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A.C.B. 0233/44 (5)

SOUTH-WEST PACIFIC

ANTI-SUBMARINE REPORT

MAY, 1944

ARCHIVE 65

S E C R E T

This book is invaluable
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...S. 0233/44 (5)

SOUTH-WEST PACIFIC

ANTI-SUBMARINE REPORT

MAY, 1944

ANTI-SUBMARINE
WARFARE DIVISION,
NAVY OFFICE,
MELBOURNE.

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S E C R E T

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SOUTH-WEST PACIFIC

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MAY, 1944

ANTI-SUBMARINE
WARFARE DIVISION,
NAVY OFFICE,
MELBOURNE.

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COUNTER MEASURES

1. REVIEW FOR APRIL

Japanese submarine activity in the South West Pacific Area during April was on a limited scale.

There was some activity near the Admiralty Islands (which are now firmly held by Allied forces) and submarines, possibly on supply missions, were sighted in the vicinity of Wewak.

A small number of attacks were made both by ships and aircraft, but there is no indication of any of these being successful. No Allied ship was attacked in the area.

2. CHANGE IN SURFACE ESCORT POLICY

On May 7 C.S.W.P.S.F. introduced a new policy for the protection of shipping approaching or leaving the New Guinea area. This policy is as follows:-

Unless enemy submarines are known or strongly suspected in the vicinity of route surface escort will not be provided for any categories of shipping in the Coral Sea.

The box patrol by escort vessels of an area 200 miles south of Milne Bay will be discontinued.

B.G. and G.B. convoys to and from Langemak will be discontinued.

For protection of shipping in the Solomon Sea a patrol will be established to the northward of the shipping route from Langemak some 300 miles E.S.E. to 153° E.

Escorts as necessary from this group will be detached to escort the following class of ships -

(a) Troopships carrying more than 2000 troops

(b) Aircraft carriers and Capital ships proceeding independently.

(c) Specially important naval auxiliaries.

Air escort requirements to remain as before.

NEW CONVOY AREAS

The Admiralty area has been established under C.S.W.P.S.F. and will include waters to northward of New Guinea as far west as 130° 00' east. C.S.W.P.S.F. has assumed responsibility for routeing and protection of shipping to MADANG and ALEXISHAFEN.

SECTION II.

ENEMY ACTIVITY

1. JAPANESE SUBMARINE ACTIVITY - MAP FOR APRIL

See Appendix at back of book.

2. ANALYSIS OF CONVOYS - MARCH, APRIL

AREA	No. of Ships		Tonnage	
	March	April	March	April
Thursday Is. - Darwin	17	20	58,986	97,988
Australia - New Guinea	70	*	324,389	*
New Guinea Area	278	242	1,487,236	1,529,647
Arafura Sea	6	Nil	28,429	Nil
Total	371	262	1,899,040	1,627,635

* Convoys discontinued in this area.

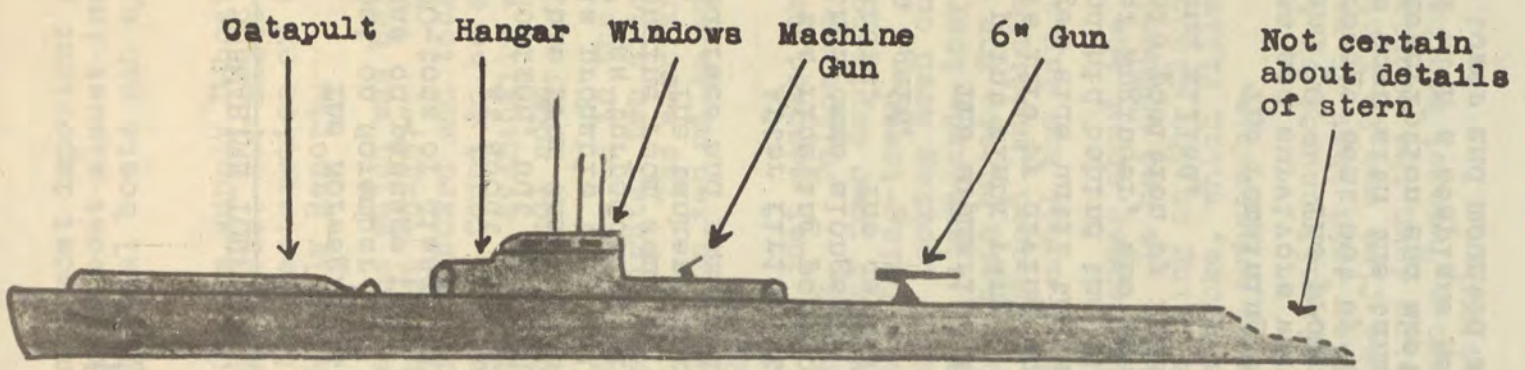
3. SINGLE ESCORTED VESSELS

The following table shows the number of ships escorted singly during April.

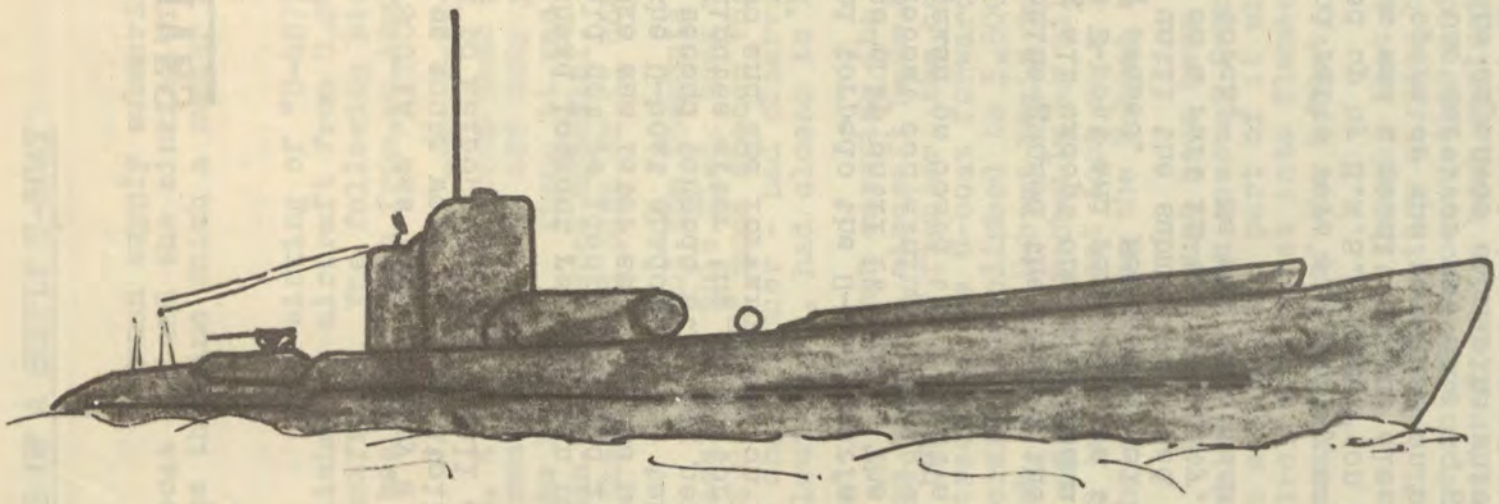
Area	Number of Ships	Tonnage
New Guinea Area	32	167,958
Australia - New Guinea	5	34,081
Arafura Sea	10	30,110
Total	47	232,149

4. INDEPENDENT VESSELS - AUSTRALIA AND NEW GUINEA

Area	Number of Ships	Tonnage
Eastern States - Western States	44	294,032
Melbourne - Adelaide	74	309,044
Newcastle - Melbourne	161	718,320
Brisbane - Sydney	122	589,823
Barrier Reef - Brisbane	127	577,393
Coral Sea and New Guinea	283	1,627,612
Arafura Sea	1	1,364
Total	659	3,378,485



SKETCH DRAWN BY SURVIVOR



SKETCH OF "I-30" (W.I.R.)

SECTION III

NARRATIVES

1. JAP. SUBMARINE TORPEDOES TANKER

The Norwegian tanker "SCOTIA" was torpedoed by a Japanese U-boat on November 27, 300 miles south west of Addu Atoll. The tanker was on passage from Bahrein to Melbourne with a full cargo of 13,800-tons of diesel oil.

At about 1230 the masthead lookout reported an object on the horizon, but the object could not be identified and it was not visible from the bridge. Smoke was later seen on the horizon and it is probable that this was the U-boat shadowing the tanker. "SCOTIA" was torpedoed at 1725, a second torpedo striking her in the engine room some 10 or 15 minutes after the first torpedo had hit. The tanker broke in two and the forward portion rose to the surface and remained afloat.

After firing its second torpedo the U-boat surfaced and shelled the floating portion of the ship until it sank. The submarine then came alongside the lifeboat containing the captain and seven others. The captain was taken on board the U-boat and was not seen again.

The submarine then machine-gunned the men in the lifeboat at point blank range, killing all except one Able Seaman who saved his life by diving under the U-boat and remaining on the disengaged side until the shooting ceased. He then dived back again and hid behind the lifeboat until the submarine moved away. The Chief Engineer, who was alone on a raft in the vicinity, disclosed his position by flashing a torch. He was also machine-gunned and killed.

The remaining boats and rafts were sighted by searching Catalinas and survivors were picked up by H.M.S. "OKAPI" on November 29 and 30. The prompt rescue was a result of the clear distress message sent out by the W/T operator who remained on board and went down with the tanker. One survivor was able to give a good description and sketch of the Japanese submarine which was equipped with a seaplane hangar and a catapult forward of the conning tower and mounted a large gun aft.

2. LOSS OF A SUPPLY U-BOAT

German supply submarines form a most important part of the U-boat arm and the sinking of one supply boat almost invariably shortens the time which a number of operational boats can spend on patrol.

The sinking of "U-487", a 1600-ton supply U-boat was accomplished by aircraft from U.S.S. "CORE" about 400 miles west of Teneriffe. The following story of the destruction of this U-boat has been taken from an Admiralty Monthly Report.

"During the afternoon, just as the watch was being changed, a piece of flotsam came drifting past "U-487". Some of the men who had come off duty pulled it on board and took it up to the bridge. There it was unpacked and found to be a bale of cotton or some such material. When the men eventually went below, they carried part of it down to the control room.

"Had not the lookouts been so interested in the salvage and unpacking of this find, they might have sighted two aircraft from U.S.S. "CORE" much sooner than they did. The aircraft - a fighter and a bomber - had observed a wake from ten miles range and, using cloud cover, had closed to investigate.

"The men carrying the cotton had just reached the control room when the aircraft made their attack. Following ten seconds behind the fighter, the bomber dropped four depth-bombs which straddled the U-boat forward of the conning-tower. The two aircraft then climbed to 3,500 feet and, looking down on their handiwork, saw the U-boat begin to circle to starboard, leaving a trail of oil. Probably an oil tank had been burst, for survivors said that the boat took on a list to starboard immediately after the attack then the U-boat slowed down until she lay stopped.

"There must have been something queer about the bale of cotton which had been rescued from the sea. It had seduced the lookouts and now the part of it which was lying on the floor of the control room burst into flames. Its smoke, which filled the centre compartment of the U-boat, was almost unbearable.

One man thought that a short circuit caused by the bombs had set the cotton on fire but another said that it was a case of spontaneous combustion and that the fire was in fact put out by water from the bomb explosion falling down the conning-tower hatch. A third thought that it was a "secret weapon". Several men were badly burnt in putting it out.

"The captain had been below when the attack was made. Groping his way through the smoke to the bridge, he ordered the anti-aircraft guns to be manned and himself took over a 20-mm gun. He now found himself called upon to defend his U-boat against five bombers and three fighters for, on receiving the report of the attack, "CORE" had sent off additional aircraft.

The fighter which had made the first attack was shot down, but the captain soon realised that he could not hope to save his crippled U-boat. He gave the order to abandon ship a few moments before his crew saw him fall dead on the bridge, riddled with bullets.

When the fighters had done their work, a bomber came in to finish off the U-boat. The water thrown up by the explosion of the four bombs which it dropped seemed to lift "U-487" 10 feet or so upwards. While the spray still covered her she began to sink and, as the foam died down, the last 30 feet of her stern was sliding under the water."

3. "A TICKET TO HEAVEN"

German U-boat crews have come to regard cruises in the Mediterranean as nothing less than suicide, and orders to sail for the Mediterranean are referred to as "a ticket to Heaven".

"U-409" was to prove that this gloomy outlook was more than justified for after four patrols in the Atlantic she sailed for the Mediterranean and was sunk there within a month of her arrival.

A depth charge attack which put one periscope out of action cut short "U-409's" first patrol from Kiel, but she claimed sinking two ships, one of them a straggler, during her second cruise. The third patrol was marked by almost continuous storms and was uneventful except that "U-409" was ordered to meet a blockade runner and escort her to a French port. C.O. H.M.S. "SCYLLA sank the blockade runner before the U-boat could meet her.

Hans Massman, "U-409's" Captain might have sank a fast British minelayer on his fourth patrol but for a blunder made by the U-boat Control. The patrol had begun well, Massman sinking three ships whose estimated tonnage was more than 20,000 tons and he sighted H.M.S. "ADVENTURE" on his way back to Brest. He reported the sighting to Control and altered course to get into an

attacking position. Just as "U-409" reached periscope depth Massman received a reply to his signal. He was ordered not to attack as the ship was a German Auxiliary cruiser. Massman broke off his attack and watched "ADVENTURE" pass out of range. When he received a signal informing him that his identification had been correct it was too late. Control's blunder was a costly one for the auxiliary cruiser (which was the blockade runner "SILVAPLANA") was herself intercepted by H.M.S. "ADVENTURE".

"U-409's" fifth patrol, which was marked by two false starts, took her to the Mediterranean. On May 17, 1943 she sailed, but had to put back to Brest for repairs to her periscope and then, soon after she sailed again, the repair work was found to be defective and she again put back to port. The Captain did not tell the crew of their destination until after they were at sea for the men did not look forward to operating in the narrow waters of the Mediterranean.

Massman was lucky in obtaining what he considered were favourable conditions for the passage past Gibraltar - a fairly light but foggy night. "U-409" proceeded on the surface until she was within a few miles of Gibraltar and then she dived, using the set of the current to carry her past the Rock.

When he was off Mallorca Massman signalled Control "Massman through" and received a reply "Well done Massman". He had done well indeed for when he reached harbour he learnt that of the group of seven U-boats that had received their "tickets to Heaven" only "U-409" had managed to pass Gibraltar.

On July 4 Massman attacked a convoy and sank a 5,000 ton ship, although the escorts counter attack deprived him of the satisfaction of knowing of his success. During that day and the next nearly 150 charges were dropped on "U-409" but no serious damage was done.

A few days later while "U-409" was continuing her patrol H.M.S. "INCONSTANT" gained Asdic contact and attacked. The U-boat's crew felt hopeless and doomed from the time the first charge dropped. They were not unaccustomed to depth charge explosions, but the whistling sound of high pressure air escaping from a damaged vent was most depressing, and the hunting destroyer seemed to be using some sort of "secret weapon". This latter was nothing more terrifying than "INCONSTANT'S" echo sounder.

A few moments later two very accurately placed patterns abolished all hope of escape. Water was entering the U-boat aft, the hydrophones, lighting and the electrical instruments were out of order, a propeller shaft was damaged, and the U-boat lost trim.

Photograph of the large Japanese submarine sunk by British destroyers in the Indian Ocean in February, 1944. The submarine was damaged by depth charges and gunfire and was later torpedoed.

The tanks were blown and the U-boat shot upwards. "INCONSTANT" opened fire as soon as the U-boat's bows appeared and in half a minute the after end of the conning-tower was blown away and twenty casualties were caused. In a few moments most of the men were in the water, and the British destroyer, sending away her whaler, rescued 39 of them.

4. JAPANESE SUBMARINE SUNK

February, 1944 proved to be the Japanese submarines worst month in the Indian Ocean to date for in addition to the U-boat destruction by H.M.A.S. "LAUNCESTON" which was reported in A.C.B. 0233 (3 & 4) two British destroyers sank a second U-boat.

The sinking took place south of the Maldive Islands on February 12 after the submarine had attacked a convoy escorted by H.M.S. "HAWKINS" and H.M. destroyers "PETARD" and "PALADIN". The convoy consisted of five ships in three columns, "HAWKINS" being in the convoy and the destroyers being stationed 3,000 yards on either bow. At about 1345 the officer of the watch in "PETARD" sighted a periscope astern. The U-boat was opposite the gap between the two ships in the starboard column, and at a range of about 1,000 yards it fired a salvo of torpedoes, sinking the transport "KHEDIVE ISMAIL". The ship went down in two minutes with heavy loss of life.

The following account of the events subsequent to the torpedoing has been taken from an Admiralty report.

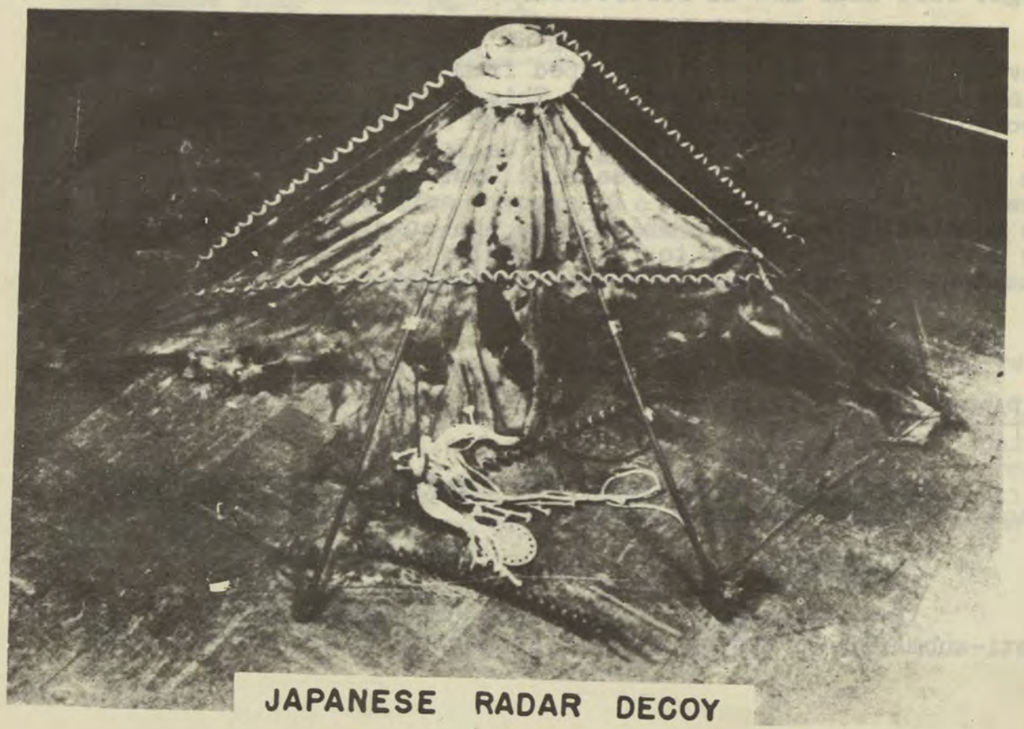
"The destroyers turned 180° outwards and began a pre-arranged search, "PALADIN" to the northward and "PETARD" to the southward of the sinking. Both ships obtained contacts and carried out attacks in good Asdic conditions but without results and about half an hour after the sinking "PALADIN" began an "OBSERVANT" square search. Before she had time to complete it, "HAWKINS" ordered one destroyer to rejoin the convoy and the other to hunt the U-boat to destruction or to limit of endurance and "PALADIN" therefore closed and began to pick up survivors.

"While "PALADIN" was lowering her boats, a large amount of air broke surface close to the south-westward of the wreckage; no Asdic contact was, however, obtained and it was thought that this was air escaping from the sunken ship. The work of rescue had nearly been completed when another large air bubble appeared north-west of the wreckage. Again a search was without result but at

1620 a Japanese U-boat surfaced about 3,000 yards from "PETARD" and about a mile from "PALADIN".

"Both ships opened fire, "PETARD" passed as close astern of the U-boat as was practicable and dropped shallow depth-charges near it while "PALADIN", whose Commanding Officer thought that the U-boat had only surfaced owing to temporary loss of trim and was about to dive again, closed to ram. The ramming was, however, called off by "PETARD" at the last moment and "PALADIN", while endeavouring to pass close to the U-boat and lob depth-charges across it, damaged her side on a hydroplane. It is thought that this attack so damaged the U-boat that it could not dive again; for the first time men were seen on the conning-tower. They fell victims to "PALADIN'S" fire before she had to haul out of action with her engine room, gearing room and "Y" magazine flooded.

"For a whole hour the U-boat maintained a running action with "PETARD", who kept up a heavy fire, riddling the conning-tower and blowing away the 5-in. gun, but the many hits which she obtained on the pressure hull apparently inflicted little damage. The U-boat, with its periscope broken in "PALADIN'S" attack, circled blindly at between six and ten knots, making it difficult if not dangerous for "PETARD" to close and lop depth-charges over. The risk of being torpedoed and the hazard of collision made "PETARD" decide to sink it with torpedoes. The seventh found its mark and at 1730 the U-boat blew up, leaving only an oil patch; a violent underwater explosion seven minutes later brought more oil and some wreckage to the surface."



JAPANESE RADAR DECOY

SECTION IV

INTELLIGENCE

1. JAPANESE RADAR DECOY

A probable Japanese Radar decoy, a photograph of which appears opposite, was recovered recently. The device consists of an umbrella like frame in the centre of which is a metal hub to which eight iron ribs about 30" long are attached. The inside of the frame is covered with a heavy cloth which is apparently impregnated to be fire resistant. The diameter is about five feet.

The general structure of the device seems to indicate that it was a balloon, the upper part of the envelope having apparently been ripped off. Presumably a pilot parachute was attached to the lower end of the copper spirals. These copper spirals appear to be Radar reflectors intended to produce false echoes, but the reason for the spiral construction is open to conjecture. The eight ribs also act as reflectors.

One possible explanation of the use and operation of the device is that when it is dropped from a plane the pilot parachute acts to release the ribs. This causes the device to open and probably a gas generating compound in a lead can in the centre of the device is ignited, filling the balloon. The balloon then drifts with no substantial increase or decrease in altitude until the gas generator burns out. It appears very probable that the device contains a detonator which rips the envelope when the gas supply runs out causing it to fall rapidly. This is based on reports that the false echoes suddenly disappear.

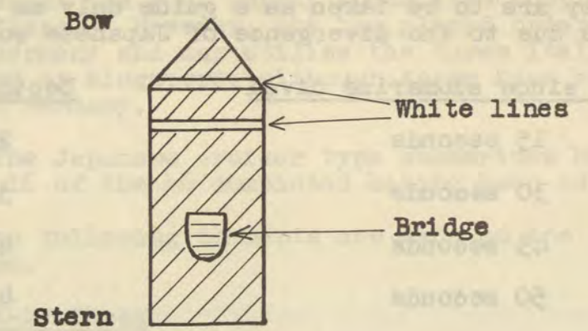
2. JAPANESE SUBMARINE IDENTIFICATION

The following extracts are from a captured Japanese document classified as "very secret".

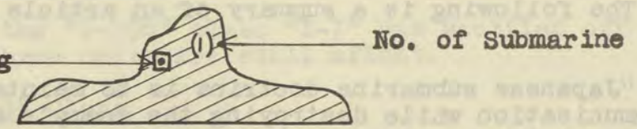
"Precautions while at sea.

It is necessary to carry out continuous anti-aircraft and anti-submarine training as well as strict battle preparedness

and constant anti-aircraft and anti-submarine watch. Identification of friendly submarines is as follows.



Plan View



Elevation View

However, sometimes part of these standard instructions are not used in areas complicated by enemy aircraft."

The following points should be taken into consideration with regard to markings referred to above.

(a) These markings are not always used in areas where Allied aircraft are operating.

(b) The regulations are dated "Kwantung Army Headquarters, September, 1943" and may no longer be in effect. No information has been received, however, to indicate that the identification markings have been changed or that the Japanese are aware that the document is in Allied hands.

3. JAPANESE SUBMARINES' PERFORMANCE

The following figures show rates of dive of Japanese submarines. They are to be taken as a guide only as they are not strictly accurate due to the divergence of Japanese submarine types.

Times since submarine dived	Depth of submarine
15 seconds	25 feet
30 seconds	33 feet
45 seconds	40 feet
50 seconds	43 feet

4. REVIEW OF SUBMARINE TYPES

The following is a summary of an article from the O.N.I. Weekly.

"Japanese submarine doctrine is to maintain Japanese lines of communication while destroying the enemy's and to reduce the enemy's fleet (by night action) to parity with Japanese surface strength, which will then attack.

"Among Japanese submarines, the cruiser types, more nearly than any other, seem designed in response to this doctrine. They are among the largest and newest submarines in the world. They combine, according to the Japanese way of thinking long range, cruising and moderate speed with habitability. They follow the design trend evident in older types - large but inefficient and in some respects obsolete.

"This type has been used mainly for reconnaissance and for landing, supplying and evacuating small land parties. It is estimated that 100 men plus a month's provisions for 200 men can be carried by some of these craft."

The article states that the submarines are excellently equipped for long range patrols. One of them cruised to St. Nazaire in 1943 without refuelling. Though the Japanese urgently need supply submarines, cruiser type boats have not been altered to any appreciable extent, for the Japanese intend that class will

not lose their fighting efficiency. They can therefore transport only 20 tons of provision whereas if they were completely converted to supply they might carry well over 100 tons.

"Japan has four supply submarines completed or building - the "I-54" Class. However, she has placed orders for five 2,500 tonners with Germany and may utilise the three Italian supply U-boats now based at Singapore, although these have been reported turned over to Germany.

"The Japanese cruiser type submarines have suffered heavy losses, 16 of the 46 completed having been sunk."

The following comments are made on the various Japanese submarine types.

"I-1" Class

These submarines are almost a direct copy of German prizes from the Great War. "I-2" is the sole survivor of the four units in this class.

"I-528" Class

Of the "I-528" class "I-7" was scuttled off Kiska. The remaining three units are still afloat.

"I-9" Class

The "I-15" class is very large and versatile. Some submarines carry aircraft, some midgets, and others have carried landing craft. Of the 36 built 10 have possibly been sunk. Some may have been salvaged and it is believed that new units are still building.

"The dangerously slow crash-diving time is common to all Japanese submarines, particularly the cruiser types which may be slowed even more by the presence of deck cargo."

"As far as is known these submarines are all lightly plated and double hulled, the most important construction feature being that all joints (with certain special exceptions) are riveted, not welded.

"It may be assumed that almost all of the cruiser type submarines are equipped with an aircraft search Radar, hydrophones and Asdic gear. In radio equipment they carry long and short wave receivers and transmitters and have a device for underwater signalling."

5. JAPANESE A/S METHODS

A British submarine, which recently attacked a Japanese convoy which was screened by one submarine chaser, reported that the escort vessel was stationed 150° on the beam of the leading ship and that it zig-zagged with the convoy. It operated Asdics when screening the convoy and used both Asdics and hydrophones when hunting after the attack.

6. JAPANESE SUBMARINE OPERATIONS

According to figures published in a recent United States Fleet Anti-Submarine Bulletin, about 88 Japanese submarines are believed to be afloat at present compared with 84 on December 7 1941.

Since the outbreak of war it is estimated that 46 new U-boats have been launched while at least 42 have been lost from all causes.

More than half of the Japanese submarine fleet is comprised of large seagoing "I"-class boats (1200-2400-tons), but the smaller RO-class (500-1000-tons) are being constructed at about double the rate of the I-class and may be in the majority within a year.

The use of submarine as an adjunct to fleet operations seems to be one of the essentials of Japanese submarine operations. A number of submarines carried out reconnaissance in the Pearl Harbour area for some days before December 7 1941, and they remained in the vicinity during and after the raid to protect surface forces from attack. Reconnaissance is also an important part of Japanese defensive strategy, U-boats being used to observe the disposition of Allied forces and to carry out investigations near Allied bases.

The Japanese have shown themselves to be very efficient in using submarines for the purpose of supply and evacuation. Allied aerial superiority and, later, naval superiority in forward areas had forced the enemy to use a large number of his submarines to supply, reinforce, and often evacuate his forces. The Japanese used submarines in the evacuation of Kiska, and for supplying their forces which were isolated on Bougainville Island and the northern New Guinea coast, and these operations have been carried out most efficiently.

Aircraft attack on German U-boat

The use of aircraft-carrying submarines for reconnaissance has met with some success. However, the number of Japanese submarines carrying aircraft has been considerably reduced because it has been necessary to substitute landing barges needed for the more urgent tasks of supply and reinforcement. A similar development has taken place with regard to midget-carrying submarines, and it is believed that not more than ten aircraft-carrying U-boats and two midget-carrying boats are in operation. New construction submarines are thought not to be designed to carry either planes or midgets.

The Japanese offensive against Allied supply lines in the South and South-West Pacific and the Indian Ocean has met with little success. This is due, apparently, to the fact that only a few submarines are on patrol at one time and it seems, too, that Japanese submarine commanders are excessively cautious, the result being that a large percentage of torpedoes fired from long range have missed their targets.

7. U-BOAT CONSTRUCTION

During the six months, German U-boat output has continued to be 20 or more per month, but no new U-boats are being laid down to replace those launched. Consequently, there are now only about 160 U-boats under construction compared with about 270 in September, 1943 (a 40% drop). This fall in U-boat building is not offset by any increase in other sections of the ship-building industry.

The net result of the present position is that during the next six months output will remain fairly high (probably 100 boats will be completed) with a falling off towards the end of the period. Thereafter it may fall to almost negligible proportions.

Actual U-boat completions in the past six months total:-

Type	Number Built
1600 tons	1
1200 tons	9
740 tons	22
500 tons	90
	122 (Plus 2 small U-boats)

It is possible that an additional 12 boats were completed on covered slips, making 134 in all.

The most interesting point revealed by figures of the various types of U-boats now building or fitting out, is that there has been an increase from 2 to 7 in the number of broadbeamed supply boats on the slips. Since only 14 of this type have been completed during the four war years, this increase is particularly noticeable.

8. NEW GERMAN U-BOATS

The following has been taken from a recent British report.

"Allied tactics and weapons used to counter U-boat warfare during 1942-43 caused Germany to modify her strategy and tactics and to introduce new weapons and equipment e.g. the S.B.T., the Radar Decoy Balloon, improved gun armament, the gnat torpedo, supply U-boats etc.

"These counter measures did not keep pace with Allied anti-U-boat measures and Germany has probably for some time recognised the need for a radical change in U-boat warfare and for producing and operating U-boats with -

(i) increased surface and submerged speeds to reduce the danger from aircraft and escorts when attacking and disengaging from attack;

(ii) increased submerged endurance to reduce the danger of aircraft and radar detection when proceeding to operational areas and to allow batteries to be charged submerged; and

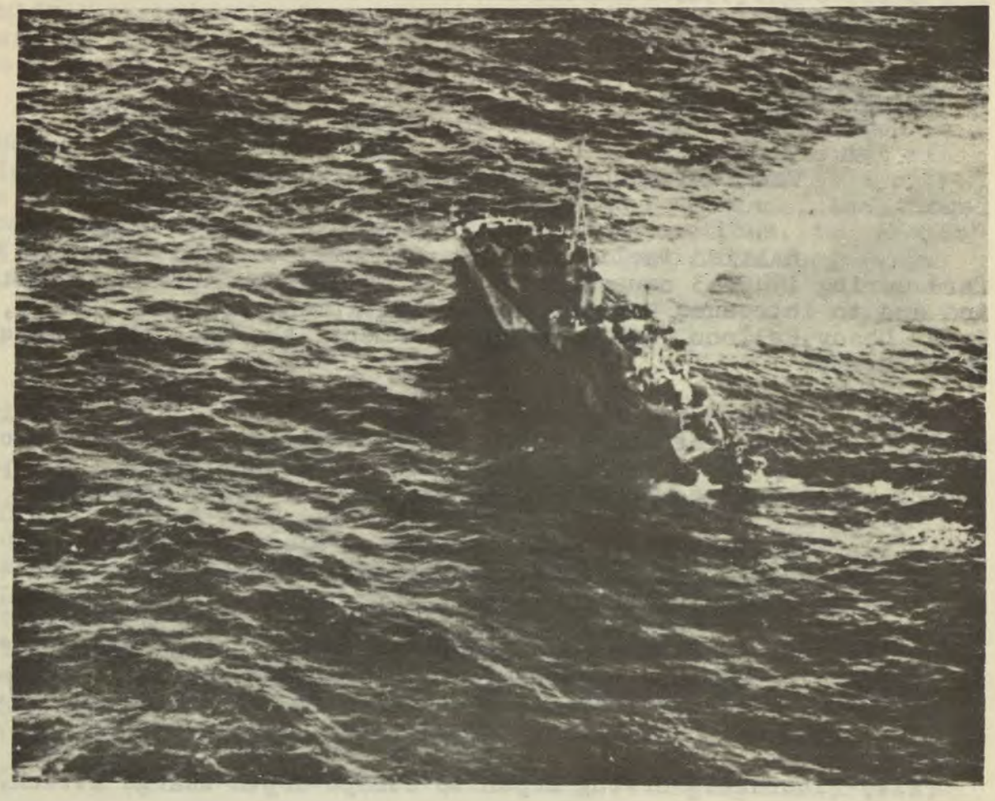
(iii) increased diving depth to escape depth charge attack.

"It is now probable that, since at least August 1943, Germany has been engaged in producing a new ocean-going type of U-boat called the VII C.42, which meets requirements (ii) and (iii), namely greatly increased submerged endurance and diving depth.

"There is no evidence of any U-boats of type VII C.42 being in warlike operation but their appearance at any time is not unlikely."

THE "W-BOAT"

There is reliable evidence that the Germans have develop ed a special submersible which will be called the W-boat.



A British escort photographed after she had been torpedoed in the Atlantic by a "gnat".

It may be either a submersible E-boat with high surface speed or a small U-boat with high submerged speed. It is possible, though unlikely, that both characteristics are embodied in one design.

The length is believed to be about 90 feet, and speed may be as high as 40 knots surfaced and 30 knots submerged. The craft is not easy to handle at slow speed surfaced but can proceed at slow speed submerged. Maximum diving depth is reported to be 100 feet. The W-boat carries two torpedoes, and has no guns. It has a very small silhouette.

The W-boat may be designed for anti-invasion use to attack convoy or ships in undefended anchorages.

Likely tactics are estimated to be either (a) if of E-boat type to attack with E-boats, the latter drawing off escort to allow the W-boat to attack unobserved, or (b) to lie submerged in the estimated path of the convoy and, if of E-boat type, to surface at night and attack on the surface, or (c) if of U-boat type to attack in the normal way making tactical use of high submerged speed to gain bearings etc.

There is no evidence of how many W-boats have been built or of any having reached an operational stage. Details are still uncertain and the above appreciation of the W-boat and its likely use is subject to alteration in the light of further evidence.

9. POSSIBLE NEW JAPANESE SUBMARINE

Information has been received recently of a possible new Japanese submarine known as Type HA. Details of the submarine are vague, but it is believed that it is approximately 100 feet in length.

The Type HA submarine would necessarily have a limited range and could therefore not operate far from its base unless carried by a "mother ship". The size of the new submarine would mean that it would not present a large Asdic target and it may constitute a menace to Allied landing operations if used by the Japanese as an anti-landing weapon.

10. GERMAN U-BOAT CARRIES AIRCRAFT?

It is possible that a German U-boat in the Indian Ocean

carries and operates an aircraft to locate our merchant ships. Such an aircraft would necessarily be small, probably of float plane type, single engined and of limited range. It would not be fitted with wheels and could only be operated in calm weather.

The sighting of such an aircraft is therefore a strong indication of the presence of a German U-boat within about 50 miles to whom the ship's position would be reported.

SECTION V.

MISCELLANEOUS

1. JAPANESE SUBMARINE COMMANDERS' ORDERS

The following is an extract from a captured Japanese instruction to submarine commanders.

"Do not stop with the sinking of enemy ships and cargoes. At the same time that you carry out the complete destruction of the crews of the enemy ships, if possible seize part of the crew and endeavour to secure information about the enemy."

2. SWORDS INTO PLOUGHSHARES!

A Japanese prisoner of war said that originally waters around the Philippines had been mined by the Japanese, but now most of the mines had drifted ashore where they were picked up by natives along the coast, and cut in half. These halves were used as cooking vessels to make soup which was sold to the Guerrilla forces.

3. U-BOATS IN THE INDIAN OCEAN

The following analysis of U-boat attacks in the Indian Ocean during 1942 and 1943 has been taken from the "East Indies Station Report of A/S Warfare."

"Total number of ships attacked in 1942, 91; 1943, 76.

1. Percentages of ships sunk, damaged or escaped of the total number of ships attacked.

	1942	1943
Sunk	59.5 per cent	65.8 per cent

	1942	1943
Damaged	4.5 per cent	10.5 per cent
Escaped	36.0 per cent	23.7 per cent

2. Percentages of ships attacked by day, in twilight, and by night of the total number of ships attacked.

By Day	56.0 per cent	36.8 per cent
In Twilight	5.5 per cent	14.5 per cent
By Night	38.5 per cent	48.7 per cent

3. Comparison of methods of attacks as shown as a percentage of the total number of ships attacked.

By Torpedo	62.6 per cent	92.1 per cent
By Gunfire	11.0 per cent	1.3 per cent
By Torpedo followed by Gunfire	12.1 per cent	5.3 per cent
By Gunfire followed by Torpedo	6.6 per cent	1.3 per cent
By other means	1.1 per cent	-
Not known	6.6 per cent	-

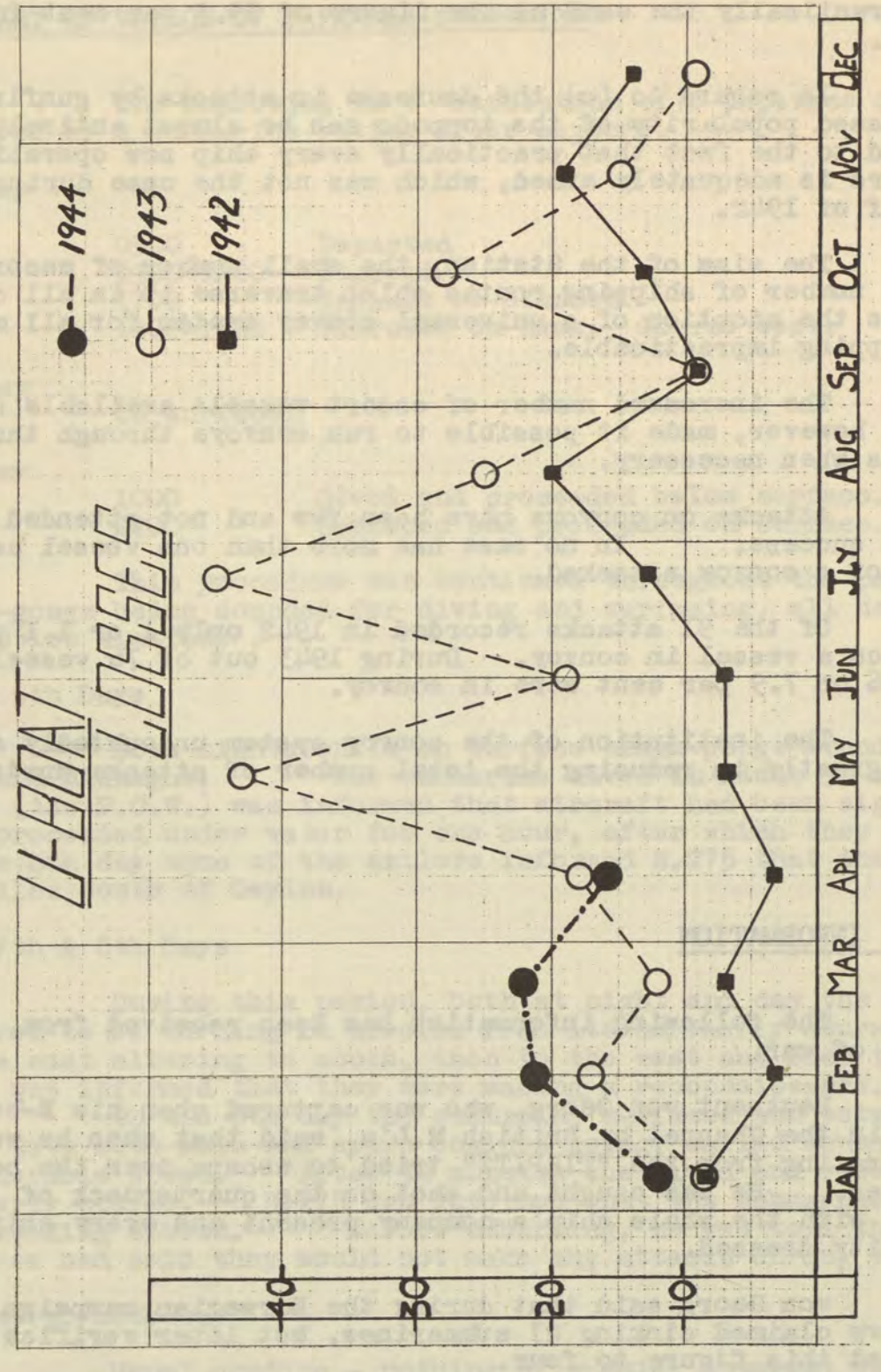
A study of these percentages brings out the following points:

(a) Although less ships were attacked, the U-boats were more efficient and fewer ships attacked escaped unscathed.

(b) Less ships were attacked by day and more by night and in twilight.

(c) The torpedo has gained in popularity at the expense of the gun.

In regard to (a) the increase in efficiency is to be attributed to the arrival of German U-boats on the Station. The actual number of known or believed attacks by Japanese U-boats during 1943 was 30, in which 18 ships or 60 per cent were sunk.


U-BOAT LOSSES
1944
1943
1942
40
30
20
10
JAN FEB MAR APL MAY JUN JLY AUG SEP OCT NOV DEC

This is practically the same as the figure of 59.5 per cent for the year 1942.

In regard to (c) the decrease in attacks by gunfire and the increased popularity of the torpedo can be almost entirely attributed to the fact that practically every ship now operating in the theatre is adequately armed, which was not the case during the first half of 1942.

The size of the Station, the small number of escorts and the large number of shipping routes which traverse it in all directions makes the adoption of a universal convoy system for all merchant shipping impracticable.

The increased number of escort vessels available during 1943 has, however, made it possible to run convoys through threatened areas when necessary.

Attacks on convoys have been few and not attended with any great success. In no case has more than one vessel been lost out of a convoy attacked.

Of the 91 attacks recorded in 1942 only 1 or 1.1 per cent was on a vessel in convoy. During 1943 out of 76 vessels attacked 6 or 7.9 per cent were in convoy.

The institution of the convoy system undoubtedly contributed greatly in reducing the total number of attacks during 1943.

4. P.O.W. INFORMATION

The following information has been received from prisoners of war.

Leutnant von Georg, who was captured when his E-boat was sunk in the Channel by British M.L's, said that when he was in Norway a rating from the "TIRPITZ" tried to escape over the border into Sweden. He was caught and shot on the quarterdeck of "TIRPITZ" with the whole ship's company present and every ship in the vicinity dressed.

von Georg said that during the Norwegian campaign the German navy claimed sinking 27 submarines, but later verification had reduced this figure to four.

5. DIARY OF VOYAGE OF JAPANESE SUBMARINE

The following is a translation of a Japanese diary, prepared by a submarine rating after capture.

1st Day

0900	Departed
0900-1200	Stopped
1700	Engines re-started
1800-1810	Exercise on deck. Course west.

2nd Day

On surface.

3rd Day

1000	Dived and proceeded below surface.
2200	Surfaced and proceeded on surface.

This procedure was continued throughout the passage, alarm-gongs being sounded for diving and surfacing, all hands going to 'Action stations'.

4th & 5th Days

Both nights while on surface alarm-gongs sounded between 2300 and midnight. The submarine dived in about 30 seconds. B.275 (the P.O.W.) was informed that aircraft had been sighted. They proceeded under water for one hour, after which they surfaced. On the 4th day some of the sailors informed B.275 that they were 260 miles south of Ceylon.

6th, 7th & 8th Days

During this period, both at night and day the submarine appeared to be turning in circles from its northerly course, first to the east altering to south, then to the west and back to north. B.275 was informed that they were making a reconnaissance.

On the 8th day the submarine surfaced and between 6/7 p.m., with both main and spare engines going, sailed south at a considerable speed. After 30 minutes she dived and resumed the northerly course. B.275 was informed that the submarine was taking avoiding action. Before embarking, he was told that the Japanese had said they would not make any attacks during this trip.

9th Day to 14th Day

Usual routine - nothing of special interest occurred. B.275 was quite ill for the first few days. He was given vitamin

tablets in lieu of food and states that after taking these he felt better, and as if he had eaten a normal meal.

15th Day

Soon after midnight the submarine surfaced and a party was put into two collapsible boats, four in each boat. They were then towed by the submarine towards land and were told they were then only 2/3 miles off shore, and cast off.

SUBMARINE'S OFFICERS AND CREW

The officers and crew were dressed in khaki shirts and shorts. The officers wore gold or silver stripes on the shoulders of their shirts.

1 (Commander)	- 3 gold stripes
1 Officer	- 3 silver stripes
1 Officer	- 2 gold stripes
1 Officer	- 2 silver stripes
5/6 Officers	- 1 silver stripe

There were about 40 ratings, but B,275 saw only those who lived in his mess. Amongst these were engine-room artificers and cooks. The Commander appeared to be a man of some 45 years of age, while the rest of the officers and crew were young. All appeared to be happy and well nourished. They appeared to receive news through their radio loud-speaker.

On the evening of December 22 a party was taken forward to the Officers' quarters, where they were given tea and shown their position on the chart. One of the officers spoke a little English.

6. WATERSPOUTS IN SOUTH-WEST PACIFIC AREA

The following has been received from Headquarters, Eastern Area, R.A.A.F.:

"On two occasions recently aeroplanes patrolling over the sea off the East coast of Australia have sighted waterspouts and sub-surface turbulence which closely resembled, in one case, the periscope of a submarine, and in the other, the conning tower wash of a submarine about to break surface.

"The first occasion was on February 19, 1944, when an

aeroplane whilst on seaward patrol sighted a "suspicious object" consisting of a spray of water five feet high and leaving a wake approximately 100 yards long and six inches to one foot in width. This sighting was made from two miles distant. The spray was too constant to be a blowing whale and, in view of its position in relation to the ships being escorted, the object was taken to be a submarine at periscope depth. Bombs were selected and fused and a bombing run begun, but when one mile distant the object gradually disappeared and the bombing run was discontinued and a sea-marker dropped. The aeroplane made a signal to its base and warned the vessels in the vicinity by V/S.

"The object concerned had remained visible for approximately two minutes.

"For some time the aeroplane remained in the vicinity and three minutes later the object reappeared but, on this occasion, it resembled the turbulence which would be caused by a submarine in the act of surfacing. A further bombing run was begun and almost simultaneously a second object appeared some two miles distant.

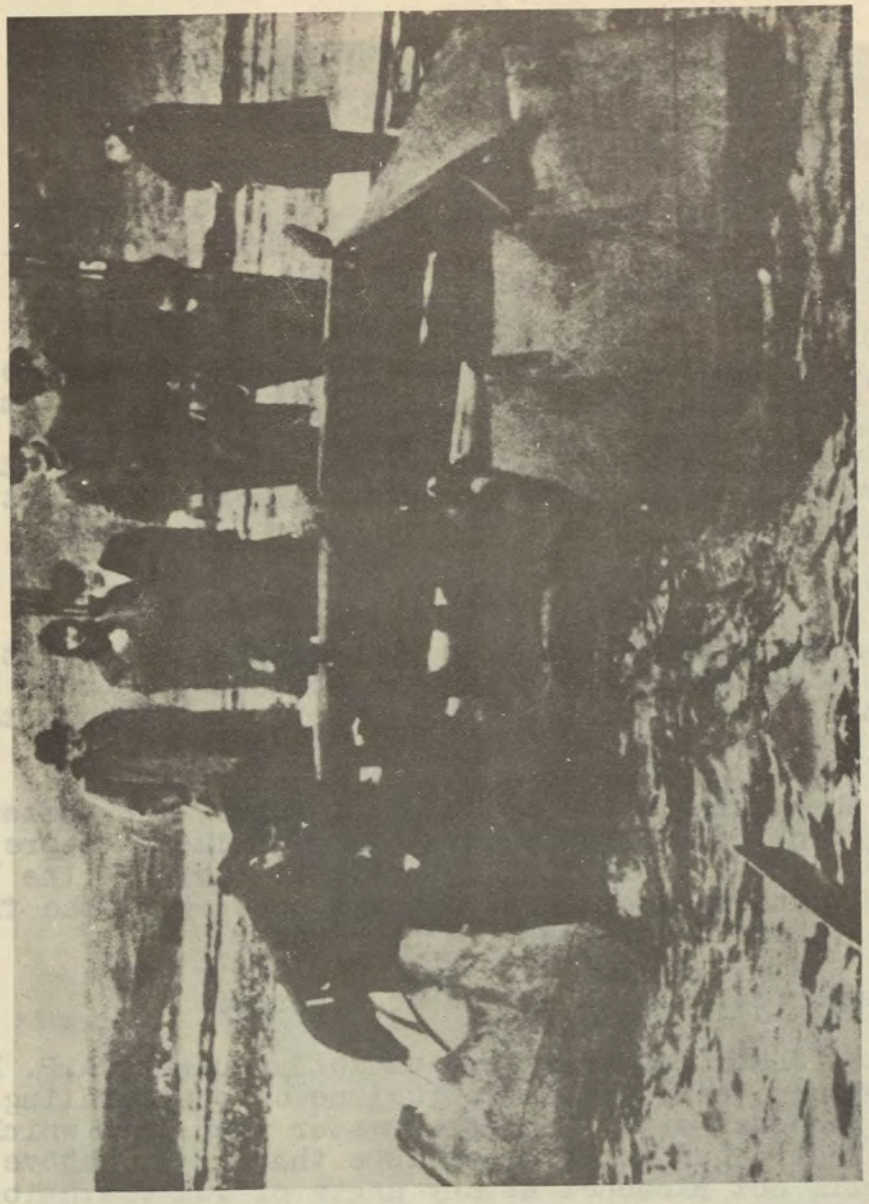
"During the bombing run a narrow vapour trail was obser-ved . This extended for 100 feet from the base of the cloud and pointed to the suspicious object. At first it was thought to be the trail of a signalling or warning pyrotechnic device from a submarine. This phenomenon estimated to be five feet in length remained in view for some time. At half a mile the aeroplane dived towards it from 2000 feet in line with the wake. At 700 feet a circular swirl was noticed around the object whereupon the Captain suspected a waterspout and continued to dive to 300 feet. It was then definitely identified as such. The waterspout had been in view for fully 10 minutes. The second object was also investigated and it was found to be similar but without the vapour trail extending to the over-hanging cloud.

"The second occasion on which the phenomenon was noted was on March 13, 1944, when an aeroplane on patrol from Coff's Harbour sighted a "suspicious object" some 10 nautical miles distant. At the time the sea was smooth with 5/10 cumulonimbus cloud. On approaching the object 4/10 cumulonimbus cloud was noted with base at 1200 feet and in its vicinity the sea was moderate with a heavy swell. The object itself resembled a wake 20 feet in width and of indefinite length. At the time it was raining heavily. The pilot considered that it may have been the conning-tower of a submarine. It was later concluded that this also was due to either a waterspout or sub-surface turbulence.

"Waterspouts are commonly reported in the Coral Sea and have been frequently seen off the N.S.W. coast. When very well developed they correspond to small tornados over the land, and are due to vertical instability.

"On the date of the occurrence reported on February 19, considerable instability was in evidence, as the pilot had referred in his report to "some large towering cu. with a base at 1500 feet and moderate turbulence."

"Small waterspouts have their counterpart in the severe local blows which sometimes unroof houses and blow down trees during the warmer months of the year. The average life of a waterspout is about half an hour. The "Funnel" descends from the cloud to the water; the agitation on the sea surface sometimes creates the impression that the column ascends from the sea to the cloud base but the heavy local precipitations experienced by ships which have passed through waterspouts have always been found to consist of fresh water. The violent action, accompanying the passage of either a tornado or a waterspout, is due to the great pressure differences between the inside and outside of the funnel of the "twister"."



Photograph taken during trials of the new 4-inch "Shark" projectile showing damage done to the "U-Boat" target.

SECTION VI.

MATERIEL

1. THE "SHARK" ANTI-SUBMARINE PROJECTILE

The following has been extracted from an Admiralty Monthly Report.

"A projectile has been developed for use in 4-in. guns for the attack of U-boats on the surface. During development the projectile was known by the camouflage name of "Shark". Its official name will be "projectile, 4-in., anti-submarine." The "Shark" is intended to hit the water just short of the U-boat and strike the boat underwater when the water tamping will make its detonation more effective.

"The purposes underlying development are that:-

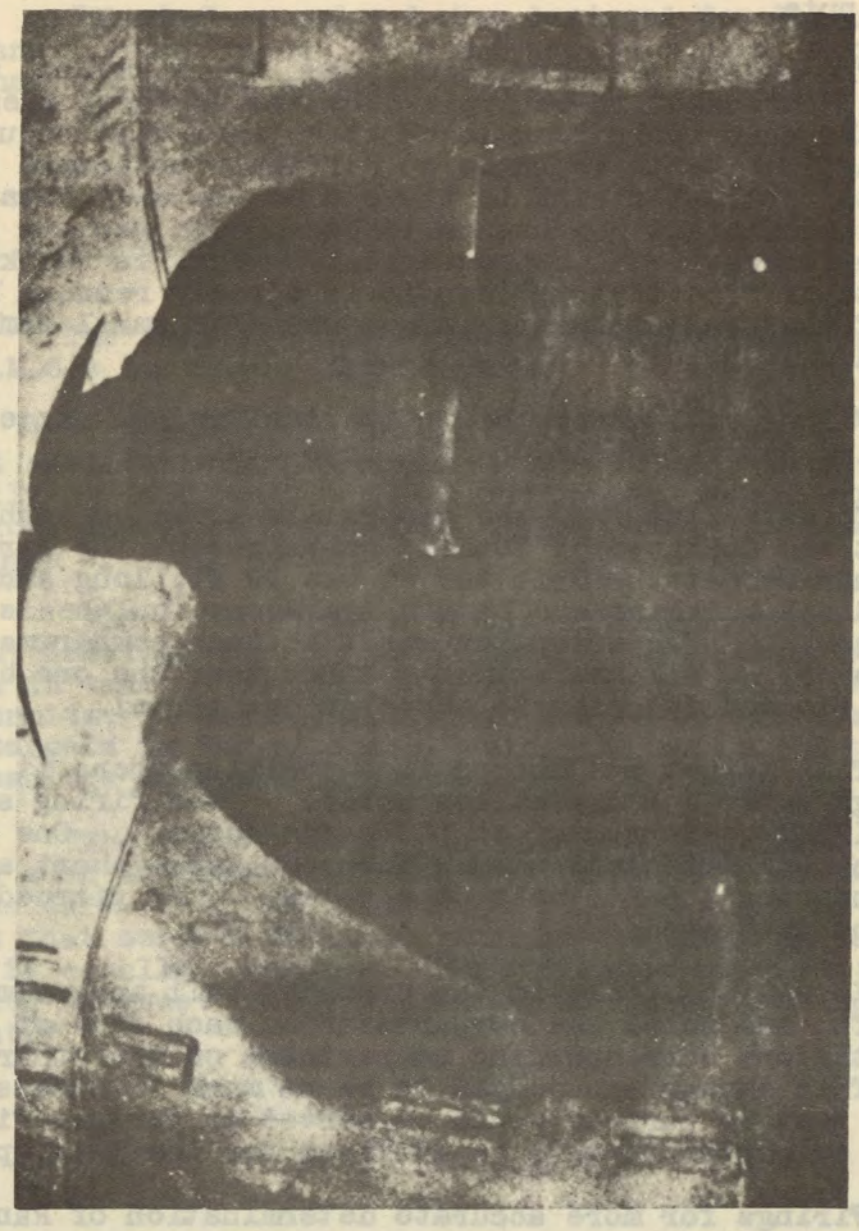
"When attacking U-boats on the surface the target in a vertical plane, on which lethal damage can be done, is very small. Even if this small target be hit, S.A.P. shell are likely to glance off the pressure hull.

"If these shells hit the conning-tower, they often go on before bursting and, even if they burst, are unlikely to prevent the boat diving. H.E. shell will detonate if they hit the target anywhere but only under exceptional circumstances will the fragments from a 4-in. shell hole the pressure hull.

"Larger calibres are more successful.

"The "Shark" is heavy and unwieldy but its A.P. head enables it to pierce tanks or superstructure before bursting. It is immune from ricochet at all angles greater than $3\frac{1}{2}^{o}$, which means that, if fired from a gun mounted not less than 15 ft. above the waterline, it will not ricochet at any angle of gun elevation. Its fuze gives sufficient delay to permit penetration and its charge, 25 lbs. of Torpex, will cause a large hole in the pressure hull.

"On hitting the water the "Shark" continues to move substantially along the same trajectory but loses its velocity rapidly. It follows that the "Shark" is essentially a short range weapon, because the greater the range the more steeply is the trajectory inclined downwards and the projectile will miss under the



A close-up of the hole caused by the explosion of a "Shark" projectile.

U-boat unless it falls very close to her.

"Owing to the unhandiness of the projectile the rate of fire will be slow, particularly with motion of the ship. Start -ing with the gun loaded, it would be a smart crew that fired three rounds in a minute.

"The muzzle velocity is only 500 ft. a second, which means that the "forecast" to be applied by the gunlayer when there is motion on the ship would need to be five times that required by an ordinary shell. This would be so difficult to assess that it is advisable to restrict firing to the end of the roll towards - there may be insufficient depression to be able to fire on the roll away - when no forecast will be required. This is unlikely to reduce the rate of fire further than it is already reduced by the unhandiness of the projectile and in any case the small number of rounds carried will preclude a high rate of fire.

"Firing will always be in Quarter Firing, range being set on a special "Shark" scale on the Range dial.

"To establish that the projectile would be lethal, a special target was designed by "Undex" to represent the structure of modern German U-boats. This target was 19 ft. long and divided by a longitudinal bulkhead and by two transverse bulkheads into six compartments. The intention was that each compartment should receive one round. All compartments other than the one being attacked were flooded in order to submerge the target.

"This target was moored in a position where it would be covered at high water but dry at low water. The firing ship H.M.S. "KINGFISHER", was moored at 100 yards range. One round was fired which (as intended) struck about 20 yards short and hit the centre compartment 5 ft. below the water. It pierced the saddle tank and detonated.

"It caused a hole in the pressure hull approximately 8½ ft. by 5½ ft. and holed the compartment on each side of the one attacked and the one corresponding compartment on the other side of the ship. This damage was judged to be so much in excess of what was necessary that no purpose would be served in further firing. The remaining compartments will be utilised for the 3-in. projectile.

"Firings for more accurate determination of Range Tables and of the underwater movement are proceeding.

"The present projectile can be fired from all marks of 4-in. gun, but each mark requires a different propellent charge.

"It is anticipated that a small number of these projectiles will be available for Western Approaches by the end of March,

1944. A larger order will begin to mature in May.

"Other possible uses of the projectile, such as for sinking small merchant vessels, will no doubt receive consideration.

"Sharks" are also being designed for 3-in., 12-pdr., 4.5-in. and 4.7-in. guns. For the two former it is not yet established that the weapon will be lethal."

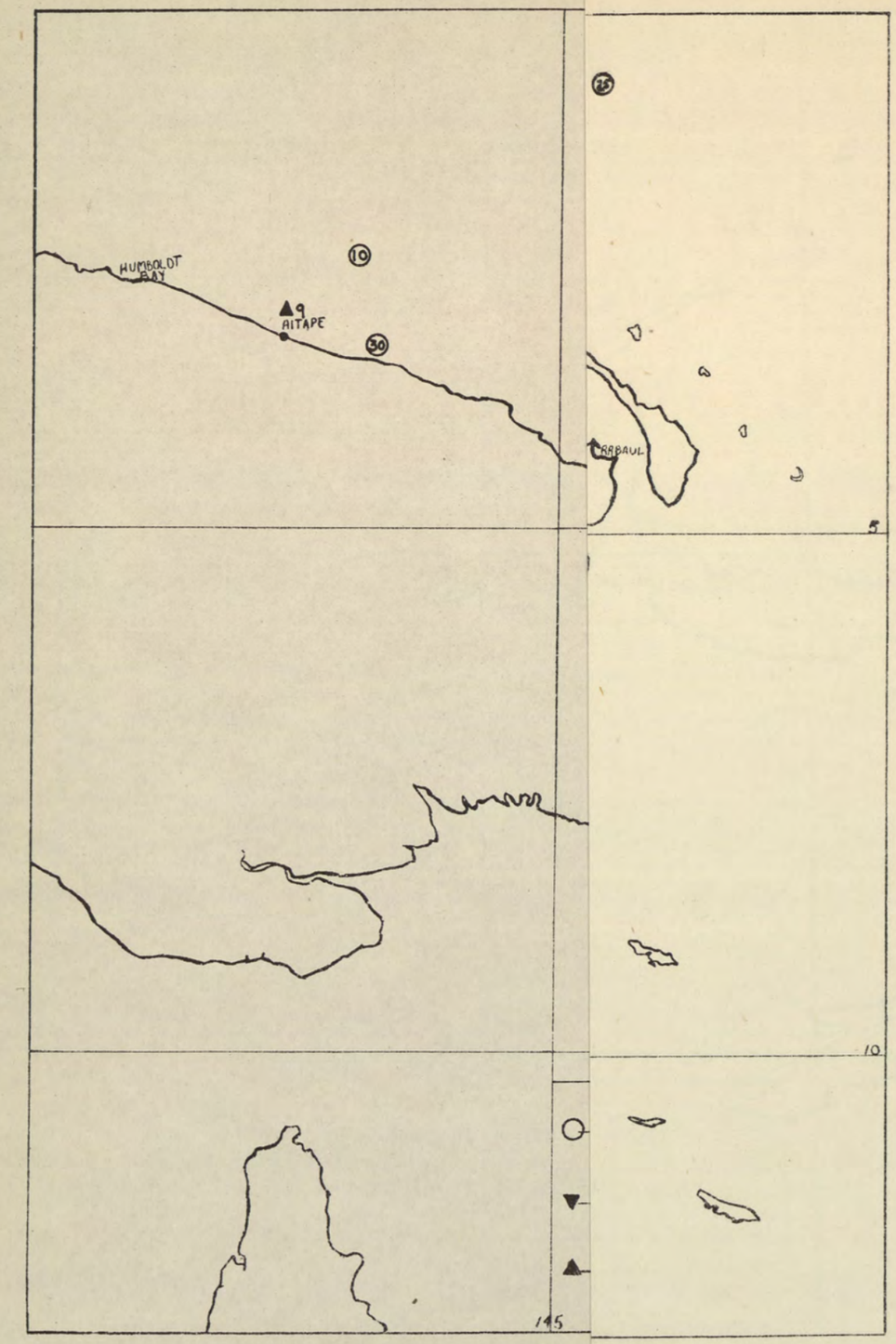
2. RADAR EXERCISE REPORT

The following is a report on Radar exercises carried out by A.M.S's in the New Guinea Area.

"The ranges of detection of the submarine's periscope were most satisfactory. Operators were able to pick up the periscope easily at 1600 yards while carrying out an all round sweep. On occasions the echo from 6 feet of periscope has been retained above ranges of 3,000 yards.

"Radar ranges were always within 50 yards of Asdic ranges but bearings were up to 3° out. Exercises to practice operators in taking accurate bearings will be conducted as opportunity permits; meanwhile operators are to be exercised against surface targets in the vicinity, using the method of taking a mean of two readings of equal amplitude.

"The satisfactory performance of the A272 Radar during exercises such as these indicates its usefulness as an additional aid to the safe escorting of convoys in these waters, and it is important that surface Radar be used by all ships at night. However, it is equally important that efficient watch be maintained by lookouts who must never be allowed to think that Radar is sufficient."


HUMBOLDT BAY
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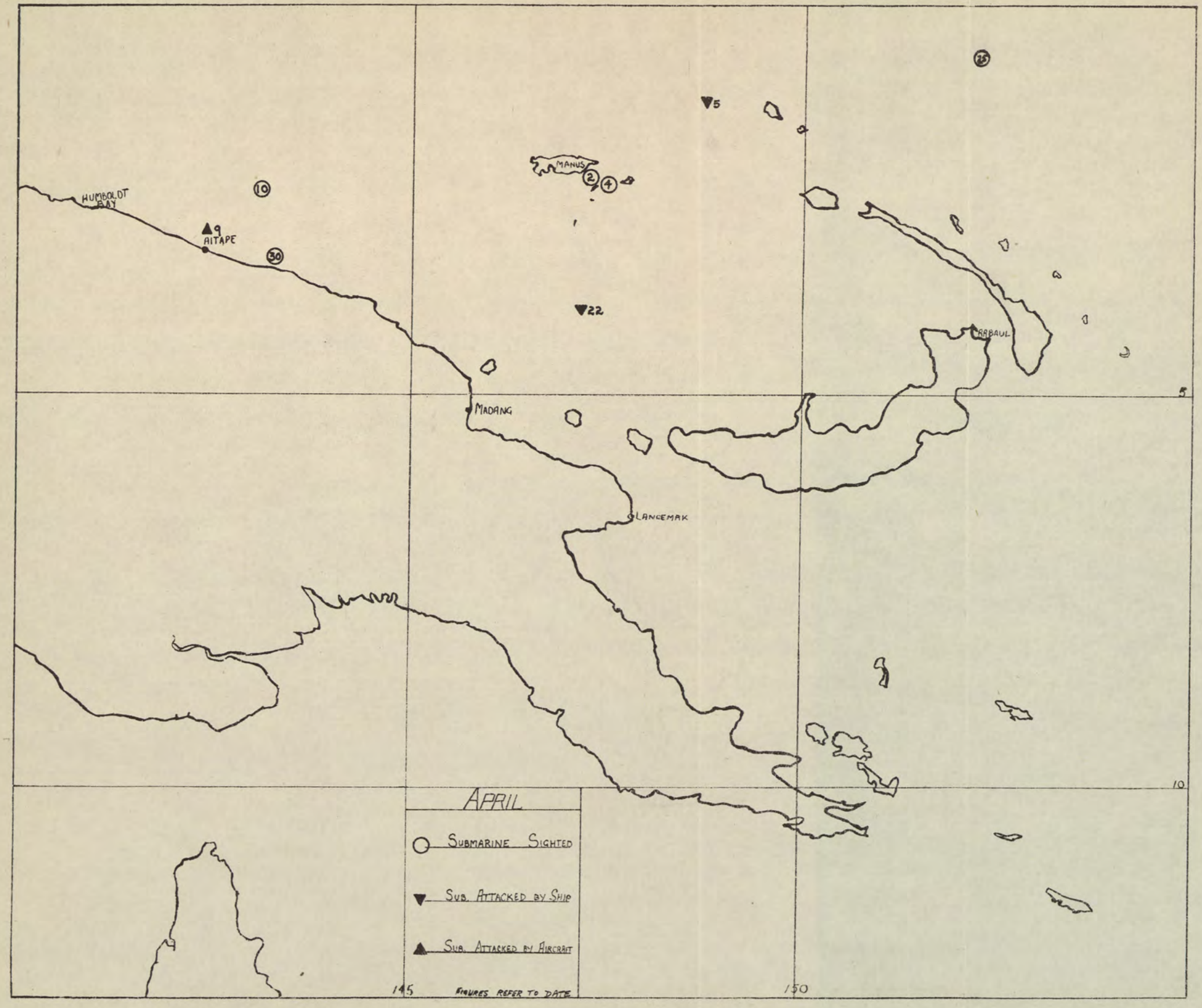
HUMBOLDT BAY
AITAPE
MANUS
MADANG
LANGEMAK
RABAUL
APRIL
SUBMARINE SIGHTED
SUB. ATTACKED BY SHIP
SUB. ATTACKED BY AIRCRAFT
FIGURES REFER TO DATE
145
150
5
10