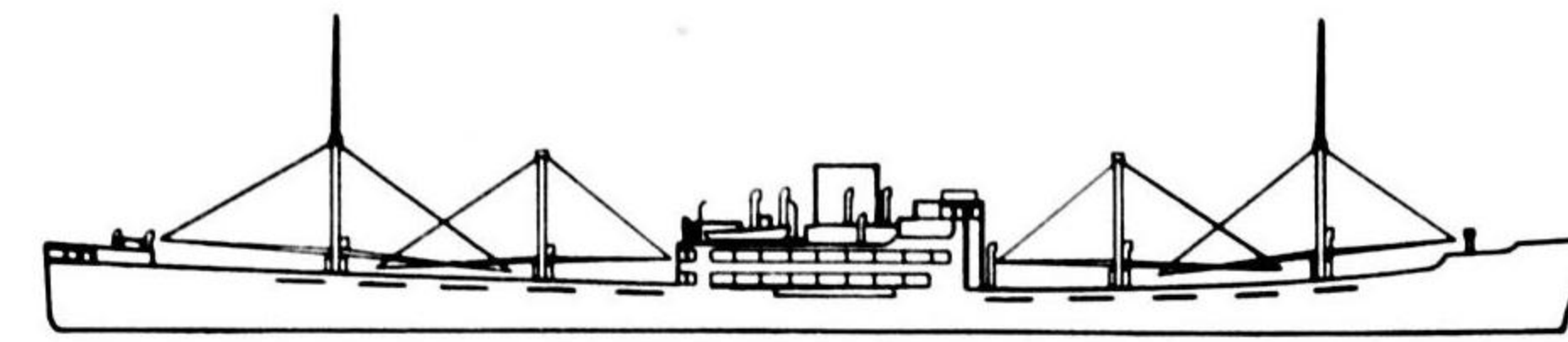
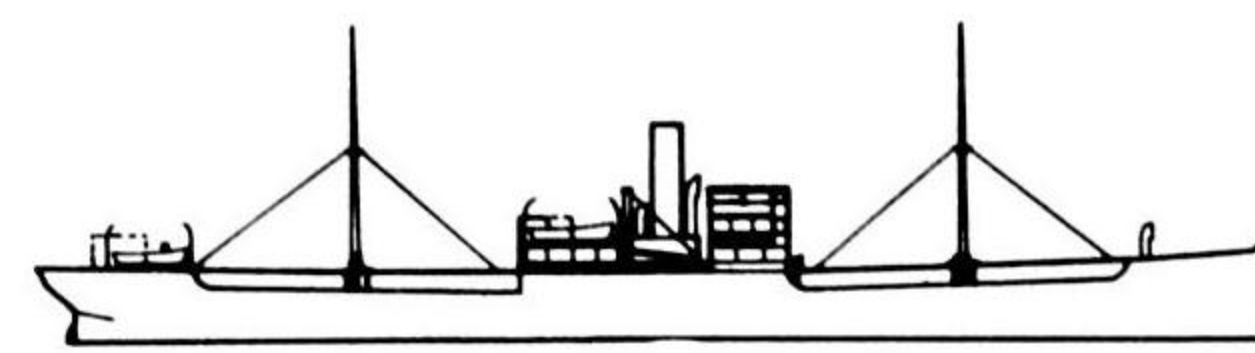
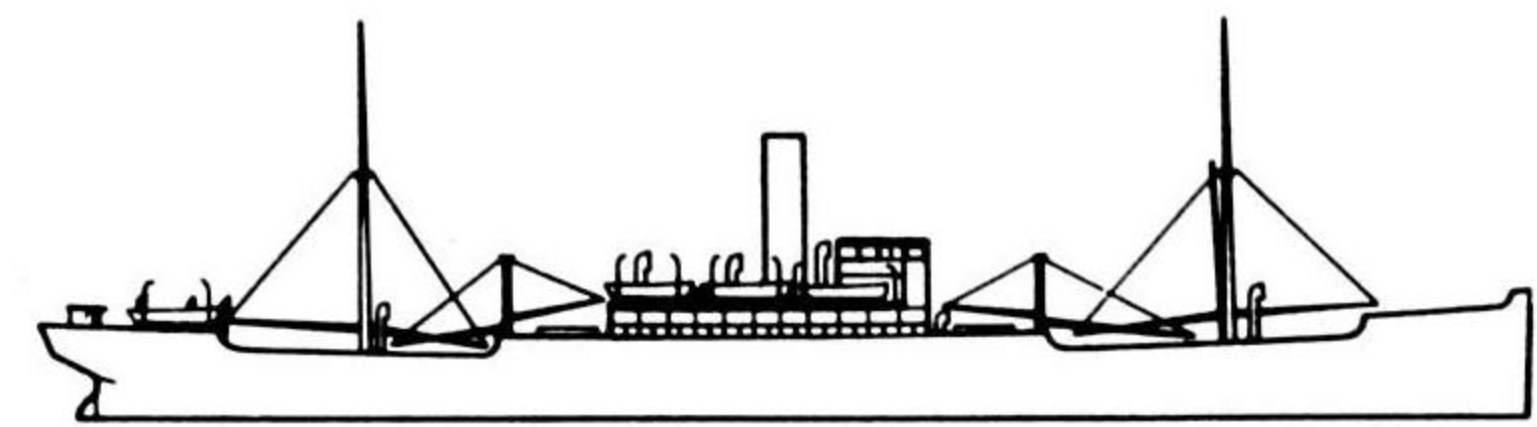
1

2

3

4

FREIGHTER TRANSPORTS



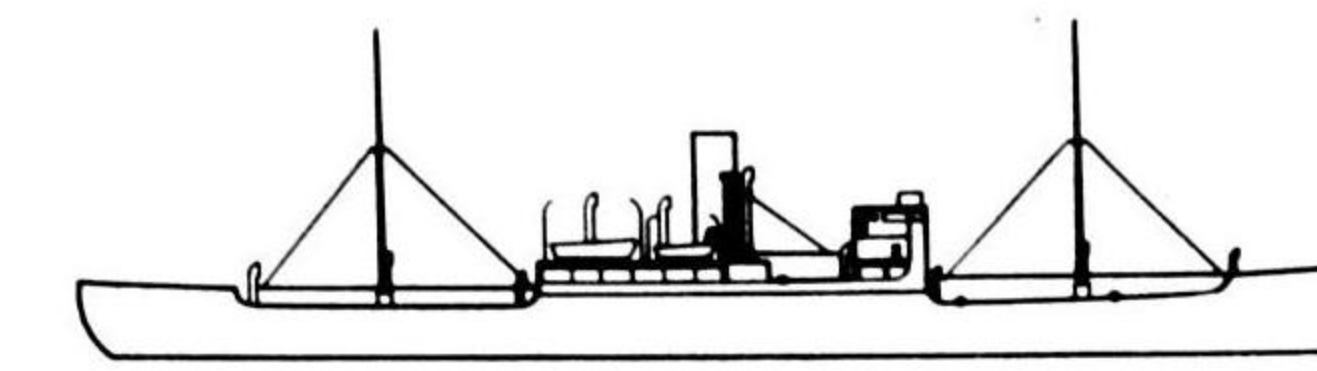
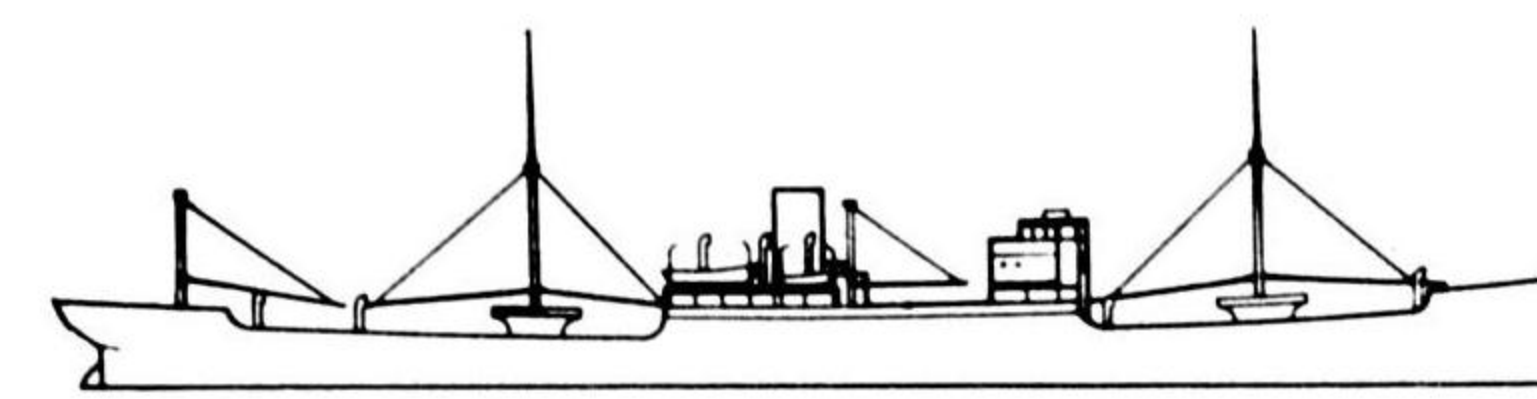
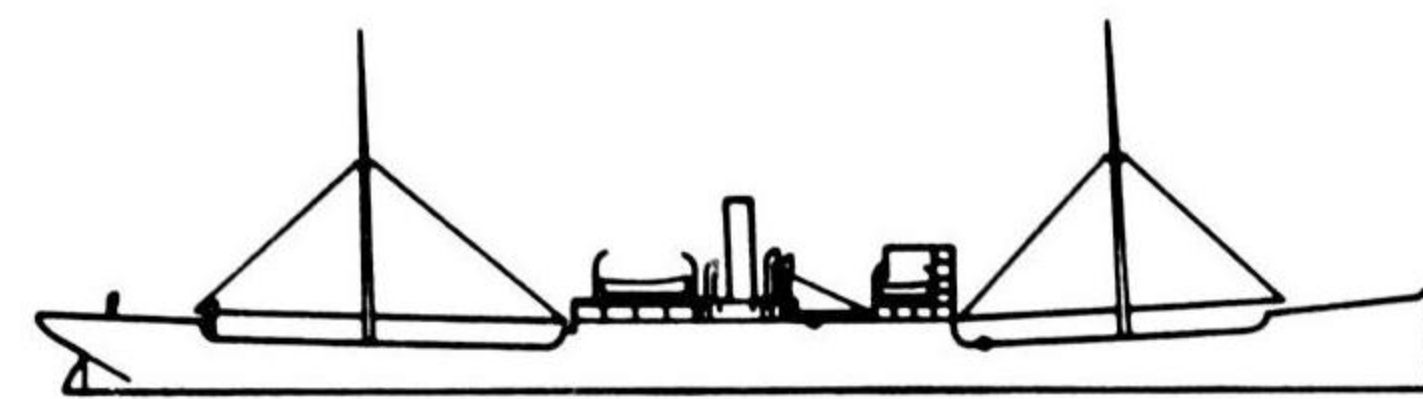
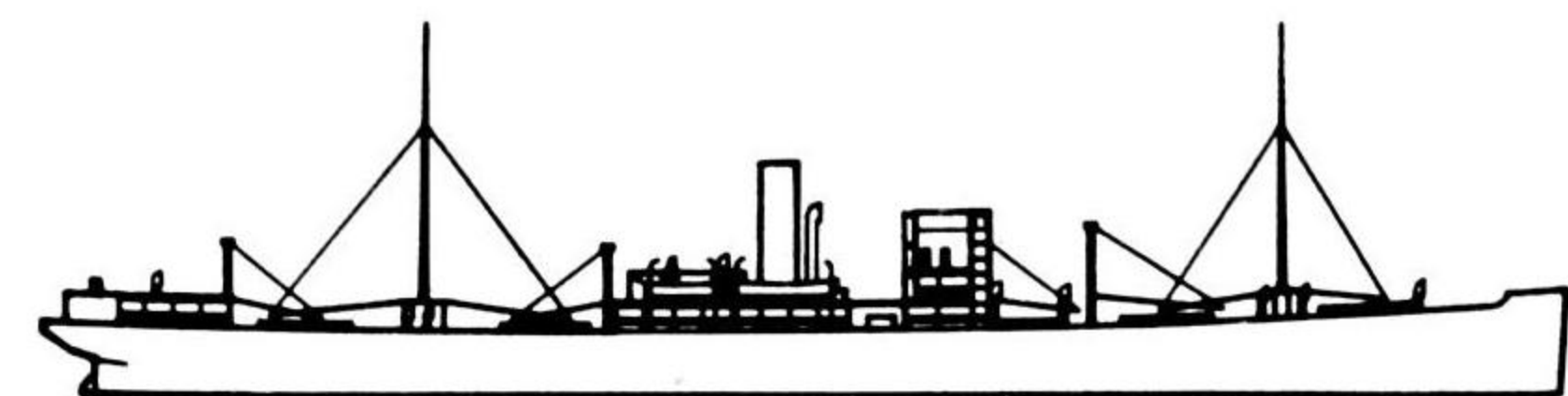
5

6

7

8

FREIGHTERS



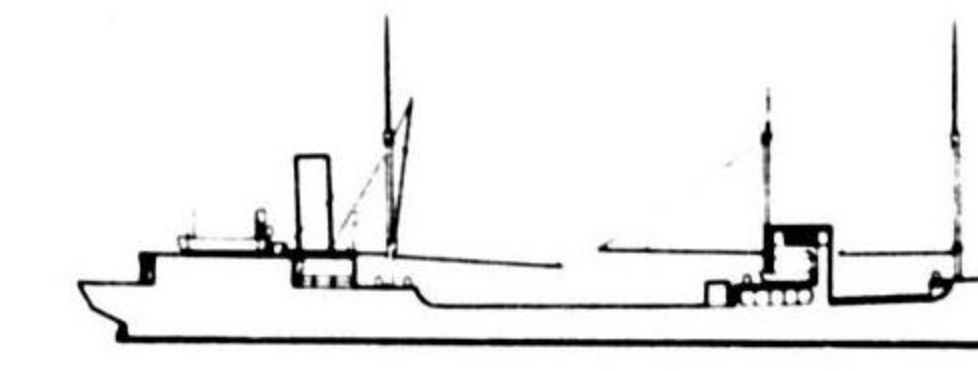
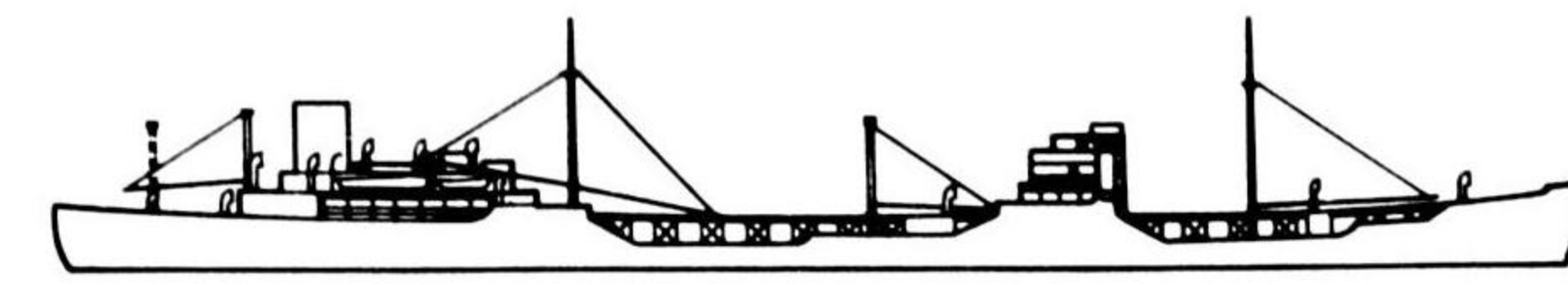
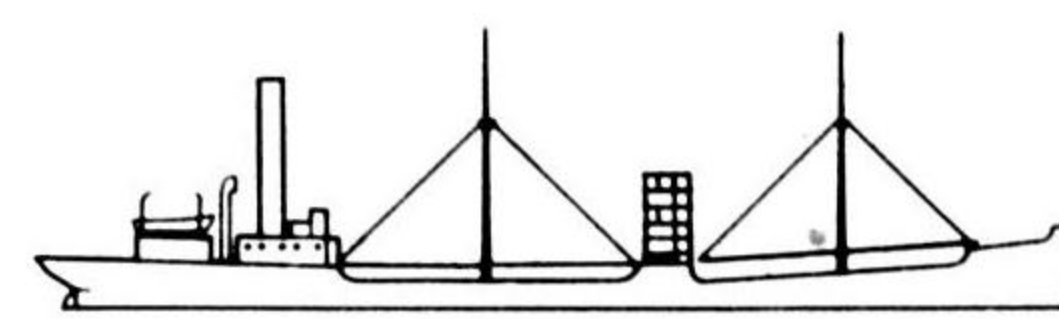
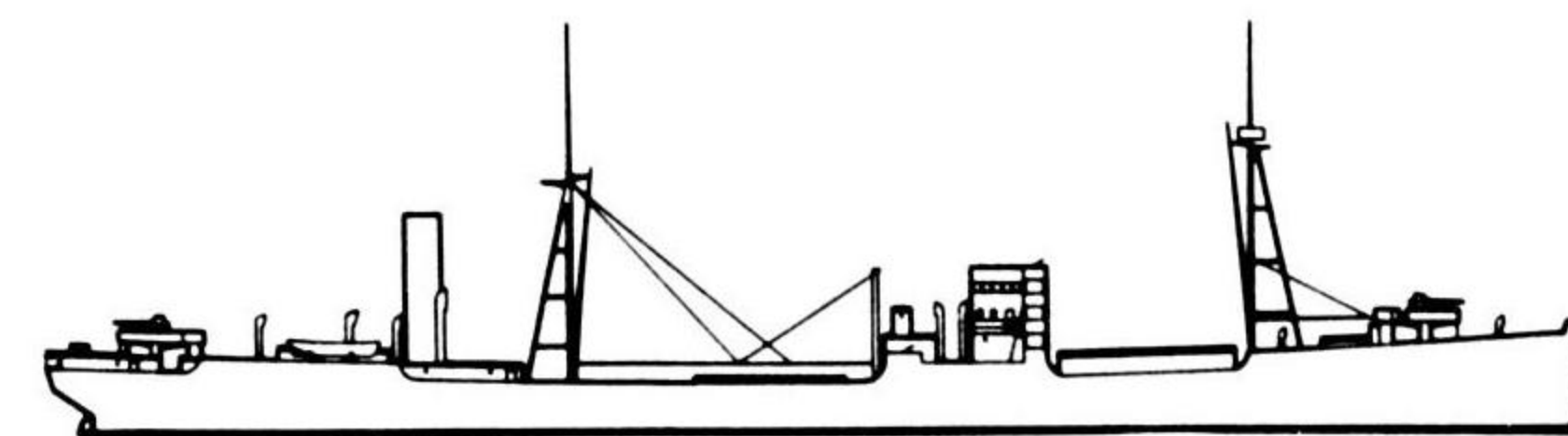
9

10

11

12

STACK AFT



13

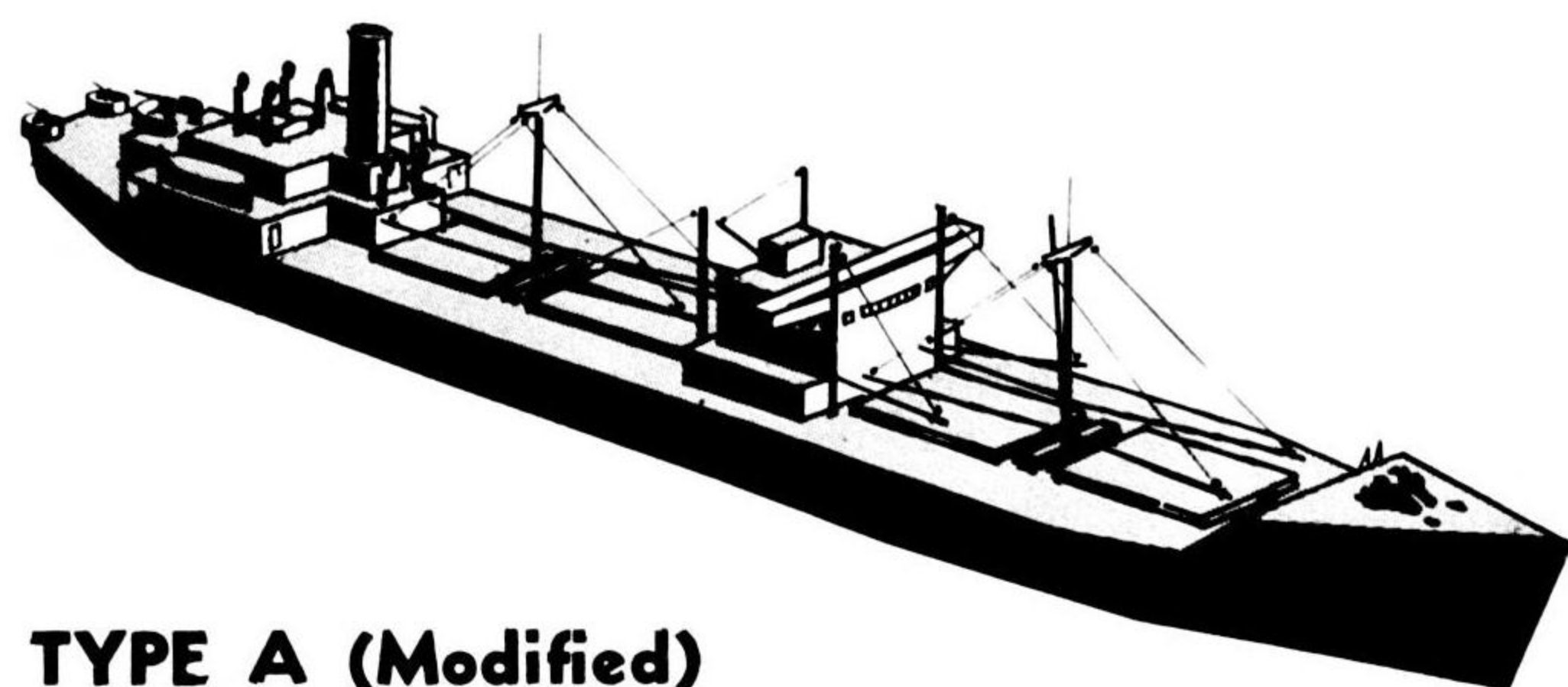
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15

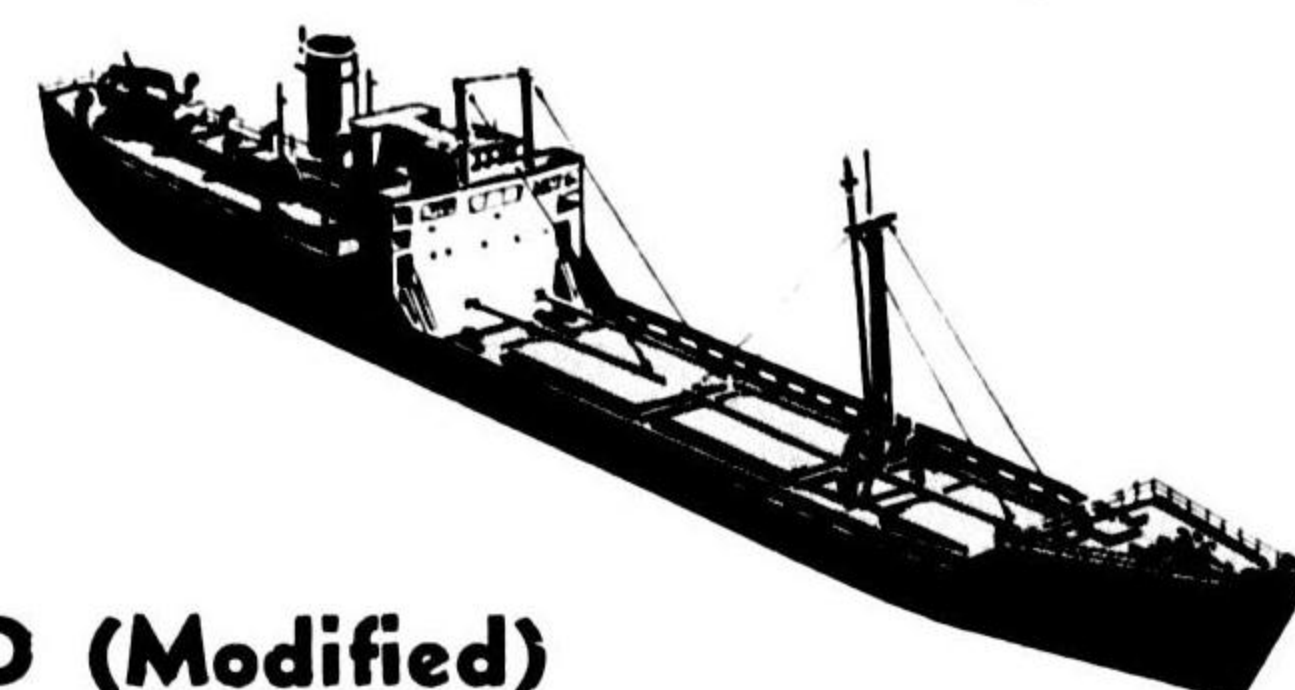
16

TRENDS IN DESIGN

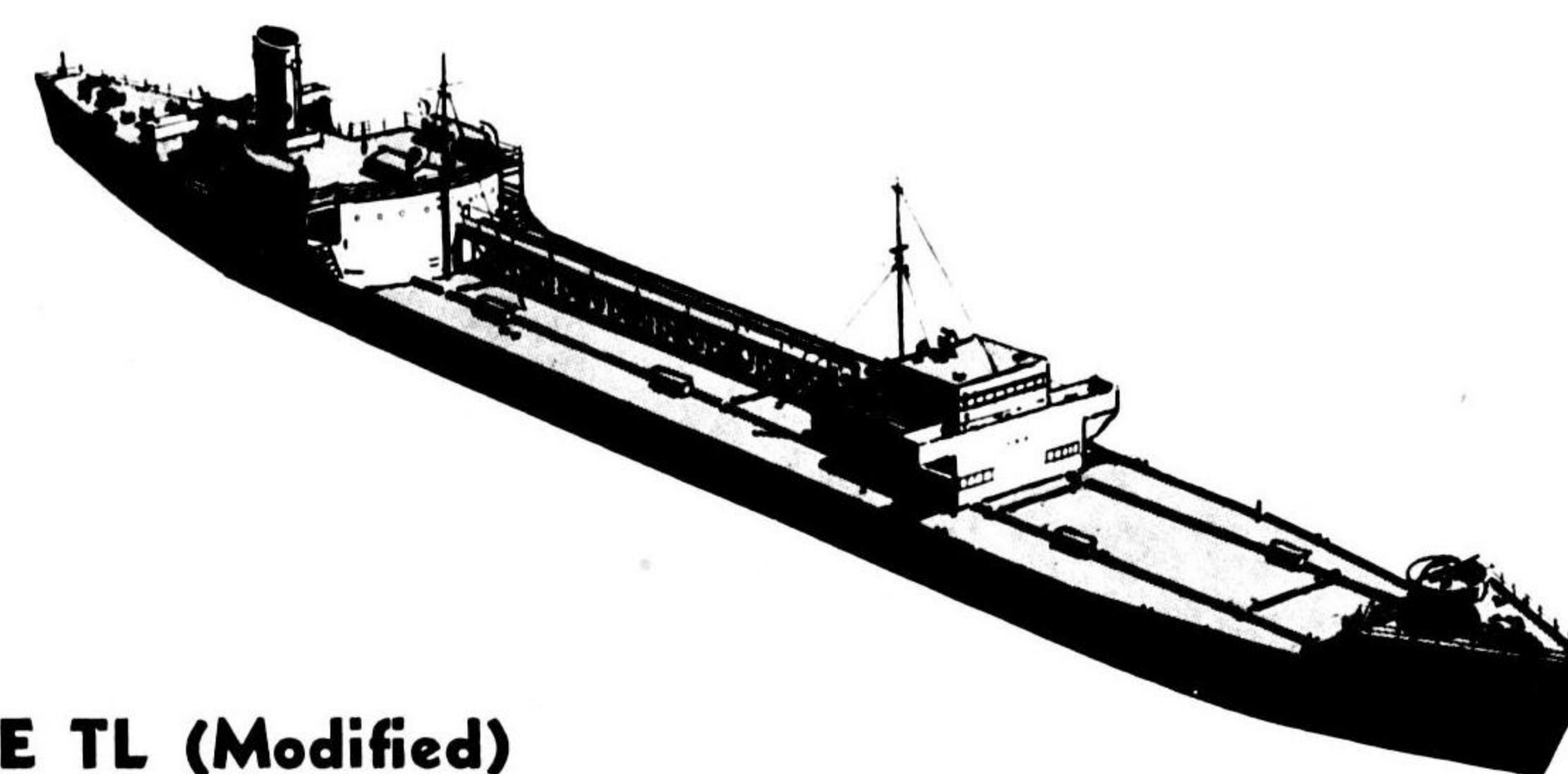
STANDARD TYPES—WORLD WAR 2



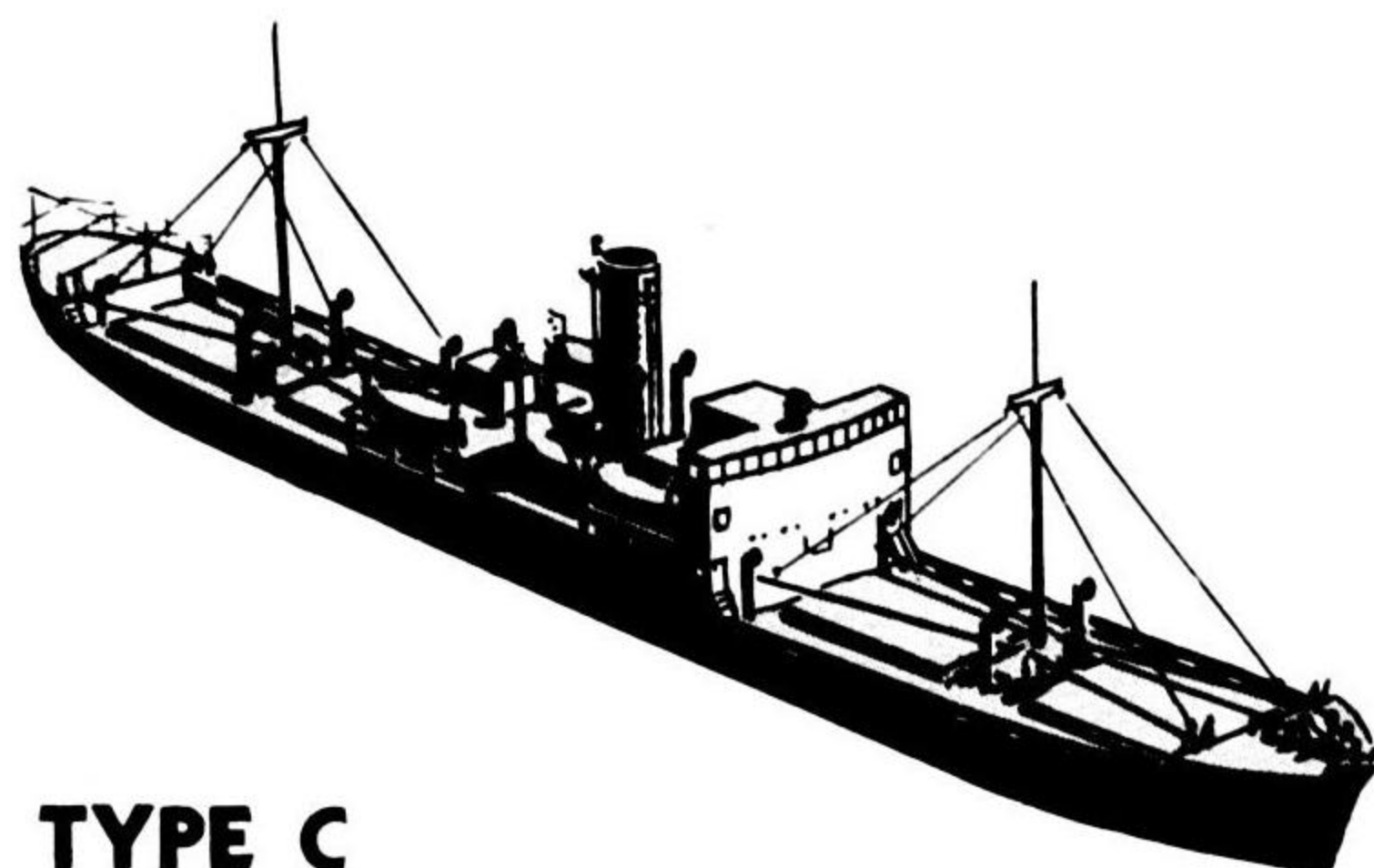
TYPE A (Modified)



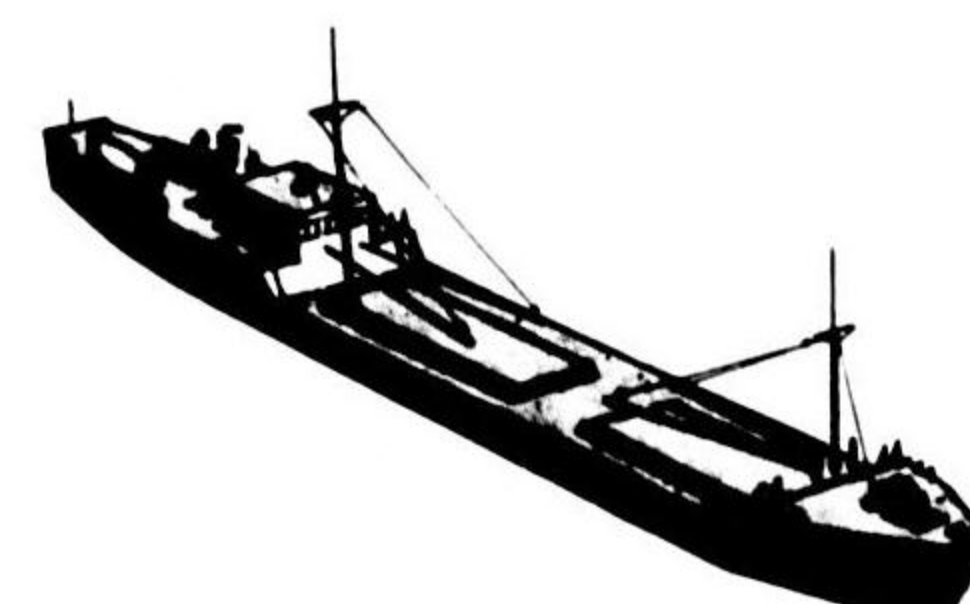
TYPE D (Modified)



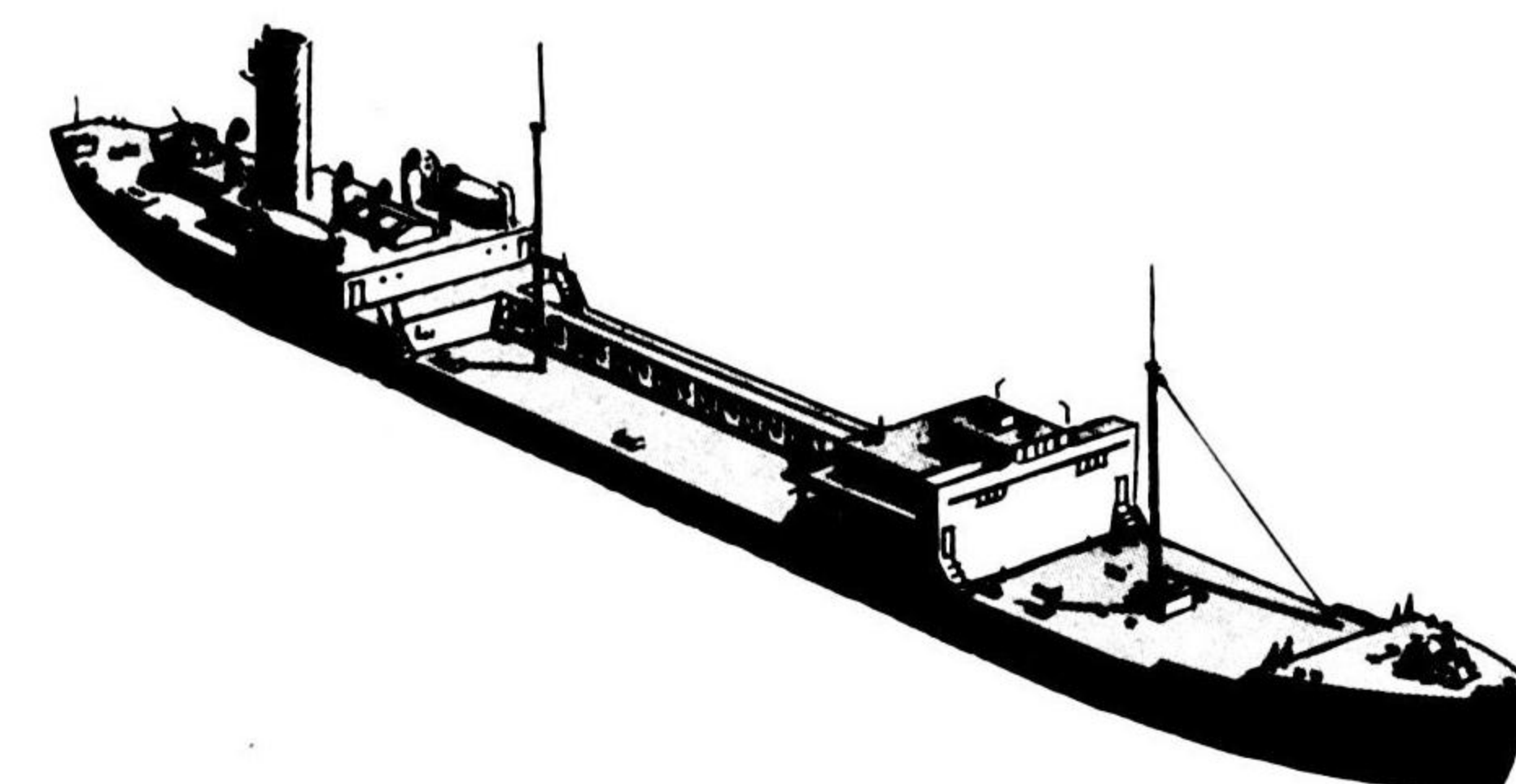
TYPE TL (Modified)



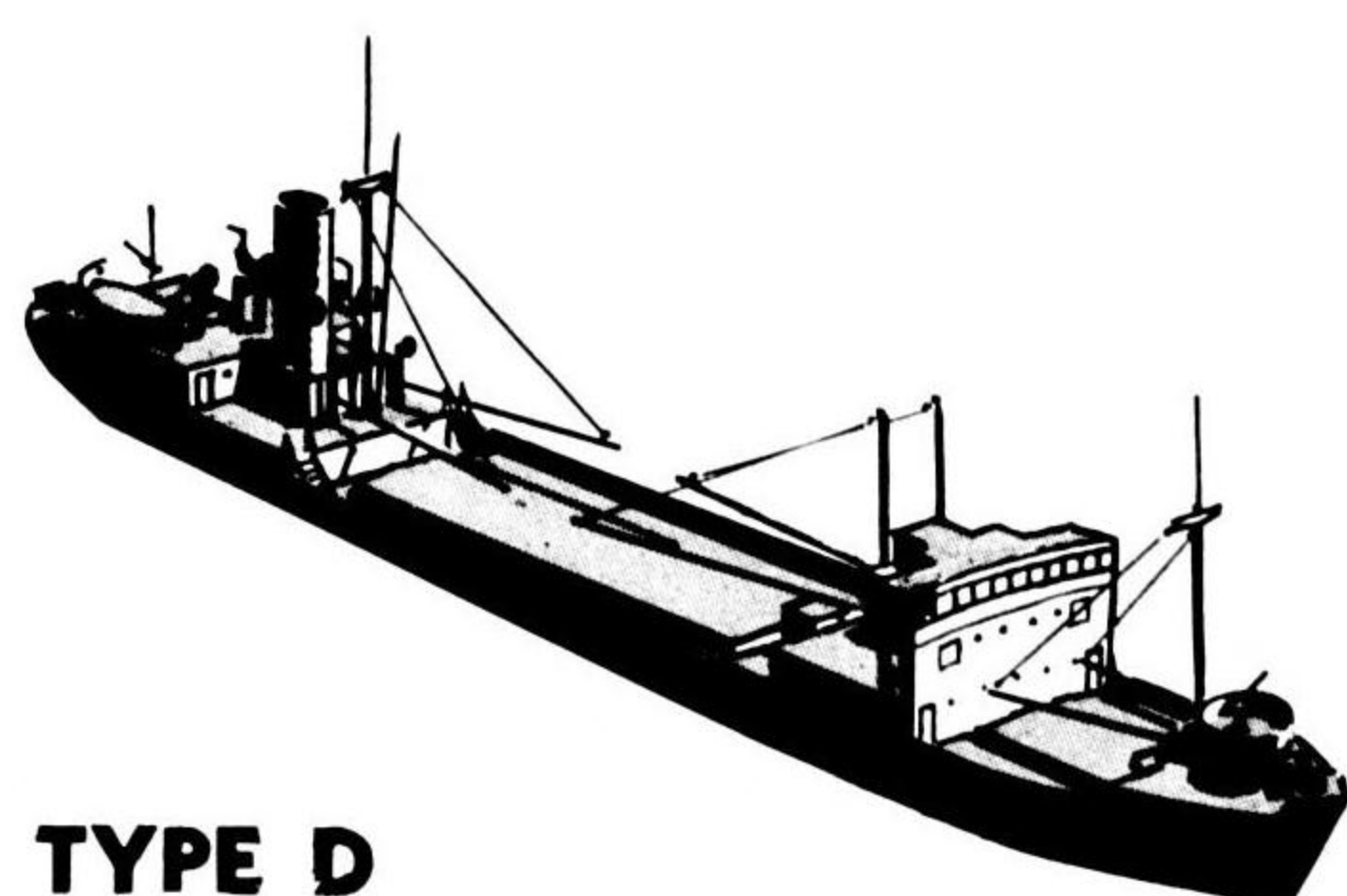
TYPE C



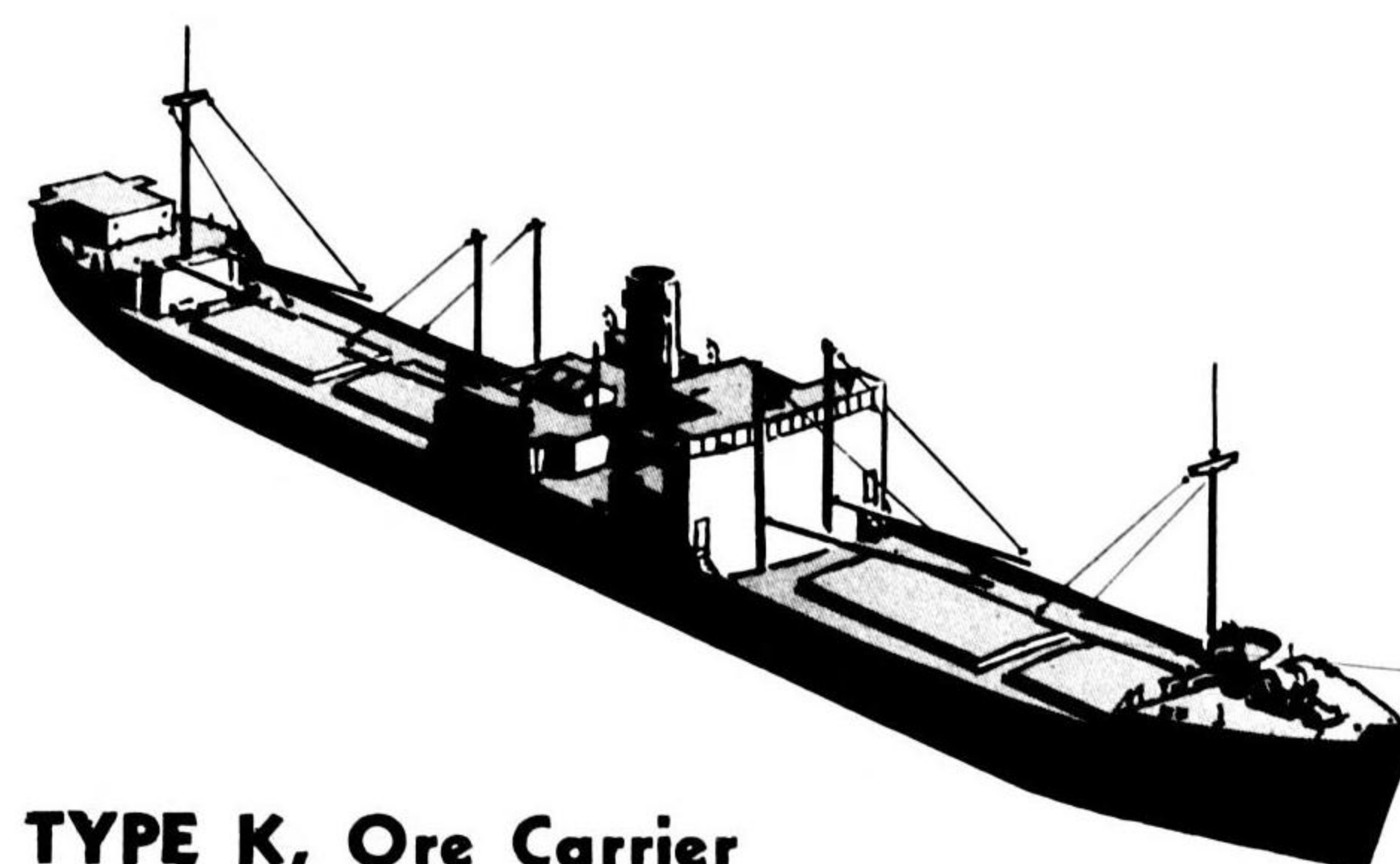
TYPE E



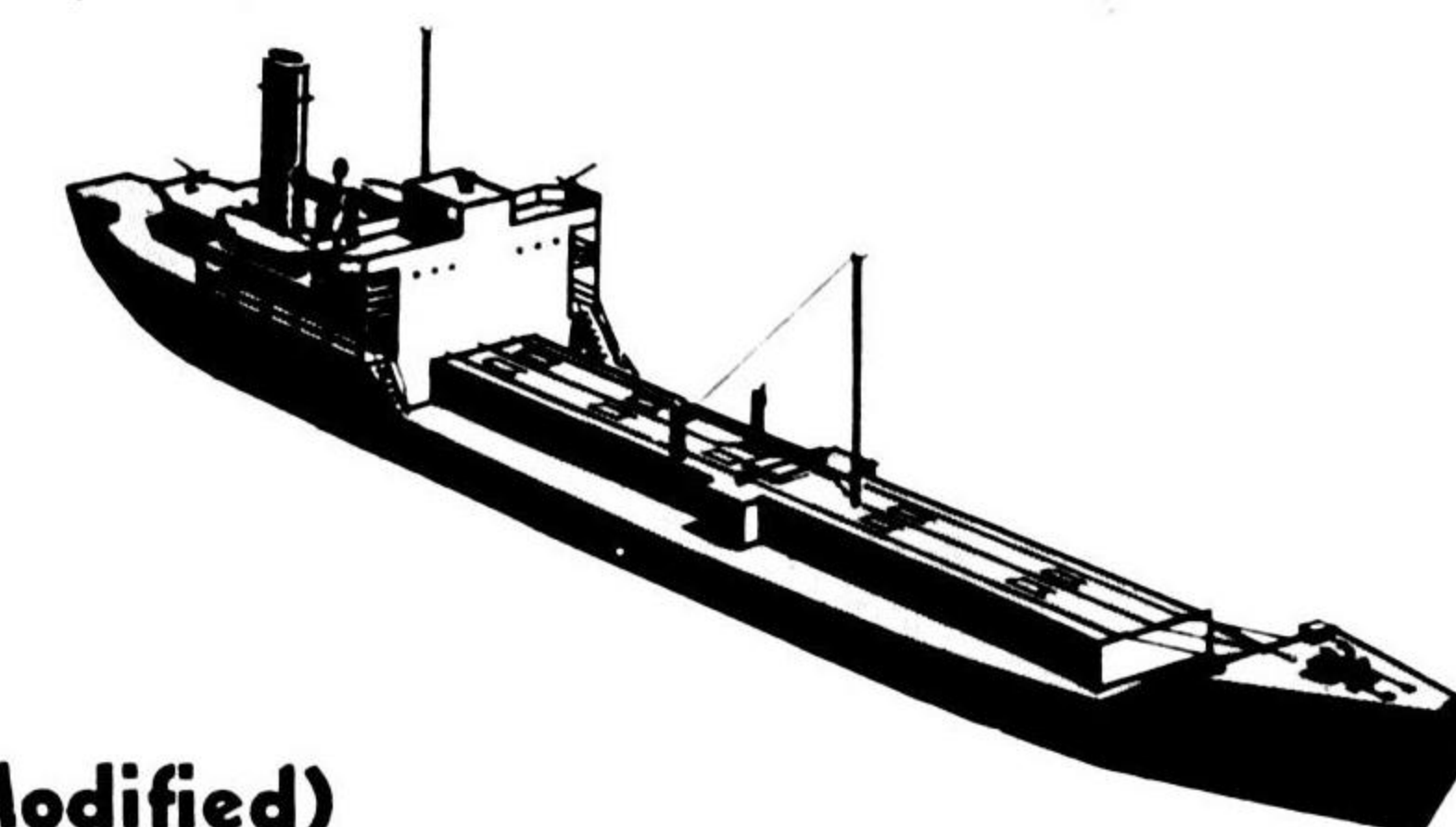
TYPE TM



TYPE D



TYPE K, Ore Carrier



TYPE TM (Modified)

TYPE A (Modified)
(Sugar Baker Love)

Gross tonnage 6,670
Length, o.a. 445'

TYPE C (Modified)
(Fox Tare Charlie)

Gross tonnage 2,700
Length, o.a. 321'

TYPE D
(Sugar Baker Sugar)

Gross tonnage 1,900
Length, o.a. 295'

TYPE D (Modified)
(Sugar Charlie Love)

Gross tonnage 2,300
Length, o.a. 310'

TYPE E
(Sugar Charlie Sugar)

Gross tonnage 830
Length, o.a. 210'

TYPE K, Ore Carrier
(Fox Tare Charlie)

Gross tonnage 5,300
Length, o.a. 410'

TYPE TL (Modified)
(Sugar Able Love)

Gross tonnage 10,000
Length, o.a. 517'

TYPE TM
(Sugar Able Item)

Gross tonnage 5,200
Length, o.a. 410'

TYPE TM (Modified)
(Sugar Able Sugar)

Gross tonnage 2,800
Length, o.a. 325'

MERCHANT FLEET STATUS

THE JAPANESE SHIPPING POSITION (ONI WEEKLY, 21 Feb. 1945)

The detailed analysis of the Japanese shipping position as of February 1, 1945, is presented in Table 1. Table 2, a tentative breakdown of the tonnage afloat, shows the great losses suffered by ships in the higher tonnage groups.

Japan was estimated, as of February 1st, 1945, to have 2,416,556 gross tons of powered and auxiliary powered merchant vessels of 100 gross tons and upwards. Reducing this figure by 20 per cent to allow for lay-ups and repairs, the total of serviceable shipping amounts to 1,935,000 gross tons.

As a result of intelligence, partly derived from photographic coverage of Japanese shipyards, it is believed that the construction rate during recent months was 90,000 tons a month, or even slightly more. (The increased construction is attributed in part to the standardization of Japanese merchant types.)

The smallest ships, those below 100 gross tons (not included in the foregoing tables), are chiefly engaged in fishing, picketing, and general cargo traffic. An approximate break-down of vessels in this category follows:

20 - 99 gross tons:

Full powered: About 2,500 ships 125,000 gross tons

Auxiliary engines: About 7,000 ships 350,000 gross tons
Sailing vessels without engines are estimated as follows:

Over 100 gross tons: 750 ships 100,000 gross tons

20 - 99 gross tons: 6,000 ships 300,000 gross tons

5 - 19 gross tons: 5,000 ships 60,000 tons

In addition, the Japanese, using native laborers, have built numbers of small wooden vessels in all the conquered southern territories. These, engaged chiefly in coastal and inter-island trade in those areas, are not included here.

TABLE 1

	FREIGHTERS AND TRANSPORTS		TANKERS AND AO's		TOTAL	
	NO.	GROSS TONS	NO.	GROSS TONS	NO.	GROSS TONS
Total as of Dec. 7 1941, plus captures and construction to March 1, 1944 ¹	5,778	7,543,352	208	845,204	5,986	8,388,556
Construction March 1, 1944 to Feb. 1, 1945 ²	648	520,560	92	469,440	740	990,000
Total assets	6,426	8,063,912	300	1,314,644	6,726	9,378,556
War Losses estimated to Feb. 1, 1945 (1000 GT upwards) ³	1,385	5,680,273	122	856,727	1,507	6,537,000
War Losses estimated to Feb. 1, 1945 (100-1000 GT) ⁴	1,466	399,338	34	25,662	1,500	425,000
Total losses	2,851	6,079,611	156	382,389	3,007	6,962,000
Total available	3,575	1,984,301	144	432,255	3,719	2,416,556
Total serviceable ⁵	2,860	1,590,000	115	345,000	2,975	1,935,000

¹Based on captured documents which are considered authoritative; naval oilers are included.

²Monthly construction of 90,000 gross tons.

³Losses to November 1, 1944 from confirmed sources; November, December and January estimated from best available information.

⁴Unofficial figures, based on estimate that the Japanese have lost almost 40% per cent of tonnage of ships between 100 and 999 gross tons.

⁵20 per cent deduction (of total available) for lay-ups and repairs.

TABLE 2

TONNAGE GROUP	NO.	GROSS TONNAGE
10,000.....	20	210,000
9,000.....	5	47,000
8,000.....	6	50,000
7,000.....	10	73,000
6,000.....	32	207,000
5,000.....	62	344,000
4,000.....	38	170,000
3,000.....	37	130,000
2,000.....	120	300,000
1,000.....	100	150,000
Subtotal	430	1,681,000
500-999.....	355	276,000
100-499.....	2,822	459,000
Total	3,607	2,416,000

IDENTIFICATION SYSTEM

JAPANESE MERCHANT SHIP IDENTIFICATION

On the following pages is presented a system for identifying Japanese merchant ships.

There are four steps in making the identification:

- STEP 1. From the charts on pages 3.06 and 3.07 determine the JMST subdivision of the ship to be identified.
- STEP 2. Turn to the key on page 3.08 and under the JMST subdivision determined in Step 1, select the description that fits the ship to be identified.
- STEP 3. Turn to page given in the key and select the column heading describing the ship.
- STEP 4. From the drawings and notes in the columns, identify the ship.

ABBREVIATIONS USED IN THE TEXT

L/B	LIFE BOAT. Unless otherwise stated, this refers to the number of life boats on one side of a ship's superstructure.
MFK Sequence	THE MAST, FUNNEL, KINGPOST SEQUENCE ON A SHIP. This sequence is given from bow to stern and is often used as a means of identifying a ship. Kingposts flush with the superstructure and not projecting above it are not counted in this sequence. On freighters, the kingposts between the bridge and funnel are common to all classes, and are not counted.
MK	MASTS OR KINGPOSTS. 4 MK indicates 4 masts or kingposts on a ship.
M	MAST OR SAMPSON POST.
K	KINGPOSTS.
K _T	KINGPOSTS WITH TOPMAST.
KK _T	KINGPOSTS OR KINGPOSTS WITH TOPMAST.
F	FUNNEL OR STACK.
g.t.	GROSS TONS
o.a.	OVERALL LENGTH.

SUPERST. SUPERSTRUCTURE.

Often, the drawing of a ship is not sufficient for positive identification. The page references above the drawings in this text, refer to the pages in ONI - 208J (REV.) where photographs and detailed information concerning each ship may be found.

If the ship being identified is not found in the text, or if the photograph of the ship being identified does not reveal sufficient detail for positive identification, report the ship by its JMST subdivision and an estimation of its tonnage. The tonnage can best be estimated by checking the tonnage of ships of similar characteristics and length in the text.

When doubt arises as to the JMST subdivision of a ship; for example, whether the ship is a TARE BAKER or a FOX TARE CHARLIE with a long superstructure, it is suggested that both classifications be checked before reporting on the identity of the ship.

The notes given below the drawing of each ship in the text point out features that distinguish it from the other ships in that group. Other details that are often helpful in identifying a ship are:

1. The relative positions of the stack and life boats on the superstructure.
2. The positions of the cargo booms when lashed down.
3. The plan of the engine house on Freighters. Usually this plan is "T" shaped, with the stack placed forward on the leg of the "T", but sometimes the plan is square.
4. The position of the kingposts abaft the bridge on Freighters. Usually, they are athwartships from the stack, but sometimes they are set well forward.
5. The presence or absence of crosstrees on the kingposts, and when present, their shape. (The latter is useful only for low oblique and submarine photographs).

EXAMPLE 1. Identify the ship shown on page 3.01 (Terminology).

STEP 1. (JMST pp.3.06-3.07) Short compos-

ite superstructure, storm decks and 4 MK (masts or kingposts) identify the ship as a FOX TARE BAKER (FTB).

- STEP 2. (Key p.3.08) FOX TARE BAKER with 4 MK describes this ship and the page reference given is pp. 3.27, 3.29.
- STEP 3. (COLUMN HEADINGS) The four columns headed "NO MK ON POOP OR SUPERST." describe this ship.
- STEP 4. (DRAWINGS AND NOTES). Winch houses forward and aft, and narrow kingposts forward, identify the ship as the AKIURA MARU Class.

EXAMPLE 2. Identify ship No. 9 on page 3.02 (Trends in Design)

- STEP 1. (JMST). FOX ABLE (FA).
- STEP 2. (KEY). FOX ABLE with 5 MK, Page 3.48
- STEP 3. (COLUMNS). 6 or 5 MK is proper column heading.
- STEP 4. (DRAWINGS AND NOTES). MF sequence of M K F K M K identifies ship as HAKUSHIKA MARU Class.) Note: MF sequence is given from bow to stern, and K abaft bridge is not coded on Freighters.

EXAMPLE 3. Identify Ship No. 6 on page 3.02 (Trends in Design). Assume that from vertical photographs we have determined the ships length to be approximately 360' o.a.

- STEP 1. (JMST). FOX TARE CHARLIE (FTC)
- STEP 2. (KEY). FTC with 2 masts centered in wells, pp. 3.39 - 3.44.
- STEP 3. (COLUMNS). The two columns headed "375 - 345'" should contain the drawing of the ship being identified.
- STEP 4. (DRAWINGS AND NOTES). Side hatches abaft the bridge identify ship No. 6 as the AKITA MARU Class.

In order to become familiar with this system of identification, it is suggested that the other ships on page 3.02 be identified. Assume that the lengths of ships Nos. 8, 10, and 13 have been determined from vertical photographs as approximately 315', 400', and 375', respectively.

This simple and systematic method is designed for observing and reporting Japanese merchant vessels and warships. It permits immediate conclusions as to type and tonnage of merchant ships or identification of classes of naval vessels. This is accomplished through 2 or 3 simple steps based on prominent recognition features which allow for reporting to the limit of the conditions of observation. After successful operational use in S.W.P.A., these methods are hereby disseminated for general use in the Pacific. The arrangement here has been altered slightly to coincide with identification charts.

INSTRUCTIONS FOR USE

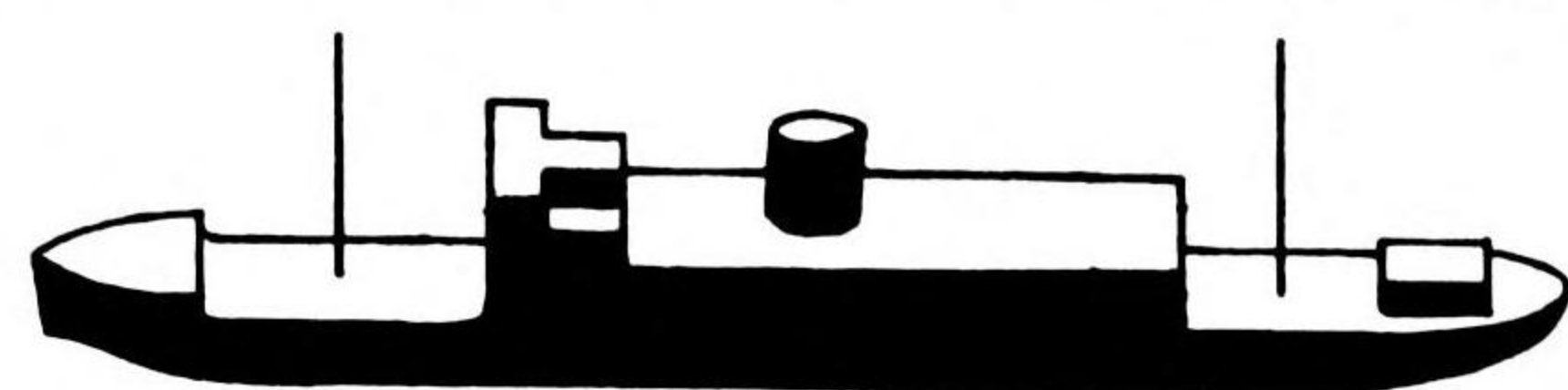
- Determine the division through observation of superstructure in column below; for instance, SUGAR (Merchant ship with stack aft).

- Select correct subdivision from appropriate column on basis of verticals (Masts and Kingposts), hatches or location of bridge; e.g., SUGAR BAKER.
- Select minor subdivision; e.g., SUGAR BAKER LOVE.

When division cannot be determined, report MIKE VICTOR (Merchant Vessel) with estimate of tonnage if possible.

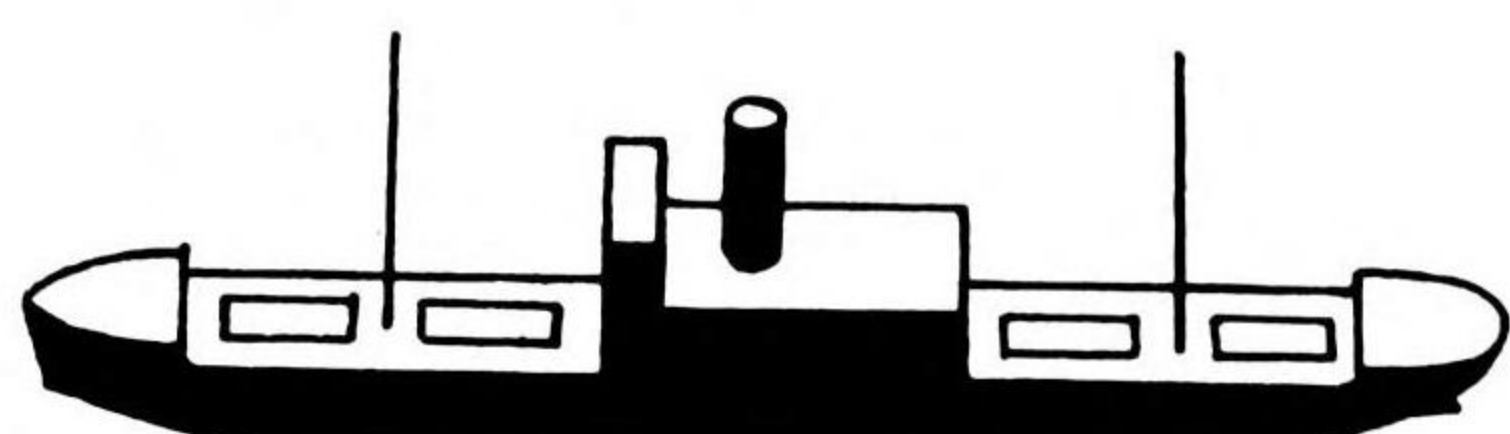
Note that JMST, to simplify reporting, divisions and subdivisions have been assigned code names from the phonetic alphabet; e.g. Freighter Transports, subdivision A, B, or C, are reported as Fox Tare Ables, Bakers, or Charlies.

1 TARE DIVISION (TRANSPORT)



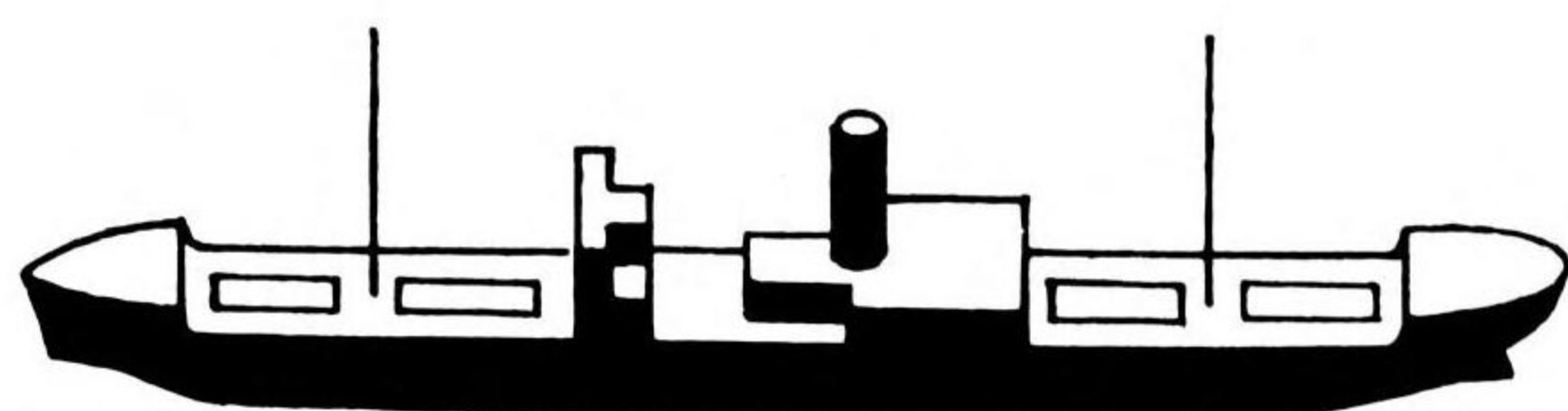
LONG COMPOSITE SUPERSTRUCTURE
(AT LEAST 1/3 LENGTH OF SHIP)

2 FOX TARE DIVISION (FREIGHTER TRANSPORT)



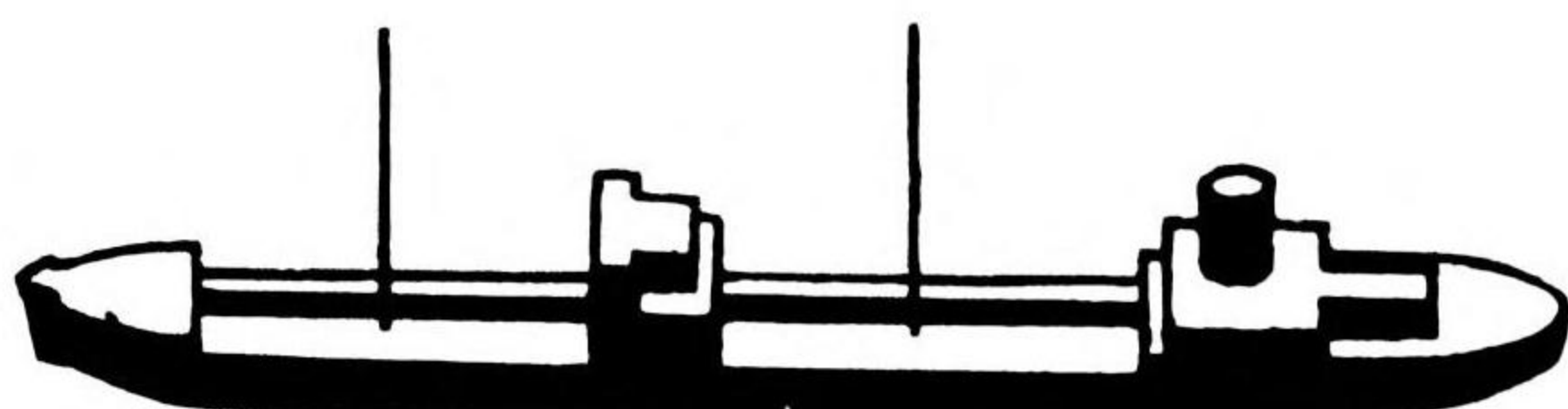
SHORT COMPOSITE SUPERSTRUCTURE

3 FOX DIVISION (FREIGHTER)



SPLIT SUPERSTRUCTURE

4 SUGAR DIVISION (STACK AFT)



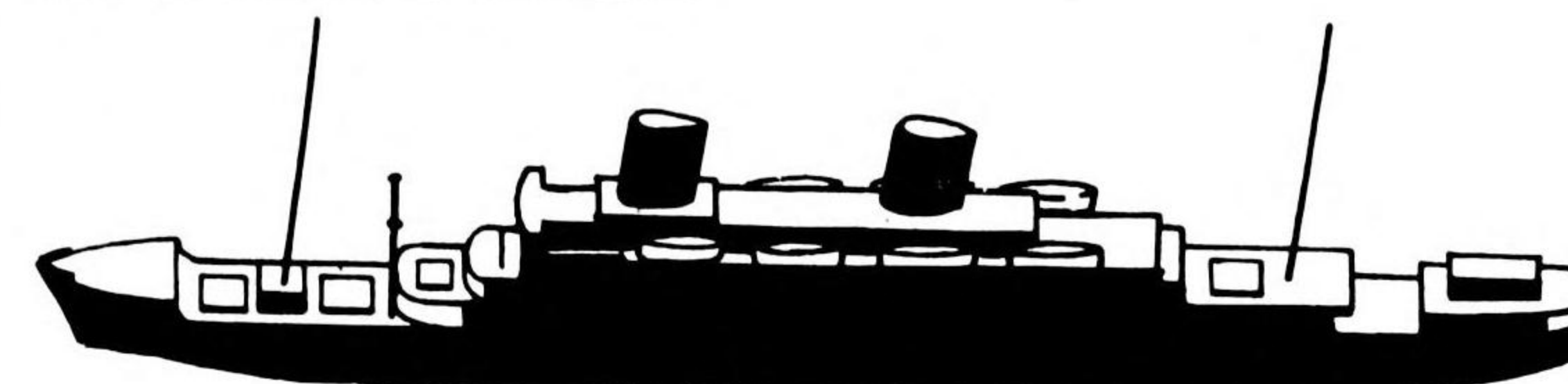
STACK AFT

TARE DIVISION (TRANSPORT)

1

LONG COMPOSITE SUPERSTRUCTURE
(AT LEAST 1/3 LENGTH OF SHIP)

TARE ABLE 2 STACKS

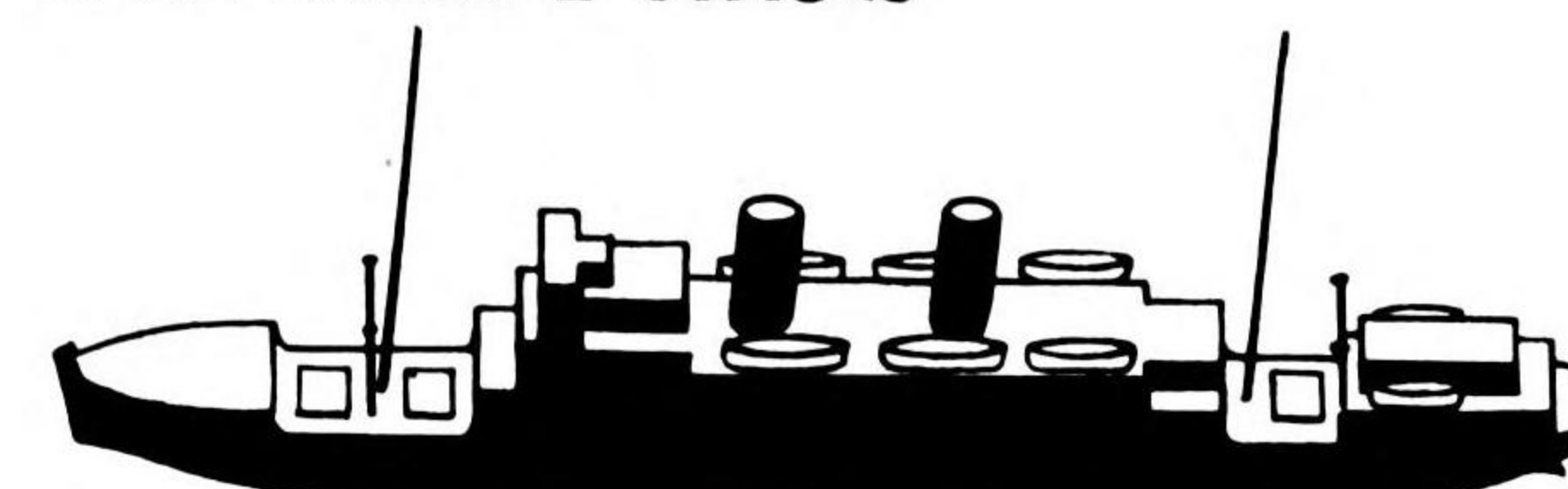


Minimum of 4 Lifeboats to a Side on Superstructure. 7000/10000 G.T. 15Kt 18 Kt

Note: ASAMA and TATSUTA MARU-7 Lifeboats to a Side. 17000 G.T.

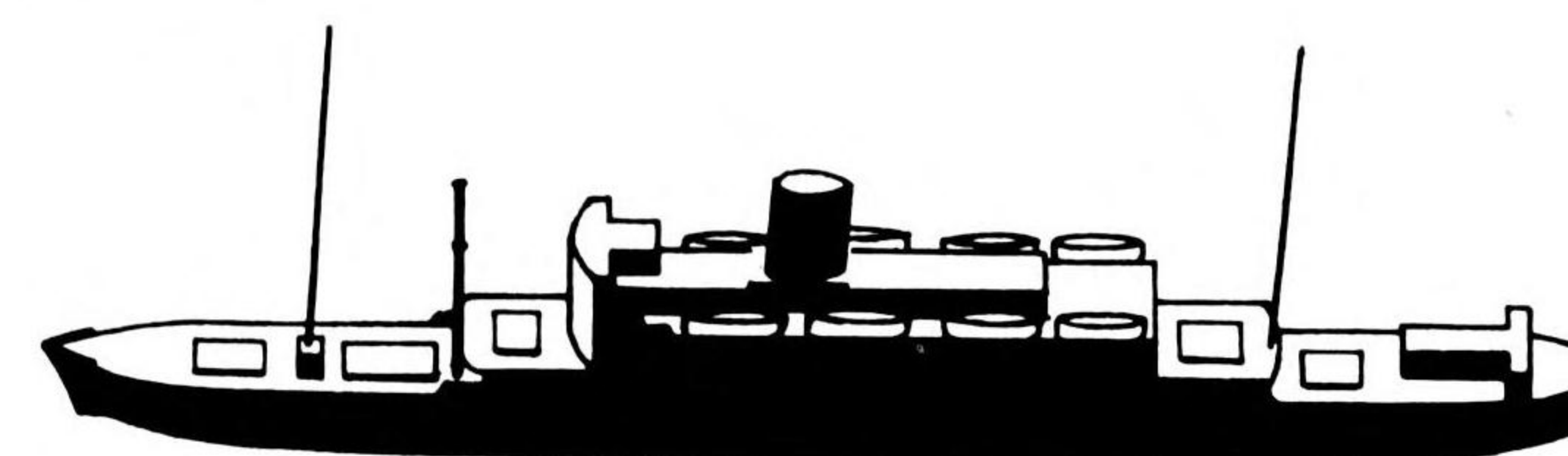
TEIA MARU-Square Stacks-6 Lifeboats to a Side. 17000 G.T.

TARE BAKER 2 STACKS



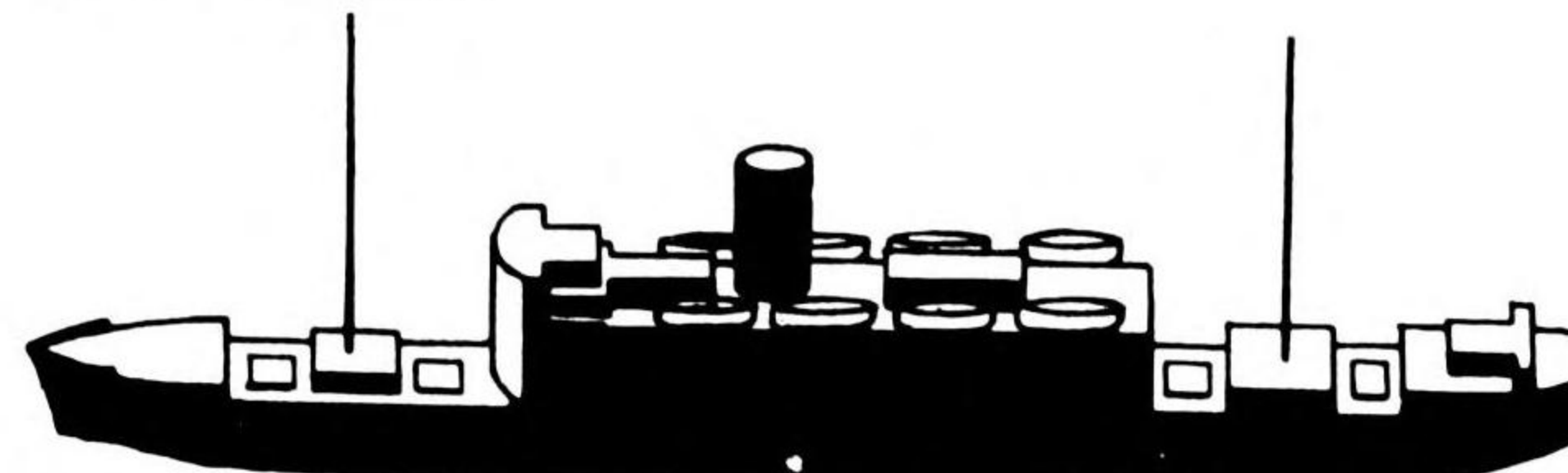
Maximum of 3 Lifeboats to a Side on Superstructure. 4000/6000 G.T.

TARE ABLE



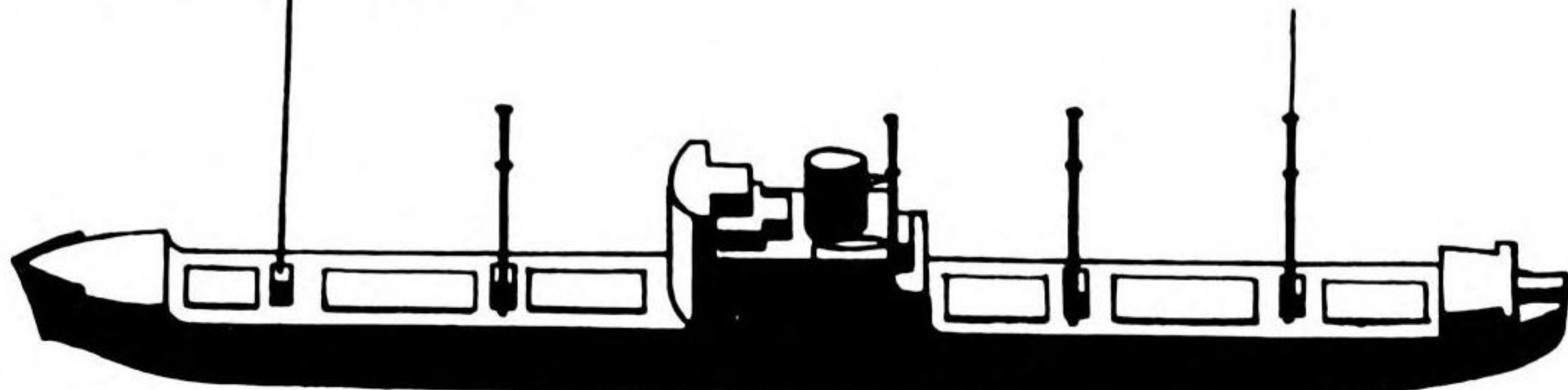
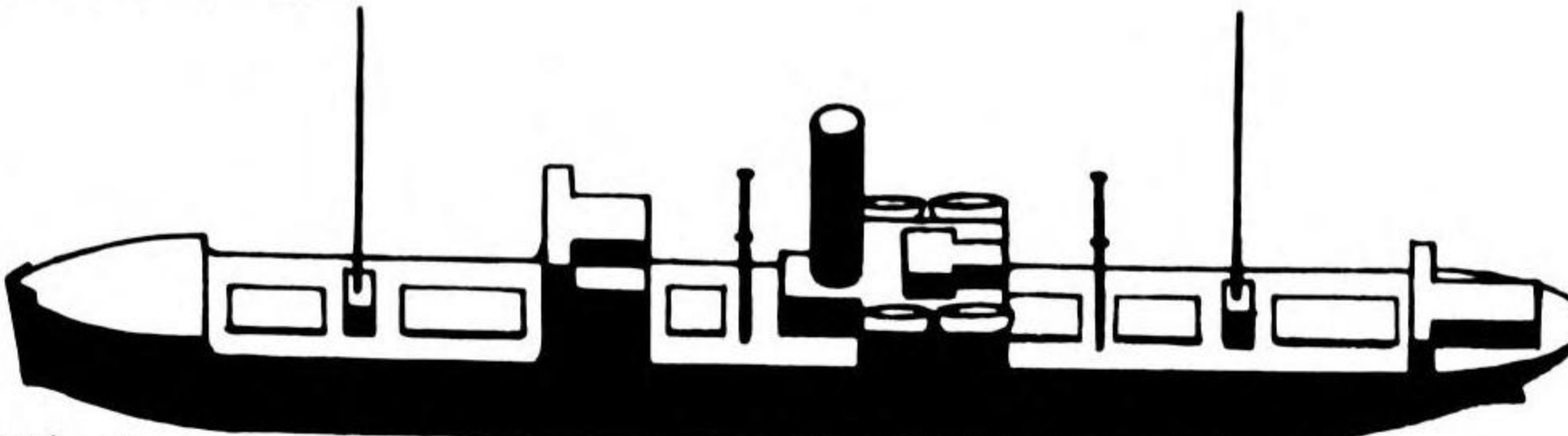
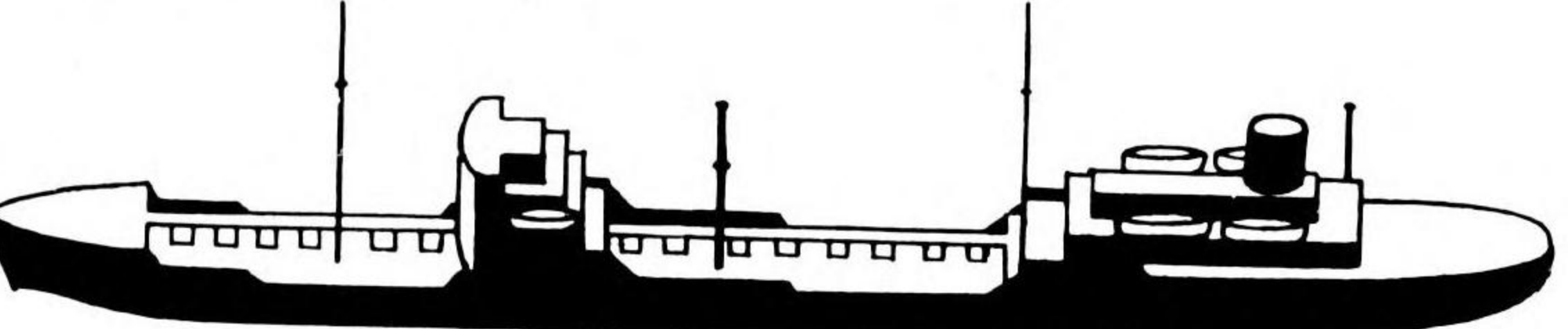
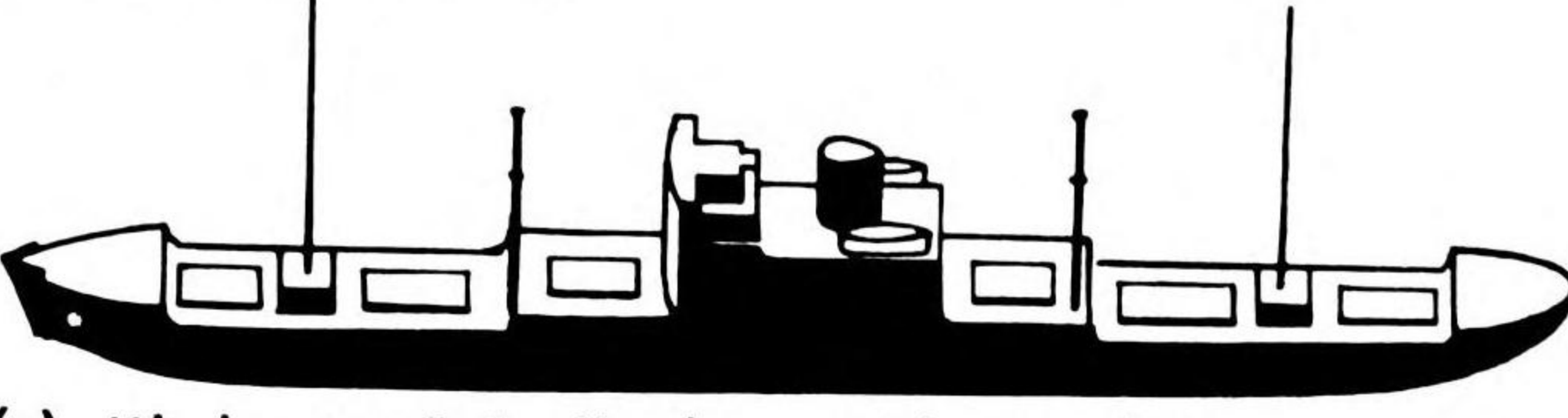
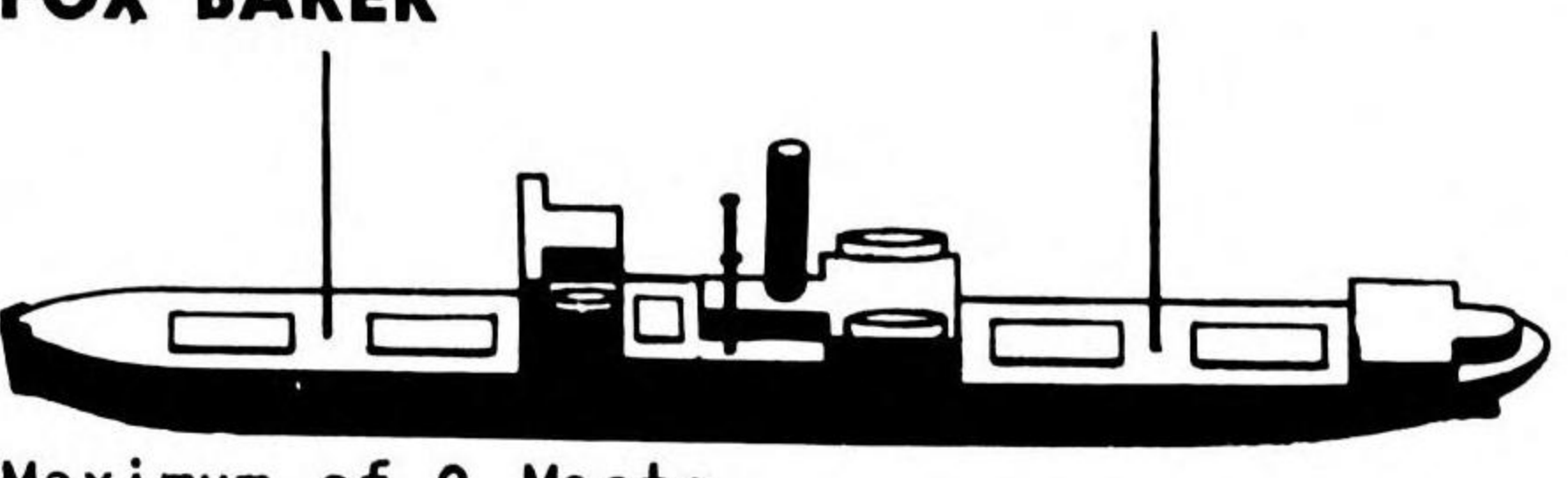
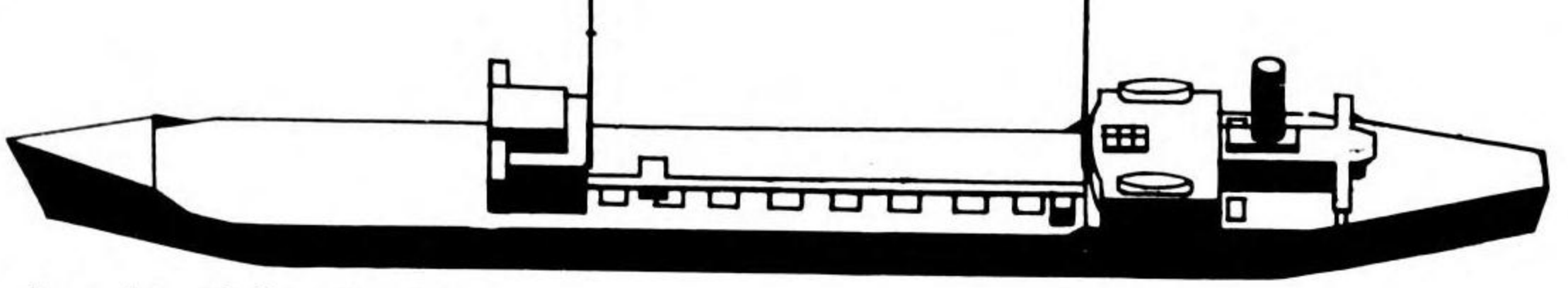
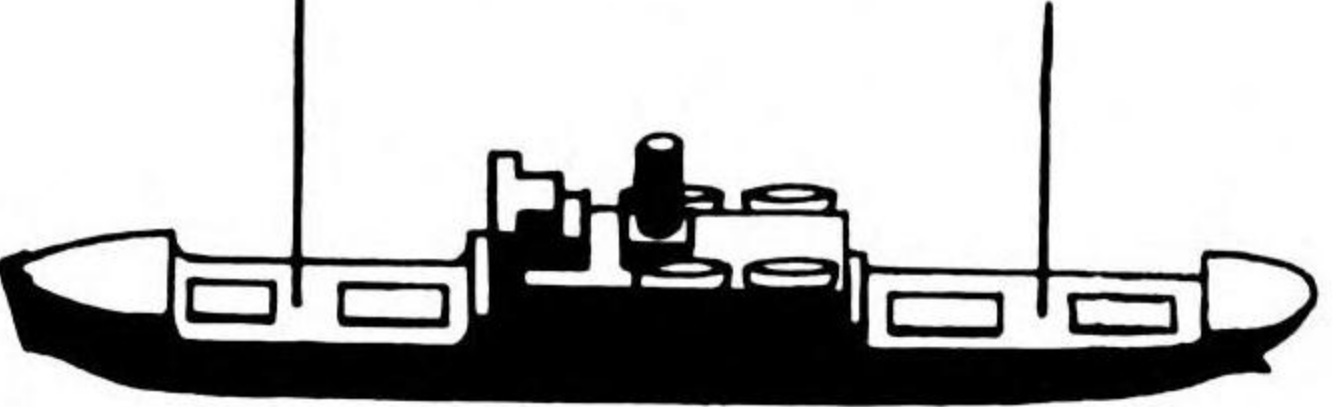
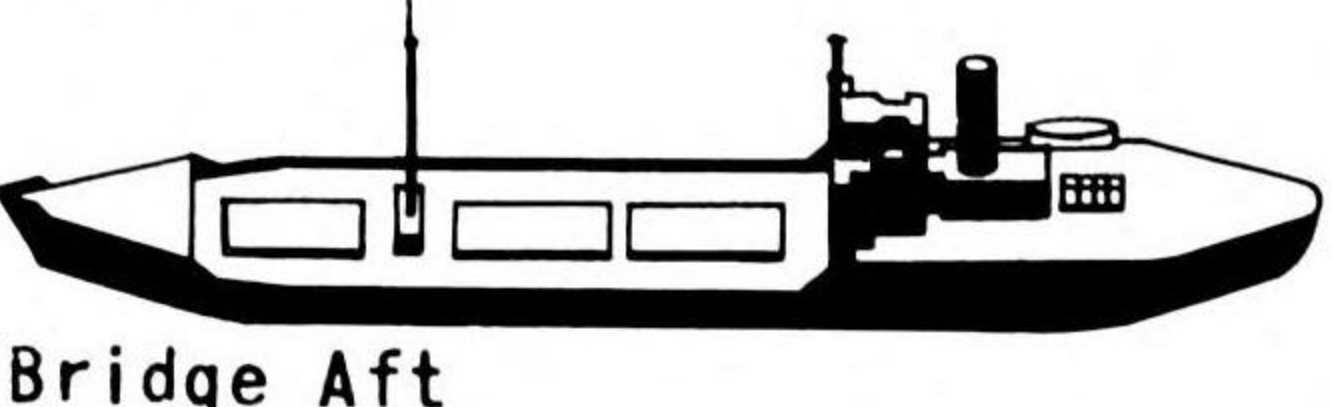
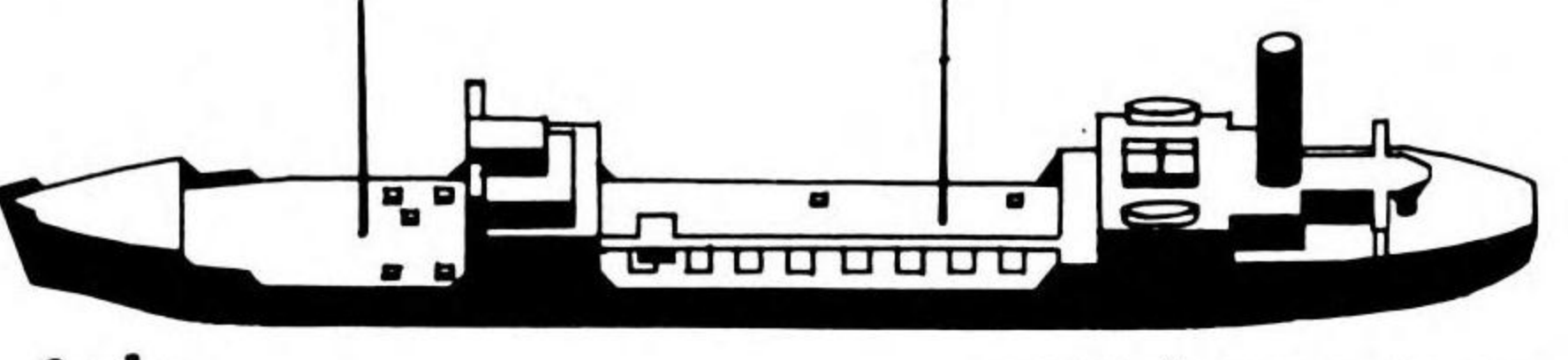
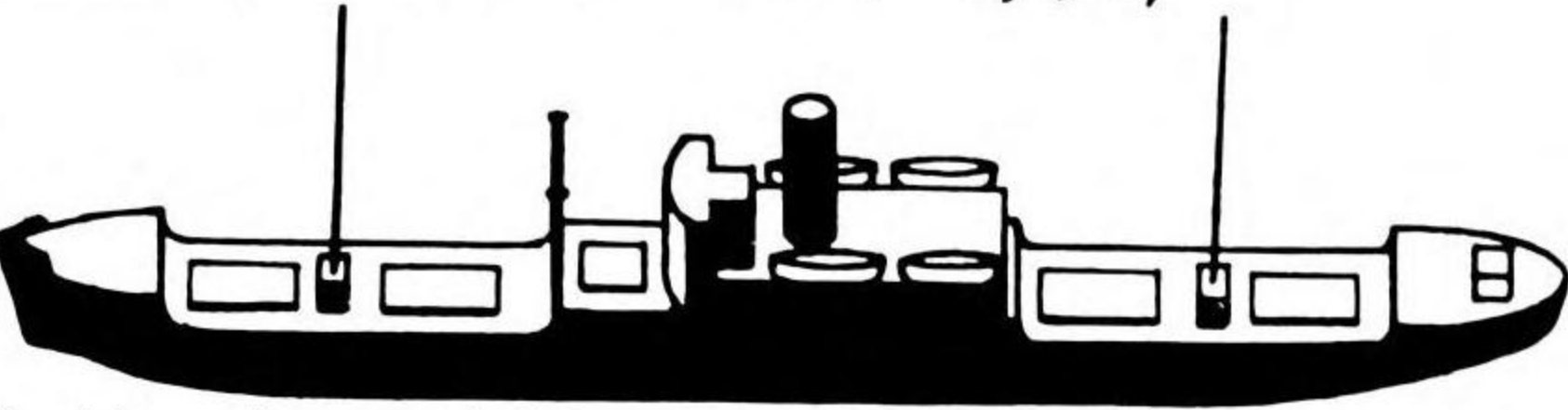
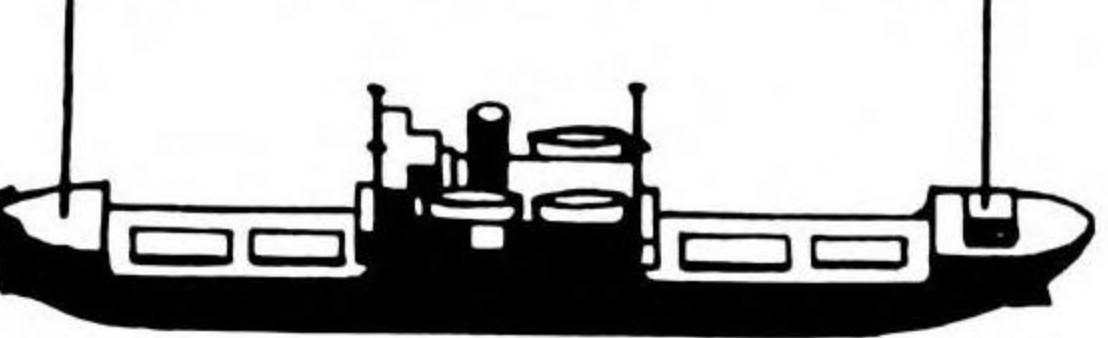
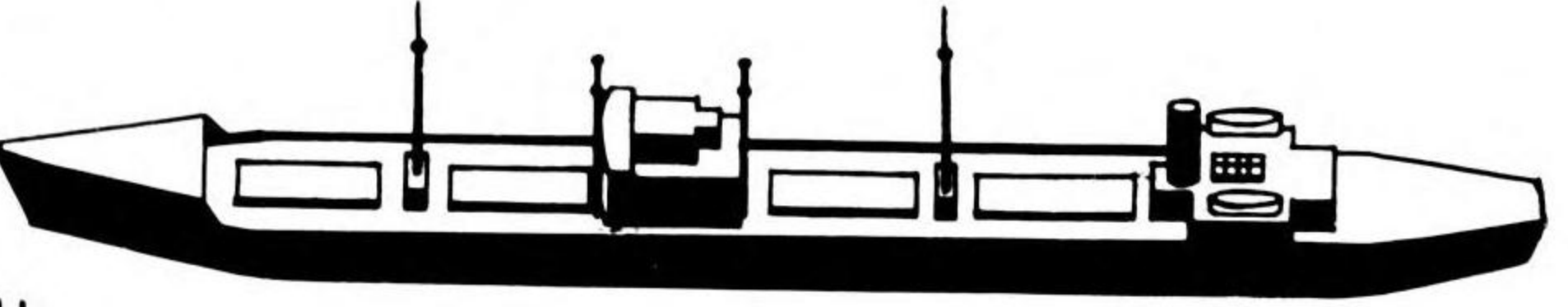
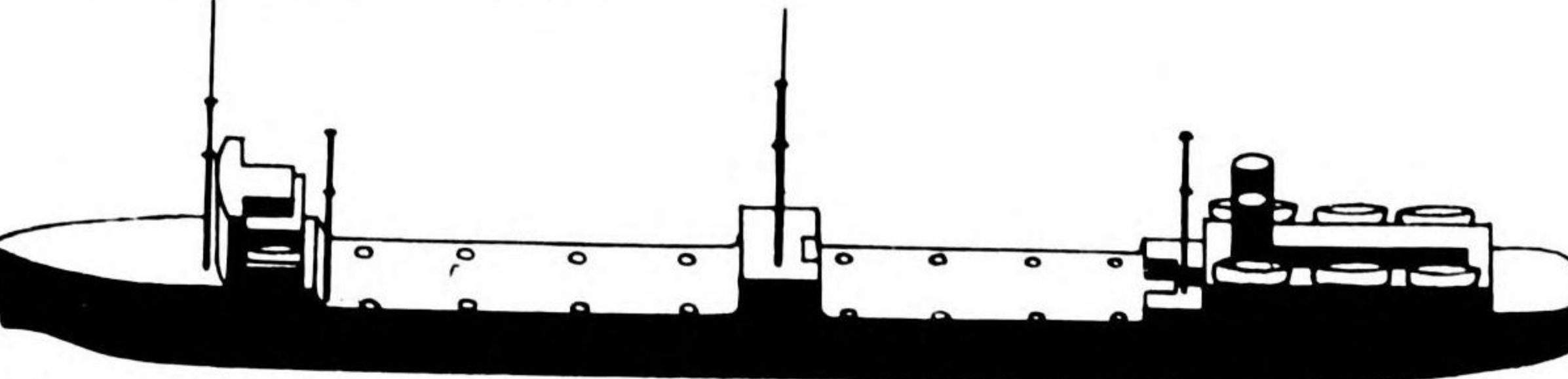
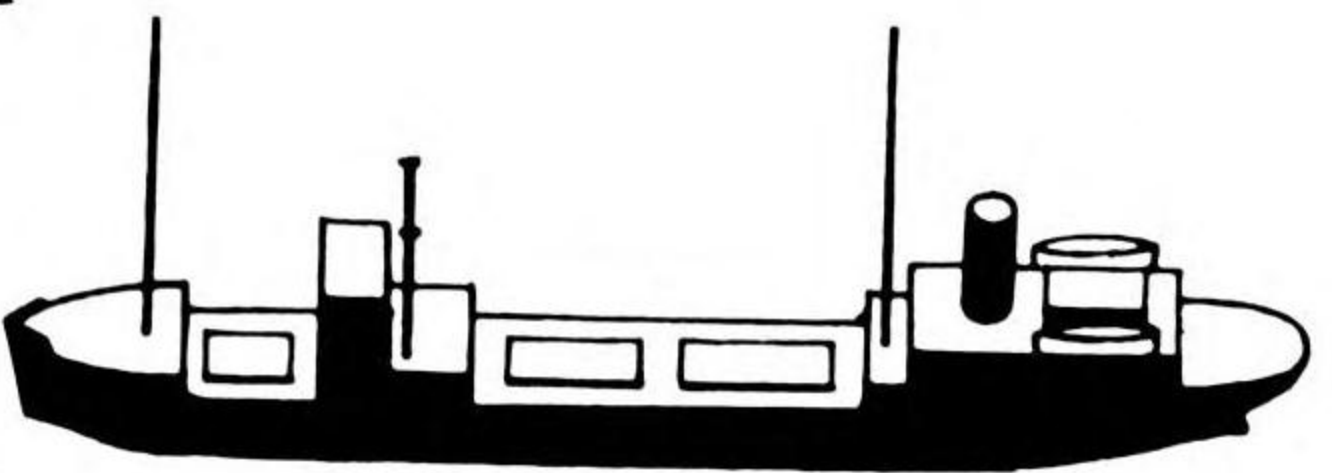
(a) 5 or more Lifeboats
(b) 3 Masts or Kingposts and 4 or more Lifeboats. 9000/12000 G.T. Either identifies. 14-15Kt 16½Kt

TARE BAKER



(a) 2 Masts or Kingposts and maximum of 4 Lifeboats 2000-8000 G.T.
(b) 3 Masts or Kingposts and maximum of 3 Lifeboats. 16Kt 18½Kt Either identifies.

TARE UNCLE (UNIDENTIFIED) 4000-12000 G.T.

FOX TARE DIVISION (FREIGHTER TRANSPORT) 2 SHORT COMPOSITE SUPERSTRUCTURE	FOX DIVISION (FREIGHTER) 3 SPLIT SUPERSTRUCTURE	SUGAR DIVISION (STACK AFT) 4 STACK AFT
<p>FOX TARE ABLE</p>  <p>(a) Minimum of 4 Masts or Kingposts Minimum of 6 Hatches Either with (b) identifies 7000/8500 G.T. (b) No Stormdecks 16Kt 19Kt</p>	<p>Note: Kingposts and hatches in split of superstructure and kingposts abaft mainmast will not be counted.</p> <p>FOX ABLE</p>  <p>Minimum of 3 Masts or Kingposts Minimum of 5 Hatches. 5500/7500 G.T. Either identifies 11Kt 13/14Kt</p>	<p>SUGAR ABLE LOVE</p>  <p>Catwalk Fore and Aft 7000/10500 G.T. Mast Forward 16Kt 19Kt</p>
<p>FOX TARE BAKER</p>  <p>(a) Minimum of 4 Masts or Kingposts Minimum of 6 Hatches Either with (b) identifies 5500/7500 G.T. (b) Stormdecks 14Kt 16/17Kt</p>	<p>FOX BAKER</p>  <p>Maximum of 2 Masts Maximum of 4 Hatches 3500/6000 G.T. Either identifies 10Kt 12/13Kt</p>	<p>SUGAR ABLE ITEM</p>  <p>Catwalk Aft Only 13Kt 17Kt No Mast Forward</p>
<p>FOX TARE CHARLIE</p>  <p>2 Masts or 4 Hatches - 2000/4500 G.T. Either identifies (80 10/11 Kt 12/13 Kt percent are of this type)</p>	<p>FOX UNCLE (UNIDENTIFIED) 3500/7500 G.T.</p> <p>SUGAR CHARLIE LOVE</p>  <p>2300/3100 G.T. 9Kt 12Kt Bridge Aft Foremast Separated from Forecastle 3 Hatches</p>	<p>SUGAR ABLE SUGAR</p>  <p>Catwalk Aft Only 3000/6000 G.T. Mast Forward 12Kt 14.5Kt</p>
<p>FOX TARE DOG</p>  <p>2 Masts with a Kingpost forward of Superstructure or 5 Hatches-Either identifies</p>  <p>Masts or Kingposts on forecastle and poop 4 Hatches Either identifies 700/1300 G.T.</p>	<p>SUGAR DOG 70/150 G.T. Bridge Aft 1 Mast, 1 Hatch</p> <p>SUGAR CHARLIE SUGAR 300/850 G.T. Bridge Aft Foremast Amidships or on Forecastle 2 Hatches</p>	<p>SUGAR ABLE SUGAR</p>  <p>No Catwalk Bridge Forward 4400/6700 G.T. Masts Centered 10Kt 14Kt</p>
<p>FOX TARE UNCLE (UNIDENTIFIED) 700/8500 G.T.</p>	<p>SUGAR TWO STACKS</p>  <p>Stacks Abreast 6000/17000 G.T. Slipway in stern 13 Kt 15Kt</p> <p>SUGAR UNCLE (UNIDENTIFIED) 70/17,000 G.T.</p>	<p>SUGAR BAKER LOVE</p>  <p>No Catwalk Bridge Forward 1800/2000 G.T. Mast on Forecastle 10Kt 13Kt</p> <p>Note: Speeds indicated are normal cruising, and average maximum.</p>

KEY TO IDENTIFICATION

HOSPITAL SHIPS

Tare 2-stacks	3.09
Tare Able	3.09
Tare Baker	3.10
Fox Able	3.10
Fox Tare Able	3.11
Fox Tare Baker	3.11
Fox Tare Charlie	3.11

TRANSPORTS

TARE ABLE 2-STACKS	3.12
TARE BAKER 2-STACKS	3.13
TARE ABLE	
4 MK	3.14
3 MK	3.15-3.16
2 MK	3.16
TARE BAKER	
3 or more MK	3.17
2 MK and 4 L/B	3.18
2 MK and 3 L/B	3.19-3.20
2 MK and 2 L/B	2.20-3.21

FREIGHTER TRANSPORTS

FOX TARE ABLE	
5 or more MK	3.22-3.23
4 MK and ONE K superstructure	3.23
4 M	3.24
4 KK _T	3.24
4 MK and NO K at superstructure	3.25
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4 MK	3.30-3.31
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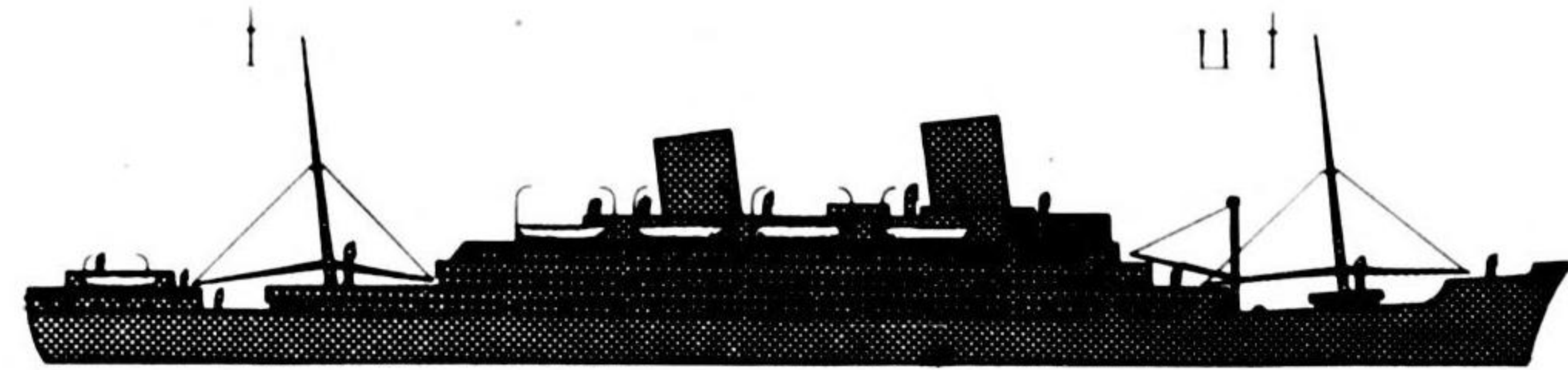
STACK AFT

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SUGAR BAKER LOVE	3.72
SUGAR BAKER SUGAR	3.73
SUGAR CHARLIE	3.74

HOSPITAL SHIPS TRANSPORTS

TARE 2 STACKS

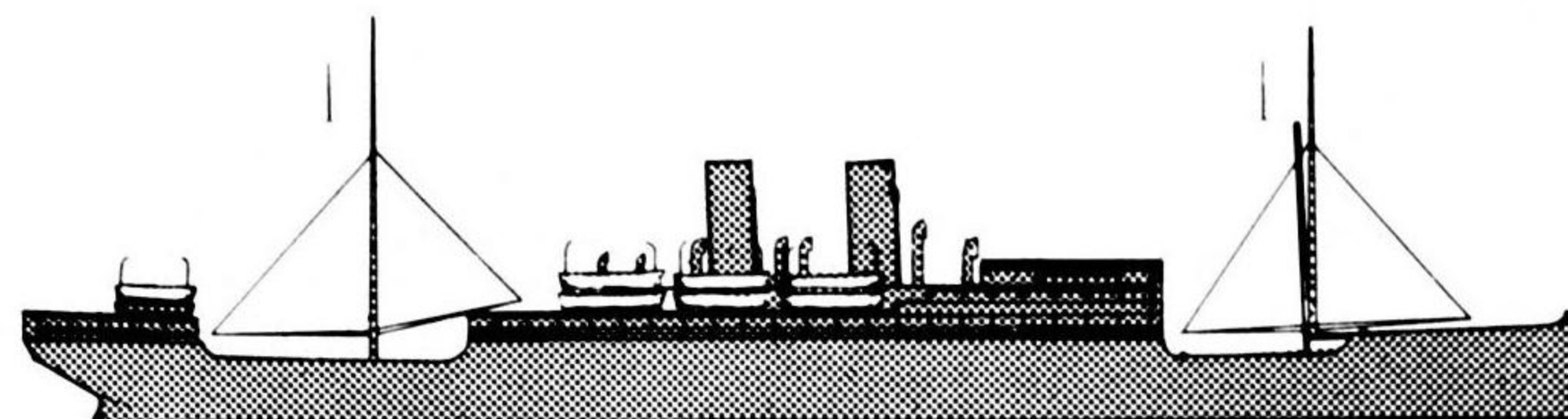
TAKASAGO MARU approx. 483' o. a.
9,347 g. t.
(P. 6)



4 L/B



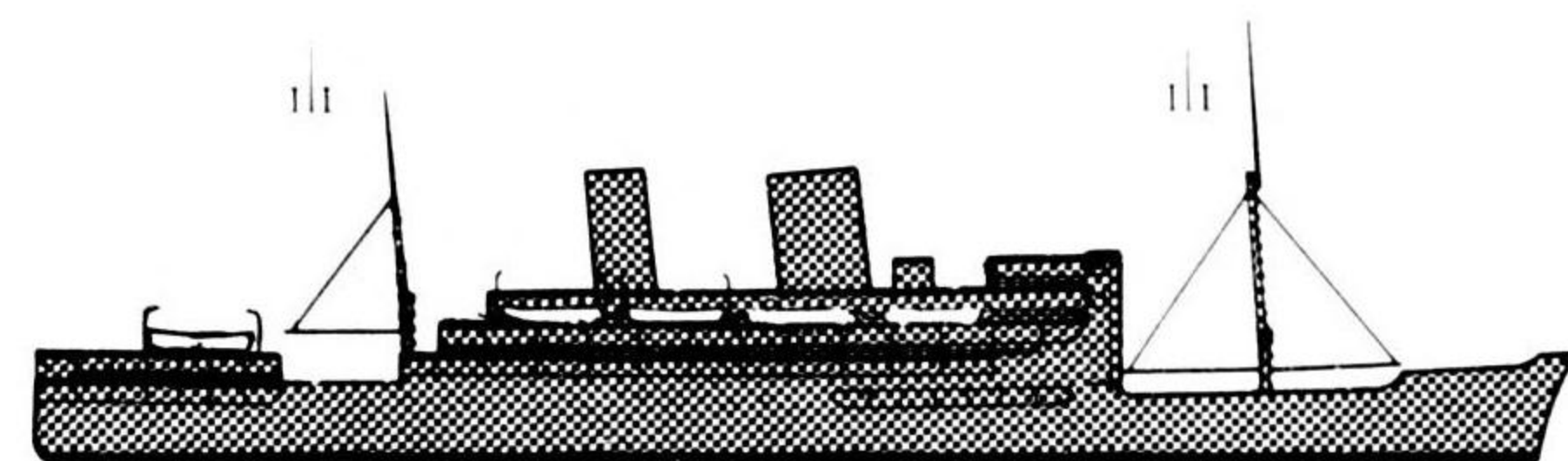
FUSO MARU approx. 500' o. a.
8,196 g. t.
(P. 8)



3 L/B



DAINAI HIKAWA 459' o. a.
5,500 g. t.
(Drwg. from ONI Weekly)

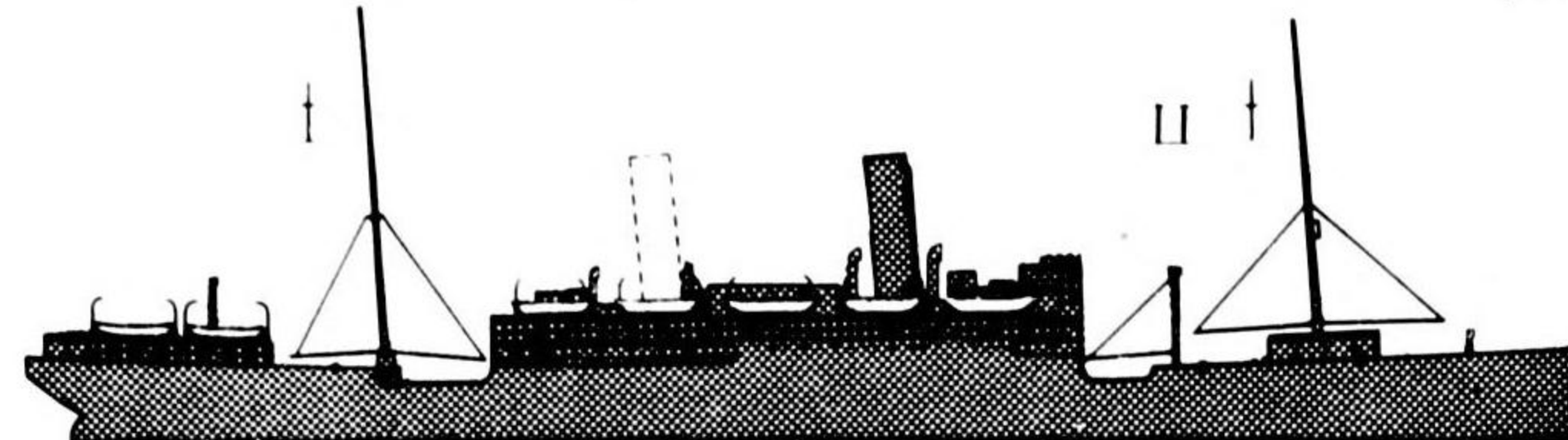


No. 2 stack small
4 L/B
Mainmast on superstructure



TARE ABLE (5 L/B)

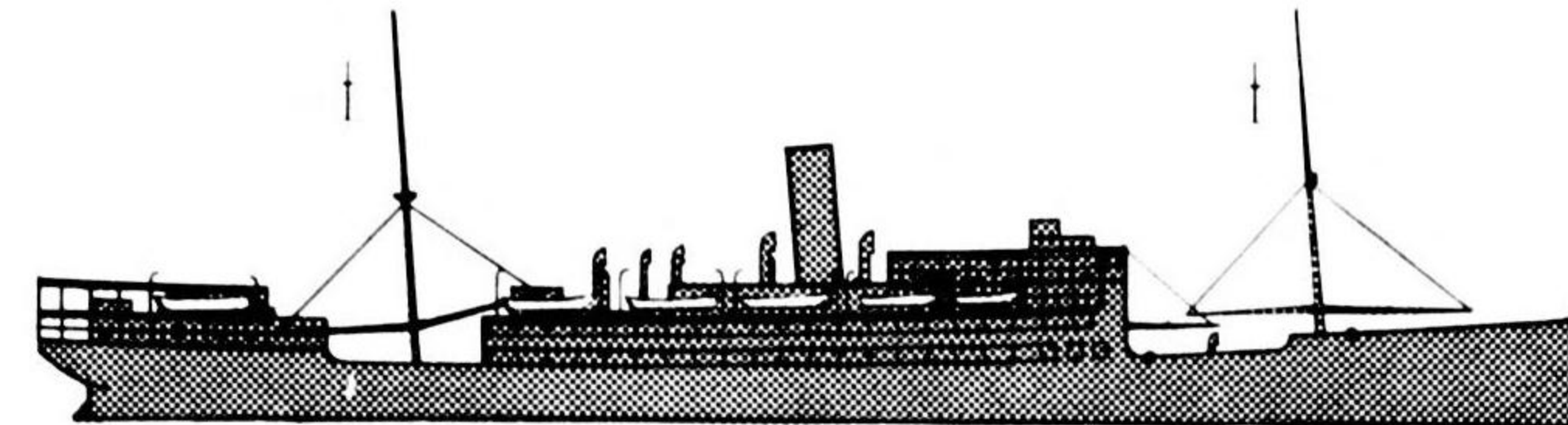
ASAHI MARU approx. 500' o. a.
9,326 g. t.
(P. 56)



5 L/B, 2 L/B on poop deck
MKFM



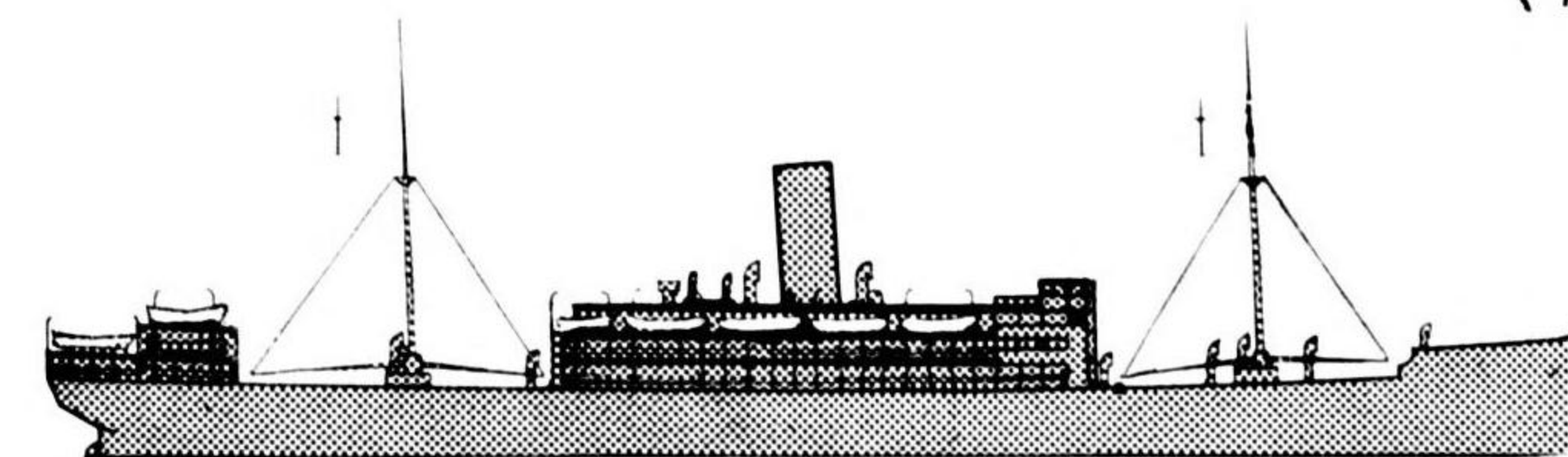
YOSHINO MARU approx. 485' o. a.
8,990 g. t.
(P. 30)



5 L/B
Two stick masts
Foremast on forecastle



MIZUHO MARU approx. 485' o. a.
8,506 g. t.
(P. 30)

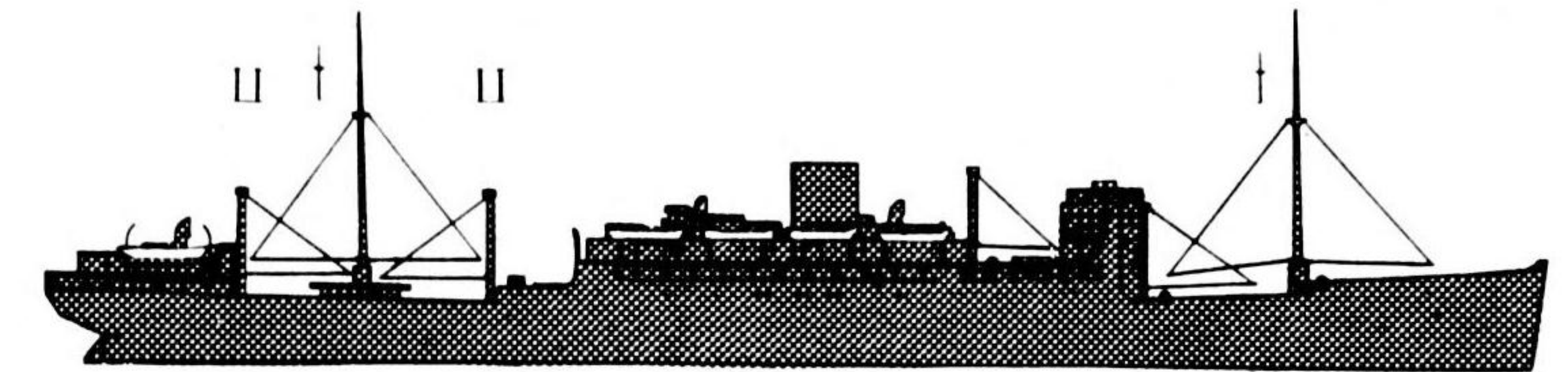


5 L/B
Two stick masts



TARE ABLE (4 L/B)

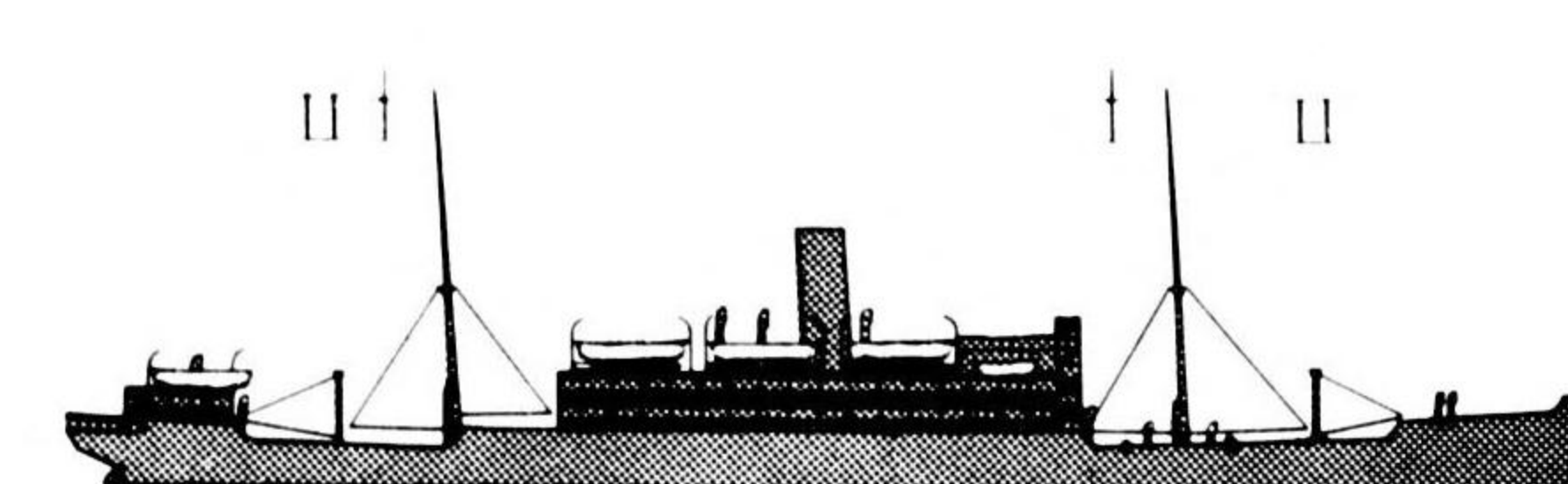
HIKAWA MARU 535' o. a.
11,600 g. t.
(P. 61)



4 L/B
MFKMK
Hatch abaft bridge



BAIKAL MARU approx. 415' o. a.
5,266 g. t.
(P. 58)



4 L/B
KMFMK

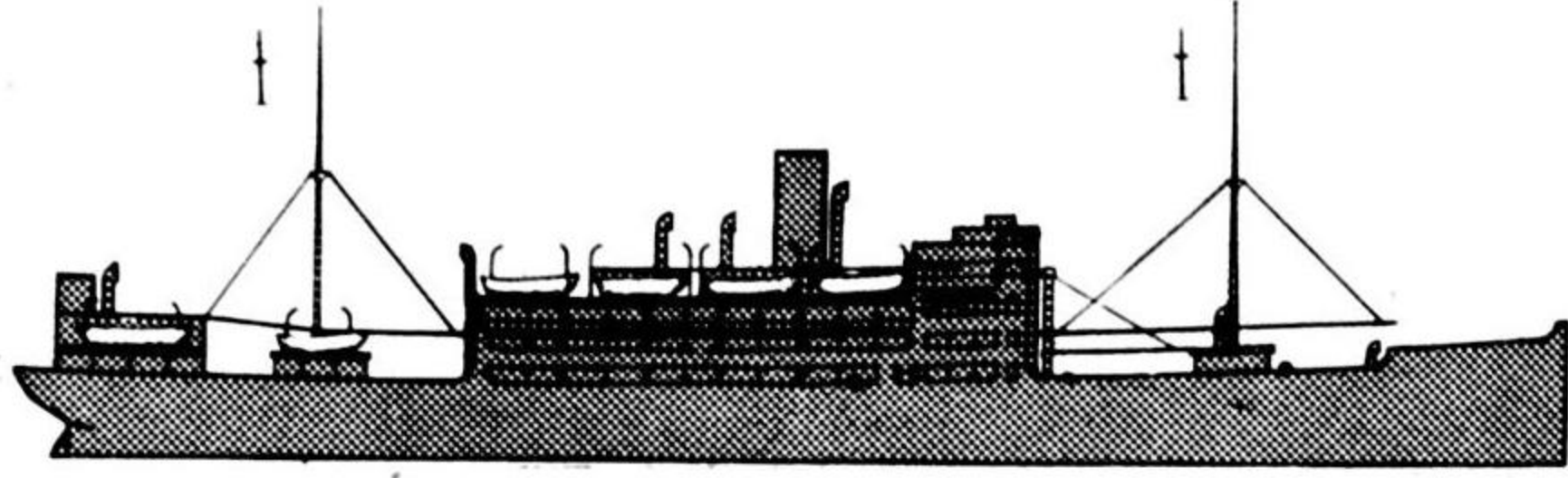


HOSPITAL SHIPS

TRANSPORTS AND FREIGHTER

TARE BAKER (4 L/B)

URAL MARU approx. 420' o. a.
6,374 g. t.
(P. 32)

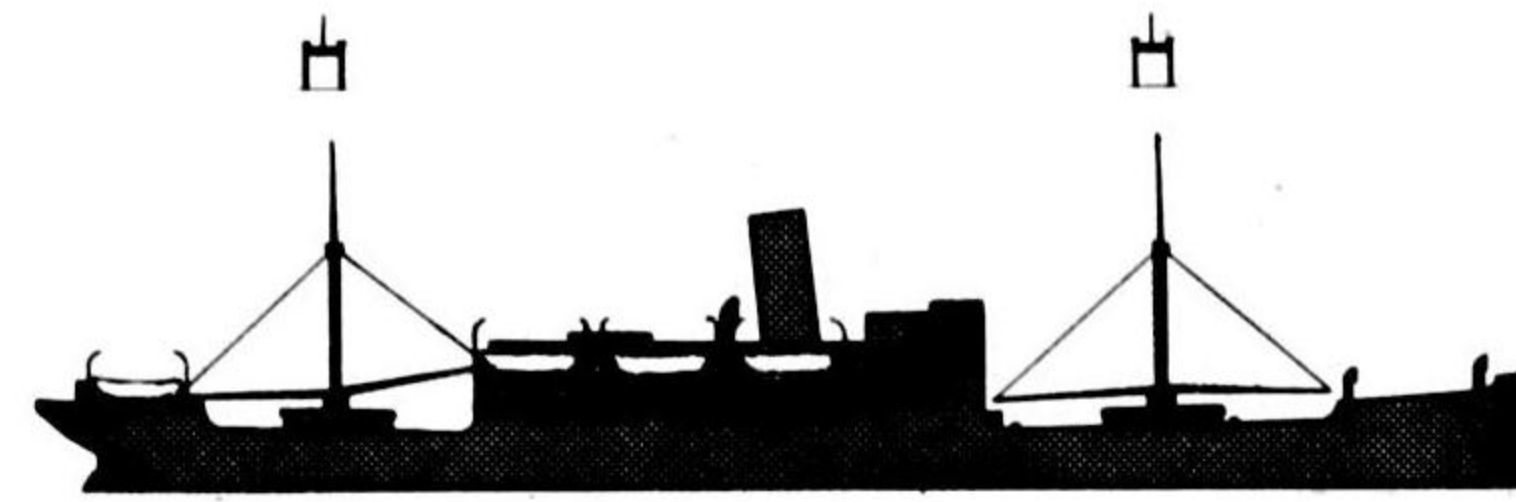


One L/B forward of stack
One L/B athwart mainmast



TARE BAKER (3 L/B)

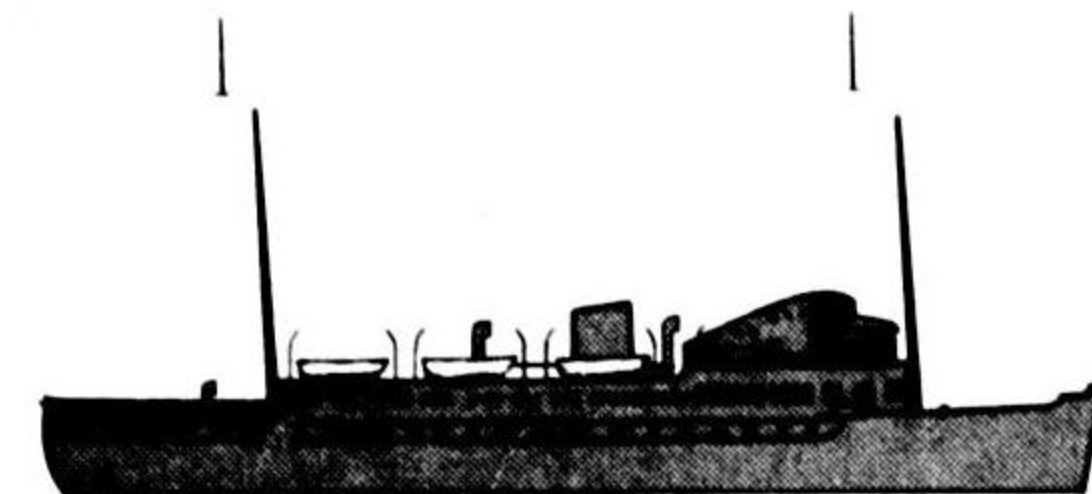
SIBERIA MARU approx. 365' o. a.
3,461 g. t.
(P. 33)



K_TFK_T



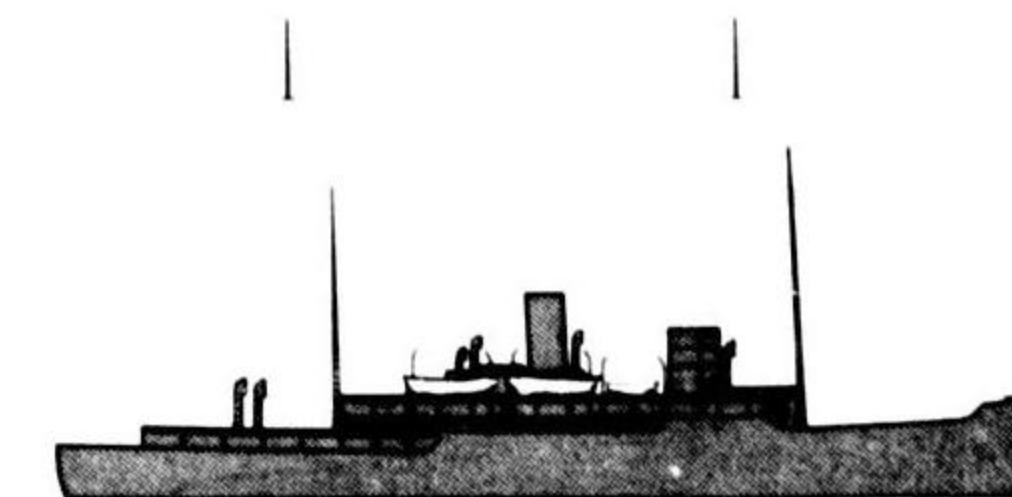
TACHIBANA MARU approx. 255' o. a.
1,772 g. t.
(P. 27)



Two stickmasts
Streamlined bridge and low stack



MURO MARU approx. 235' o. a.
1,607 g. t.
(P. 19)

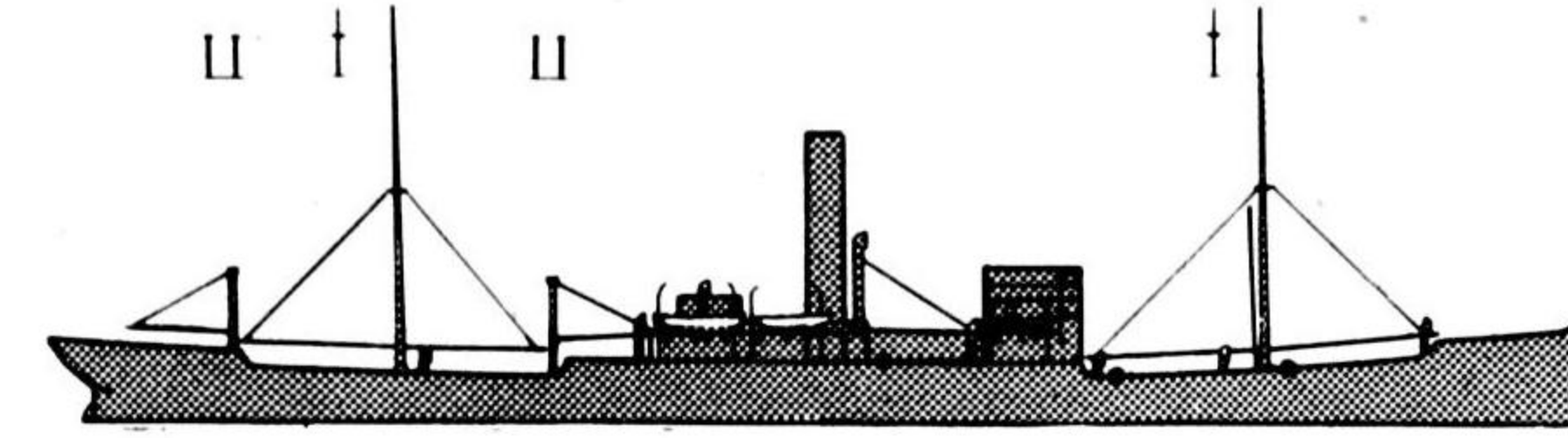


Two stick masts
Tall stack



FOX ABLE

HOKUSHIN MARU approx. 435' o. a.
5,820 g. t.
(P. 249)



MFKMK

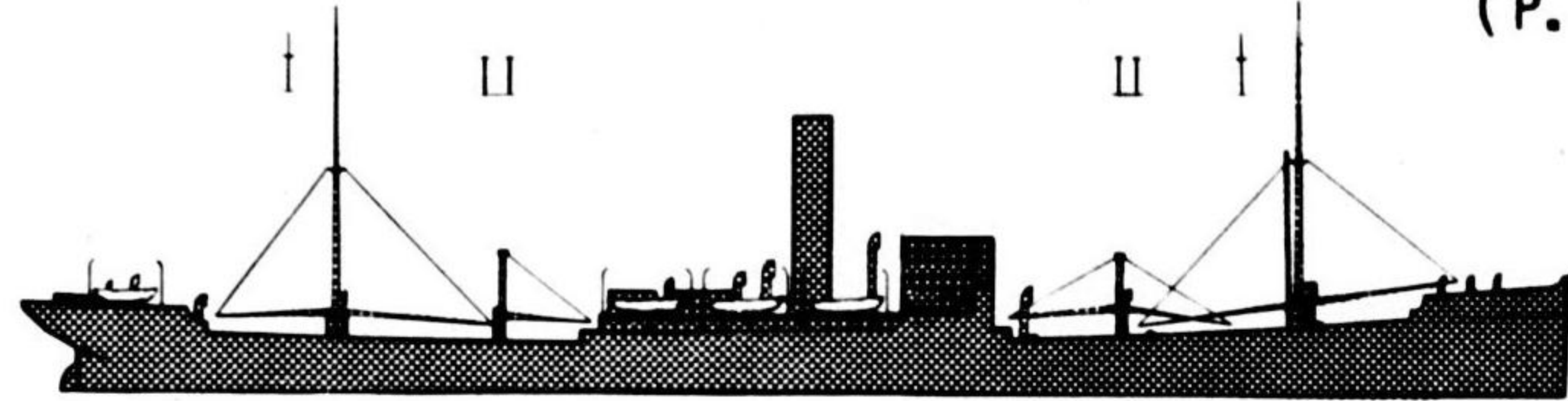


HOSPITAL SHIPS

FREIGHTER TRANSPORTS

FOX TARE ABLE

MANILA MARU	approx. 500' o. a.
	9,467 g. t.
ARABIA MARU	9,480 g. t.
	(P. 99)

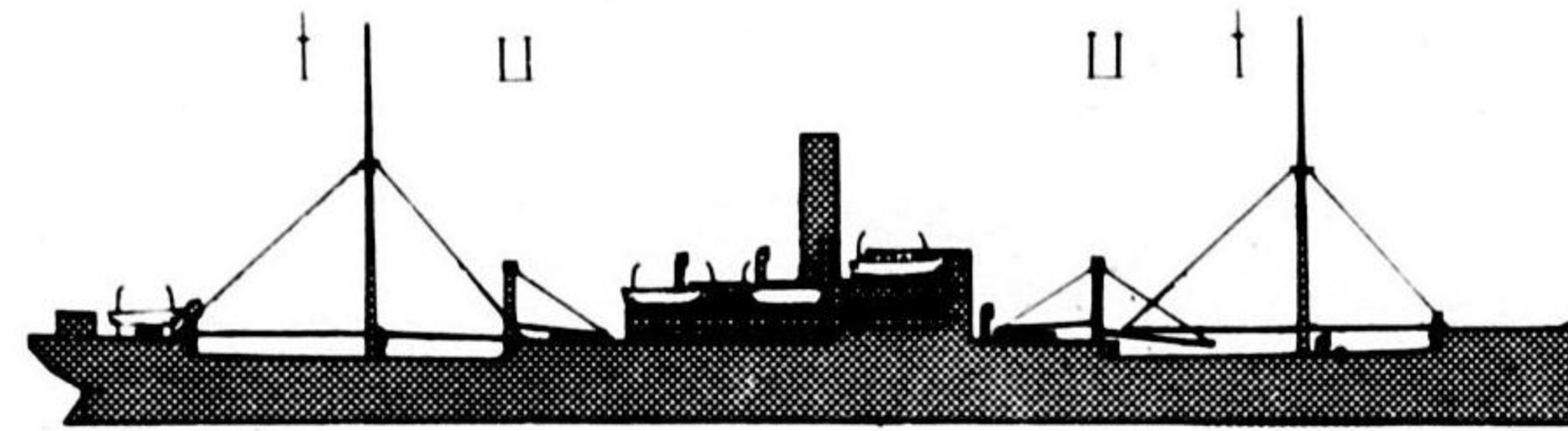


Sister ships



FOX TARE BAKER

SEATTLE MARU	approx. 435' o. a.
	5,773 g. t.
	(P. 172)

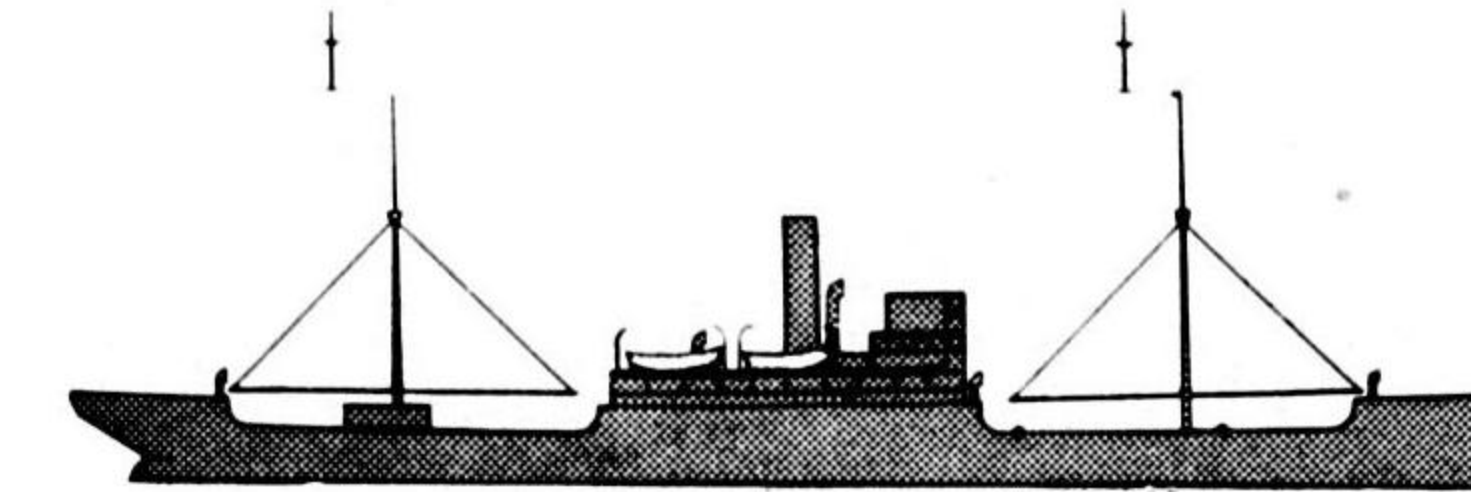


No. 1 L/B high



FOX TARE CHARLIE

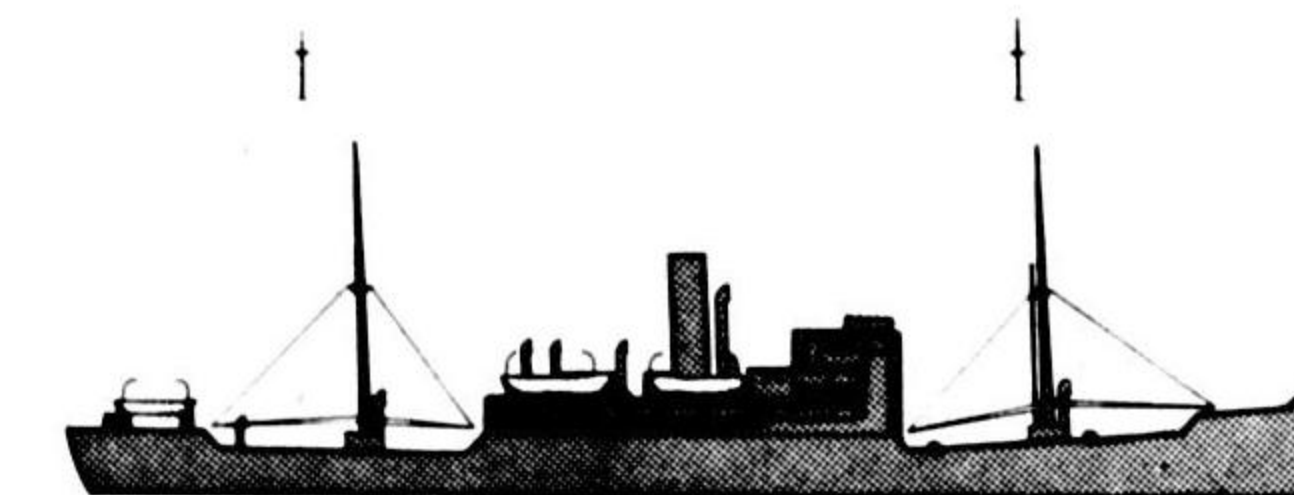
MIKASA MARU	approx. 350' o. a.
	3,143 g. t.
	(P. 137)



Winch-house at mainmast



RYUKO MARU	approx. 310' o. a.
	2,962 g. t.
	(P. 107)



L/B on poop deck

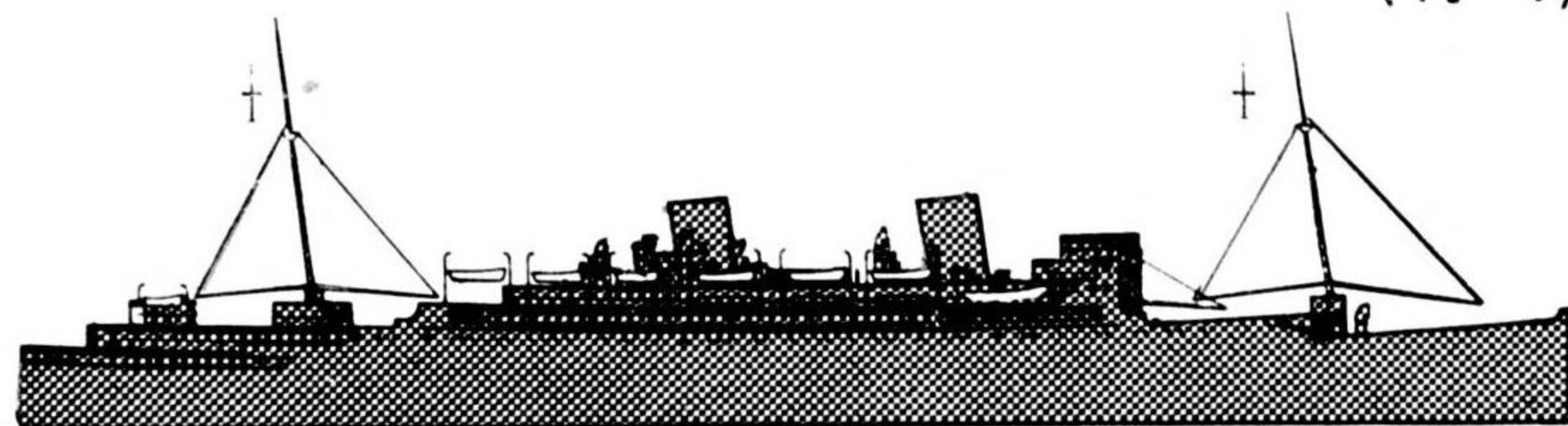


TRANSPORTS

TARE ABLE 2 STACKS

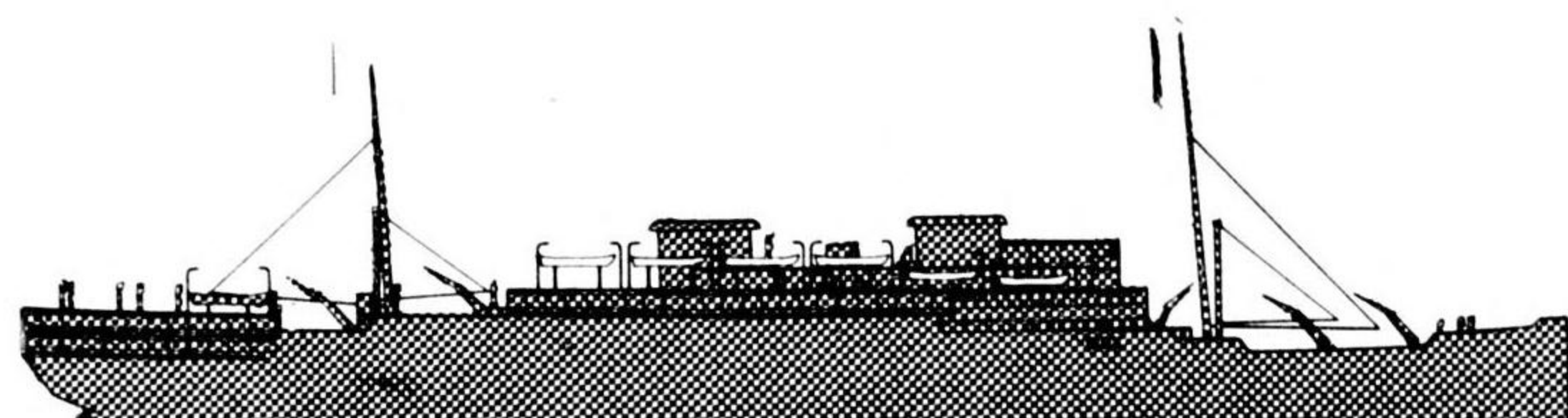
7-6 L/B

ASAMA MARU Class	584' o. a.
	16,975 t. t.
	(P. 1)

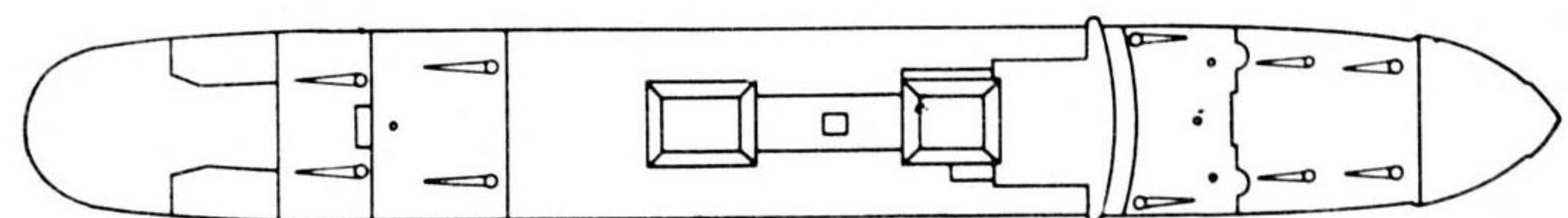


7 L/B

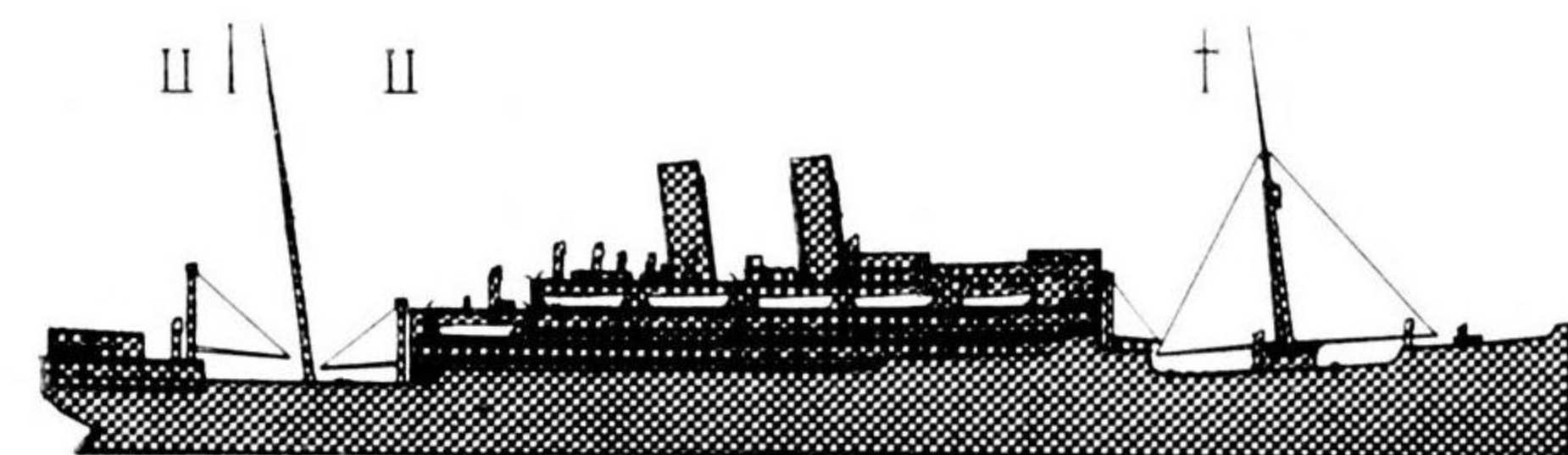
TEIA MARU	approx. 574' o. a.
(ex Aramis)	17,537 g. t.
	(P. 17)



Square stacks
6 L/B



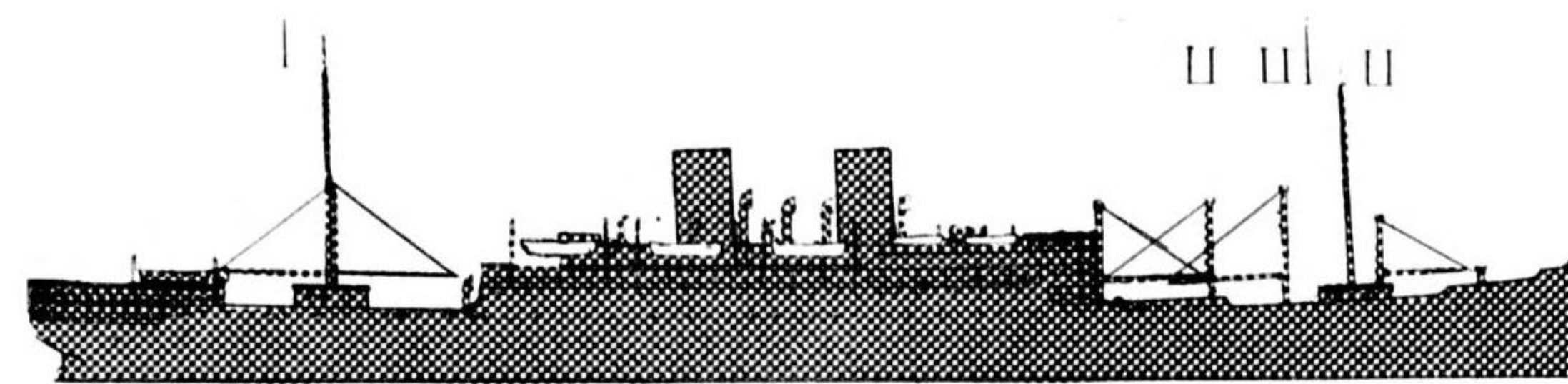
HORAI MARU	approx. 470' o. a.
	9,192 g. t.
	(P. 14)



K on poop deck
6 L/B

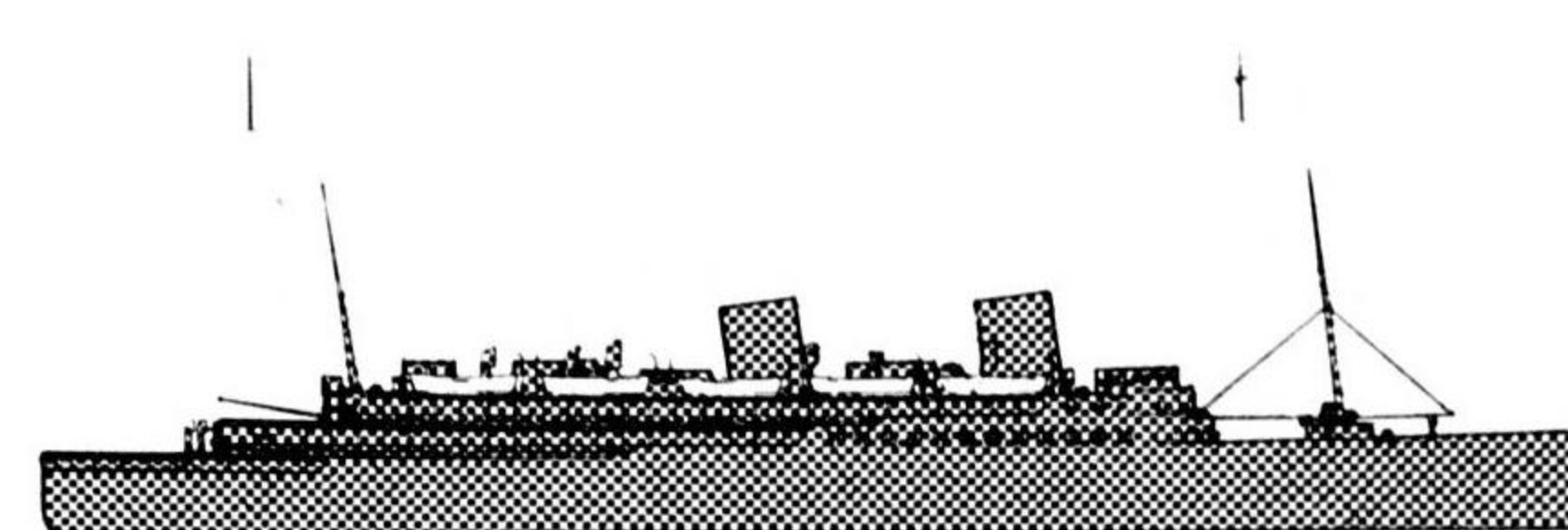
5 L/B

TEIKYO MARU	approx. 565' o. a.
(ex-D'ARTAGNAN)	15,105 g. t.
	(P. 16)

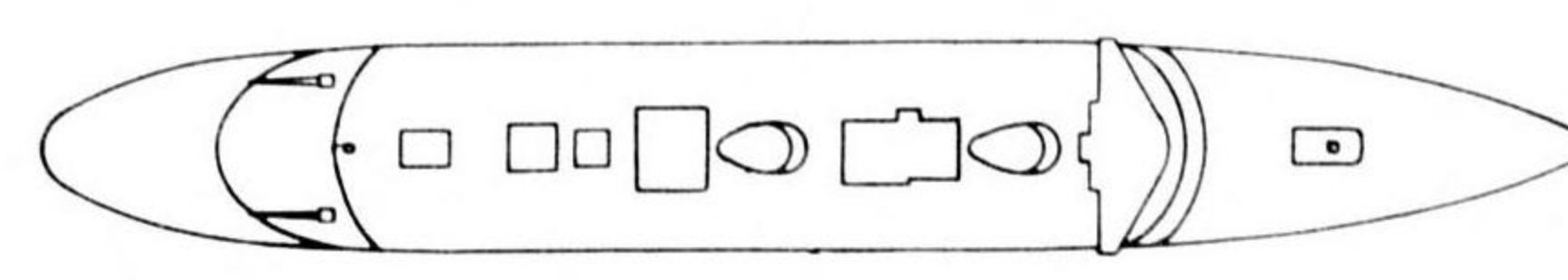


KMKK on foredeck

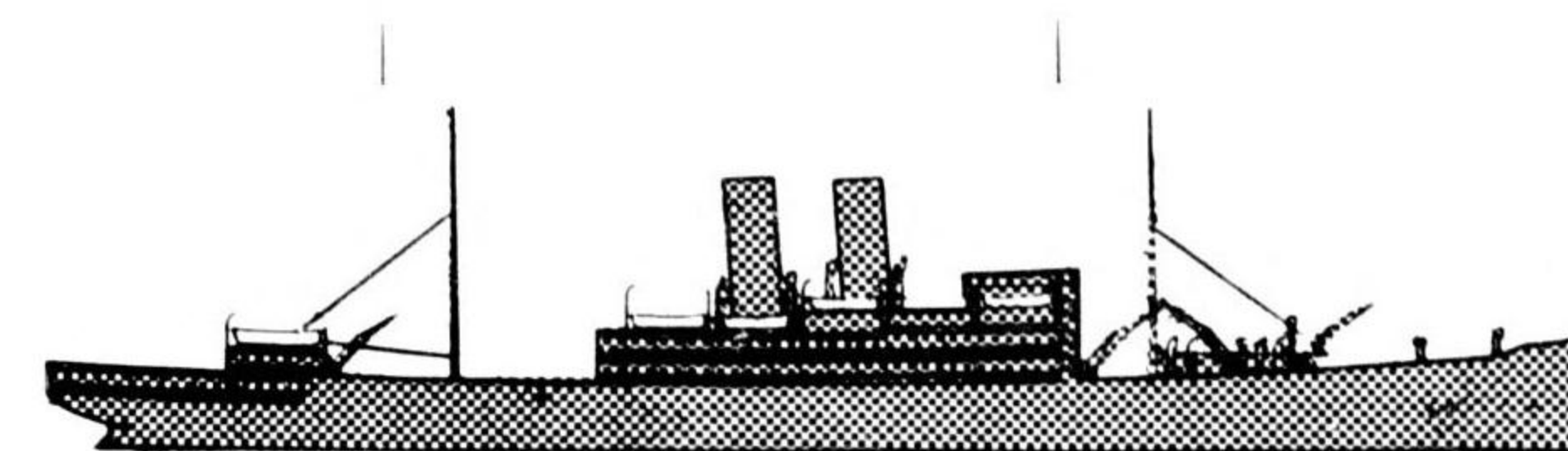
KOAN MARU Class	440' o. a.
	7,080 g. t.
	(P. 2)



mainmast on superstructure a-
baft No. 5 L/B



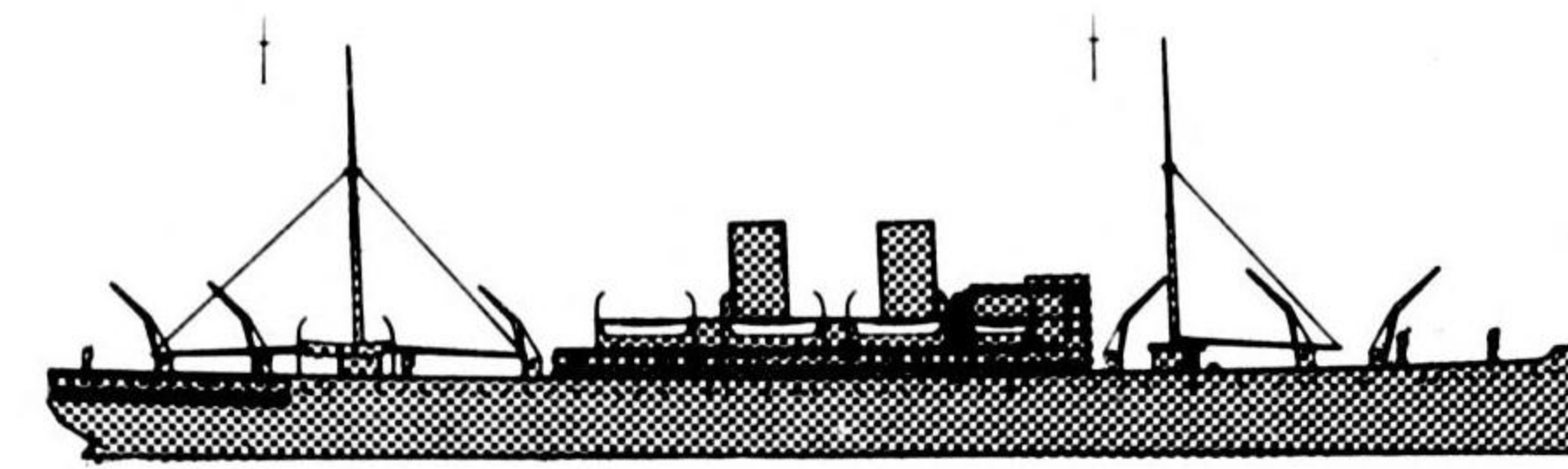
TEIRITSU MARU	approx. 475' o. a.
(ex Leconte De Lisle)	9,877 g. t.
	(P. 18)



Flush deck
Cranes forward and aft

4 L/B

TEI----? MARU	approx. 480' o. a.
(ex Bernardin De St. Pierre)	10,086 g. t.
	(P. 18)

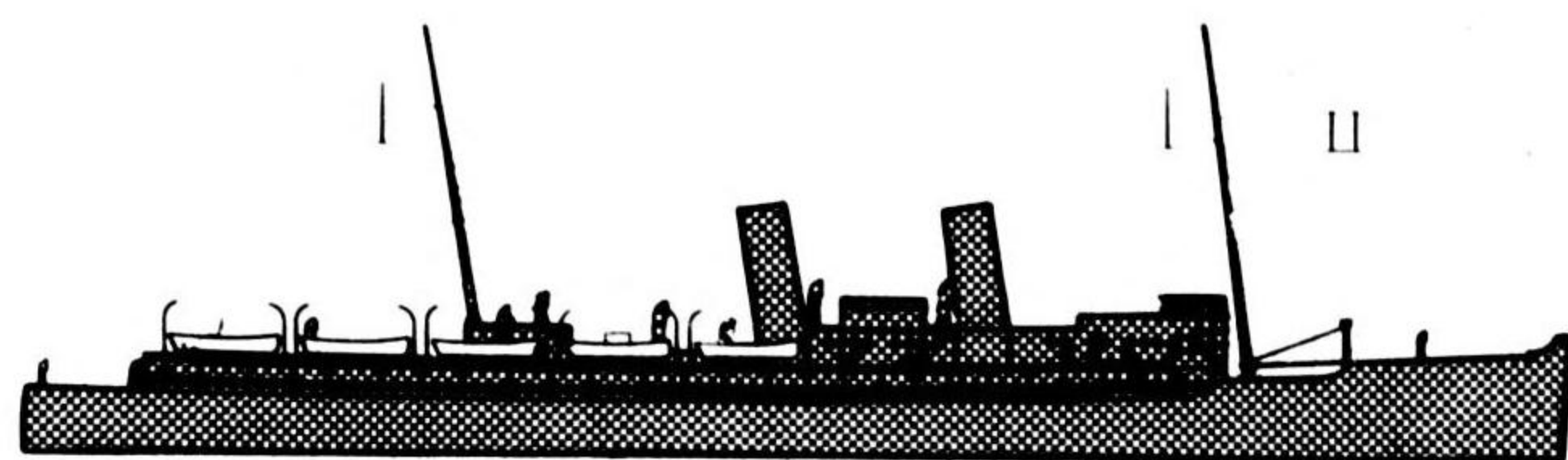


Flush deck
Cranes forward and aft

TRANSPORTS
TARE BAKER 2 STACKS

5-4 L/B

KEIFUKU MARU Class approx. 365' o.a.
3,500 g.t.
(P. 7)

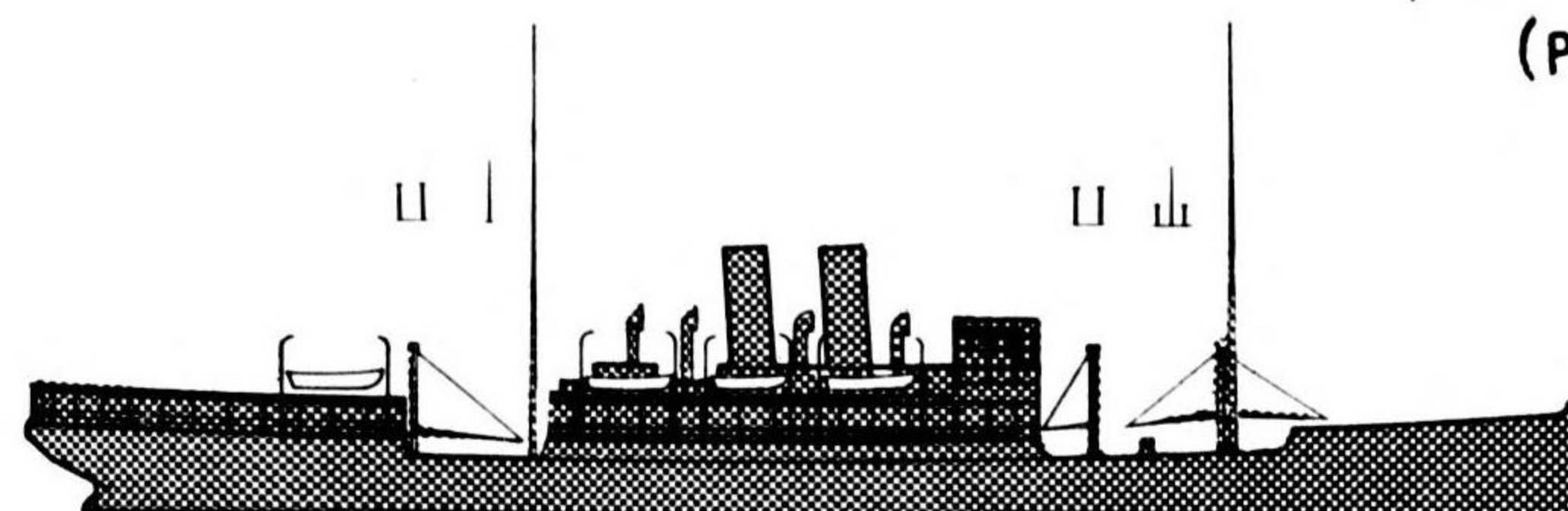


5 L/B, all abaft No. 2 stack



3 L/B

TAIZAN MARU approx. 400 o.a.
3,935 g.t.
(P. 15)

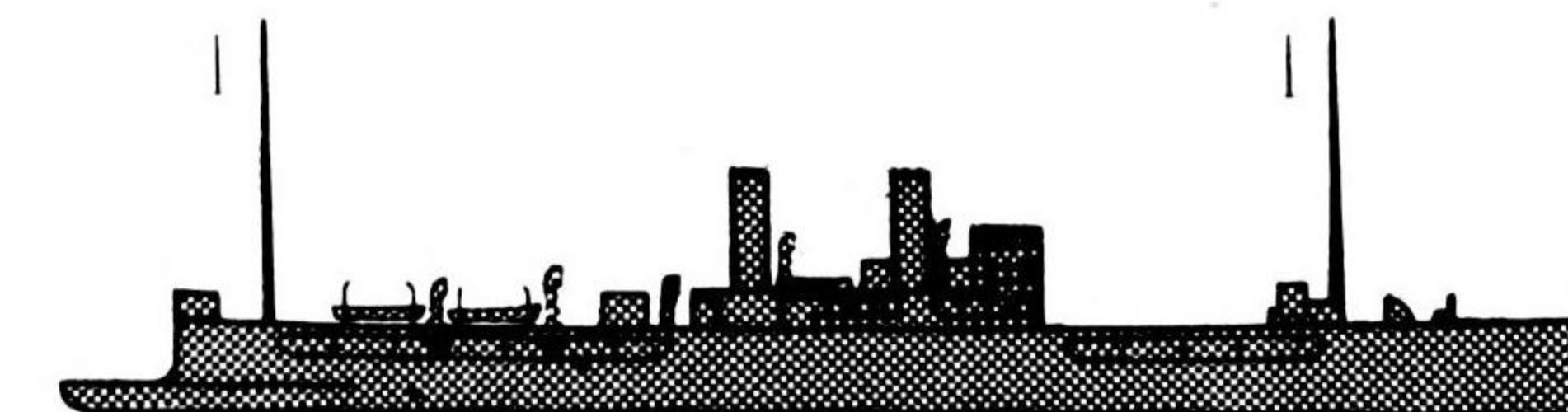


MK forward of bridge

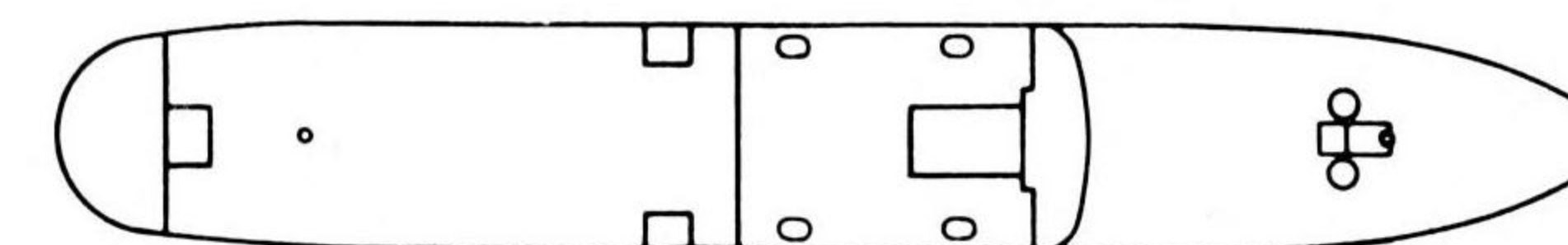


2 L/B

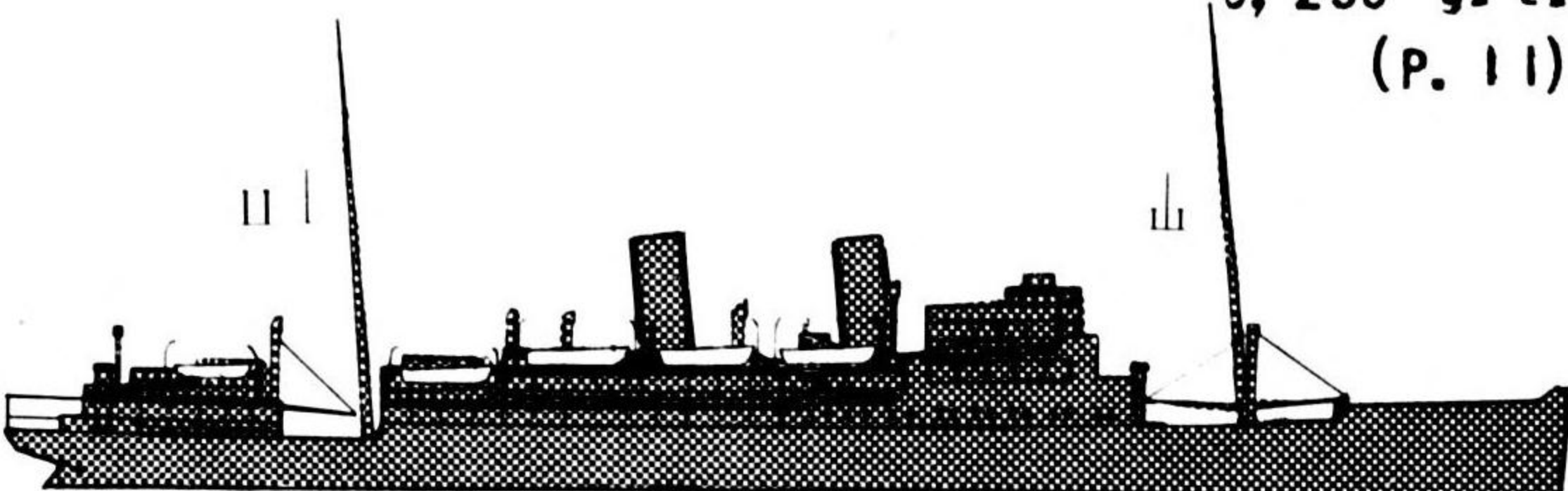
SEIKAN MARU NO.3 approx. 370' o.a.
2,787 g.t.
(P. 10)



Four stacks



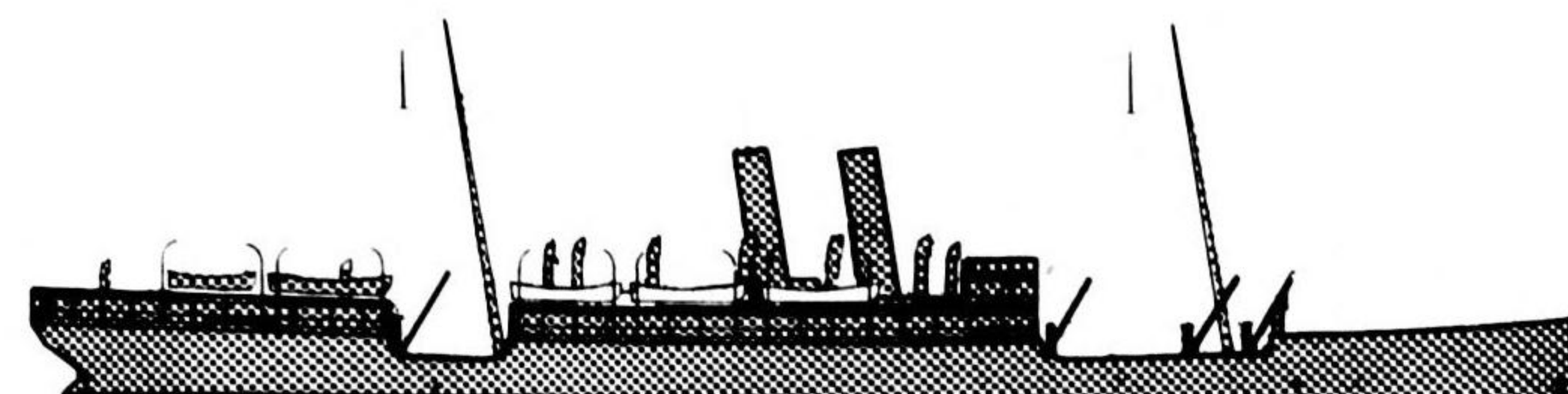
SHANGHAI MARU approx. 425' o.a.
5,259 g.t.
(P. 11)



4 L/B
Stepped Superstructure forward



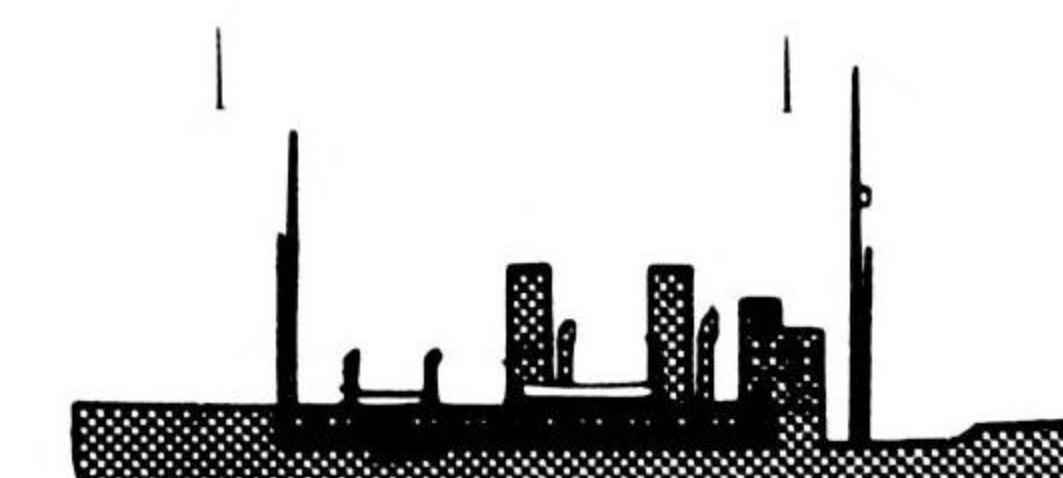
HARADA MARU approx. 400' o.a.
4,109 g.t.
(P. 13)



Foremast at break in forecastle



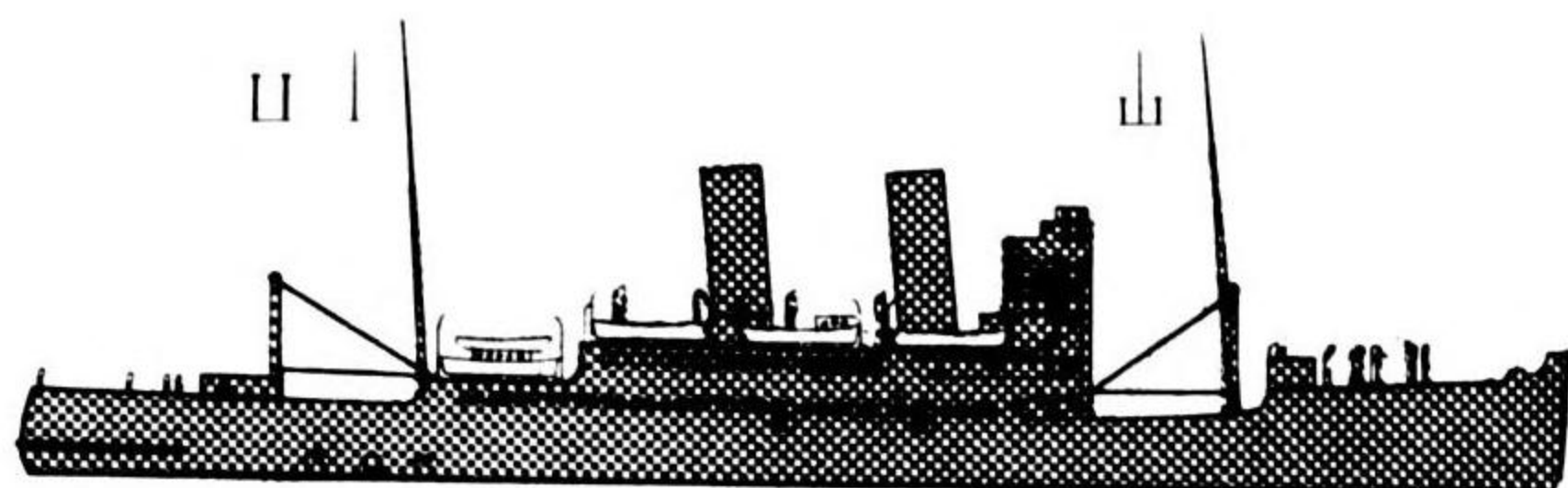
OTOMARI approx. 205' o.a.
2,300 g.t.
(P. 4)



Foremast just forward of bridge



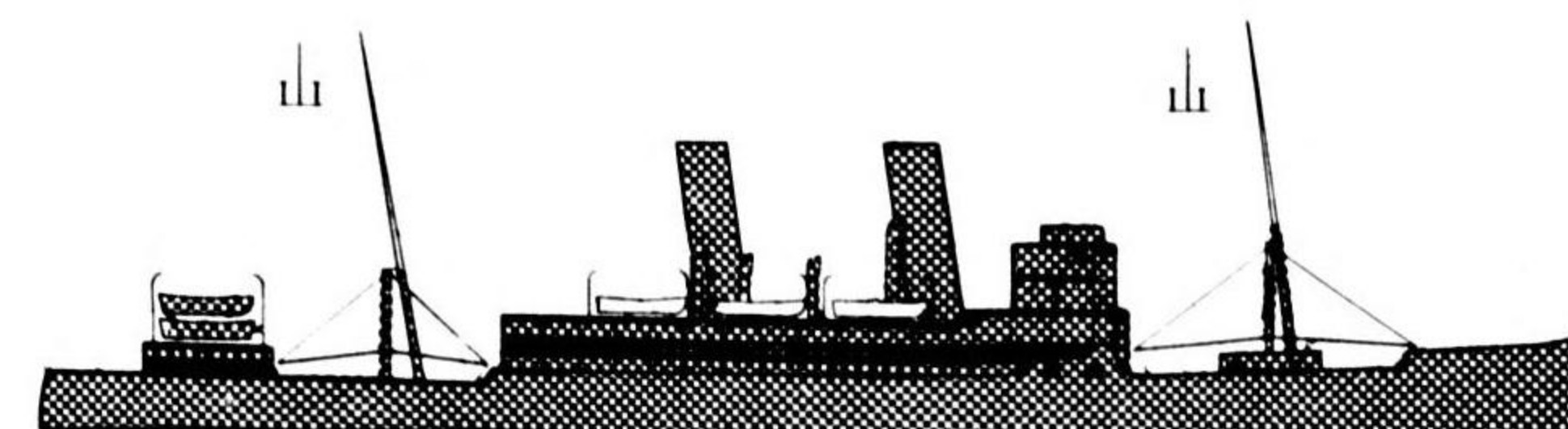
ANIWA MARU 327' o.a.
3,391 g.t.
(P. 5)



4 L/B
Foremast close to forecastle



DAIREN MARU Class approx. 365' o.a.
3,850 g.t.
(P. 3)



Mainmast well abaft superstructure



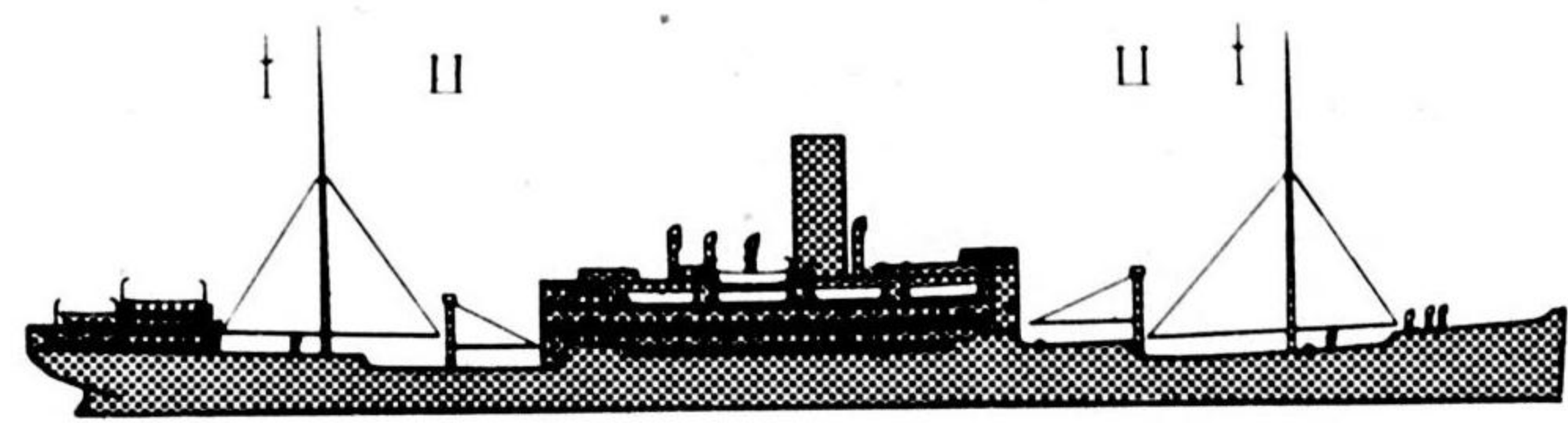
~~CONFIDENTIAL~~

TRANSPORTS

TARE ABLE (4 MK)

2 MK FORWARD, 2 AFT

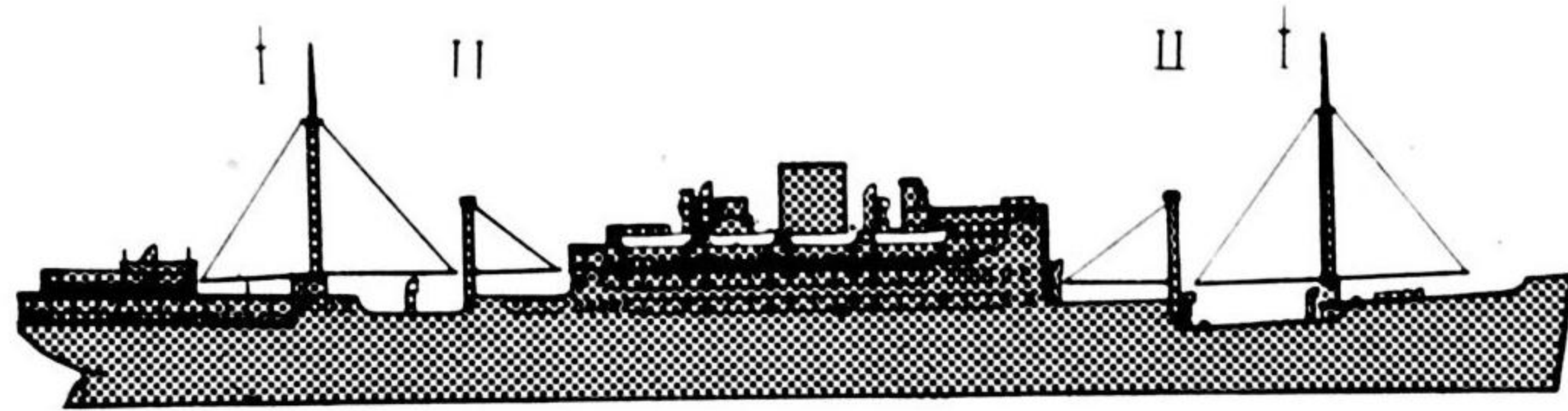
HAKONE MARU Class	515' o. a.
	10,400 g. t.
	(P. 57)



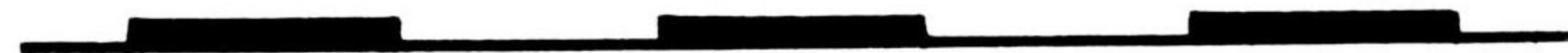
MKFKM
4 L/B
Foremast abaft break in fore-
castle



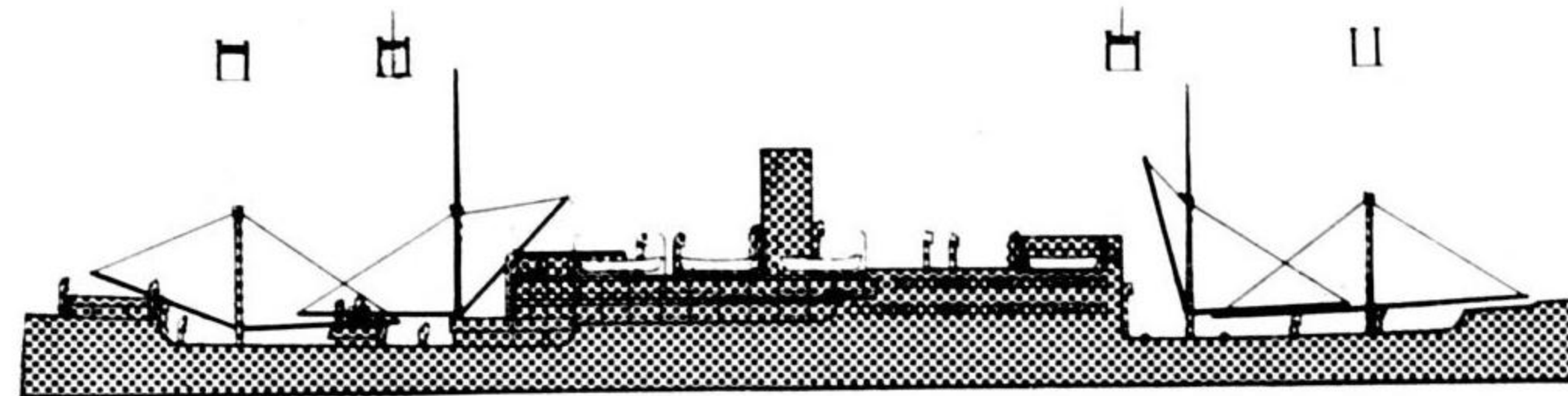
YASUKUNI MARU	531' o. a.
	11,930 g. t.
	(P. 62)



Foremast at break of forecastle
Storm deck forward and aft of
superstructure



KACHIDOKI MARU (Ex-President Harrison)	522' o. a.
	10,509 g. t.
	(P. 43)

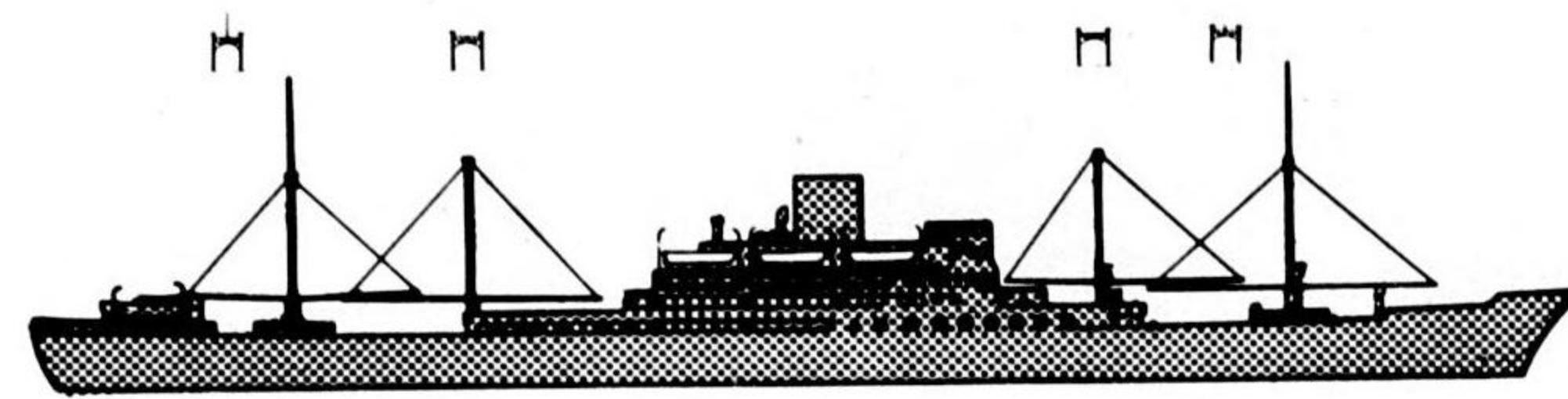


KK_TFK_TK
4 L/B, with wide gap between
Nos. 1 and 2

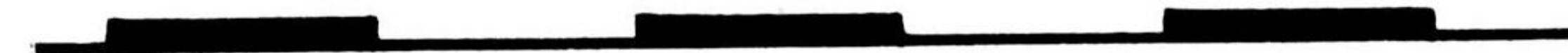


2 MK FORWARD, 2 AFT

AIKOKU MARU Class	527' o. a.
	10,400 g. t.
	(P. 48)

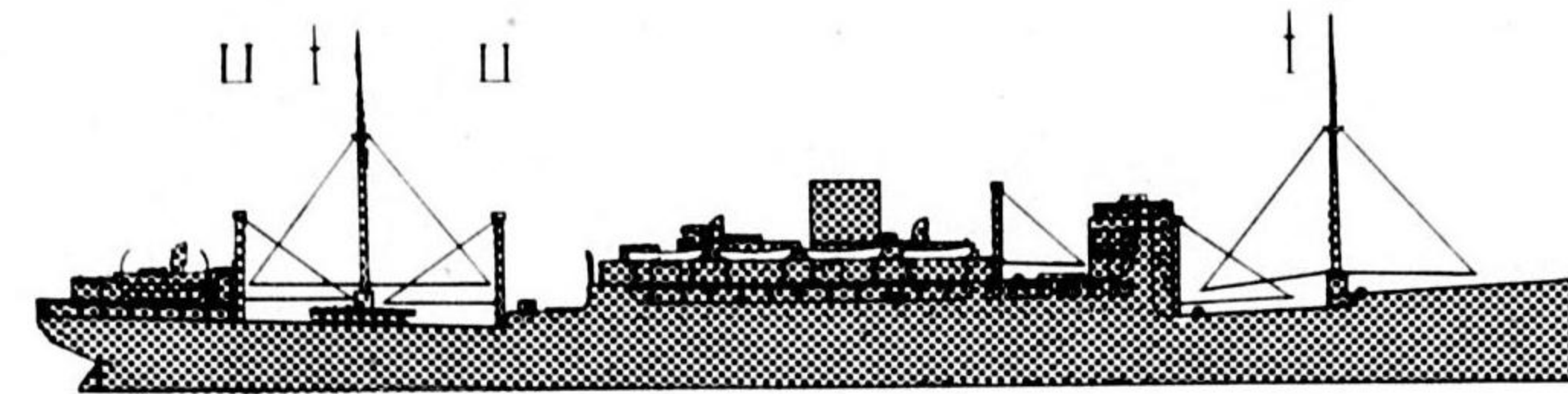


3 L/B
K_TKFKK_T (Note: nos. 2 and 3 king-
posts removed from GOKOKU MARU)



1 MK FORWARD, 3 AFT

HEINAN MARU Class	535' o. a.
	11,610 g. t.
	(P. 61)



MFKMK
Note hatch abaft bridge
4 L/B

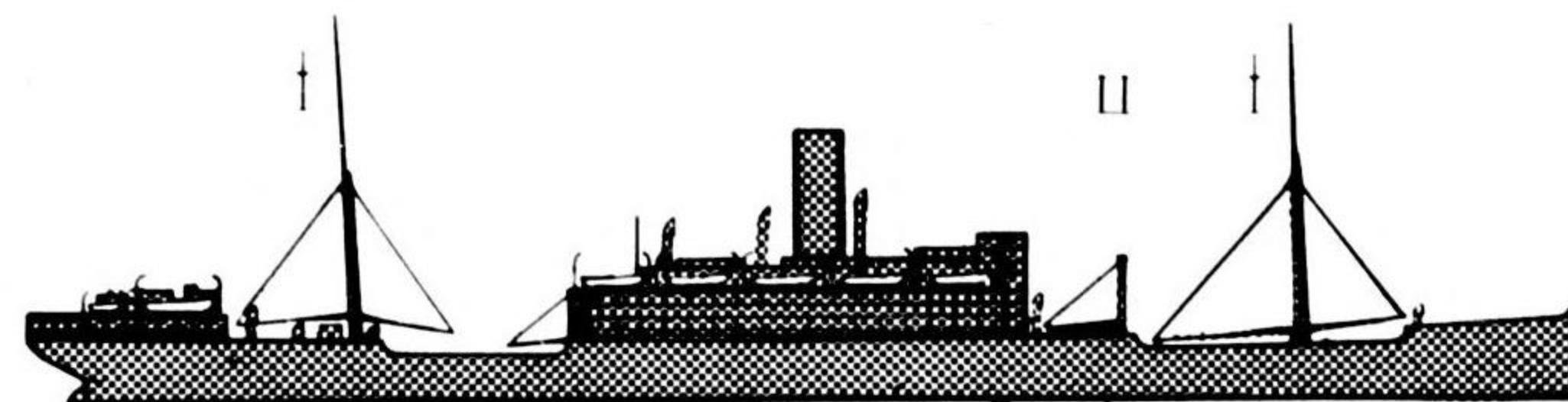


TRANSPORTS

TARE ABLE (3 MK—2 FORWARD, 1 AFT)

5 L/B

FUSHIMI MARU Class approx. 530' o.a.
10,800 g.t.
(P. 51)



Storm deck forward of super-structure



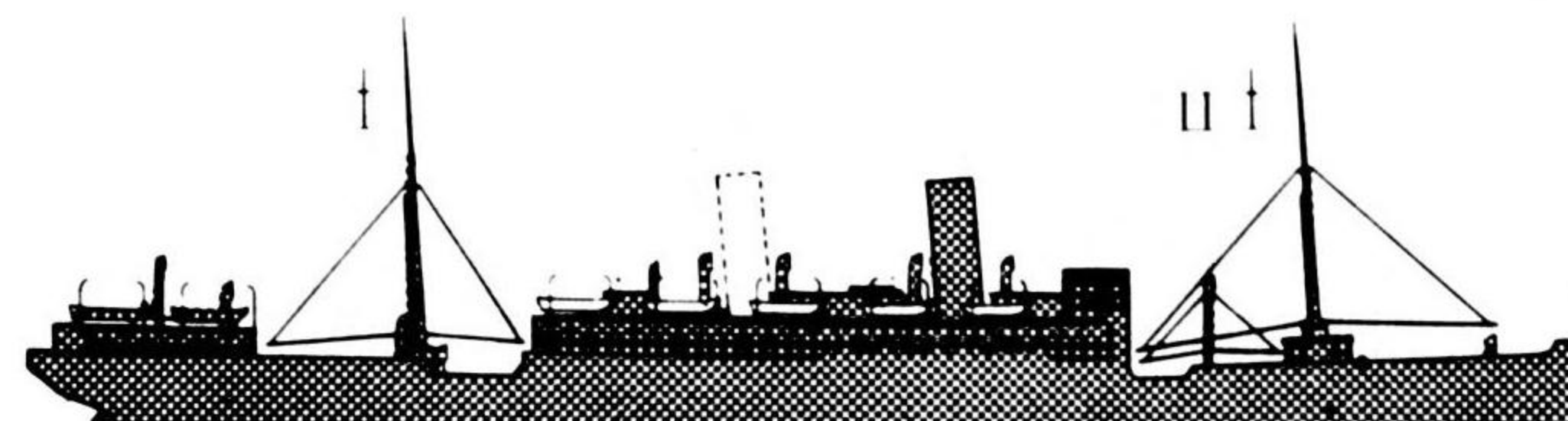
RAKUYO MARU 477' o.a.
9,419 g.t.
(P. 53)



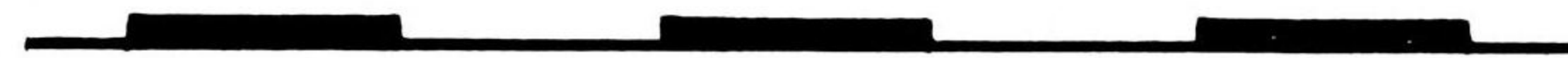
L/B's on two levels
Winch houses at foremast and mainmast



YAMATO MARU approx. 535' o.a.
9,656 g.t.
(P. 55)

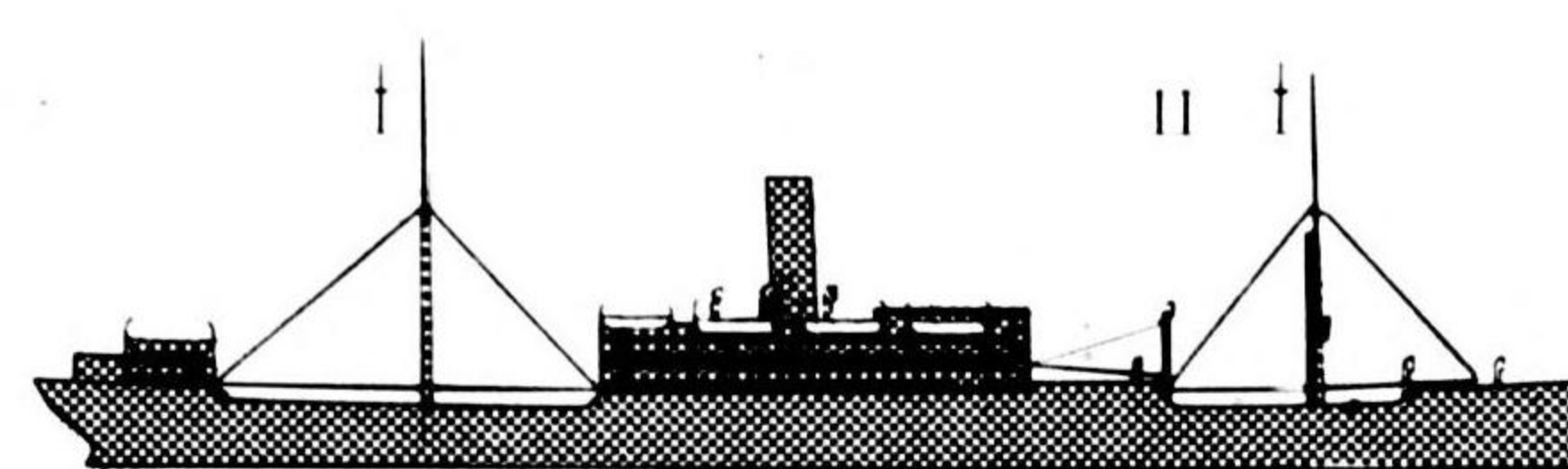


Foremast and kingposts on long forecastle
Stack well forward on super-structure



4 L/B

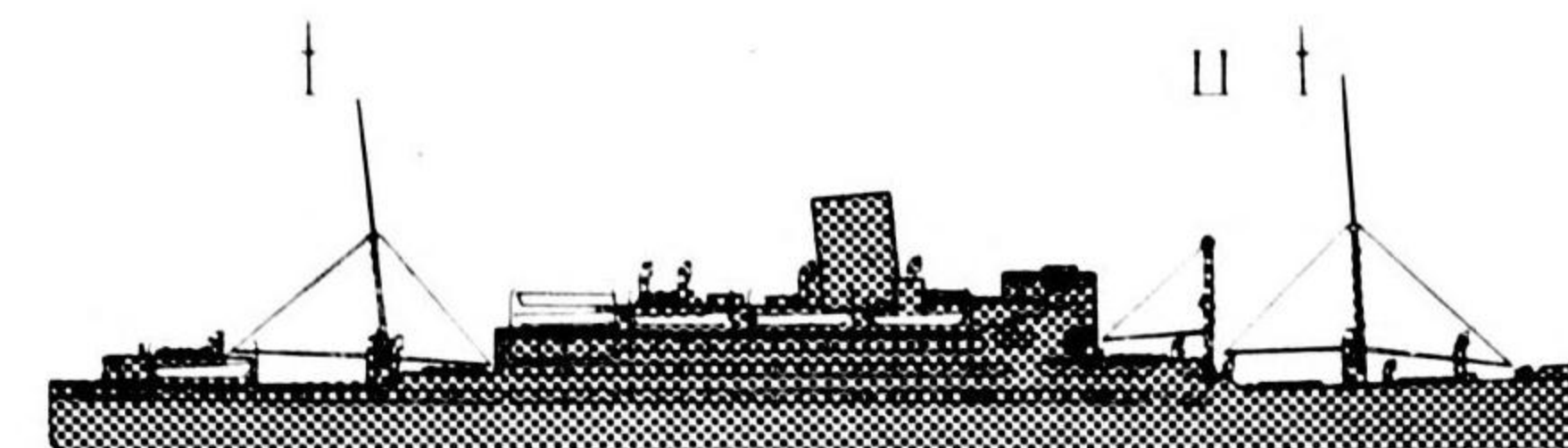
TANGO MARU approx. 465' o.a.
6,893 g.t.
(P. 54)



Storm deck forward of bridge
1 L/B on poop deck



FUJI MARU approx. 460' o.a.
9,138 g.t.
(P. 44)

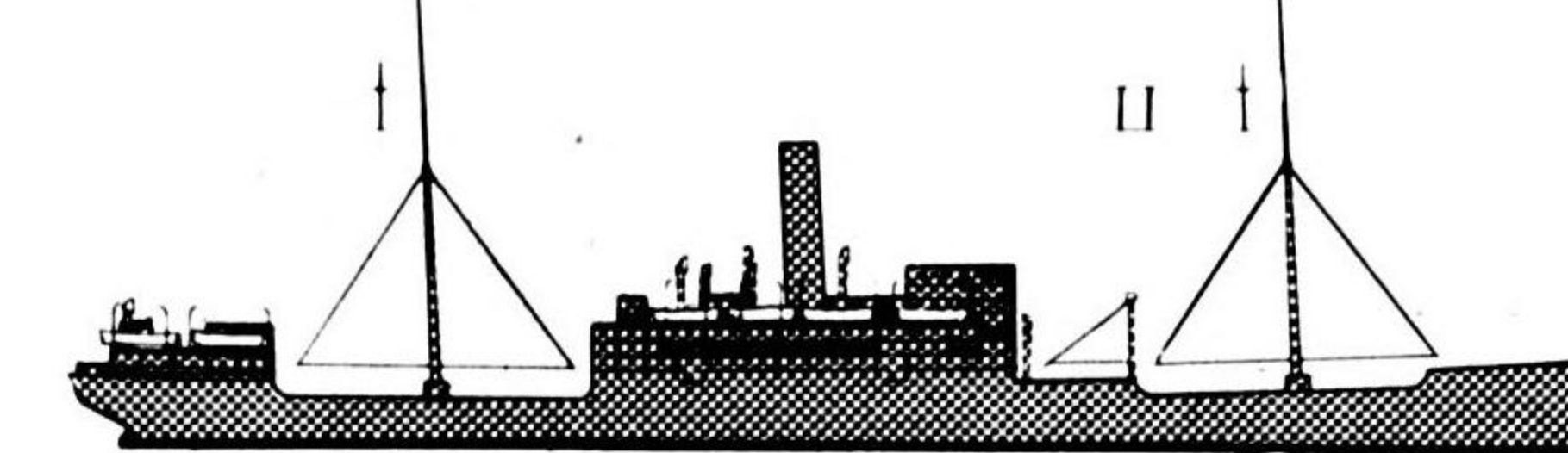


Storm decks forward and aft
1 L/B on poop deck
No forecastle deck



4 L/B

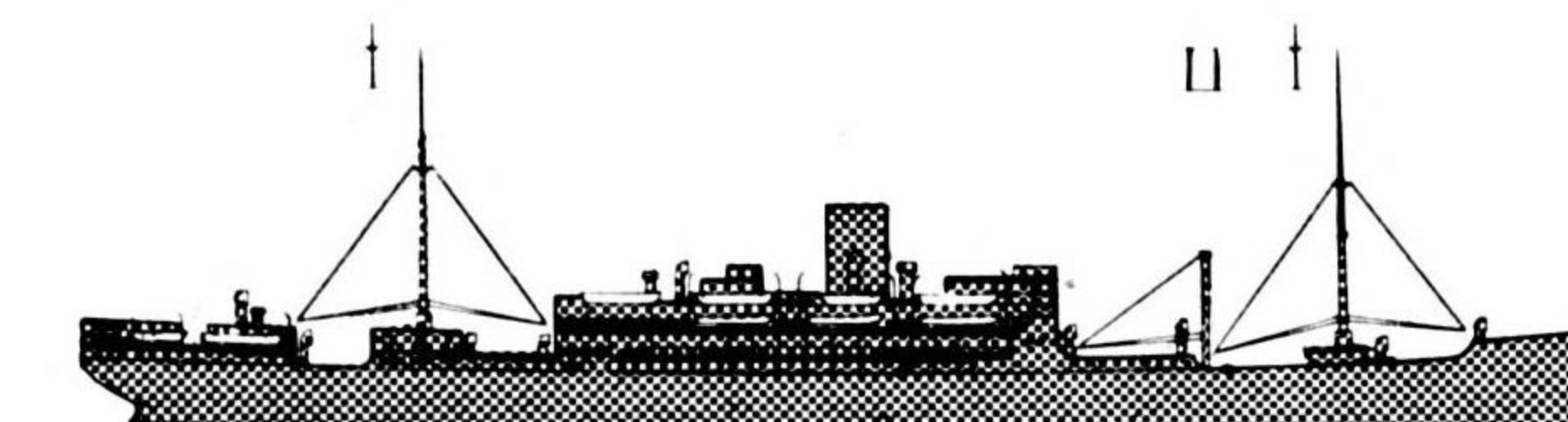
ATSUTA MARU Class 474' o.a.
7,970 g.t.
(P. 52)



Storm deck forward of bridge
2 L/B on poop deck



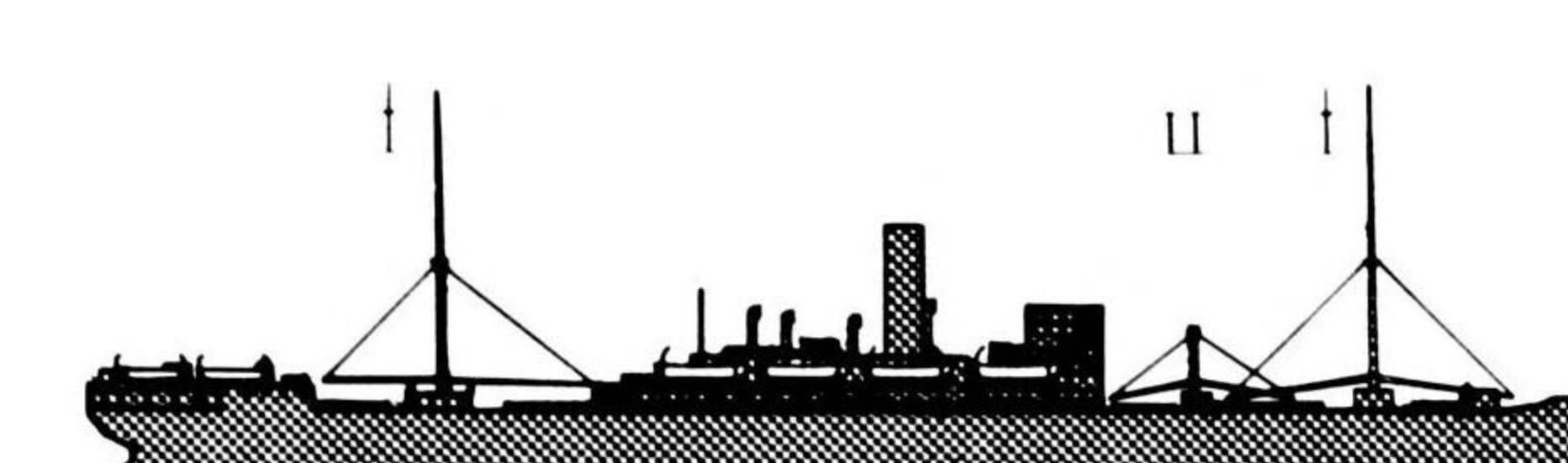
HEIYO MARU 482' o.a.
9,815 f.t.
(P. 60)



Storm decks forward and aft
2 L/B on poop deck



ANYO MARU approx. 480' o.a.
9,257 g.t.
(P. 68)



No storm decks
2 L/B on poop deck

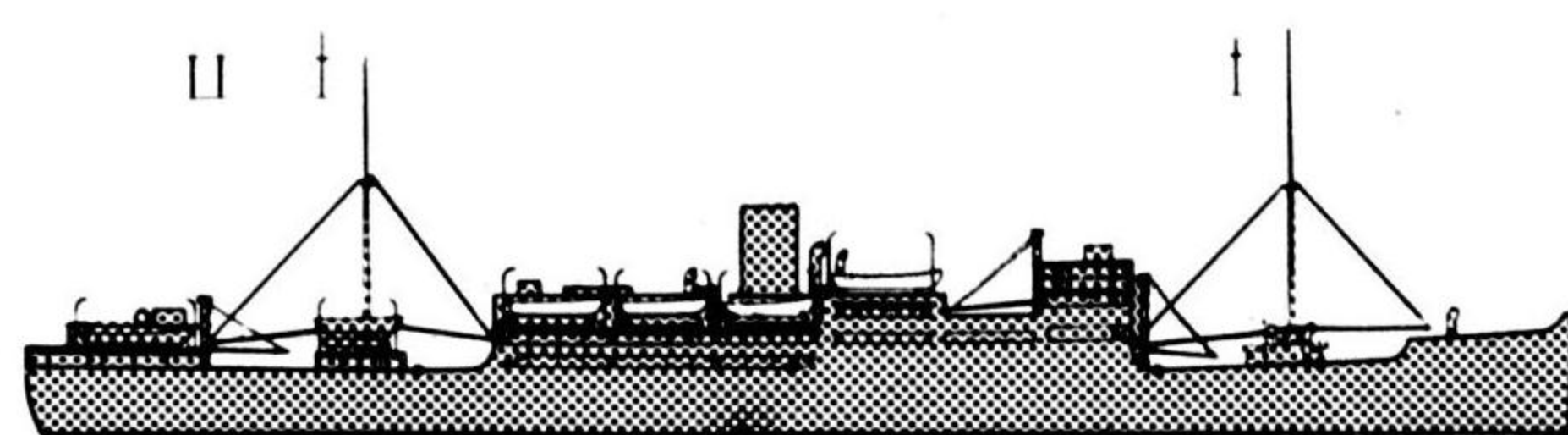


TRANSPORTS

TARE ABLE (3-2 MK)

3 MK-1 FORWARD, 2 AFT

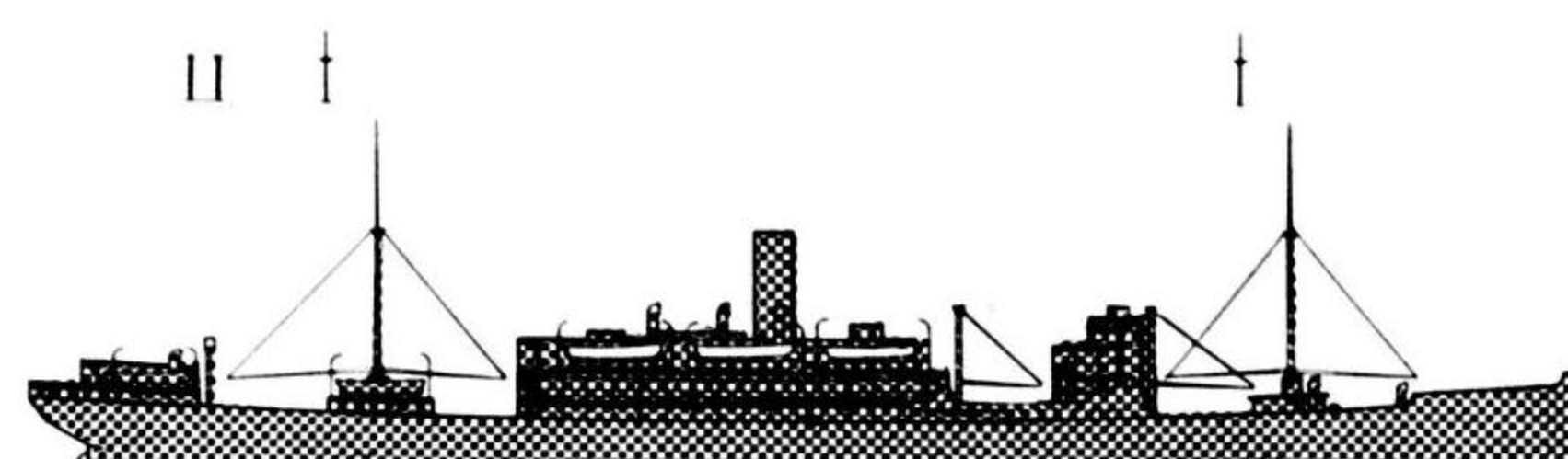
RIO DE JANEIRO MARU approx. 480' o.a.
9,627 g.t.
(P. 45)



4 L/B
Hatch abaft bridge



KANJU MARU Class 449' o.a.
7,267 g.t.
(P. 50)

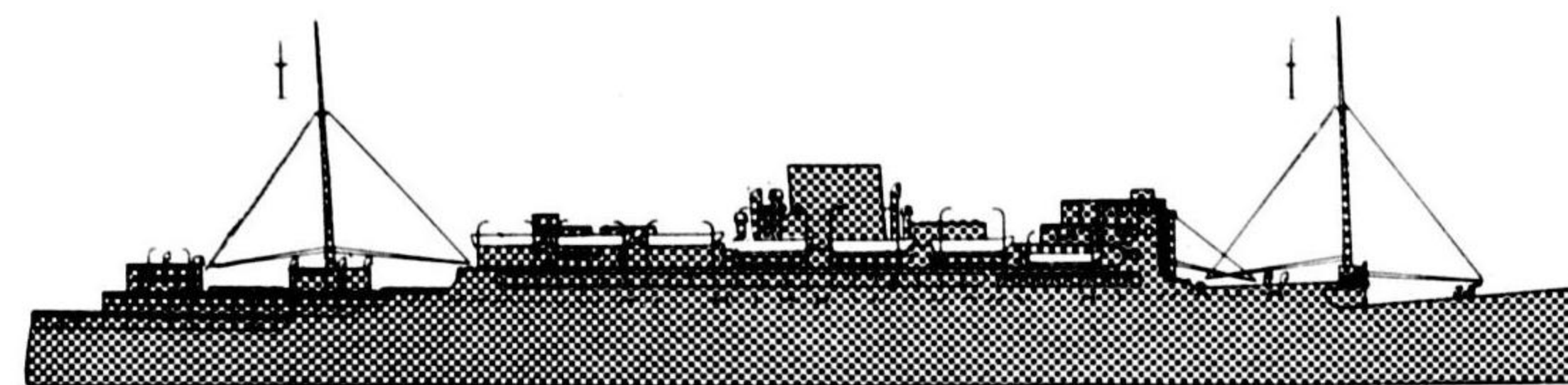


3 L/B
Hatch abaft bridge



2 MK

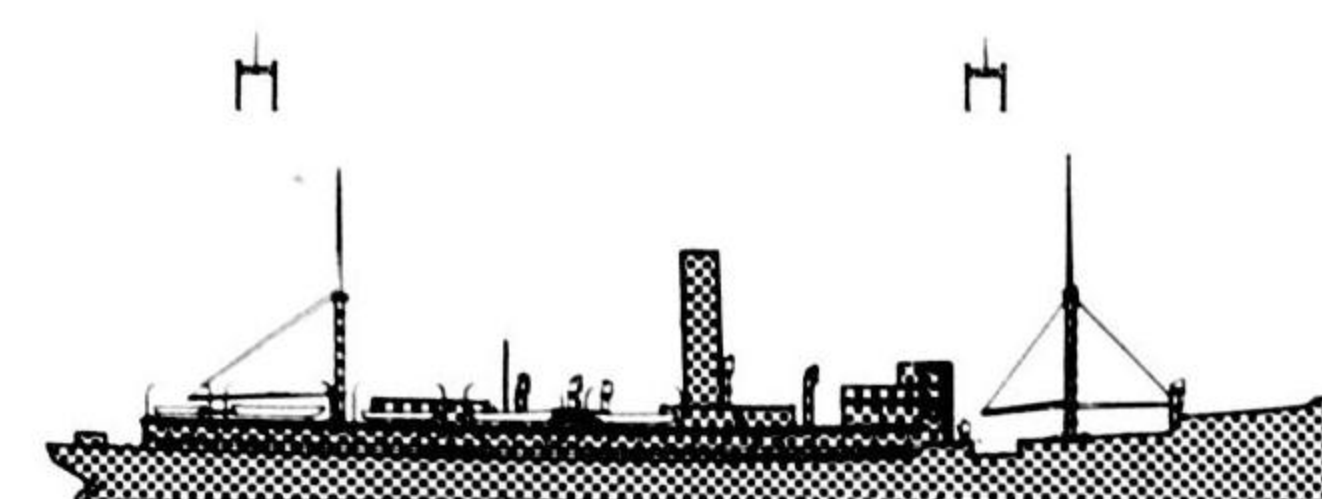
KAMAKURA MARU 583' o.a.
17,526 g.t.
(P. 20)



7 L/B



MANSHU MARU Class approx. 340' o.a.
3,054 g.t.
(P. 36)

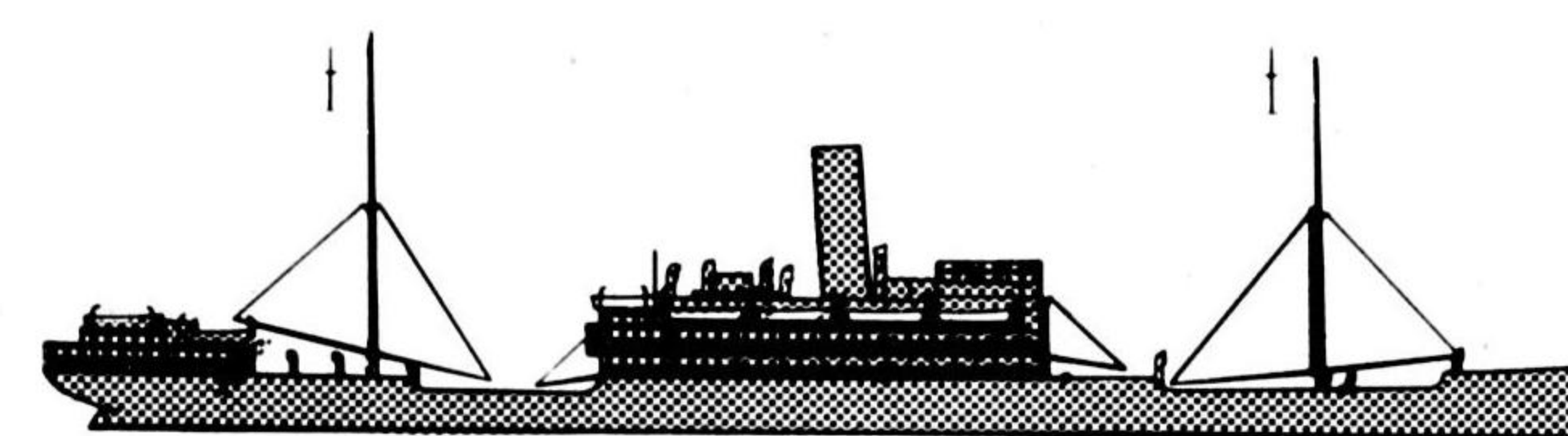


5 L/B
K_T forward and aft



2 MK

KASHIMA MARU Class approx. 515' o.a.
9,908 g.t.
(P. 29)



5 L/B



TRANSPORTS
TARE BAKER (MIN. OF 3 MK)

2 L/B

FAUSANG 299' o. a.
2,256 g. t.
(P. 59)

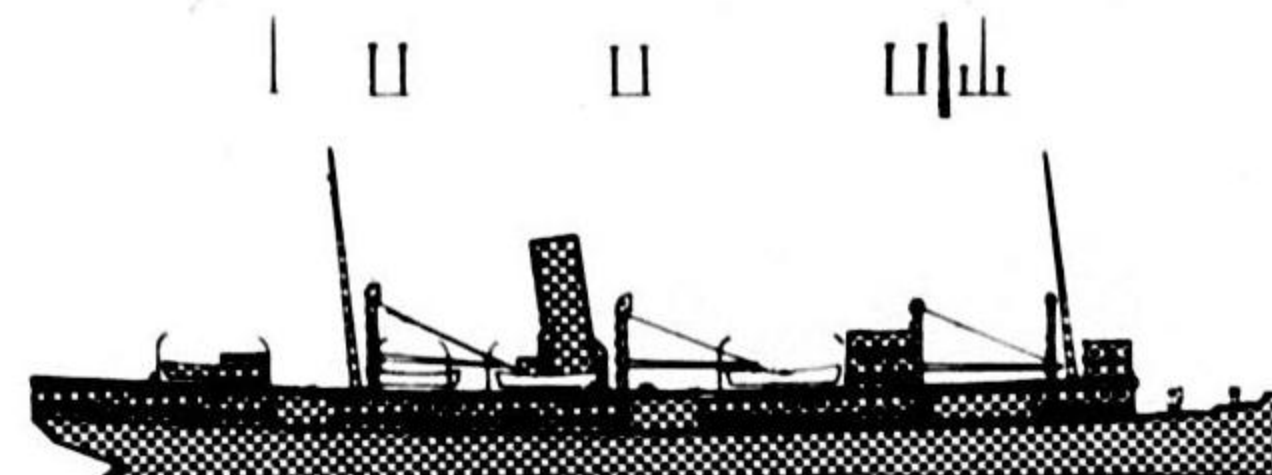


MKFKM



3 L/B

ARIADNE MOLLER approx. 270' o. a.
1,840 g. t.
(P. 59)

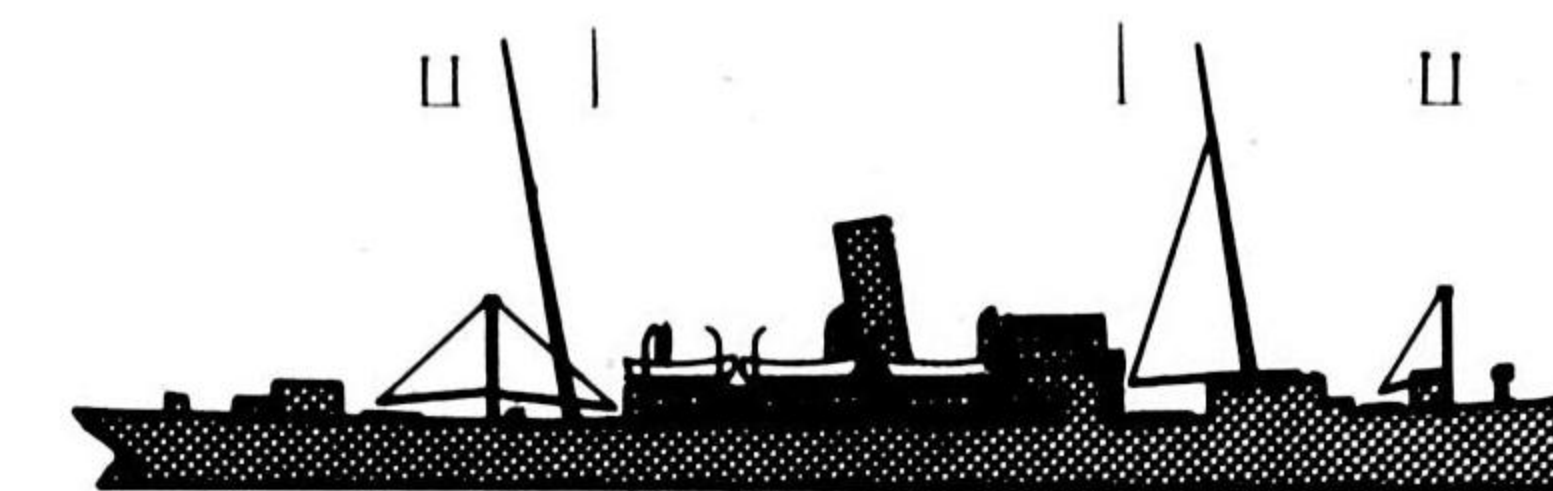


MKKFKM



3 L/B

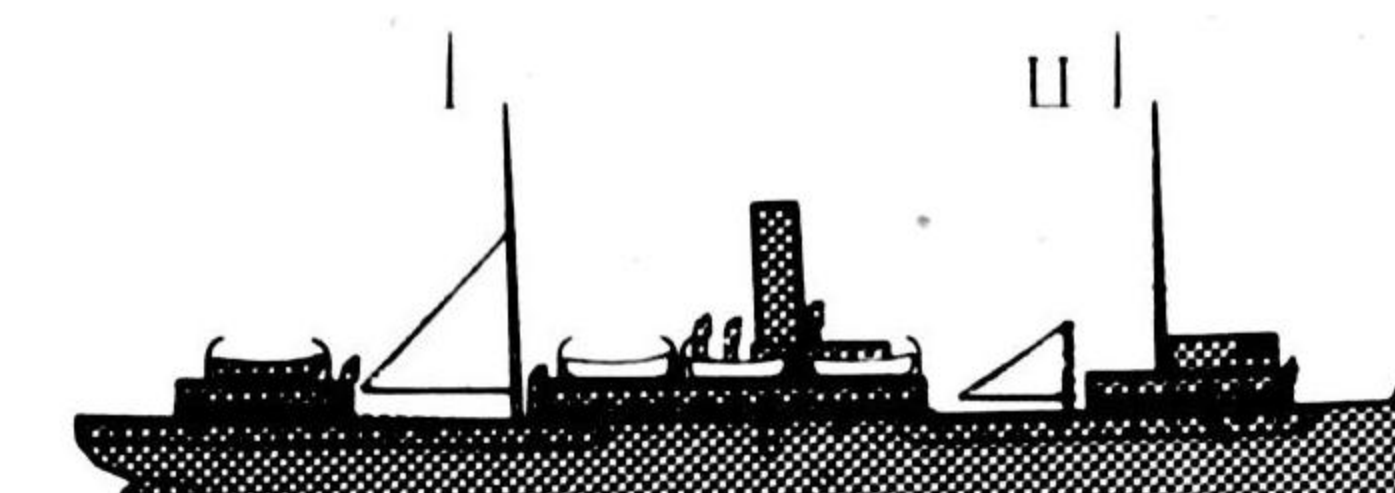
BIFUKU MARU approx. 325' o. a.
2,558 g. t.
(P. 70)



KMFMK



BAKUZAN MARU approx. 295' o. a.
2,104 g. t.
(P. 38)



MKFM
Bridge at forecastle

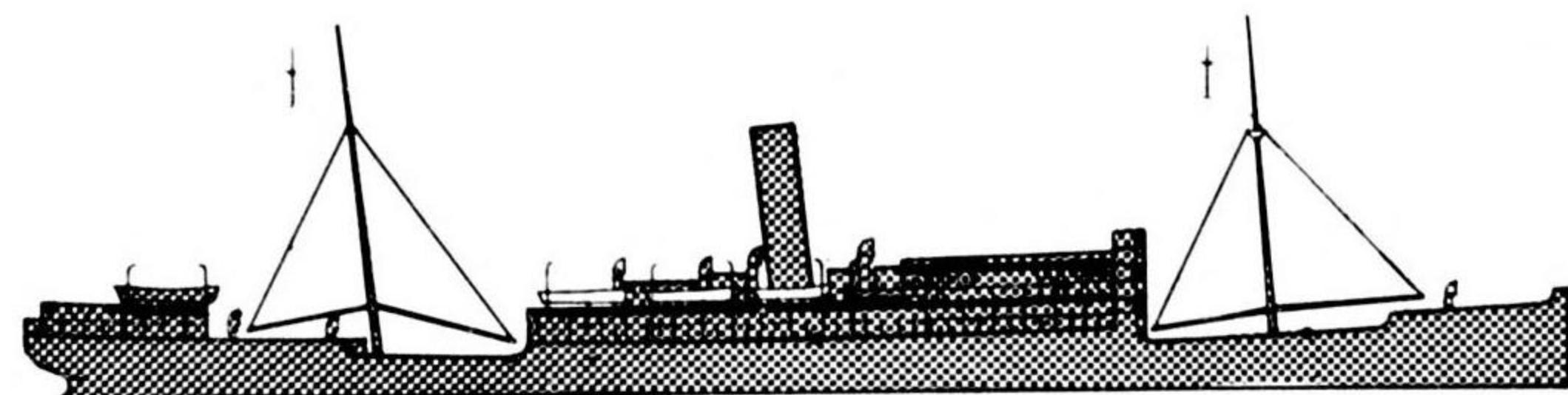


TRANSPORTS

TARE BAKER (2 MK-4 L/B)

MAINMAST CENTERED AFT

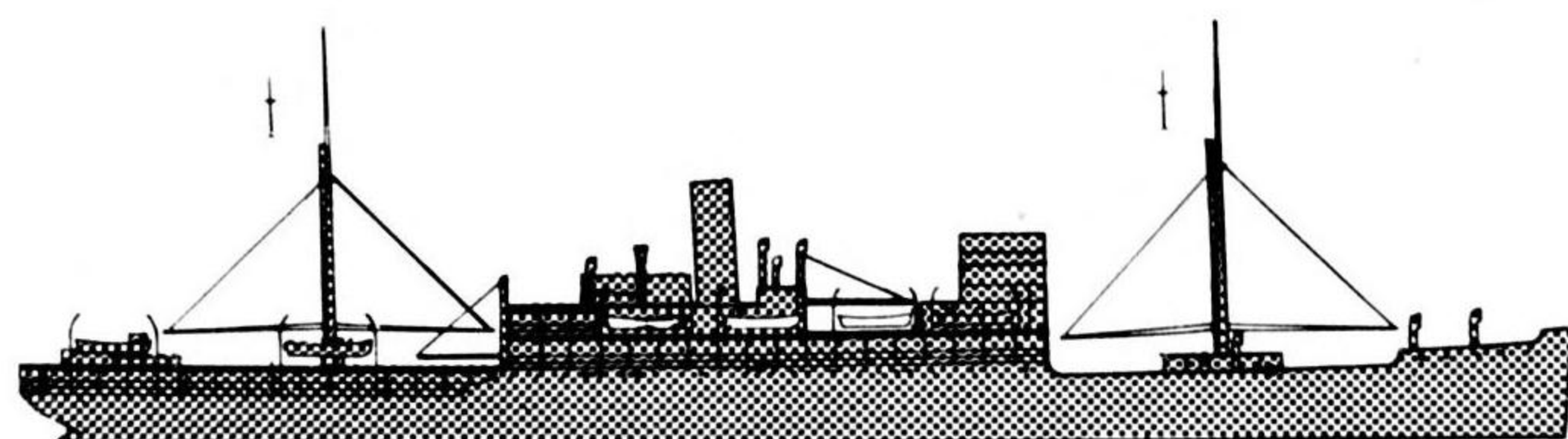
NIKKO MARU approx. 445' o.a.
5,058 g.t.
(P. 31)



Mainmast at break of poop deck



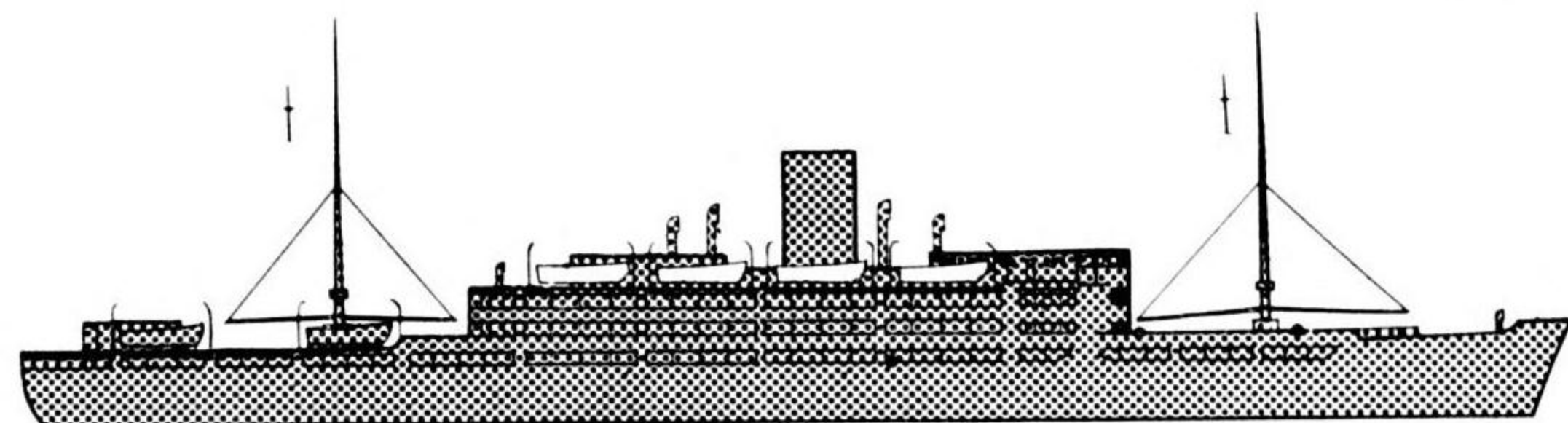
TEIKO MARU approx. 435' o.a.
(Ex-Cap. Varella) 8,009 g.t.
(P. 31)



Hatch abaft bridge
Low kingpost at after end of superstructure



KOKURYU MARU Class 453' o.a.
7,365 g.t.
(P. 24)

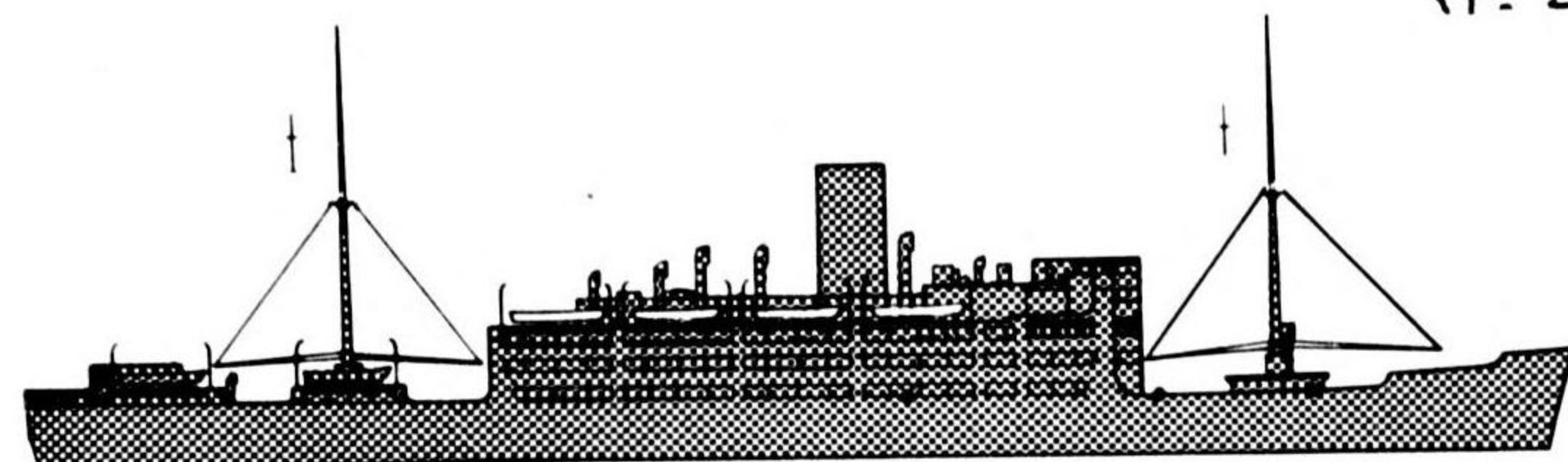


Long storm deck forward of bridge

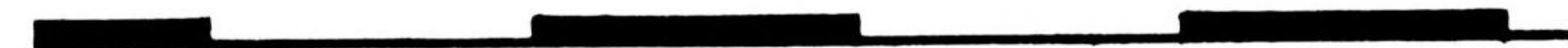


MAINMAST CENTERED AFT

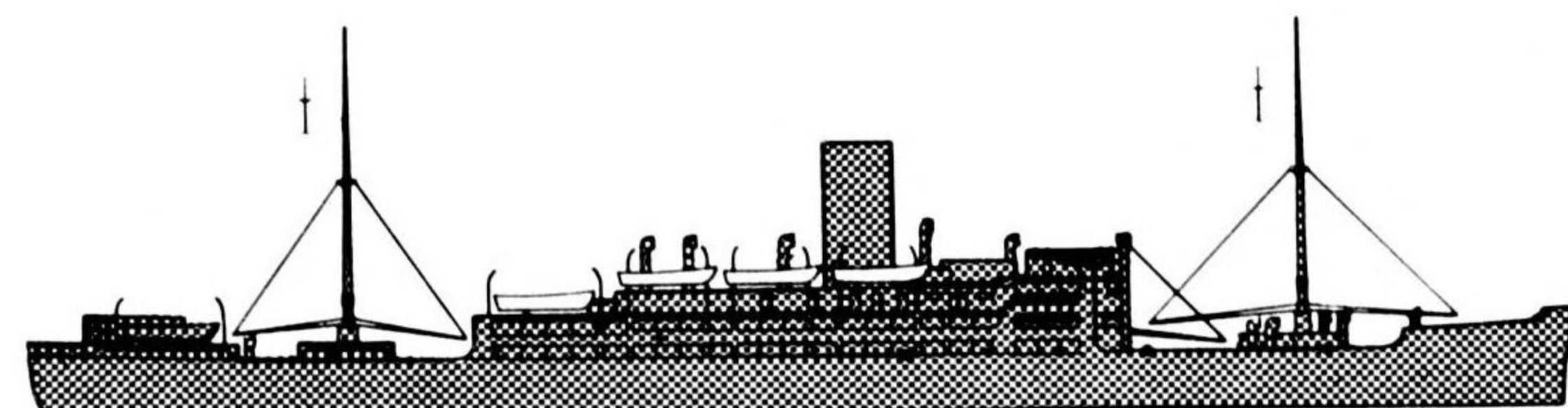
KITSURIN MARU Class 446' o.a.
6,783 g.t.
(P. 23)



Winch houses at foremast and mainmast
L/B athwart mainmast



TAKACHIHO MARU 473' o.a.
8,154 g.t.
(P. 21)

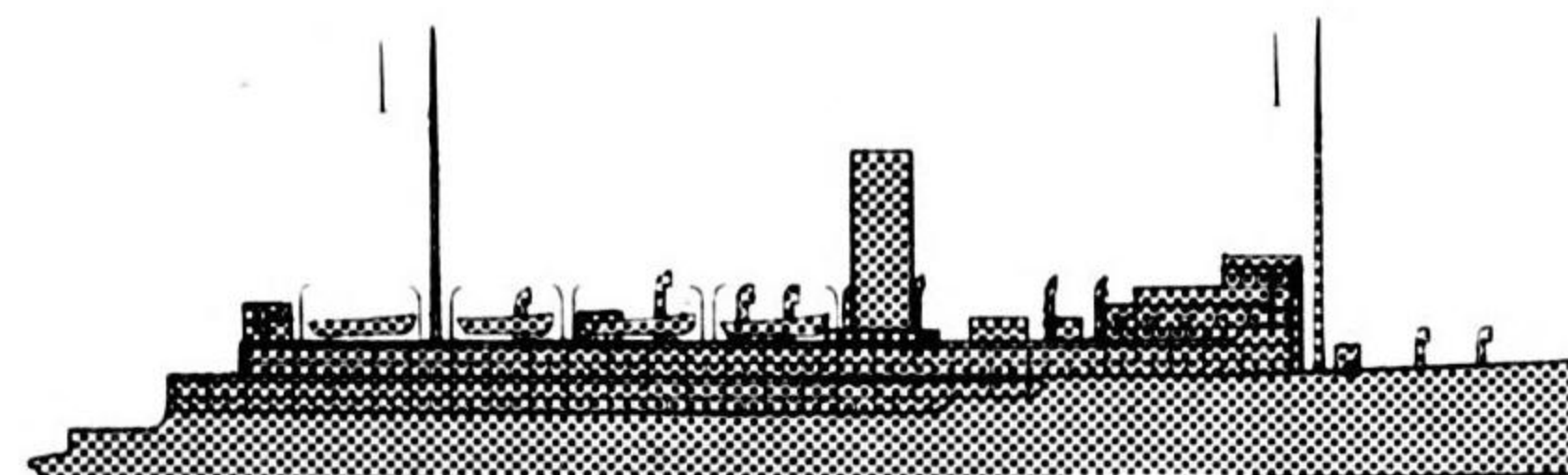


Winch houses at foremast and mainmast
No. 4 L/B stepped down
No L/B athwart mainmast

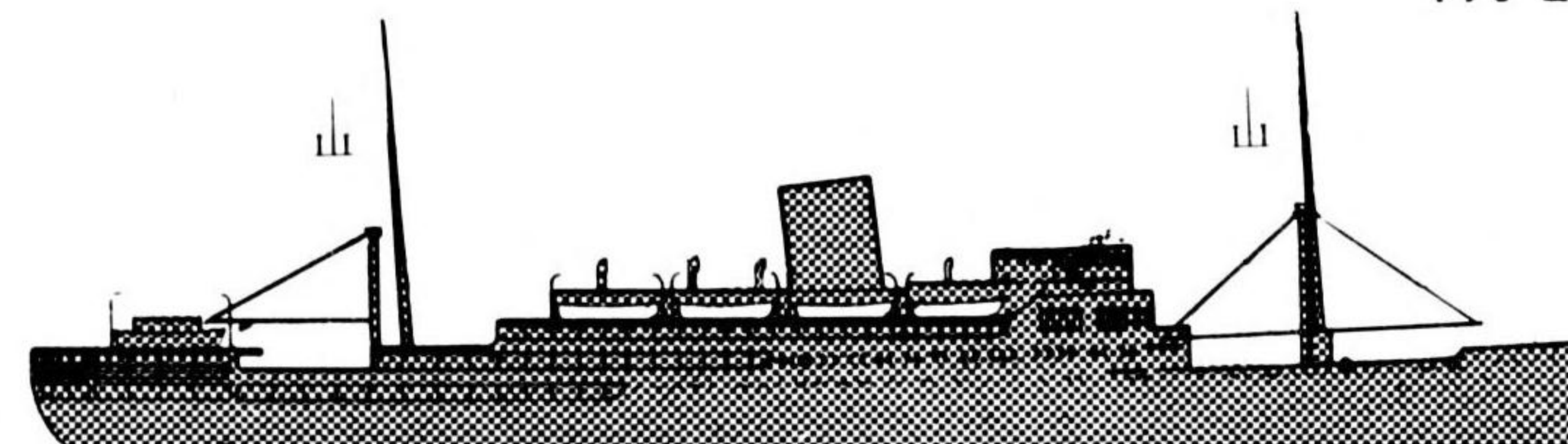


MAINMAST AT SUPERST.

MATSUMAE MARU Class approx. 360' o.a.
3,450 g.t.
(P. 34)



KOBE MARU 454' o.a.
7,930 g.t.
(P. 22)

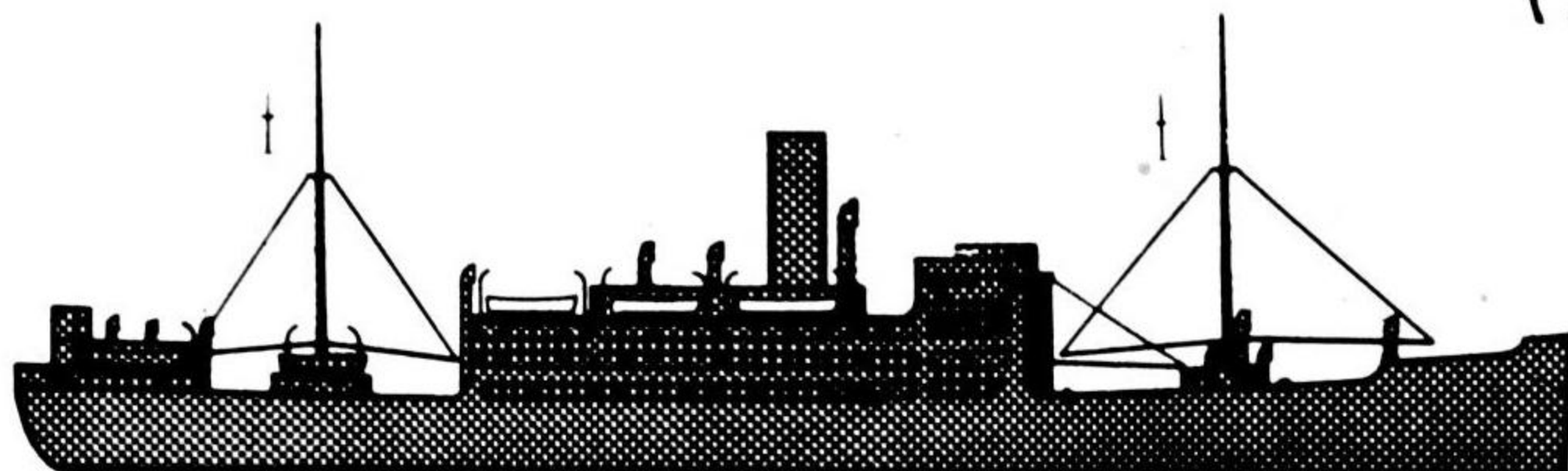


TRANSPORTS

TARE BAKER (2 MK-3 L/B)

MAINMAST CENTERED IN WELL

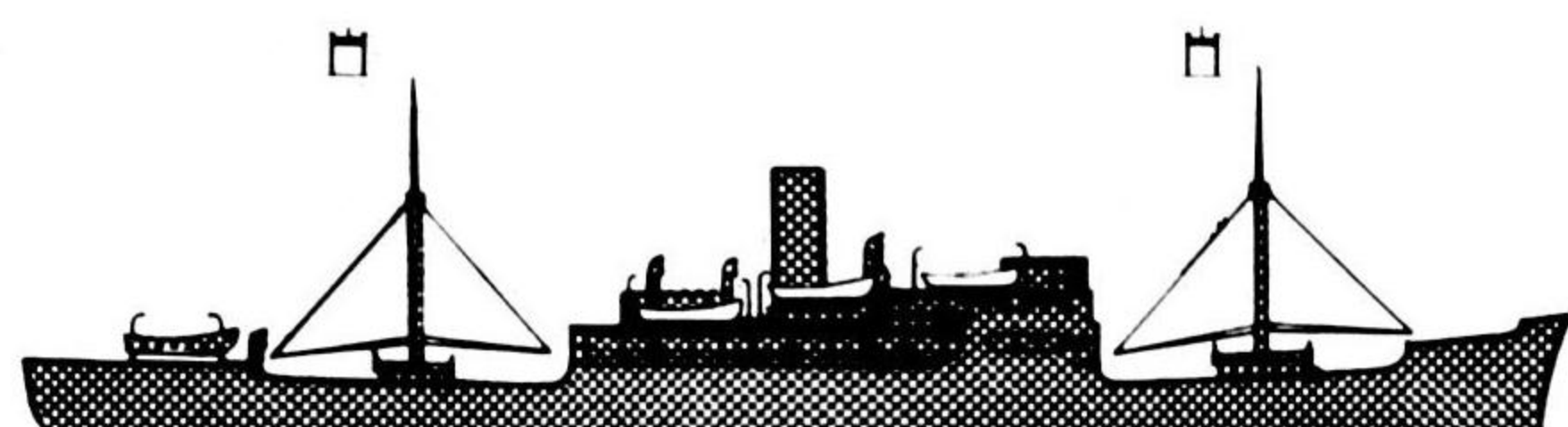
USSURI MARU approx. 425' o.a.
6,386 g.t.
(P. 25)



Winch houses at foremast and mainmast
L/B athwart mainmast



GASSAN MARU Class approx. 365' o.a.
4,515 g.t.
(P. 25)

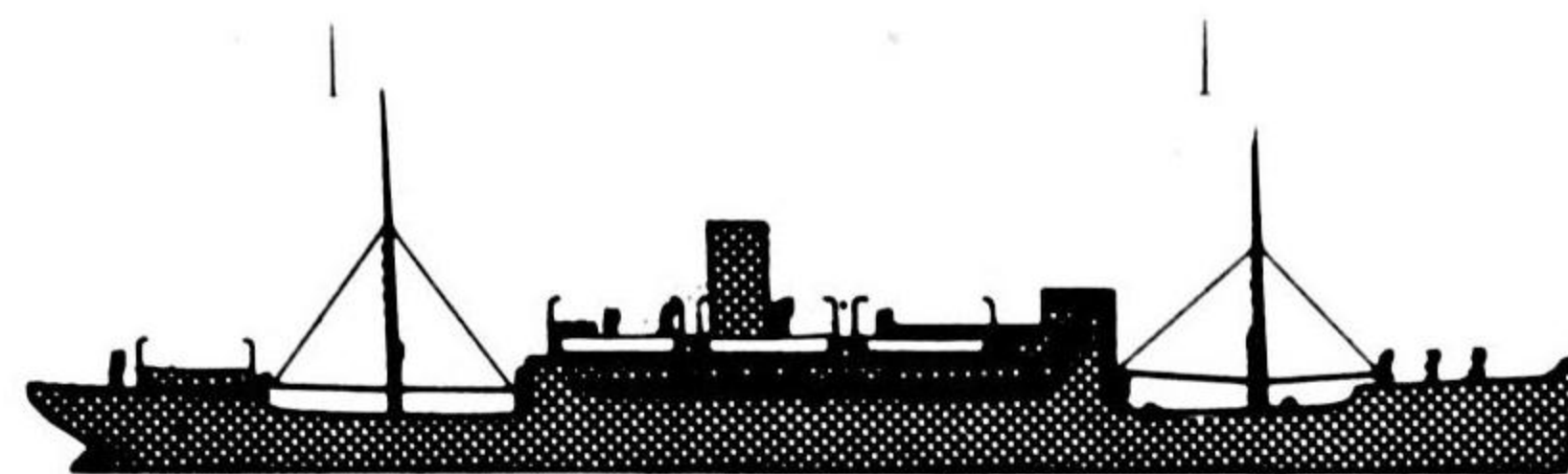


Winch houses at foremast and mainmast
K_T forward and aft



MAINMAST CENTERED IN WELL

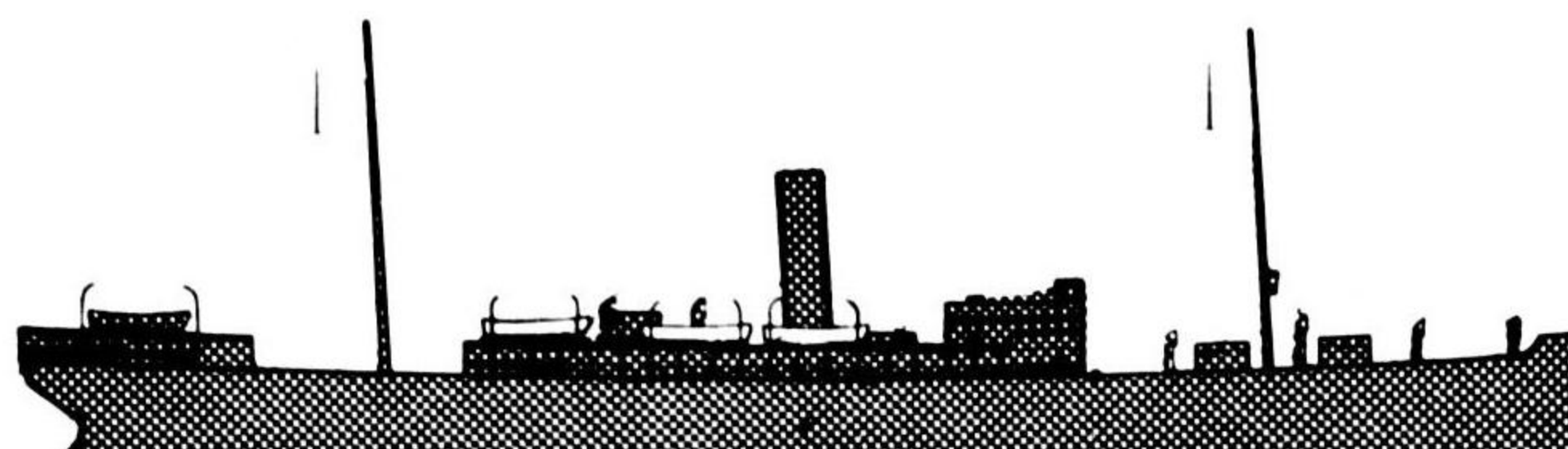
BISAN MARU Class 343' o.a.
(ex-MING SANG) 3,357 g.t.
(P. 42)



Stack well aft on superstructure



KASADO MARU approx. 420' o.a.
6,003 g.t.
(P. 33)

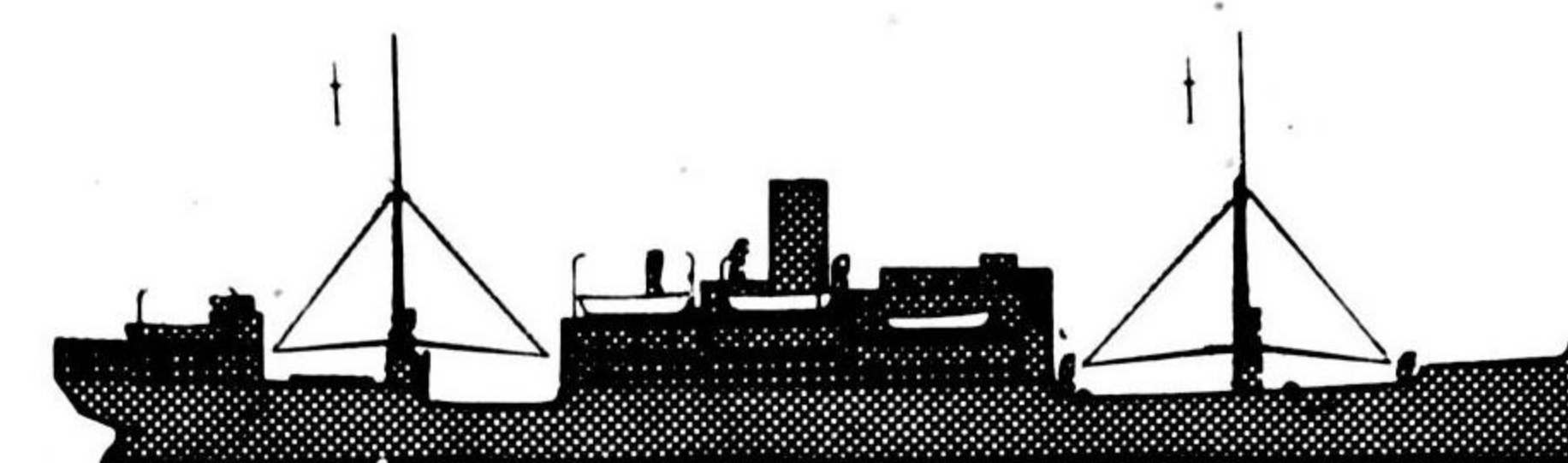


Mainmast close to superstructure
Flush deck
L/B athwart and abaft stack



MAINMAST CENTERED IN WELL

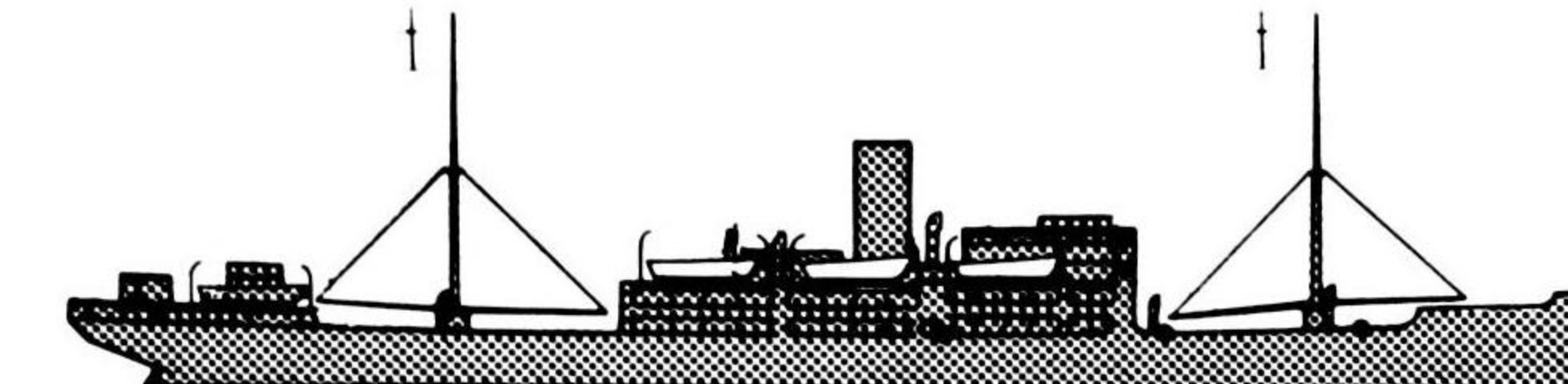
PALAO MARU 383' o.a.
4,495 g.t.
(P. 40)



Mainmast at break of poop deck
No. 1 L/B stepped down



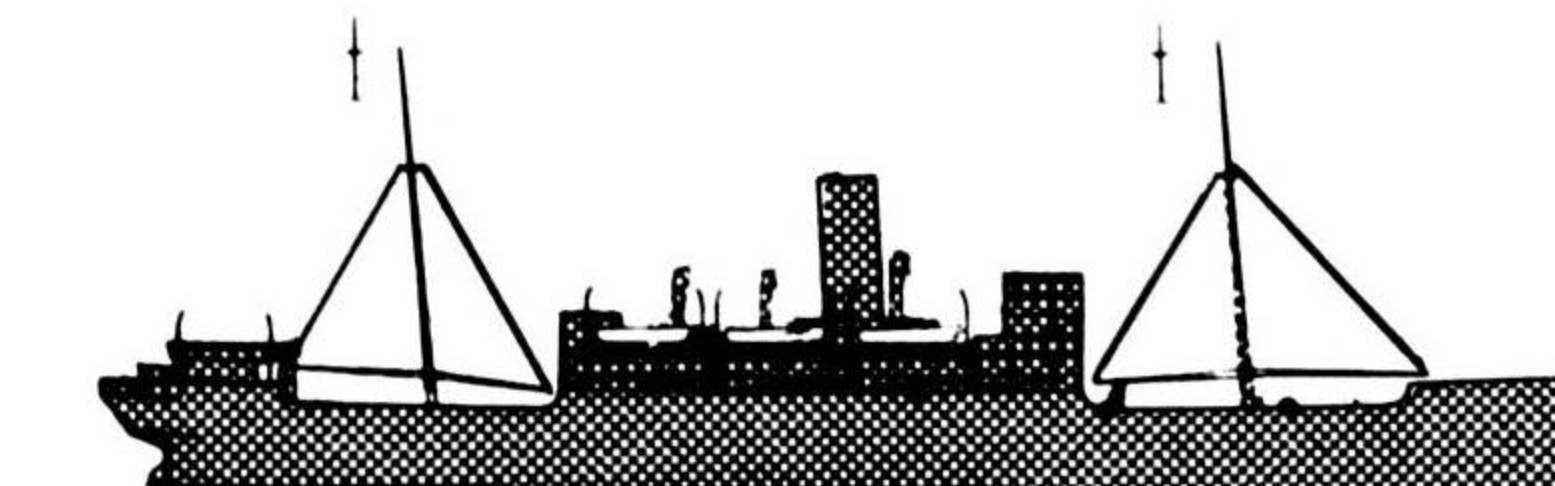
SAIPAN MARU approx. 410' o.a.
5,533 g.t.
(P. 39)



Foremast close to forecastle



HOZAN MARU Class approx. 320' o.a.
2,344 g.t.
(P. 36)



Short o.a. length

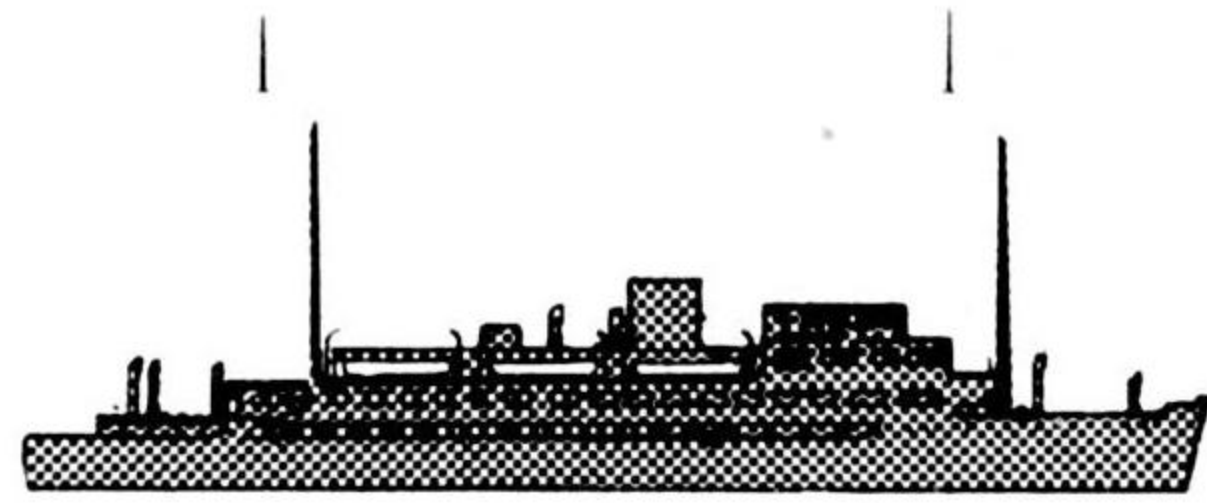


TRANSPORTS

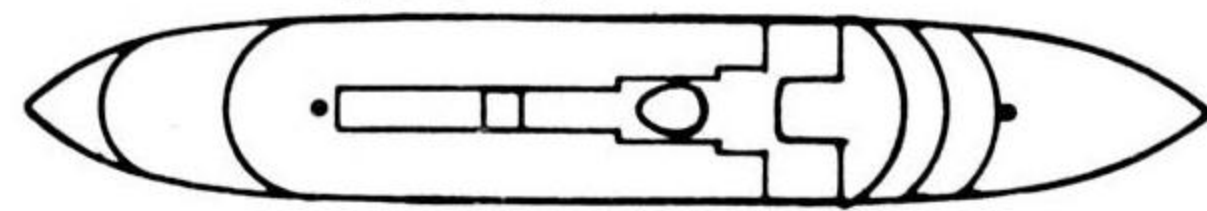
TARE BAKER (2 MK—3-2 L/B)

BOTH M ON SUPERST.

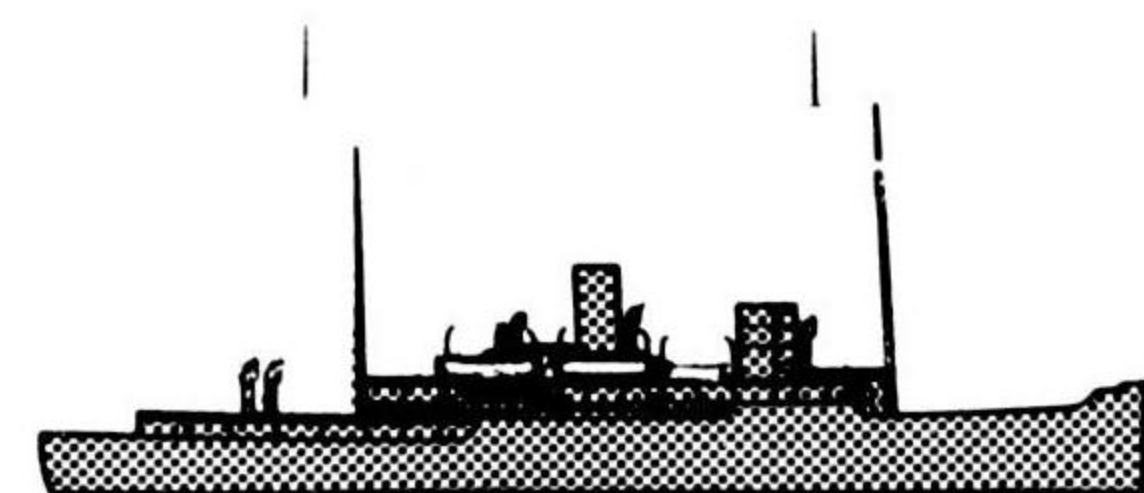
NISHIKI MARU Class approx. 250' o.a.
1,848 g.t.
(P. 27)



3 L/B
Well rounded decks and pointed stern



NACHI MARU Class approx. 240' o.a.
1,607 g.t.
(P. 19)



3 L/B
Mainmast flush with after end of boat deck

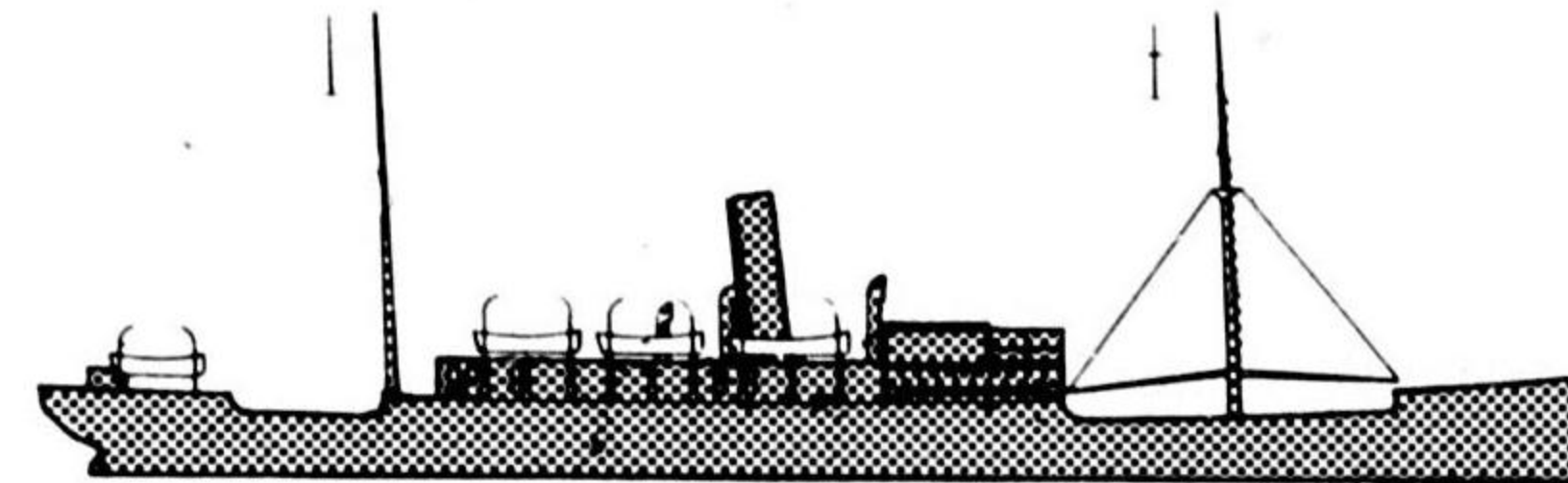
KURENAI MARU approx. 245' c.a.
1,547 g.t.
(P. 19)



3 L/B
Mainmast on boat deck

MAINMAST AT SUPERST

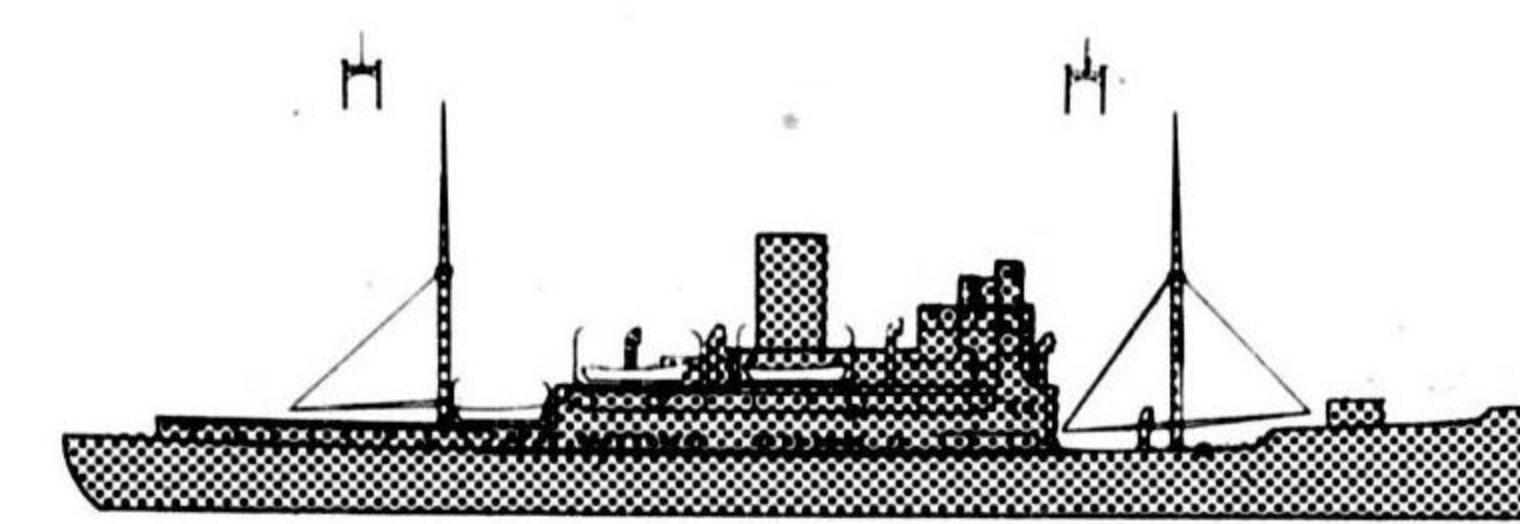
TAINAN MARU approx. 340' o.a.
3,175 g.t.
(P. 35)



3 L/B
Mainmast just abaft superstructure at break in deck

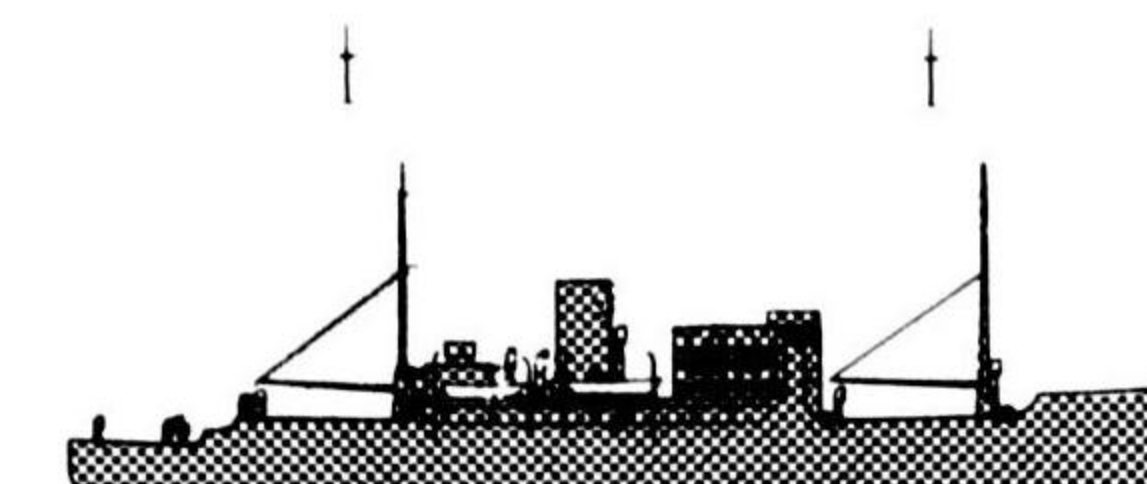
MAINMAST AT SUPERST.

SOYA MARU approx. 320' o.a.
3,593 g.t.
(P. 26)



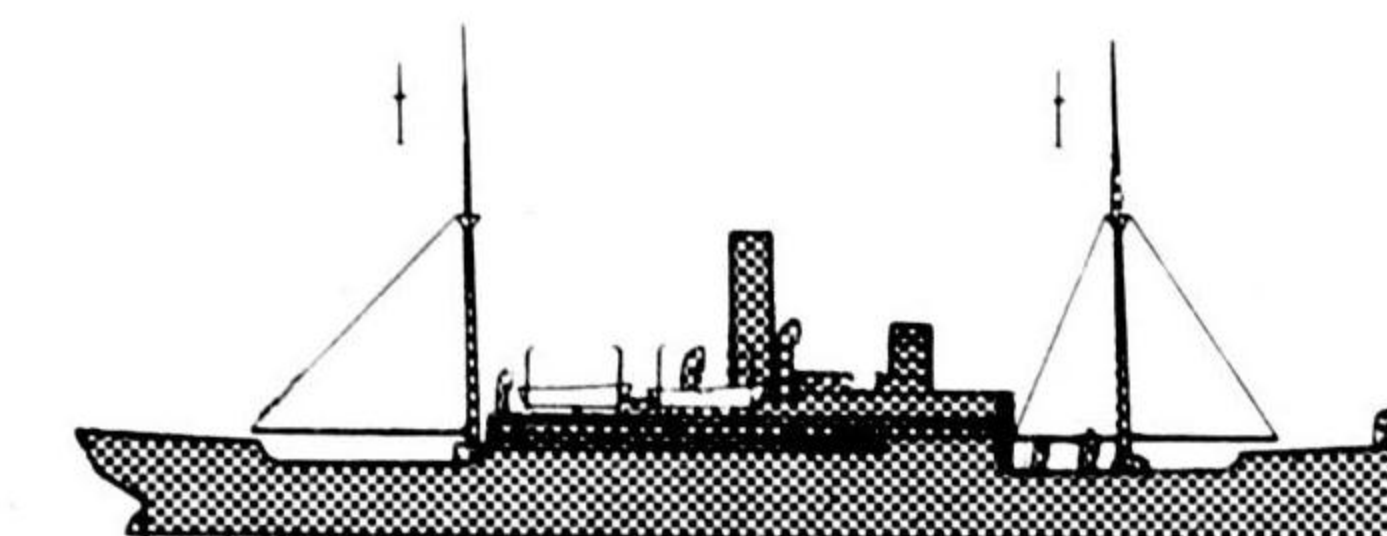
2 L/B
K_T fore and aft

RYOFU MARU 241' o.a.
1,180 g.t.
(P. 28)



2 L/B
Low pointed stern
Foremast just abaft forecastle

AMAKUSA MARU approx. 290' o.a.
2,340 g.t.
(P. 37)

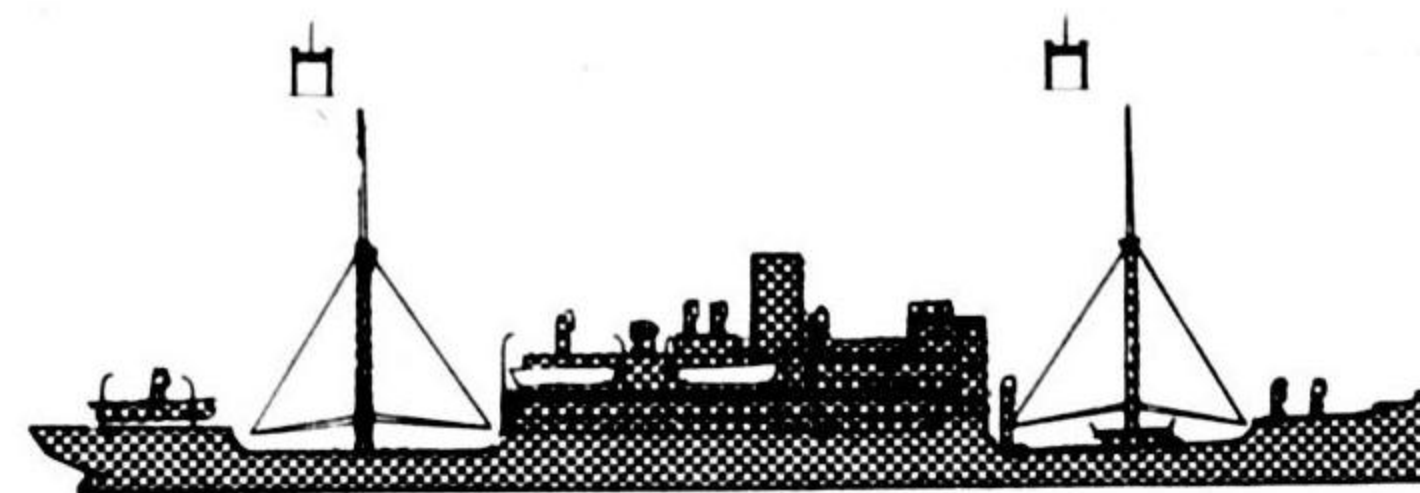


2 L/B
Distinctive bridge

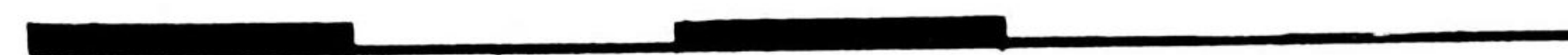
TRANSPORTS
TARE BAKER (2 MK-2 L/B)

MAINMAST WELL ABAFT SUPERST.

CHOKO MARU Class approx. 300' o.a.
2,611 g.t.
(P. 37)



K_T forward and aft



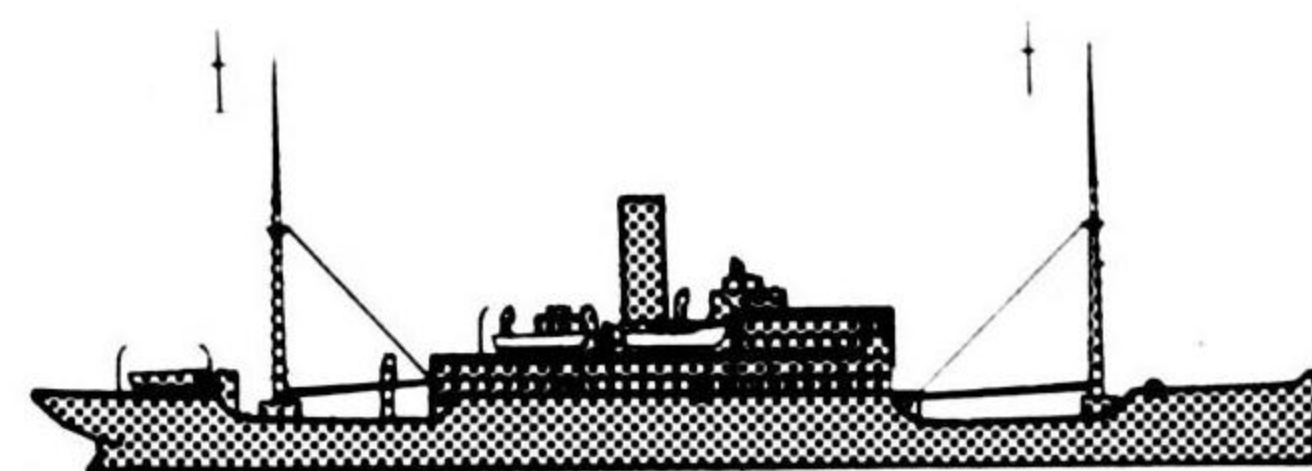
PEKING MARU Class approx. 280' o.a.
2,289 g.t.
(P. 26)



Foremast and mainmast at breaks
in deck



CHOHEI MARU approx. 275' o.a.
1,718 g.t.
(P. 38)

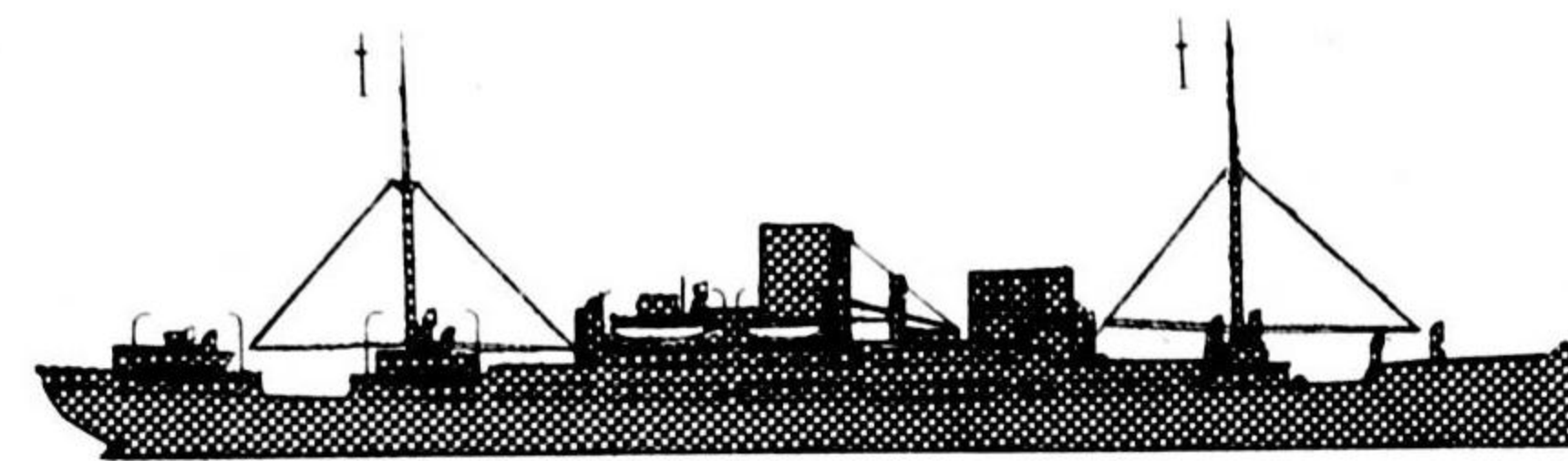


Foremast and mainmast at breaks
Note bridge structure

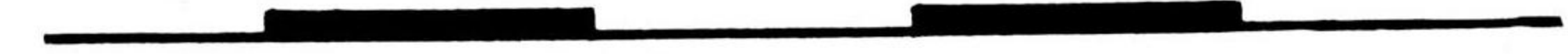
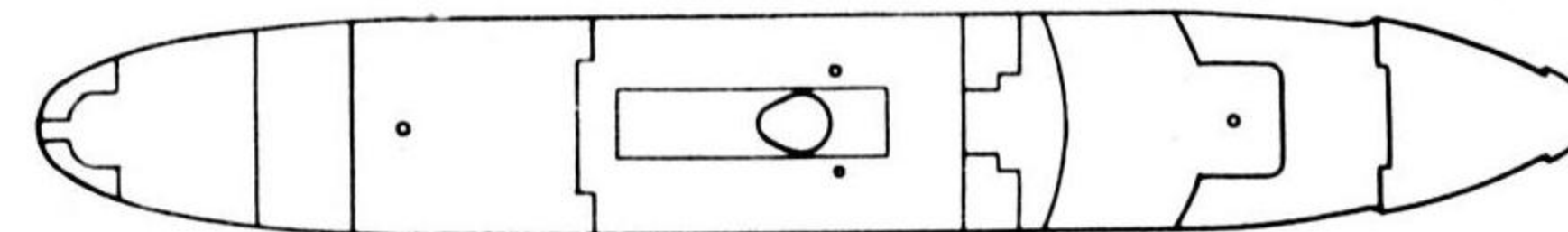


MAINMAST WELL ABAFT SUPERST.

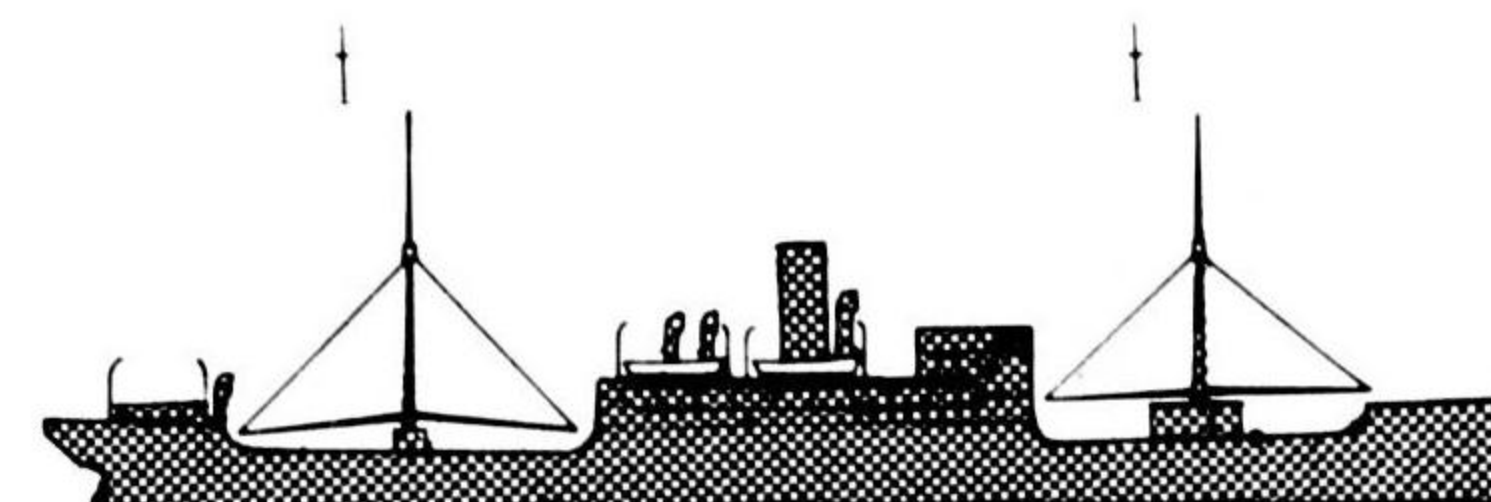
NAMINOUE MARU Class approx. 370' o.a.
4,730 g.t.
(P. 41)



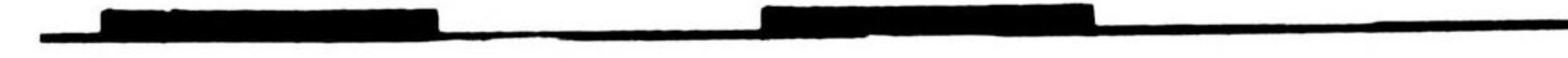
Hatch abaft bridge
Storm decks forward and aft



CANTON MARU approx. 315' o.a.
2,820 g.t.
(P. 37)

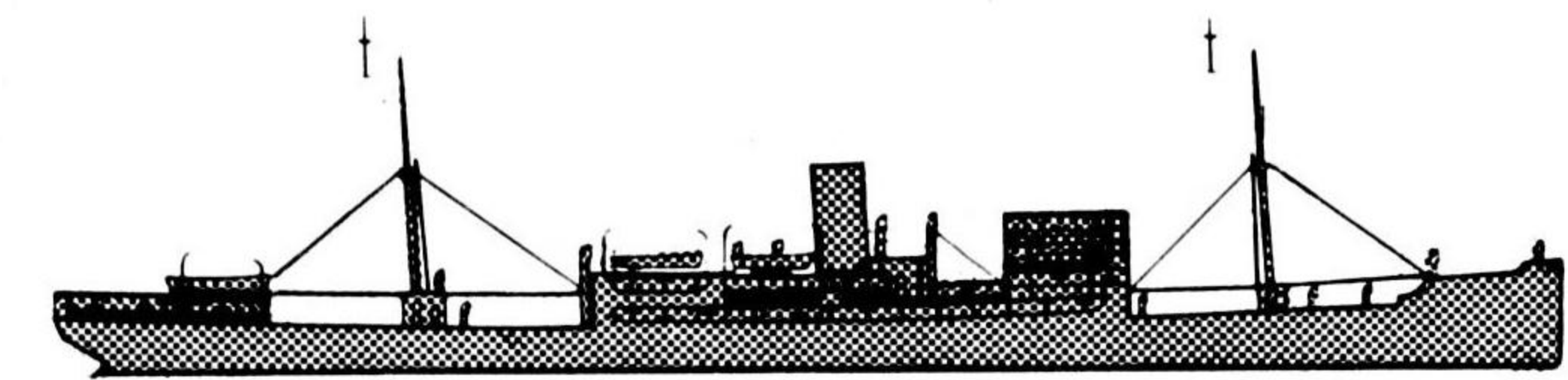


Note bridge structure



MAINMAST WELL ABAFT SUPERST.

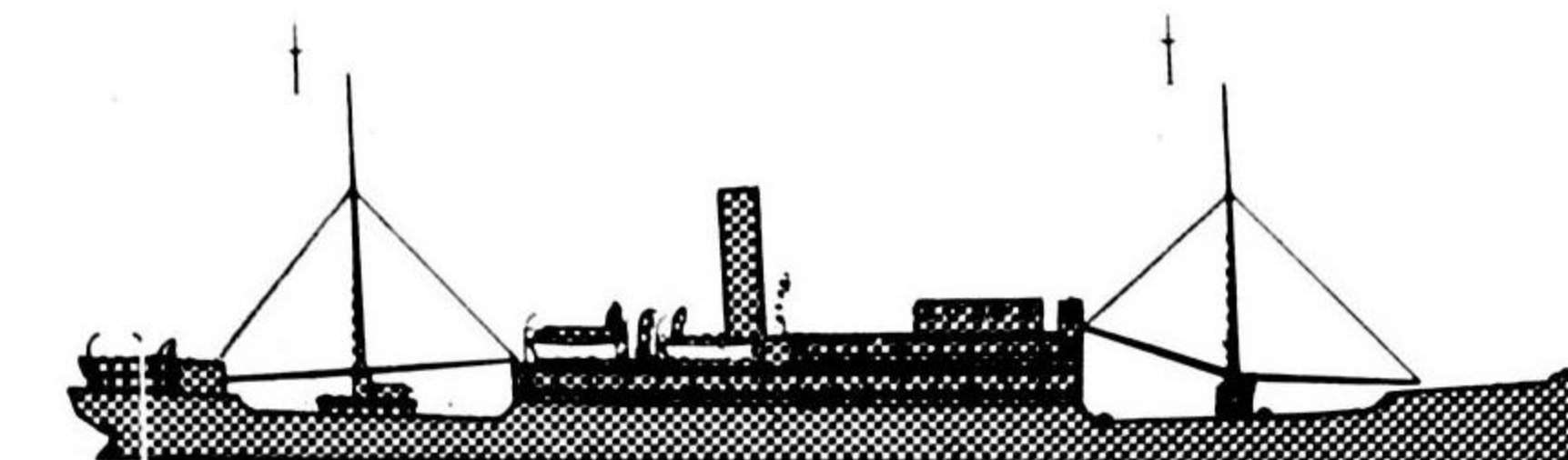
TEISON MARU approx. 430' o.a.
(Ex-Ville De Verdun) 7,007 g.t.
(P. 32)



Hatch abaft bridge



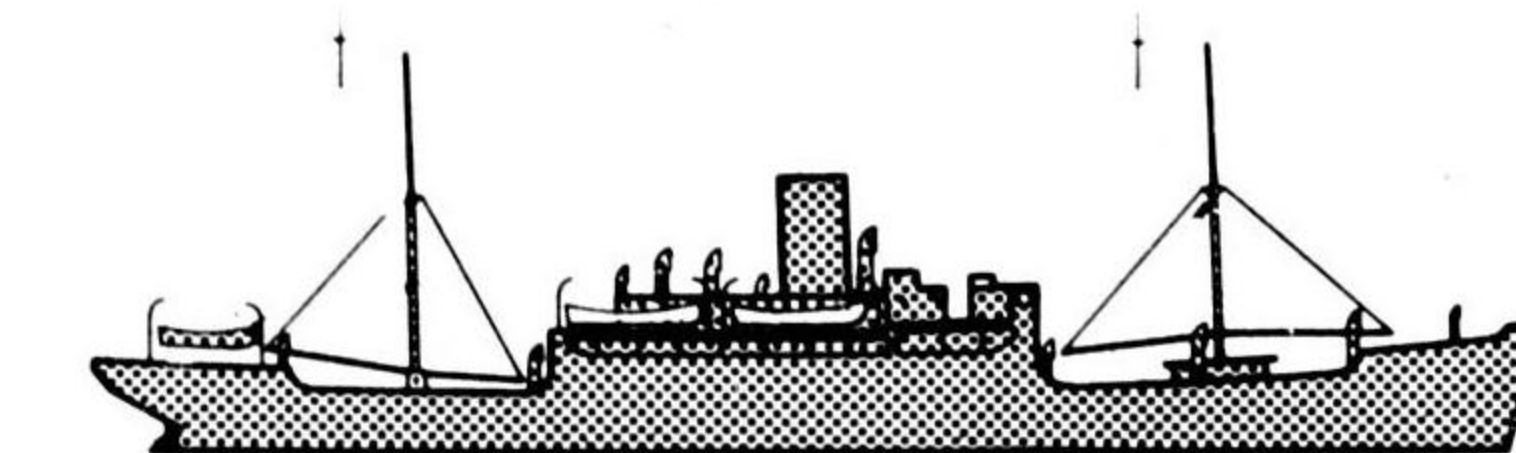
KOWA MARU approx. 345' o.a.
3,217 g.t.
(P. 35)



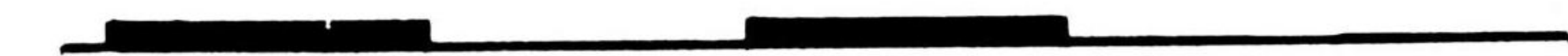
Stack abaft center of super-
structure



HONGKONG MARU 315' o.a.
2,797 g.t.
(P. 42)



Note bridge structure

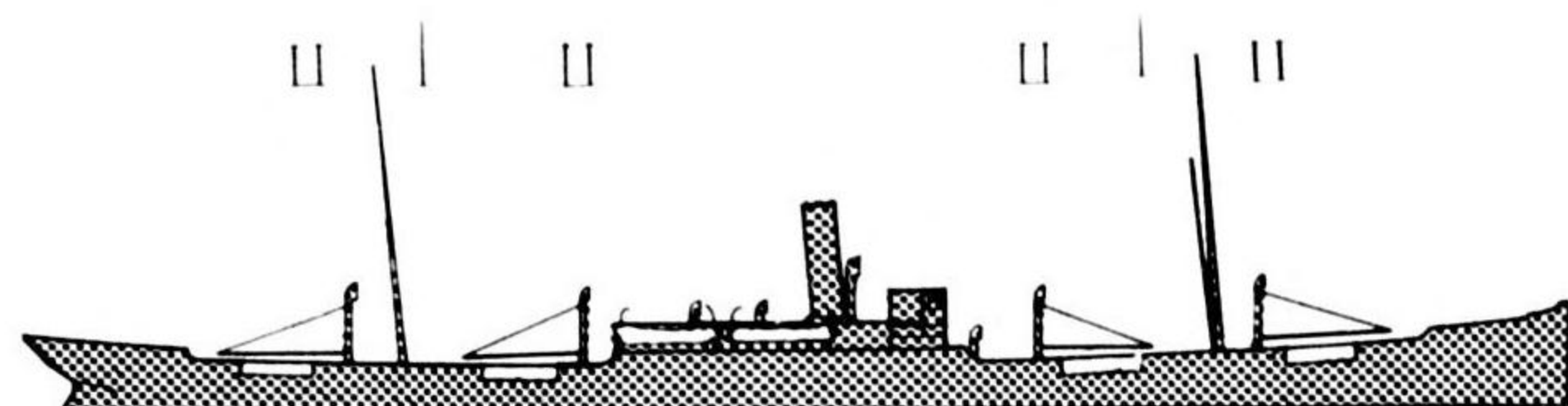


FREIGHTER TRANSPORTS

FOX TARE ABLE (6-5 MK)

3 MK FORWARD

RYUJIN MARU Class Approx. 455' o. a.
 6,169 g. t.
 (P. 163)

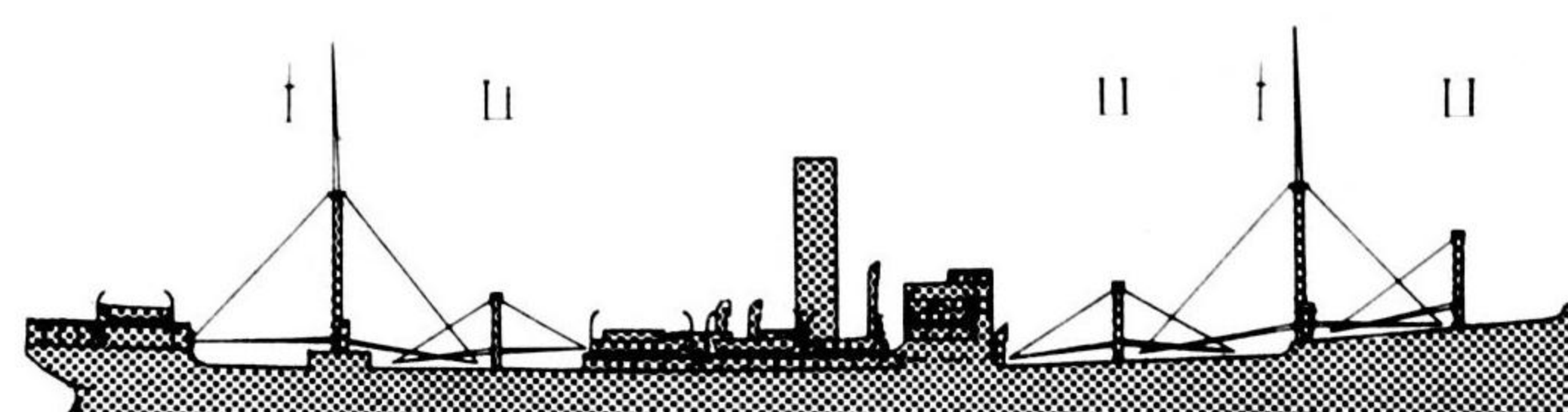


KMKFKMK
 2 L/B



ARIZONA MARU

Approx. 495' o. a.
9,684 g. t.
 (P. 100)

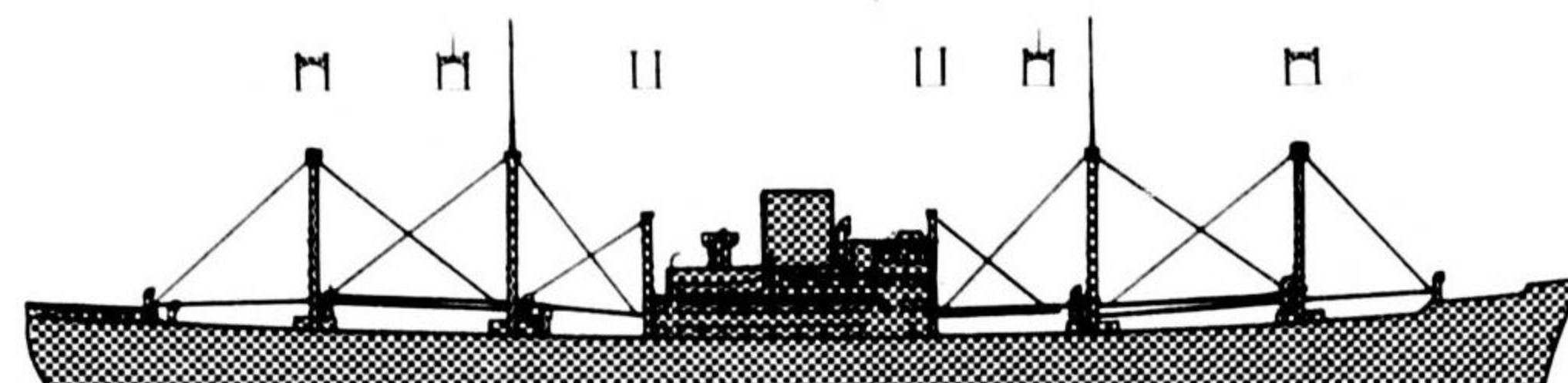


KMKFKM
 K & foremast on forecastle

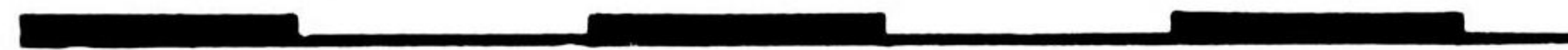
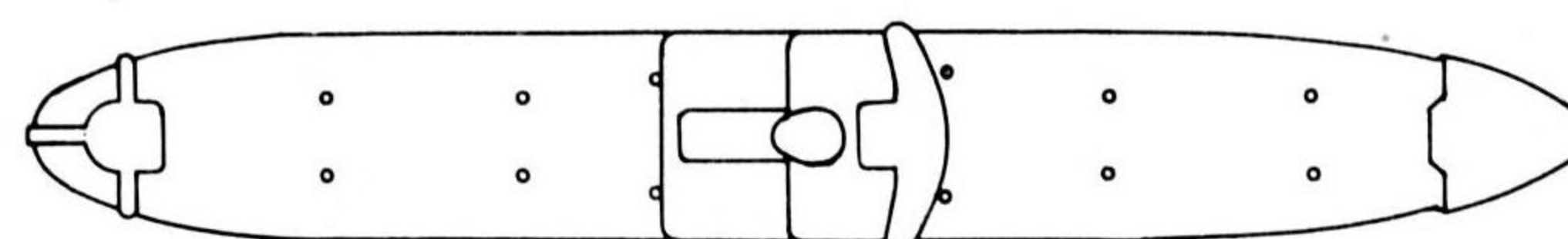


3 MK FORWARD

KYUSHU MARU Class 492' o. a.
 8,666 g. t.
 (P. 88)

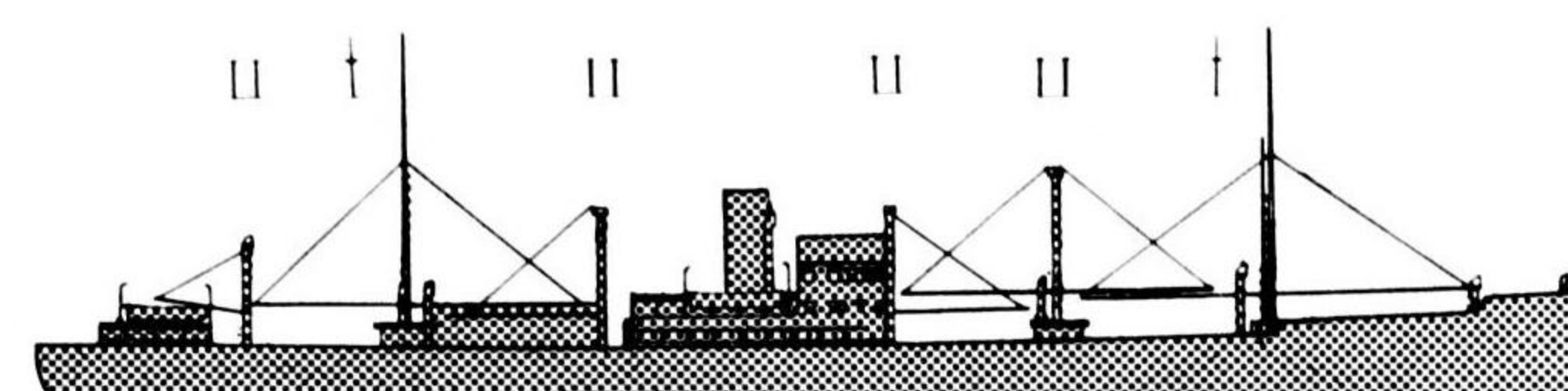


KK_TKFKK_TK



NINGPO

485' o. a.
6,079 g. t.
 (P. 87)

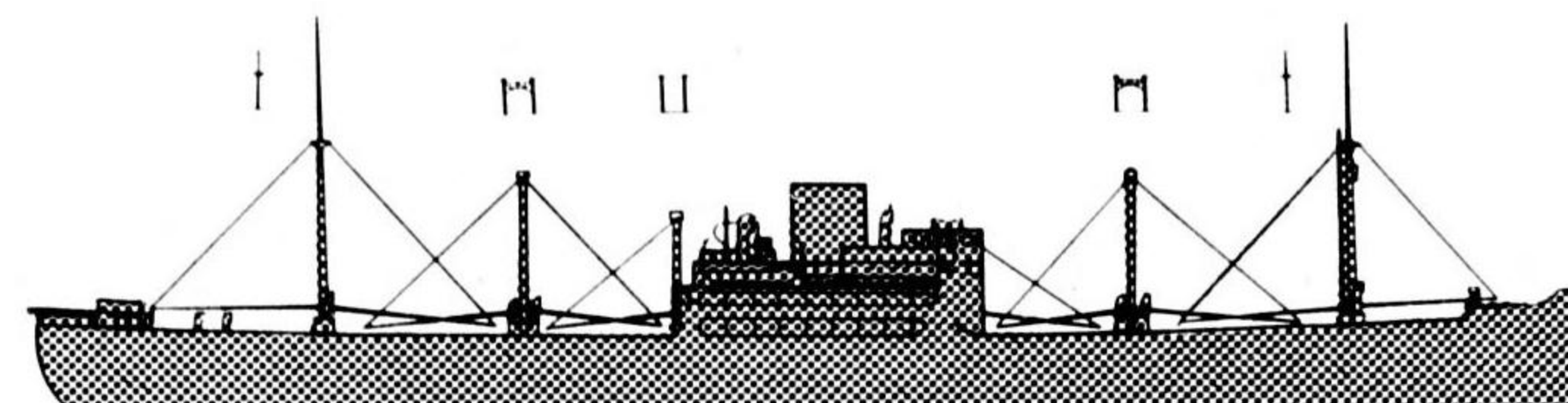


MKKFKMK



2 MK FORWARD, 3 AFT

SADO MARU Class 509' o. a.
 7,100 g. t.
 (P. 83)

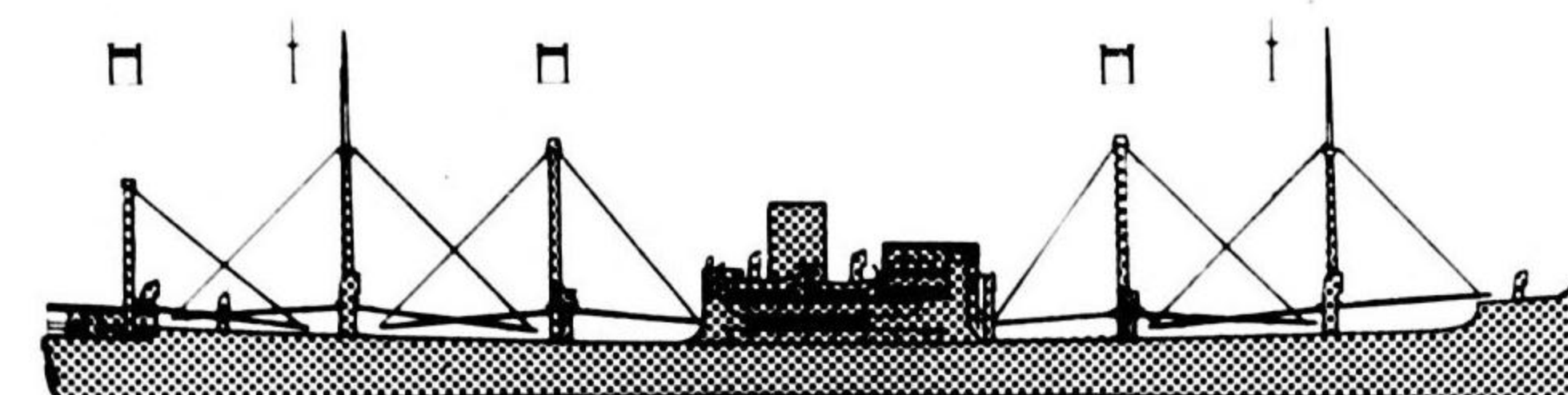


Stick foremast & mainmast
 MKFKKM

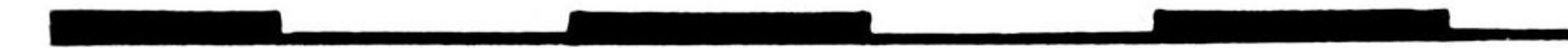


KATSURAGI MARU Class

466-77' o. a.
8,300 g. t.
 (P. 82)

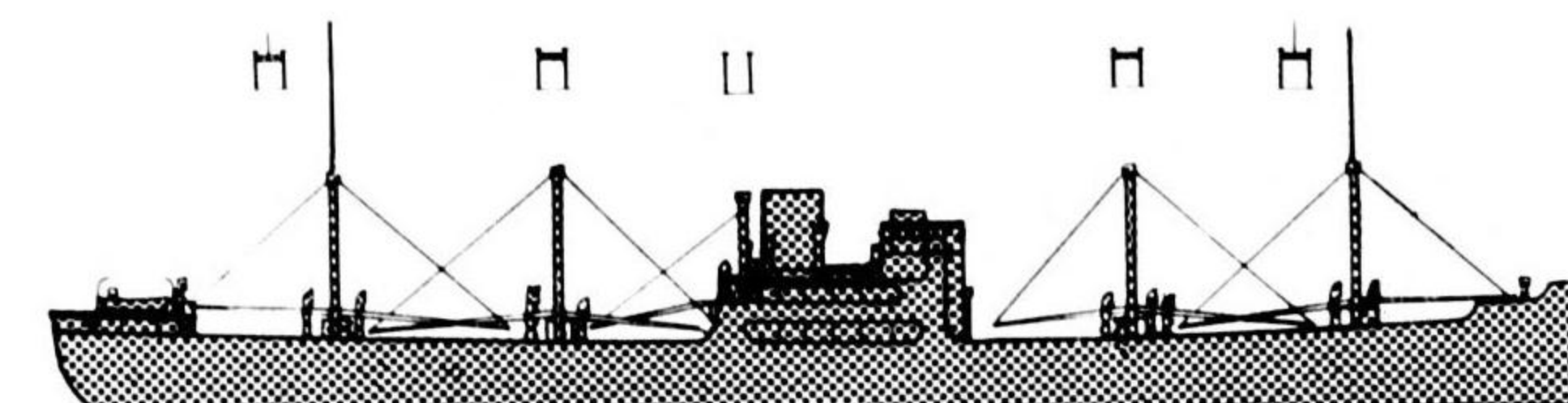


Stick foremast & mainmast
 MKFKMK



AOBASAN MARU Class

475' o. a.
8,812 g. t.
 (P. 84)



K_TKFKK_T

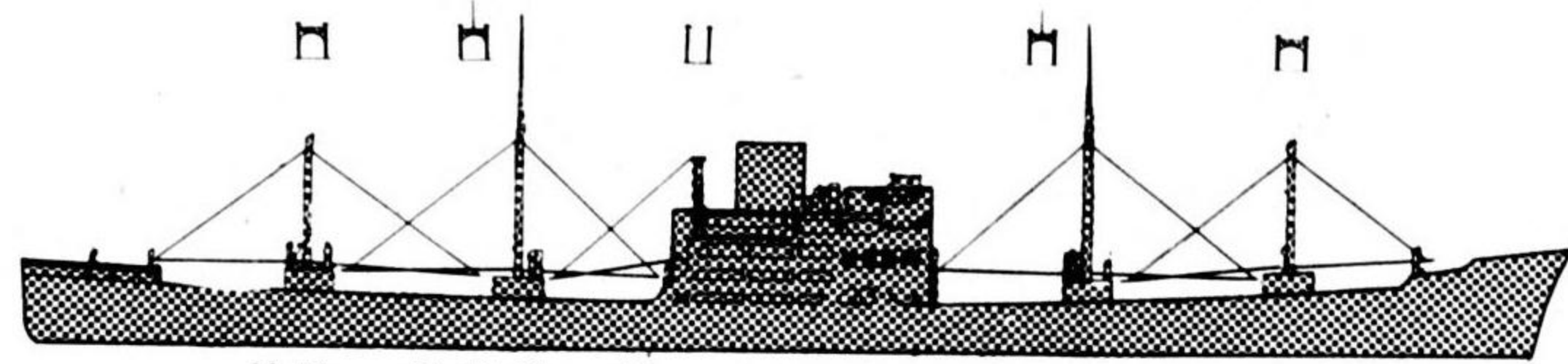


FREIGHTER TRANSPORTS

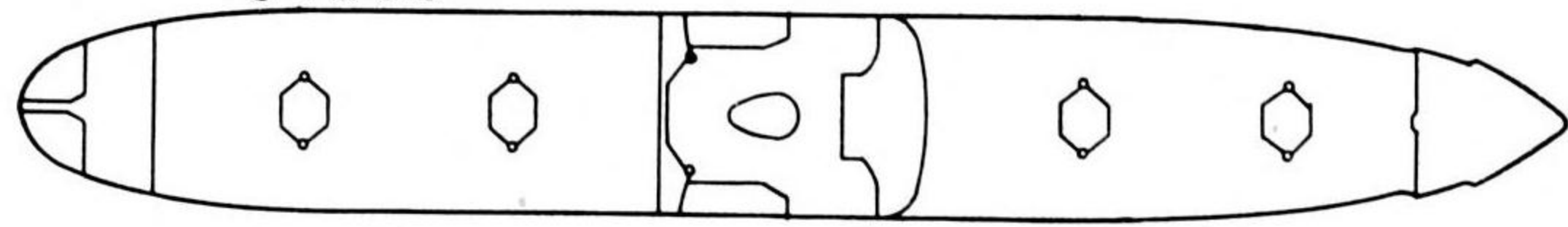
FOX TARE ABLE (5-4 MK)

2 MK FORWARD, 3 AFT

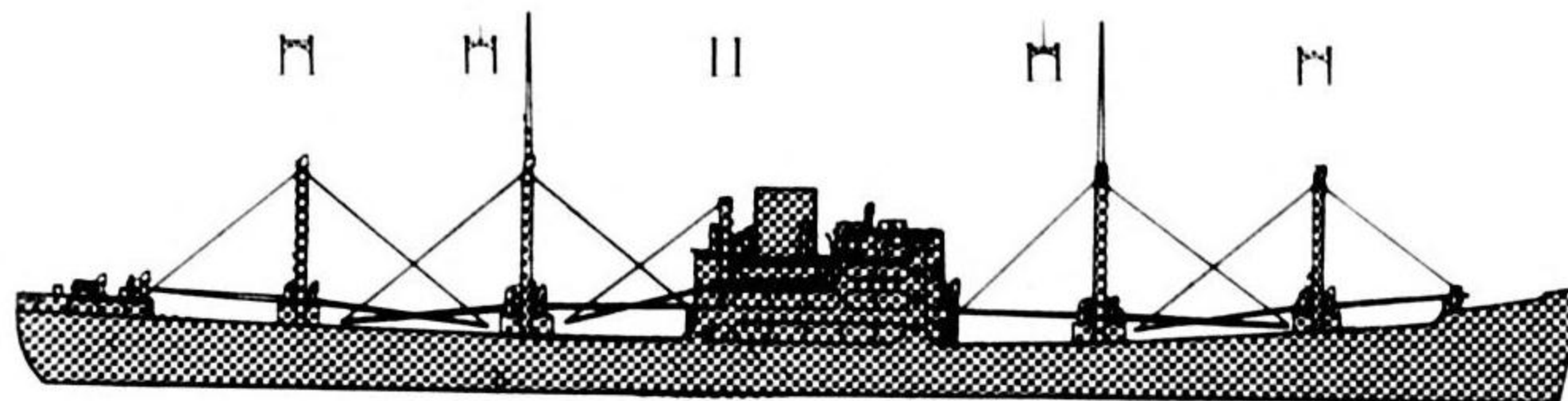
AWAJISAN MARU Class 511' o. a.
9,794 g. t.
(P. 85)



KK_TFKK_TK
34' longer than ARIMASAN MARU
Class



ARIMASAN MARU Class 477' o. a.
8,663 g. t.
(P. 86)

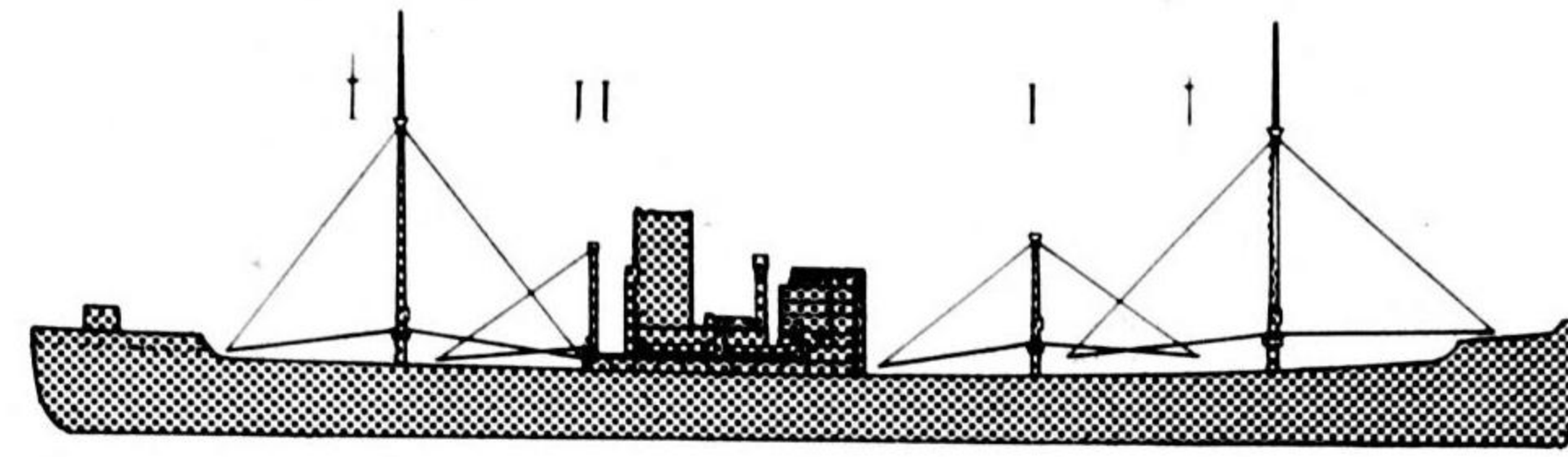


KK_TFKK_TK

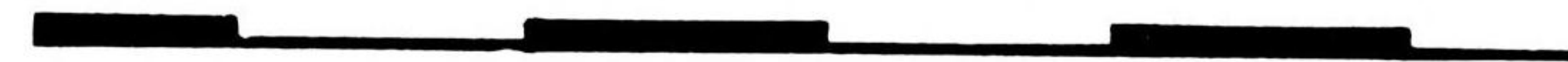


4 MK, AFT K AT SUPERST.

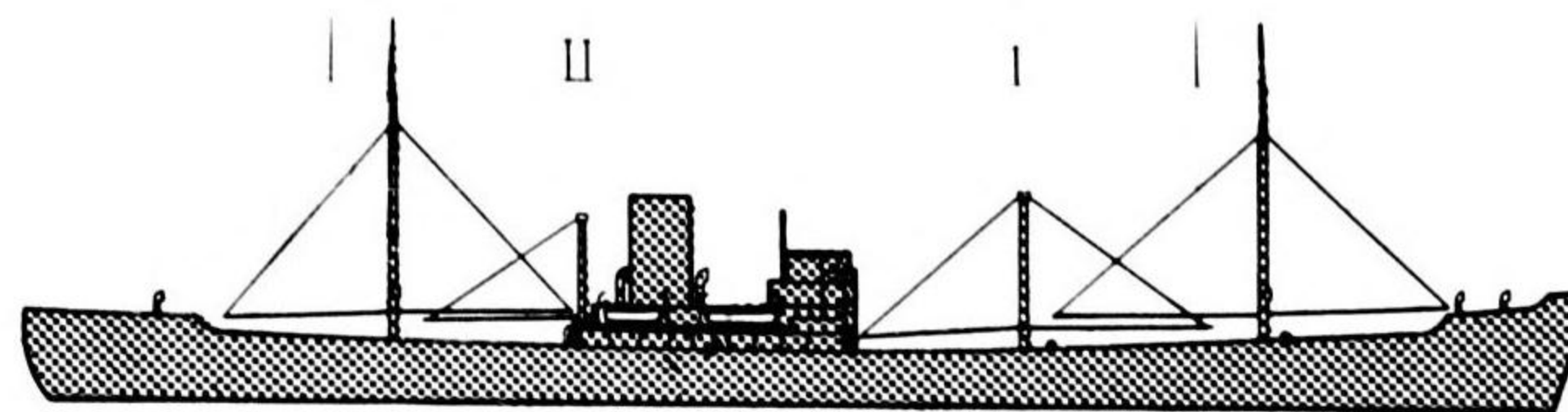
BELGRANO 467' o. a.
6,095 g. t.
(P. 97)



Single K Forward
Stack aft on superstructure
Tall ventilator abaft bridge



RIO GRANDE 467' o. a.
6,062 g. t.
(P. 96)

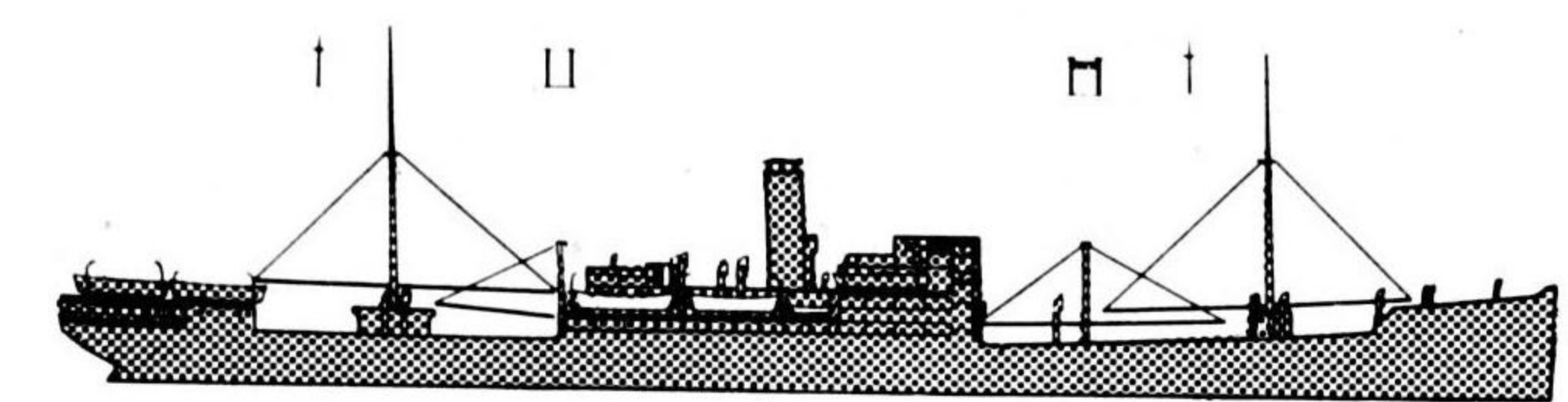


L/B separated on superstructure
Stack aft on superstructure

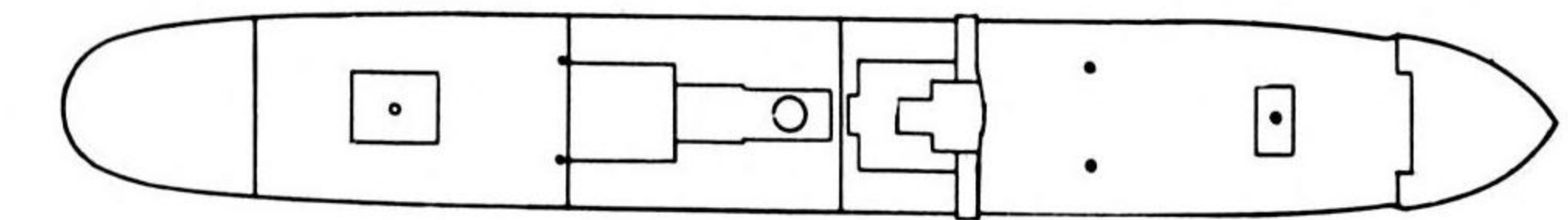


4 MK, AFT K AT SUPERST.

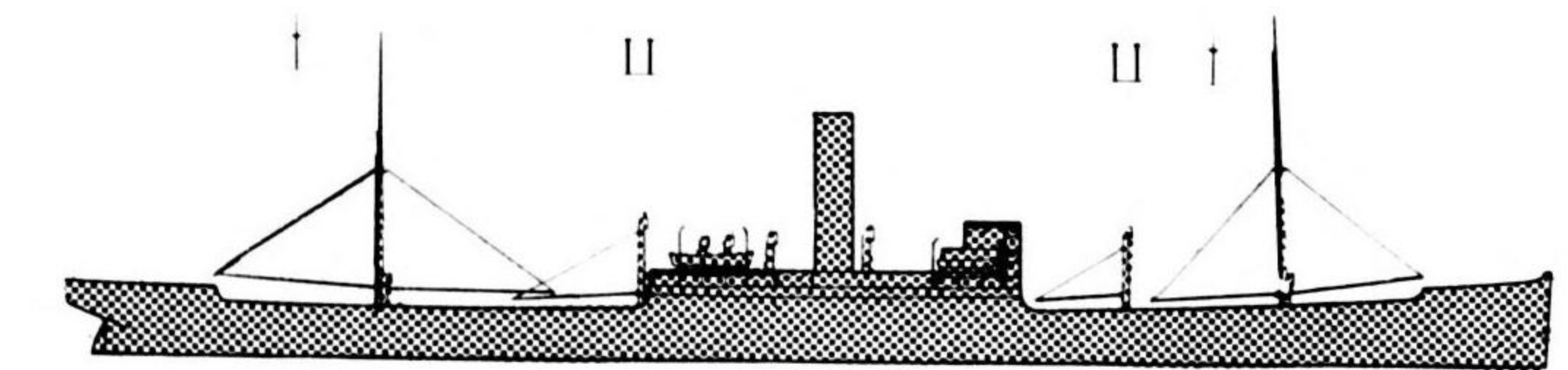
GINYO MARU approx. 467' o. a.
8,613 g. t.
(P. 91)



Mast house on mainmast
2 L/B abaft stack



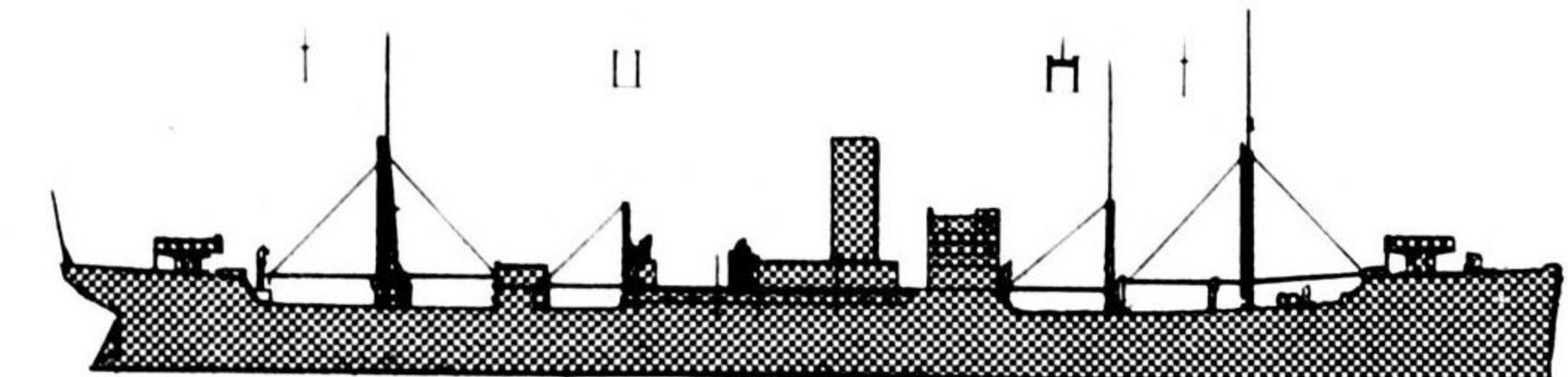
SEIWA MARU approx. 495' o. a.
7,210 g. t.
(P. 162)



No crosstrees on forward K



MAMIYA 483' o. a.
15,820 g. t.
(P. 98)



Topmast on forward K
Stack forward on superstructure
Naval auxiliary

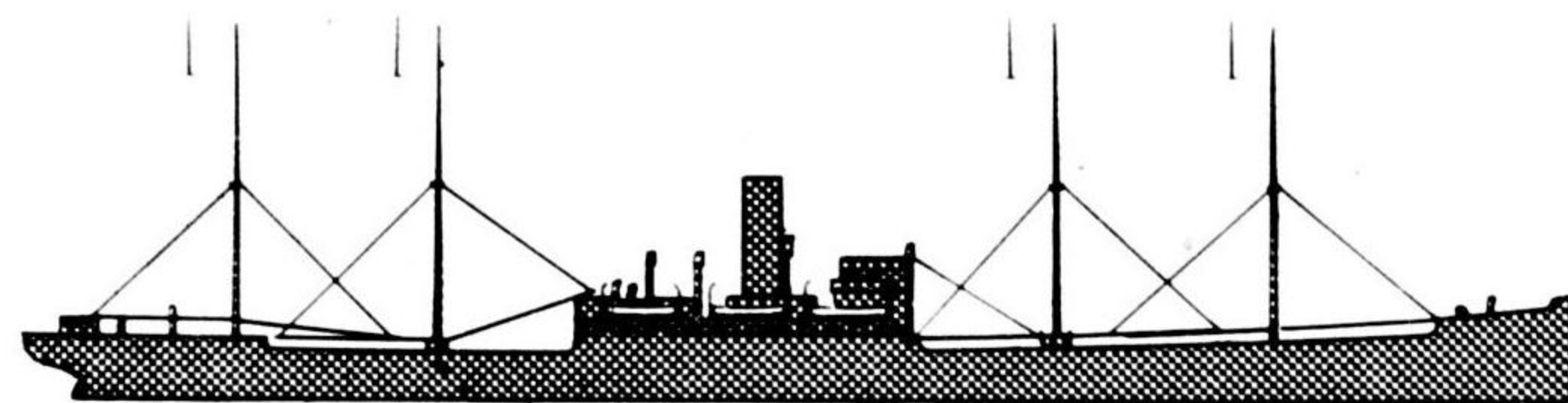


FREIGHTER TRANSPORTS

FOX TARE ABLE (4M or 4KK_T)

4 M

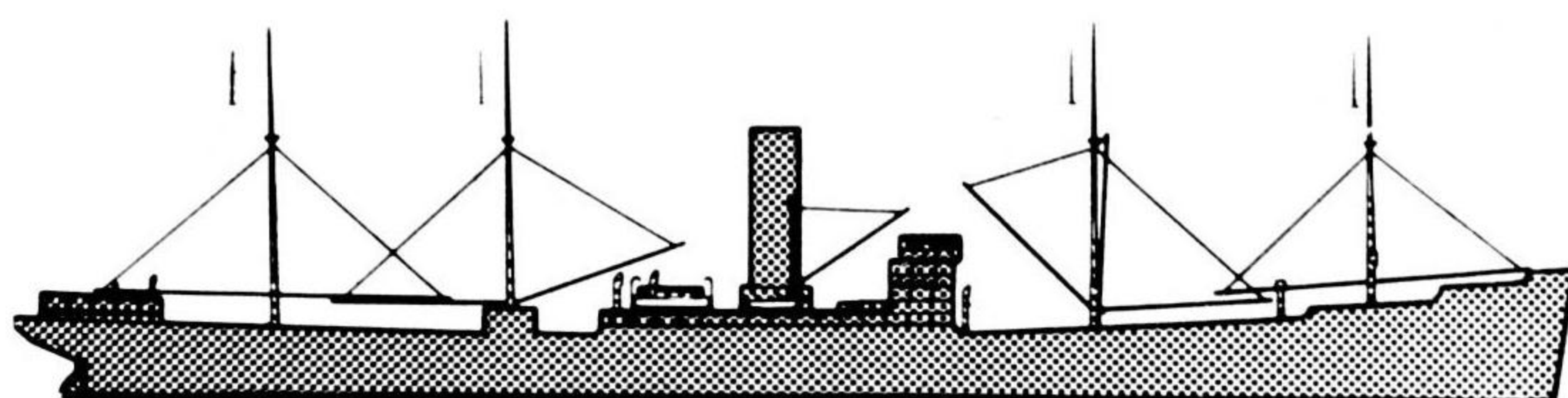
TEIO MARU approx. 495' o. a.
7,974 g. t.
(P. 161)



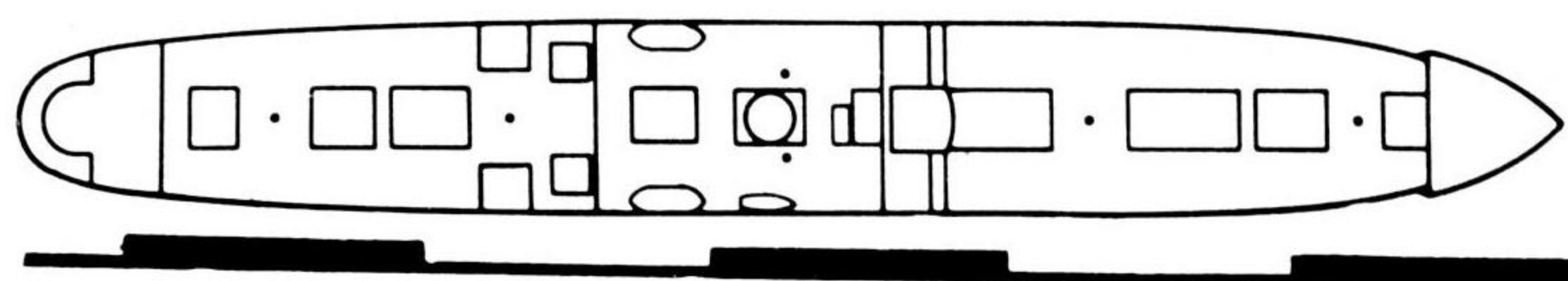
3 L/B
No. 4 M on poopdeck



MOSEL approx. 535' o. a.
8,428 g. t.
(P. 90)

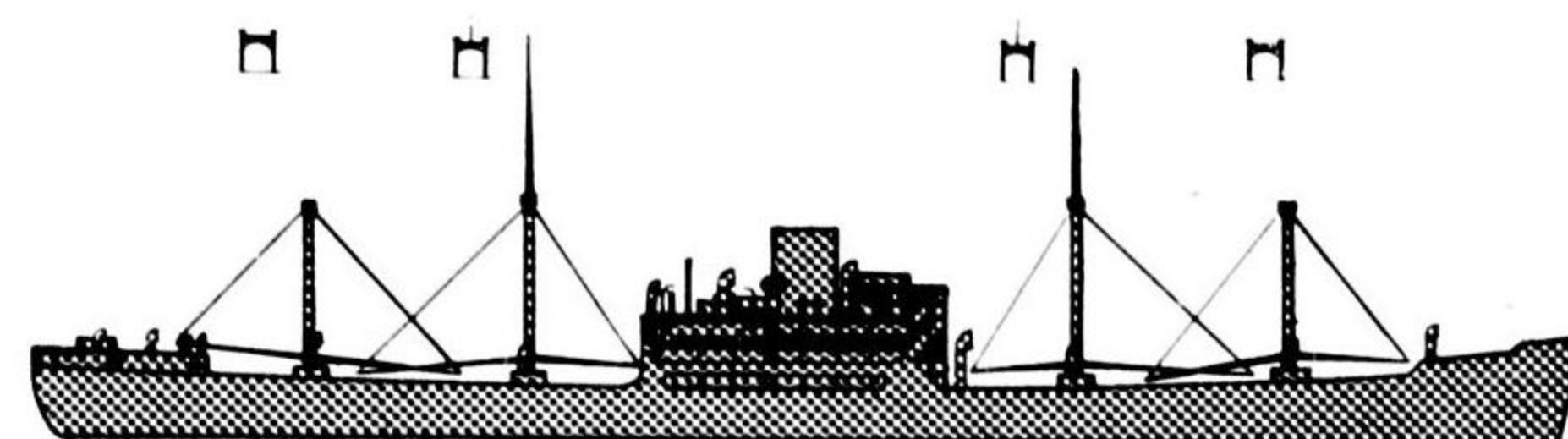


2L/B



4 KK_T

CANBERRA MARU Class approx. 445' o. a.
6,477 g. t.
(P. 80)



K_T on No. 2 & 3K



HAKKAI MARU Class approx. 445' o. a.
5,086 g. t.
(P. 79)

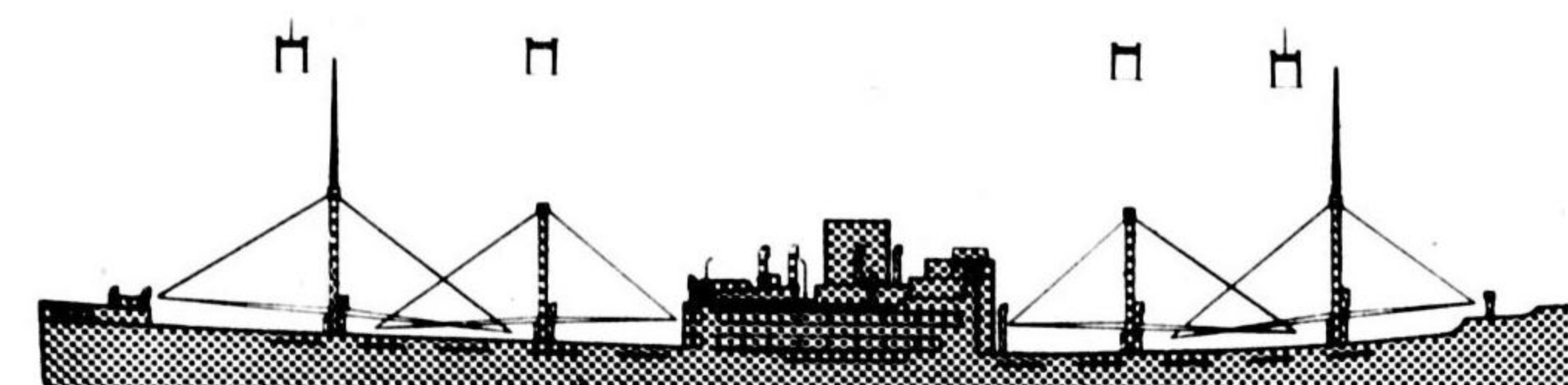


Stack aft on superstructure



4 KK_T

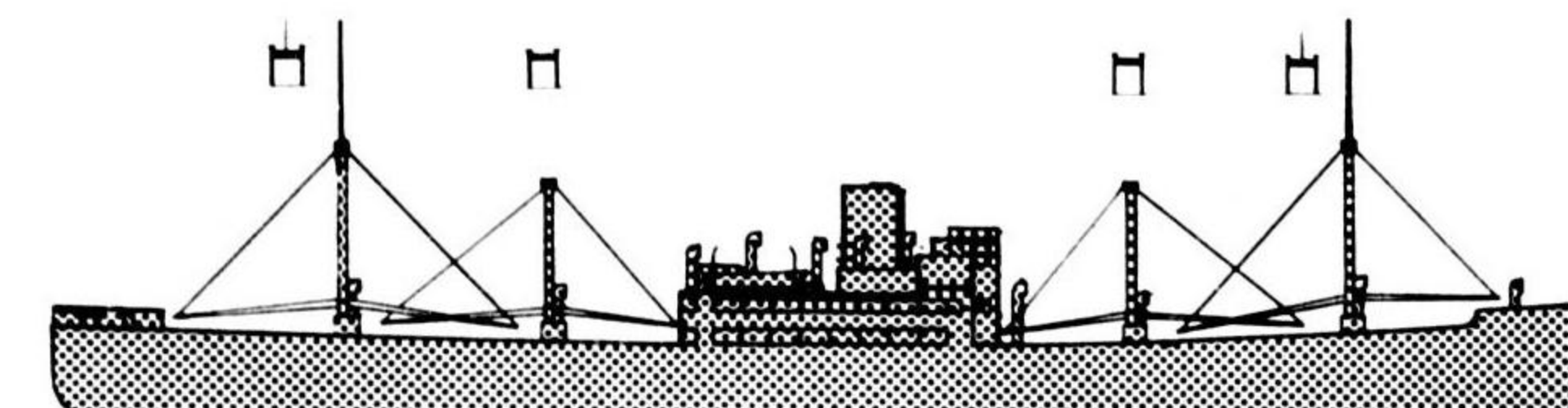
HIROKAWA MARU Class 508' o. a.
6,853 g. t.
(P. 73)



No. 3 K sometimes gone
53' longer than GOSHU MARU Class
Boom pattern



GOSHU MARU Class 466' o. a.
8,469 g. t.
(P. 78)



Boom pattern

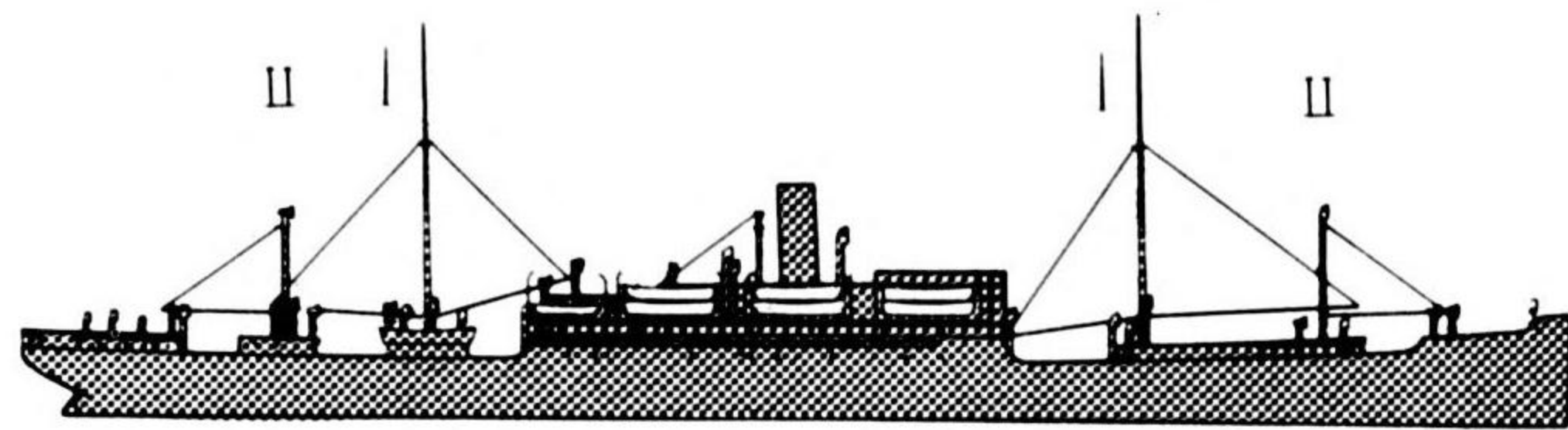


FREIGHTER TRANSPORTS

FOX TARE ABLE (4 MK)

NO K ON SUPERST.

TEIKOKU MARU approx. 485' o. a.
7,744 g. t.
(P. 95)

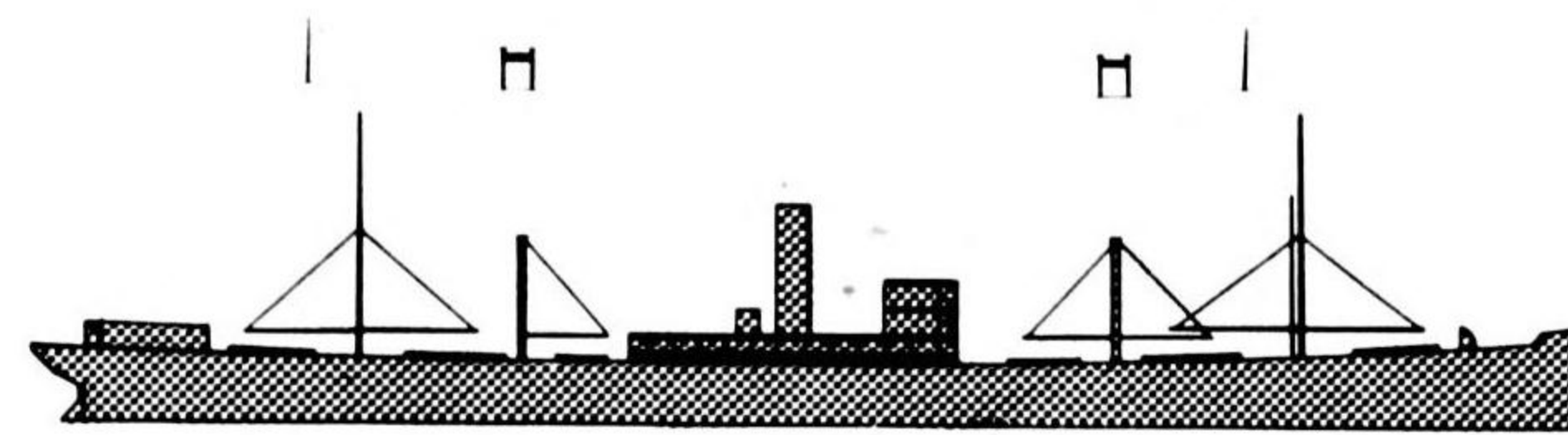


KMFMK
4L/B
Winch houses

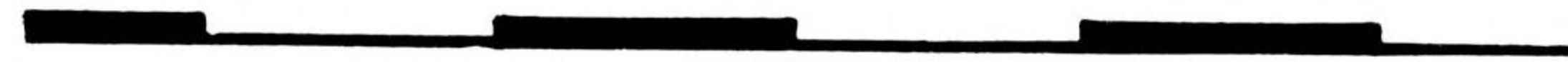


NO K ON SUPERST.

TAMON MARU approx. 470' o. a.
8,156 g. t.
(P. 70)

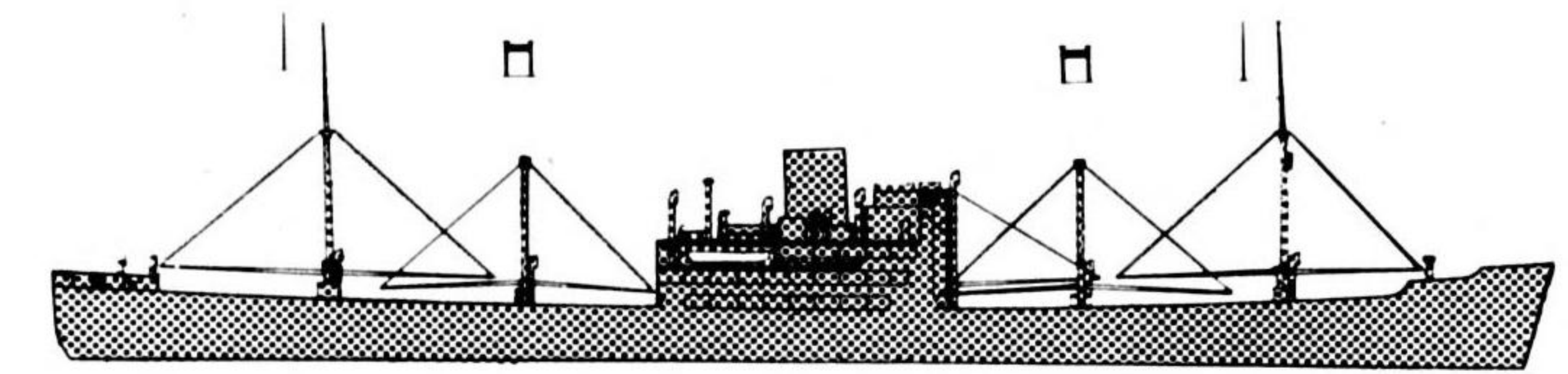


Flush decked
Tall stack

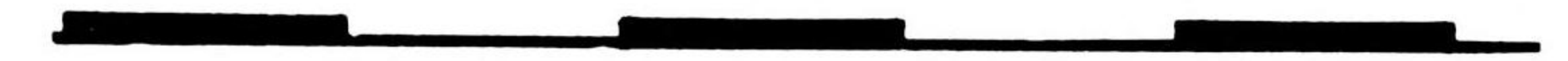


NO K ON SUPERST.

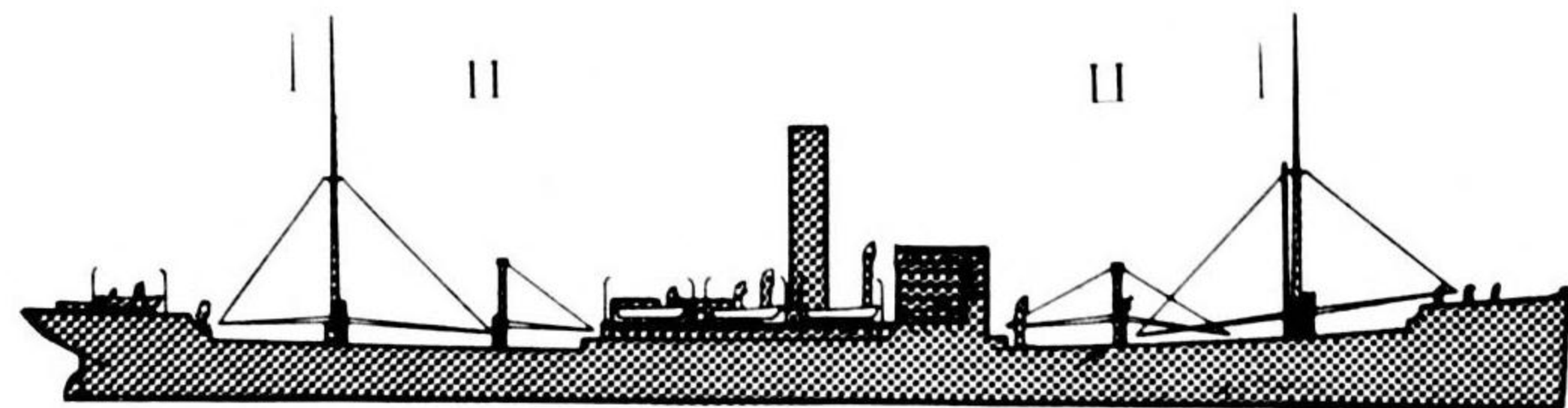
KAGA MARU Class 502' o. a.
9,305 g. t.
(P. 72)



K flush with bridge
Short stack slightly forward
1L/B



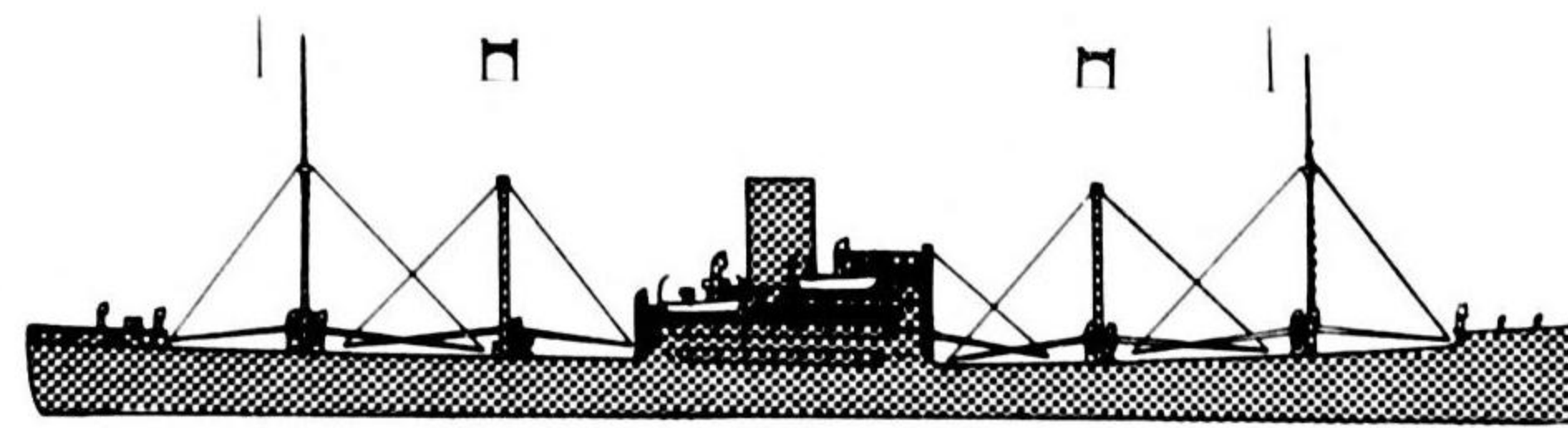
AFRICA MARU Class approx. 500' o. a.
9,467 g. t.
(P. 99)



3L/B
Tall Stack
Well decks



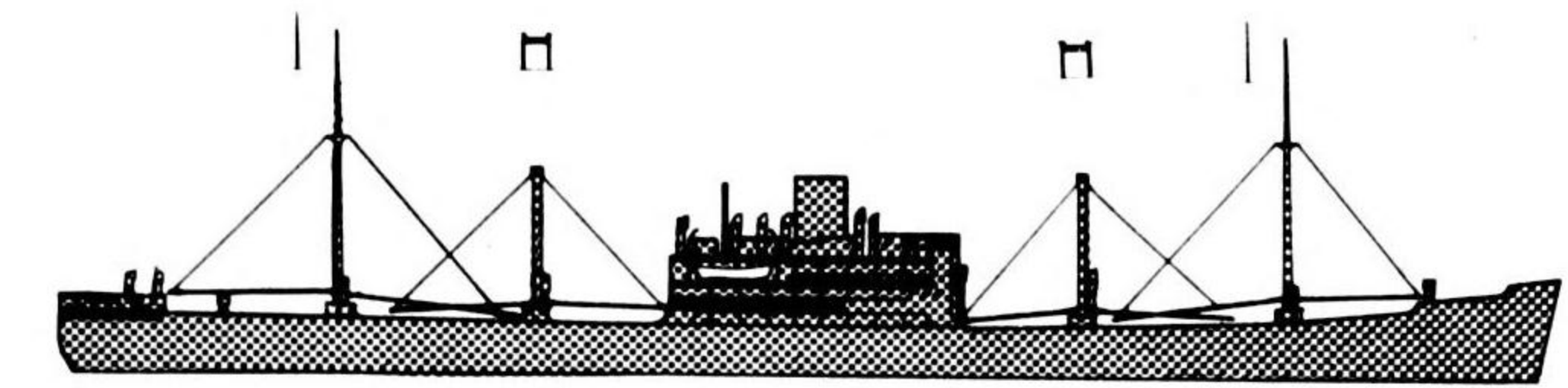
HOKKAI MARU Class 485' o. a.
8,400 g. t.
(P. 77)



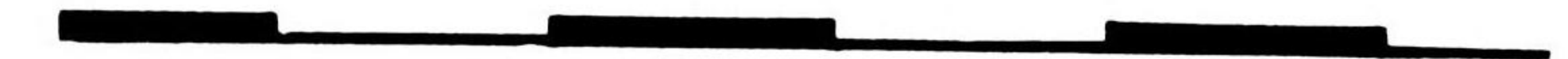
2 L/B No. 2 stepped down



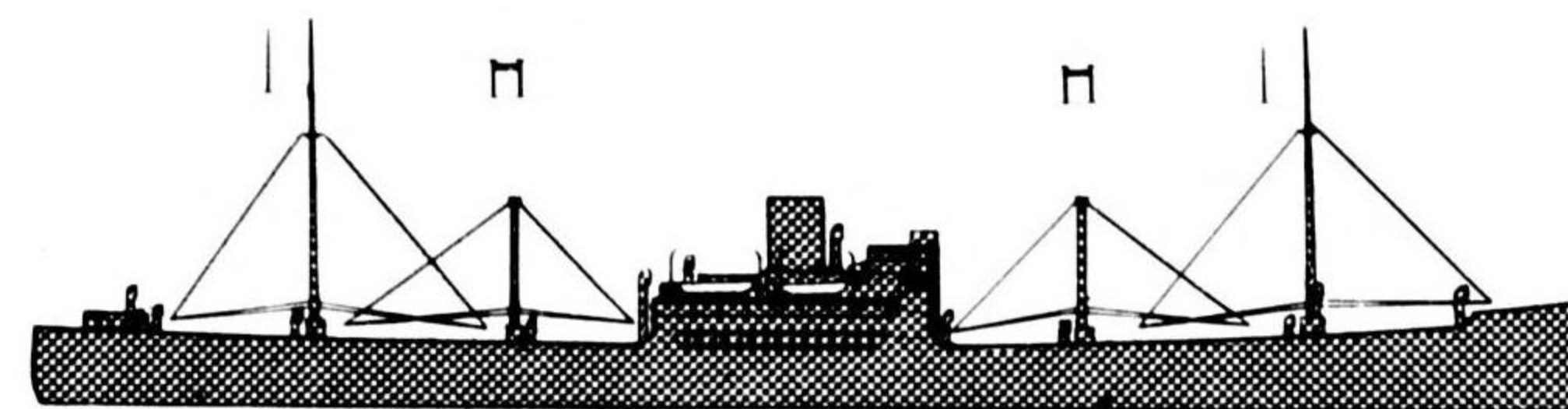
KASHII MARU Class 477' o. a.
8,500 g. t.
(P. 76)



Short stack centered
1L/B



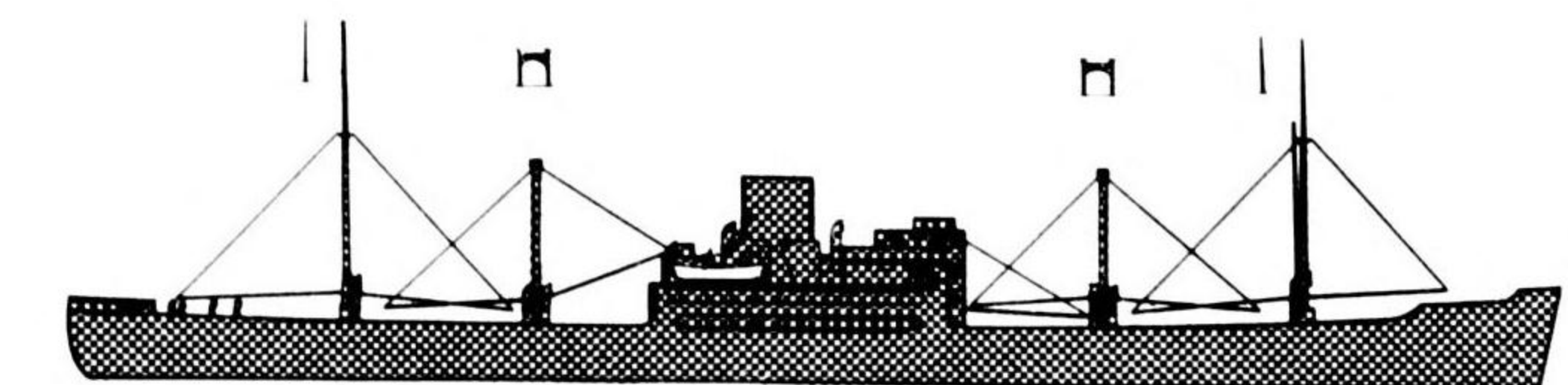
KANSAI MARU Class approx. 485' o. a.
8,607 g. t.
(P. 75)



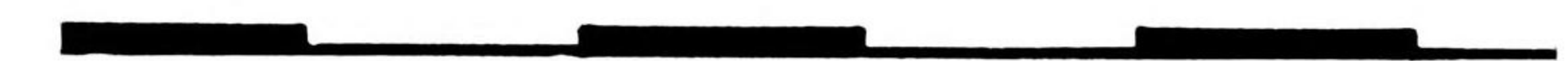
2 L/B (same level)



AZUMA MARU 485' o. a.
6,648 g. t.
(P. 74)



Short stack slightly aft
1L/B

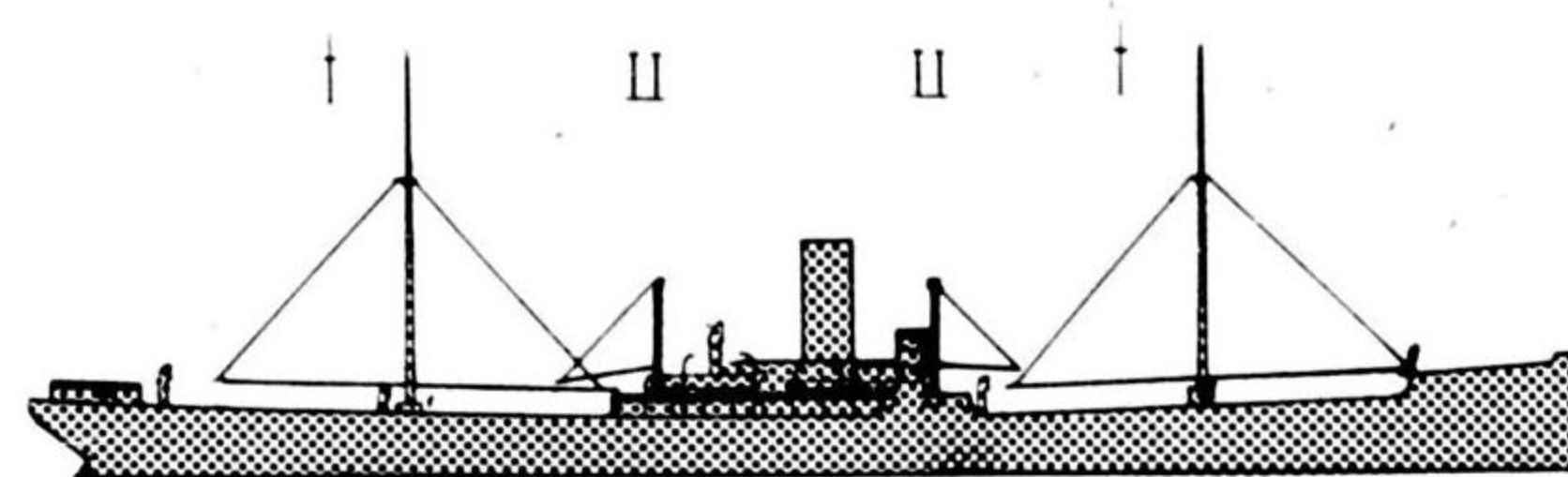


FREIGHTER TRANSPORTS

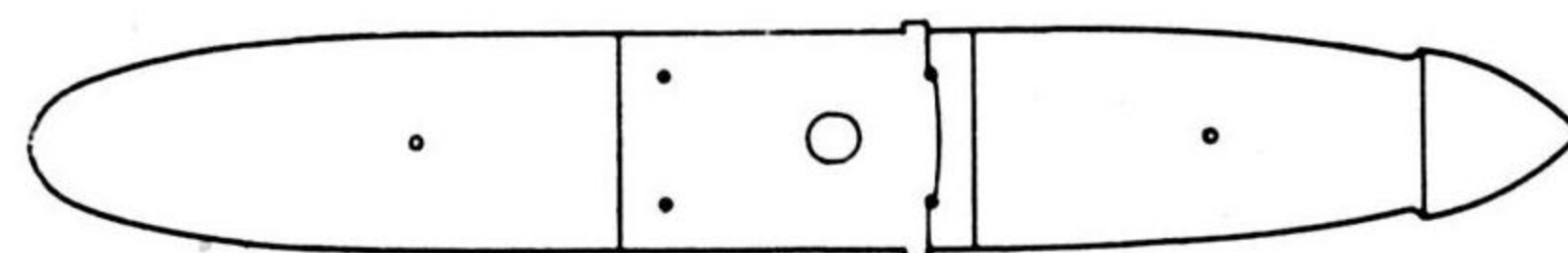
FOX TARE ABLE (4 MK)

2 K AT SUPERST.

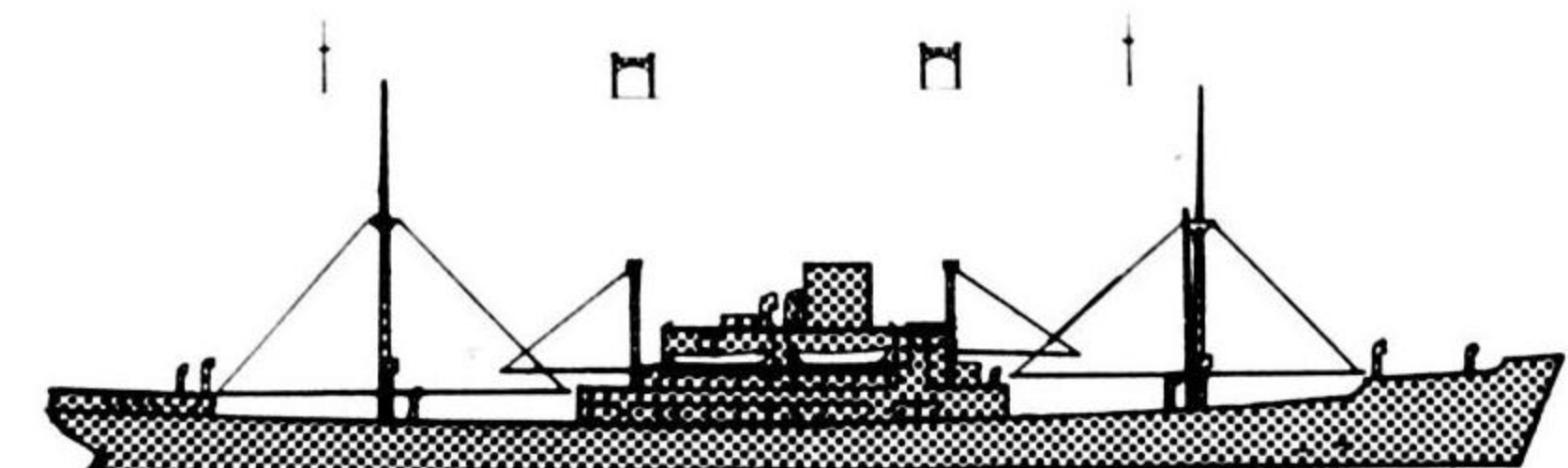
BRISBANE MARU Class approx. 400' o.a.
5,423 g.t.
(P.91)



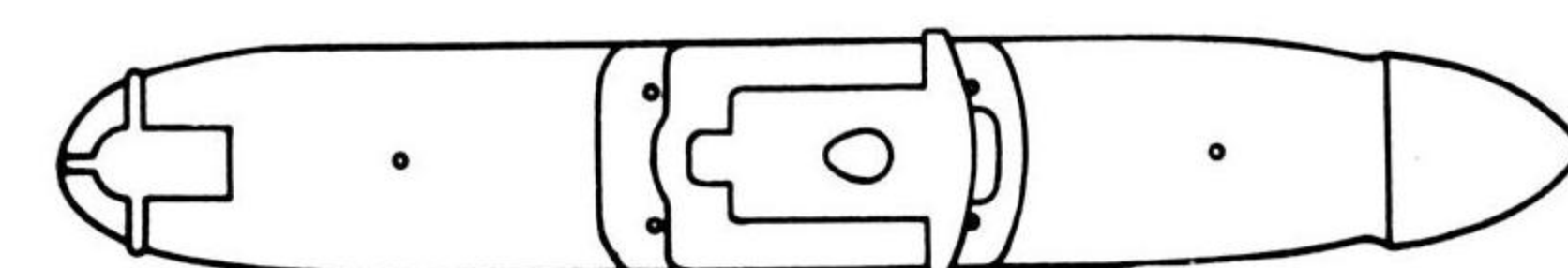
Tall stack
No crosstree on K



BANGKOK MARU Class approx. 395' o.a.
5,350 g.t.
(P.92)

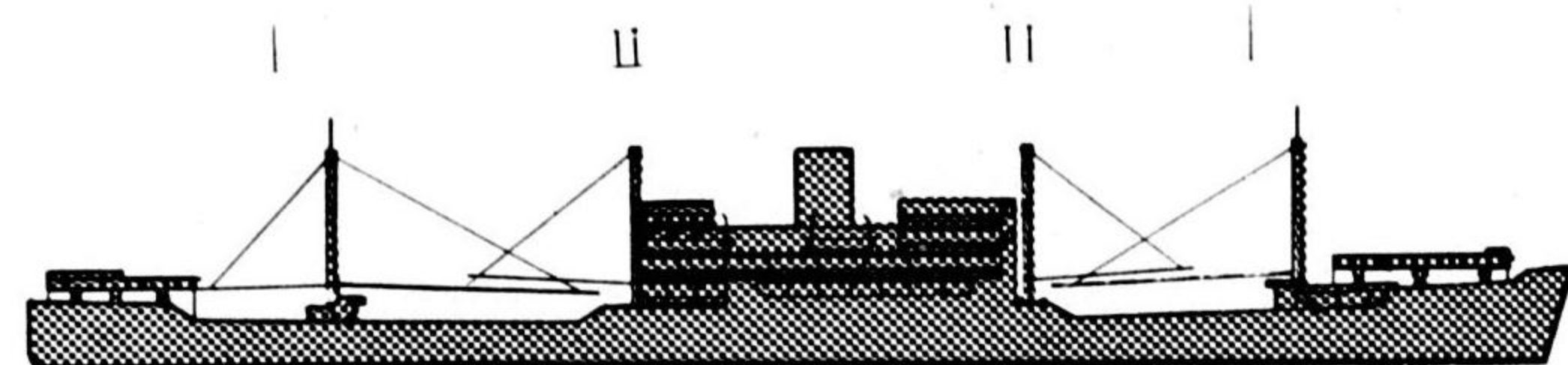


Short stack
2L/B

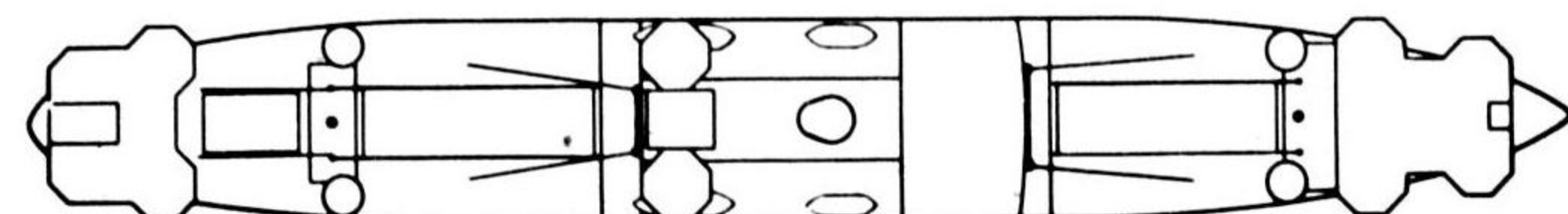


2 K AT SUPERST.

KIBITSU MARU Class approx. 500' o.a.
9,400 g.t.
(Provisional Drawing)



Large gun tubs
Assault transport



FREIGHTER TRANSPORTS

FOX TARE BAKER (5-4 MK)

5 MK

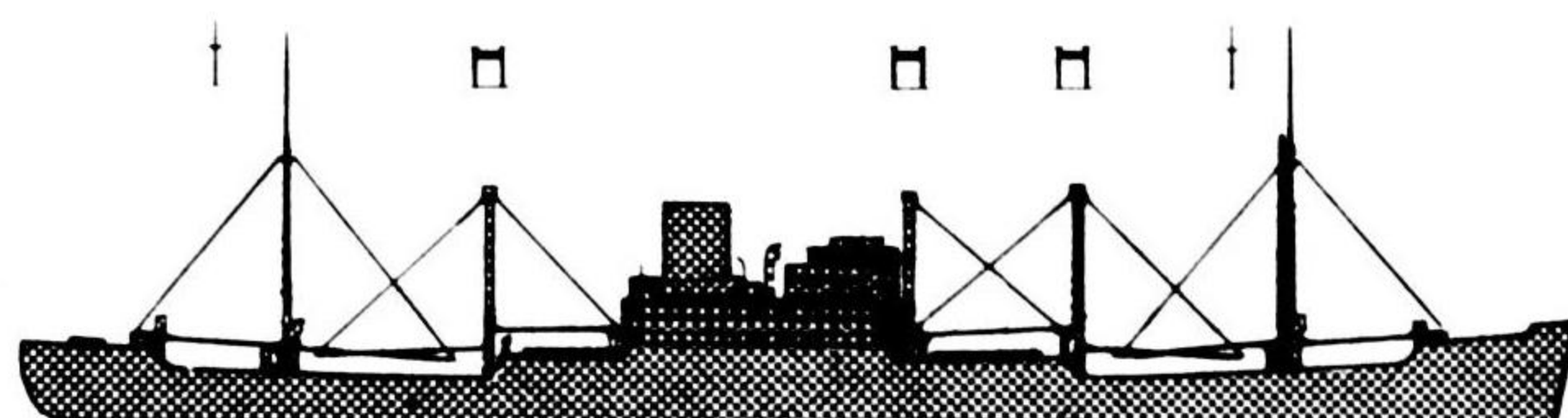
YAMABIKO MARU Class 460' o. a.
6,798 g. t.
(P. 124)



3 MK aft with K on poopdeck



NAGARA MARU Class 470' o. a.
7,145 g. t.
(P. 125)

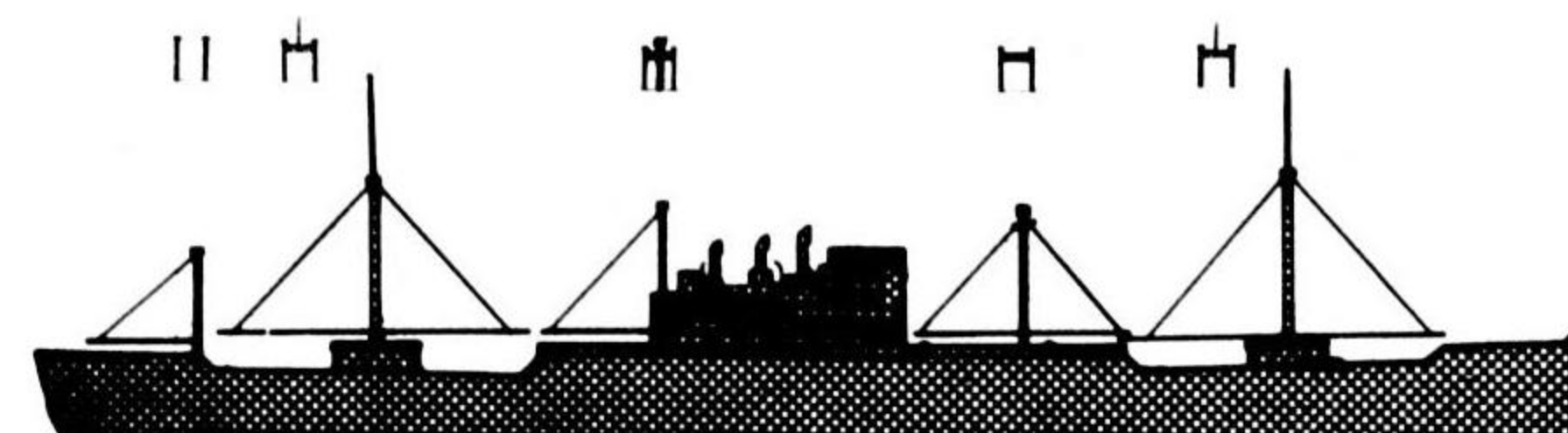


3 MK forward, K against bridge
Stack aft on superstructure



5 MK

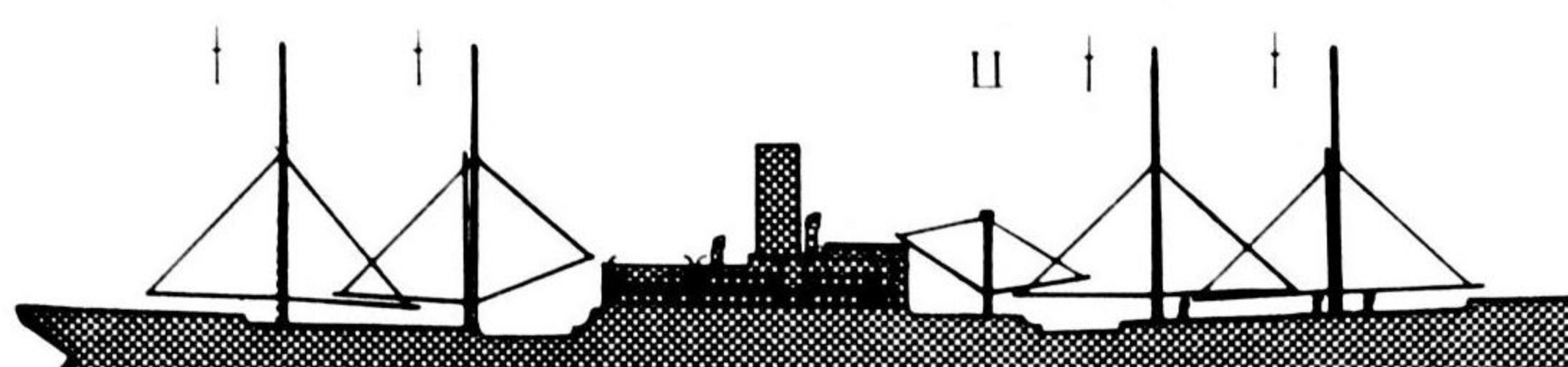
KURAMA MARU approx. 450' o. a.
6,789 g. t.
(P. 259)



KTKKKTK
No Stack



DON JOSE approx. 550' o. a.
10,893 g. t.
(P. 175)

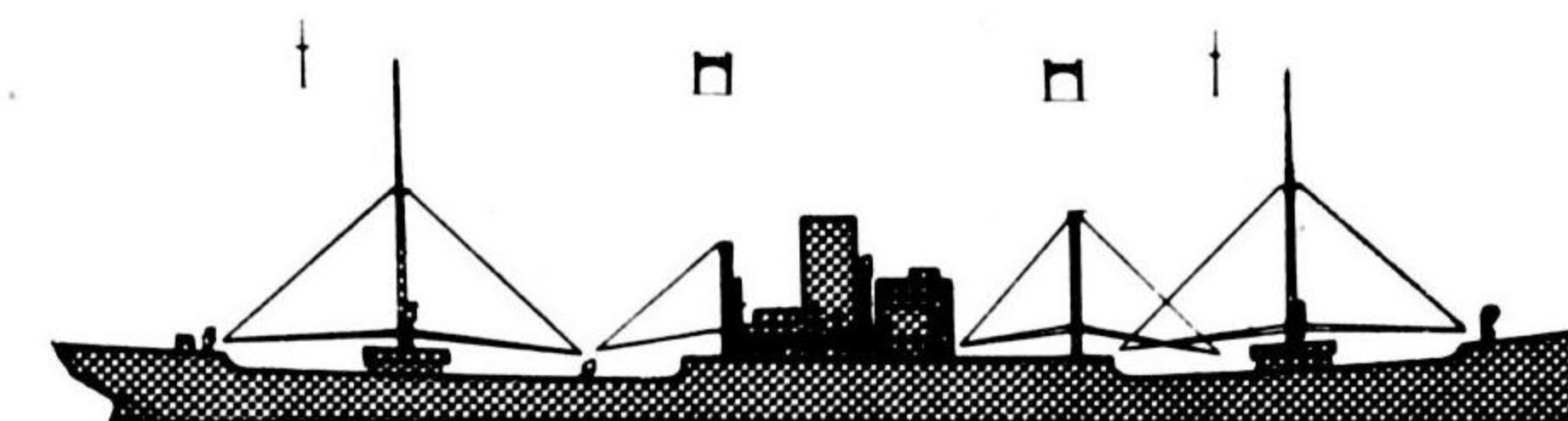


MMKFMM



4 MK, K AT SUPERST.

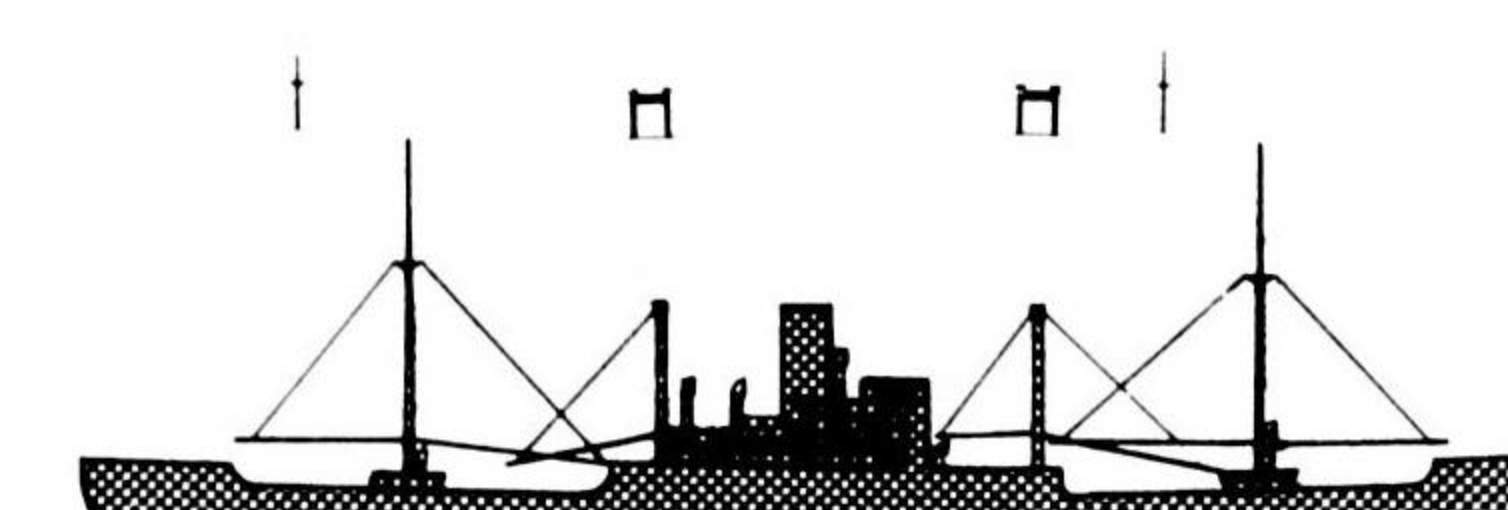
KOEI MARU Class 454' o. a.
6,700 g. t.
(P. 171)



79' longer than HINO MARU #3



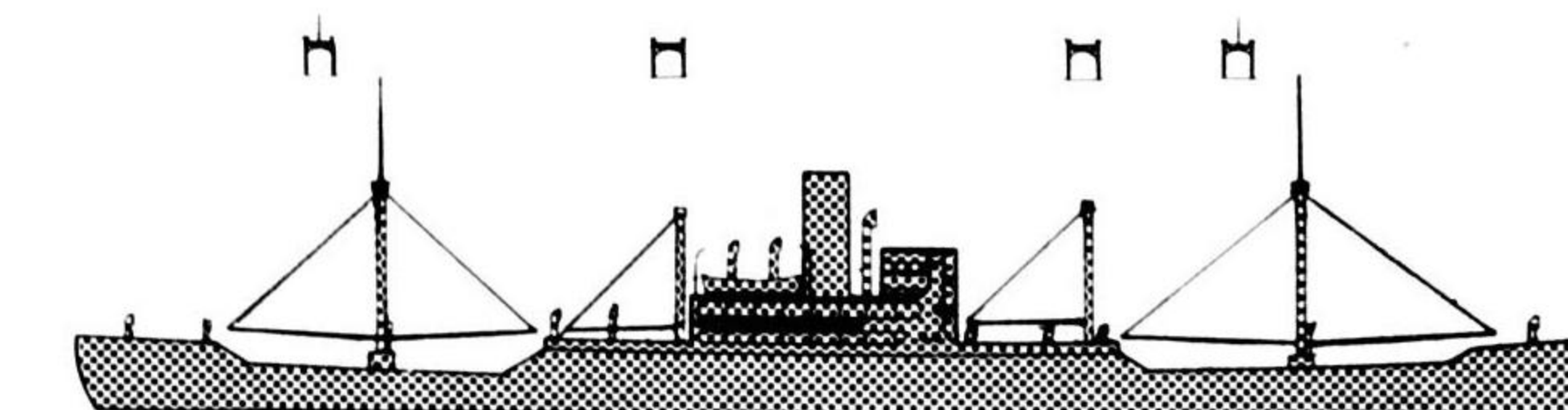
HINO MARU No. 3 approx. 380' o. a.
4,391 g. t.
(P. 122)



Note length



ARATAMA MARU Class 475' o. a.
6,777 g. t.
(P. 116)



KTKFKKT
Long storm deck aft

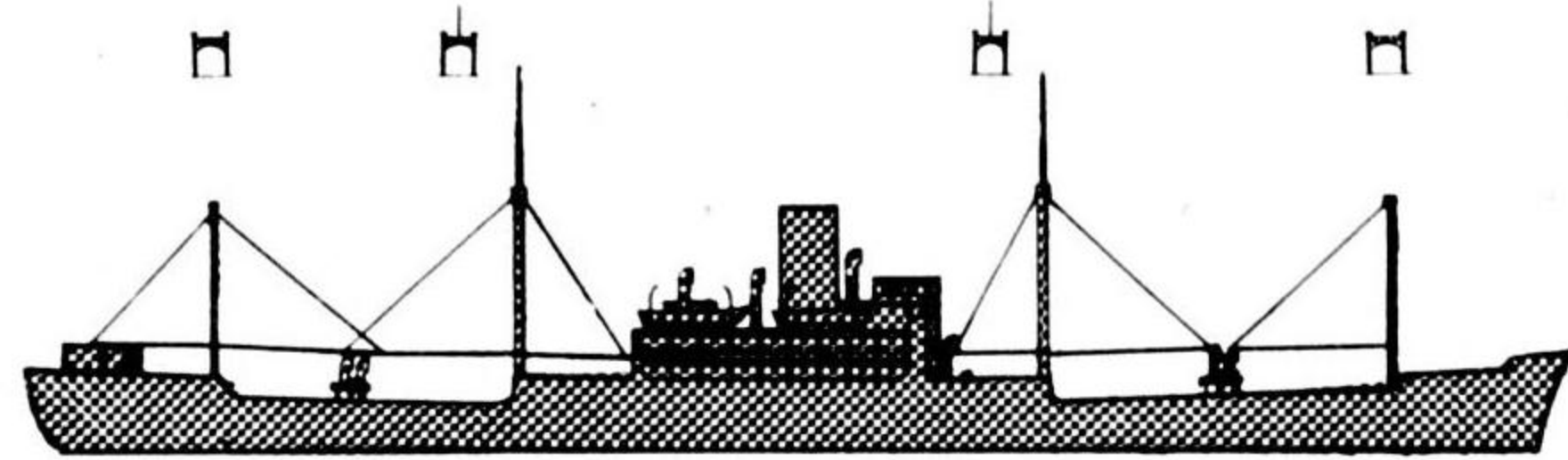


FREIGHTER TRANSPORTS

FOX TARE BAKER (4 MK)

I MK, ON POOP DECK

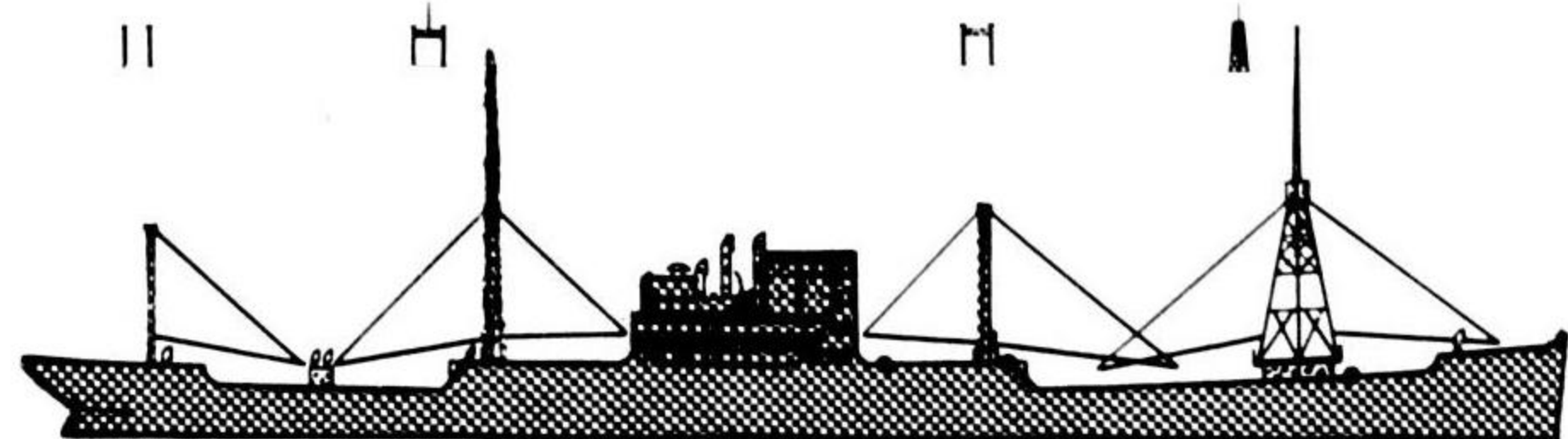
TATSUHARU MARU Class approx. 430' o. a.
6,335 g. t.
(P. 123)



K at break of forecastle
KK_TFK_TK



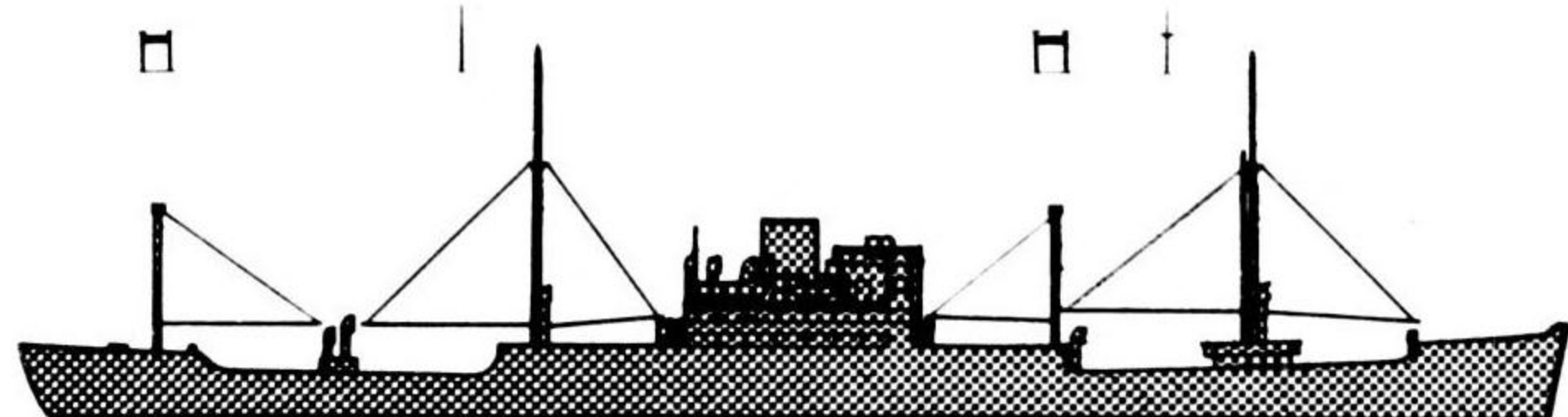
SHOHEI MARU approx. 455' o. a.
7,256 g. t.
(P. 261)



Tower foremast
No stack



KAMOGAWA MARU Class 456' o. a.
6,438 g. t.
(P. 113)

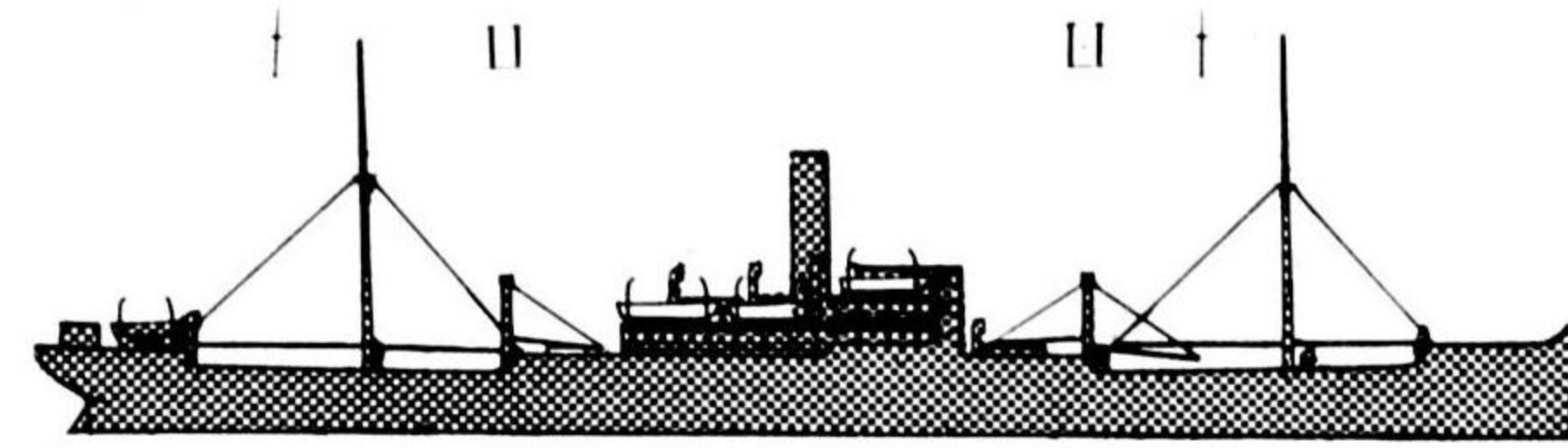


Stick foremast and mainmast
Winch house on foremast



NO MK ON POOP OR SUPERST.

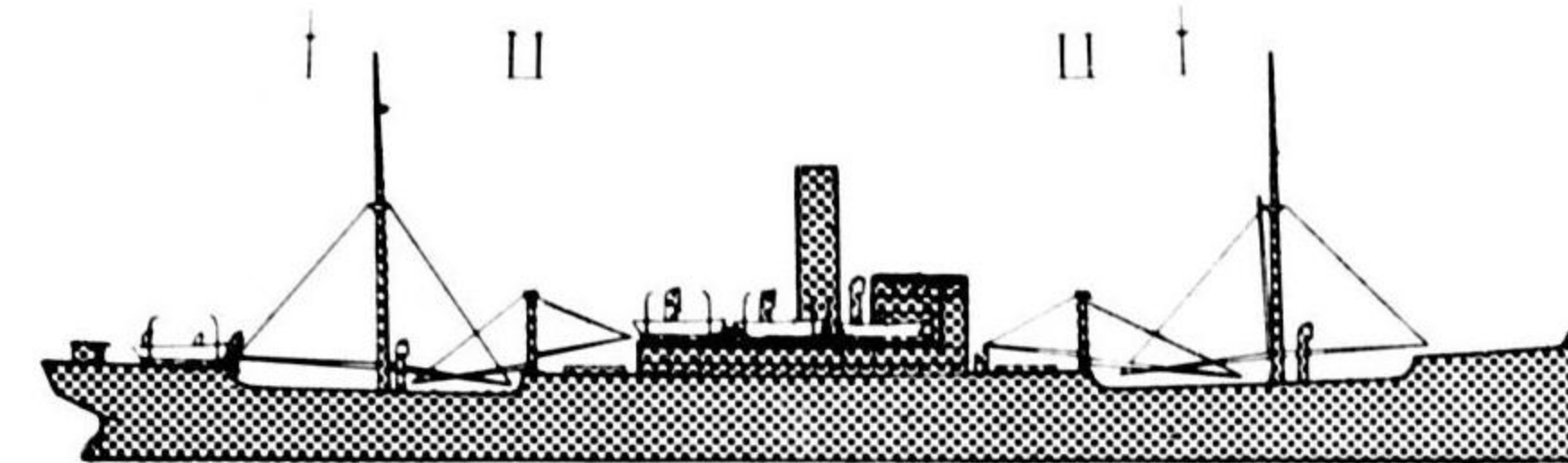
TACOMA MARU approx. 440' o. a.
5,773 g. t.
(P. 172)



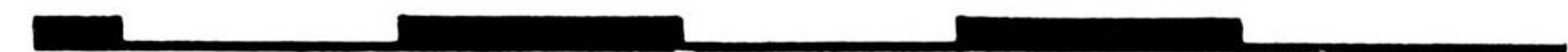
Tall thin stack
Square bridge
3L/B, No. 1 stepped up



MEXICO MARU approx. 430' o. a.
5,785 g. t.
(P. 173)

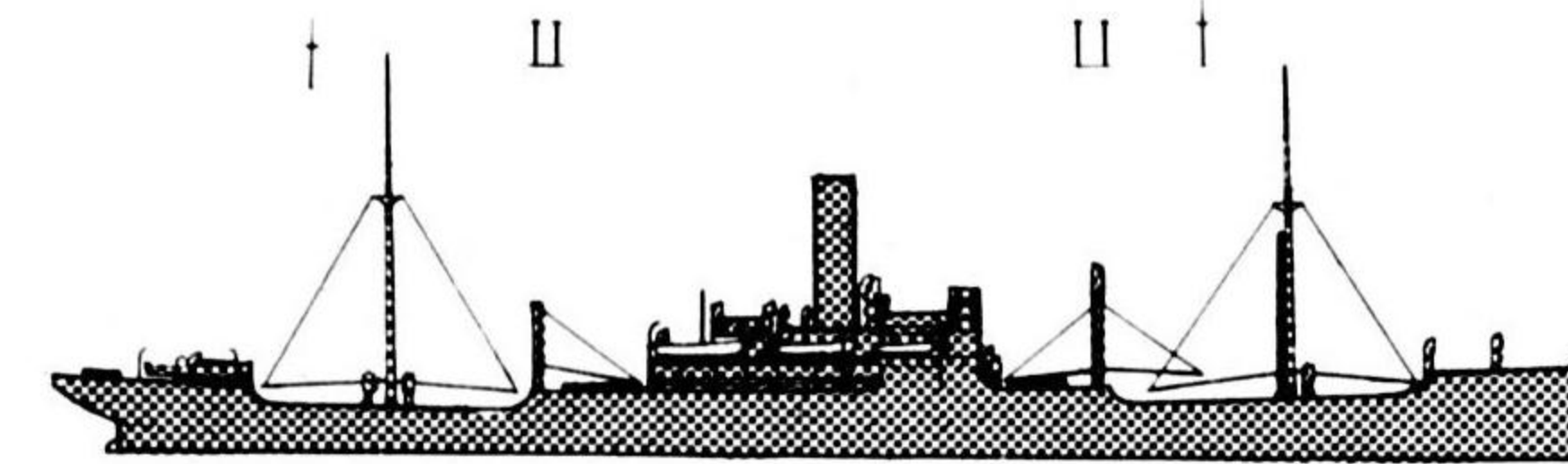


Tall stack
Square bridge
3L/B



NO MK ON POOP OR SUPERST.

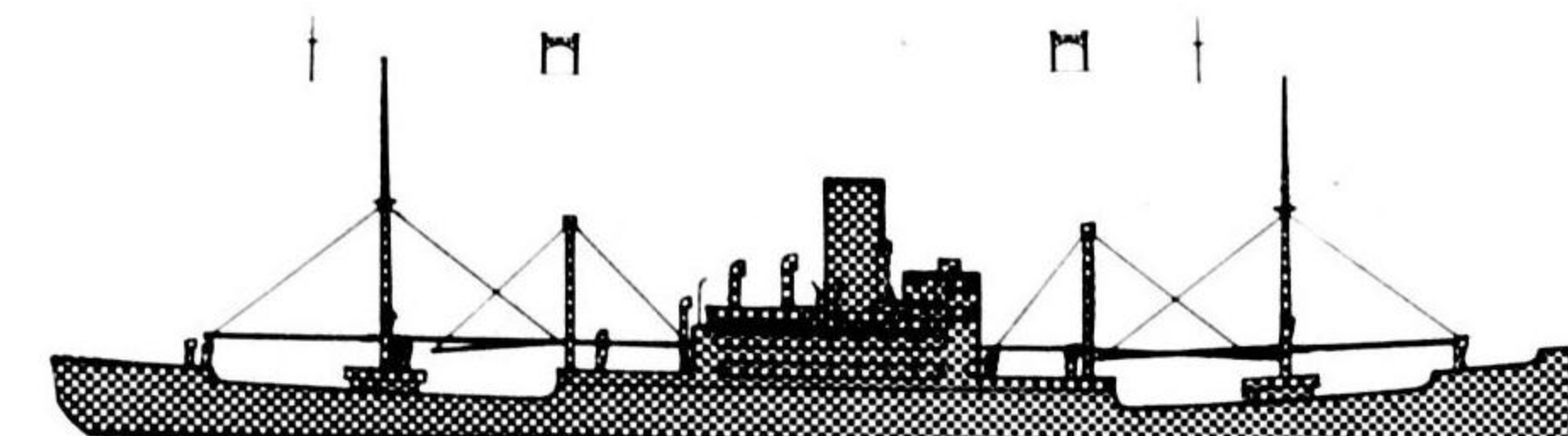
PANAMA MARU Class approx. 425' o. a.
5,261 g. t.
(P. 173)



Tall stack
Square bridge
3 L/B



TATSUKAMI MARU Class approx. 460' o. a.
7,064 g. t.
(P. 117)



Stack forward
Winch houses

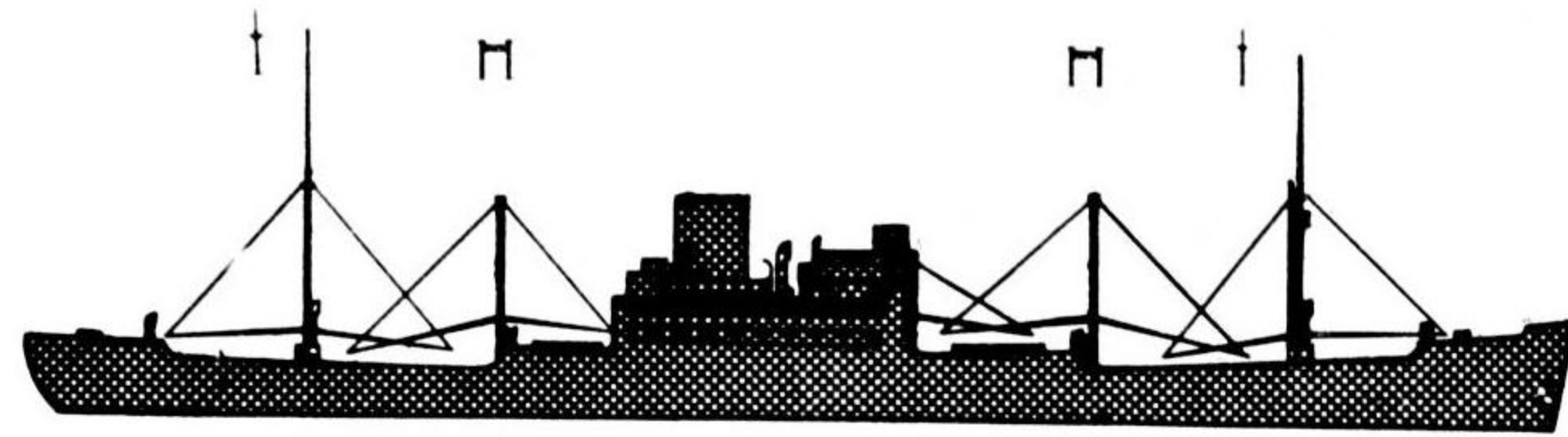


FREIGHTER TRANSPORTS

FOX TARE BAKER (4 MK)

NO MK ON POOP OR SUPERST.

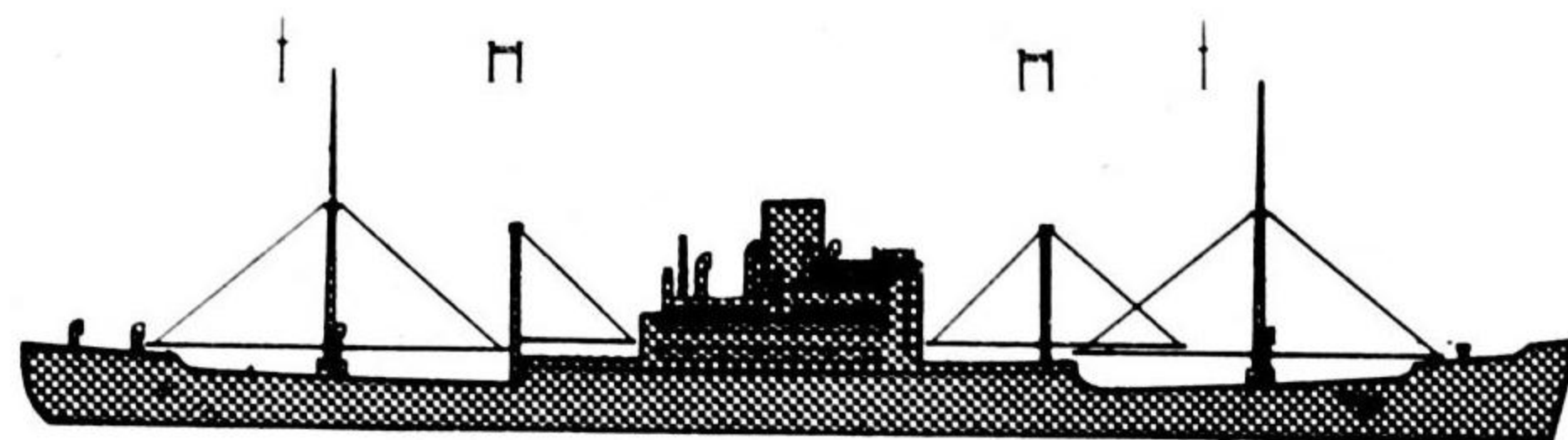
AKAGI MARU Class 485' o. a.
7,390 g. t.
(P. 114)



Stack aft on superstructure



NANA MARU Class 461' o. a.
6700 g. t.
(P. 119)

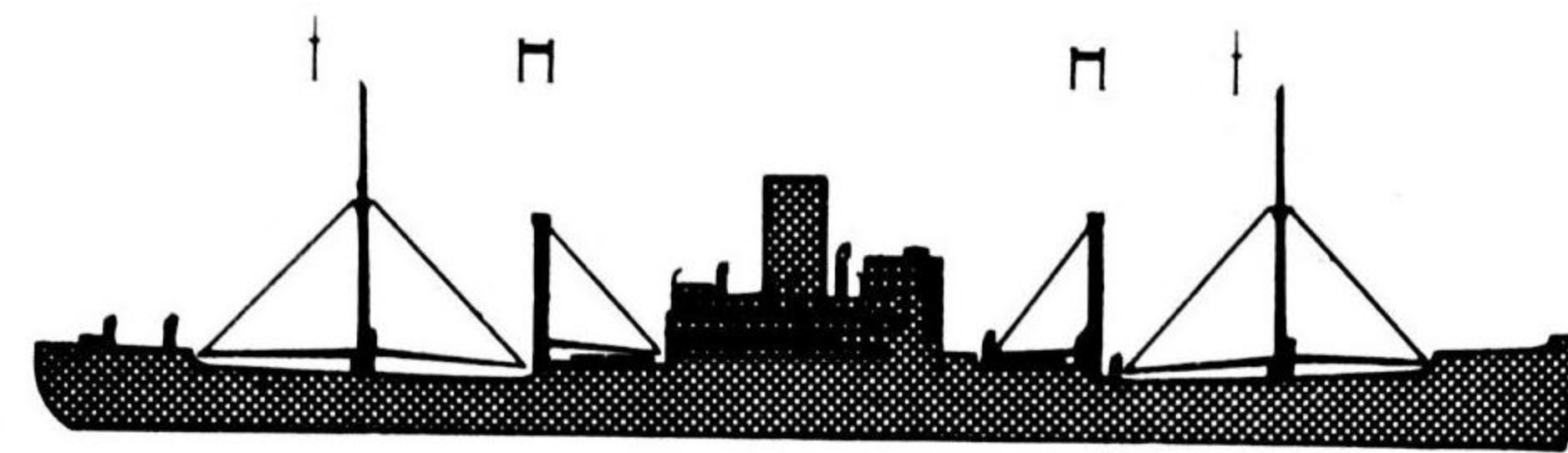


Stack amidships
KENYO MARU very similar



NO MK ON POOP OR SUPERST.

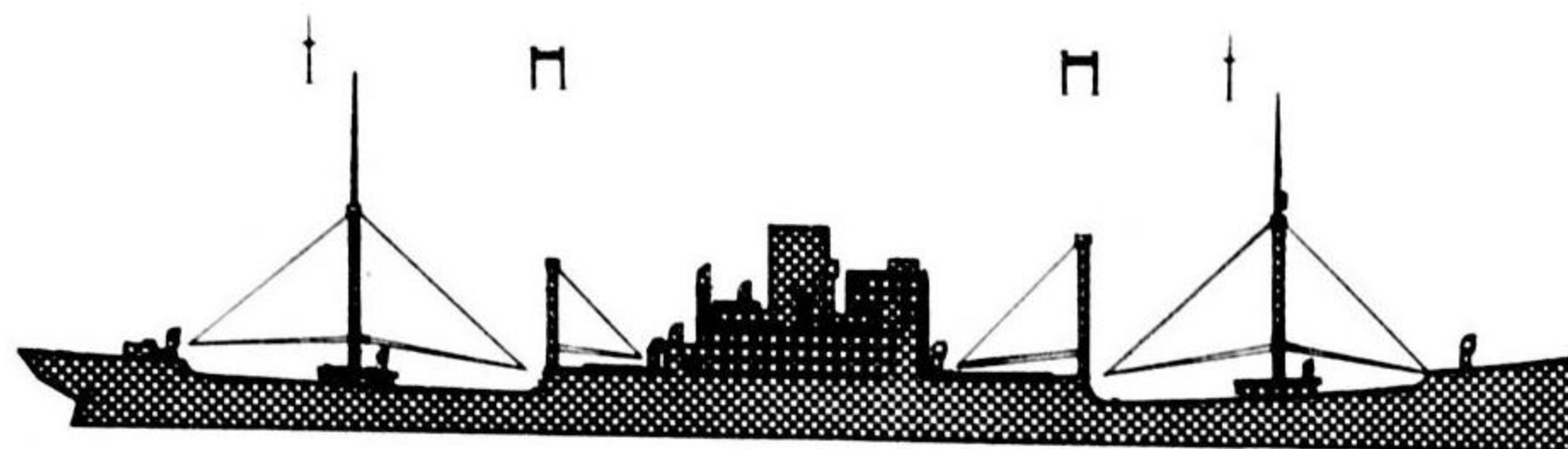
KENYO MARU Class 461' o. a.
6,550 g. t.
(P. 120)



Stack amidships



AKIURA MARU Class approx. 465' o. a.
7,100 g. t.
(P. 170)

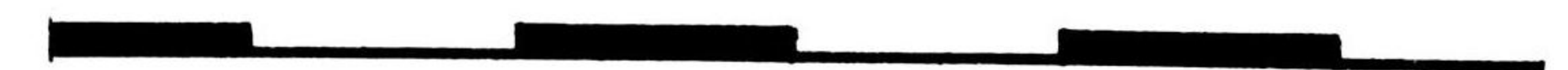
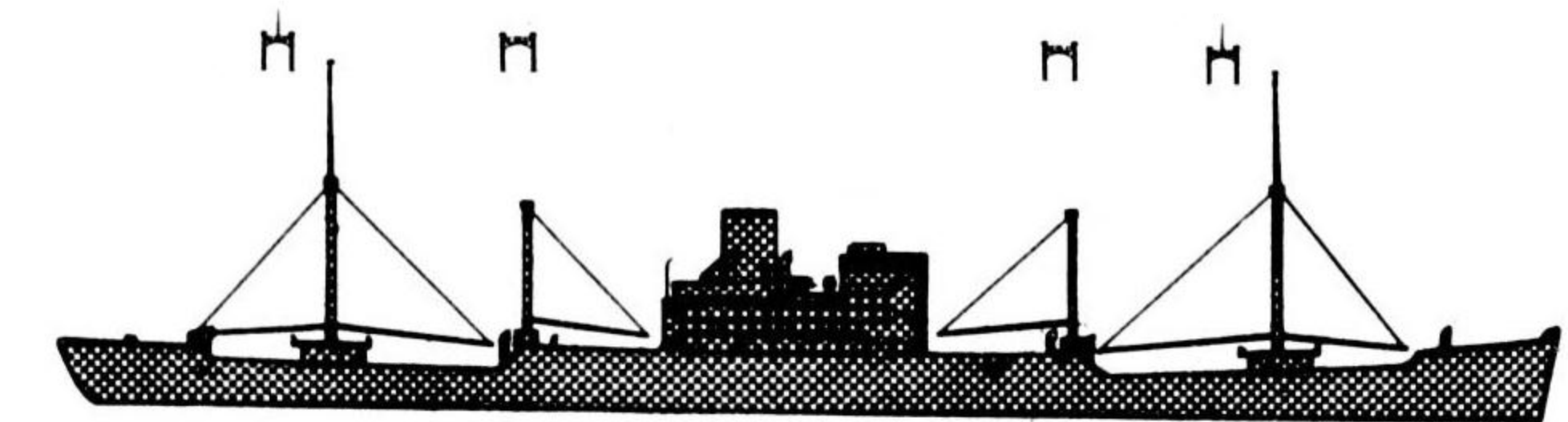


Narrow K forward

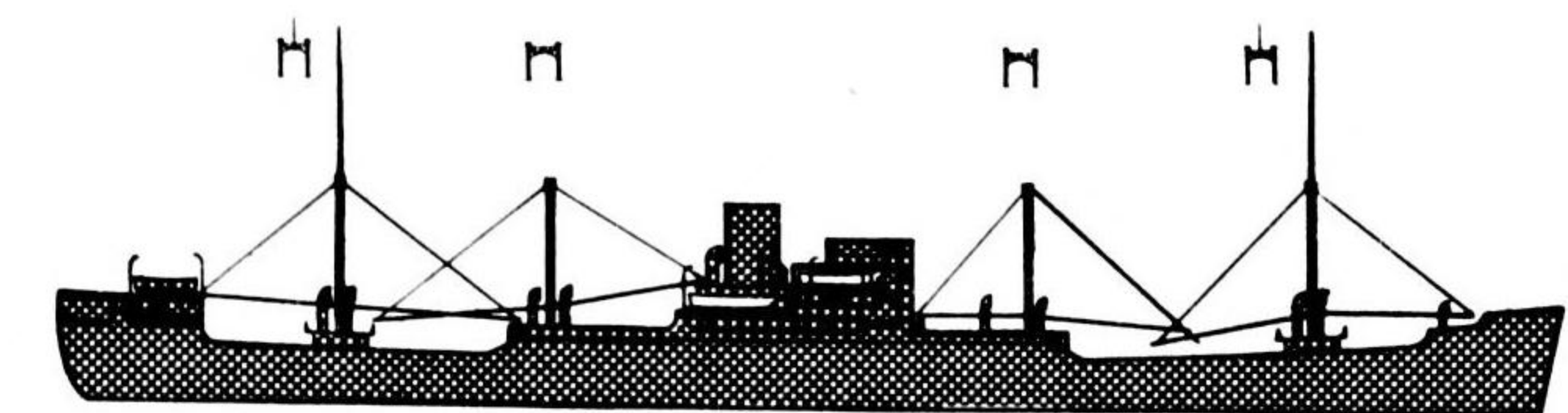


4 KK_T

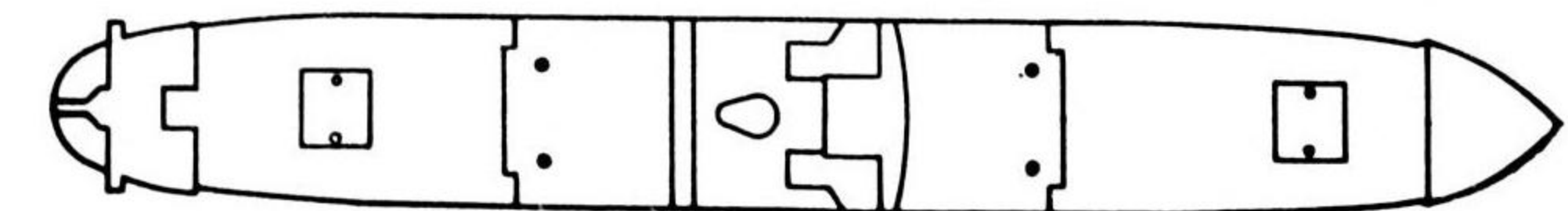
YAMAKAZE MARU Class 460' o. a.
9,925 g. t.
(P. 118)



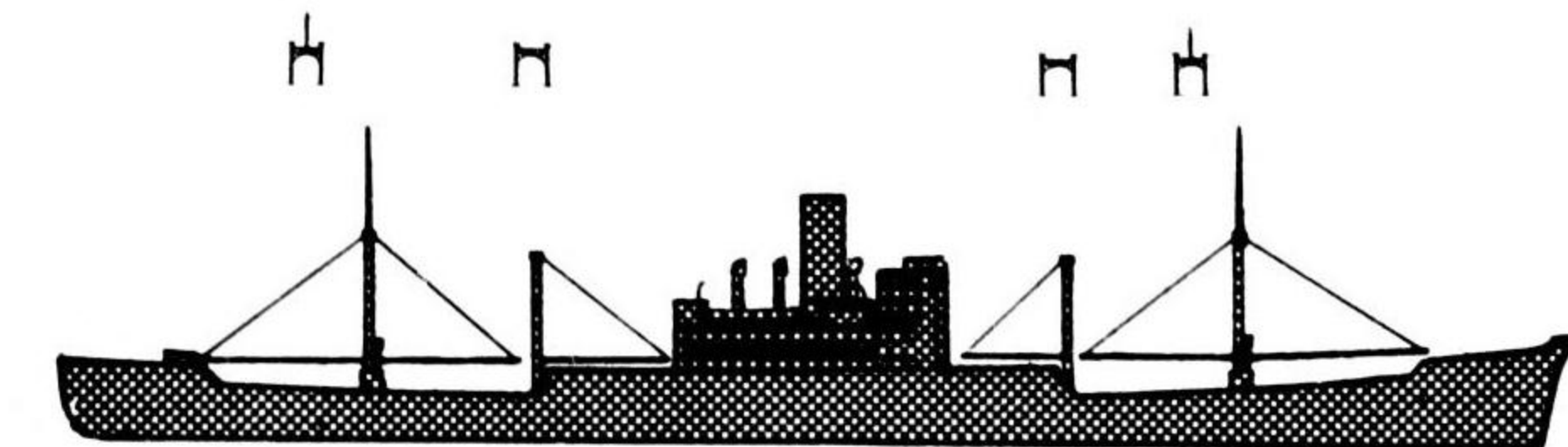
AMAGISAN MARU Class 472' o. a.
7,620 g. t.
(P. 115)



No. 2 L/B stepped down
Rectangular break in stormdeck



ASAKAZE MARU Class approx. 445' o. a.
6,353 g. t.
(P. 121)



No winch houses
Tall stack slightly forward

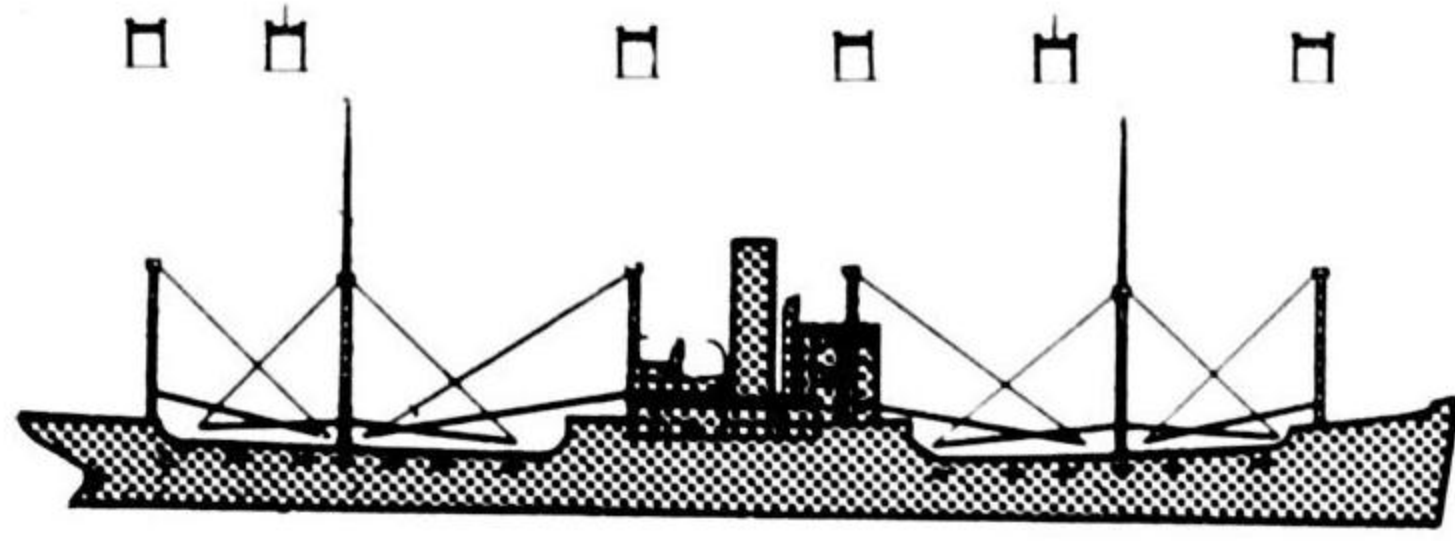


FREIGHTER TRANSPORTS

FOX TARE CHARLIE (6-4 MK)

6 KK_T

KONEI MARU approx. 310' o. a.
2,345 g. t.
(P. 165)

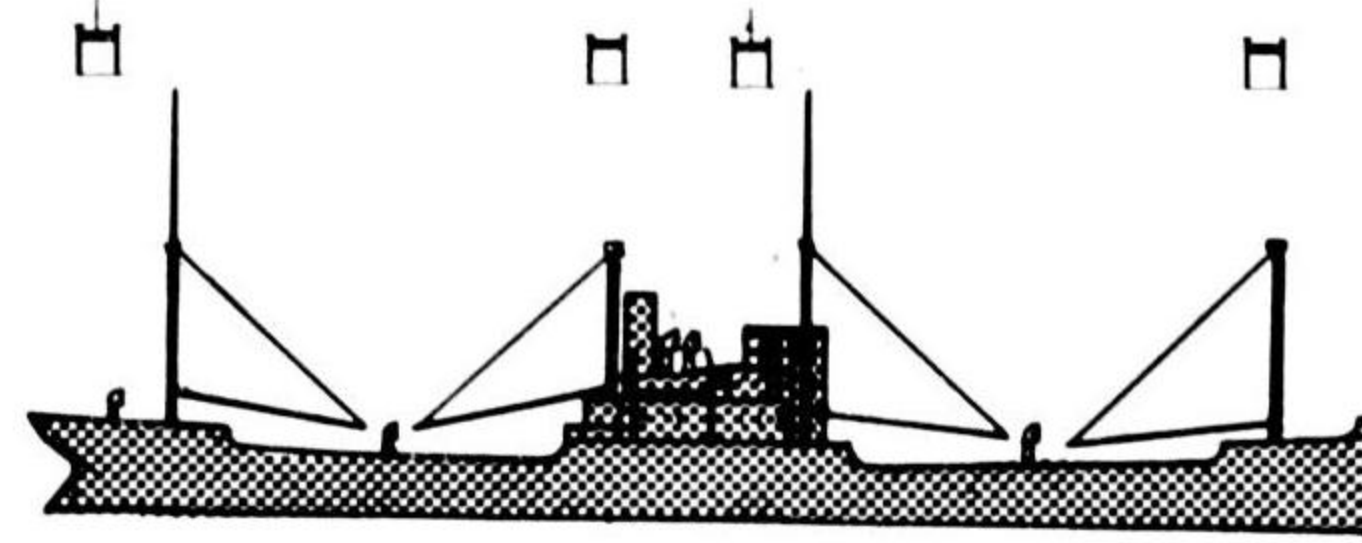


6KK_T

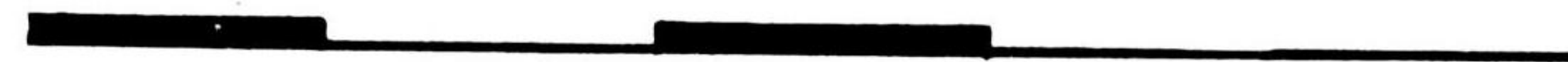


4 MK ON FOCSE, SUPERST. & POOP

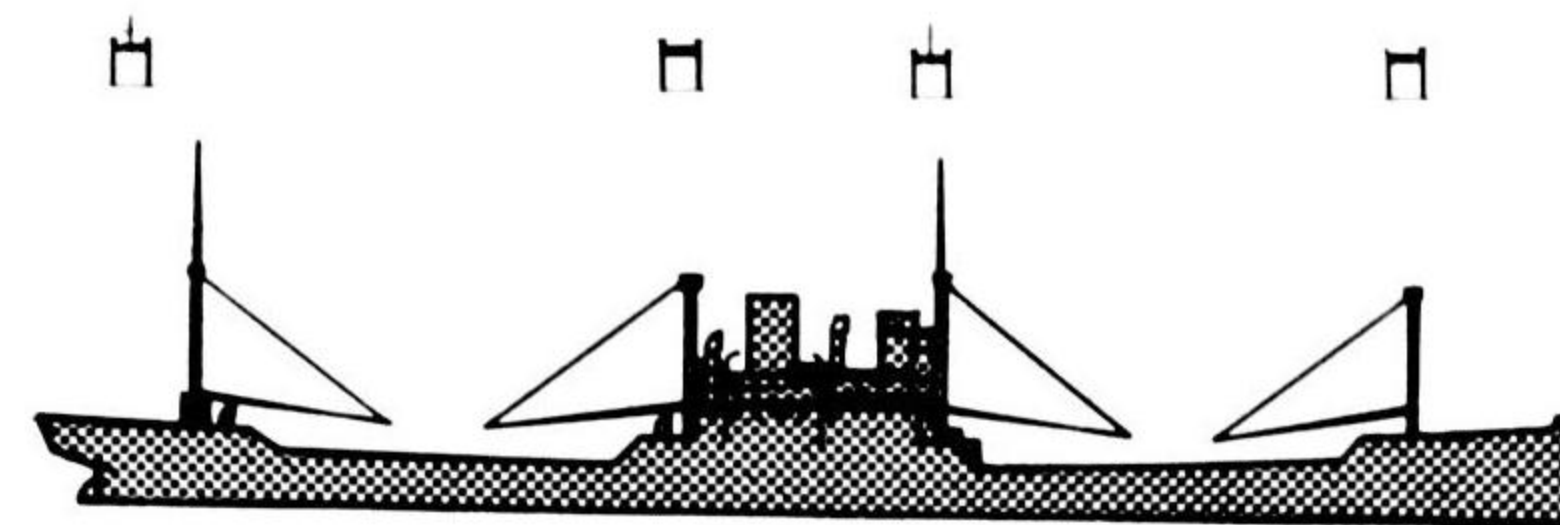
KURAMASAN MARU 287' o. a.
1,998 g. t.
(P. 165)



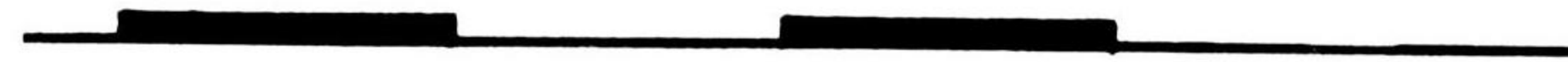
All KK_T
60' shorter than HINO MARU



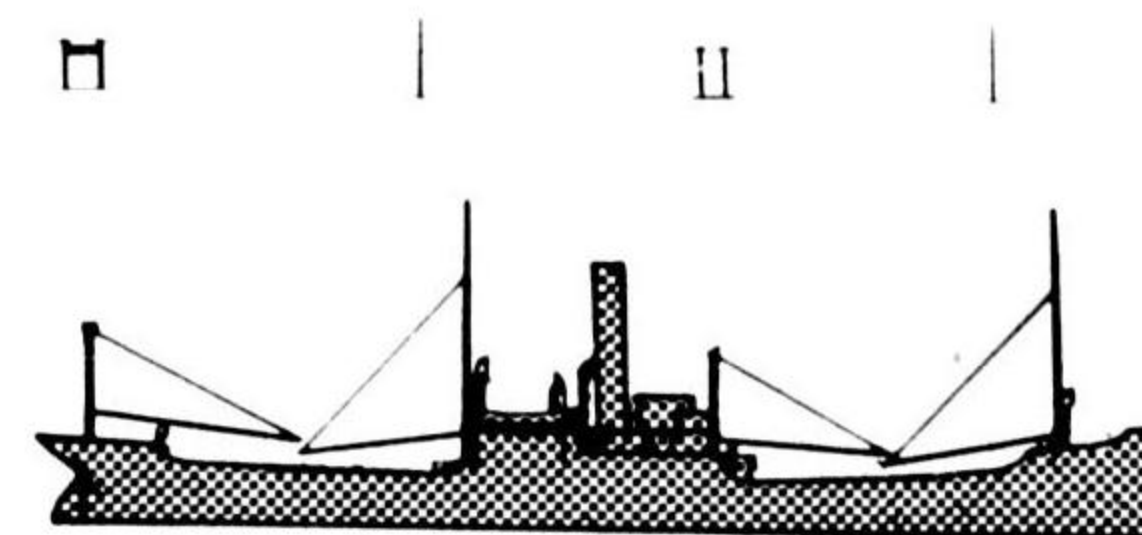
HINO MARU approx. 330' o. a.
2,666 g. t.
(P. 164)



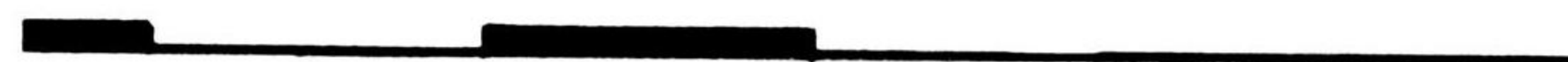
All KK_T



RANDI approx. 240' o. a.
1,132 g. t.
(P. 162)

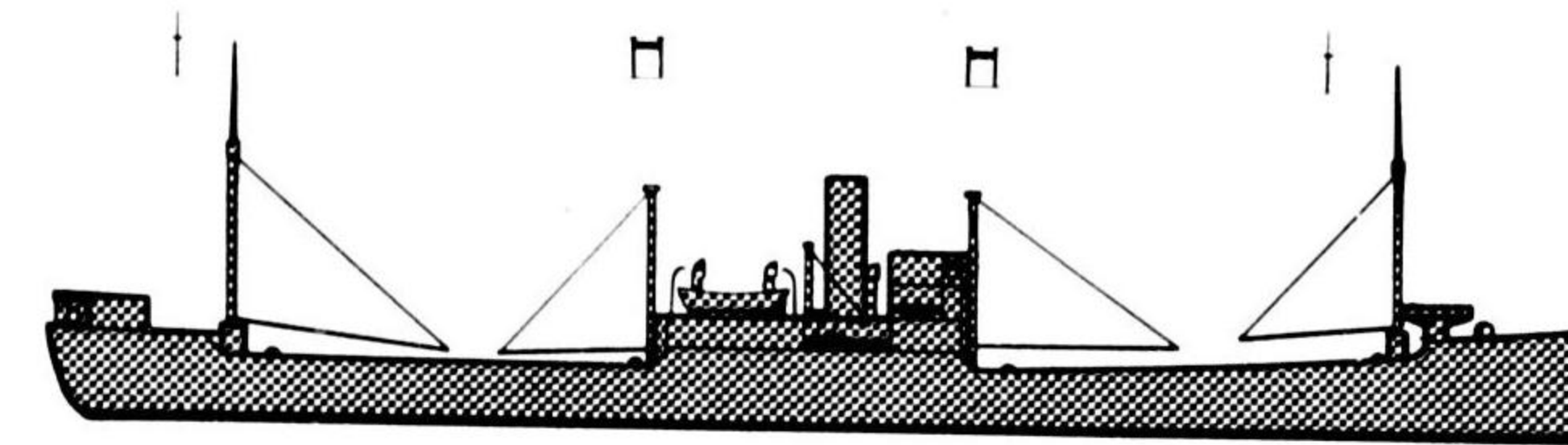


MKFMK



4 MK ON FOCSE, SUPERST. & POOP

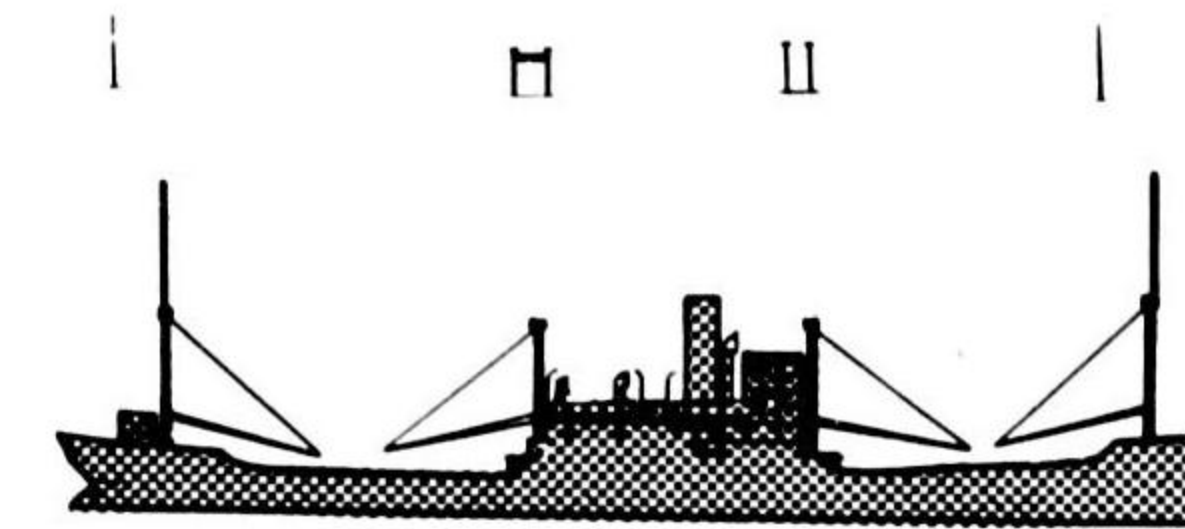
TYPE K ORE CARRIER 410' o. a.
(AKAMA MARU Class) 5,300 g. t.
(Supp. 3 P. 10)



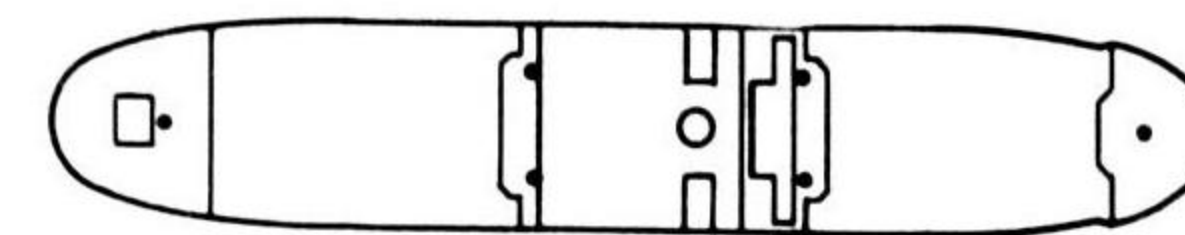
MKFKM
Side hatches on superstructure
Note length



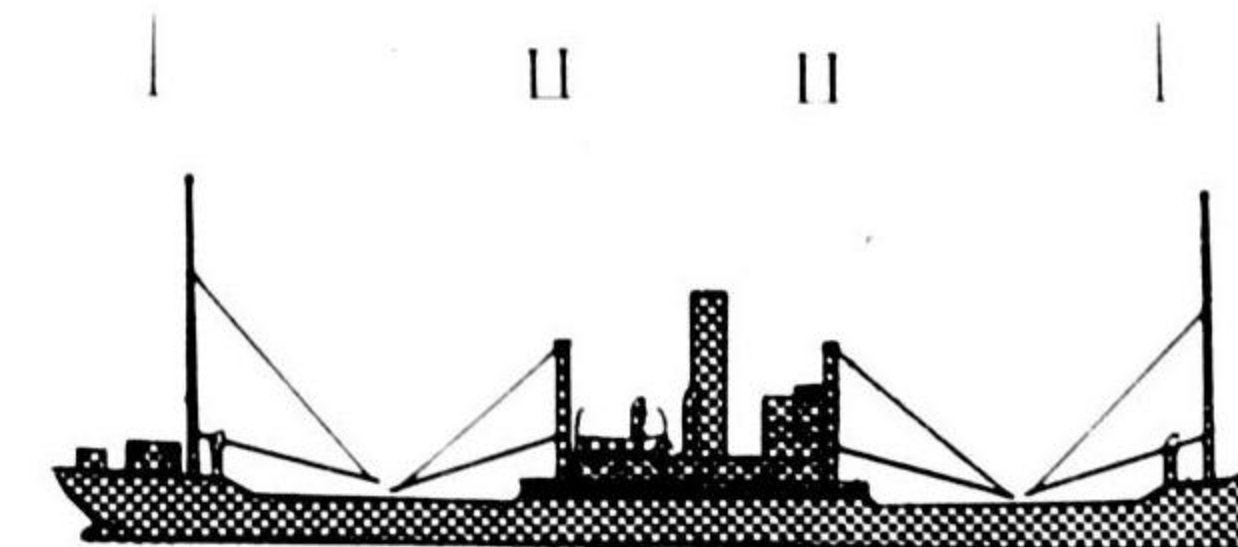
DAIGEN MARU Class 251' o. a.
2,000 g. t.
(P. 163)



MKFKM
Crosspiece on after K



KORYU MARU Class 261' o. a.
2,300 g. t.
(P. 164)



MKFKM

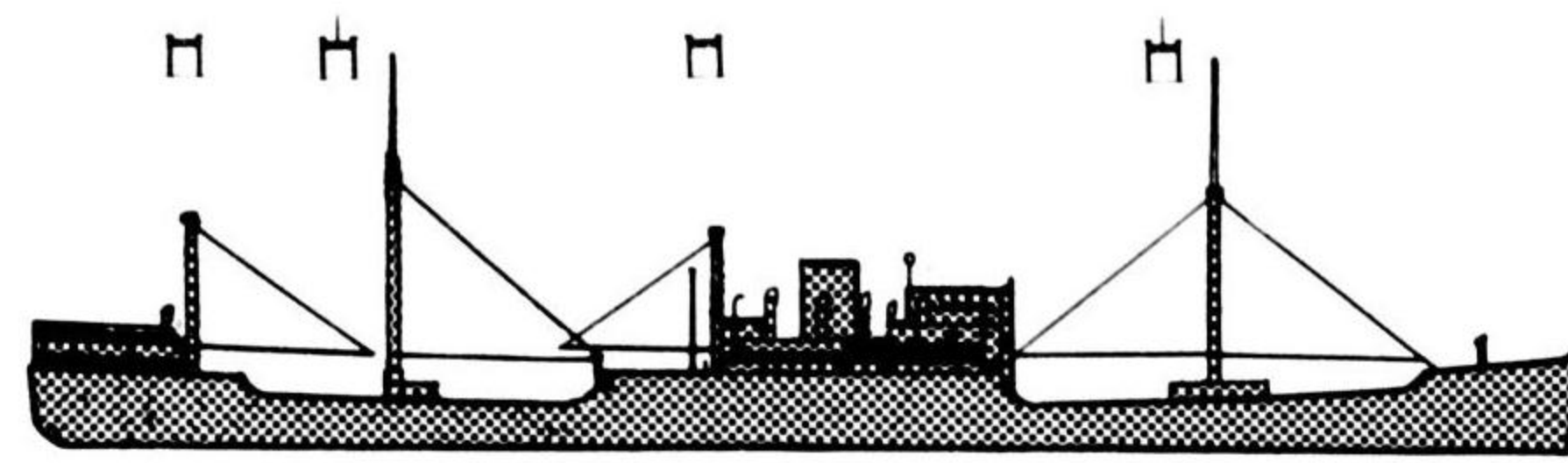


FREIGHTER TRANSPORTS

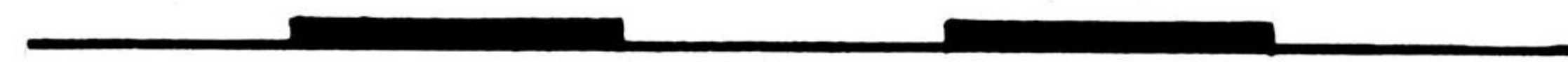
FOX TARE CHARLIE (4 MK)

FOREMAST CENTERED IN WELL

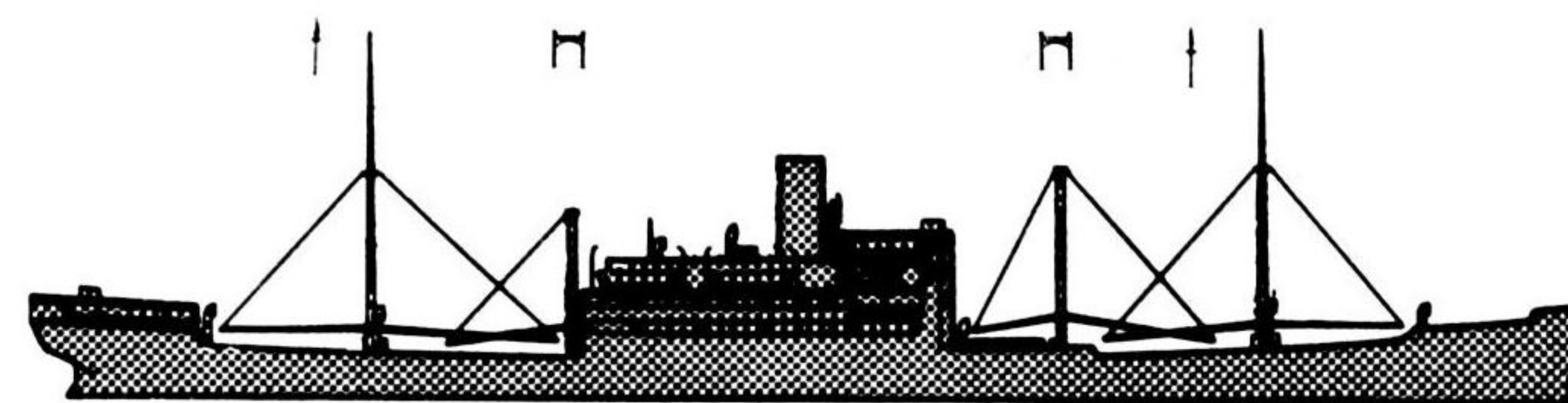
AKASHISAN MARU Class 378' o. a.
4,550 g. t.
(P. 112)



K_TFKK_TK
Stormdeck aft



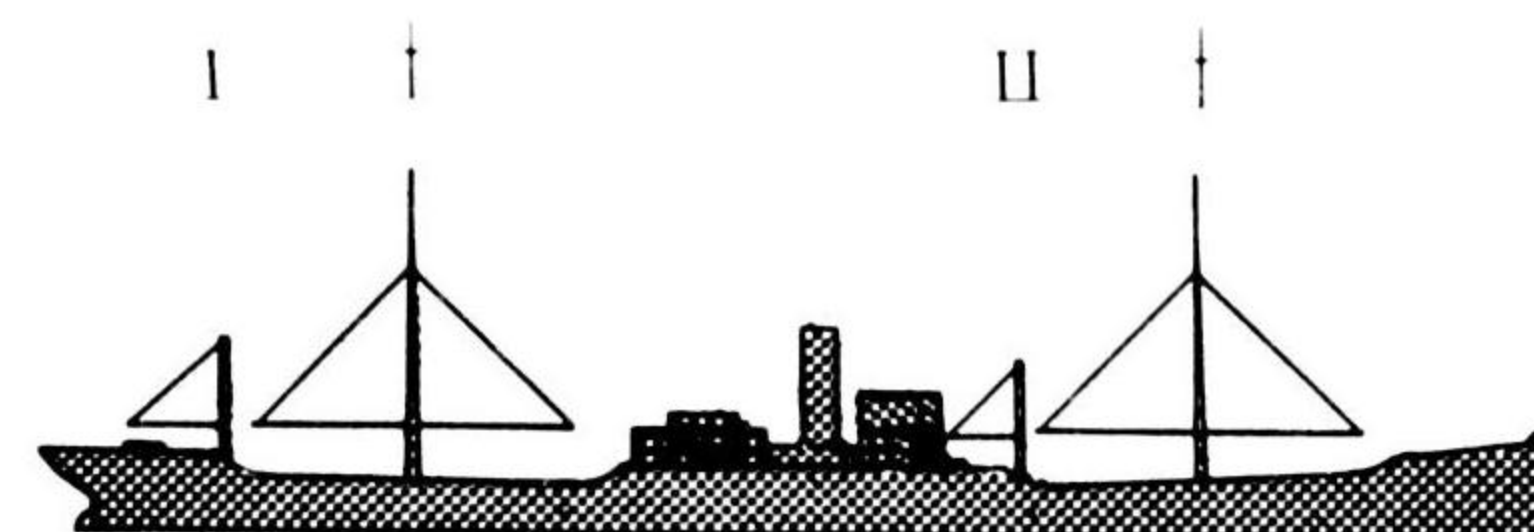
NITIRAN MARU Class approx. 435' o. a.
6,520 g. t.
(P. 172)



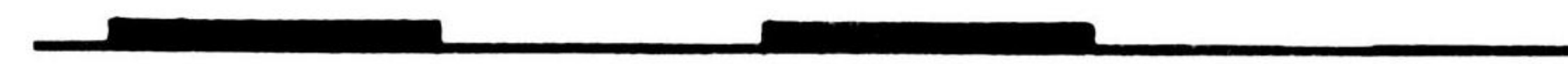
MKFKM



KOREI MARU approx. 320' o. a.
2,487 g. t.
(P. 170)

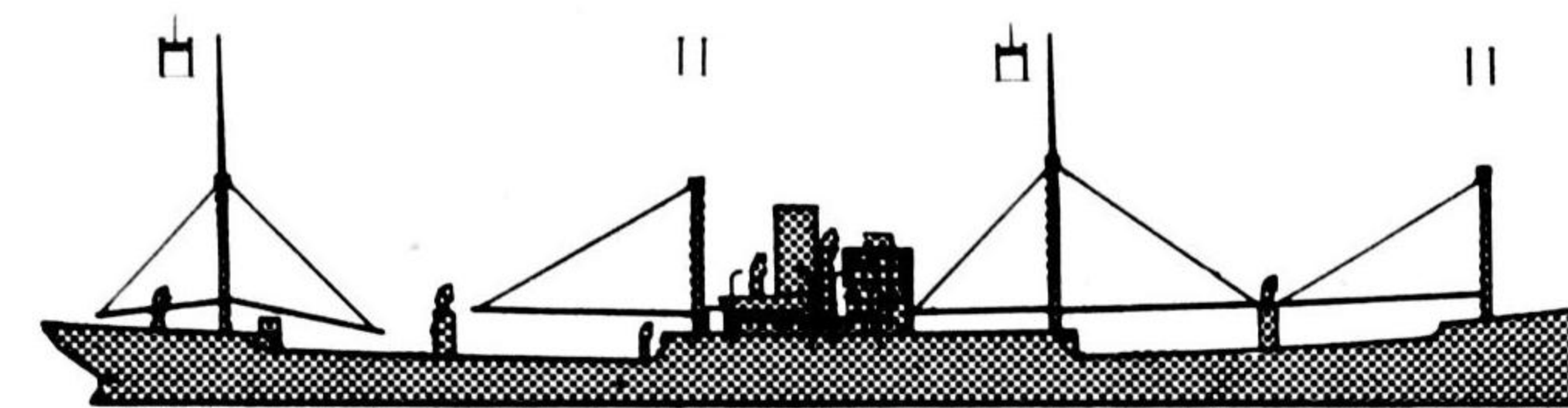


MKFMK



NO MK IN WELLS, 1 MK AT SUPERST.

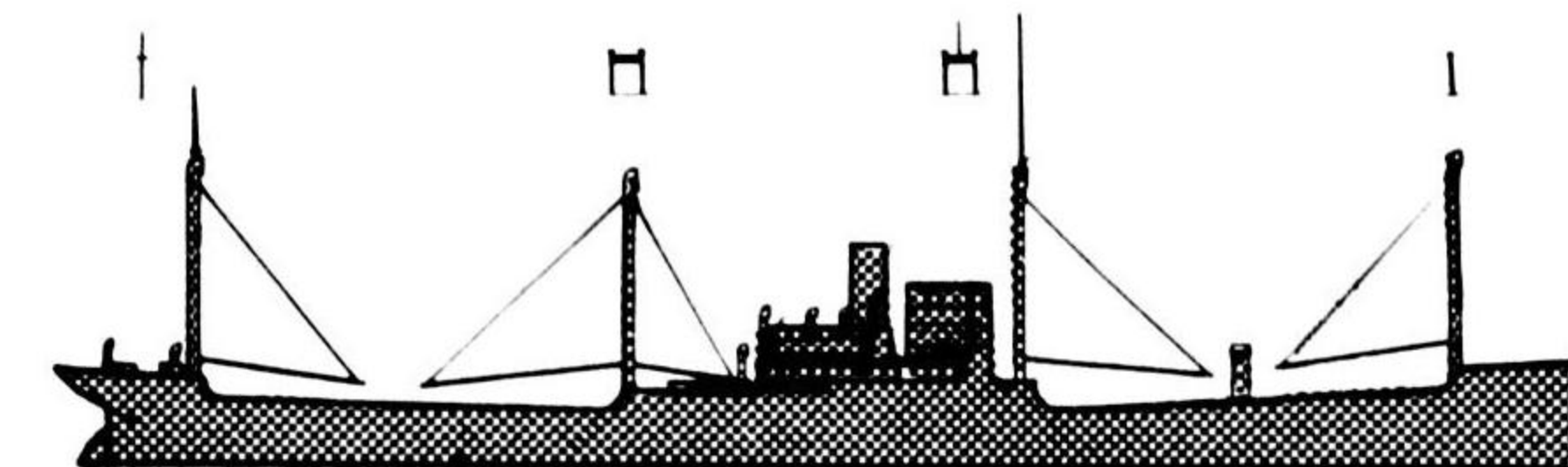
COLUMBIA MARU Class approx. 425' o. a.
5,620 g. t.
(P. 174)



All KK_T
K_T at break of forward stormdeck



FUKKO MARU approx. 370' o. a.
3,834 g. t.
(P. 174)

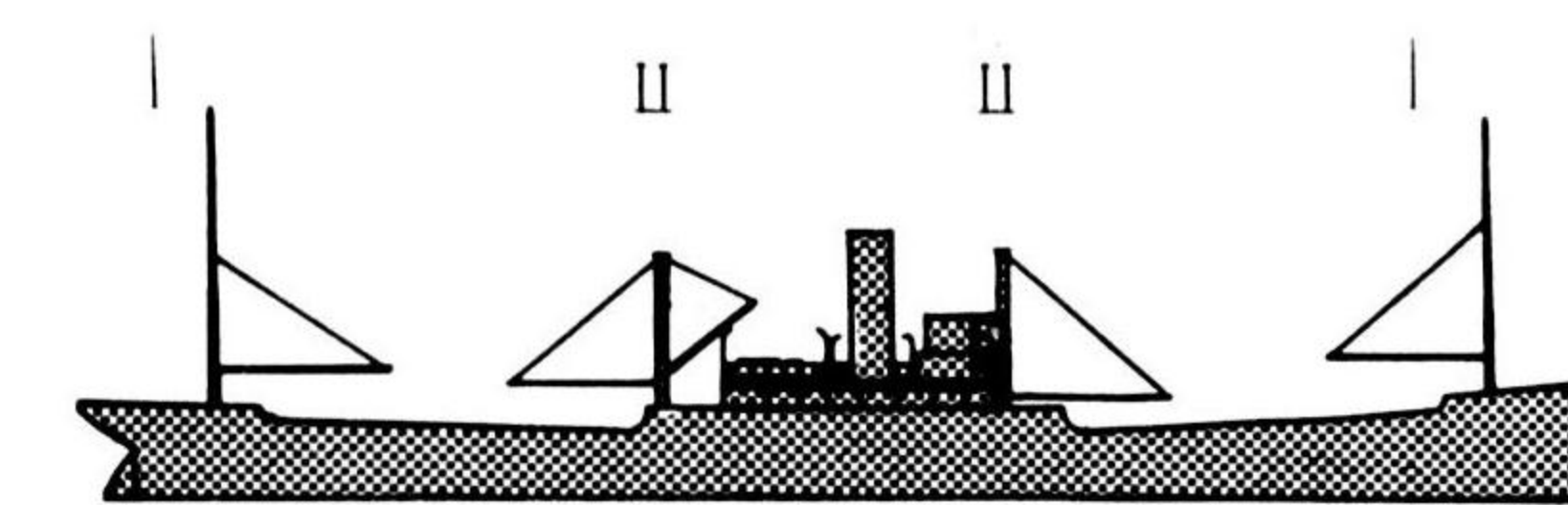


K at break of long after stormdeck
Sampson post at break of fo'c'sle



NO MK IN WELLS, 1 MK AT SUPERST.

MIKAGE MARU No. 3 approx. 345' o. a.
3,111 g. t.
(P. 175)



K at break of short after storm deck

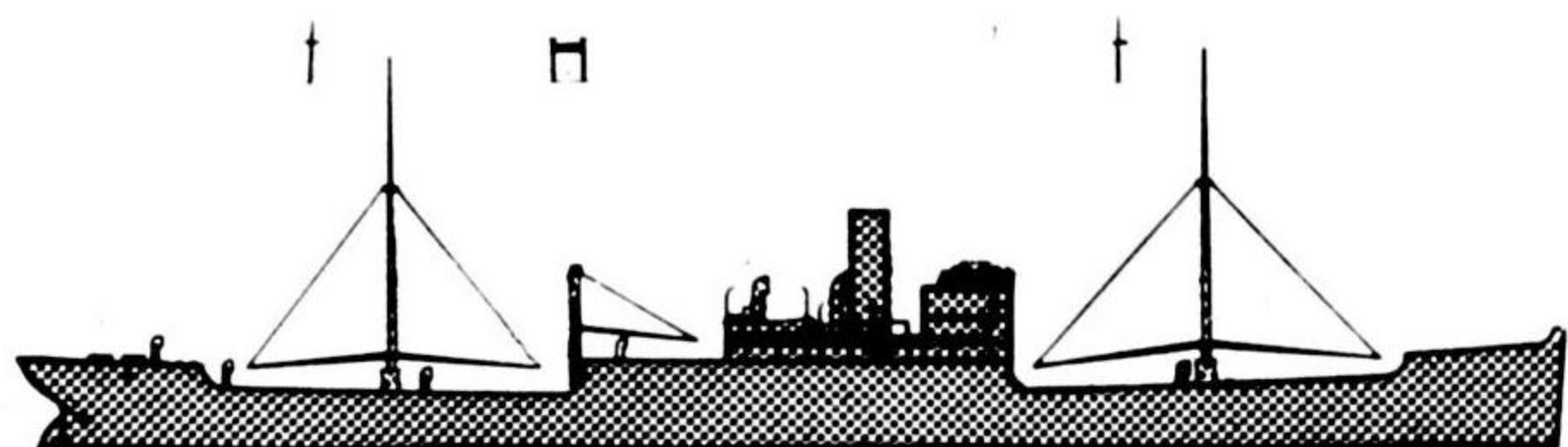


FREIGHTER TRANSPORTS

FOX TARE CHARLIE (3 MK)

1 M FORWARD, 2 MK AFT

AKAGISAN 389' o. a.
4,634 g. t.
(P. 166)

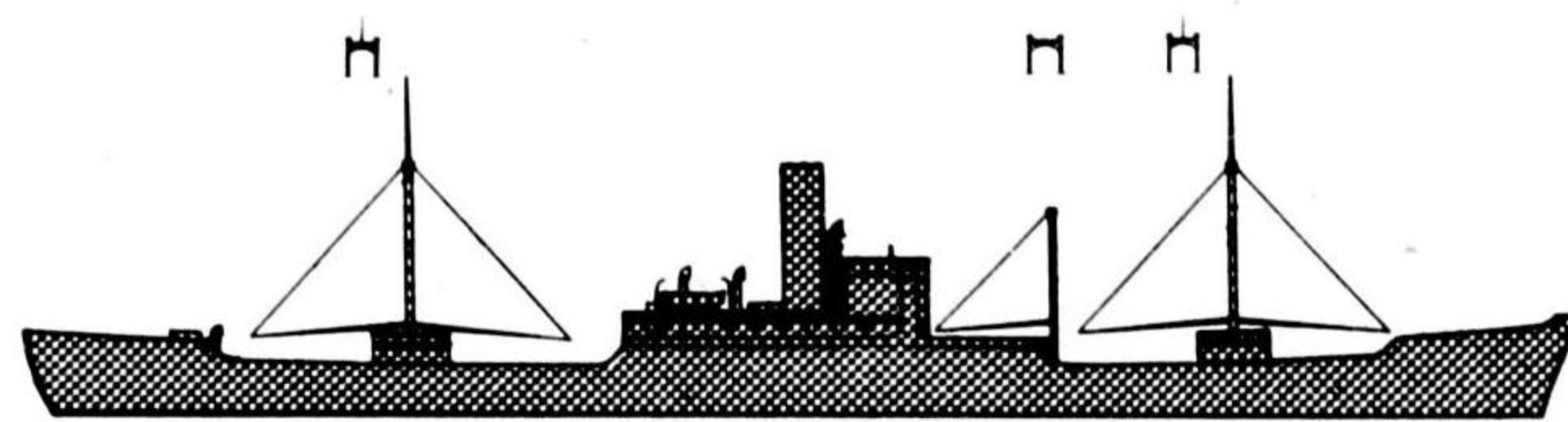


Storm deck aft with K at break



3 KK_T

KIMISHIMA MARU approx. 410' o. a.
5,193 g. t.
(P. 109)

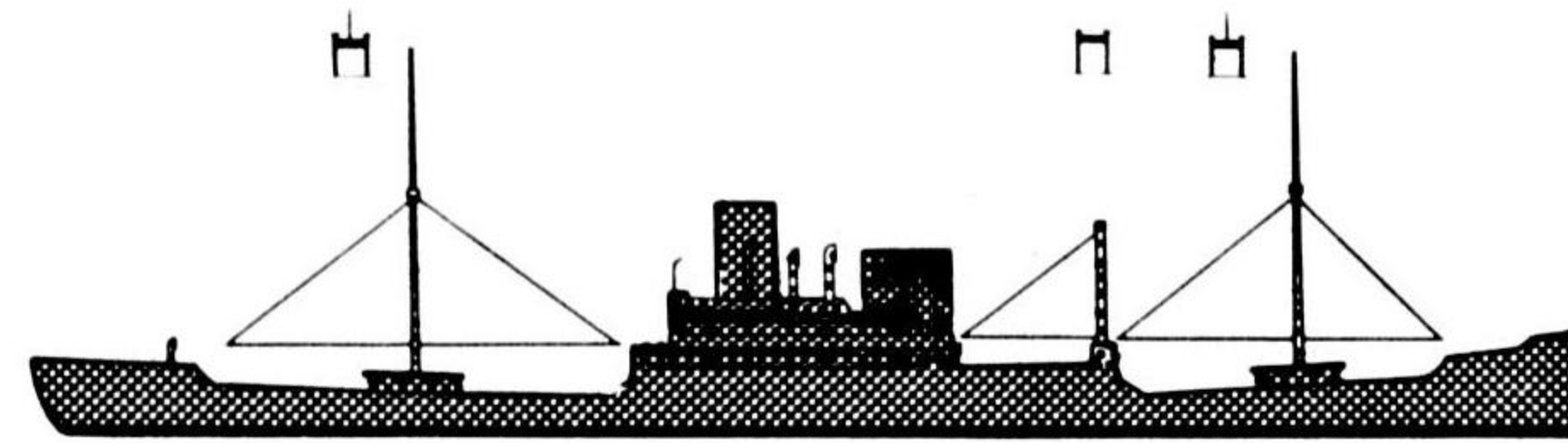


Crosspiece on #2K



3 KK_T

KENSHO MARU approx. 395' o. a.
4,862 g. t.
(P. 110)



Stack slightly aft
Crosspiece on #2K



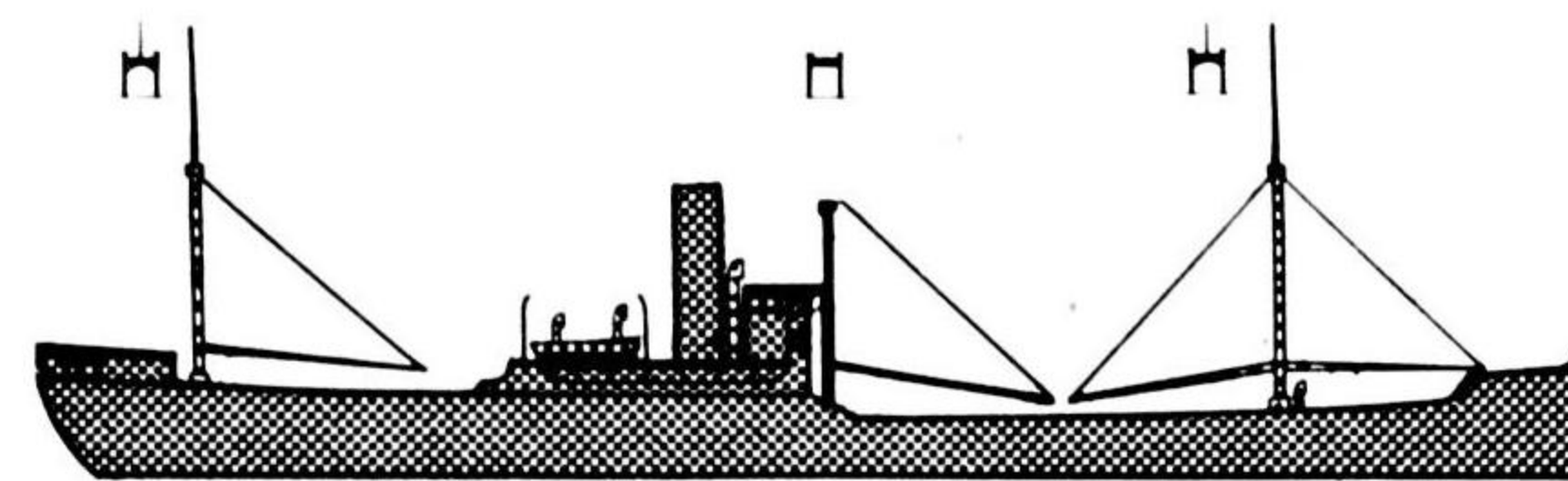
FUSHIMI MARU Class approx. 320' o. a.
2,600 g. t.
(P. 160)



Broken deck line
K on poop



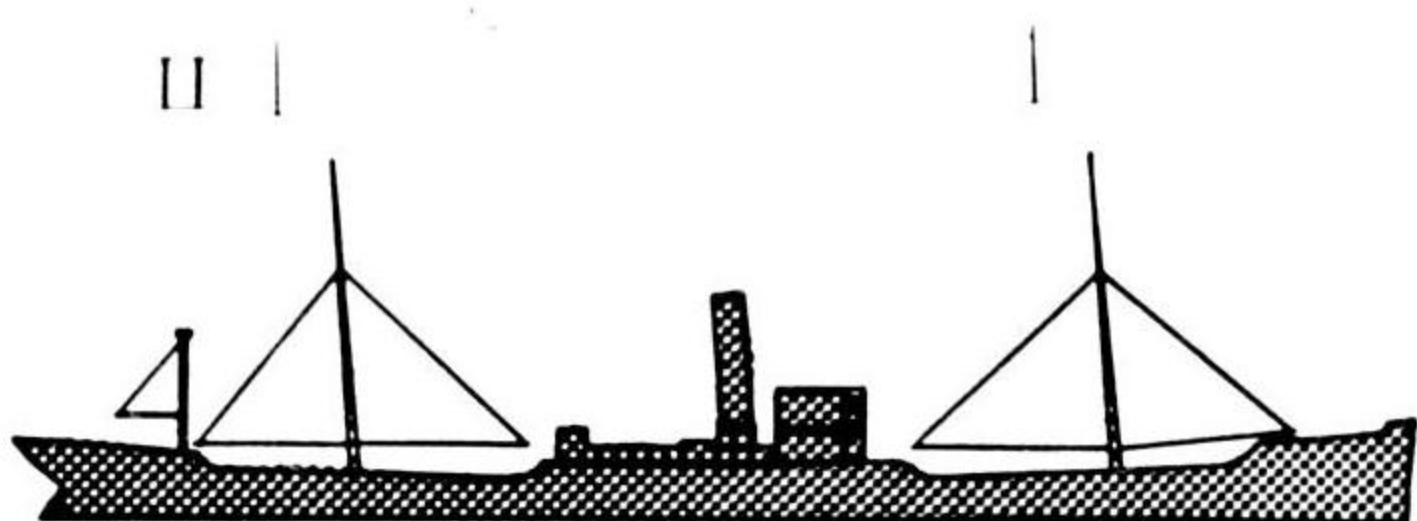
HAKOZAKI MARU Class approx. 373' o. a.
3,945 g. t.
(P. 176)



No storm deck



HIKOSAN MARU approx. 300' o. a.
2,073 g. t.
(P. 160)



K on poop

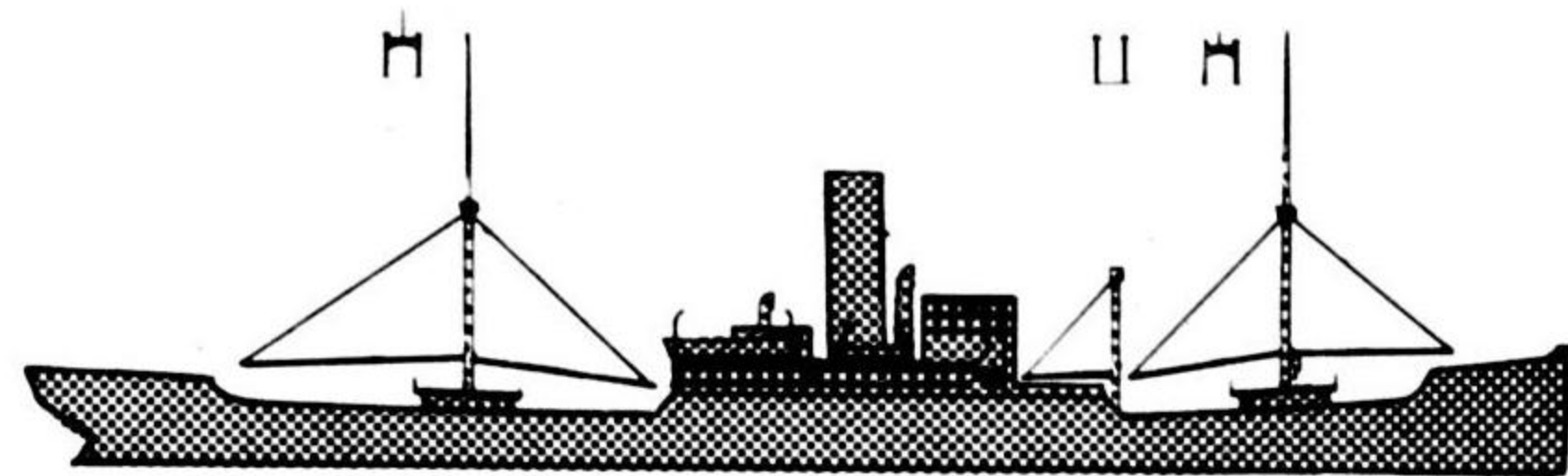


FREIGHTER TRANSPORTS

FOX TARE CHARLIE (3 MK)

3 KK_T

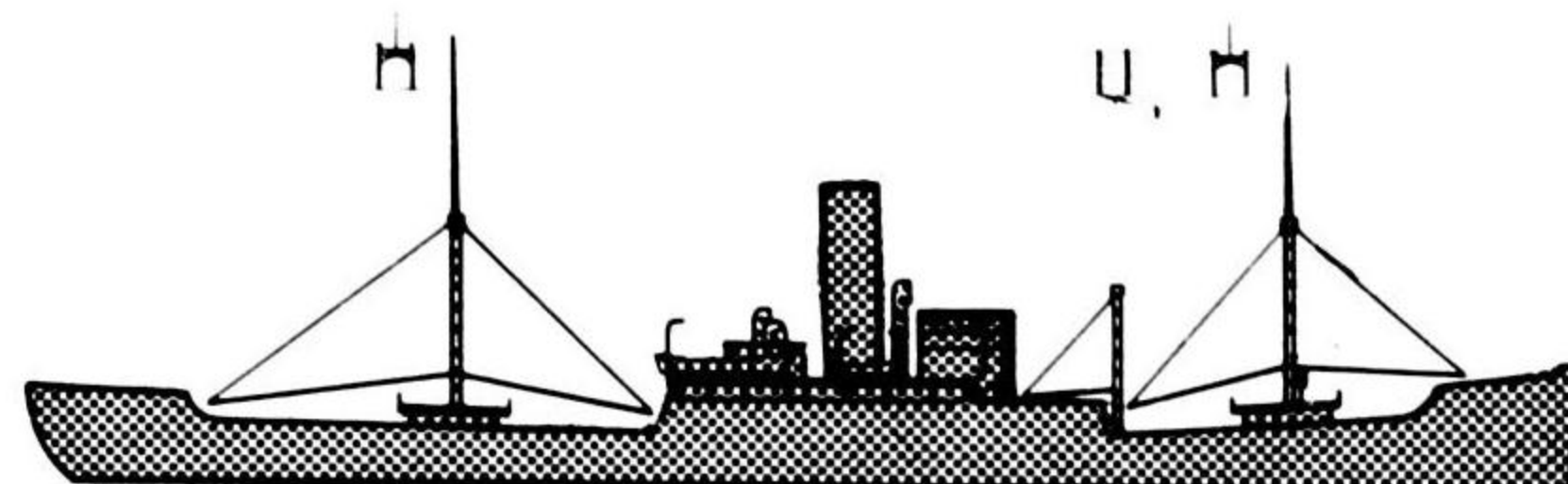
GENKAI MARU approx. 355' o.a.
3,851 g.t.
(P.167)



Counter stern

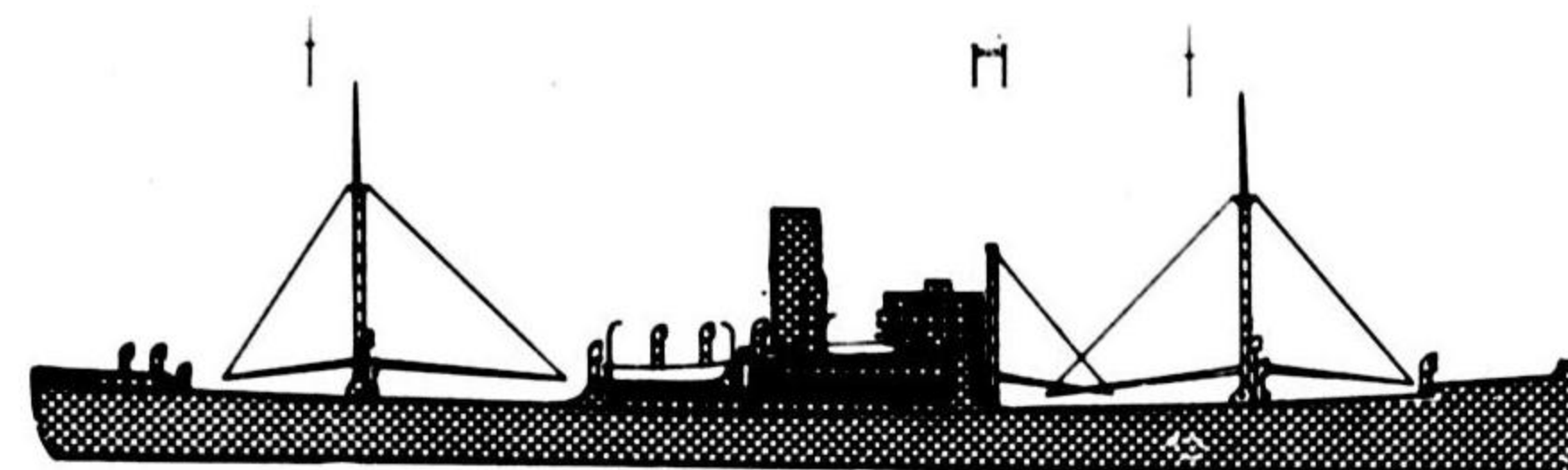


KOKAI MARU approx. 350' o.a.
3,871 g.t.
(P.112)



K AT BRIDGE

MANKO MARU Class approx. 375' o.a.
4,472 g.t.
(P.71)

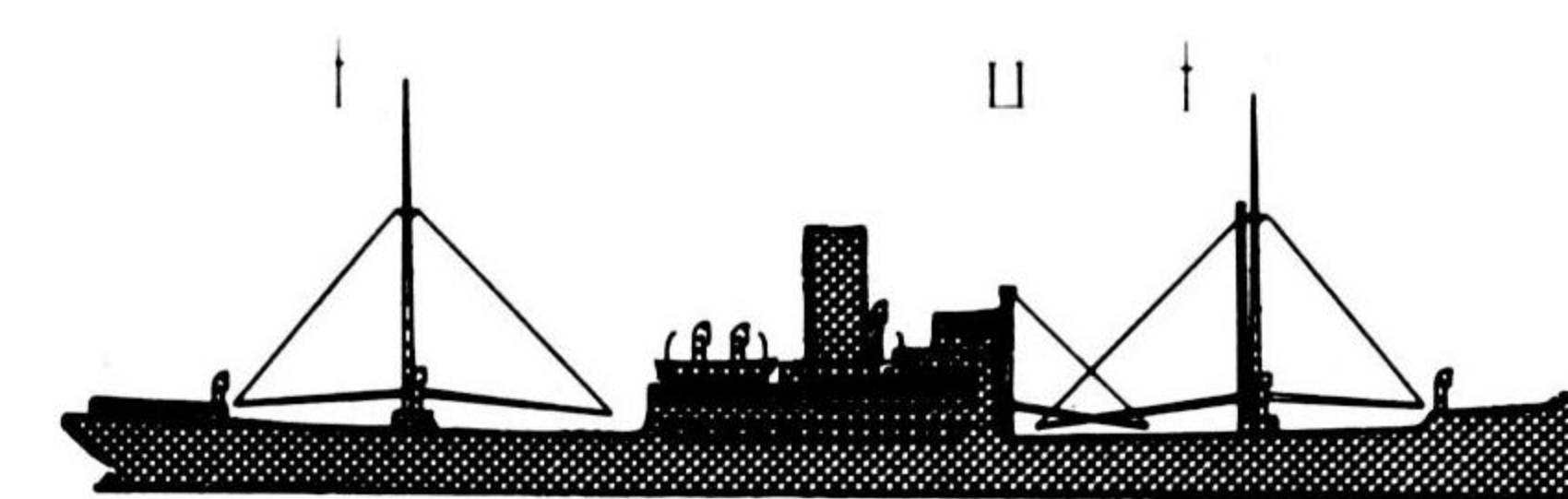


Crosspiece on narrow K
No. 2 L/B stepped down

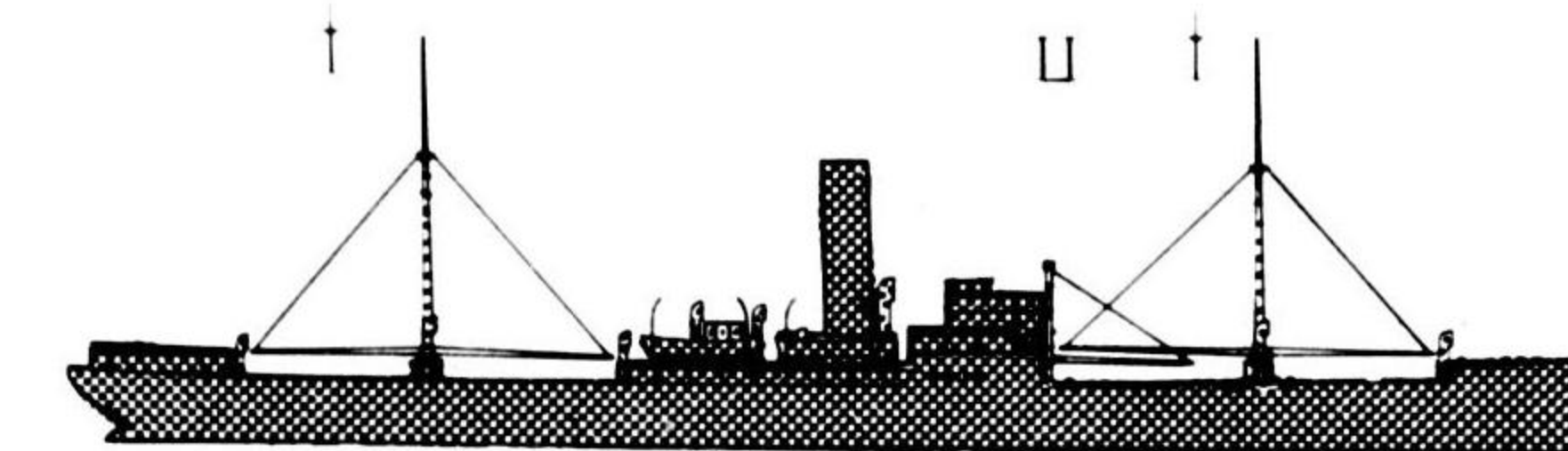


K AT BRIDGE

HEITO MARU Class 357' o.a.
4,467 g.t.
(P.89)



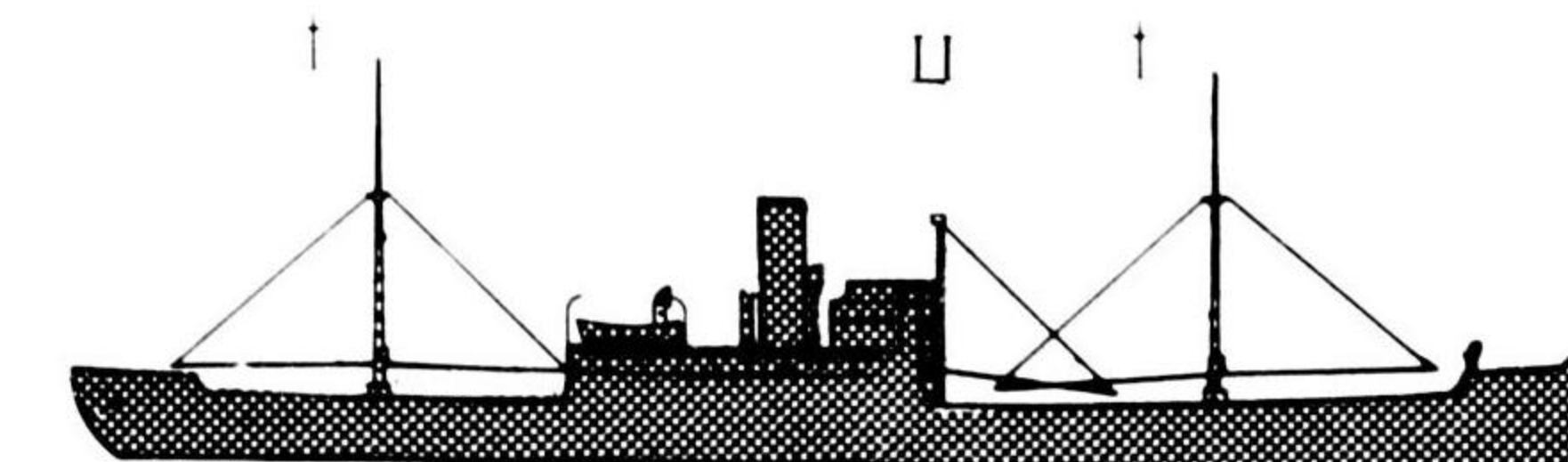
TAKAO MARU approx. 370' o.a.
4,282 g.t.
(P.89)



Wide K
Square bridge
Long superstructure



HIYOSHI MARU approx. 365' o.a.
4,046 g.t.
(P.108)



Raised poop deck



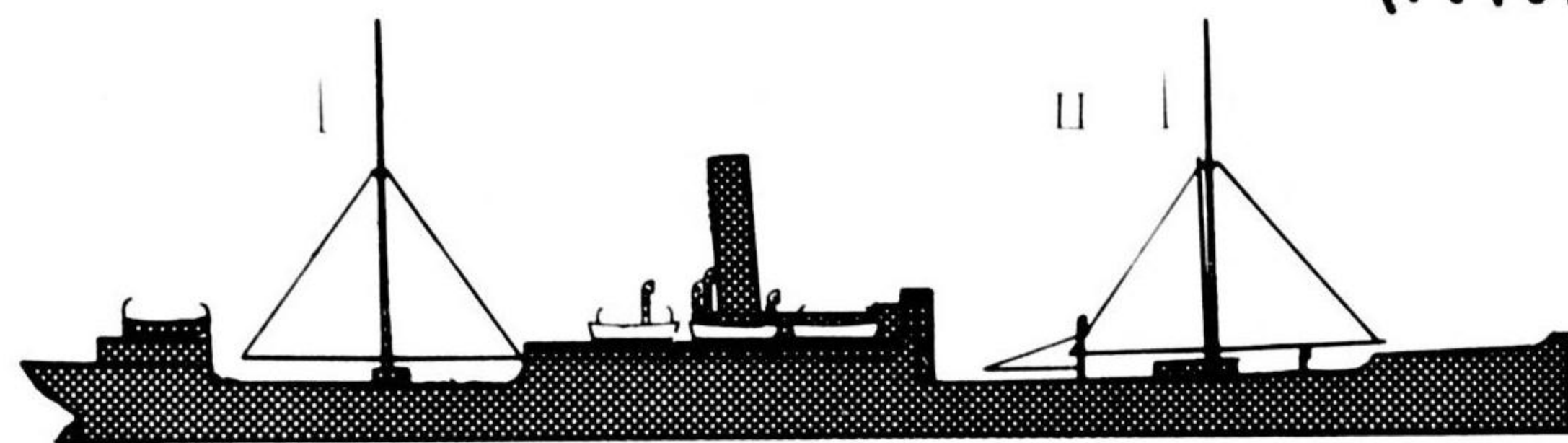
CONFIDENTIAL

FREIGHTER TRANSPORTS

FOX TARE CHARLIE (3 MK, K FORWARD OF BRIDGE)

NO STORM DECKS

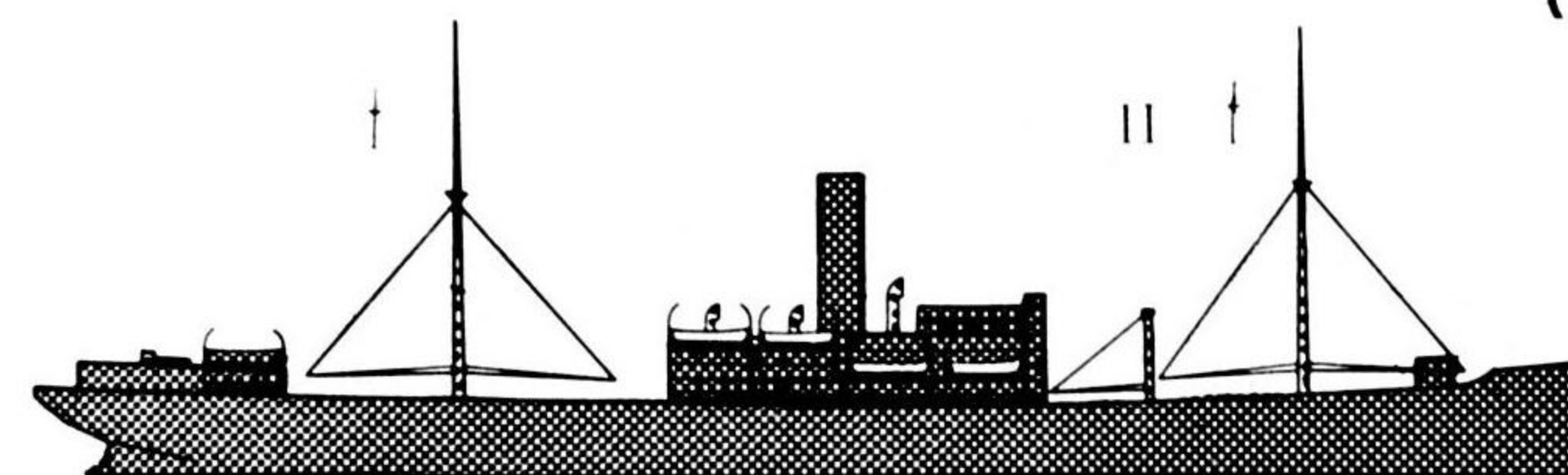
SHINANO MARU approx. 460' o.a.
6,254 g.t.
(P. 161)



3 L/B
No storm decks
Long fore deck



YOKOHAMA MARU approx. 425' o.a.
6,143 g.t.
(P. 68)

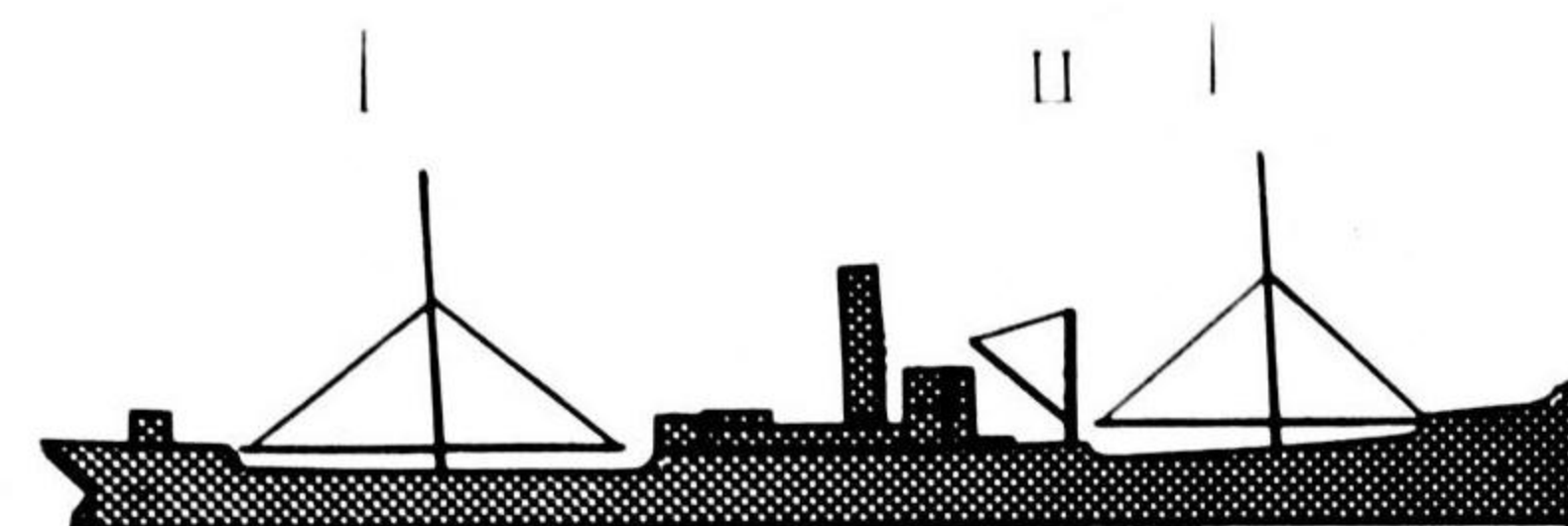


4 L/B
No storm decks

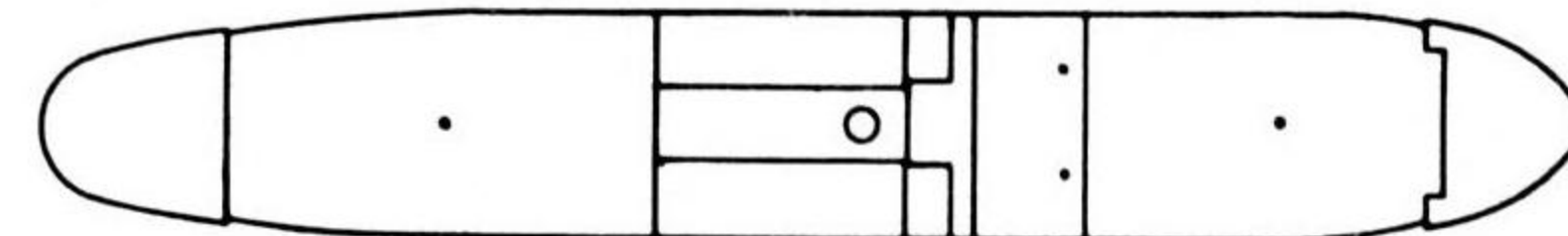


STORM DECK FORWARD

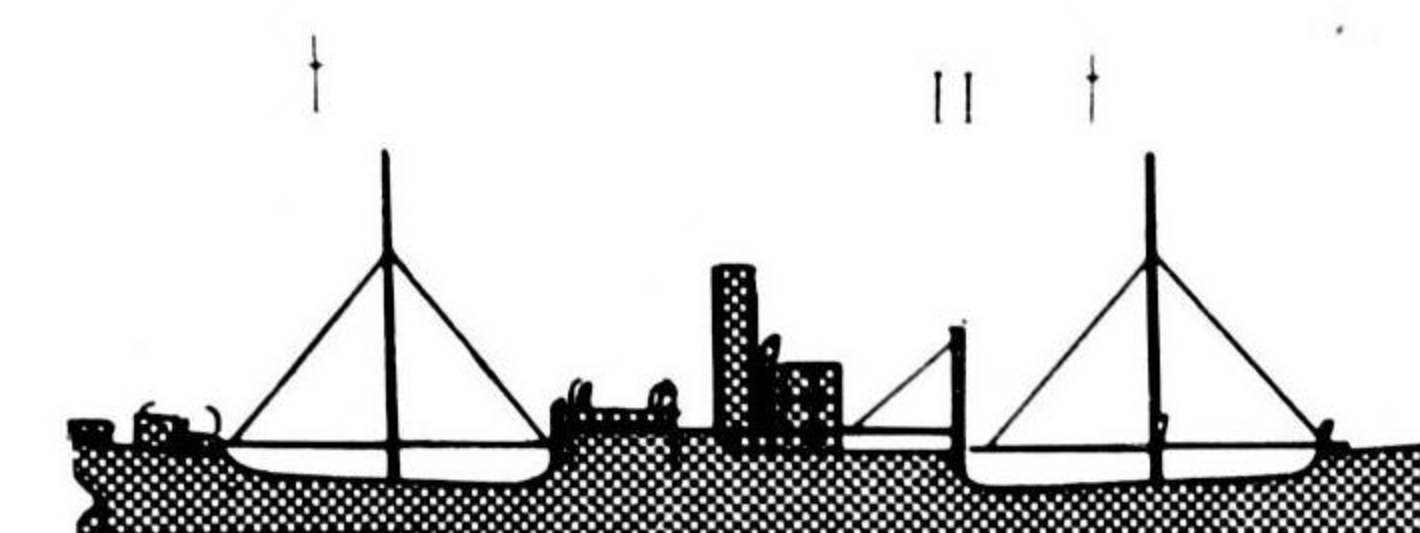
TAKUSAN MARU approx. 330' o.a.
2,753 g.t.
(P. 168)



Square bridge
Note fo'c'sle plan



NISSHO MARU approx. 295' o.a.
2,827 g.t.
(P. 168)



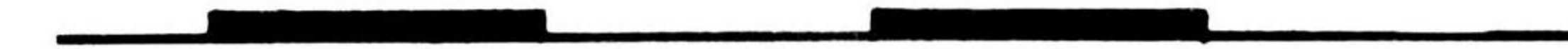
Square bridge



BANSEI MARU Class approx. 340' o.a.
3,120 g.t.
(P. 168)

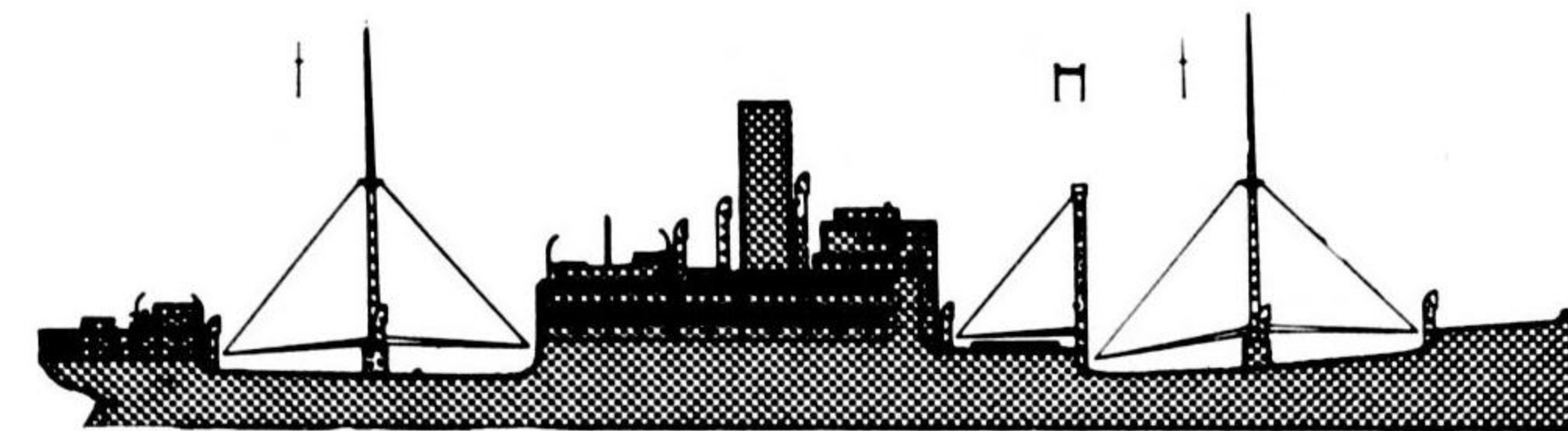


2 L/B wide apart
Square bridge

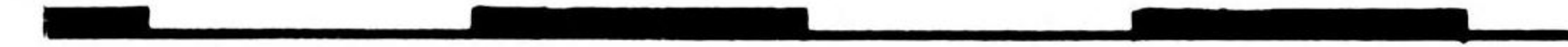


STORM DECK FORWARD

NAGOYA MARU Class approx. 430' o.a.
6,100 g.t.
(P. 167)



Rounded bridge
Note length



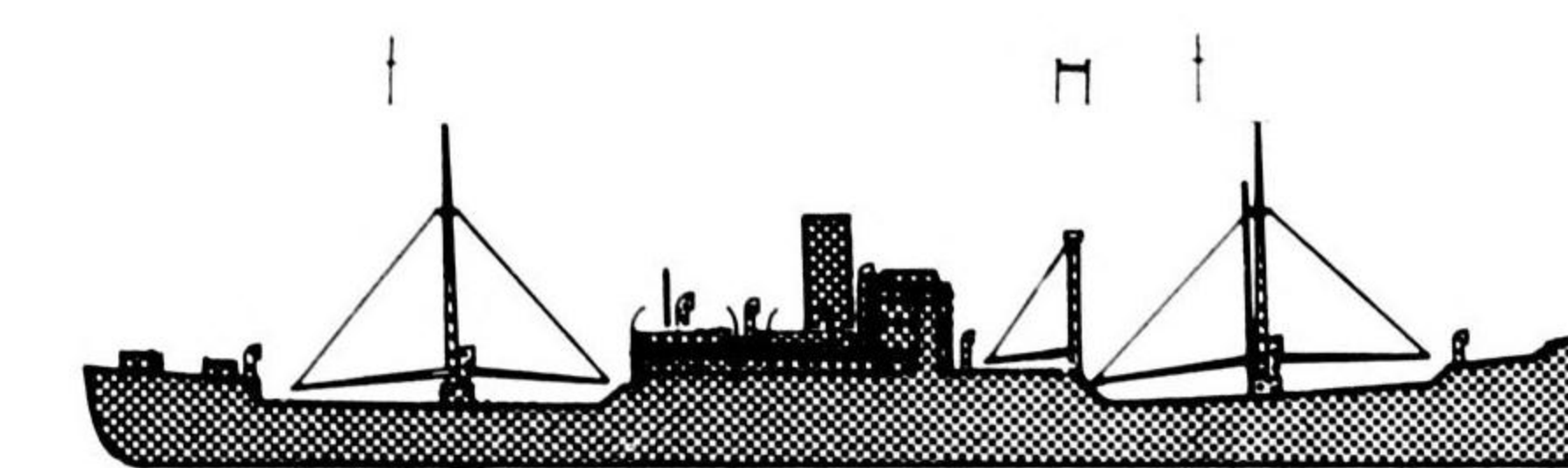
MIKAGE MARU No. 18 approx. 375' o.a.
4,319 g.t.
(P. 111)



Rounded bridge



KIKUKAWA MARU Class approx. 370' o.a.
3,900 g.t.
(P. 111)



Rounded bridge

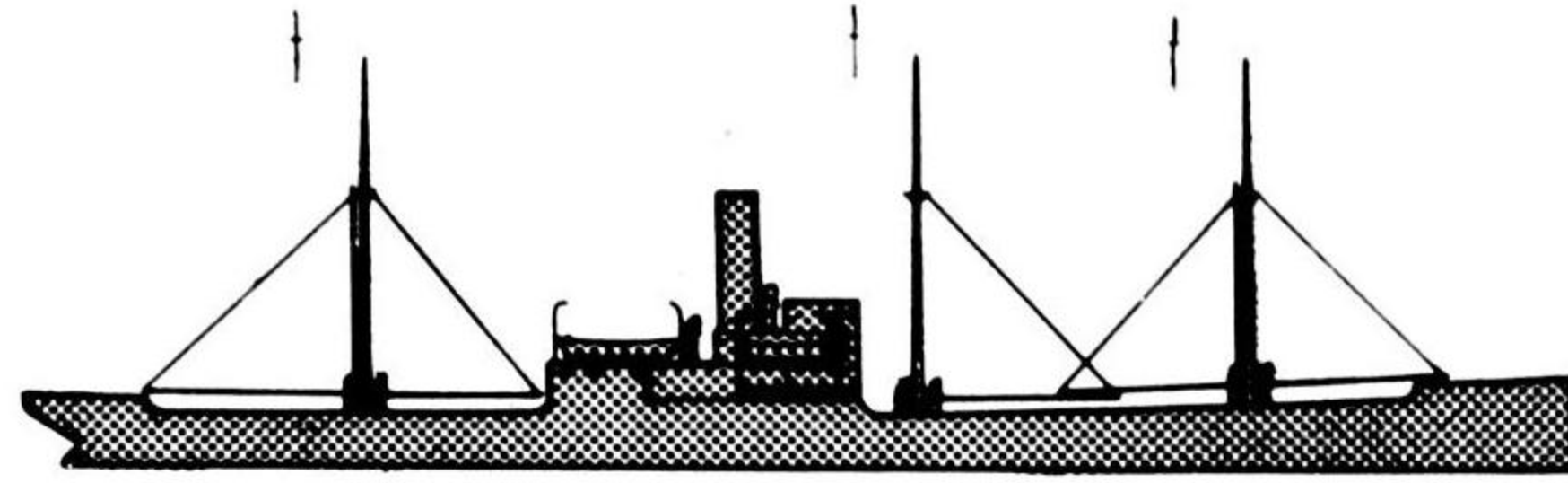


FREIGHTER TRANSPORTS

FOX TARE CHARLIE (3M. CABLE SHIPS, AND TRIPOD MASTS)

3 M

GRANATIERE PADULA approx. 370' o.a.
3,904 g.t.
(P. 159)

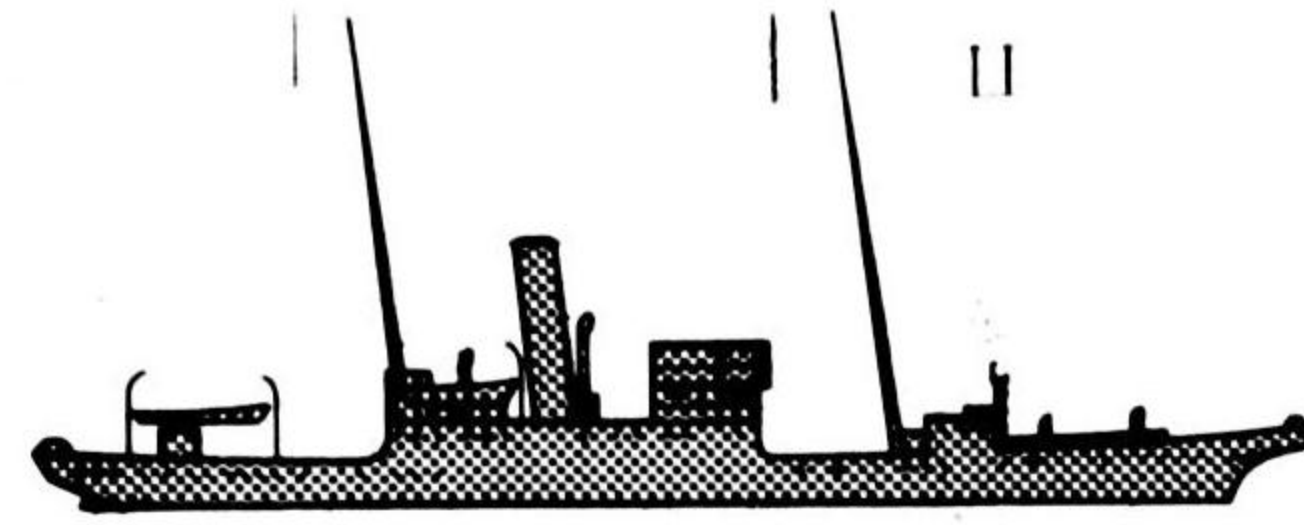


MMFM
Long foredeck

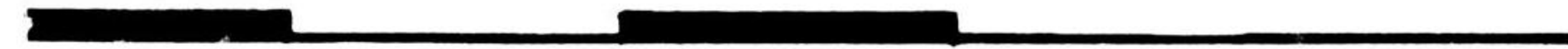
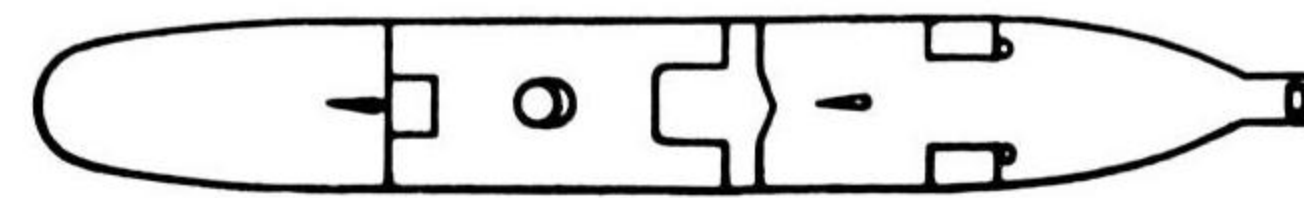


CABLE SHIP BOW

OGASAWARA MARU approx. 275' o.a.
1,404 g.t.
(P. 69)

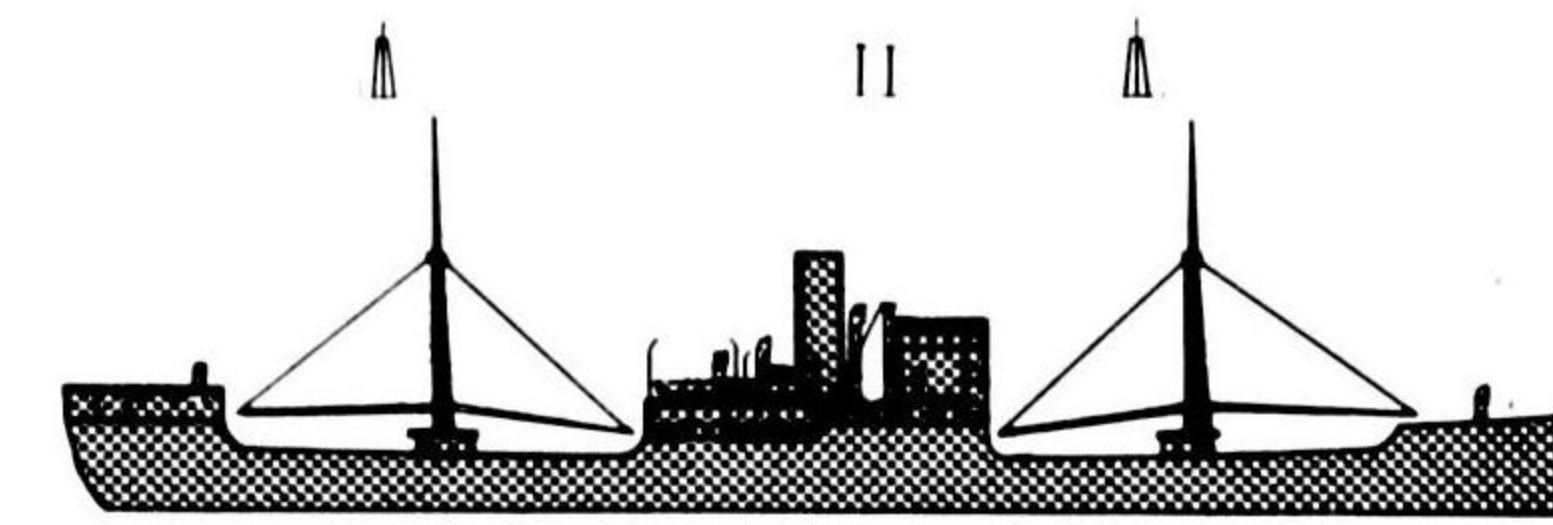


Mainmast on superstructure
Low K & M on foredeck



2 TRIPOD MASTS

KOFUKU MARU approx. 330' o.a.
3,200 g.t.
(P. 104)



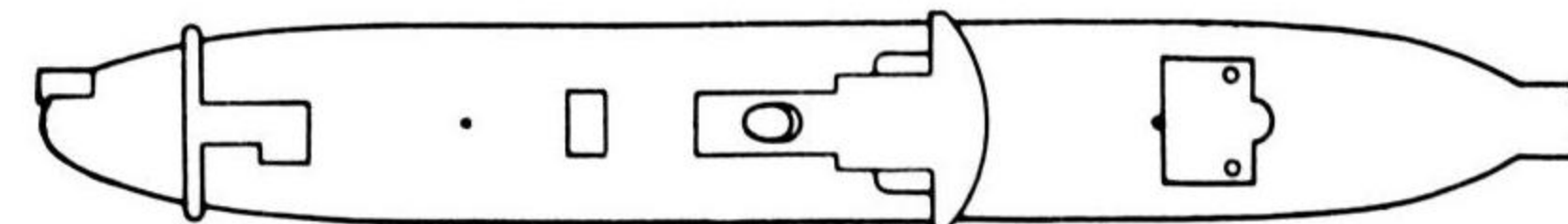
Side hatches



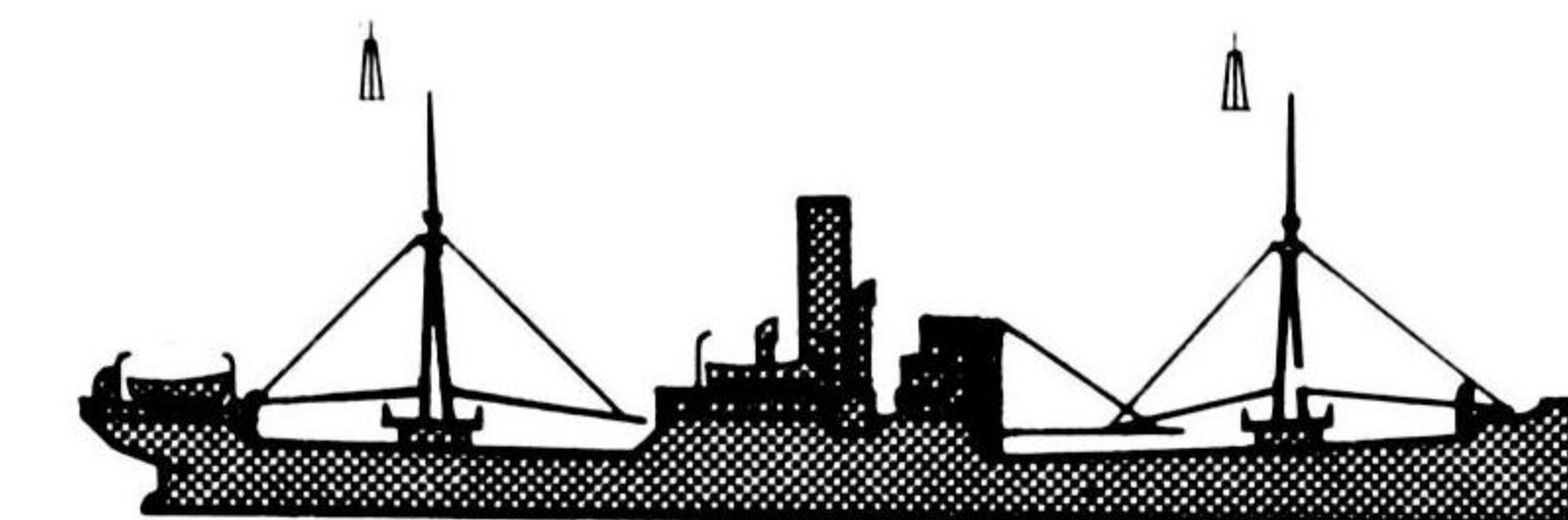
TOYO MARU approx. 360' o.a.
3,719 g.t.
(P. 63)



KMFM
Flush decked
Stack forward



UNYO MARU No. 2 approx. 335' o.a.
2,827 g.t.
(P. 140)



K flush with front of bridge



NANYO MARU approx. 380' o.a.
3,610 g.t.
(P. 63)



MFM
Stack amidships

