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BATTLE EXPERIENCE FROM PEARL HARBOR TO MIDWAY.

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Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
1943	**N/A**	**-**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Battle Experience From-Pearl Harbor To Midway	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **United States Fleet**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release, distribution unlimited

13. SUPPLEMENTARY NOTES
JFSC WWII Declassified Records.

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**SAR**	**124**	

[redacted] INFORMATION BULLETIN NO. 1

BATTLE EXPERIENCE

FROM

PEARL HARBOR TO MIDWAY

DECEMBER 1941 TO JUNE 1942

INCLUDING

MAKIN ISLAND RAID 17-18 AUGUST

CAUTION

THIS BULLETIN AND THE INFORMATION CONTAINED HEREIN MUST NOT FALL INTO THE HANDS OF THE ENEMY.

UNITED STATES FLEET

HEADQUARTERS OF THE COMMANDER IN CHIEF

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UNITED STATES FLEET
HEADQUARTERS OF THE COMMANDER IN CHIEF
NAVY DEPARTMENT, WASHINGTON, D.C.

February 15, 1943

These Bulletins on "Fighting Experience" during the first year of the War are issued for the general information of officers.

They are planned to promulgate reliable information concerning actual War experience. Any adverse comment made, is not intended to reflect criticism on any individual but to assist officers in appreciating the best line of action in many circumstances.

It is inevitable that there would be considerable delay if complete analysis were made before issue to the Fleet. Comments that are made in these bulletins represent those expressions of opinion from responsible sources that were available at the time the particular operation under discussion was completed.

Studies are continuing to the end that divergent views may be reconciled and complete analysis made.

Encounters with the enemy discussed in these Bulletins, are presented in their chronological order. It will be apparent that "lessons learned" during the earlier part of the war were put to good advantage in subsequent engagements.

Air combat actions, Anti-submarine experiences, Submarine Patrol experiences and Technical Gunnery Experiences are covered in Cominch Bulletins #6, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, and 20.

Material contained in these Bulletins was drawn largely from War Diaries, and Battle Reports of various Commanders and ships.

These Bulletins are ~~SECRET~~ and shall be safeguarded in accordance with the provisions of Article 76, U.S. Navy Regulations, 1920. They should be widely circulated among commissioned personnel.

When no longer required they shall be destroyed by burning. No report of destruction need be submitted.

R. S. EDWARDS,
Chief of Staff.

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CHAPTER I

HISTORICAL SUMMARY

DECEMBER 7, 1941 TO DECEMBER 7, 1942

On the morning of December 7, 1941, the Japanese without warning, made heavy attacks on United States bases in the Pacific. Pearl Harbor and other Hawaiian installations were attacked by strong carrier based air forces. It appeared that four aircraft carriers and their escorts comprised the force attacking Pearl Harbor. The attack on Hawaii was in three waves of aircraft carrier planes commencing at 0747 and ending at 0936, local time. The first attack was on various air fields followed by attacks on ships at Pearl Harbor. Small enemy two-man submarines were used ineffectively.

Guam was attacked and, after strong but short-lived resistance, surrendered to the enemy.

Wake Island was attacked but resisted this and subsequent attacks until December 23rd.

Naval installations in the Manila Area were attacked by enemy bombers on December 8th (local time) without previous warning at approximately the same moment as the other attacks in the Pacific Area.

The local naval defense forces reported shortly thereafter to General MacArthur, U.S. Army, Commander in the Philippines. It soon became apparent that the units of the U.S. Asiatic Fleet could best operate against the enemy by withdrawing to bases in the Netherlands East Indies. Accordingly, all but a few submarines retired to the N.E.I. These submarines based on Manila for a short time, but were withdrawn to the south when the base facilities at Manila were destroyed or became untenable. Thereafter, the Asiatic submarines operated offensively against the enemy and were used in maintaining logistic lines of communication between Manila and the South.

The naval forces in the Manila Area cooperated with the Army in the defense of Bataan and later of Corregidor. U.S. Navy motor torpedo boats operated against enemy surface units in and near Manila sinking and damaging various ships. One of these boats carried General MacArthur to the southern Philippines when he left Manila. Eventually, these units were immobilized because of lack of gasoline and torpedoes, or destroyed by enemy action. It was also reported that Fifth Column Japs put lubricating oil in our gasoline.

The Asiatic Fleet, commanded by Admiral T.C. Hart, joined British and Dutch naval forces to form the "ABDA" naval forces. This force was commanded by Admiral Hart who later was relieved by Admiral Helfrich of the Royal Netherlands Navy, shortly before the fall of Java.

On December 11th, planes from the *U.S.S. ENTERPRISE* surprised a group of enemy submarines numbering from three to five on the surface 150 miles northeast of Oahu and bombed them. At least one of these submarines was sunk.

During December and January minor actions in the Pacific Area occurred as follows:

(a) Johnston Island was shelled by two enemy ships.

(b) Kahalui, in the Hawaiian Group, was shelled by an enemy submarine.

(c) Johnston and Palmyra Islands were shelled by enemy submarines.

(d) Two enemy submarines were sunk south of Oahu.

(e) Hilo, Kahalui, and Nawiliwili in the Hawaiian Group were shelled by enemy submarines.

(f) Tutuila, Samoa, was shelled by an enemy submarine.

(g) The *U.S.S. SARATOGA* was hit by submarine torpedo, 600 miles west of Hawaii. The ship returned to Hawaii under her own power.

(h) The *U.S.S. NECHES*, an oil tanker, was torpedoed and sunk west of Hawaii.

On the night of January 23rd, Destroyer Division 59, composed of four old destroyers, attacked an enemy convoy of 31 transports, heavily escorted, in the Straits of Makassar, near Balikpapan, Borneo. The destroyers succeeded in eluding the escort and did extensive damage to the enemy transports. The U.S. force then retired, total damage inflicted by the enemy consisting of one shell hit taken by the destroyer *JOHN PAUL JONES*.

On the 25th of January, Midway Island was bombarded by an enemy submarine. Our shore battery claimed one hit on the submarine.

At a point 300 miles west of Midway, on the 27th of January, a large enemy submarine cruising on the surface was sunk by the submarine *GUDGEON*.

On January 30th, the *U.S.S. WAKEFIELD*, naval transport, in the vicinity of Singapore, took one bomb hit and was damaged above the waterline.

On February 1st, U.S. Task Forces 8 and 17, which included the aircraft carriers *ENTERPRISE* and *YORKTOWN*, carried out an air attack and surface bombardment of Japanese installations in the Gilbert and Marshall Islands. Severe damage was done to shore installations. Ships found in the area were sunk or damaged. Planes were destroyed on the ground and in the air when they attempted to attack our forces. The *U.S.S. CHESTER*, heavy cruiser, received one small bomb hit. Thirteen U.S. planes were lost.

On February 4th, a concentration of Dutch and U.S. warships off the Ægean Islands, Flores Sea, were heavily attacked by enemy bombers. The heavy cruiser *HOUSTON* took one hit which put #3 turret out of commission, killing 45. The light cruiser *MARBLEHEAD* was extensively damaged. This vessel reached Tjilatjap, Java, only through the heroic efforts of her crew which kept the vessel from sinking.

An enemy submarine fired three rounds at Midway on February 9th but no damage was done.

The U.S. naval forces in the N.E.I. Area continued to escort transport and supply ships and to support "ABDA" operations to the limit of the strength of the units present.

During an attack by enemy bombers on Darwin, Australia, on the 19th of February, the U.S. destroyer *PEARY* was sunk and the seaplane tender *WILLIAM B. PRESTON* severely damaged.

On the night of the 19th of February, five U.S. destroyers with Dutch units attacked enemy forces in Badung Strait covering a landing on Bali. No U.S. ships were damaged while two enemy vessels were put out of action.

On February 20th, 346 miles east of Rabaul, Task Force 11, including the carrier *LEXINGTON*, was attacked by 18 enemy heavy bombers. No damage was done to our ships. Sixteen and possibly seventeen enemy planes were destroyed. Our losses were two fighter planes and one pilot.

On the 21st of February, at Soerabaja, the U.S. destroyer *STEWART*, in dry dock, fell from the dry dock blocks and was badly damaged. The ship was destroyed when Soerabaja was evacuated.

On February 24th, a U.S. Task Force made an air attack and bombarded Japanese installations on Wake Island. Three large seaplanes and a patrol boat were destroyed. Shore facilities were damaged extensively. We lost one dive bomber and the crew was captured by the enemy. On March 4th, the same task force attacked Marcus Island. No enemy air or surface craft were present. Extensive damage was inflicted on this base. One of our dive bombers was shot down and the crew captured by the enemy.

On the 28th of February, in the Java Sea, an Allied force of two heavy cruisers, two light cruisers and nine destroyers engaged an enemy force of nine cruisers, nine destroyer leaders, twelve destroyers and forty transports. The enemy force retired to the north having sustained some damage to combat units. Our heavy cruiser *HOUSTON* was slightly damaged. The next day, it became apparent that the enemy occupation of Java was imminent and it was decided to retire our remaining naval forces to Australia. The *HOUSTON*, in company with the Australian cruiser *PERTH*, left Batavia to proceed through Soenda Strait. These ships were last seen in action with superior enemy forces in the strait and are presumed sunk. The remaining five U.S. destroyers proceeded through Bali Strait without contact with the enemy.

From the 26th of February, an enemy surface force including at least one carrier operated to the south of the N.E.I. Islands. The old carrier *LANGLEY*, the tanker *PECOS*, the destroyers *PILLSBURY* and *EDSALL*, and the gunboat *ASHEVILLE* were attacked and sunk by this force.

The surviving U.S. naval forces retired to Perth, Western Australia. Our submarines continued to operate from that port and inflicted damage on enemy units during the occupation of Java.

U.S. naval action in the N.E.I. Area has since been confined to submarine offensive patrols in enemy-held waters and in air patrols of the approaches to Western Australia.

On March 5th, two, possibly three enemy planes flew over Oahu dropping three bombs in an open field north of Honolulu.

On March 10th, two U.S. carrier groups, from a point in the Gulf of Papua, crossed the mountains of New Guinea and carried out a surprise attack on Salamoa and Lae. No enemy air opposition was encountered except for one seaplane which was shot down. Four transports were sunk, one transport was beached; one cruiser was left burning, another blew up and probably sunk; one destroyer was sunk and another badly damaged; and a minelayer was set on fire.

U.S. submarine attacks on Japanese naval and commercial vessels are believed to have accounted for a total of 1,073,903 tons sunk and 450,350 tons damaged. Worthy of special mention is the torpedoing and sinking on April 21st of the *TAIYO MARU* (15,000 ton N.Y.K. ship.) This vessel was sunk 80 miles west of Nagasaki during heavy weather.

On May 4th, the air attack group from the carrier *YORKTOWN* made repeated attacks on enemy ships at Tulagi, Solomon Islands. Two destroyers, four patrol craft and one cargo ship were believed hit; a minelayer was beached and sunk; possibly other naval craft and transports were damaged. Five seaplanes were shot down. U.S. losses were three carrier planes.

On May 7th, the *U.S.S. NEOSHO*, tanker, and the destroyer *SIMS*, were bombed and sunk in the Coral Sea south of the Solomon Islands. On the same day, an engagement took place between U.S. and Japanese carrier groups in the Coral Sea south of the Louisiade Archipelago. The Japanese carrier *SHOHO* was sunk and on the following day the carrier *SHOKAKU* received severe damage. Twenty three enemy aircraft, in addition to the *SHOHO* group, were destroyed. The *U.S.S. LEXINGTON*, carrier, received several bomb hits which started fires resulting in the eventual loss of the ship.

During the latter part of May, our scouting forces detected movements of Japanese units which seemed to indicate an imminent attack upon U.S. bases.

Early on the 3rd of June, the Naval Air Station at Dutch Harbor was attacked by a group of light bombers, apparently from an enemy carrier. An enemy carrier was later sighted south of the Aleutian Chain escorted by cruisers and destroyers. This formation was attacked by Army planes. Subsequent efforts to locate this enemy force were unsuccessful due to unfavorable weather. Dutch Harbor was again attacked on the 5th of June. During this three day period, Japanese forces occupied Kiska and Attu Islands. Enemy attack units were not again seen in the area. Since that date, enemy forces have been seen in and to the west of Kiska. These vessels were engaged in supplying and reinforcing Kiska. To date, no offensive action by the enemy has been taken to the east of Kiska.

Early on the morning of June 3rd, U.S. scouting planes located a force of enemy transports under heavy escort 700 miles to the west of Midway. This force was attacked by four Catalinas with torpedoes. No damage was observed and the enemy force continued on an easterly course with the apparent intention of occupying Midway. Later, on the 4th, Midway was attacked by carrier based planes. Considerable damage was done. An enemy carrier force was then discovered approximately 150 miles to the northwest. This force was found to consist of four large carriers escorted by heavy units. Planes from Midway attacked the enemy carrier force following which U.S. carriers operating in the eastward launched striking groups which attacked the enemy carriers. All four carriers were eventually sunk and some escort units were believed sunk or badly damaged. The U.S. submarine *NAUTILUS* on patrol in this area sank one damaged Japanese aircraft carrier (included in the four above)

The enemy transport force to the south and west of the carrier group was taken under attack by Army planes from Midway. Some damage was reported. Later on the afternoon of the 4th of June, the enemy forces commenced a general retirement to the westward, harried by U.S. air, surface and submarine forces.

During the U.S. air attack on the Japanese carrier group, Japanese carrier planes attacked the U.S. carrier *YORKTOWN*, then in a position north northeast of Midway. The *YORKTOWN* received bomb hits which caused considerable damage. Efforts were made to salvage the ship, but on the 6th of June an enemy submarine scored two torpedo hits and the *YORKTOWN* sank early on the morning of the 7th. Air searches made on the 7th disclosed that the Japanese invasion force had abandoned its mission and was returning to home bases.

Naval action in the Aleutian Theatre since June has been confined with one exception to escorting, patrol and scouting. Our submarines have attacked enemy surface units whenever possible and a number of these have been sunk or damaged. On August 7th, a task force of U.S. cruisers and destroyers bombarded Japanese installations at Kiska Island. Unfavorable weather and poor visibility conditions prevented complete observation and assessment of the damage inflicted. Photographs taken during the following few days indicate that it must have been extensive.

On the morning of August 7th, U.S. amphibious forces supported by carrier task forces attacked and occupied Tulagi and the air field area in the north central section of Guadalcanal Island in the Solomons. Japanese troops offered strong resistance in the Tulagi area but were killed or captured. The enemy forces on Guadalcanal offered slight resistance and then fled to the hills. Enemy aircraft present were destroyed. Shortly after the occupation, a force of 25 Japanese bombers attacked the transports in the area damaging the destroyer *MUGFORD*. The transport *GEORGE F. ELLIOTT* was set afire by an enemy plane which crash-landed on board. The *GEORGE F. ELLIOTT* was later beached. Most of the enemy bombers were shot down. The destroyer *JARVIS* received a torpedo hit which caused considerable damage. This ship got underway for Noumea, New Caledonia, without escort during the next night and has since been unreported. On the night of August 8th, an engagement took place off Savo Island between an enemy cruiser force seeking to attack the transport group and a U.S. cruiser force screening the transports. The Australian cruiser *CANBERRA*, the U.S. cruisers *VINCENNES* and *QUINCY* were sunk. The U.S. cruiser *ASTORIA* received severe damage and sank the next day. The *U.S.S. CHICAGO*, the *RALPH TALBOT* and the *PATTERSON* were damaged. Some damage was inflicted on the enemy ships, the extent of which is unknown.

The air field at Guadalcanal was completed and placed in operating condition within a few days. Marine and naval planes landed and commenced operations.

Marine forces continued to slowly mop up enemy forces on Guadalcanal and to resist continued attempts by the Japanese to land reinforcements and supplies for the survivors of the original garrison.

On August 17-18, 1942, two detachments from the 2nd Marine Raider Battalion totaling 13 officers and 208 men made a raid on Makin Atoll in the Gilbert Islands. This force was transported and landed from the submarines *NAUTILUS* and *ARGONAUT*. Two small enemy vessels were sunk, two seaplanes destroyed and heavy damage was done to enemy installations. Japanese known dead were reported as eighty-three; our losses one officer and thirteen men killed plus twenty missing.

On the 21st of August, the U.S. destroyer *BLUE* was torpedoed by an enemy motor torpedo boat off Savo Island. Extensive damage was done to the ship and she was sunk by our own forces the next day when it was thought that she could not be towed to a base for repairs.

On the 24th of August, in the vicinity of the Santa Cruz Islands, enemy task forces containing at least two and possibly four carriers were engaged by U.S. surface forces. The surface ships did not come in contact but the carrier attack groups exchanged attacks on heavy units in the opposing formation. The Japanese carrier *RYUJO* was badly damaged and set afire. It is believed that this ship later sank. One enemy battleship and two cruisers were reported damaged. A transport force, for which the carrier groups were a screening force, was attacked and units scattered. The U.S. carrier *ENTERPRISE* received three bomb hits but continued to

operate with no decrease in efficiency. It is believed that upwards of 100 enemy planes were destroyed in this action, while not more than 20 U.S. planes were lost. During the course of the action, two enemy submarines were attacked and believed sunk.

Notable in the above action was the employment for the first time of a new U.S. battleship in a high speed carrier task force. Seven and possibly fourteen enemy planes were reported shot down by the anti-aircraft fire of this vessel. This battleship not only aided in defending the aircraft carrier when it was attacked but also defended itself against a separate attack made later by dive bombers and suffered no damage whatever during the entire engagement. So intense was her firing that personnel on other vessels described her as being ablaze and thought that she was actually on fire.

On the evening of the 29th of August, Navy dive bombers operating from Guadalcanal attacked a formation of three destroyers near that island. Two of the enemy vessels were reported destroyed and the third damaged to an extent which made its return to its home base improbable.

On the 30th of August at Guadalcanal, the fast transport *CALHOUN* (ex-destroyer) was attacked by enemy bombers and sunk.

On September 4th at Guadalcanal, the fast transport *LITTLE* and *GREGORY* were sunk by gunfire from enemy destroyers.

On September 15th, the *U.S.S. WASP*, carrier, was torpedoed and sunk by a submarine in the area south of the Solomons.

During the period from August 7th to December 7th, the enemy made repeated attacks on our installations at Guadalcanal.

Worthy of special note is the enemy air attack of September 28th on Guadalcanal. A force of 25 bombers escorted by fighters approached the air field. Twenty-three of the enemy bombers and one fighter were shot down. All of our planes returned safely.

On September 29th, near Truk, a U.S. submarine hit a large enemy carrier with two torpedoes and badly damaged the vessel.

On October 5th, a force of 49 U.S. carrier planes attacked enemy vessels in the Shortlands Area in extremely unfavorable weather. Two heavy cruisers and four naval auxiliaries were believed damaged.

On the night of the 7th and 8th of October, an enemy surface force which was attempting to reinforce Guadalcanal was attacked by dive bombers. An enemy large cruiser was set afire and all forces retired. Guadalcanal planes on the 10th of October attacked two light cruisers reportedly damaging both.

On the 11th of October, a U.S. cruiser force engaged an enemy force of cruisers and destroyers west of Savo Island. Several enemy craft were damaged or sunk. The heavy cruiser *SALT LAKE CITY* and light cruiser *HELENA* received some damage. The U.S. light cruiser *BOISE*

received extreme damage and the destroyer *FARENHOLT* light damage. The U.S. destroyer *DUNCAN* was badly damaged and was sunk by our own forces next morning.

On the night of the 14th of October, enemy surface units near Savo Island were attacked by U.S. motor torpedo boats. One enemy cruiser and one destroyer were thought to have been damaged.

On October 15th, U.S. dive bombers from Guadalcanal attacked an enemy force of transports escorted by combat units. Three transports were believed to have been destroyed and one escorting ship sunk.

On the same day, enemy dive bombers attacked and destroyed the U.S. destroyer *MEREDITH*.

On the morning of the 16th of October, the U.S. light cruiser *SAN JUAN* sank two enemy patrol vessels south of the Gilbert Islands.

On the night of October 19th, U.S. patrol planes bombed a formation of two heavy cruisers and two destroyers near Guadalcanal badly damaging one cruiser.

On the 20th of October, the *U.S.S. CHESTER*, heavy cruiser, was damaged by an enemy torpedo west of Espiritu Santo Island.

An outstanding air combat occurred on the 23rd of October when a formation of 20 Zeros and 16 bombers appeared over Guadalcanal airfield. The enemy lost 20 Zeros; and one certain, possibly 4, enemy bombers destroyed. All of our planes returned safely.

On the 22nd of October, two U.S. destroyers sank two enemy patrol vessels south of the Gilbert Islands.

On the 26th of October, north of the Santa Cruz Islands, an engagement occurred between the air attack groups of the U.S. and Japanese task forces. Two enemy carriers received some damage. One other enemy carrier received a torpedo hit and a number of hits were scored on the escort vessels. The U.S. carrier *ENTERPRISE* was slightly damaged and the destroyer *PORTER* sunk. The *HORNET* was badly damaged. An attempt was made to tow the *HORNET* to a nearby base but the ship finally was abandoned and sunk by our own forces. The enemy is believed to have lost 115 planes. Our losses were 64 planes and 24 pilots.

At Tulagi on the 25th of October, a fleet tug *SEMINOLE* and a small patrol craft were sunk by enemy gunfire.

On the 29th of October near Guadalcanal, a U.S. motor torpedo boat scored a torpedo hit on an enemy destroyer.

Since the occupation of Guadalcanal and Tulagi, our occupation forces have been continually reinforced and supplied in the face of opposition from the enemy. Our forces have been active in beating off attempts to re-occupy the area. These operations reached their climax in the period from November 12th to November 15th when an "all out" effort was made by the enemy to land strong forces on Guadalcanal and to re-occupy the air field. The attempt was made by a formation of 12 transports and cargo vessels heavily escorted by battleships, heavy cruisers and lighter craft. On the night of November 12-13, U.S. cruisers and destroyers attacked an enemy formation far superior in power and number off Savo Island. The enemy losses were two battleships damaged, one heavy cruiser and one destroyer were blown up and sunk, several other light cruisers and destroyers were damaged. A damaged battleship of the *KONGO* class was attacked the following day by U.S. planes and sunk. U.S. losses were *ATLANTA*, *MONSSEN*, *LAFFEY*, *BARTON* and *CUSHING* sunk, and *PENSACOLA* and *SAN FRANCISCO* and six destroyers damaged. On the following day the *JUNEAU* was torpedoed by a submarine and sunk. On the 14th, the transport formation was heavily attacked by U.S. planes. Eight of the twelve vessels were sunk or set afire. The remaining four ships were beached on Guadalcanal on the night of the 14th. On the morning of the 15th, these vessels were destroyed by our surface and air units. On the night of the 14th-15th, an enemy surface force was engaged by a U.S. task force comprised of battleships and destroyers.

Enemy losses were: 1 battleship sunk, and several other craft damaged. A U.S. battleship received slight damage, 2 U.S. destroyers, *PRESTON* and *WALKE*, were sunk and a third destroyer, *BENHAM*, badly damaged. This destroyer broke up the next day, due to heavy seas, while en route to a repair base and was sunk.

On the night of November 30 - December 1 a task force of four heavy cruisers, one light cruiser and seven destroyers engaged an enemy force off Tassafaronga, Guadalcanal, which was attempting to land supplies and reinforcements. A fierce gun duel resulted and in a period of 16 minutes after the first gun was fired, four of the five cruisers in the column had received one or more torpedo hits and were out of action. Several enemy ships were damaged.

CHAPTER II

FAR EASTERN OPERATIONS

INITIAL OPERATIONS OF ASIATIC SUBMARINES

Upon the outbreak of war in the Far East, submarines of the Asiatic Fleet sailed for patrol stations as per plan:- One-third off enemy harbors; one-third stationed for intercepting enemy expeditions advancing on Luzon; one-third in reserve stations which were somewhat scattered and concealed. The submarines which were sent on directly offensive missions arrived after the enemy shipping had, for the most part, moved out and found only poor hunting for some time. They probably would have been more effective if they had been partly armed with ground mines instead of torpedoes only. The mines had only recently arrived and BuOrd had informed us that a defect had to be corrected before they were to be used. The submarines in reserve stations soon began to be fed into the defensive-intercept patrol lines, - as the Japanese amphibious offensive developed against Luzon.

First penalty of peace-minded false economy. No good drill mines - no experience in laying and sweeping. Inadequate expenditure of service mines in proof, anti-countermining service tests, effectiveness tests, etc. Inadequate expenditure of service mines to determine the numerous effects of aging.

The submarines did not succeed in disrupting the enemy's invasion of Luzon, even though two-thirds of them were employed on the task. Those results were disappointing to all concerned including the submarine personnel themselves. The personnel was long-service and experienced in peacetime training but - like everyone else - were not experienced in the kind of war that they faced; only war proves what is correct and what is wrong, - who is effective and who is not. It can also be said:-

That our peacetime training was not realistic in certain respects.

That we also had not been realistic as regards the material which was too complex in installations that did not contribute directly to offense, or defense, and was lacking somewhat in the absolute essentials.

That the enemy's mastery of amphibious war, by virtue of which he could land most anywhere, made interception of his expeditions very difficult.

The difficulties faced by submarines operating against enemy formations in shallow water well screened by air and surface anti-submarine craft.

That the enemy employed large numbers of small ships, difficult to hit and that there was scant return when they were hit.

The advantage of using numerous small vessels in amphibious attacks, and of making the last stage of the voyage of amphibious expeditions during darkness.

The importance of specially designed landing boats and reliable equipment for the expeditious landing of forces on open beaches. The added protection that may be given to landing force vessels by planting lines of mines around the landing area.

That the enemy employed large numbers of anti-submarine craft; they seemed to be good at detection but not at attack, though it required time to learn that the hundreds of depth charges which they dropped were not very dangerous.

That the last stage of the voyage of their invading expeditions was always at night, - and during the dark of the moon at the critical periods. The enemy being in full control of the air, the submarines could be given no information of his ship movements approaching Luzon.

NIGHT ATTACK ON JAPANESE FORCES IN BADOENG STRAIT, OFF BALI, 19 FEBRUARY, 1942.

An allied striking force under Rear Admiral Doorman, R.N.N., had been operating in the Western Java Sea in vicinity of Banka, Gaspar and Karimata Straits against an enemy advance in the direction of Palembang obviously for the purpose of occupying the oil fields and installations in that area. The enemy followed his usual procedure, softening the objective areas by air bombing supported by *seaplane* fighter aircraft followed by landing of troops. In regard to his use of seaplane fighters rather than carrier-based fighters for the initial drives into enemy country, this was done, it is presumed, in order not to endanger his carriers by thrusting them into range of our own land based aircraft, such as they were.

This operation was clearly one of attrition.

Only the Allies' great lack of land-based fighters permitted this to be successful.

The striking force under Doorman made several efforts to close the enemy as the latter advanced from the North through Banka Straits. The troop convoys were the main objectives. He failed to make any impression on the enemy due in part to restricted waters in which to operate during bright moonlight, but especially to enemy air attacks. On two occasions the striking force was heavily bombed but without serious damage to our ships.

Necessity of adequate fighter patrols and air support.

Importance of complete and detailed knowledge of local conditions.

It became apparent from reconnaissance reports soon after the 14th of February that an enemy move in force would be made from the Eastward, that is from the direction of the Celebes. The enemy objective was soon disclosed to be the Island of Bali. It was assumed correctly he would attempt a landing on the Southeast Coast in the Straits of Badoeng between Bali and Besar. Accordingly the striking force was ordered from the West Java Sea where it had been basing at Priok, to the Eastward with base at Surabaya. The force now consisted of Dutch and U.S. ships only.

The enemy was definitely reported on the 17th and 18th heading for Bali which had previously been softened by heavy bombing. The enemy objective was definitely known. He was observed landing in force on Southeast Bali and an attack was planned in detail by the high command for the night of the 19th-20th February and Doorman given orders, hardly a directive, accordingly. The attack was ordered in three waves as follows:

Thorough and complete planning is essential for success.

Four U.S. destroyers, namely the *STEWART, PARROTT, JOHN D. EDWARDS* and *PILLSBURY* of Division 58 were to proceed under command of *TROMP* (Dutch destroyer leader) from Surabaya, through Madoera and Bali Straits and attack while heading northeasterly into Badoeng Strait. The attack was to be ready to start at 1:00 a.m. the 20th from a point three miles south of the southern point of the island, but was to follow by two or three hours the initial attack made by the forces from Tijlatjap. These latter were the Dutch cruisers *DE REUTER* and *JAVA*, the destroyer *PIETHEIN* with two U.S. destroyers, *FORD* and *POPE*, which were to come in from the south coast of Java. All had refuelled at Tijlatjap. This was the force which was to attack first.

Both of the above groups were to strike at the enemy as in a raid. A "battle" was not contemplated. The work was to be done while simply passing the enemy. All forces were then to continue on - passing North - about Bali to Surabaya.

Torpedo motor boats were ordered out from Surabaya to attack after the two foregoing groups had attacked. Arrangements were made for their refuelling at Pangpang Bay.

The enemy was disposed in two groups. All attacks were made by passing between these two groups and resulted in the extraordinary situation of *each enemy group attacking the other* as each wave of our attack group cleared the waters between them.

With inferior forces, attrition is normally the best line of action.

The *DE REUTER* (Flag), *JAVA, PIETHEIN , POPE, FORD* Group attacked on schedule. The *DE REUTER* for reason not explained did not get into action. She did not fire a shot. The *JAVA* which followed immediately astern of *DE REUTER* was considerably damaged. The *PIETHEIN* was sunk, apparently torpedoed. The *FORD* and *POPE* made an especially determined attack on both groups of the enemy. They lost touch with the Dutch cruisers which they were following, reversed course to the S.W. in order to again pass the enemy. Two or three enemy ships were observed to blow up or were in flames as result of the group torpedo and gun fire. A possible torpedo hit was reported made on an enemy cruiser of the *NATORI* class. The two U.S. destroyers having made a second "pass" at the enemy on southerly course, retired clear of the motor torpedo boats along the south coast of Java to Tijlatjap, contrary to plan. The rest of the group retired to Surabaya.

Failure to retire to Surabaya might very well have interfered with higher commands' further plans.

High speed at which firing was conducted reduced the accuracy of the attack.

The second group followed the above attack according to plan. Only enemy destroyers and cruisers were observed - no transports. Two of the enemy were reported torpedoed and on fire. The *TROMP*, in the lead, evidently took the brunt of the fighting and was badly damaged. The *STEWART*, which had lost contact with *TROMP* and now led the attack was the only U.S. destroyer hit, putting out of commission her steering gear and killing one man. This was an 8-inch shell that went clear through her without exploding. The entire group, including *TROMP* found its way into Surabaya the following morning. The *STEWART* was docked immediately on arrival in the large 15,000 ton lift - floating dock at the private ship yard.

The composition of the enemy that night is not definitely known. That 8-inch cruisers were present is definitely established.

The shooting of the enemy cruisers was reported as excellent as far as pattern is concerned - but the control was not correspondingly good. Our destroyers had little trouble in dodging splashes, although at times they were literally smothered in them. Individual enemy salvos did not straddle as frequently as could be expected. Our ships were continuously straddled, however, but by separate salvos.

Large searchlights illuminated several destroyers in column and very heavy gunfire immediately began in the area cleared by our destroyers. Two destroyers burst into flames and one exploded. A third destroyer emitted a large burst of steam. It has been verified that in this action at least two destroyers were completely destroyed and probably a third was in a sinking condition when last observed. It would therefore appear that the Japanese forces were destroying each other after our forces had left. The firing continued with violence after the burning ships could no longer be seen over the horizon. No doubt the entire division of Japanese destroyers were destroyed by other Japanese forces.

Ranges were short and enemy patterns apparently good, but their shooting was definitely nothing out of the ordinary, and in comparison with results which our own commanding officers feel they attained as measured by damage inflicted on the enemy, poor.

In a night action, gunfire by our destroyers should be held if possible until after the torpedoes, the principal weapon, have been fired.

Proper use of destroyers.

It was on this basis that the "Strait of Makassar" action was successfully fought by Destroyer Division 59, without cruiser support due to the grounding in Sapa Strait of the *U.S.S. BOISE* while en route to the attack. In making plans for this action against the enemy transports off Balikpapan, it was decided to adopt the tactics employed during the World War by Captain Evans of the *BROKE* who with *SPITFIRE* engaged six enemy destroyers in the Channel, destroying four in accordance with plan which contemplated no gunfire whatever against a surprised enemy. Each British ship was to account for three of the enemy by ramming and torpedo fire. The *BROKE* got her three; the *SPITFIRE* only sank one of her quota, due entirely, according to Evans, to the fact she violated instructions in using her guns, thus relinquishing so far as she was concerned the vital element of surprise.

Voice radio between U.S. ships was used continually after the action began. This form of communication is considered invaluable in a successful destroyer night action. Unfortunately, no voice radio was available between Dutch and American ships and this resulted in many uncertainties during the action.

Importance of communications.

Disadvantage of Allies operating together when prior preparation and planning are lacking.

Because of communication difficulties and tactical differences, it was recommended that in any future joint action at night American and Dutch forces be separated into individual attack units.

It is felt that the gunfire of the 1200-ton destroyer is of little real value at night with the possible exception of its use against other destroyer attack, and in self defense when under fire. When a destroyer opens fire with guns it immediately reveals its location and its character, and due to its extreme vulnerability invites quick destruction. Balancing the small destructive effect of the few 4" hits that can be expected against the possibility of total loss of the ship under these circumstances should make it doctrine that these destroyers initiate gunfire under only most exceptional conditions.

BATTLE OF JAVA SEA

28 FEBRUARY - 1 MARCH, 1942.

Doorman's force now was composed of two heavy cruisers, *HOUSTON* (only two turrets in commission), *EXETER*, three light cruisers *DE REUTER* (flag), *JAVA, PERTH,* ten destroyers *KORTENAR, EVERTSEN, ENCOUNTER, JUPITER, ELECTRA, JOHN D. EDWARDS, POPE, FORD, ALDEN, PAUL JONES.*

The situation of the above striking force based at Surabaya was precarious. It had orders to keep the seas and could only refuel and provision safely at night. Navigation through the mine fields during dark was dangerous. At times ships were caught in port during the daylight bombings - but fortunately no damage to our ships resulted except to the *STEWART* already capsized in drydock, and to the Dutch hospital ship standing by in the outer roads. She was severely strafed. The *HOUSTON* arrived Surabaya with 67% capacity fuel on board and could not refuel, nor could other large ships, the oil fuel lines to the docks they could go alongside having been ruptured by the air bombing. The enemy bombed the port with impunity. There was scant air protection and no adequate fighter protection at any time. In fact on *no occasion* during the entire campaign in defense of the N.E.I. did any naval operation or movement in which U.S. ships participated, have the support of any fighting aircraft.

The importance of well equipped and defended bases.

The importance of placing vital facilities under ground.

Lack of plane coverage.

Lack of preconceived plans for joint operation in N.E.I.

Enemy combat information was derived mostly from our own observers in the PBY planes of our Patrol Wing 10.

Much information was had from submarines and the Army bombing planes - but none was as valuable, complete and reliable as from the PBY's.

The value of Navy manned and controlled air reconnaissance planes.

Information of the enemy which reached allied naval headquarters at Bandoeng was ample in all respects. The composition, disposition, location of enemy forces was known with reasonable accuracy at all times. This information was communicated at once when received to the Commander of the striking force, Rear Admiral Doorman.

Value of complete and accurate information.

On the 26th, Rear Admiral Doorman was informed that at 1155 local time that day an enemy force of 30 transports escorted by two cruisers and four destroyers was in position Lat. 04° 50' S., Long. 114° 20' E., course 240° true, speed 10 knots. He was directed to proceed to sea, attack after dark then retire toward Priok.

The above instructions were modified in a subsequent dispatch as follows:

"You must continue attacks until the enemy is destroyed."

Previously many reports had been received from our PBY's, our submarines and our U.S. Army bombers of scattered enemy units in the Java Sea and of a "large convoy near the Coast of Borneo," pointing to a major move by the enemy in the Java Sea.

Admiral Doorman did not contact the enemy the 26th. He reported that his information of the enemy was insufficient.

On the 27th Admiral Doorman reported that he had been attacked at 0900 local time by enemy bombers in vicinity of Surabaya. He requested fighter protection. He was instructed by the high naval command to "proceed, search for and attack the enemy convoy notwithstanding the air attack."

By 1700, local time the 27th, the enemy forces had been developed with reasonable accuracy. It was known that a *convoy* of 39 to 45 transports, escorted by 2 or 3 cruisers, and 8 to 12 destroyers, was in position approximately 20 miles *WEST* of Bawean Island, 60 miles north of the West Entrance to Surabaya. It was established furthermore that a strong *covering* force was then 35 to 40 miles *southwest* of Bawean. This force was partially developed by the British *EXETER, JUPITER* and *ELECTRA* now joining Doorman from the West Java Sea.

The *EXETER* reported 1 enemy cruiser and 4 destroyers in this locality, and later 3 cruisers and 4 destroyers. The *ELECTRA* reported 2 battleships (really heavy cruisers), 1 cruiser and 6 destroyers; and later 1 cruiser and large number of individual ships. The *JUPITER* made one report of scattered forces consisting of 4 cruisers and 14 destroyers.

Thus the two groups of the enemy, namely the convoy plus escort and the covering force to the southward of the convoy, were fairly well known and developed by early evening the 27th.

Doorman permitted himself to engage the enemy *covering force* in the vicinity of Surabaya during daylight.

Failure to appreciate and carry out own missions.

This covering force evidently fulfilled its mission in keeping the allied striking force away from the convoy.

The striking force was assembled hurriedly - the British units especially were engaged before proper indoctrination could possibly have been effected. It is doubtful then that Doorman had opportunity to promulgate a well considered plan of action.

Allies suffer in their attainment of unity of effort in that they lack to a great extent a sound basic indoctrination common to all the commanders.

In spite of disparity of forces, the allied striking force was evidently doing very well, inflicting more damage than it received until unfortunately the *EXETER* was badly hit, slowed and sheered out to clear the battle line. The other cruisers, including Doorman's which led, followed her movement, thus virtually breaking off the engagement.

Figure 1 shows the composition and disposition of the opposing forces at the beginning of the action about 1630, February 27th. Note that the U.S. destroyers trail the cruisers. Two large British destroyers lead the cruiser column. Three destroyers, one British, two Dutch appear on the unengaged flank.

Destroyers other than those in van not in favorable position to defend cruisers from attack by enemy destroyers or to attack the enemy cruisers.

The Dutch flagship, the light cruiser *DE REUTER* leads the cruisers. The two heavy cruisers follow and they in turn are followed by two light cruisers. Formerly it had been practice when the striking force was commanded by a U.S. flag officer, to dispose the force in cruiser groups by types, each to seek suitable ranges in accordance with a plan, while supporting each other. The destroyers normally were disposed as one group or squadron by divisions. Cruising and battle PLANS were promulgated in which TASK GROUPS were indicated and procedure set forth under the various conditions that could be visualized. Furthermore special cruiser and destroyer DOCTRINES were promulgated. The enemy 6-inch cruisers shown in this figure as in the battle line were probably acting as an independent group as at Tsushima in 1904. They appeared, however, to trail the 8-inch cruisers as shown.

Necessity for commanders of naval units to have a basic familiarity with probable gunfire effects relative to own and enemy guns, armor and life of ships.

Figure 2 indicates closing the range by the Dutch Admiral. Evidently the heavy cruisers alone could range at the beginning of the action. Doorman who in his leading flagship was probably a target, concluded to get within range of his own 6-inch guns and in doing so he led our 8-inch cruisers into his own shorter range. Fire distribution problematical. Doubtful if any prescribed.

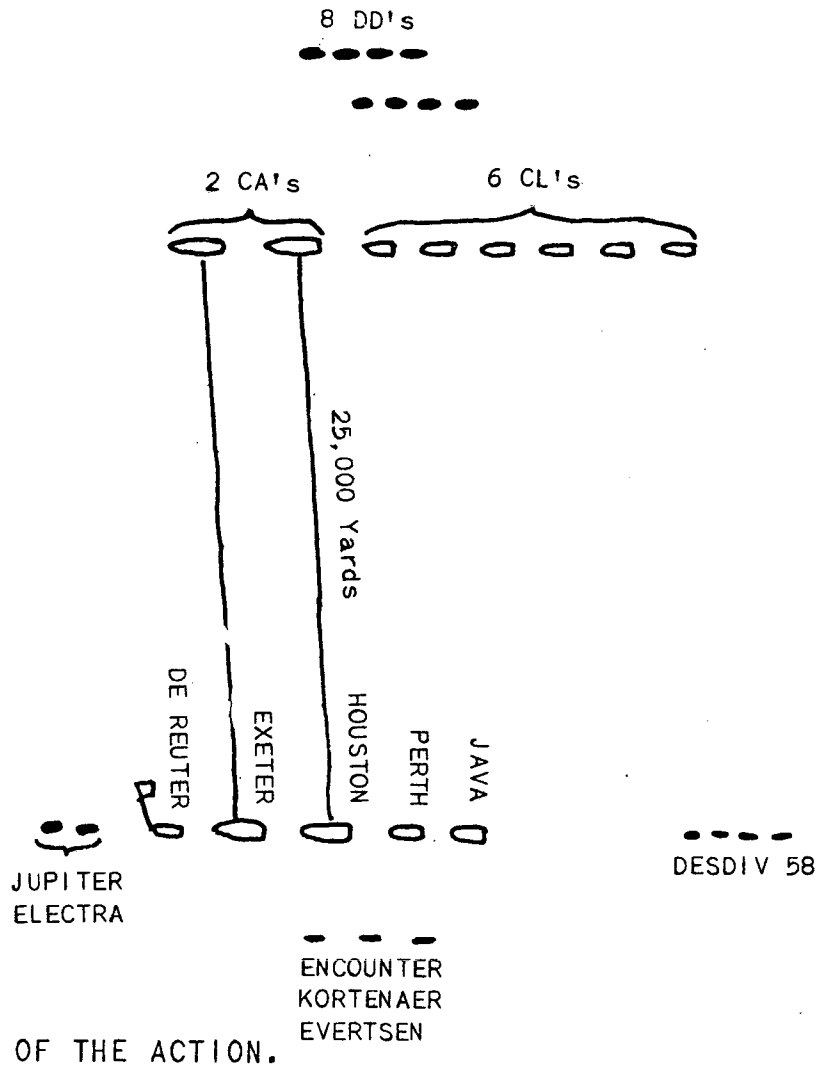


Figure 1. 1630 FEBRUARY 27th. OPENING OF THE ACTION.

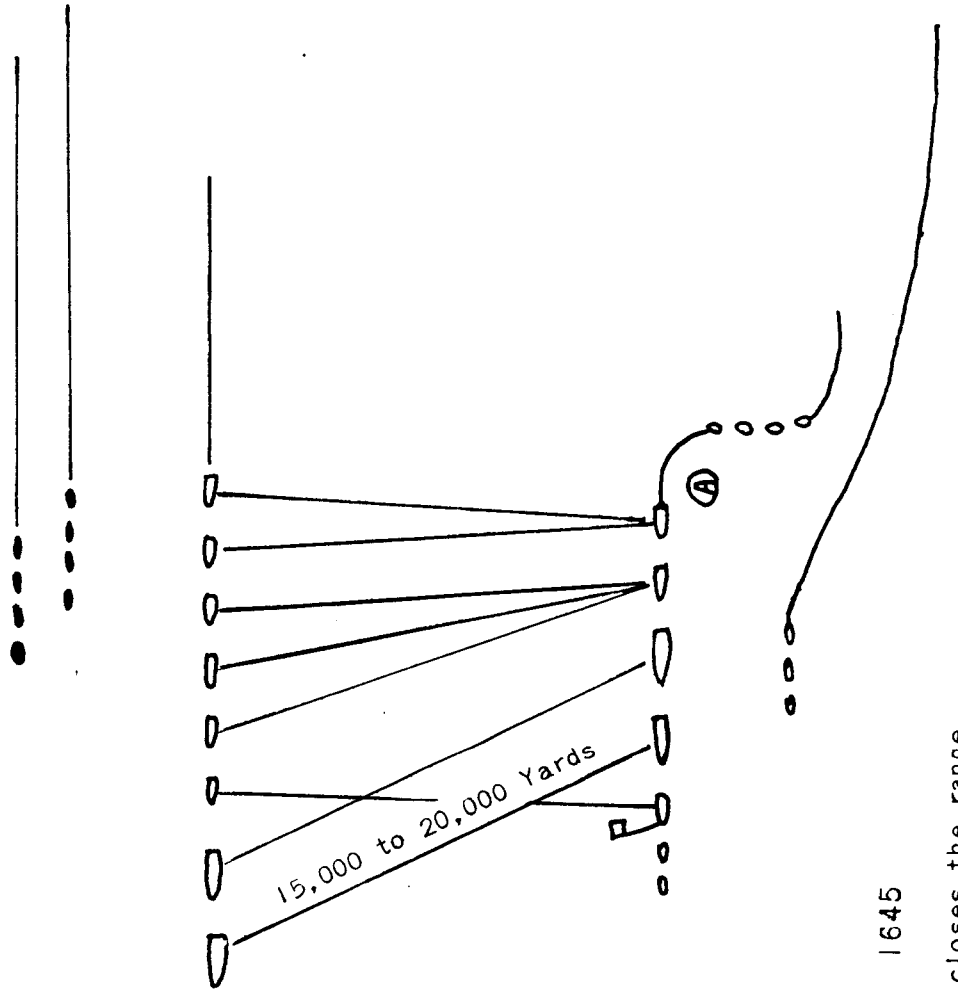


Figure 2. 1645

A Doorman closes the range.

Figure 3 indicates the two enemy heavy cruisers taking punishment. Both are reported now in flames. The enemy destroyers advanced to attack probably to ease pressure on their heavy cruisers by driving the allied striking force out to greater range. *JUPITER* and *ELECTRA* advance from the cruiser van to repel this attack and are promptly sunk by concentrated gunfire.

All Allied destroyers should have advanced to repel enemy destroyer attack.

Figure 4. The two enemy heavy cruisers probably out of action but not before disabling the *EXETER.* Maximum range is now about 15,000 yards. Enemy 6-inch splashes, fifteen in one pattern, come near our ships. The *EXETER* sheers to port out of the battle line. The *DE REUTER* (Doorman) swings left signalling "What is the matter with you," following motion of *EXETER* for reason undisclosed, as do the three rear cruisers *HOUSTON, PERTH, JAVA,* probably following motion of leader. This maneuver was not ordered. The cruiser action is virtually broken off.

Better fire discipline would have prevented breaking off action due to damaged EXETER.

Figure 5. The disabled *EXETER* screened by *ENCOUNTER* and *KORTENAR.* The latter is sunk by enemy destroyer gunfire. Enemy torpedoes seen in the water. The *HOUSTON* and *PERTH* join and are screened by *EVERTSEN.* The *DE REUTER* and *JAVA* form another group without destroyer screen. Desdiv 58 attacks by order of Doorman by telephone to cover his retirement. One enemy light cruiser out of action.

Cruisers - destroyers should have retired together for mutual support.

Figure 6. Dispersal of the striking force in groups which have lost touch with each other. Doorman in *DE REUTER* with *JAVA* heads N.E., probably to seek the convoy; is headed off by the enemy light cruisers. Doorman later headed south then west (not shown) and probably ran into the Dutch mine field off north coast of Java. Both *DE REUTER* and *JAVA* were observed to blow up about 2230. The *EXETER* with *ENCOUNTER* retire at slow speed toward Surabaya. The *HOUSTON, PERTH* and *EVERTSEN* eventually retire toward Priok. Desdiv 58 attacks and eventually retires toward Surabaya. Priok had been designated as the rendezvous after action. The *POPE* evidently did not join in the battle but returned to Surabaya.

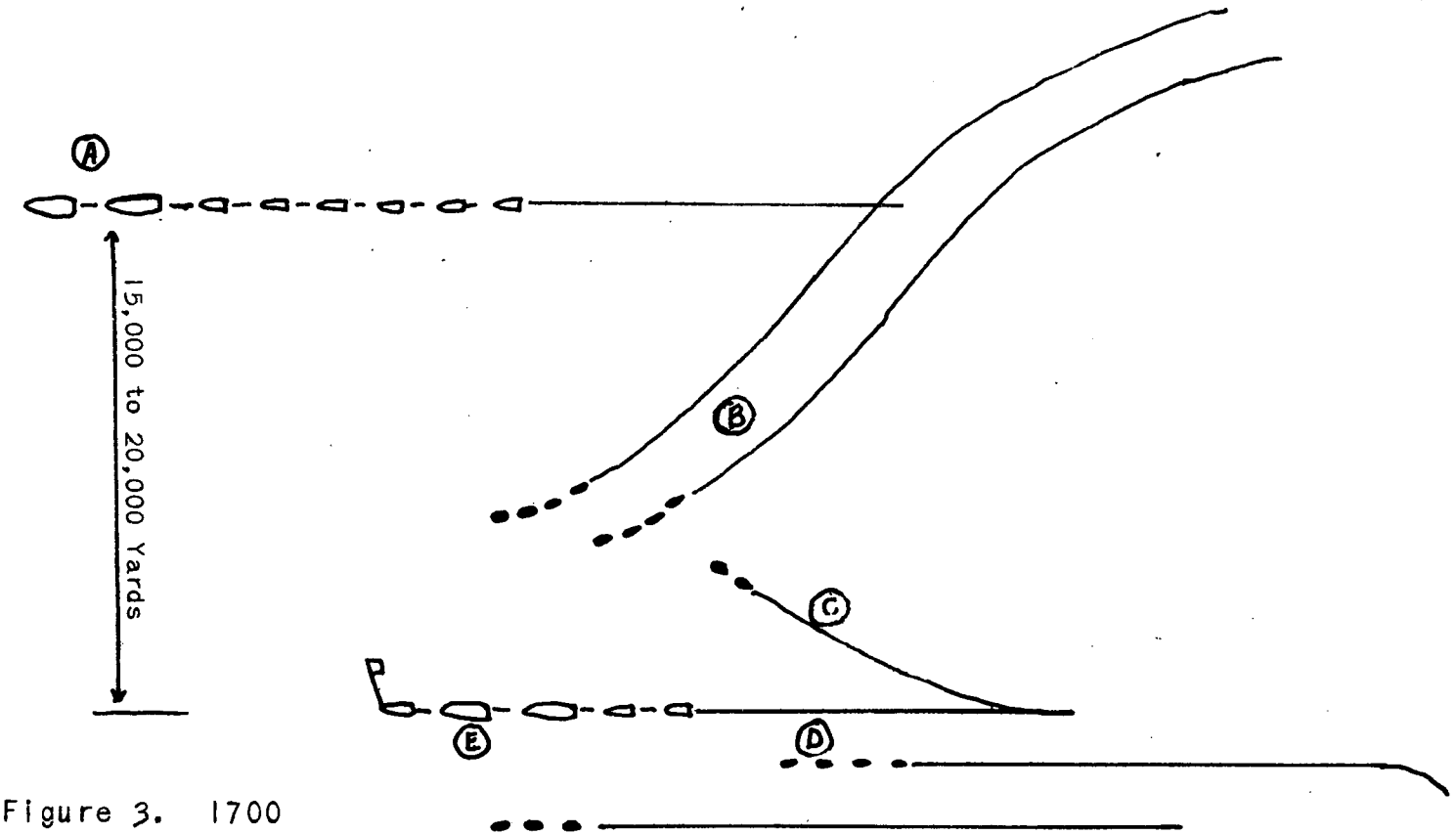


Figure 3. 1700

A Enemy CA's badly hit and on fire.
B Enemy destroyer attack.
C JUPITER, ELECTRA oppose enemy destroyer attack.
Probably sunk at this time.
D Desdiv 58 seeks the unengaged flank.
E EXETER hit in engine room.

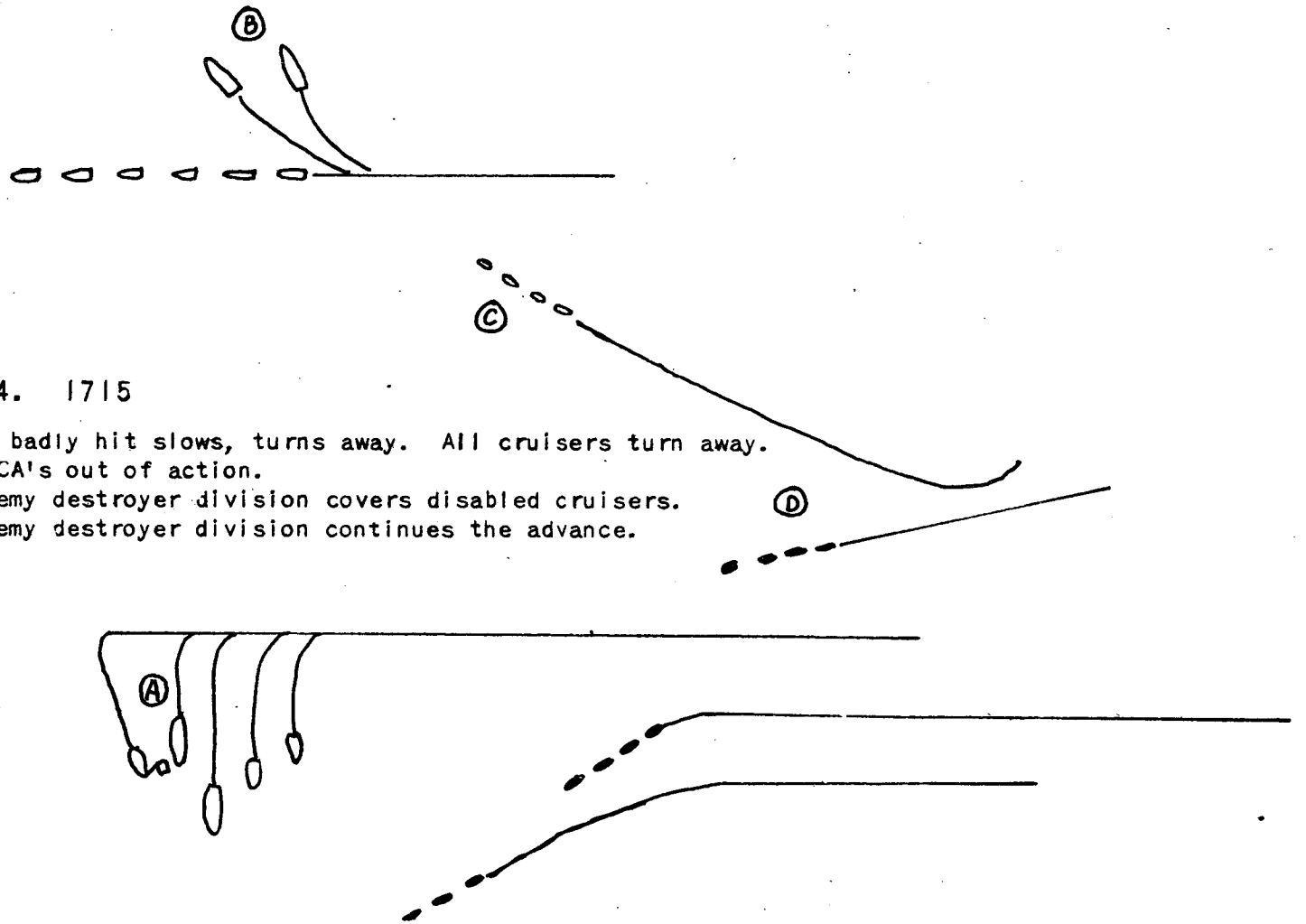


Figure 4. 1715

A EXETER badly hit slows, turns away. All cruisers turn away.
B Enemy CA's out of action.
C One enemy destroyer division covers disabled cruisers.
D One enemy destroyer division continues the advance.

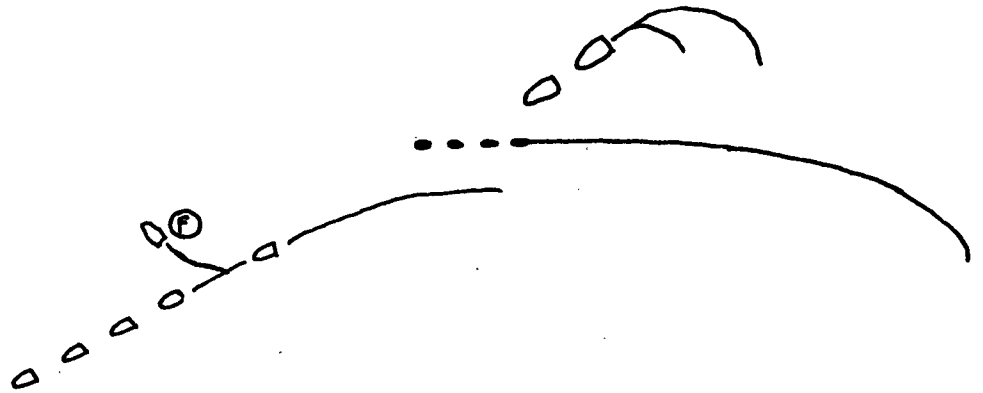
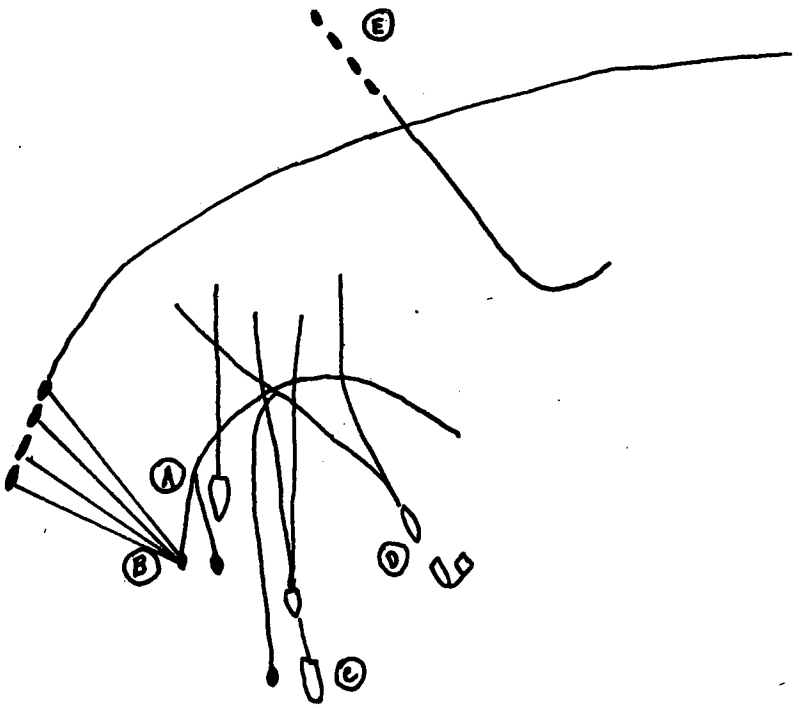


Figure 5. 1730

A EXETER screened by KORTENAER, ENCOUNTER.
B KORTENAER sunk.
C HOUSTON, PERTH, EVERTSEN.
D DE REUTER, JAVA.
E Desdiv 58 attacks.
F Enemy CL out of action.



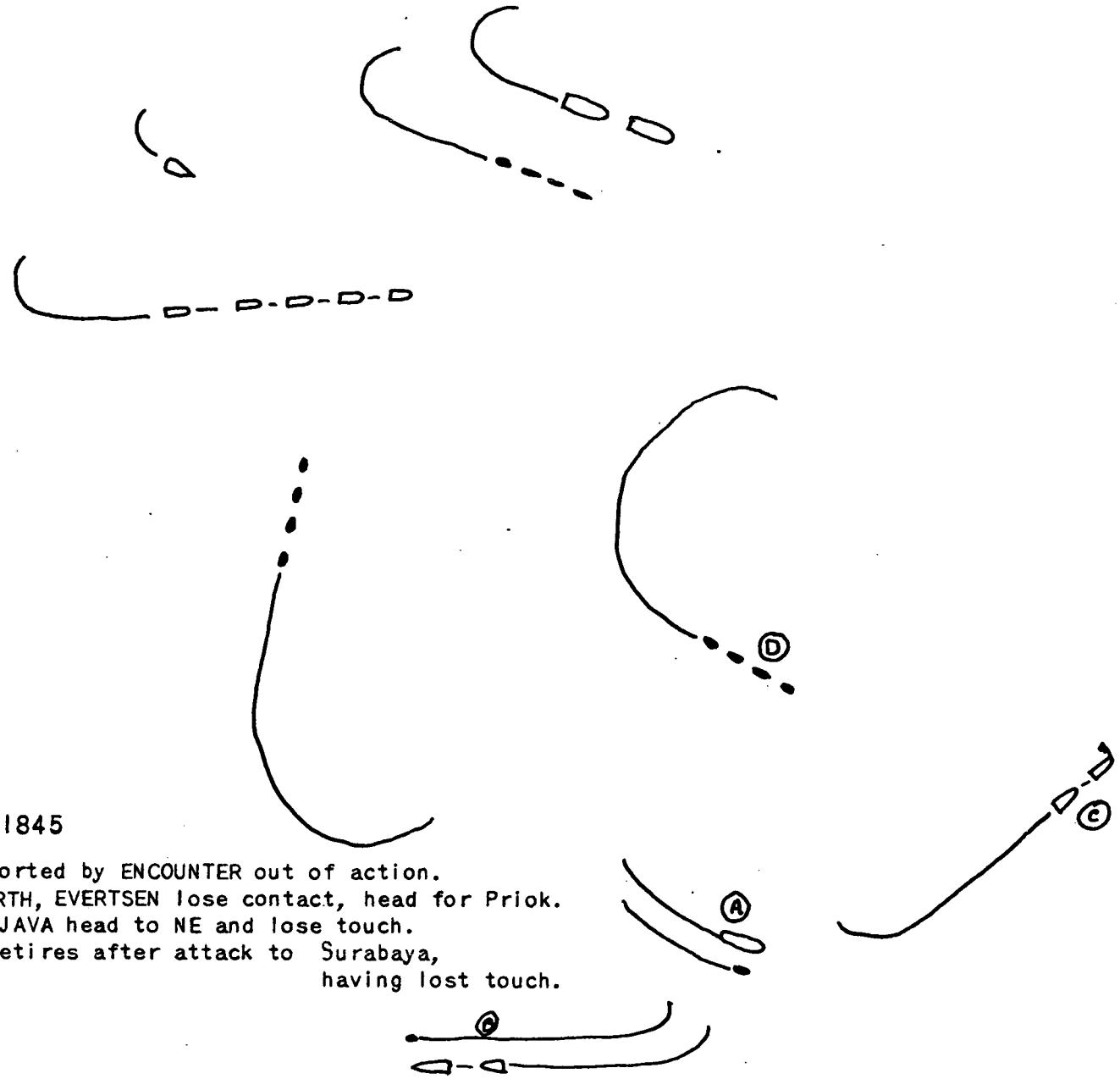


Figure 6. 1845

A EXETER, escorted by ENCOUNTER out of action.
B HOUSTON, PERTH, EVERTSEN lose contact, head for Priok.
C DE REUTER, JAVA head to NE and lose touch.
D Desdiv 58 retires after attack to Surabaya, having lost touch.

CONCLUSIONS RESULTING FROM THE EVENTS LEADING UP TO THE WAR AND THE OPERATIONS IN THE ASIATIC FLEET

A review of these events and operations emphasize the following points:

(a) That allies suffer in their attainment of unity of effort in that they lack to a great extent a sound basic indoctrination common to all the commanders.

(b) The great importance of officers personally familiarizing themselves with areas in which they may be called upon to operate.

(c) That thorough and complete planning is essential for success.

(d) That with inferior forces, attrition is normally the best line of action.

(e) That where forces are stationed beyond immediate support or reenforcement, plans should take this into account and courses of action should be based on the forces actually available. Plans for use of reenforcements, if and when they arrive, should also be made as subsidiary or as alternative plans.

(f) The extreme importance of timely and correct information.

(g) The importance of all echelons of command keeping their subordinates informed of the current situation; also, those on the same echelon.

(h) The importance of radar in the air warning system.

(i) The extreme importance of withholding useful information from our present or probable future enemies.

(j) The importance of well equipped bases or tenders suitably located with reference to area of operations.

(k) The importance of suitable bases for all types of ships.

(l) The comparative uselessness of weakly defended bases.

(m) The comparative ineffectiveness of three-inch 50 caliber anti-aircraft guns in the air protection of important stations.

(n) The absolute dependence of operations on supplies.

(o) The importance of placing vital facilities under ground.

(p) The extreme importance of fighter protection in the operation of surface forces and the need for close cooperation between air and sea forces.

(q) That reports as to enemy ship types, especially from aviators relatively inexperienced in such recognition, should be accepted with considerable reserve.

(r) That, in the absence of contrary indications, when planes are returning to base, it should always be assumed that our planes are being shadowed for an attack after landing, and dispositions for defense taken accordingly.

(s) The great offensive strength of submarines.

(t) The numerous uses to which submarines may be put in areas not under command.

(u) The difficulties faced by submarines operating against enemy formations in shallow water well screened by air and surface anti-submarine craft.

(v) That effectiveness of submarines is increased when assisted by planes furnishing information as to the enemy forces.

(w) The importance of keeping air forces advised of movements of own forces.

(x) The advantage of using numerous small vessels in amphibious attacks, and of making the last stage of the voyage of amphibious expeditions during darkness.

(y) The importance of specially designed landing boats and related equipment for the expeditious landing of forces on open beaches.

(z) The added protection that may be given to landing force vessels by planting lines of mines around the landing area.

CHAPTER III

CARRIER TASK FORCE RAID ON GILBERT AND MARSHALL ISLANDS - 1 FEBRUARY 1942

On the morning of 1 February, 1942, Air Groups from two Task Forces including *YORKTOWN* and *ENTERPRISE* made attacks against objectives in the Gilbert and Marshall Islands. These raids were well conceived, well planned and brilliantly executed. At the same time cruisers and destroyers bombarded shore objectives.

The Commander in Chief, Pacific Fleet, Task Force Commanders and Commanding Officers remarked as follows as a result of this operation:-

COMMANDER IN CHIEF, PACIFIC FLEET

The results obtained by both raids were the more noteworthy as the Task Forces were obliged to make their attack somewhat blindly due to lack of information. The little information that had been obtained, was made available as a result of observations by our own submarines. This information, although fairly accurate as to shipping, was rather meager regarding fortifications, aviation facilities, and other defensive installations.

The importance of intelligence work in peace time and preparations for same in war.

An analysis of the gunnery performances was made after the return of the Task Forces. The actions against land and surface objectives were generally excellent. The anti-aircraft batteries did not provide satisfactory results. The causes of the poor performance of the anti-aircraft battery were masked to some extent by the malfunctioning of the Mark 18 Mod. 0 and Mod. 1 fuzes. Other causes that contributed were: failure of radar warnings and information to reach battery personnel through faults within the ships and within the disposition, lack of fire discipline under diversified attack, minor personnel errors associated with inexperience under fire. With the exception of the failure of the Mark 18 Mods. 0 and 1 mechanical time fuze and three apparently premature explosions of the Mark 13 MCBD fuze, the material stood the test most satisfactorily. Corrective measures have been instituted for all gunnery faults and failures determined.

COMMANDER TASK FORCE 8

In connection with the bombing attacks by enemy planes, and their subsequent efforts to locate the carrier during the night of 1-2 February and on 2 February, the determined manner in which the Japanese bombing planes were handled, the ferocity and accuracy of their attacks, and the tenacity with which they endeavored to regain contact were particularly noteworthy.

Importance of determined "follow-up."

An engine data plate which was recovered on the deck of the *ENTERPRISE* from the bomber which crashed over the side of that ship, bears a stamp which indicates that the equipment was naval.

Commander Task Force Eight is of the opinion, from his observation of the conduct of the enemy operations, that their multi-engined shore-based reconnaissance and bombardment planes - at least in the Marshall's Area - is operated by naval personnel and is part of the Japanese Navy. The effectiveness and precision of their overwater operations made them a powerful and dangerous threat to the carrier and the force during retirement. It is believed that deep significance rests in the impressive functioning of this type of equipment under such conditions when in the hands of naval personnel.

- **Too much emphasis cannot be placed on this feature. The enemy has a tremendous advantage here.**

During the first night of retirement, radar gave warning of, and tracked, enemy planes seeking to regain lost contact. The course change to the northwestward was an interesting example of use of radar to evade such effort. The night was clear, brilliant full moon, and the ships' wakes at 30 knots were a source of concern. Indications of better cloud cover to the northwestward, which proved correct, also influenced the course change. Improved concealment throughout the night was fortunately found. The next day, a narrow front, stretching generally ENE-WSW and providing low visibility and ceiling, was exploited to good effect. Excellent performance by *ENTERPRISE* Aerological Officer facilitated effective use of these helpful weather conditions.

The importance of accurate weather information.

While the performance of ships' A.A. batteries, insofar as observed by the Task Force Commander, on the occasion of the first attack to which exposed, was expectably erratic, nevertheless the shooting was so poor as to give rise to grave anxiety on this score in the future. Deficiencies appear to be mainly in the matter of alertness and precision of control and, equally vital, the coordination of radar warnings and battery control.

Lack of training in peace time with equipment to be used during war.

Immediate drastic corrective action is believed to be essential in the case of all Fleet units. Certainly, in the case of the first attack particularly, A.A. fire properly controlled with the equipment currently available should have taken a heavy toll of the attacking planes.

The action embraced, to the best of my knowledge, the first instance in history of offensive combat by U.S. carriers. The performance of the *ENTERPRISE* justifies the highest hopes heretofore held regarding the effectiveness of these vessels when properly employed. This action, likewise, was the first offensive operation by Task Forces of the Pacific Fleet in the current war. The results must speak for themselves.

COMMANDING OFFICER, U.S.S. ENTERPRISE

The inability of the 5" AA battery to knock down the formation of enemy twin-engine bombers during the first attack, Phase A, before they reached the point of release is a matter of grave concern. It is believed the reason can be attributed in part to over-anxiety to hit on the part of the gun crews, as the rate of fire was exceptionally good. However, it was apparent that the target was not led sufficiently (a characteristic fault in all AA firing by inexperienced personnel), with the result that practically all bursts were late and behind the targets.

At 30 knots the ship responded to rudder almost instantly, and in order to throw the stern around, full rudder was used in one direction followed almost immediately by full opposite rudder. The effect on the maneuverability of the ship was quite remarkable and it is believed that the bomb misses were largely due to the "crabbing" motion of the ship. That the ship escaped practically unscathed from such determined bombing attacks can only be described as miraculous.

CONCLUSION AND RECOMMENDATIONS

(a) That every effort be made to improve and increase AA batteries, at earliest date.

(b) That gunnery radar installations be provided immediately.

(c) That AA gunnery practices be scheduled when opportunity offers, with ship steaming at not less than 25 knots. If adequate safeguards can be introduced, ship should be required to make radical changes of course.

(d) That own carrier is and will continue to be principal objective of enemy effort in any air attack at sea. Although it will always be true that the most vigorous aggressive action on the part of the carrier air group may largely nullify the amount and degree of enemy air attack against the carrier, the need for providing carriers with the best anti-aircraft batteries, including the latest radar fire control installation, and adequate fighter protection with friendly aircraft identification equipment is apparent.

COMMANDING OFFICER, U.S.S. YORKTOWN

COMMUNICATIONS

This expedition again proved the well established fact that aircraft radio equipment cannot be considered reliable when subjected to long periods of disuse incident to radio silence. Poor radio reception in the vicinity of the Jaluit attack may have been largely due to electrical disturbances in the atmosphere; however, transmitter failures were reported.

The YE installation on the *YORKTOWN* continued to give excellent results and was responsible for the safe return of many planes. As had been previously noted, the signal tends to fade when the ship enters an area of heavy rain. This possibility should be given wider dissemination and pilots advised to hold their course on the last heard YE sector.

OPERATIONS

We have been working under false premises in our peace time operation of aircraft at night. Large numbers of airplanes, completely darkened or with only dim running lights, *cannot* be effectively rendezvoused in the vicinity of a practically invisible carrier on a dark ocean. It is considered that nine planes is the maximum that can be assured of a quick rendezvous under these conditions, and then only if there are no undue holdups in take off.

COMMANDING OFFICER, U.S.S. LOUISVILLE

COMMENTS AND RECOMMENDATIONS

The *YORKTOWN's* radar reports throughout the morning of planes located were of great assistance and enabled our fire control parties to be "on" when the enemy plane emerged from the cloud, still beyond gun range. The *WALKE's* radar position reports of the guide while rejoining in a heavy squall enabled a much quicker and surer approach to be made. The installation of a radar in this ship is considered vital.

The installation of radio receivers and transmitters capable of voice modulated carrier transmission and reception is urgent. The standard receivers (code) used eliminate much of the voice band necessary. Model TBS and TBX or equivalent sets are recommended.

The installation of 20 and 40 mm. AA guns is vital. The present 5" and 3" guns are too slow to follow a fast plane such as a dive bomber, and the .50 caliber machine guns have not the range necessary.

A submarine detection installation is recommended. This ship has done escort duty and at other times has been on detached duty when a submarine could attack entirely undetected. Some such set as the QCB or equivalent could be installed in the old sound compartment which is still vacant.

CONCLUSIONS AND RECOMMENDATIONS

(a) That damage to ships would have been greater had the 500-lb. bombs on the VSB been fitted with delayed action fuzes instead of instantaneous fuzes.

(b) That more damage would have been inflicted during strafing attacks - especially on airplanes on ground if incendiary bullets had been available.

Since this action incendiary ammunition is available in large quantities and has been distributed to the fleet.

(c) That our present type airplanes, with the exception of the F4F-3's do *not* have sufficient performance in their present overloaded condition.

(d) That armor and leak-proof tanks are a vital necessity. VF-6 made up and installed their own armor aboard ship prior to this action, using 3/8" boiler plate behind the pilot's seat. This saved one pilot from certain destruction. No leak-proof tanks were installed in any type.

(e) That the oxygen equipment in the SBD type is not satisfactory. The face mask does not fit properly, deteriorates rapidly and is uncomfortable.

(f) That IFF equipment is necessary. Considerable voice radio communications for identification of friendly planes and confusion would have been eliminated.

(g) That the number of VSB planes assigned be reduced to permit operating 27 VF. Fighter protection for VT is mandatory. Fortunately in this action VT-6 encountered no air opposition, but it is certain that their mission would not have been accomplished had they been intercepted by enemy fighters which were in the near vicinity.

(h) That at *least* 50% spare qualified pilots are necessary for any prolonged operations lasting longer than a period of one day. It must be remembered that the *ENTERPRISE* Air Group participating in this operation, with a few exceptions, is considered a thoroughly trained and experienced one. With less experienced groups, as will be the case in the future, more losses will be incurred in action, deck landing accidents, and minor casualties. Fighter squadrons will require more replacement or relief pilots than other types due to *constant* combat patrols that must be maintained in addition to any other missions that may be assigned them.

(i) Bomb releases for the attack on the Marshalls were rigged for dropping one 500-lb. bomb (salvo), one 100-lb. bomb (left), or a salvo of two 100-lb. bombs (right). This arrangement was found to be most satisfactory.

(j) All pilots had positions on all atolls within flying range of ship sketched on chart boards in black India ink prior to first take-off. In the hurried work during attacks when boards were erased and new navigation data plotted in "the picture worked the problem."

(k) The YE-ZB equipment proved invaluable. Without this aid planes may have been lost and it is certain that much valuable time would have been wasted.

(l) Dive bombing attacks on anchored ships should be made from ahead if possible as this gives a down-wind shot, a large hitting area in range, and maximum retirement speed.

(m) Information of enemy bases as furnished to pilots was scant and inaccurate.

(n) Japanese anti-aircraft fire is very inaccurate and places too much reliance upon an umbrella type barrage.

(o) All information aboard was not made available to the attack group prior to take off. This should be remedied in the future if at all possible by having typewritten instructions available for all pilots of the flight ready upon landing from the first attack. It is believed that time permitted this in this case.

(p) Dropping of sticks of bombs is easily done from a dive when planes are well spaced or if individual planes take a slightly different angle of approach in order not to endanger the planes ahead. It should be noted however, that the bombs must be dropped at those objectives farthest under the plane first in order to allow for a slight pull *up* in between drops to eliminate the danger of the bomb striking the dropping plane and going off. Dropping of these sticks is very accurate provided the dive is started steep enough.

(q) Planes are scattered widely after pull outs in various directions and it is incumbent on all hands to report any aerial opposition to the flight leader by broadcast if at all possible. It is extremely difficult to follow all the planes of a group after attack and the leader must be kept informed of the situation if any mutual support is to be had. Planes must report fighter opposition even if it has been successfully dealt with. In this case no report was made and a second attack group was surprised to find fighters on the spot because the flight leader of the first group had reported no aerial opposition and no one had corrected the report.

BOMBARDMENT OF WOTJE AND WITHDRAWAL THEREFROM

The following comments, criticisms and recommendations were made:

GENERAL

Whenever sufficient intelligence is lacking it was strongly urged that strafing attacks prior to bombardment, should have submarines as the objective next after aircraft. Consideration should be given to camouflage such as submarines camouflaged as sampans nested together. In view of the existence of heavy foliage in a mandated area, it is recommended that consideration be given to the existence of planes hidden under trees. This would indicate the necessity for the presence of fighters to make careful low altitude observations immediately after the initial strafing attacks, and so far as possible, throughout the bombardment. The Japanese may be expected to follow the current European practice of dispersing and hiding planes as they are now known to be using expertly the advantages of color camouflage. It has been noted on Wotje that expert camouflage was applied to hangars, magazines, oil storages, batteries and gasoline tanks.

When definite objectives are not known, consideration should be given to allocating ships to separate bombardment areas instead of having ships in close formation. Such a procedure not only simplifies target selection, firing interval and spotting but also reduces possible submarine menace. If ships are used in formation, contrasting color splashes should be used to assist aviators in spotting.

When definite expenditure of ammunition has been designated the OTC should give warning of intention to cease fire so that rate of fire may be stepped up and other objectives taken under fire in order to leave nothing of value untouched. It seems indicated that only in case of covering a landing or bombardment under strong opposition should high rate of fire be maintained. In firing against ships, salvo fire and not single turrets should be used.

It is not believed necessary after our experience to emphasize further that moonlight withdrawal is a dangerous and disconcerted procedure. This will also apply to moonlight approaches. In the light of our experience it is recommended that immediate steps be taken to formulate a night anti-aircraft procedure and doctrine.

The conning officer must have clear overhead view in air attacks. The maintenance of catwalks outside of conning towers is believed to be imperative.

During bombardment empty tanks and shell cases were noted in the water, which gave rise to false submarine alarms. It is believed in order to remove this disconcerting condition all life lines in the vicinity of the broadside guns should be fitted with nets to prevent empty cases from falling overboard. Such floating objects might provide excellent information for tracking forces.

LOOKOUTS

It is still noticed that in spite of repeated training, admonitions, etc., there is still a tendency for lookouts to be diverted from their own sectors by events occurring in other sectors. There seems to remain a tendency to rely on destroyers and radar to pick up enemy submarines and aircraft and an attempt will be made to remedy this situation by:

(a) Emphasizing the possibility of detecting aids being out of commission and the attendant dangers of low ceiling and rough water.

(b) Making the lookouts an "elite" group, removal from which will be publicized and made a distinct dishonor. This should develop a high "esprit de corps" which will give them a sense of great importance.

(c) Giving small prizes for vigilance and detecting enemy craft, graded for aircraft, surface craft and submarines.

GUNNERY

Consideration should be given to providing ammunition for both soft and hard objectives of bombardment. A vital need exists for incendiary bombs and bullets. When it was indicated that the ship-based planes would bomb objectives upon completion of spotting, an incendiary bomb was devised and used effectively by attaching to the 100-lb. bomb a water-fillable bomb filled with gasoline. These bombs were extremely effective and one was seen to start a large fire on shore. The only effect on the flight of the bomb was a slight shortening of its range.

COMMUNICATIONS

Violation of radio intelligence principles was noted by the sending of unnecessary despatches on well known frequencies in the vicinity of known Japanese high and low frequencies intercept and direction finder stations and at a time when it was imperative that a knowledge of our location be denied to the enemy. It is therefore recommended that the provisions of Pac 70 be more strictly complied with. On one occasion after "Nine Turn" by voice on the warning net, the base course was given. A similar violation was made giving true bearing of enemy planes over the warning net. It should be noted that a Japanese plain language message was intercepted by one vessel on the warning net frequency which indicates that the enemy was carefully covering our own frequency. However, it was pleasing to note that during the withdrawal communications became progressively better, progressive radio silence. It is recommended that all personnel concerned be impressed with the vulnerability of radio communications to radio intelligence and that the decision to violate fundamental principles should be the sole prerogative of and at the discretion of task force commanders.

AVIATION

The report of the reconnaissance group must be accurate and so phrased as to leave no doubt as to location or objective.

Reconnaissance should be made at the earliest possible moment, even during strafing attacks, in order that bombardment will not be delayed. An initial report of three ships and no batteries came in from the reconnaissance group. It was learned that actually eight ships and five batteries were present. Such incomplete information might cause disaster if acted upon.

Spotting groups should not be led into dangerous areas, as was done in this case where heavy AA fire was encountered. It has been recommended that one plane, as stand-by spotter, should remain near the ship in line of fire, if, as in this case, specific objectives could not be designated. (He is also in a position to act as anti-submarine observer.) In such a position he will be able to spot effectively, even when clouds exist. During bombardment a plane over the island was prevented by clouds from seeing both the ship and the target. Whenever possible planes should take position for spotting both in range and deflection. Ships should provide the planes with target description, bearing and range.

A necessity for using key from the ship was a great handicap. Voice installation should be provided immediately.

The grid proved useless because of different shape of the land areas and the incorrect location on chart of land markings.

Strafing planes after their attack should send as much of their information to the ship as possible.

1.1 anti-aircraft guns or their equivalent are considered essential on cruisers for protection against dive-bombing attacks as demonstrated by their effective use on the *BALCH*, which time after time broke up attacks on the *CHESTER*. Two-second fuses are absolutely essential on ammunition for dive-bombing attacks. Four thousand foot barrage distance is satisfactory and effective. The futility of firing at receding targets was conclusively proven. Communications from control stations to guns is inadequate. A one way loud speaker system is considered essential.

GENERAL COMMENTS

(1) In connection with these raids, own submarines proved very useful in obtaining information as to shipping but not as to fortifications, aviation facilities, and other defensive installations.

(2) Events occurring in these raids indicated, as invariably do those in every action, need for continued effort to perfect equipment and ammunition.

(3) It is considered highly desirable that carriers, when possible, operate in units of not less than two carriers. The value of planes for offense and defense is too great, to accept, unless unavoidable, the risk of losing all carrier plane support due to the loss of a

single carrier from a task force having no other carrier. Also a second or third carrier within radius of mutual support offers opportunities for tactical combinations and for recovery of planes belonging to a lost or disabled carrier.

(4) In view of the proven ability demonstrated by ship-borne AA guns to shoot down some enemy planes, it is recommended that emphasis in arranging the formation of the combatant vessels escorting carriers be laid on: (a) the availability of heavy AA batteries in such escorts, for example, the *ATLANTA* class CL's or CA's equipped with light double purpose guns, DD's having five double purpose 5" guns, and (b) a disposition to cover the most probable enemy approach such as two AA gun-carrying escorts placed on bearings from the carrier of 45° to either side of the sun, and also providing for one or two escorts to cover the stern of the carrier (considering the importance of the rudder and propellers.)

Five-inch batteries of destroyers are particularly well adapted to bombardment of these atolls because:-

(a) The terrain is flat and the objectives are mostly unprotected by natural obstacles from direct gun fire.

(b) The islands are small, the objectives are crowded close together and are quickly and easily located.

(c) Five-inch ammunition is large enough to destroy any of the objectives, and a high rate of fire and ammunition supply makes possible a more complete coverage of area than can be had with large caliber battery (8-inch or over.)

(d) Fire control installations are extremely flexible and efficient. It is well adapted to quick shift of target and to open fire on gun flash, moving objects or searchlights.

The task bombardment group should include 1850-ton destroyers and 5" double purpose gun destroyers. It is suggested that cruisers have special bombardment ammunition and that 1850-ton destroyers include in their ammunition allowance for bombardment tasks, both their service type and instantaneous type projectiles, some of both types to be fired in each salvo.

While undoubtedly eight thousand to twelve thousand yards would be most effective, it is worth while establishing a range as far out as sixteen thousand yards. Expenditure of ammunition at maximum rate at any range under fourteen thousand yards is justified.

Assign destroyers to all counter battery and fire interdiction mission against shore batteries which can be reached with direct fire.

If assignment of air mission would permit and unless all enemy combat planes in the vicinity have been destroyed, it would be highly desirable to have a fighter patrol assigned to support the task group during the bombardment stage.

CHAPTER IV

AIR ATTACK ON CARRIER TASK FORCE ELEVEN EAST OF RABAUL

20 FEBRUARY, 1942

Task Force ELEVEN - *U.S.S. LEXINGTON*
U.S.S. INDIANAPOLIS
U.S.S. NEW ORLEANS
U.S.S. BAGLEY
U.S.S. BENHAM
U.S.S. HULL
U.S.S. PATTERSON
U.S.S. PHELPS

USS PENSACOLA
USS CLARK

while operating in an area 350 miles east of Rabaul on 20 February awaiting an opportunity to strike at Rabaul, was attacked by two Japanese bombing forces. This Task Force successfully repelled these two attacks by means of radical maneuvering, anti-aircraft fire and fighter patrols.

When the force was sighted by enemy scouts during the forenoon of February 20th, the Task Force Commander was faced with the difficult decision as to whether or not to continue the schedule attack on Rabaul. He was quite conscious of the tremendous importance of the issue involved. The destruction of enemy ships previously reported in Rabaul Harbor would delay indefinitely any enemy move to the Southwest Pacific. A successful attack there would serve as an important diversion to the threatened attack on Timor and Java. On the other hand, with twenty hours warning, the Japanese would have ample time to withdraw all ships from the harbor of Rabaul to a safe position to the westward, and to assemble at Rabaul strong air reinforcements from nearby air bases and from Truk, and to be alerted for our attack.

Appreciation of the element of surprise and the value of deception.

The fuel shortage had required him to plan definite speed limits during the approach, the attack and withdrawal. Any marked deviation from this schedule threatened running out of fuel before he could join up with the tanker. Prevailing calms had already required more high speed operations for handling planes than had been hoped for. The approach to the attack launching point at night involved navigational risks because of the presence of coral reefs in the necessary operating area. During the preceding several days, currents had been found strong and variable. The success of the whole operation depended upon an accurate position fix on the night before the attack. (Ships were unable to obtain star sights on the night of the 20th, and would not have had an accurate fix had they gone in.) The loss of the carrier or a bungled attack would have been still another major calamity to the Allied cause.

In order to create as great an alarm and diversion as possible after the final decision, the Task Force changed course directly for Rabaul, (intending to hold this course until after dark) expecting to be picked up again in the afternoon and to be attacked by long range bombers. This expectation proved correct and the results were most gratifying. Captain Sherman and his fliers did a magnificent job.

The entire Task Force operated on doctrine in support of the carrier for the most part without signals. The fire discipline was excellent and well timed so as to give our fighters complete freedom of action up to the point where anti-aircraft fire had to be opened. The enemy pressed home their attacks through strong anti-aircraft fire with indomitable resolution. It is literally true that they have to be knocked down to keep them from getting in. The carrier avoided hits from planes that survived the barrage only by skillful and radical maneuvers. It was the Task Force Commander's considered opinion that if he had been attacked by 40 planes instead of 18, only a miracle could have prevented damage to the *LEXINGTON*, 3,500 miles from the nearest drydock.

The Commander in Chief, Pacific Fleet, Task Force Commander and Commanding Officers made the following remarks as a result of this engagement:-

COMMANDER IN CHIEF, PACIFIC FLEET

The second wave of enemy bombers caught the Task Force with little fighter support, probably because of the eagerness of the fighters to pursue the first attack group beyond reasonable distance in their retreat.

Importance of fighter patrol doctrine with emphasis on its primary function.

A good F.D.O. can prevent this by control of all fighters.

The AA gun fire did not hit, even though it is reported that the groups approached at steady altitude and course for six miles. This may have been because the directors failed to detect the levelling off for a dropping run, after a gliding or climbing approach.

COMMANDER TASK FORCE ELEVEN

COMMUNICATIONS

In an air engagement, there is little time for communications. Insofar as possible, instructions had been issued ahead of time, establishing doctrine for various emergencies. As a result of this indoctrination, the force functioned in a highly satisfactory manner, without voluminous signals. It is apparent, however, that in an air engagement, voice communication is the only real satisfactory method. Information was passed

to all units of the force by way of the warning net expeditiously and without difficulty. The Force Commander was fortunate in having TBS equipment available for his use, with which he was able to direct destroyers to recover pilots shot down in combat.

GUNNERY

Analysis of available information indicates that the first attack was carried out at eleven thousand feet, attack group in level flight during the approach. Some reports indicate a climb prior to levelling off. The approach for the second attack commenced with a glide from fifteen thousand to eleven thousand feet, followed by level flight to the release point. Speeds reported by fighter planes were about 150 knots for first attack and 180 to 200 for the second.

Anti-aircraft fire by ships in the rear of the formation was very heavy, but inaccurate. Reports by fighter pilots indicate that bursts were beyond the target by 500 to 1000 feet on the first attack and short by more than 1000 feet on the second. It is possible that the inaccuracy in the second case was due to failure of AA directors to detect the levelling off after the glide.

Reports of enemy damage by AA fire are conflicting. Fighter pilots positively state that no planes were shot down, while observers on deck reported from two to four. Fighter pilots further stated AA fire hampered them in driving home attacks near the bomb release point.

High density of bursts and general ineffectiveness of tracers rendered the problem of spotting in fuze range exceedingly difficult, if not impossible. Tracers which will burn until the point of burst are an absolute necessity. Fuze performance was excellent - very few low order bursts were noted.

PENSACOLA suffered damage to number one 5" gun about two and one-half feet from the muzzle, consisting of battering and scarring of rifling. Several chips of brass were removed, indicating possible breakup of portion of fuze.

The volume of short range fire at a damaged plane attempting a crash landing on the carrier was excellent. The attempt was frustrated and the plane set afire before crashing on the water close aboard. However, this was the result of the entire automatic equipment firing. In a combined dive and torpedo attack, the amount of such equipment available might prove inadequate.

Against the type of attack encountered, it is considered necessary to withhold AA fire until a reasonable good solution has been obtained. Rangekeeper operators must be on the alert for the maneuvers described, otherwise fire, when opened, will be inaccurate. Fire must be ceased promptly after bombs are released to give fighters, when present, more opportunity to attack.

Fuel supply is a constant source of concern in the planning and execution of operations similar to the projected raid upon Rabaul. Had the raid been made as planned, and even had the Task Force escaped damage during the raid, any subsequent contact with enemy forces prior to rendezvous with the tanker would have been disastrous.

AVIATION.

(a) Judging by the altitudes at which the 4-engine patrol planes shadowed this force, it is not believed that the Japanese are aware that by flying at low altitudes they may avoid detection by radar.

(b) The shadowing planes carried bombs.

(c) They were reported by our fighters as being very slow and comparatively easy targets.

(d) The enemy bombers attacked this force in two waves of nine planes each. Both attack groups made their attacks up wind and from almost astern in close formation of "Vee of Vees."

(e) Both attacks were very determined, being continued against most effective fighter protection.

(f) It appears to be doctrine for damaged enemy planes to attempt crash landings on our carriers.

(g) There is some evidence to indicate that when the leader of a flight is shot out of the formation, the remainder of the formation appears to be unable to conduct its bombing attack properly.

(h) It is believed that the bombs carried by the enemy bombers were either 100-lb. bombs or armor-piercing shells - more probably the latter. Pilots stated that explosion of the bombs which fell in the water did not occur until an appreciable interval after striking the water.

(i) Most of the enemy planes shot down were on fire in one or the other engine section. It is believed that these planes have unprotected gasoline tanks in the wings between the engine and the fuselage.

(j) Attention is invited to the fact that the enemy planes were camouflaged in a manner similar to that of U.S. Army planes at Honolulu, including an orange-striped tail section, which is easily confused with our red-striped tail section. The following recommendations are submitted:

(1) Our fighters should endeavor to shoot down the leaders of the enemy groups.

(2) Our fighters should make their point of aim the engine section of enemy bombers instead of the fuselage.

(3) Radar identification of our own planes is vitally essential to our force and to our planes.

During the first attack *LEXINGTON* launched additional four VF and eleven VS planes and landed five VF for re-service, all while maneuvering at 30 knots with 30° rudder to avoid fall of bombs.

Danger exists if aircraft are launched and landed and re-serviced during air attack.

In the meantime a second group of enemy bombers was detected on radar approaching from eastward. All the fighters except two were pursuing the remnants of the first group and were not in position to intercept the second group.

Fighter patrol primary function is protection of carrier and not pursuing planes retiring.

The two fighters available, led by Lieutenant E.H. O'Hare, attacked nine bombers of second group but guns of second plane jammed on first attack. Lieutenant O'Hare continued to attack alone and shot down two planes immediately and damaged others so that only four planes reached the dropping point. Lieutenant O'Hare persisted in his attacks and shot down two more in flames and badly damaged another plane which eventually crashed. He was primarily responsible for destruction of five enemy planes.

CHAPTER V

CARRIER TASK FORCE RAID ON WAKE AND MARCUS ISLANDS

24 FEBRUARY, 1942 AND 4 MARCH, 1942

On 24 February a carrier Task Force carried out a surface bombardment and air attack on Japanese occupied island of Wake. Ships participating in this raid were: *YORKTOWN*, *ENTERPRISE*, *NORTHAMPTON*, *SALT LAKE CITY*, and seven destroyers.

The general plan provided for a dive bombing attack on the air field and facilities on the south portion of Wake Island coordinated with a horizontal bombing attack on Wilkes Island and bombardment at Teale Island and the northwest portion of Wake Island by Cruiser Division Five. One division of a bombing squadron was to act as "moppers-up" on the landing field area in case enemy planes were found. One division of fighters was detailed to provide fighter protection for the attack group. The coordinated attack was scheduled to begin at 0707, 10 minutes before sunrise.

The general plan for the bombardment of Wake and Teale Islands was as follows:

Cruiser Division Five, in column, order of ships, *MAURY*, *NORTHAMPTON*, *SALT LAKE CITY* and *BALCH*, were to approach from the west remaining out of sight of the island until the carrier air group had attacked and then to proceed as expeditiously as possible to the initial point for commencing bombardment in order to coordinate bombardment with air attack as far as practicable.

Necessity for coordination of air and surface attacks in shore bombardment, and difficulties of execution.

The bombardment was to commence at a point 16,000 yards, 295° from Teale Island in order to permit maximum fire down the length of that island, the western part of which is too narrow in width to present a good bombardment target.

Advantage in maintaining long ranges which give larger angles of fall and likely to be more effective against emplacements protected by sand bag or concrete parapets.

Range was to be closed in order to make destroyer fire effective and also cruiser 5-inch if practicable.

Except for the fact that the air group arrived at its objective late incident to launching delays, the attack plan was well executed.

The various commanders participating in this operation commented as follows:

"This delay was a matter of deep concern to the Task Force Commander and it might well have proved costly had appreciable enemy air opposition existed. The delay in arriving at the attack position nullified the element of surprise for the air group. The absence of diversion of enemy fire by aerial attack exposed the surface ships in the bombardment group to the concentrated fire of the shore batteries. Fortunately there were no Japanese fighters or bombers based on Wake. Fighter escort is considered essential for protection of an attack group. A flight launched for an attack on shore objectives should be provided with a fighter escort of not less than one division of VF's when one carrier only is involved and the distance to the objective permits. However, carrier VF do not have endurance equivalent to the other carrier types when combat is probable, consequently VF protection depends on the existing situation."

"In coordinated attacks between surface and aircraft out of visual touch timing becomes the most important factor in the operation. Therefore, there should be sufficient flexibility in the plan of operation to permit wide variation in aircraft launching intervals, time required to reach the rendezvous, and time to reach the objective. This flexibility will be required under extremely dark or unfavorable weather conditions and variable winds."

"Approach by heavy ships for bombardment should be made only after it is certain that the attack by bombers and fighter planes has been completed."

"It is believed that at least one hour should elapse between the beginning of the aircraft attack and the bombardment in order to make certain that an air attack group will have sufficient time to search for the objective if they should become lost as appeared to be the case to Cruiser Division Five in this attack. This is necessary if bombardment vessels are not to be hazarded through failure to destroy planes on the land and water before approaching ships are sighted, remove danger to own attacking planes through bombardment and remove danger to own spotting planes through bombardment. The Task Force Commander considered having an appreciable delay (about one-half hour) in the bombardment after the carrier air group had completed its attack. The decision arrived at was that the most damage can be inflicted with the least risk if the air group attack shortly prior to sunrise and the bombardment start as nearly simultaneous as practicable. The delay of the air group was caused by launching difficulties under unfavorable pre-dawn conditions. Early and effective air attack on enemy air base provides the best air coverage possible for bombardment units."

"Unfortunately Cruiser Division Five could not be informed of the delay of the air group because radio silence had to be maintained for obvious reasons."

Importance of flexibility of plan.

"The need for VF protection for own surface units when enemy air attacks are probable, was recognized and arranged. The carrier launched the initial attack from a position 100 miles north of the island in order that VF could furnish protection to the air and bombardment groups. The delay in arrival of the air group and VF's nullified this protection as far as the surface ships of the bombardment group were concerned."

"Cruiser Division Five was obliged to approach the objective into the sun which blinded the director pointers and trainers and the rangefinder operators and made it necessary to rely on the radar for opening fire. This position, relative to the sun, made it impossible to obtain a fix on the island with which to establish a grid position."

"The carrier fighter planes left the scene before all enemy planes had been destroyed. This left the surface ships vulnerable to shadowing and later bombing which should have been prevented. It would have been desirable for the carrier to have been sufficiently close to the surface ships to send fighters to destroy shadowers when notified of their existence. As a result of this shadowing by the enemy aircraft, in addition to the bombing attack made near dark, the persistence of the enemy enabled him to fix the position at dark and provide for a systematic search from that point the next day. The radius of search fortunately was just short of finding the Task Force. The enemy shadower appears to employ a special technique after his bombing planes have arrived in the area. The shadower after remaining on the horizon all day, and at times invisible, suddenly starts an approach as if to attack. This has the effect of centering attention upon himself. Meanwhile the bombers at very high altitude approach the release point unobserved until just as they are about to release. It is recommended that in the presence of a shadower a special overhead 'release point' lookout be established in a reclining chair on the bridge, particularly when cloud formations exists as in this case."

"The following items of importance were noted:

"(a) 5-inch gun fire was apparently effective in silencing shore batteries of the character installed in these islands.

Use of batteries heavier than 5-inch is needed to silence shore batteries permanently.

"This fire mission must be recognized as an important element in every shore bombardment plan. While the shore batteries did not demonstrate any effectiveness, it is believed that had their batteries not been actively engaged, their fire would have inflicted important damage and casualties.

"If the bombardment were to be followed by landing operations it would be essential to silence shore batteries both for protecting landing craft and to allow destroyers to lie in close for fire on the beach zone.

"(b) Approach from the West reduced the effectiveness of fire control as the island was indistinct when viewed in the glare of the rising sun.

"(c) Plane spot did not materialize for either destroyer due to inability to establish communication with assigned spotting planes on assigned frequencies.

"(d) Bombardment was conducted at such ranges on courses firing into the sun, and at such speeds into the wind and sea that it was difficult to observe fall of shot.

"(e) The tactics of the enemy plane to divert attention from enemy high altitude bombers using cloud concealment for approach.

"(f) The damage to cruiser's planes because of own gun fire.

"(g) The superiority of enemy single float sea planes over cruiser SOC planes.

"(h) The plan for a simultaneous air bombardment attack was not carried out due to launching difficulties. The bombardment was therefore conducted without air coverage."

"A review of the bombardment group reports, indicated that we have much to learn of bombardment procedure, particularly when such bombardment is to be coordinated with aerial attack. When such bombardment is opposed also by enemy aircraft, the operation becomes most hazardous or even impossible unless bombardment groups have sufficient air coverage."

The great amount of damage our Air Attack Group was able to do on Wake proved the weakness of the enemy AA defenses and emphasizes the need of powerful AA batteries and VF protection at all advanced bases.

The value of creating craters in a runway resulting only in an hour's delay in the take off, is questionable. It is considered that bombs should be used on buildings, tanks, magazines and other material installations, damage to which would be more lasting.

RAID ON MARCUS ISLAND ON 4 MARCH, 1942

The same Task Force which raided Wake Island on 24 February carried out an air attack on Marcus Island on 4 March, 1942.

The general plan for the attack was as follows:

One bombing squadron strafe and bomb the airfield, planes on the ground if found, hangars, fuel tanks and other suitable objectives near-

by that might present themselves. One scouting squadron to follow the bombing squadron strafing and bombing the radio station, any remaining military buildings, storage tanks and buildings in the settlement at the south edge of the island. The Group Commander accompanied by three photographic planes take as a primary objective any ships that might be encountered, followed by taking photographs if conditions permitted. One division of fighters to act as protective escort and for offensive action against any enemy planes attempting to take off after the dive-bombing had been completed. Only one attack was contemplated followed by a high speed retirement to the southeast.

The following comments were made:

"Wind, sea and light (moonlight) conditions were favorable and there resulted an accelerated take-off in rendezvous of the Air Group approximating in time that required for normal day operation. It now appears that the attack group could have remained in the vicinity of the ship from twenty minutes to one half hour before taking departure for the objective. That this was not done was due to the uncertainty of immediately locating a small distant and isolated objective and the necessity of making ample allowance for navigational errors in adverse wind. Radar detected the Air Group five miles to the south of the line from the ship to Marcus Island prior to contact and so informed the Air Group Commander. Radar was also able to inform him his distance from the island. This is the first known instance of this specific use of radar. It proved to be positive and of great value. In similar circumstances in the future, this accurate navigational assistance can be counted upon to eliminate one uncertainty. It should be used in timing the attack of a single group to coincide with most favorable conditions, or in coordinating two or more groups in an attack."

"The accurate anti-aircraft defense on Marcus Island prevented the maximum damage by bombing and subsequent strafing. It was realized that the VF planes had to be held for counter-action against possible enemy air attacks and in this attack there was no preliminary fighter strafing which might have dispersed the anti-aircraft crews. It remains that preliminary ground strafing aids the main destruction by the bombers."

"Air bombing and ship bombardment, should be coordinated where suitable as happened in the Marshall and Wake raids. Such coordination insures severe damage to the enemy especially in the low-lying atolls of the Pacific."

"As a result of this operation the following points were emphasized:

"The need for reserve pilots is considered of major importance. After flying for four hours or more on an attack mission, these same pilots have to immediately become available for search and patrol, reserve combat patrol or anti-torpedo plane patrol for the rest of the daylight period, and possibly at night under moonlight conditions when attack by enemy planes is threatened. These conditions may easily last for a period of twenty hours or more during an extensive action."

"In many war operations involving carriers and their air group, it is recommended that serious consideration be given to operating two carriers in mutual support. Under these circumstances, the loss of the air group would not necessarily occur if one carrier were destroyed or seriously damaged. The enemy has a tendency, when part of the attacking surface vessels have been located, to concentrate his air strength upon it and regard as secondary importance, the locating of other forces known or suspected to be in the area. There results a dangerous and heavy attack upon the one but the other may escape detection and attack. Two carriers provide an alternate air port, each of which could accommodate two air groups in an emergency. It should not necessarily follow that because a carrier suffers serious damage it must lose its entire air group. On the other hand a carrier's underwater body and below deck machinery might remain unimpaired yet two or more well placed bombs or a serious hangar or flight deck fire might make recovery of the air group impossible."

Recently Commander South Pacific has directed that if two carriers are used, either in one task force or are together as the result of the joining of two separate task forces, provision must be made for their separation when air attack is imminent.

CHAPTER VI

CARRIER TASK FORCE ATTACK ON LAE AND SALAMAUA ISLANDS

10 MARCH 1942

Task Force Eleven consisting of *U.S.S. YORKTOWN, U.S.S. LEXINGTON, U.S.S. MINNEAPOLIS, U.S.S. SAN FRANCISCO, U.S.S. INDIANAPOLIS, U.S.S. CHICAGO, H.M.A.S. AUSTRALIA* and fourteen destroyers, was operating in the Coral Sea - Solomon Islands Area at this time awaiting an opportunity to attack the enemy where and when found.

Because of the possibility of effecting surprise thereby, it was originally planned to conduct a moonlight air attack on Rabaul and Gasmata, launching the attack approximately three hours before sunrise. This idea was abandoned, however, when it was learned that the majority of the *YORKTOWN* pilots were unqualified in night launchings and landings, and that they were relatively inexperienced in night bombing due to lack of opportunity for practice. Therefore, it was decided to launch a dawn air attack followed by bombardment of shipping and shore installations at Rabaul and Gasmata by attack groups composed of cruisers and destroyers. Had the air attack found the enemy alerted and no shipping in the harbor, it was the intention to direct the attack groups of cruisers and destroyers to rejoin the Task Force without attacking.

On 7 March, information was received from Comanzac that an enemy convoy of one cruiser and several destroyers and transports, had been sighted off Buna. On 8 March word was again received from Comanzac that enemy forces had commenced an early morning landing at Salamaua, and that at 0830 local time on the same date additional enemy ships totalling eleven and including 4 cruisers or destroyers had begun to shell both Salamaua and Lae. Landings were made at each location and both towns were in enemy hands by local noon. Reconnaissance by the Australian Air Force on 8 March revealed no warships and three transports at Rabaul and no shipping at Gasmata, although on the previous day approximately 23 ships had been sighted in Rabaul harbor.

The above information indicated strongly that the Japanese were moving in force on New Guinea and pointed clearly to the advisability of attacking Japanese forces at Salamaua and Lae while the enemy was in an exposed position, and before he had time to establish himself in force at these two ports. Such an attack if successful, would, it was believed, remove any immediate threat to Port Moresby and go far towards checking the enemy's advance.

Under the assumption that the objectives of the attack should be shifted to enemy shipping in the Salamaua - Lae Area, the question then arose whether the attack should be launched from a point to the eastward of the Huon Gulf or from a position in the Gulf of Papua. After careful deliberation the conclusion was reached that an air attack from the Gulf of Papua offered the best promise of success mainly because:

(1) An air attack from that location stood an excellent chance of taking the enemy by surprise, whereas surprise was unlikely in an attack from the eastward of Salamaua, since it required an approach through waters that were being patrolled by the enemy. In this connection, as a matter of principle it should be assumed that an alert enemy, once he has received warning of the approach of a hostile raiding force, will, in all probability, disperse his important shipping to areas which cannot be readily reached by air attacks.

(2) It offered reasonable security from repeated attacks by enemy aircraft based at Rabaul and Gasmata.

(3) It permitted lower speeds during the approach to and retirement from the point of attack because of the relative immunity from enemy air attacks. This allowed a reserve of fuel, and therefore an opportunity to withdraw temporarily, if necessary, to await more favorable weather conditions, in case unfavorable weather was encountered on the day planned for the attack. Such freedom of action would have been denied by an attack from the eastward.

On the other hand it was realized that an air attack from the Gulf of Papua possessed the following principal disadvantages:

(1) A hazardous 100 mile flight over wild and unknown country with high mountain ranges often obscured by clouds.

(2) The probability that the attack would not prove as damaging or as decisive as one launched from the eastward of Salamaua, should it have been possible to effect the latter through surprise. However, as previously stated, the chance of surprise in an approach from the eastward was believed to be practically nil. The early detection of our force would have enabled the enemy to move all of their shipping out of reach.

It was considered however, that these disadvantages were considerably outweighed by the advantages enumerated in the foregoing paragraph. Final decision was therefore made late on 8 March to conduct an air attack on enemy shipping in the Salamaua - Lae Area from the Gulf of Papua on 10 March.

In addition it was considered advisable to order a special group of four heavy cruisers and four destroyers under the command of Rear Admiral Crace, R.N., to remain in the vicinity of Rossel Island, in order to cover the carrier operations in the Gulf of Papua, to intercept any enemy surface force striking at Port Moresby, and to cover the arrival of the troops in New Caledonia.

This operation required a flight of 104 airplanes over wild, unexplored mountain jungle, whose interior included mountain peaks extending 13,000 to 15,000 feet high and of which our naval charts showed nothing of the interior behind the shore line. It also required handling the ship and launching from narrow waters close to

shore with many coral dangers, some of their positions doubtful, and all of the water area covered only by old and somewhat doubtful charts.

During peacetimes we should perfect our hydrographic intelligence for possible use during war.

The operation also required very careful planning in detail to insure coordination of the two carrier groups and to give all pilots all the intelligence information available. In order to obtain information as to the area to be flown over, Commander W. W. Smith of Commander Task Force Eleven staff was flown into Townsville, Australia, and Commander W. E. Ault, of the *LEXINGTON* Air Group flew to Port Moresby, New Guinea. Both of these officers brought back invaluable information regarding the pass over the mountains, without which it is questionable whether or not the attack would have been a success. Commander Ault landed at Port Moresby between two air bombings by the Japanese and his visit was curtailed somewhat by the necessity of getting away before the second arrived.

The distance involved required absolute maximum range of torpedo planes and fighters. The Task Force Commander was particularly anxious to send at least one torpedo plane squadron armed with torpedoes to test the performance both of planes and torpedoes. In view of the doubt about their ability to get over the mountains and back, only the *LEXINGTON* squadron was sent so armed, the *YORKTOWN* VT squadron being directed to take two 500- pound bombs each.

Importance of insuring in peacetime that all equipment is adequate and reliable.

In order to properly coordinate the attack and have the *fighters* at the scene of action at the right time, they were landed and topped off with fuel after the attack groups. With their higher speed they were able to catch up with the other squadrons and be at the scene at the time desired with the maximum possible amount of gasoline.

The attack by the *LEXINGTON* and *YORKTOWN* groups was carried out as planned and was unique for carrier planes in that it involved a flight over difficult mountains, the pass being reported as seldom open even on good weather days for more than the four hours between 0700 and 1100. If the weather had closed in behind these planes, the loss of both carrier groups might have occurred due to shortage of gasoline and inability to climb to the altitude necessary to get back over the mountains. It was not recommended that this kind of an operation for carrier planes be repeated very often.

CONCLUSIONS

It is believed that the force initially encountered at Salamaua and Lae consisted of eleven vessels, of which five were transports and cargo vessels and the remainder a covering force to two cruisers and four destroyers. These vessels were attacked by the *LEXINGTON* Group arriving in the area. Unknown to most of the planes, about twenty-five miles to the eastward a second force was approaching.

The composition of this group is not exactly known but is believed to have been at least one cruiser, four destroyers, one seaplane carrier *(KAMOI)*, and six transports. The cruiser and destroyers steamed ahead to the Salamaua area to defend or rescue personnel already under attack. These ships were in addition to the ships already in Salamaua. The cruiser and destroyers were attacked by *YORKTOWN* dive bombers and the AV by Torpedo Squadron Five. The transports were later attacked by the U.S. Army, B-17 heavy bombers.

FOGGING

All dive bombers encountered severe fogging of windshields and sight telescopes. This is a serious defect, affecting both the safety of the planes themselves as well as the accuracy of bombing.

ORDNANCE EQUIPMENT

As far as can be determined all bombs functioned. In accordance with the operation plan, instantaneous fuzes were employed. It is considered that the use of delayed action fuzes is essential against surface vessels. The advantage to be gained in damage by fragments of near misses is far outweighed by the disruptive internal damage incurred when a direct hit is obtained.

COMMUNICATIONS

Again the well established fact was brought out that aircraft radio equipment cannot be considered reliable when subjected to long periods of disuse incident to radio silence. Numerous transmitter failures occurred, later determined to be the result of sticking relays and contactors.

Particular attention was invited to the following material features.

(1) Fogging of windshields and sight telescopes in dive bombers.

(2) Failure of bomb release solenoids in *YORKTOWN* planes and the fact that *LEXINGTON* planes used manual release.

(3) The need for detachable fuel tanks in the fighter planes.

(4) The failure of the torpedoes to make hits when all were reported to have run "straight and hot" and nine should have been sure hits.

This was the first coordinated attack against enemy ships and shore establishments by two carrier air groups. Although the attack was initially planned against enemy concentration in the Rabaul - Gasmata Area, later information indicated enemy movements in the Salamaua - Lae Area. The Task Force Commander therefore rightly changed his attack to the latter area. In order to make the coordinated attack and

to prevent disclosing his presence by the use of radio to transmit orders for such an attack, he also decided to keep his carriers together, in the approach.

The Commander in Chief, U. S. Pacific Fleet, considered that the attack was well planned and very well executed. It is probable that the attack had an important effect in checking enemy operations in the New Guinea Area.

CHAPTER VII

CARRIER TASK FORCE ATTACK ON TULAGI AND THE BATTLE OF CORAL SEA

4-8 MAY, 1942

The Battle of the Coral Sea consists of four distinct though related actions:

(1) The attack on enemy forces at Tulagi May 4th.

(2) The attack on enemy forces north of Misima May 7th.

(3) Air attack on Task Force 17 south of Rossel Island May 7th.

(4) The exchange of air attacks southeast of Rossel Island May 8th.

The forces which took part in this operation were Task Force 17, 18 and 44, composed as follows:

TASK FORCE 17	TASK FORCE 18	TASK FORCE 44
YORKTOWN	*LEXINGTON*	*AUSTRALIA*
ASTORIA	*MINNEAPOLIS*	*CHICAGO*
PORTLAND	*NEW ORLEANS*	*HOBART*
CHESTER	7 DD's	
6 DD's		

The operations of the task forces were in coordination with aircraft of the Southwest Pacific Area based in Australia, Port Moresby and Tulagi, and with fleet patrol planes at Noumea. (Australian forces evacuated Tulagi two days before Task Force 17 struck the enemy there on 4 May.)

This coordination may be called strategical rather than tactical. In other words, the information as to enemy concentrations obtained by shore-based aircraft was of much value, and the almost daily attacks on shipping were undoubtedly of cumulative assistance, but the furnishing of air support in tactical situations was lacking and is a problem which for various reasons has not been solved for that area up to this time. Two evident drawbacks were the inadequate number of planes and the remoteness of the Australian bases. Difficulties as to communications are in the process of being cleared up. There is still much to be done in providing for the readiness and training of shore-based aircraft to coordinate their operations tactically with fleet units. Such coordination is essential in order that carrier-based planes may be relieved of long range scouting and be ready to attack, with full groups, any targets located by shore-based craft.

In addition, the necessity for intensive training and indoctrination was emphasized on 7 May when three U.S. Army B-26 bombers from Australia made a high level bombing attack on the Support Force (*AUSTRALIA, CHICAGO, HOBART*) to the south of Jomard Passage. Fortunately no hits were scored.

Task Force 17 was returning to the Coral Sea from Tongatabu when contact with Task Force 11 was made at 0615 May 1st, in Lat. 16° 16' S., Long. 162° 20' E., as previously arranged. The next few days were spent in fueling preparatory to striking the enemy, when and if opportunity afforded.

The track chart appended shows the tracks of the various forces during this operation.

A study of the track chart shows that the Task Forces were seriously exposed to submarine attack during 1-2 May while fueling at slow speed within a restricted area. Enemy has taken advantage of this opportunity in later months while our Task Forces operated in same general area at slow speed over a period of several days.

At 1545, May 2, a *YORKTOWN* air scout sighted an enemy submarine on the surface in Latitude 16° 04' S., Longitude 162° 18' E., just 32 miles north of Task Force 11 and 17. Submarine dove but surfaced shortly afterward as it was again sighted and depth-charged by three planes sent out to locate it.

The proximity of the submarine to our surface forces and direction finder radio bearings pointed to the probability of their position having been reported to the enemy. In over two months of operating in the Coral Sea, this was the first definite indication of our presence having become known to the enemy.

Japanese have the ability to closely coordinate air and submarine reconnaissance and attacks.

The submarine danger threatening our Task Forces when they remain in same general area for several days operating at low speeds and being observed by enemy aircraft and submarines should be guarded against. Note 0615/1 and 1545/2 position of Task Force.

On 4 May the *YORKTOWN* Air Group made three attacks on enemy vessels at Tulagi Harbor. In this attack a total of 22 torpedoes and seventy-six 1000-lb. bombs were released. Five torpedo and eleven bomb hits were reported. Considering that there was practically no air opposition and very little anti-aircraft fire, the ammunition expenditure required to disable or drive away the limited number of enemy ships involved was excessive. This is particularly true in the instance where

11 torpedoes were fired against a maneuvering aircraft tender without any hits. Although fogging of sights and windshields affected accuracy of the first attack, this condition did not apply in subsequent ones begun from lower altitudes.

The Tulagi performance emphasizes how much proficiency drops off in wartime and the necessity for target practices at every opportunity in order to keep pilots completely trained in all phases of aerial warfare. Despite their lack of training, the *YORKTOWN* Air Group demonstrated very creditable willingness and effort to keep after their enemy objective until it was destroyed. It was gratifying that some loss was inflicted on the enemy with very small loss to our forces.

At 0825, May 5, *YORKTOWN* launched four fighters to investigate radar contact on aircraft bearing 252°, distance 30 miles. Interception was completed at 0840 and enemy patrol plane shot down. At this time the patrol plane was fifteen miles from *LEXINGTON* and twenty-seven miles from *YORKTOWN*, suggesting the possibility that it may have been trailing Task Force 11 and not Task Force 17. Shortly before rejoining, *HAMMANN* sighted the patrol plane.

YORKTOWN air scout reported enemy submarine on the surface at 0808, bearing 285°, distance 150 miles, course 105. As this course was the reverse of his bearing, it is probable that patrol plane had been directing him toward Task Force 11 or 17. Three torpedo planes from *YORKTOWN* made an unsuccessful search for submarine.

Again close coordination between enemy aircraft and submarines.

Task Force 17 fueled from *NEOSHO* May 5 and 6 and combined with Task Forces 11 and 44 as Task Force 17.

The force was organized as shown below with an attack group of cruisers and destroyers for the purpose of making night and day attacks on enemy surface craft and a support group of cruisers and destroyers to protect the carriers. Either of these groups might be assigned the mission of the other, depending on the strength of the force to be attacked or they might be combined for an attack if the four destroyers assigned the carrier group were considered sufficient protection.

ATTACK GROUP: *MINNEAPOLIS*
NEW ORLEANS
ASTORIA
CHESTER
PORTLAND
5 DD's

SUPPORT GROUP: *AUSTRALIA*
CHICAGO
HOBART
2 DD's

AIR: *YORKTOWN*
LEXINGTON
4 DD's

FUELING GROUP: *NEOSHO*
TIPPECANOE
2 DD's

SEARCH GROUP: *TANGIER*
12 VP

MAY 7

At 0600 the Support Group was detached to patrol south of the Jomard Passage for the purpose of intercepting any enemy forces which might approach Port Moresby through that passage.

Task Force 17 launched a search and headed north to close the enemy, since it was believed that a large number of enemy ships were in the area between New Guinea, New Britain and Solomon Islands. Practically every type of ship was reported by aircraft and it was fairly well established that three aircraft carriers were in the area. The forces were scattered and courses reported, varied from 100°. clockwise to 340°.

A scout searching to the northwestward reported two carriers and four cruisers north of Misima Island. After launching the attack groups, the scouts were recovered and it was learned that an error had been made in using the contact pad and the pilot had not sighted any carriers. About the time this error was discovered, Army aircraft reported a carrier group close to Misima and the attack groups were diverted and made contact.

The mistake made by the pilot in encoding the first contact, is a glaring example of the fallacy of expecting a pilot to encode a message when in contact with the enemy. As happened in this case, the pilot is very liable to make a mistake in encoding a message, while trying to maintain contact and watching for enemy planes; there is also a strong possibility that a scout will be shot down before he has a chance to encode and send out a contact report, if the enemy has radar and a combat air patrol in the air. It appears that a contact should be reported in plain language giving the geographical position and composition of the enemy force and be authenticated with a simple authenticator.

The combined *LEXINGTON* and *YORKTOWN* Groups attacked these enemy forces whose composition was not entirely clear. The *YORKTOWN* reports the enemy as consisting of 1 carrier, 1 very large heavy cruiser, 3 heavy cruisers and 1 light cruiser, whereas the *LEXINGTON* Group reports the enemy as 1 carrier. Reports also conflict as to damage caused, probably because without realizing it both air groups attacked the same carrier simultaneously. This seems a logical explanation of why the *LEXINGTON*, which attacked first, reports 7 bomb and 9 torpedo hits, while the *YORKTOWN* Group, which followed in the attack, reports the carrier with only one small fire aft standing into the wind to launch planes after the *LEXINGTON* Group had completed its attack. The *YORKTOWN* Group,

then reports 14 bomb and 10 torpedo hits on the same carrier. The *YORKTOWN* Group also reported sinking the light cruiser in company with the enemy carrier.

Difficulty in accurate observation by pilots when attacking.

It seems from these two reports, which correspond quite closely in times at 1145, that the attack was made simultaneously by both air groups and that probably in the excitement neither one appreciated that the other was involved in the same attack.

The attack groups returned at 1338 and a second attack on enemy ships in the DeBoyne Island Area was ready at 1450/7 but was not ordered by the task force commander due to the possibility of other enemy carriers being in the vicinity and not yet located. Evidence existed that our task force was being shadowed by enemy planes and enemy radio was intercepted giving the approximate position and exact course and speed. The weather in the area was squally, with about 90% overcast, frequent rain squalls, in which ceiling and visibility were zero. Wind varied from 15 to 22 knots from southeast.

There is an urgent need for long range reconnaissance and shadowing planes manned by experienced observers.

The Task Force Commander stated that:

"The advisability of sending in another attack or launching a search was considered. The probability of finding a suitable objective near the scene of the morning attack was not great. The location of Carrier Division Five (*SHOKAKU* and *ZUIKAKU*) was unknown though quite possibly might be within striking distance. Radar contacts and radio interceptions indicated that our position and disposition were known to the enemy. One four-engined patrol bomber had been intercepted and shot down by *YORKTOWN* fighters. Inasmuch as enemy carriers were probably in the vicinity, it was not believed that any other objective should be considered for our air striking force which should be held in readiness for a counter attack. There probably would have been insufficient daylight for an attack following an extensive search. Flying conditions and visibility were becoming increasingly bad and frequent rain squalls were encountered. It was, therefore, decided to rely upon shore based aircraft to locate enemy carriers."

There is an urgent need for long range reconnaissance and shadowing planes manned by experienced observers and reliable communications with Task Force Commander.

"During the afternoon an estimate of the situation led to the decision to head westward during the night, it being expected that the enemy would pass through Jomard Passage by morning headed for Port Moresby, in force, probably accompanied by carriers. The situation was altered by the sighting of enemy planes just before and after dark. At 1659 an enemy seaplane was sighted but fighters failed to intercept. At 1747 radar showed a group of planes to the southeastward on a westerly course. Interception was completed and our fighters completely broke up the enemy attack resulting in the loss through destruction or failure to return to own carrier of between fifteen and twenty enemy planes. Our losses were three fighters, one of which may have landed on Tagula Island. While our planes were landing after dark, three enemy planes circled the disposition showing lights and made no sign of hostility. They were believed to be lost having mistaken our force for their own. One of these enemy planes was reported shot down by ship gun fire. It was realized that carriers were in the vicinity but their location was indefinite. Radio interception on the homing of these lost planes indicated the probability of enemy carriers being about 140 miles either east or west. At 2200 Task Force Commander in *YORKTOWN* received a message from Commander Air that *LEXINGTON* radar plot had indicated enemy carrier or carriers about thirty miles bearing 090° at 1930. *YORKTOWN* radar had given no indications, except a single plane which was circling at 25 to 30 miles on bearing 060° and later was tracked on course 310 and was believed to be one of *YORKTOWN's* missing fighters."

An example of subordinates not keeping seniors fully and promptly informed. This incident also emphasized the necessity of combining the duties of OTC and Commander Air in one commander.

An example of lack of suitable night search and shadowing planes to facilitate night destroyer attack.

NOTE: The Commanding Officer of the *LEXINGTON* reported as follows in this connection:

"While landing the combat patrol, well after sunset and almost completely dark, strange planes appeared flying around our formation. They were challenged and one report was received that they answered correctly and it was presumed at first they were *YORKTOWN* planes approaching to land. *YORKTOWN* reported they were enemy planes. Some ships opened fire on them. *YORKTOWN* and *LEXINGTON* planes were still circling to land. However, these strange planes made no hostile move, were burning running lights and eventually moved off thirty miles to the eastward, where radar showed them circling and apparently landing on an enemy carrier. They were definitely enemy planes and apparently mistook us for their own force. The indicated presence of enemy carriers only thirty miles east was reported to the Task Force Commander. It was estimated that these carriers were the *SHOKAKU* and the *ZUIKAKU* of Cardiv Five, which until that time had been unaccounted for."

Why was there a delay of two or three hours getting this important information to the Task Force Commander?

The Task Force Commander stated further:

"Assuming that *LEXINGTON's* analysis was correct for 1930, the location of the enemy three hours later would have been very doubtful. Under these circumstances, it was considered inadvisable to detach cruisers and destroyers or even destroyers alone. Some destroyers had to be retained for submarine protection. There was the further possibility that the attack force might not rejoin by daylight, when their protection would be valuable to our carriers. Had there been any assurance of our surface force making contact, it might have been advisable for the carriers to retire to the southward. But had the surface force failed to make contact during the night, they might have met a disastrous air attack next day. All things considered, the best plan seemed to be to keep our force concentrated and prepare for a battle with enemy carriers next morning."

With suitably equipped radar planes, attack could have been made by surface ships or aircraft.

At 1051, May 7, a despatch, repeated several times, was received from *NEOSHO* reporting that she was being bombed by three aircraft in Latitude 16° 50' S., Longitude 159° 08' E. Later, at 1600, the *NEOSHO* reported that she was sinking in Latitude 16° 38' S., Longitude 158° 28' E. A subsequent despatch from Commander in Chief, U.S. Pacific Fleet indicated that *SIMS* had also been sunk.

Inadequate escort to counter air attack and protect when operating in area where enemy submarines are known to be. High speed by NEOSHO and avoidance of remaining in same area would have been the best protection.

Unfortunately, nothing was received as to the type of aircraft which attacked them. It would have been extremely valuable information if it had been reported that they were carrier planes. *MONAGHAN* was detached during the night May 7-8 to search next morning for survivors and to send radio despatches to Commander in Chief, Pacific Fleet and others. This left seven destroyers and five cruisers with our two carriers.

Importance of units making proper contact reports.

Considerable difficulty was experienced locating the sinking *NEOSHO* because the position given in her despatch report was erroneously picked off the chart. The following day a correct position was given.

ACTION SOUTHEAST OF ROSSEL ISLAND, MAY 8

As the shore-based aircraft had not sighted *SHOKAKU* and *ZUIKAKU* on the 7th, it was necessary to launch a 360° search at dawn. At 0828 *LEXINGTON* scout reported two carriers, four heavy cruisers, three destroyers. This was amplified at 0835 as two carriers, four heavy cruisers and many destroyers 120 miles, bearing 006° from reference point ZED. *LEXINGTON* signaled that true bearing of enemy was 028°, distant 175 miles from own force. This placed him in Latitude 11°51' S., Longitude 156°04' E. An intercepted radio transmission indicated that the task force had been sighted at 0822. At 0900 attack groups were launched. Cruisers and destroyers were in a circular screen surrounding the two carriers, axis 305. To avoid having all ships moving to new positions at a time when an air attack might develop, the axis was not changed and *YORKTOWN* was told to adjust position as necessary to avoid having the two carriers in line with the sun. Throughout the day, the manner in which ships were maneuvered without signal was remarkable. In order to reduce signalling between carriers and to allow him complete freedom of action for his carriers and air groups, Commander Air was given tactical command at 0907.

At 1000 a radio despatch was sent to Commander Southwest Pacific Force giving the enemy's disposition and 0900 position in the hope of shore-based aircraft being available to bomb and track him. The task force position was also included.

There is an urgent need for adequate shore-based aircraft to cooperate tactically.

At 0832/8 intercepted plain language enemy transmission giving our position, course and speed and it was then known definitely that the force had been located. It was predicted enemy attack would come in about 1100.

Two radar contacts resulted in no interception and one visual contact resulted in the destruction of a four-engine patrol bomber. At 1055 radar indicated a large group of enemy aircraft bearing 020°, distance 68 miles. These planes came in on a steady bearing and it is considered that they should have been intercepted earlier than they were and also more effectively. It would appear that the advantage which we possess with our radar and fighter director system was not exploited to the fullest extent.

Failure to train in peacetime with equipment to be used during war.

The weather in our vicinity was clear, unlimited visibility and ceiling, few clouds, no rain squalls, wind about 15 knots, from southeast. Radar reported at 1100 many enemy aircraft approaching from northward, distance about 75 miles. First enemy planes were sighted from the

ship at 1113. They were torpedo planes. They were at about 6,000-7,000 feet altitude and split and came in from both bows. Ship's speed had been built up to 25 knots at 1100 when the attack was expected and was immediately increased to 30 knots when the hostile aircraft were sighted.

The combat patrol, under the Fighter Director, was patrolling at 10,000 feet. The torpedo planes were followed by dive bombers whose exact altitude was not determined, but was known to be over 10,000 feet. The fighters made contact 20-30 miles out but the enemy bombers were at 17,000 feet and the performance of our fighters was not sufficient to gain enough altitude to attack them before they reached the "push over" point. The bombers intercepted were accompanied by 18 protective fighters, which our fighters subsequently engaged in combat and shot down or damaged six.

Importance of fighter director organization cannot be overemphasized. The value of combat patrols is in direct proportion to the efficiency of fighter directors.

The Commanding Officer of the *LEXINGTON* described the attack as follows:

"The anti-torpedo plane patrol of SBD's was on station at 2,000 feet, but about 6,000 yards out. This patrol always has a tendency to get too far out, probably due both to concern over AA fire from surface ships and an eagerness to intercept torpedo planes well out. From this position the enemy torpedo planes at high speed came in over them. Even so, the SBD's on the port side intercepted; shot down 4 VT with torpedoes, 4 without torpedoes, 1 VB and 2 accompanying VF. One SBD was shot down by enemy VF.

Urgent need for adequate fighter patrol doctrine and suitable planes. Urgent need for more fighters in carrier.

"Anti-aircraft fire from this force was opened generally about 1113. Torpedo planes made the first attack, the first approaching from port and others circling to come in from starboard bow. Most of these planes came in at about a 40° or 45° dive from 6,000-7,000 feet, making high speed and dropping their torpedoes in the dive attitude from altitude of 300-500 feet, although some were seen to level off just above the water and make a normal drop. The range at the dropping point varied from 500 to 1,200 yards. I turned to port with full rudder to bring the first torpedoes ahead. From then on torpedoes were coming from both starboard and port and I maneuvered with full rudder both ways as I considered best to avoid torpedoes. Some from starboard crossed ahead; two others ran parallel to the ship, one on each side; some from port ran ahead; two ran under without hitting. At 1120, first torpedo hit ship and exploded just forward of port forward gun gallery; at 1121, one hit a little further aft about opposite the bridge. In the meantime, dive bombers were making their attack from about a 70° dive angle. They were pushing over from high altitude, 17,000 feet, and were not visible until

they were in the final stages of their dive. One bomb estimated to be 1,000 lbs. hit the after end of the port forward gun gallery in the ready ammunition locker just outside the admiral's cabin. Two other near misses hit close aboard on the port side and at first were mistaken for torpedo hits. Another bomb estimated 500 lbs. hit the gig boat pocket on the port side, and one 100 lb. hit the stacks and exploded inside. There were one or more near misses aft on the starboard side, fragments killing and injuring a number of men in the stack machine guns, sky aft, and the after signal station.

"At about 1245, Damage Control reported the ship on an even keel, that three fires were out and the other one in the admiral's country under control. The ship was periodically turned into wind to reservice aircraft.

There is danger to ship when fighting fires, to turn into wind.

The attack group returned and was landed by 1400.

"In the meantime, Damage Control was gradually getting all damage checked and cleared up. At 1247 a heavy explosion shook the ship. It appeared to come from amidships well down in the bowels of the ship. Communication with Central Station was immediately lost, all telephones except the JV line went out including the ship's service phones, and a bad fire broke out from the main deck down to the vicinity of Central Station just forward of the main elevator. All pressure was lost in the fire main forward. Rudder indicators on the bridge went out, although steering control was working.

This heavy explosion at 1247 was what caused the loss of the ship. Until that time everything was well under control. Full propulsive power was available, steering was O.K., the ship was on an even keel, and all fires were either out or under control. The cause of this explosion was uncertain. At first it was thought to be a "sleeper" dud 1,000-lb. bomb which went off in the bowels of the ship. However, further study indicates that small gasoline leaks from the heavy pounding the ship had received had caused accumulation of gasoline vapors in the lower regions and they were set off by spark of unknown origin. In any event, from this time on the ship was doomed."

The fact should not be overlooked that during the period that various fires throughout the ship were being brought under control, the ship was steaming at high speeds and heading into the wind periodically. This no doubt hindered fire fighting and possibly caused explosive vapors to filter through the ship resulting to some degree, in the later explosion at 1247.

The air attack on Task Force 17 developed at about the same time our airplanes were attacking the enemy. The enemy striking group, protected by many fighters, attacked both carriers with bombs and torpedoes. Our carriers appeared to be the sole objective of the enemy. Dive bombing and the torpedo attacks were divided about equally between each ship. The attack was short, not lasting over 15 minutes, during which period a considerable number of enemy aircraft were shot down by short range AA and combat and anti-torpedo plane patrols.

In the attack on our carriers the hostile planes were picked up by radar at a distance of about 70 miles. In spite of this warning and of the fighter protection over the carrier, only one group of our fighters was "vectored" to a successful interception before the enemy planes reached their attack point. Considering the tremendous odds against them, the performance of the SBD's in the anti-torpedo plane patrol was highly creditable.

The urgent need for fighter director doctrine and experienced director.

It is of interest that either due to intensive anti-aircraft fire, or to a change in procedure, the Japanese torpedo plane approach on our carriers differed greatly from the approach used in the attack on the *PRINCE OF WALES* and *REPULSE*. The approach against the British ships was made in squadron formation. In the Coral Sea action, however, squadrons broke up into small groups which attacked from various directions. Some came in at a constant low level and dropped torpedoes 150 to 200 feet from the water at a relatively high speed; others approached in a high speed glide and dropped from heights of as much as 500 feet.

During the air attack, the two carriers separated due to their radical maneuvers at high speeds. Without signal those ships nearest each carrier formed a screen around each. The anti-aircraft fire was better than had been expected and shot down a number of enemy planes. The screening ships also provided protection by making the approach more difficult for enemy torpedo planes.

When action is imminent it is advantageous, if the tactical situation permits, to have the base course into the wind. With two carriers operating in company and the necessity for turns into the wind any other course will result in little net gain. Screening vessels should be definitely assigned to each carrier so that in case they are separated during attack due to maneuvers or air operations they would each have their own screen. The failure to do so prior to this attack indirectly contributed to damage to carriers because there was an unequal division of forces between carriers and the screening positions as a result not such as to give the best protection.

It is a notable fact that at Tulagi and Misima, as at other attacks in which Task Force 17 has participated at Salamoa-Lae, the Japanese forces were completely surprised and caught off guard. This would seem to indicate that their reputation for efficiency and alertness is not entirely justified.

False conclusions as to Japanese alertness should be guarded against. In the Marshall Raids, for example, AA fire at Kwajalen was fired promptly and at Roi the AA and fighter opposition accounted for several U.S. planes.

During the final action on 8 May involving not only a simultaneous attack by enemy planes on our own carriers but also an attack by our planes on enemy carriers at about the same time, it is significant that there is no mention of attack groups engaging each other in the air enroute. The enemy group reported by the *YORKTOWN* scouts consisted of 2 carriers, 4 cruisers and 3 destroyers. The reports of the attacks by the two air groups do not clearly prove that both carriers were attacked and damaged. It is possible that only one enemy carrier was hit on 8 May and that the air groups from the *LEXINGTON* and *YORKTOWN* attacked the same carrier. The second carrier may have taken advantage of cloud concealment and thereby escaped. If the number of hits made is approximately as claimed (8 torpedoes and 8 heavy case 1,000-pound bombs fused with Mark 21 and Mark 23 one-hundredth second fuze), both bomb and warhead must be improved.

The following comments were made by the Task Force Commanders and other responsible officers in their reports covering these engagements against the enemy:

EMPLOYMENT OF SHORE BASED AIRCRAFT - INTELLIGENCE

(a) Information furnished by shore and tender based air was of considerable value strategically - tactical information and attack support was non-existent.

Shore-based aircraft should be able to trail an enemy force and should have sufficient armament to protect itself against attacks by enemy fighters.

(b) The necessity for maintaining radio silence at sea requires shore based air to give support by doctrine rather than by direction. The Japanese are considered definitely superior in this phase of air operations. It is recommended that additional tender and shore based aircraft under naval control be established in the Southwest Pacific Area. These units should cooperate directly with our task forces scouting both strategically and tactically; they should also coordinate their attacks against the enemy's sea-borne forces. As the opposing carrier task forces approach each other, the search and shadowing activities should be intensified and a continuous flow of information furnished directly to our task force commanders.

This air support for naval operations under naval control cannot be stressed too much. Until we have this and it is efficient and reliable our forces will be at a disadvantage when fighting the Japanese.

(c) Shore based aircraft should also have the ability to move rapidly to new operating bases. Fast long-range landplanes are preferable to large seaplanes.

AIR ORDNANCE

The air ordnance installed at present appears to have functioned satisfactorily. The *YORKTOWN* reports fogging of telescopes in dive bombers on May 8th, but the *LEXINGTON* makes no report of this trouble. Apparently, gun jams have been largely eliminated. No failures of bomb racks, fuzes, or torpedoes were reported.

SHIP'S GUNNERY

Our anti-aircraft fire is unable to stop a determined air attack, but it does reduce the effectiveness of the attack. It is believed that a number of planes were destroyed by AA gunfire. It appeared that the majority of enemy planes were shot down after they reached their torpedo or bomb release point. The 20mm. gun is not effective at ranges greater than 1,000 yards. This is insufficient against torpedo attacks and just barely effective against dive bombers. We are not getting the most out of the 1.1 due to lack of directors and the slow training rate of mounts which have not been equipped with new gears. We are urgently in need of an automatic lead computer for all types of machine guns. Machine gunners persist in the fault of allowing insufficient lead and shooting under the target. This condition improved as the attack progressed, until at times enemy planes appeared to be coming through a veritable hail of bullets unscathed. Patterns appeared excessive. The five-inch barrages from carriers appeared well executed. Five-inch fire from screening ships against an attack of this type appears generally ineffective. From the gunnery standpoint, a heavy screen on the fifteen hundred yard circle would offer the optimum protection. The disadvantage of such a procedure lies in restricting the maneuverability of the carrier. Two thousand yards seems to be the best answer to this problem.

Fire was slow in starting and extremely erratic. This attack was followed closely by a dive bomber wave which was concentrated on the carriers. At the first attack the carriers increased speed and constantly maneuvered. Due to these maneuvers the *U.S.S. YORKTOWN* and *U.S.S. LEXINGTON* became quite widely separated and the formation broke into two separate screens operating about the two carriers. Two ships of this unit, *U.S.S. MORRIS* and *ANDERSON*, remained with *LEXINGTON* along with

U.S.S. MINNEAPOLIS, NEW ORLEANS and *DEWEY*. Two ships of this unit, *U.S.S. RUSSELL* and *HAMMANN*, operated with the *U.S.S. YORKTOWN* along with *U.S.S. ALYWIN* and *PHELPS*, and *U.S.S. PORTLAND, ASTORIA* and *CHESTER*. Due to this separation and to the erratic avoiding action taken by the carriers, an effective screen was maintained with difficulty. Repeated attacks were made on both carriers by both torpedo planes and dive bombers. Fire by both anti-aircraft and automatic weapons was heavy though erratic and several planes were observed to be shot down.

Unequal screen for carriers and screen not stationed for giving best defense to carriers.

With LEXINGTON: 2 CA, 3 DD
With YORKTOWN : 3 CA, 4 DD

While some planes undoubtedly were shot down during the attack it is felt that the fire was relatively ineffective.

Lack of AA doctrine for screening vessels for defense of carrier.

The anti-aircraft fire by the various 5" batteries was erratic and uncoordinated; that of the automatic weapons, particularly 20mm., was frequently directed at targets far beyond effective range; fire of all batteries was often directed at planes that had finished their attack when other targets, still attacking, were available. Since similar shortcomings have been reported before by other forces, it is assumed that the fact that this was the first air attack for a large part of the task force, it may be an explanation and that improvement in the effectiveness of the fire may be expected in later attacks. While improvement in fire discipline may be expected, it is felt that effective fire in defense of the screened vessel cannot be anticipated from 5" batteries against torpedo and dive bomber planes until there is a considerable change in the doctrine. Some arrangement must be made for controlled, coordinated fire of screening ships' anti-aircraft batteries against dive bombing and torpedo attacks pushed home with determination against the vessel screened if an effective defense is to be achieved. Uncoordinated fire results in confusion of bursts, targets not engaged at all, and danger to own ships from duds and fragments.

An analysis of radar information times indicates a lag or "dead time" of approximately 5 to 7 minutes from the radar plot on the radar guard ship to receipt by Sky Control, although all radar information received was very accurate and was transmitted promptly. The lag or "dead time," must be taken into account by the Sky Control officer. An FC radar will offset this error.

COMMUNICATIONS

The communication officer exercised communication control from Air Plot, maintaining communication with the captain via battle telephone, messenger, and "Talk-Back" between Air Plot and pilot house. This

departure from the standard system of having the communication officer with the captain is made because it is felt that by having the communication officer in Air Plot, in direct supervision of the vital aircraft circuits, he is in a better position to see the development of the air tactical situation and to maintain intelligent control over all external communications than he could be if he were in the pilot house.

This method is worthy of consideration by individual ships.

The following circuits were manned throughout the day:

(a) Task Group Commanders' Circuit.
(b) Task Unit Commanders' Circuit.
(c) Warning Net.
(d) *YORKTOWN* Air Group Search and Attack Circuits.
(e) *LEXINGTON* Air Group Search and Attack Circuits.
(f) Combat Patrol (Fighter Director) Circuits.
(g) TBS (75.5 Mc.) Circuit.
(h) Primary and high frequency FOX Schedules.
(i) Wellington - Suva intercept.
(j) Two circuits on Allied shore-based aircraft.
(k) Several circuits on enemy intercepts.

All our own aircraft circuits were controlled from Air Plot and were backed up by additional operators in Main Radio. The warning net was manned in Air Plot and had loudspeaker outlets to the pilot house and the signal bridge. The TBS super-frequency circuit was manned in Flag Plot and in the signal shelter, and had a receiver manned in Air Plot (Radar Plot.)

To provide emergency communications with aircraft, two aircraft transmitters and receivers, powered from storage batteries, were set up; one in Air Plot and the other in the ex-direction finder station aft on the port side.

Fighter Director should be accomplished by super-frequency radio until the actual engagement begins. The appearance of a bandit on the radar screen in enemy waters does not necessarily mean that own force has been reported. To open up on the high frequency radio band normally employed, and direct the interceptions, is tantamount to reporting the location of own force. The following solution is offered as a stop-gap:

(a) Equip all carriers with YOKE GEORGE transmitters (in addition to YOKE EASY already installed.) Voice modulate the YOKE GEORGE and use same for fighter direction until the engagement begins. Even with sector broadcasting, it is believed that interception of the few preliminary contacts might be made without sacrifice of radio security.

(b) TBS intercommunication is mandatory for all ships of the force. For carrier installations the fighter director officer should have a remote control outlet, transmitter and receiver in order that radar information to and from other ships might be quickly handled.

This ship has found that some sure method of communications with the Combat Air Patrol is essential. At present the only method is to break radio silence, which has the grave disadvantage of giving the Japs an opportunity to obtain RDF bearings. When in dangerous waters, where enemy aircraft are present, this risk has to be taken in order to avoid being shadowed or attacked. It is strongly recommended that VF planes be equipped with a short range super-frequency radio set, so that the Fighter Director can feel free to direct the Combat Air Patrol to investigate "bogies" etc., without breaking radio silence on the regular circuit.

The necessity of having planes equipped with BI-ABA or ABD equipment was clearly brought out in this operation, the Combat Air Patrol was continually being "vectored" out to investigate unidentified planes of which over 90% turned out to be friendly. If the BI-ABA transmitter on the *YORKTOWN* functioned, it would have been unnecessary to send the CAP out, as the planes would have identified themselves on the screen. Unfortunately, the BI-ABA equipment has never functioned satisfactorily on this ship due to improper and hasty original installation of the BI transmitter and the unavailability of spare parts, that might have permitted the ship's force to put it in workable condition. It is considered that the installation of ABD equipment or the repair of the present BI-ABA equipment is of the utmost importance, and it is recommended that immediate action be taken to rectify this condition.

RADAR

The makeshift Radar Plot in this vessel, wherein all functions of Radar Plot are attempted to be accomplished in a corner of Air Plot, again showed itself, during the air attack on May 8, to be woefully inadequate to enable complete use to be made of all the information which the combined radars of own and other ships are capable of furnishing, or even to use with full effectiveness information which can be furnished by this vessel's one radar.

Properly designed Radar Plot is absolutely essential. This project is well in hand for new construction.

In order that Radar Plot may properly perform its function it must:

(a) Be, in itself, a complete unit.

(b) Have sufficient room to allow the Fighter Director and his plotting and communication assistants to perform their functions without mutual interference.

(c) Be so isolated as to be relatively free from spectator interference and from noise interference from other activities. Both spectator and noise interference are unacceptably great with radar installed in a corner of Air Plot.

(d) Have its own radio communications, capable of transmitting or receiving on any aircraft circuit, and on a superfrequency circuit with other search radar equipped vessels and with other Fighter Directors.

(e) Be provided with interior communication channels connecting to signal bridge, lookouts, flag, and important ship and fire-control stations.

(f) Be contiguous to Air Plot and should have means for actual physical, conversational communications with Air Plot.

(g) Be provided with plotting facilities sufficient to allow two simultaneous radar plots to be run: one search plot, and a Fighter Director (tracking) Plot.

(h) Have sufficient blackboard and extra chartboard space to allow a complete picture to be maintained of the situation of our own aircraft and of the general and immediate tactical situation.

It must be recognized that the importance of Radar Plot in carriers is comparable to that of the plotting room in battleships.

The importance of our fighter director organization cannot be overemphasized. The value of our combat patrols is in direct proportion to the efficiency of our fighter directors. Normally, fighter director should be maintained in one carrier; however, since carriers will always bear the brunt of air attack, other radar equipped ships must be trained and ready to take over. Fighter director is useless without communications - radio silence must be broken on the fighter net frequency when attack is expected. Distribution of aircraft radar recognition equipment should be continued with highest priority.

This operation again demonstrated the value of carriers operating in pairs for mutual support.

When action is imminent it is advantageous, if the tactical situation permits to have the base course into the wind. With two carriers operating in company and the necessity for turns into the wind any other course will result in little net gain. Screening vessels should be definitely assigned to each carrier, so that in case they get separated during attack due to maneuvers or air operations they would each have their own screen.

The two enemy carriers in the battle May 8, were superior to us in number of fighters, number of torpedo planes, performance of fighters, and performance of torpedo planes. They were also favored by the weather on May 8. Our aircraft personnel were superior in quality and skill. Our AA fire is superior to the Japanese as evidenced by number of planes shot down in attacks. Otherwise, the two air forces were about equal.

DEFENSE OF CARRIER TASK FORCE

The following comments were made by various ships and commanders:

It was recommended in several reports that the "V" disposition be a tighter one, cruisers and destroyers taking station on a 1,500 to 2,500 yard circle around the carrier. The outboard guns thus protect against low approaching torpedo planes, while at the same time the inboard guns lay an anti-aircraft umbrella over the carrier and the disposition as a whole. This seems an excellent plan. It will be noted that this anti-aircraft disposition is at complete variance with observed Japanese tactics. Their cruisers and destroyers screening a carrier dispersed widely, with no coordinated anti-aircraft fire for themselves or the carrier.

With circle spacing of 1,000 yards, cruisers should be placed on circle 2 instead of 3. The *NEW ORLEANS* was generally ahead of the carrier during this engagement. Although, in approximate position just prior to the attack, due to the carrier slowing down to launch planes with inadequate notice and then turning to avoid torpedoes without signal shortly after the attack, this vessel found herself approximately 4,300 yards away from the carrier at the time the dive bombers commenced their attack. This was too far away to render effective assistance with anti-aircraft fire.

Another ship stated:

We appeared to be too far from the carrier to give her very much protection.

The handling of *ASTORIA*, *PORTLAND* and *CHESTER* was excellent throughout the engagement. At no time did any of these vessels vary appreciably from their assigned stations in formation. The fact that the *YORKTOWN* received only one direct bomb and no torpedo hits is attributed in large measure to the brilliant maneuvering by her commanding officer.

It should be noted that YORKTOWN had 3 CA and 4 DD in her screen. LEXINGTON had only 2 CA and 3 DD.

The most effective protection from this form of attack (D/B and T/B), in so far as the stationing of ships is concerned, is an all around screen of cruisers and destroyers at 2,000 to 2,500 yards. Depending upon number of ships available this screen should be as dense as possible but not closer than 30° between ships. Additional destroyers if available should form a screen on 4,000 yard circle at 30° intervals evenly distributed relative to axis. The above stationing should provide maximum protection without restricting maneuvering of either the carrier or each other.

There seems to be no question on this point. The inclusion of an AA light cruiser of the SAN JUAN class will strengthen the screen as well as the inclusion of a new fast battleship. This has been proven in later operations.

Carriers must if at all feasible give notification of turns if AA and anti-submarine protection by light forces is to be expected.

Inboard batteries of cruiser 5" AA guns should by doctrine place fixed umbrella barrage over the carrier at 10,000-12,000 feet, each ship taking that portion of the barrage corresponding to its assigned station. Destroyers on lee side of attack should augment this barrage when practicable.

The cruiser gunnery doctrine provides for locally controlled barrages against torpedo planes, strafing planes, and dive bombers that attack own ship, and for director-controlled fire where usable, as in the case of high altitude bombing attack. It does not provide for protection of a carrier by fire from units of a screening force. In the subject engagement, the inboard 5"/25 caliber batteries of the cruisers could not use director-controlled fire on the types of attack being delivered; and the various individual barrages noted in this action were wholly ineffective. It is suggested that a doctrine should be developed for employment of 5"/25 caliber batteries of screening vessels that would provide more adequate protection for the vessel screened. A director-controlled barrage just below the anticipated or observed altitude of the start of the dive, and placed just beyond the carrier in assigned sectors, could be provided by the inboard batteries of the screen, and would afford considerable protection against dive bombing attack on the screened vessel.

Defense of own ship, while employed in a protective screen for a carrier should be a secondary consideration when the attack is primarily against the carrier, main reliance being placed on the short range weapons while the 5"/25 caliber battery is being employed in defense of the carrier.

SHIP AND AIR GROUP NOTES

Flexibility of handling returning planes, with the object of launching repeated attacks rapidly would be increased if a doctrine for diverting planes from one carrier to another for reservicing should be placed in effect. This would be particularly valuable where one of two carriers operating together is damaged. A further feature could include a signal for all damaged planes to land on one carrier and serviceable planes on another.

Consideration should be given to the value of two carriers operating in mutual support of each other.

FIGHTER DIRECTION

It is believed that fighters should be vectored out at least 30 miles to meet the enemy, and if no radar altitude reading is available, and the day be clear with unlimited ceiling, they should be sent out at about 20,000 feet.

Do not concur in the 20,000 foot altitude for VF's going out. Consider a better way of expressing this would be to send out the fighters at such an altitude as to ensure an initial altitude advantage.

The fighters making the first contact must broadcast immediately the enemy's altitude and the composition of his force. It is imperative that all fighter pilots be indoctrinated to report contacts with enemy planes before attacking; this is of the utmost importance if the enemy group is large.

TORPEDO PLANES - TACTICS

In the recent engagements the Japanese screen has scattered instead of closing in to support the ship being attacked. This is, however, no indication that their screen will not close in on future attacks. Closing in tactics would be an excellent counter to our system of attack. Due to the slow speed and low altitude of drop required for the Mk. 13 torpedoes, our planes are forced to come in low and slow. In the event that the Japanese change their system and put a heavy cordon of ships around their large vessels, it is doubtful that a successful torpedo attack could be launched by TBD's without the loss of the major part of the squadron.

All TBD's have been replaced by TBF's which WILL permit a glide attack even though it will be necessary to slow down FOR THE ACTUAL DROP. Whether it is possible to continue the dive bombing attack throughout the torpedo attack is difficult to say but the point to be stressed is that the VT attack must NOT precede the dive bombing attack.

In order to inflict a maximum damage on a maneuvering ship it is essential that the torpedo and dive bombing attacks be coordinated so that the dive bombing attack starts just before and continues through the torpedo attack. This has the following advantages:

(a) It provides mutual support and forces the enemy to divide his fire.

(b) The spray and smoke from close misses will partially obscure the torpedo planes from the target, and the concussion will reduce the accuracy of the AA fire.

SHIPS AGAINST DIVE BOMBING AND TORPEDO ATTACKS

As soon as the Japanese sighted the attack, the ships scattered, in fact it looked like they were trying to get as far away from their own carrier as possible. It is believed, however, that they depend more on the maneuverability of their ships, to avoid being hit, than on the effectiveness of a concentrated AA fire to repel an attack. The ships, when attacked, maneuver violently, at high speed. The CV, sunk in this engagement, must not have been expecting a second attack so quickly, and turned into the wind to launch planes just as our attack commenced. This gave our dive bombers and torpedo planes a perfect target headed into the wind and on a steady course. This engagement clearly indicates that it is extremely dangerous for a CV to attempt to launch planes while being attacked. Such a situation must be accepted, and the ship maneuvered to avoid the attack, rather than to launch planes to repel it.

Value of hitting same ship repeatedly.

Danger of operating planes from carriers during air attack.

Sharp and radical maneuvers after planes have commenced dive is absolutely necessary.

It is apparent that the enemy uses land-based aircraft (four-engine patrol seaplanes) for the majority of his scouting. Based on information available on May 8, 1942, our force is believed to have been located by a four-engine VP who sent MO's until shot down. No other contacts are known to have been sent.

Advantage of shore-based scouting planes.

The enemy attack group appeared on the radar screen at a distance of 68 miles and came directly on without changing course or use of evasive tactics of any sort. The group flew in a stack formation consisting of VT, VF, VB and VF, at an altitude between 11,000 to 15,000 feet. The VT group with their VF commenced their high speed glide approach from about 10 miles, the VB continuing on at altitude. The VT attack was completed before the dive bombers commenced their attack. Torpedoes were dropped at high speed (estimated 200 knots) after breaking a 30° glide at varying altitudes of from 150 to 350 feet or higher. Range at dropping 700 to 1,000 yards.

All dive bombers came in from up-sun, and released at extremely low altitudes of from 1,000 to 500 feet. The ship at this time was maneuvering with the wind on the port bow. It is possible that the bombers used, as a point of aim, either the bridge or the anti-aircraft control director, since four bombs passed within a few feet of that point and exploded just clear of the ship in the water to starboard. All dives were noted to be relatively shallow, angles varying from 50° to 60°.

SUMMARY OF BATTLE LESSONS

The more important lessons from the engagement and comments concerning them are summarized in this paragraph for ready reference:

(a) Proficiency of both aviation and gunnery personnel drops off badly in war because of training difficulty. Not only must task force commanders increase training but shore training must be broadly expanded.

(b) Fogging of sights and windshields seriously affect accuracy of dive bombing. Early correction of this defect is urgent.

(c) Insufficient fighters prevent suitable protection of either our attacking squadrons or ships of the task force. Carrier allowance has been increased from 18 to 36 VF.

(d) Obsolescent torpedo planes reduce effectiveness of our VT squadrons. These have been replaced by a later type.

(e) Torpedo plane attacks are most effective when closely coordinated with dive bombing attacks. Much of the success in the Coral Sea lay in this coordination.

(f) Automatic weapons urgently require the directors and lead computing sights under manufacture, in order to be able to shoot down planes *before* they release their missiles.

(g) All carriers must have 2 long range radars equal in effectiveness to the CXAM.

(h) Operations of land based aircraft and fleet units must be better coordinated by intensive combined training.

(i) Aircraft bombs and torpedoes must be made more effective. Too many hits were required to destroy an enemy carrier. Larger aircraft torpedo warheads should be given priority in shipment to this area. A more suitable bomb than the present 1,000-pound type is necessary for our dive bombers. Action to correct both these deficiencies is now in progress.

(j) The brunt of our offensive effort is now being carried by our aviation personnel in a courageous and devoted manner. Full provision must be made for replacement units in order that plane crews may not be pushed beyond reasonable endurance.

(k) Means must be provided for reducing the menace to carriers of the large quantities of gasoline carried.

(l) Screening ships provide best protection for carriers against torpedo planes when stationed on a 1,500 to 2,500 yard circle. Such a disposition is now being used in this fleet.

CHAPTER VIII

BATTLE OF MIDWAY

3-8 JUNE, 1942

The Commander in Chief, Pacific Fleet, summed up the Battle of Midway as follows:

(Slight changes have been made in the text where later information indicated the necessity therefor.)

PRELIMINARY OPERATIONS

After the Battle of the Coral Sea it became evident that Japan was concentrating her fleet for movements of major importance against the Aleutians and Midway. Later indications were that the Midway expedition was a powerful fleet composed of a STRIKING FORCE, SUPPORT FORCE, and OCCUPATION FORCE. An estimate of the composition of this fleet, since largely verified by reports of the battle, was:

STRIKING FORCE	SUPPORT FORCE	OCCUPATION FORCE
CinC 1st Air Fleet (F)	Crudiv 7	1 *TAKAO* Class CA
	MOGAMI (F)	1-2 *MYOKO* Class CA(?)
Cardiv 1	*MIKUMA*	
AKAGI (F)	*SUZUYA*	Airon 7
KAGA	*KUMANO*	*CHITOSE*
		CHIYODA
Cardiv 2	Cardiv ---	
SORYU (F)	1 CV or XCV	Airon 11(?)
HIRYU		2-4 *KAMIGAWA* Class XAV
	Batdiv 3, 2nd Sect.	
Desron 10	*HIYEI*	Transdivs ?
NAGARA (F)	*KONGO*	8-12 AP
12 DD		
	Crudiv 4 Part	Transdivs
Batdiv 3	1 *ATAGO* Class CA	4-6 AK
HARUNA (F)		
KIRISHIMA	Desron 2 Part	Desron 4
	JINTSU (F)	12 DDs
Crudiv 8	10 DD	
TONE (F)		
CHIKUMA		

In addition, the plan was believed to provide for approximately 16 SS to be on reconnaissance and scouting mission in the Mid-Pacific - Hawaiian Islands Area.

The status of the important Pacific Fleet forces at the time the afore-mentioned threats developed was as follows:

(a) Task Force 17 had fought the battle of the Coral Sea from 4 to 8 May and was still in the South Pacific. The *LEXINGTON* had been sunk and the *YORKTOWN* damaged to an extent which might require a considerable period of repair - possibly even a trip to a West Coast Navy Yard. The remainders of the air groups of these two carriers were on the *YORKTOWN* urgently requiring reorganization and rest. This force had been continuously at sea since February 16.

(b) Task Force 16 (*ENTERPRISE* and *HORNET* with supporting cruisers and destroyers) was in the South Pacific, having arrived just too late for the Coral Sea action. It had been sighted recently, however, by an enemy reconnaissance plane and thus probably prevented an enemy occupation of Ocean and Nauru Islands.

(c) Task Force 1 (containing battleships and a small destroyer screen) was on the West Coast.

It was evident, if estimates of the enemy's strength and intentions were true, that the situation was most serious. Midway itself could support an air force only about the size of a carrier group; our carriers were far away; and perhaps only two would be fit to fight. Task Force 17 had already been recalled for repair and replenishment. Task Force 16 was immediately ordered north. At the same time a new force, Eight, was formed out of all cruisers within reach (five), and all destroyers available (four), and sent to Alaskan waters to assist the Sea Frontier Forces which were being assembled in that Area.

Midway was meanwhile given all the strengthening that it could take. Long range Navy and Army aircraft, though necessarily difficult to protect on the ground and water, were moved in. It was considered most important that the enemy be discovered at a distance and promptly attacked. To provide essential close-in air striking power, the Marine Air Group was increased to approximately 30 fighters and 30 dive bombers supported by six Navy new TBF torpedo planes and four Army B-26's fitted for dropping torpedoes. Many of these planes arrived just before the engagement. Despite a heavy inflow of planes from the mainland to Oahu and from there to Midway, the available numbers were never large enough to give a comfortable margin for losses. So critical, in fact, was this condition that after the first morning attacks at and off Midway the dive bombers, fighters and torpedo planes stationed there were nearly wiped out. Replacements of these types on Oahu were scanty and could not be got to Midway for the remainder of the battle.

Midway's ground defenses were strengthened by the emplacement of new batteries, completion of underwater obstacles, laying of mines, etc. Additional Marine forces were moved in, including a part of the 2nd Raider Battalion with special equipment for meeting a mechanized landing assault. Other reinforcement included motor torpedo boats and YP's.

Thirteen submarines were stationed on the 200 and 150 mile circles covering the western and northern approaches to Midway. A few

submarines were placed in support on the 800 mile circle northwest of Oahu, and the last ones to become available on the 100 mile circle from that place. All submarines which could reach the Oahu-Midway area were employed and the consequent cessation of their offensive patrols accepted.

Daily searches from Midway to distance of 700 miles generally through bearings 200° to 020° to westward were made as sufficient planes became available to accomplish this. From May 30th this coverage was maintained except in generally northwesterly direction where low visibility prevented search to maximum distance.

Full consideration was given to employment of Task Force One in the defense of Midway. It was not moved out because of the undesirability of diverting to its screen any units which could add to our long range striking power against the enemy carriers. Events proved that every air unit which was employed could have ill been spared from the purpose for which it was used, even though the results were far beyond the expectations of most.

It is unfortunate that complete control of the air could not have been foreseen and a fast surface striking force retained to mop up after the enemy air power had been eliminated.

As our air forces increase in strength relative to the enemy, and surface screening forces become available to permit a balanced force, the application of battleships' striking power will become practicable.

The Commander in Chief, United States Fleet estimated that the enemy's plans included an attempt to trap a large part of our Fleet. He directed that strong attrition tactics, only, be employed and that our carriers and cruisers not be unduly risked. The whole situation was a most difficult one requiring the most delicate timing on the part of our carriers if they could reach supporting stations in time. It so happened that they did. Task Force 16 arrived at Pearl Harbor on 26 May and departed on the 28th under command of Rear Admiral R.A. Spruance, U.S.N., as Task Force Commander, with Rear Admiral T.C. Kinkaid in Command of Cruiser Group, and Captain A.R. Early in command of the destroyers. Task Force 17 reached here on the 27th and sailed on the 30th, under Command of Rear Admiral F.J. Fletcher as Task Force Commander with Rear Admiral W.W. Smith in command of the Cruiser Group, and Captain G.C. Hoover in command of the destroyers. It was found, most fortunately, that the *YORKTOWN* and her aircraft could be placed in reasonable fighting condition in three days. Excellent work by the Navy Yard, the Service Force and all supporting services at Pearl Harbor made possible these prompt sailings.

Task Forces 16 and 17 joined at assigned rendezvous northeast of Midway on 2 June, having previously refueled at sea. In compliance with his directive, Rear Admiral Fletcher, Commander Task Force 17, then moved the combined forces to an area of operations north of Midway.

Broad tactical direction of all the forces in the Midway Area was retained by the Commander in Chief Pacific Fleet.

A closer tactical direction might have been better, provided communication could have been relied on.

THE BATTLE

3 JUNE

The enemy Occupation Force and perhaps part of the Support Force was picked up in several contacts west of Midway on the 3rd, as shown on plot of battle. The first contact was at about 0900 when a large number of ships (later reported as 11) were sighted by a Navy patrol plane, bearings 261° distant 700 miles from Midway, reported course 090, speed 10.

There were several smaller groups of ships, indicating that the escort group for the occupation force and the various ships of this force were converging on a rendezvous for the final advance on Midway.

Unfortunately continuous shadowing had not been provided for.

About 1623, striking unit of 9 B-17's with four 600 lb. demolition bombs each, contacted and attacked the large group. They reported the force now consisted of 5 BB or CA and about 40 other ships - DD, AP, AK, etc. The course made good since the morning contact was about 081°, the bearing of Midway. Distance was then about 570 miles from Midway. Two ships, a CA or BB and an AP or AK were reported hit and injured severely so that they fell out of column and sent up "huge clouds of black smoke which mushroomed above them."

High altitude bombing on moving targets at sea is not particularly effective. Could not the B-17's have been used to better advantage shadowing with experienced Naval observers on board? Diaries of Japanese on board this part of the Jap force indicate that no ship larger than a CL was present, and that there were no bomb bits or damage from this attack.

Value of long range patrol planes for scouting B-17's should be used where practicable for contact scouting rather than PBY's which are very vulnerable to enemy fighters.

This was the only attack of the day, though at its close 4 PBY's armed with torpedoes were en route to attack. Estimated results are:

No damage to enemy.

Feasibility of long range night attacks against ship targets at sea. With radar equipped planes, this should be exploited.

4 JUNE

Attacks on the Japanese fleet began early this day and continued in force until nearly noon, with other attacks before sunset. Between 0130 and 0200 the 4 PBY's found and 3 attacked probably the same force as the B-17's had sighted; 10 or more big ships in 2 columns with 6 DD were observed. There were indications of another large group nearby. Bearing was still about 261° from Midway, distance reported about 500 miles, though part of the enemy force was closer. Two of the planes were able to press home attacks unobserved. One plane machine gunned a transport with good result. This night attack by Catalinas was a daring and historical feat, even though the exact damage is unknown.

The Japanese Main Striking Force assumed to have 4 carriers was not sighted on the third. These ships were apparently riding a weather front bearing down on Midway from the northwest. One carrier had been reported among the ships west of Midway, but this contact was not verified. It is possible that the Japanese had five carriers off Midway and that the fifth one moved from the west to the northwest for the engagements of the fourth of June, but there is no clear evidence yet to bear this out.

Emphasizes value of meteorological information.

Before dawn on 4 June PBY's took off from Midway continuing their invaluable scouting that contributed so greatly to the success of the action. Sixteen B-17's were despatched by Commanding Officer, Midway, to attack the enemy transport force to the westward. At 0545 the most important contact of the battle was made. A PBY reported many planes heading for Midway 150 miles distant on bearing 320; 7 minutes later another PBY sighted 2 of the enemy carriers and many other ships on the bearing, distant 180 miles, coming in at 25 knots on course 135.

With the shore-based B-17's and PBY's it should have been possible to have located all enemy forces and maintained continuous shadowing of all forces sighted making frequent contact reports to shore and to the Carrier Task Forces so these activities might send out attack groups directly with no loss of striking power due to searches. This would have necessitated a coordinating authority ashore. Unfortunately, our war technique was not developed to that degree.

All serviceable planes at Midway were in the air before 0600 (except for 3 SB2U spares); 6 Navy TBF and 4 Army B-26 armed with torpedoes, and 27 Marine dive bombers were despatched to strike the enemy carriers. The B-17's proceeding westward were also diverted to the carriers. Midway radar picked up the enemy planes and, at 0615, 14 of the 27 fighter planes available made contact 30 miles distant with 60 to 80

dive bombers (possibly a few of these were twin-engined horizontal bombers) and about 50 fighters. Severe fighting continued as long as our fighters were in the air, which was not long for most of them against these odds, accentuated by the poor maneuverability of these planes. Of the 27 fighters available, 15 were lost and 7 severely damaged. Statements from 9 of the 11 surviving pilots show that they shot down a total of 3 Japanese Zero fighters and 8 Aichi Type 99 dive bombers. Survivors believe the total number destroyed by all the fighter planes was probably 8 zero fighters and 25 dive bombers.

Value of Radar and the importance of getting planes in the air and on missions prior to enemy attack.

The first bomb hit Midway at about 0633 from horizontal bombers. Dive bombing and strafing continued for about 17 minutes. Considerable damage was done to nearly all structures above ground, the most serious at the time being the destruction of the power plant on Eastern Island. Little damage was done to the runways, the Japanese apparently leaving these intact for their own anticipated use. The anti-aircraft batteries shot well, downing 10 planes and, with the fighters, damaging many more, so that our returning airplanes reported "large numbers of enemy planes down on the water and falling out of formation."

This illustrates the effect that can be expected when heavy concentrated attacks are made on isolated ports such as Midway. Had our carriers not been at hand and had the Japanese been able to follow up air attack on Midway with assault, Midway would have been in a very perilous position. This indicates the feasibility of attacks on comparatively strong island outposts when made in sufficient assault strength following effective air attacks and covered by effective air support.

Absolutely necessary to put all essential services under ground.

The B-26's found their targets, 2 CV, about 0710 and made a most gallant attack. This is likewise another historical event, and, it is hoped, one soon to be repeated under better conditions - our Army's first attack with torpedo planes. Heavy fighter concentrations were encountered; 2 of the 4 planes did not return; one was shot down before launching his torpedo, and possibly the other, though it is said to have attacked and in pulling out touched the flight deck of the target before crashing into the sea. Both of the 2 planes that did return were so badly shot up by the terrific fighter and AA fire encountered that they were unserviceable. Survivors had no time to observe results but approaches were such that it is believed probable that one torpedo hit.

The absolute necessity for fighter support of torpedo plane attack demonstrated. Also the comparative ineffectiveness of small attack groups. Air attacks should be concentrated to the maximum possible in order to cause the enemy AA fire to be least effective due to multiplicity of targets and to comparative confusion and thus to permit the greatest number of planes to get their attacks home.

The TBF's made a similarly gallant attack almost simultaneously with the B-26's and against an equally determined and overwhelming number of fighters. At least 2 of them were shot down before they could launch torpedoes. Only one badly shot-up plane returned. The pilot could not tell what happened to the remainder of his unit or how the attack fared. A B-17, on reconnaissance, reports seeing one of the planes make a hit. Although the TBF is a well armed plane, it is obvious that it cannot go through fighter opposition without fighter protection.

Value of concentrating fighters against torpedo planes.

At 0755 a group of 16 Marine dive bombers, under Major L.R. Henderson, U.S.M.C., made a gallant glide bombing attack on one of the carriers in the Striking Force. The planes had been received too recently for training in dive bombing, so the Commander chose this less effective and more hazardous method of attack because it permitted lower pull-outs. His and 7 other planes were shot down by overwhelming fighter opposition. The 8 planes that did return were badly shot-up, one having 210 holes. The target, probably the *SORYU*, was hit 3 times and left afire.

No attempt apparently was made to have the Army B-26 and Navy TBF units join the Marine dive bombers in one concentrated attack, though all were flown off Midway at about the same time. Experience indicates that the enemy would have suffered more and our planes less had those four groups of planes attacked together.

This incident emphasized too well the absolute necessity for close coordination of air attacks. This should have been done but apparently no time had been available for careful study and thought.

Soon afterward, at about 0820, the 11 SB2U Marine bombers from Midway made a glide bombing attack on a battleship, likewise against heavy fighter attack. Two hits are reported. When last seen the battleship was smoking and listed.

The B-17 unit of 16 planes , under the Commanding Officer of the 431st Bombardment Squadron, Lt. Col. W.C. Sweeney, U.S.A., who led each flight he made in an outstanding manner , was directed to change its objective from the Transport Force to the carriers. Promptly and with skillful navigation the planes proceeded, picked up the enemy fleet on bearing 320° about 145 miles from Midway, and at 0814 began attacking from 20,000 feet, each plane carrying 8 500-pound demolition bombs. Results were reported as a total of 3 hits on the carriers present, possibly 2 carriers hit with heavy smoke from one; carriers still maneuvering and operating normally. Since only one carrier was reported smoking, this was probably the same one, *SORYU*, the Marine dive bombers had set afire a few minutes earlier with 3 hits.

Bombs are damaging but torpedo damage is more suitable for sinking ships.

The comparative ineffectiveness of high level bombing against freely maneuvering surface vessels.

The Midway Forces had struck with full strength, but the Japanese were not as yet checked. About 10 ships had been reported damaged, of which 1 or 2 AP or Ak may have sunk. But this was hardly an impression on the great force of about 80 ships converging on Midway. Most of Midway's fighters, torpedo planes and dive bombers - the only types capable of making a high percentage of hits on ships - were gone, and 3 of the Japanese carriers were still either undamaged or insufficiently so to hamper operations.

This was the situation when our carrier attack began. Task Force 16 and 17, ready about 200 miles to the northeast of the Japanese carriers, had intercepted the fist contact reports by the Midway scouts. At about 0700 launching commenced of the following attack groups, *YORKTOWN*'s being temporarily held in reserve until her scouts returned (majority of fighters retained for combat patrol):

HORNET - 35 VSB, 15 VTB, 10 VF
ENTERPRISE - 35 VSB, 14 VTB, 10 VF

(Bombers carrying one 1,000-lb., or one 500-lb., or one 500- and two 100-lb. bombs.)

These two groups proceeded independently to attack.

Coordination between carrier task forces, land-based aircraft, submarines and surface forces in the combat zone should be centered in a supreme tactical command ashore if maximum results in offensive operations are to be achieved. This would, to a limited extent, eliminate carrier search and thus strengthen carrier striking force. This, of course, is predicated on reliable communications and efficient shore-based search and shadowing. The Japs appear to have it.

Dive bombers proceeded at a high altitude with the torpedo planes at about 1,500 feet below the cloud base. Fighters failed to accompany the torpedo planes. *HORNET*'s accompanied dive bombers expecting to provide protection for bombers and torpedo planes over enemy fleet. Torpedo planes proceeded separately and contact was lost with them. *ENTERPRISE*'s fighters likewise operated at a high altitude expecting fighters there and were not able to reach torpedo planes in time to assist. Lack of fighter support, visibility conditions, distance of attack, delay in locating the Japanese force, and Japanese tactics of concentrating fighters on torpedo planes all combined to prevent coordination of bombing and torpedo attacks, with resultant heavy loss of torpedo planes.

Sometime after 0830, when the last attack that morning by Midway planes was completed, the Japanese Striking Force commenced retirement to the north or northwest. Consequently it was not found in the estimated position by our carrier attack groups. *HORNET* Group Commander made the decision to turn south, to search along the enemy's reported track, and failed to make contact. All 10 of the fighters were forced down for lack of gas and lost at sea, though 8 of the pilots have been recovered. All but 2 of the dive bombers eventually got back to the *HORNET* (11 via Midway) without attacking.

Throughout the period June 4th to 6th it can be noted that the striking force and remnants of that force apparently made radical changes of course on each occasion when it was known that this force had been contacted.

Importance of contact scouting.

The *ENTERPRISE* Group Commander, proceeding separately decided to turn north to search, estimating that enemy must have reversed course. This was one of the most important decisions of the battle and one that had decisive results. Soon after 1000 he made contact and prepared to attack.

Meanwhile the *HORNET*'s torpedo squadron led by Lt. Comdr. J.C. Waldron had found the enemy and without hesitation at about 0920 conducted a most gallant and heroic attack entirely unsupported. They were met by overwhelming fighter opposition about 8 miles from the 3 carriers they attacked, and followed all the way in, being shot down one by one. The remnant drove in their attack to close range. Voice intercepts indicate that they shot down some Japanese fighters and made some hits.

Not a plane survived this magnificent devotion to purpose. One pilot, after attacking and probably hitting the *KAGA* at close range, with his gunner already killed, crashed near the *AKAGI*, ducked under his seat

cushion to prevent being machine-gunned, and from this reserved position observed the fierce attacks that followed.

YORKTOWN and *ENTERPRISE* torpedo squadrons led respectively by Lt. Comdr. L. E. Massey, U.S.N. and Lt. Comdr. E.E. Lindsey, U.S.N. attacked later with equal courage and determination, and similar crushing losses. Both are believed to have made hits, but both were almost completely destroyed, *ENTERPRISE* losing 10 out of 14 planes and *YORKTOWN* 10 out of 12. Despite the many difficulties, exact coordination with dive bombers was almost achieved, the torpedo planes launching their attack only a few minutes before the bombers. Even had they attacked later, in perfect coordination, without adequate fighter protection their losses would have been probably as great. Recognizing the torpedo plane for the menace it is, the Japanese concentrated most of their fighters and anti-aircraft fire on it. The result was that the VT squadrons were a sacrifice that enabled the dive bombers to make their attack almost unopposed, with disastrous results for the enemy.

At 0830 *YORKTOWN* commenced launching the following attack group, dive bombers being armed with 1,000-lb. bombs:

17 VSB 12 VT 6 VF

These proceeded with VT's at 15,000 feet, 2 VF at 2,500 feet, 4 VF at 5,000-6,000 feet and bombers at 16,000 feet. Contact was made at about the same time as by the *ENTERPRISE* planes and attack delivered almost simultaneously.

Repeated attacks in rapid succession are most effective and finds the enemy in a state of confusion.

When the *HORNET* torpedo squadron attacked, there were 4 carriers dispersed in a wide roughly circular formation. *AKAGI, KAGA* and *SORYU* were in the same general vicinity, probably having just landed planes. *SORYU* was smoking, showing signs of heavy damage, as was also a ship some distance away that resembled a battleship. The surviving *HORNET* VT pilot, Ensign Gay, U.S.N.R., had been in the water only a few minutes when the *ENTERPRISE* and *YORKTOWN* dive bombers struck hard and most effectively. Both *KAGA* and *AKAGI,* between which he lay, were hit repeatedly, the planes on deck that they sought to launch being ignited until the two ships burned fiercely from stem to stern. *SORYU* was also hit again and continued to burn.

The dive bombing attacks by both *ENTERPRISE* and *YORKTOWN* squadrons began at about the same time, between 1020 and 1025. Many hits were made on each carrier. Some pilots considering them destroyed attacked other ships. The following damage was inflicted:

3 carriers - *AKAGI, KAGA, SORYU* set afire and ultimately destroyed.
2 battleships - one 1,000-lb. hit each, one a mass of flames.
1 CL or DD - one 1,000-lb. hit, believed DD sunk.

Value of coordinated attacks from many directions.

All submarines were ordered to close on the enemy Striking Force but the only submarine attack of the day was by *NAUTILUS* which at 0710 sighted smoke from torpedo hits and anti-aircraft fire on bearing 331° True. As she approached a formation consisting of one battleship of the *ISE* class and one *JINTSU* class cruiser she was twice attacked by aircraft, once by strafing, once by bombs, and depth-charged by the *JINTSU* class cruiser. On again coming to the surface she found herself in contact with a large number of ships. An unsuccessful long range torpedo attack was made on the battleship which headed away. After repeated depth charge attacks on her she eventually reached position to fire torpedoes at a burning carrier of the *SORYU* class, obtaining three hits on the carrier which burst into flames throughout its length. The carrier soon after was abandoned by the cruisers that had been attempting to take it in tow when attacked by *NAUTILUS*. About 1840 *NAUTILUS* on hearing heavy explosions, came to periscope depth and saw nothing but heavy smoke from burning oil. On surfacing at 1941, no ships, smoke or flames were to be seen. The *GROUPER* in a similar situation was unable to get in to attack because of the enemy's intensive anti-submarine measures.

At 0815 Task Force 16 radar had picked up a twin float seaplane, 36 miles to the south, which probably reported our formation's position. During *YORKTOWN* and *ENTERPRISE* Group dive bombing attacks on the Japanese carriers, the *KAGA* and *AKAGI* tried to launch planes. They were probably at the time preparing to attack our carriers. The carrier *HIRYU*, according to survivors picked up on 18 June (4 officers and 31 men), at this time drew off to the northward undamaged. Soon afterwards a Japanese message was intercepted "inform us position enemy carriers."

Lacking complete information on the number and location of enemy carriers, at 1150 *YORKTOWN* launched scouts to search sectors 280°-030° to 200 miles. Immediately thereafter at 1152 *YORKTOWN*'s radar picked up many planes approaching from westward, distant 32 miles. These were later determined to be 18 dive bombers and 18 fighters. As one fire precaution *YORKTOWN* drained the gas system and introduced CO_2.

Lessons learned at Coral Sea Battle put to good advantage.

The Combat Air Patrol of 12 fighters located the enemy planes at about 9,000 feet altitude and attacked, shooting down 11 of the bombers. Out of the melee from time to time seven planes broke out and dived through heavy anti-aircraft fire. Of the first 3, one was caught by a 5" burst and disintegrated; the second dropped its bomb, which was a miss and plunged into the sea; the third was cut into fragments by automatic gun fire, but the bomb tumbling down exploded on the flight deck aft of the island and wiped out two 1.1 mount crews. At 1214 a hit in the uptake forced the *YORKTOWN* to stop, largely because boiler gases were drawn into firerooms making them uninhabitable. A third hit landed in the forward elevator well starting fires adjacent to the forward tanks of gasoline without igniting it.

At this time YORKTOWN had only 2 CA and 5 DD in her screen which is insufficient to give adequate AA defense.

At 1402 with all fires extinguished and temporary repairs to the uptake completed, *YORKTOWN* was able to go ahead. Her position then was Latitude 33° 51' N., Longitude 176° W., course 090°. Speed was gradually increased to 19 knots by the time of the next attack. *PENSACOLA, VINCENNES, BALCH,* and *BENHAM* had meanwhile joined from Task force 16.

Approaching aircraft were again picked up on various bearings, the largest group being on 340°, distant 25 miles at 1433. The total attacking force was 12 to 15 torpedo planes and 10 to 18 fighters. The fighter combat patrol shot down 4 to 7 of the planes. About eight of the torpedo planes came on into the fire of *YORKTOWN*'s screen which was so heavy that observers thought it incredible that any got through. Three were shot down. Fighters just launched by *YORKTOWN* went into the heavy anti-aircraft fire to attack the remaining five, which succeeded nevertheless in launching torpedoes. The last two, released at about 800 yards, at 1445 hit *YORKTOWN* amidships on the port side. All the torpedo planes were shot down. Three by fighter and ship fire before or as they passed the *YORKTOWN*, two as they attempted to pass through the heavy fire of the screen.

Success of the enemy here is probably due to lack of fighter direction experience and lack of indoctrination of screening vessels.

Within ten minutes after being hit, *YORKTOWN* was listed 20° to 25° to port. In another ten minutes personnel began abandoning ship. It seemed that the *YORKTOWN* might capsize, and that she certainly would should she be hit again. Another attack seemed imminent throughout the afternoon. Radar contacts of unidentified planes were frequent, three of which at different times turned out to be Japanese seaplanes. The ship, however, continued to float through the night, list remaining about constant.

YORKTOWN might have been saved if she had not been completely abandoned during the night but salvage work carried on.

Both attacks on *YORKTOWN* were made by the *HIRYU* planes. At 1430, just as the *HIRYU* torpedo planes were coming in radar range of *YORKTOWN*, one of the *YORKTOWN*'s scouts contacted the *HIRYU* with 2 BB, 3 CS and 4 DD in 31° 15' N., 179° 05' W., course north, speed 20. Task Force 16 launched an attack group of 16 dive bombers from *HORNET* and 24 from *ENTERPRISE* (14 of these being *YORKTOWN* planes) which beginning at 1705 for half an hour dived on the Japanese formation. Only 6-12 fighters were encountered, good evidence that Japanese plane losses had been very heavy in the day's fighting. Results of attack were:

CV *HIRYU*	Hit many times and aflame from bow to stern.
1 BB	Two 500- or 1,000-lb. bomb hits.
1 BB	Two 1,000- and one 500-lb. bomb hits.
1 CA	Two 500-lb. hits

With the destruction of the *HIRYU* our forces had won mastery of the air, although at the time it was not clear whether all carriers had been accounted for and whether or not more than four carriers were in the area.

This was an ideal situation for a fast powerful surface striking force to complete the destruction of the enemy. Shore-based search and shadowing would have been essential.

Between 1810 and 1830 twelve B-17's in several flights struck the last blow of 4 June. Of these, 6 planes, attacking directly out of Oahu, in order to conserve gas did not climb to the usual attack level but made runs at 3,600 feet. Each group was attacked by zero fighters. These may have come from the *HIRYU*. Since these attacks occurred about an hour after *HORNET* attack and four hours after the first attack on *YORKTOWN* by *HIRYU* planes was picked up by radar and since *HIRYU* was impossible as a reservicing base, these attacks on B-17's may have been made by *HIRYU* fighter protection launched prior to attack on *HIRYU* or by planes from a fifth carrier not yet located. Some of the flights report a large CV burning and 1 or 2 small CV; but the unit most experienced in operations over the sea reported only one carrier which was burning, and a burning BB or CA accompanied by a number of other ships. Three 500-lb. bomb hits are reported on the damaged CV, one on a BB (probably CA), one on a CA (smoking badly), and one on a DD (probably sunk). A patrol plane, in this vicinity until about 1800 , from a distance reported that a ship sank when hit by a salvo of bombs.

Experienced observers and continuous shadowing would have clarified the situation.

SUMMARY OF LOSSES REPORTED INFLICTED ON THE ENEMY ON 4 JUNE.

MIDWAY FORCES

TIME	ATTACKING UNIT	TYPE ATTACK	SHIP SUNK	SHIP DAMAGED
0130	4 PBY	Torpedo	----------	1 AP or Ak hit by machine gun fire
0710	4 B26 & 6 TBF	Torpedo	----------	2 CV (estimate 2 hits)
0755	16 VMB	Glide Bombing	----------	*SORYU* (CV) 3 hits
0820	11 VMB	Glide Bombing	----------	BB 2 hits
0814	16 B17	Horizontal High Altitude	----------	1 CV 1 hit *SORYU* (CV) 2 hits

Only 1 Carrier, *SORYU*, damaged enough to limit operations at this time.

CARRIER FORCES

0920	15 VTB (*HORNET*)	Torpedo	----------	*KAGA* (CV) 1 hit 1 CV 1 hit (estimated)
1020	26 VTB (*ENTERPRISE*) (*YORKTOWN*)	Torpedo	----------	1 CV 2 hits (estimated) 1 CV 1 hit (estimated)
1022	50 VSB (*ENTERPRISE*) (*YORKTOWN*)	Dive bombing	*AKAGI* - Hit many times, burning fiercely. *KAGA* - Hit many times, burning fiercely. *Soryu* - several hits. 1 BB 1,000-lb. hit, severe damage, mass of flames. 1 BB - 1-1,000 lb. hit. 1 CL or DD - 1-1,000 lb. hit; believed sunk.	

After these attacks 3 carriers out of action and later sank.

SUBMARINE

1359	*NAUTILUS*	Torpedo	*SORYU* - 3 hits; this ship sunk by Aircraft and Submarine.	

CARRIER FORCES

1705	40 VSB (*HORNET*) (*ENTERPRISE & YORKTOWN*)	Dive Bombing	*HIRYU* - Many hits, sank next morning. 1 BB - 2 hits 1 BB - 3 hits 1 CA - 2 hits	

After this attack 4 Japanese carriers were out of action.

MIDWAY FORCES

1810	12 B17	Horizontal Bombing	1 DD	*AKAGI* (CV) 3 hits 1 CA - 1 hit 1 CA - 1 hit, smoking.

5 JUNE

After attacking the *HIRYU*, Task Force 16 stood to the eastward and back to the westward during the night. Fighter attacks on B-17's before sunset indicated possibly a fifth Japanese carrier northwest of Midway and there was every indication that the enemy was continuing to close. The first information on the 5th was *TAMBOR*'s report of many ships 90 miles west of Midway. This looked like a landing attempt, so Task Force 16 changed course to a point north of Midway and increased speed to 25 knots. When reports after daylight made it clear that the Japanese had reversed course, the Task Force headed west and then northwest in a stern chase to try to reach a position from which attacks could be made on the retiring forces. Contacts were made by patrol planes with the remnant of the striking force in the early morning and again during the late afternoon on westerly courses, as well as with a carrier sighted at 0855 well to the north on a southwesterly course apparently to join the striking force. A burning carrier, *HIRYU*, still was reported with the retiring force at the time of the morning contacts. On the afternoon of the 5th, Task Force 16 reached a position from which attacks could be launched against the striking force, based on forenoon contact reports. Search and attack groups from *ENTERPRISE* and *HORNET* were launched between 1500 and 1528 to the northwestward but both groups failed to locate the enemy force, passing astern of that force both on the flight out and on the return flight. Each group contacted and attacked a single destroyer or small cruiser, both groups failing to hit their targets. Task Force 16 engaged in no other operations on the 5th.

TAMBOR's failure to report enemy course and speed emphasizes the extreme importance of thorough indoctrination in the vital necessity of timely and complete contact reports. Submarines on offensive missions should endeavor to close their targets undetected yet remaining on surface as long as circumstances permit since in many cases submerged speed is too low to ensure reaching attack position. Trailing submerged of a ship of even moderate speed is futile. Every opportunity to trail on surface should be taken and contact reports sent as conditions require.

On sighting unidentified ships as was done by one submarine at 0205/4, the submarine should close at best speed practicable under the circumstances for amplifying the contact report as to identity of the ships, their course and speed and the assigned task permitting, to attack before the opportunity passes. This emphasizes that a non-offensive, overly cautious submarine commander may be expected to accomplish little.

Task Force 16 would have done better if it had headed westward and not eastward after attacking the HIRYU in order to follow up the successes of 4 June.

The need for air tactical scouts of suitable defense characteristics to continuously track enemy units to verify sinkings, etc., was exemplified.

The difficulty of bombing destroyers is also exemplified.

The afternoon search groups should have sighted the enemy force.

Because of the night contact indicating that the enemy was persisting in his plans for a landing attack, all submarines were directed to close Midway in order to take advantage of the opportunity to attack transports and supporting ships when they were most vulnerable. After the retirement of the enemy became apparent, the fastest submarines were sent in chase and others returning from western patrols were directed to the expected lines of retirement of the enemy.

TAMBOR's incomplete contact report caused this decision.

There were several contacts on the 5th by scouting planes, the two major ones being:

(a) A transport group west of Midway trailed by 2 damaged CA (reported as BB);

(b) The already mentioned retiring striking force of 2 BB (1 damaged), 3 CA, 4 DD trailed by a burning carrier to the northwest.

About 0430 12 B-17's departed in search of the western group but because of unfavorable weather could not locate them. Later, as more patrol plane reports came in, they found the target and attacked just after a group of 12 marine dive bombers. These leaving Midway at 0700 had struck a wide oil slick about 40 miles from the CA's and followed it in to attack position. Dives began at 0808. Results were:

1 CA (already damaged)	1 hit forward
	1 close miss astern

When the planes left between 0820 and 0830 the CA was listed "badly" to starboard and turning in sharp circles to starboard.

Once the enemy had been located contact scouting continuously should have been maintained and continuous and complete reports sent in to Midway and the Task Force Commanders.

Eight B-17's attacked both the damaged CA's about 0830 with four to eight 500-pound bombs per plane, altitude 19,000 - 20,000 feet. They report one certain hit on stern of 1 CA.

At 1320 in the afternoon, 7 B-17's armed with eight 500-pound bombs each set out to the northwest to attack the remnants of the Japanese striking force; and at 1545 another group of 5 departed. En route, the first group sighted 1 CA but found nothing beyond. On the return journey, bombing from 9,000 to 16,000 feet, they report making 3 hits on the CA, bearing 300°, distant 300 miles from Midway. The second group likewise found and attacked only 1 CA, bearing 320°, 425 miles from Midway, no hits. On this attack one pilot dropped his bomb-bay gasoline tank with the bombs and did not return. One other plane ran out of gas and landed in the sea 15 miles from Midway, plane and 1 of the crew lost. These were the only losses of B-17's attack on the Japanese fleet.

Comparative ineffectiveness of high level bombing against freely maneuvering surface vessels.

Summary of losses reported inflicted on the enemy 5 June.

1 CA (already damaged)	1 hit (Both hits may have
1 CA (already damaged)	1 hit been on same CA)
1 CA	3 hits

COMMENT

During the night of the 4th and day of the 5th the retiring striking force apparently maintained a course about 280°, accompanied by the burning *HIRYU*, and making good a speed of but five and one half knots from time of attack on *HIRYU* the evening of the 4th to late afternoon of the 5th. From the attacks by fighters on B-17's during their attacks on *HIRYU* the evening of the 4th, and from the sighting by a Midway patrol plane of a carrier to the northward the morning of the 5th as well as subsequent contacts the afternoon of the 5th, it would appear that a fifth carrier to the northward joined up with the striking force the forenoon of the 5th, possibly to salvage personnel and material from burning *HIRYU*. At 1612 on the 5th a Midway patrol plane reported a force of one carrier, two battleships, three cruisers and five destroyers bearing 325° from Midway on course 280°, speed 10 knots. The report contained no mention of a burning carrier and it is probable that this carrier was the fifth carrier that had joined up during the day and that *HIRYU* had sunk or been sunk shortly prior to this contact.

At 1852 the 5th a Midway patrol reported a carrier disappearing into a front to the northwest on course 315° and that a formation of nine planes was overhead and followed a few minutes later with a report that he was being attacked by planes.

The Japs appear to take advantage of weather.

It is probable that the contact made by the patrol plane with the striking force at 1612 was known to that force and that that force shortly after made its usual radical change of course, to about 240°

Evasion after being sighted by an enemy patrol plane has considerable merit.

The carrier departed to the northwest not to be sighted again. It is not entirely clear what course was pursued by the battleships of the force. Two were still reported present at the last contact. One was reported in a contact the following morning although its presence in the force at that time appears to be controversial. One of the two battleships formerly with this force almost certainly had been heavily damaged. Whether one of the two battleships parted company with the rest of the force during the night, or possibly sank, while the other continued to the southwestward with the striking force remnant, to be attacked and possibly sunk the following morning, or whether both battleships parted company from the rest of the force during the night is not clear. However, it is probable that part of the former striking force, cruisers and destroyers with possibly one battleship, maintained a generally southwesterly course during the night of the 5th while Task Force 16 maintained a generally westerly course. The occupation and support forces presumably continued their retirement to the westward unmolested.

Submarines that had been drawn in close around Midway the night of the 4th to assist in repelling the prospective attack, were directed to the westward to attack the retiring forces on the 5th when the retirement was ascertained but apparently never again made contact with any of those forces.

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By Cincpac: "Task Force 16's search to the northwest on 5 June had been unsuccessful and weather conditions there were deteriorating. The best opportunity for contacting any of the fleeing enemy units appeared to be to the West. Therefore, on the evening of 5 June the force was turned to a westerly course, and speed reduced to 15 knots because of a growing shortage of fuel in the destroyers."

COMMENT

At dawn of the 6th *ENTERPRISE* launched a search flight to search through the western semicircle as a result of which contact was again established with a substantial enemy force apparently a remnant of the striking force and another group composed of two cruisers and two destroyers.

Value of shore-based long range shadowing planes to permit carrier planes to concentrate on attack.

The effect of lack of fuel for continued high speed in destroyers in its restrictions on the plan of battle was demonstrated.

Reports of the attacks on these groups are difficult to reconcile. The first contact at 0645 was made with what was reported to be a carrier accompanied by five destroyers, this report later corrected to a battleship and five destroyers. About three quarters of an hour later at 0730 another contact reported two cruisers and two destroyers about forty miles to the southeastward of the first group. Reports of the three attacks on vessels in this area on the 6th, two attacks by *HORNET* groups and one by *ENTERPRISE* groups, would indicate that all three attacks were made on the first contact. However, these same reports, together with the reported composition of this enemy group and statements of a survivor from *MIKUMA*, rescued on the 9th, can only be reconciled by attacks on vessels of both the first and second contacts.

The composition of the first group contacted, reported as one battleship and five destroyers on course west, speed 10 knots, was next reported by *HORNET* attack group as a battleship, cruisers, and three destroyers. *HORNET* pilots all identify the largest vessel as a battleship (*KIRISHIMA* class) and not a heavy cruiser. *ENTERPRISE* attack group commander later reported "the battleship" dead in the water in a position between the positions of *HORNET*'s first attack and *ENTERPRISE* attack, although it is not clear just what ship he referred to. *ENTERPRISE* attack group just prior to this report had attacked a formation reported as two heavy cruisers and two destroyers. At the same time, *ENTERPRISE* groups, with the battleship reported in the first contact designated as its principal objective, was unable to find a battleship target and attacked the group of two cruisers and two destroyers. Commander in Chief, Pacific Fleet in his report gives the probable composition of this group as two heavy cruisers, *MOGAMI* and *MIKUMA*, and three or four destroyers. It is believed that his conclusions as to the composition of this group are incorrect and that this group was composed of either one battleship (probably *KIRISHIMA* class) one *MAGAMI* class cruiser (probably *KUMANO* or *SUZUYA*), one light

cruiser and three destroyers, or two heavy cruisers (*KUMANO* OR *SUZUYA* and one *NATCHI* class - possibly *TAKAO),* one light cruiser and three destroyers. It is possible identification of *NATCHI* class cruiser was incorrect and that heavy cruisers were *KUMANO* AND *SUZUYA.* The composition of the second group contacted is believed to have been two heavy cruisers (*MOGAMI* and *MIKUMA*) and two destroyers. When first sighted this group was about forty miles southeast of the first group on course 215° speed 15 knots.

The justification for the group compositions stated is based on analysis of the reports of the actions, statements of *MIKUMA* survivor and photographs of one heavy cruiser taken by *ENTERPRISE* photographic plane.

HORNET made the first attack of the day about 0950 and reported two 1,000-lb. and one 500-lb. hits on the "battleship" with two 1,000-lb. near misses. One heavy cruiser (*KUMANO* or *SUZUYA)* received two 1,000-lb. hits and one destroyer was sunk by a 500-lb. hit. While this attack was in progress a despatch from the Japanese Commander in Chief was intercepted stating that he was being attacked. No other attack was in progress at the time. It may, therefore, be assumed that Commander in Chief ORANGE was in the ship reported as a battleship. If it was a battleship it was at least temporarily disabled and was still lying dead in the water some four hours later when *ENTERPRISE* attack group commander reported "the battleship" dead in the water. If this ship were a heavy cruiser instead of a battleship it may have been *TAKAO,* the Second Fleet flagship, or possibly *KUMANO* or *SUZUYA* the fourth ship of Crudiv 7 (*MOGAMI* class). *TAKAO* is favored, however, since *HORNET* pilots report presence of a *NATCHI* class cruiser. In any case, were this ship a cruiser and not a battleship, it is not believed that it survived this attack.

Losses in this first *HORNET* action are therefore, placed at either one battleship disabled, one heavy cruiser (*KUMANO* or *SUZUYA)* damaged and one destroyer sunk OR one heavy cruiser sunk (possibly *TAKAO* or *KUMANO* or *SUZUYA),* one cruiser (*KUMANO* or *SUZUYA)* damaged and one destroyer sunk.

The remaining composition of this group then would be one heavy cruiser, one light cruiser and two destroyers. The light cruiser must have been of a small type since she is variously reported as a light cruiser or destroyer leader. She would, therefore, scarcely have been later mistaken for a heavy cruiser with a similar heavy cruiser present for comparative purposes. However, two hours later *ENTERPRISE* attacked two heavy cruisers and two destroyers.

The heavy cruiser identified as *KUMANO* or *SUZUYA* in this group is so identified since the gutted and abandoned cruiser photographed by *ENTERPRISE* planes after the third and last attack of the day is believed to be *KUMANO* or *SUZUYA* and not *MOGAMI.*

Subsequent to *HORNET*'s attack it is believed that this group, following the apparently regular procedure, changed course to about 245° and increased speed.

It is further believed that on being sighted the second contacted group changed course to about 280° and increased speed to about 28 knots presumably to attempt to avoid attack.

Two hours after *HORNET*'s first attack, at about 1150 *ENTERPRISE* attacked a group of two heavy cruisers (*MOGAMI* and *MIKUMA*) and two destroyers. One cruiser received five hits, was left dead in the water, burning fiercely and heavy explosions were heard on board. The other heavy cruiser received hits and was last seen smoking and leaking oil and heading west with two destroyers.

It is believed that *MIKUMA* was the heavily hit cruiser and that she sank about an hour and a half after this attack and that *MOGAMI* was the other cruiser damaged in this attack and that *MOGAMI* and the two accompanying destroyers escaped.

This group after changing course to about 280° on being sighted, continued on that course until just prior to being attacked. Then, either having sighted the remnants of *HORNET*'s first attack steering a course about 245° or having sighted *ENTERPRISE* attack group, this group probably changed course to 240°, the course on which they were attacked by *ENTERPRISE*.

Just prior to this attack a plane (either a cruiser trailing plane or a *HORNET* plane) reported one heavy cruiser, one light cruiser and two destroyers in a position north of *ENTERPRISE* attack, adding "this group left scene of our first attack."

MIKUMA survivor stated that that ship was attacked by two separate groups about noon. *ENTERPRISE* attacked in two groups, one group breaking off the search ahead for a battleship prior to the other group. He stated heavy explosions occurred in the amidships area due to warheads being set off by a bomb in that area. He stated *MIKUMA* sank about one hour and a half after the first attack on her. He further stated *MOGAMI*, in company with *MIKUMA*, was damaged by a hit but he did not know the final fate of *MOGAMI*. His statement is further to the effect that Crudiv 7 split up on June 4th, *MOGAMI* and *MIKUMA* and two destroyers working together after that date and that this group was not in visual contact with any other forces during this period.

It is noted from the prisoner's statement that: the MIKUMA and MOGAMI parted company with the KUMANO and SUZUYA about two days prior to the first attack on the MIKUMA (the prisoner's ship); the first attack was on June 4; the following day she received no attacks, but on the 6th about noontime she was again attacked

by 2-engine bombers and received hits on the forecastle, bridge area, and amidships; the MIKUMA sank within an hour and a half after the bombing on the 6th. That a destroyer accompanying the MIKUMA was also hit on the stern and broke out in flames.

The interrogation also indicated that at some time after the attack on June 4 the Midway attack was abandoned and the transports ordered to return to home waters. The MOGAMI was seen to be on fire at time of MIKUMA's sinking. This would indicate that the MIKUMA was the CA definitely sunk, while the MOGAMI may have escaped.

KUMANO and *SUZUYA* presumably operated together after Crudiv 7 split on the 4th. *KUMANO* or *SUZUYA* was definitely in the first group contacted on the 6th; there is no definite evidence to support the presence of both in this group. The missing one may have been sunk prior to the 6th, she may have accompanied some other units or she may have been the other possible heavy cruiser in the first group contacted instead of *TAKAO*.

It is believed that *MOGAMI* and two destroyers continued on to the westward on 270° and escaped, that the remnant of the first group continued on to the southwestward on course 240° - 245° and was the group attacked in the third attack by *HORNET* attack group's second attack.

It is of interest, in support of these deductions, to note that during *ENTERPRISE* attack on *MOGAMI* group a Midway patrol plane reported two heavy cruisers and two destroyers being attacked by planes and that this force was opposed by a friendly group of cruisers and destroyers (the remnants of the first group presumably).

At about 1445 *HORNET* attack group again attacked a heavy cruiser (*KUMANO* or *SUZUYA)* a light cruiser and two destroyers, the remnant of the first group previously attacked by *HORNET*. As a result of this attack the heavy cruiser received six hits and was left gutted and abandoned, the light cruiser was damaged and one destroyer was sunk.

Later, photographic planes from *ENTERPRISE* sent to photograph the *MOGAMI* class cruiser gutted by *ENTERPRISE* group actually photographed the heavy cruiser gutted by *HORNET* in third attack, either *KUMANO* or *SUZUYA*. The *MIKUMA*, gutted by *ENTERPRISE*, had sunk about two hours earlier. The photographic planes reported sighting a light cruiser and a destroyer fleeing over the horizon on course 270°. This was the surviving damaged remnant of the first group escaping, again having made a radical change of course after the third attack.

The action on the 6th has been gone into in considerable detail since the reports on these actions are obviously in error. They can only be reconciled by bringing both groups of enemy ships contacted under attack rather than only one group as concluded by the Commander in Chief, Pacific Fleet. Considerable study was given to this phase of the battle to try to reconcile the reports. The apparently standard procedure of the Japanese forces to make radical changes of course on being contacted offered a key to the solution arrived at.

It is believed that the action on the 6th was against the two groups composed as indicated below and that the ships indicated were sunk or damaged:

1ST GROUP

1 BB (*KIRISHIMA* class) damaged
1 CA (*KUMANO* or *SUZUYA*) damaged
1 CL - damaged, escaped
3 DD - 2 sunk, one escaped

or

1 CA (*TAKAO* - or possibly *SUZUYA* or *KUMANO*) damaged
1 CA (*KUMANO* or *SUZUYA*) damaged
1 CL - damaged, escaped
3 DD - 2 sunk, 1 escaped

2ND GROUP

1 CA (*MOGAMI*) damaged, escaped
1 CA (*MIKUMA*) sunk
2 DD - escaped, 1 damaged

The need for air tactical scouts of suitable defensive characteristics to continuously track enemy units, to verify sinkings, etc., was exemplified.

COMMENT BY COMMANDER IN CHIEF, PACIFIC FLEET

The only other attack on 6 June was by a flight of 11 B-17's sent out to attack the transport force on its estimated retirement course. This force was not found. On the return by separate routes one section of 6 of these at 1640, bearing about 262, 400 miles from Midway, dropped a pattern of 20-1,000 and 1,100 pound bombs and reported two hits on a cruiser which "sank in 15 seconds." This was the *U.S.S. GRAYLING* hastily submerging. Fortunately she received no damage.

The many conflicting reports made by various planes as to types of enemy vessels hit or sighted show the tendency of flyers inexperienced in such identification to make erroneous reports. The bombing of the U.S.S. GRAYLING by six B-17's and

their later report of having sunk a cruiser was an example. This also illustrates the difficulty in evaluating such reports.

After *YORKTOWN* was abandoned on 4 June, *HUGHES* was left to guard her during the night. Task Force 16 cruisers rejoined their force. Part of Task Force 17 proceeded to tanker rendezvous for fueling; remainder of the Force proceeded to eastward clear of *YORKTOWN* with plans for salvage next day. *VIREO, SEMINOLE, NAVAJO,* and *FULTON,* had meanwhile been dispatched to assist. The following morning the *HUGHES* rescued from *YORKTOWN* 2 wounded enlisted men, who had not been found in the darkened damaged ship when she was abandoned, and a *YORKTOWN* fighter pilot, shot down in action, who rowed up in his boat. *VIREO* joined about noon 5 June and at 1436 began towing at about 2 knots on course 090°. *GWIN* joined about 1600 and put salvage party aboard. *MONAGHAN* joined soon afterwards. Salvage party was removed at dusk.

The torpedoing of the YORKTOWN and the HAMMANN again emphasized the ever present menace of submarines.

The loss of the YORKTOWN demonstrates the need of a heavier and denser screen of cruisers and destroyers.

At 0220 on 6 June *HAMMANN, BALCH* and *BENHAM* joined under Commanding Officer, *YORKTOWN.* Destroyer screen circled at 12-14 knots.

Circling a damaged carrier does not appear to be effective. A well placed patrol hunting by asdic might be more efficient.

Salvage party went aboard (later *HAMMANN* secured alongside to assist) and had reduced list several degrees when at 1335 torpedo wakes were observed. At 1336 *YORKTOWN* received 2 hits, and *HAMMANN* 2 hits, one under her bridge and the second just abaft the mainmast. *HAMMANN* sank at 1339 with many heavy explosions, probably depth charges or warheads, which killed a number of personnel in the water. Questioning of *HAMMANN* personnel has brought out that not only were safety forks in place, but they were inspected after *HAMMANN* was hit. There is a possibility that another torpedo struck as she sank, detonating warheads or depth charges.

Remaining salvage party was removed from *YORKTOWN* and surviving personnel rescued from the sea. Search for the submarine continued with intermittent contacts (many false) and depth charge attacks all afternoon, one bringing up heavy oil. At 1845 heavy black smoke was sighted on the horizon 19,000 yards from the destroyers and was soon identified as coming from an enemy submarine (smoke probably from Diesels) proceeding away from *YORKTOWN* at high speed. Destroyers gave chase and opened fire. Submarine submerged at about 2127 with last splashes on in deflection and apparently straddling. Search was continued until about 0300, 7 June with no results except location of a large oil slick, Diesel odor. It is believed the submarine was damaged but not sunk.

After slowly capsizing to port, at 0501, 7 June, in about 30° 36' N., 176° 34' W., *YORKTOWN* sank.

LESSONS AND CONCLUSIONS FROM THE ACTION BY CINCPAC

This action brings out some new lessons and drives home other definite ones previously learned. For convenient reference, at the expense of some repetition, these are discussed in this section.

THE CONCEPT OF A MOBILE AIR FORCE is not acceptable for the Mid-Pacific Area with present planes and present facilities. For a long coastal district it may be possible to maintain large air forces at major dispersing centers and to move them effectively from point to point as the situation requires. This is not true of the area in which Oahu is the central base. Most points are too weakly held and do not yet have adequate service units and facilities. Pilots in our rapidly expanding air forces are not and will not for some time be sufficiently trained to operate effectively in a number of remote and unfammliar localities. Distances over water between landing fields are too great - we could not get fighter reinforcements to Midway on 4 June after virtually all the fighters there had been put out of action combating the one short Japanese raid. The lesson is simply that we must provide more and more planes permanently based at those advanced stations which are subject to enemy attack.

PLANES FOR ARMY AND NAVY. One of the primary weaknesses which showed up quickly in action was the Navy's lack of certain plane types already in use by the Army, and equally the unsuitability of certain Army types for the type of job required of them in these island areas. Each service must obviously have the types of planes it requires, regardless of any earlier agreements of Joint Boards which limit types or functions.

The Navy PBY's, while excellent for long range search, do not have the performance or defensive characteristics required to stand up against strong enemy air opposition. The vital requirement of continuous tracking, therefore, fails when enemy air enters the picture. On the other hand, the Army has its B-17's and B-24's, types which are very well adapted to this service. Sufficient numbers of these types should be immediately made available to the Navy for long range search and tracking purposes.

The Army experiences show the outstanding value of strongly protected, high speed aircraft like the B-17 in combating the Japanese Zero fighter. In 18 contacts by B-16's with Japanese Zero fighters, 10 of the latter are reported shot down and 2 damaged, with only minor damage to any B-17. This plane is seriously required by the Navy for scouting, tracking, and bombing. It is urged that the B-17 be at once assigned to the Navy, and first to Commander Task Force 8 in Alaska, where with Navy pilots experienced in navigation over water they should prove invaluable.

High altitude horizontal bombing has proven itself relatively ineffective against maneuvering surface vessels. As Commander Cruiser Division 6 states, "Our own sea forces, and apparently enemy sea forces, have little respect for high altitude bombing the results of which are mostly 'near misses'," and not near enough. Even in peacetime, high altitude horizontal bombing from about 10,000 feet results in only a small percentage of hits on a maneuvering target of battleship size, and as the altitude increases the percentage goes further down. Such results will not stop a determined fleet. On the other hand, the aircraft torpedo and dive bomber have proven themselves, in this action as well as in all prior experience of other belligerents, to be the only truly effective weapon for such attack. Island and coastal based planes should consist of a large percentage of these types, whether they are manned by the Army or the Navy.

It has been our practice to complement Marine fighter squadrons on shore with planes of carrier type. This results in a distinct and unwarranted reduction in performance and ability to combat the enemy. Having adequate ground facilities, the Marine VF squadrons ought to be furnished with the very best fighting planes available to the country. Because of the limitations which carrier operation imposes on naval planes, suitable fighters will naturally be Army types.

MORE PLANES ARE REQUIRED IN OAHU. We must speedily increase the flow of planes of all types, with service units, facilities and personnel, to the Mid-Pacific area. Strong aircraft reinforcements in the Hawaiian-Midway Area were received in flights of B-17's from the West Coast and in the highly valuable *HAMMONDSPORT* and *KITTYHAWK* during the last half of May. Even so, the shore-based aircraft strength in this area was not adequate in numbers or in types and could not alone have stopped or even checked the Japanese advance. Had we lacked early information of the Japanese movement, and had we been caught with Carrier Task Forces dispersed, possibly as far away as the Coral Sea, the Battle of Midway would have ended far differently.

A GRID SYSTEM CAPABLE OF EASY APPLICATION to extensive joint over water operations by Army and Navy, or by either or both in conjunction with allied air or naval forces, is a necessity. Neither the Navy basic grid, nor the Air Warning Service grid, is universally adaptable. Eash possesses particular advantages for particular uses. Both were available during the Battle of Midway. Neither was used. Instead, recourse was had to designating positions either by bearing and distance from a prearranged reference point or in latitude-longitude coordinates, the only two methods quickly applicable by an air pilot or navigator without extensive advance preparation. The present British lettered coordinate system, S.P. 02274, provides for designating positions by either bearing and distance from any even degree latitude-longitude intersection or in encoded latitude-longitude coordinates. This system has worldwide application, distribution to allied naval forces is already complete, and security is good. We should adopt it.

The excellent *coordination of dive bombing and torpedo plane attacks*, so successful in the Coral Sea, was missing in the Battle of Midway. Chief among the factors preventing coordination were the Japanese tactics in concentrating fighters on our torpedo planes. This let the dive bombers in so that we sank their carriers just the same, but at the very high cost of most of our torpedo planes.

TBD PLANES ARE FATALLY INADEQUATE for their purpose. The loss of the brave men who unhesitatingly went to their death in them is grievous. The TBF is much improved, but still cannot attack ships defended by fighters without fighter support. Long range carrier fighters must be developed.

The value and necessity of fighter protection is continually exemplified.

The Japanese apparently had *fighter protection over their carriers from about 20,000 feet on down* to the torpedo plane attack level. We shall have to establish at least 2 levels of fighter combat patrol.

OUR F4F-4 IS MARKEDLY INFERIOR TO THE JAPANESE ZERO fighter in speed, maneuverability, and climb. These characteristics must be improved, but not at the cost of reducing the *present overall superiority* that in the Battle of Midway enabled our carrier fighter squadrons to shoot down about 3 Zero fighters for each of our own lost. However much this superiority may exist in our splendid pilots, part at least rests in the armor, armament and leakproof tanks of our planes.

IN MOST ENGAGEMENTS OUR FIGHTERS WERE OUTNUMBERED. For this campaign the number of fighters in each carrier was increased from 18 to 27. It may be necessary to increase even further the percentage of VF types carried.

REPLACEMENT CARRIER AIR GROUPS MUST BE READY ASHORE so that after battle a depleted carrier group can be brought to a shore station for refreshment and replacements. Each replacement group should be kept as a complete unit and should be highly trained before going to sea.

SATISFACTORY TRAINING STILL SHOWS UP AS ONE OF THE GREATEST DIFFICULITIES in war operations, both for anti-aircraft gunners and aircraft personnel. Task Force commanders are taking every opportunity possible underway to fire practices and train pilots in attack procedures. At best, this training can only prevent deterioration of skill. Basic and thorough refresher training must be given at shore schools. The proficiency of our personnel, both ship and aircraft, will not reach the level desired until shore schools and training devices under development are fully in service.

AIRCRAFT SHOULD BE LAUNCHED AND ATTACK COMPLETED with the absolute minimum loss of time. Once the attack was joined, our pilots pressed it home with resolution and matchless audacity; but it is believed their successes would have been greater and their losses smaller had there been closer coordination of attacking types.

AIRCRAFT TRACKING OF ENEMY FORMATIONS HAS BEEN UNSATISFACTORY because of inadequate types and numbers of planes. Early, accurate, and continuous information of the enemy is essential for successful attack by carrier groups. Contact once made must be held and tracking information broadcast. Tracking should be conducted by shore-based planes, when in range of suitable bases. The Japanese employment as scouts of seaplanes carried by tenders warrants study. No matter how efficient this search and tracking, carriers should still maintain an alert search with their own planes, accepting reduction in offensive power for greater security. The Japanese have been very successful with non-carrier searching, but in the Coral Sea and at Midway they were caught with planes on deck.

FIGHTER DIRECTION WAS MUCH BETTER than in the Coral Sea. Over half the bombers and torpedo planes that attacked *YORKTOWN*, along with a number of accompanying fighters, were shot down. Development of tactics in stationing fighters at various altitudes and distances from the carrier, along with the Fighter Direction School now being established in Oahu, should produce further improvement.

SUPERFREQUENCY VOICE SETS are needed for fighter direction and other limited range voice communication.

COMMUNICATIONS WERE SWIFT AND EFFICIENT. By placing all Midway planes, whether Army or Navy, and all submarines operating there on a common radio frequency with provision that surface craft intercept these reports, many relays of enemy information were eliminated with consequent earlier receipt by interested commanders.

ALL CARRIERS MUST HAVE TWO SEARCH RADARS one (if not both) of which is at least equal in performance to CXAM. The SC does not meet this requirement.

GASOLINE FIRES IN CARRIERS ARE A SERIOUS MENACE. *YORKTOWN*, though hit by three bombs and set afire, had no gasoline fires, possibly because of the effective use of CO_2 in the gasoline system.

GUNNERY STILL IMPROVES on those ships that have been in action a number of times. Some crews have been in enough battles to consider themselves seasoned veterans. Part of the improvement is in better fire discipline that comes with battle experience. A very important part comes from the greater number of automatic weapons now on our ships. Most ships need more of these. The greatest need, at present, is for the directors and lead computing sights now under manufacture for automatic weapons.

EFFECTIVENESS OF AIRCRAFT TORPEDOES AND BOMBS MUST BE INCREASED.

A larger torpedo warhead is urgently required. The present strengthened torpedo is a favorable step in the right direction, but the torpedo must be designed for much higher speed drops. In the Midway action the B-26 and the TBF planes received their most serious losses from Japanese fighters when they slowed down to limiting torpedo dropping speed.

Had the 1,000-lb. armor-piercing bomb under development been available for dive bombers, fewer of the many ships that were hit would have escaped; and fewer hits would have been needed to destroy the carriers.

THE VALUE OF A CLOSE SCREEN in protecting carrier against torpedo planes was demonstrated during the attacks on the *YORKTOWN*. Not over 4 planes got through to launch torpedoes. Unfortunately she was slowed down by previous damage or she might have avoided these. A strong screen of 4 cruisers and a squadron of destroyers is the present minimum requirement for task forces containing a carrier. Present reorganization of forces places them at approximately this strength.

COMBINED TRAINING IS NEEDED BY LAND BASED AIRCRAFT and fleet units to provide for better exchange of information and coordination of attack. The superior operations of the unit of B-17's under Lieut. Colonel W.C. Sweeney, U.S.A. of 431st Bombardment Squadron show the benefit of prolonged experience with naval forces which this squadron had obtained during coordinated patrol operations. All units require more training in sending clear, complete and accurate reports that will give a commander all the information he needs to know, completely correct, without repeated questioning.

CORRECT INFORMATION is still one of the hardest things for a commander to get in action. It is especially difficult in such a battle of many battles as this one was, spread over a vast sea area. Training, suitable tracking aircraft, and some of the other steps mentioned in the foregoing paragraphs should alleviate this difficulty. It is considered that Commanders of Task Force 16 and 17 and Naval Air Station, Midway showed sound judgment and decision in correctly interpreting the many confused situations that came up during the action.

The following points were emphasized by the various commanders

1. Losses in attacking planes due primarily to enemy VF and not to AA fire.

2. Ships unsupported by VF are easy prey for CV air attack.

3. In duel between CV's side which is able to strike first blow without being itself hit wins.

4. CV's are most vulnerable to damage from fire. This is especially true when they are caught with planes on deck.

5. Strafing attack against DD's by VF's temporarily stops their AA fire by driving exposed personnel to cover.

6. Dive bombing attacks on DD's are not profitable because of the difficulty of obtaining hits on such a small and highly maneuverable target. Such attacks should not be made if a larger and more valuable target is available.

7. Early and accurate information of movements of an enemy force to be attacked is essential for successful carrier operations. This should be obtained, whenever possible, by other than CV aircraft, both to retain maximum CV striking power and to avoid disclosing the fact that any CV's are in the area.

8. HORIZONTAL HIGH ALTITUDE BOMBING attack is relatively ineffective against ships which retain speed and control.

9. CONTACT once made must be held and *tracking* information broadcast. MO's are constantly and effectively used by Jap trackers.

10. Jap *seaplane carriers* are effectively used; we do not have but should.

11. Japs do not search using their CV planes - these are held cocked and primed. Excellent when proper coverage by other means (they depend on shore air when available - on seaplane carriers when former is not) is available. Serious weakness if not fatal to them at Midway and nearly so in Coral Sea. We should always exploit this feature of their use of air afloat.

12. Great advantage of 2-CV Task Force.

13. When carriers are widely separated, each carrier should conduct its own fighter direction, and all carriers, in addition to the one in which the OTC is embarked, should be informed of the number, type and location of the planes which all other carriers have launched. Lack of this information was a continual source of alarms.

14. Coordination with carrier based aviation is an extremely difficult problem for ground based aircraft because carriers normally operate under conditions of radio silence.

The following defects were observed

1. As a result of a remarkable intelligence work, the tactical situation was in our favor; it is not believed that the enemy knew the whereabouts of our carriers until after radio silence was broken, which was on the fighter director circuit. It is felt that this violation of radio silence could have been avoided had *all* friendly aircraft, both shore-based and ship-based, been equipped with standard IFF equipment.

2. Original contact reports of planes heading for Midway was received on FOX schedule 2 hours and 19 minutes after receipt of original report. The 2 hour and 19 minute delay on the FOX schedule of the original contact of enemy planes reported approaching Midway is entirely too great a time lag and indicates that only direct communication is sufficient. This is especially so where aircraft are involved.

3. First report of enemy's position, course and speed was received 2 hours and 33 minutes after enemy planes had been sighted headed for Midway. The period of 2 hours and 33 minutes between the sighting of enemy planes approaching Midway and the report of enemy surface force position, course and speed was entirely too long and inadequate under the condtions obtaining and especially so inasmuch as the enemy's tactics conformed to prior estimates.

4. Orders to launch and attack received 30 minutes after receipt of contact report. No point option given but in lieu thereof closing of the enemy was indicated.

5. Due to deferred departure, group did not proceed toward destination until about 45 minutes after start of launching or 1 hour and 15 minutes after receipt of contact report.

6. No information on enemy's course and speed from 1823 until 2200, a period of 3 hours and 37 minutes after original contact report or 3 hours after launching of attack group.

7. The lack of information on the enemy's surface forces between 1823 and 2200 was serious and jeopardized the tactical advantage we enjoyed over the enemy. The delay of the *ENTERPRISE*'s Air Group attack against the enemy carriers and the failure of the *HORNET*'s VSB planes to make contact with the enemy can be attributed to this lack of information. Further, the loss of planes from the *HORNET* and *ENTERPRISE* by water landings from lack of fuel can be partly attached to this unfortunate lack of information on the enemy's movements.

8. About 3 hours and 25 minutes elapsed between launching and indication of starting attack.

9. Some 2 hours and 40 minutes elapsed between departure and attack.

10. Enemy asked for our position 2 hours and 43 minutes after breaking of radio silence.

11. Enemy planes picked up on radar approaching formation 59 minutes after enemy had requested bearing.

12. Enemy planes attacked *YORKTOWN* about 1 hour and 15 minutes after enemy had asked for bearing of this force.

13. As far as can be determined enemy planes were not contacted in the vicinity of this force until 3 hours and 42 minutes after breaking radio silence, all unidentified aircraft previously sighted and contacted were found to be friendly.

14. About 2 hours and 30 minutes elapsed between first and second attacks on *YORKTOWN*.

15. Three hours and twenty minutes elapsed between time enemy planes first detected approaching this formation and the receipt of definite information by this vessel of the location of the carrier attacking our forces.

16. One hour and twenty-three minutes after second attack on *YORKTOWN*, *ENTERPRISE* and *HORNET* launched an attack against an enemy carrier and accompanying ships. No further attack was launched against our forces after completion of our attack against one carrier, one battleship and one heavy cruiser.

17. It appears that the enemy was most certainly ignorant of the presence of Task Forces 16 and 17 until radio silence was broken. It is likely that he did not realize the presence of our carriers until he had been attacked by our carrier aircraft at 2225 Z, even though radio silence had been broken by our forces at 2016 Z. This assumption is supported by the fact that the enemy was first heard to ask for our position at 2259 Z. Little time was wasted by the enemy in attacking our forces with aircraft after asking for our position, as the *YORKTOWN* was subjected to its first attack at about 0014 Z or 1 hour and 15 minutes thereafter.

18. The breaking of radio silence some 3 hours and 42 minutes prior to the first definite contact with enemy aircraft was unfortunate inasmuch as the unidentified aircraft, as far as the records show, were found to be friendly. This performance indicates the immediate necessity for standard IFF equipment in all planes of all the services - Army, Navy, Marine Corps and Coast Guard.

19. From the information available, it appears that the first definite information of the enemy carrier which was attacking our forces was obtained by *YORKTOWN* scouting planes. This failure to receive adequate information from our land-based forces raises the question as to whether or not full dependence can be placed in units other than our own.

20. It appears that further attacks against this force, after the second attack against the *YORKTOWN*, would have taken place had it not have been for the attack made by the *ENTERPRISE* and *HORNET* groups against the enemy carrier and accompanying ship as a result of information gained by *YORKTOWN* scouts.

21. Liaison communication was uniformly excellent and no jamming was apparent. Interplane communications on command frequencies was unsatisfactory due to three different types of transmitters which could not overlap to provide a common frequency.

The necessity of Navy controlled and manned aircraft for all air operations operating in cooperation with naval surface forces was emphasized and is illustrated by the following:

On 6 June twelve additional B-17's were ordered to Midway from Oahu. About 1140 on 6 June six B-17's made contact with a large submarine that was mistaken for a cruiser. Twenty 1,000-pound demolition bombs were dropped from an altitude of 9,500 feet, and photographs of the pattern showed several near misses. The submarine was friendly and was not damaged. No other contacts were made with enemy surface craft after this date.

During the entire operation, a total of 55 B-17 airplane missions were flown, and three hundred fourteen 500- or 600-pound bombs and eight 300-pound bombs were dropped from altitudes varying from 8,600 feet to 25,000 feet. These bombs were dropped on an accumulated total of 7 BB's or CA's, 7 CV's, 1 DD, and 2 transports. Twenty-two direct hits, 6 probable hits, and 46 near misses were reported. Contact with 18 Zero fighters was reported, and of that number 10 were shot down and 2 damaged. Two B-17's were lost at sea and 2 were damaged. Four B-26 plane missions were flown with 4 torpedoes, scoring 3 hits on 2 carriers. Two B-26's were lost at sea, and 2 made crash landings at Midway, badly damaged. Very heavy AA fire was reported throughout, up to altitudes of 20,000 feet.

Inexperienced personnel, lacking naval experience and knowledge tend to be too optimistic on results achieved by bombing on sea targets, and identification information furnished by such personnel is most likely to overestimate the size and number of units involved.

CONCLUSIONS

Attacking force composed of Japanese Second Fleet augmented by occupation force of transports, cargo ships and tenders. While some submarine contacts were reported it is not clear whether all submarines attached to Second Fleet were present in the area or not.

The exact division of ships of the Second Fleet into the three forces, occupation, support and striking forces, is not known. It is believed, however, that the organization shown in Commander in Chief Pacific Fleet's report is substantially correct except that additional cruisers over those shown were included in the striking force as well as additional carrier. This carrier, which escaped, may have been an XCV, normally included in the organization of the Second Fleet, especially since this carrier was not included as a component part of the striking force in its attack on Midway.

DAMAGE TO THE JAPANESE FORCES

It is difficult to assess accurate damage in view of conflicting reports of types on contact and failure to observe results of attacks. However, certain definite losses are known and certain others can be fairly accurately assumed. For instance, by inference it could be assumed that three ships of Crudiv 7 (*MOGAMI* class) were sunk in the battle and the fourth, *MOGAMI*, damaged. A conservative estimate based on analysis of all reports is as follows:

BATTLESHIPS:
(*KONGO* class)
2 badly damaged
2 damaged slightly

CARRIERS:
1 *KAGA* sunk (all planes lost)
1 *AKAGI* sunk (all planes lost)
1 *SORYU* sunk (all planes lost)
1 *HIRYU* sunk (a few planes may have been recovered by fifth carrier)

HEAVY CRUISERS:
1 *MOGAMI*, damaged
1 *MIKUMA* sunk
1 *KUMANO* or *SUZUYA*, damaged
1 *TAKAO*, damaged
Additional CA damaged
Several DD sunk
Several DD damaged
2 AP or AK damaged

COMMENTS

OPERATIONAL INFORMATION INDICATED FROM THE ACTION

Once contact has been made on a Japanese force it can be expected to make a radical change of course and perhaps speed.

From depth charge attacks on *NAUTILUS* it may be deduced that Japanese submarines operate above 200 feet. All depth charge attacks on *NAUTILUS* were avoided by submerging to 200 feet with charges exploding above that depth.

Japanese bombing and torpedo attacks on *YORKTOWN* were not coordinated attacks but rather two independent and distinct attacks.

Japanese included four carriers in a single striking force group instead of two smaller groups containing two carriers each which would be more flexible and might have saved some of their carriers.

Failure of Japanese to scout to eastward of the striking force prior to launching attack on Midway permitted the destruction of the carrier force by our carrier-borne aircraft.

Japanese planning and execution of the attack was faulty, being apparently based on assumed inability of our carriers to oppose the the attack. If complete surprise was the basis of this assumption it would indicate failure to appreciate even in a small degree intelligence possibilities. If based on known recent presence of our carriers in the southwest, it again fails to appreciate possibilites of movement. In either case, no adequate steps were taken by the enemy to determine the presence of our carriers in the area. Further, apparently based on the same assumptions, no adequate air defense was provided for the large occupation and support forces. Even assuming the absence of carrier-borne aircraft this would indicate a lack of information and appreciation as to shore-based aircraft on, or possible to be based on, Midway. Again surprise must have been the guiding idea, with destruction on the ground of such planes as might be based at Midway assumed, to the exclusion of all normal precautions. While these forces escaped almost unscathed, due to the non-availability of suitable Marine planes after the Marine attacks on the striking force and to the unsuitability of the Army planes for the kind of attacks required, they would have been an easy target for our carrier-borne aircraft.

The outstanding features of the battle were the intense actions on June 4th and June 6th with practically no actions on the 5th. This was due to the retirement to the eastward of Task Force 16 on the night of the 4th. At that time Japanese air was at least known to be badly crippled with four carriers definitely out of action. The withdrawal of Task Force 16 to the eastward was made to avoid a possible night contact with superior enemy forces and still be in a position to oppose an attempted landing on Midway. However, with the retirement of the enemy started during the night of the 4th this resulted in Task Force 16 being so far to the eastward that a long high speed stern chase was required all day on the 5th to gain a position from which attacks could be launched against the retiring striking force. The attacks launched late afternoon of the 5th failed to find their objective. Both search and attack groups passed astern of the striking force both on the outward and return legs of the search. A short extension of the search east and west along the enemy course would have resulted in a quick contact. In fact the retiring striking force could scarcely have been more than just out of sight of the search and attack groups when the enemy course line was crossed on the outward leg of the search. However, due to the retirement the night of the 4th these attack groups were launched late on the 5th and then to the maximum range of the planes.

Search tactics of carrier squadrons appear to leave room for considerable improvement. In addition to failure of both *ENTERPRISE* and *HORNET* groups to locate the striking force on the 5th, *HORNET* bombing squadrons failed to locate the carrier group in the decisive action the forenoon of the 4th. *ENTERPRISE* bombing squadrons on that attack did locate the carriers and with *YORKTOWN* squadrons made the action decisive. However, *ENTERPRISE* bombing squadrons did not arrive in time to conduct a coordinated attack with the torpedo squadrons, the torpedo attack being completed just prior to arrival of the bombers. While *YORKTOWN*'s report is from memory only it appears that the bombing and torpedo squadrons from that carrier proceeded direct to the attack since they were launched over an hour later than *ENTERPRISE* group and attacked simultaneously with *ENTERPRISE* planes.

The use of zone time is still confusing. Task Forces 16 and 17 used zone plus 10, Midway used zone plus 12, Midway planes used both zone plus 12 and GCT and it is believed that B-17's from Oahu used Honolulu time. Standard use of Greenwich time or at least coordinated use of the same zone time by all forces, - land, air and sea -involved in an area would appear to offer a solution.

It is noteworthy that with all the submarines in the battle area, U.S. and enemy, but two submarines apparently made attacks. *NAUTILUS* made a successful attack on a burning Japanese carrier, *SORYU,* and fired unsuccessful shots at one battleship and one cruiser. One Japanese submarine successfully attacked *YORKTOWN* and *HAMMANN.* So far as is known no other submarine took any active part in the battle with the exception of one Japanese submarine that shelled Midway on the night of 4th-5th.

CHAPTER IX

MAKIN ISLAND RAID - 17-18 AUGUST 1942

The raid on Makin Island on 17-18 August was planned to destroy enemy forces and installations, to gain information, and primarily to create a diversion confusing Japanese plans and diverting forces from the stronger concentrations being assembled to attack Guadalcanal in late August. It succeeded in all its purposes, inflicting loss of planes, ships, supplies, and men, and diverted ships and aircraft, by causing the formation of a Makin relief force.

In the raid Japanese losses were:

1 - 3500 ton AP or AK

1 - 1500 ton PY

2 - Seaplanes

100 - 150 men

Radio stations, stores of gasoline and other equipment and material.

This loss was inflicted at the cost of 30 of our Marine raiders killed in action and drowned, and much of the raiding force equipment.

The Second Raider Battalion had been conducting extensive training for some weeks in the Hawaiian Islands. Part of the units had participated in the Battle of Midway and others had trained on that island afterwards. Immediately preceding the Makin Island landing they had trained in handling rubber boats in surf and had made several night landings on Oahu from submarines.

Two hundred and twenty-two officers and men of the raider battalion embarked in *NAUTILUS* and *ARGONAUT* and sailed from Pearl Harbor at 0900 (-9½) 8 August. The voyage was uneventful, the submarines being able to run on the surface most of the time thereby making the ships habitable despite the large number of men carried. *NAUTILUS*, proceeding at higher speed in order to reconnoitre, made landfall on Little Makin Island at 0300 (-12) 16 August, and conducted a periscope reconnaissance. (All times hereafter, unless otherwise indicated, are Zone -12.)

At 2116, 16 August, *ARGONAUT* and *NAUTILUS* joined at the rendezvous in spite of heavy rainfall and proceeded to the debarkation point. It was a clear night with scattered clouds, wind N.E., force 4, raising moderate swells. At 0300, 17 August, the raider force commenced embarking in boats.

The plan called for assembly alongside *NAUTILUS* so that all boats might get underway together. The onshore wind and current drove the *NAUTILUS* toward the reef so that she frequently had to go ahead to keep clear.

As a result boats could not keep alongside. Some boats from *NAUTILUS* had to take off troops from *ARGONAUT* and return to *NAUTILUS*. Many of the outboard motors would not start, adding to the difficulty of keeping boats assembled. The roar of the surf and the wash of the swell through the limber holes of the *NAUTILUS* drowned out orders.

Lack of foresight in planning.

After assembling off *NAUTILUS*, the force planned to proceed to two separate beaches for landing. Because of communication difficulties and some confusion among the boats, the Marine Commanding Officer ordered all troops to land on a single beach.

Lack of sufficient training in darkness.

They cleared the submarines and landed at 0500 on schedule, negotiating the surf easily. Fifteen of the eighteen boats landed together, with two others nearby. The remaining boat did not receive the changed order and went to the beach originally assigned, to the south. It contained a lieutenant and eleven men who were behind the enemy's lines throughout the day's fighting and inflicted considerable damage, at a cost of three men killed.

Boats had not been assembled in waves with each unit together, hence the various platoons were mixed in landing, and re-organization on the beach was necessary. Before this was completed, one man accidentally fired his gun. This was about 0530; dawn was just beginning to break.

Poor planning.

Realizing that the alarm had been given, the commanding officer despatched one company to the other side of the island (less than ½ mile.) In a few minutes this company reported having reached Government Wharf, near the northern edge of the settlement of Bataritari. This company was then deployed to advance down the island and the other company held in reserve. Meanwhile, voice radio communication had been established with the submarines.

In a few minutes the Japanese were contacted and by 0630 firing was general along the front. Natives, who were universally friendly, reported where Japanese troops were concentrated. The submarines were requested to fire on one of these groups and *NAUTILUS* responded promptly, firing 24 rounds in an area about one mile long. *ARGONAUT* did not fire for fear of bombarding own troops. At this time the shore force reported range and bearing from Government Wharf of two ships in the harbor and requested that they be taken under fire. *NAUTILUS* opened fire at 0716 but communication with the shore went out almost immediately so that there were no spots.

Importance of thorough communication preparations.

Salvos were laddered widely in range and bearing, 46 rounds being expended. Both enemy ships were hit and set on fire, and later sunk. One was a 3500-ton AP or AK which the natives stated quartered sixty marines. The other was a 1500-ton patrol vessel.

The Japanese were prepared for a raid, probably because of a general alert following our landing in the Solomons. They took strong positions with machine guns, grenade throwers, automatic rifles, and a flame thrower. Well camouflaged snipers secured in the tops of cocoanut trees, where natives said they had been for three days, were the most difficult problem. They could not be brought down until the fronds concealing them were sawed off by machine gun fire. Snipers and machine-gun fire killed eleven men on the Marine right flank and stopped the advance until about 1130.

Unfamiliarity with enemy tactics.

At that time a platoon of the reserve company was deployed on the left and slow progress resumed. This platoon had no casualties in the fighting.

Soon after *NAUTILUS* completed firing, *ARGONAUT* dove on false plane contact and *NAUTILUS* followed. They surfaced at about 1000, re-established voice radio with the land force, and upon request were preparing to resume fire on the ships which had not yet sunk when a biplane was sighted. Both ships made emergency dives at 1039. *NAUTILUS* surfaced at 1255 but immediately dived again when 12 planes appeared. Thereafter the submarines remained submerged until near sunset, when danger from aircraft was considered past.

Three groups of planes appeared over the island during the day. Two biplanes, one of which had driven the submarines down, flew over the Marine Force at 1130. After reconnoitering for fifteen minutes, they dropped bombs and departed. The next group of 12 planes was sighted by forces ashore at 1320; four were seaplanes, two large and two medium. One each of these landed in the lagoon where both were destroyed by machine gun and .55 caliber anti-tank rifle fire. Natives reported that the large seaplane had brought thirty-five Japanese reinforcements. After bombing and strafing for over an hour, the remaining planes departed.

Because of the report of reinforcements, the conclusion that the next flight would bring more, and the fact that snipers were still troublesome, the Marine Commanding Officer decided to withdraw the center and right of his line, hoping to bring snipers out of the heavy foliage protecting them. This he did; but the snipers did not advance. As he states the principal gain was that when a third group of planes attacked at about 1630 they concentrated on the area his troops had vacated and the area beyond where Japanese resistance had been strongest. Our troops suffered no casualties from any of the air attacks this day.

Although the mission of destruction of enemy forces and installations had not been completed, after the last bombing the raider commander decided to withdraw according to plan. The appointed time of departure was approaching and he considered that it was necessary to fall back slowly so as to permit an orderly embarkation into the boats. It

appears that there were only a few Japanese soldiers left alive, yet such is the effect of boldness in a few resolute men that it seemed to the raider commander at this time that he was still opposed by a large force.

The withdrawal was accomplished without enemy attack. Embarkation in rubber boats was carried out as planned but now came the major disaster and major good fortune of the expedition. Motors would not start. When the boats reached the surf, which had been easily transited that morning, they were forced back or turned over. For an hour the marines struggled desperately to get through. Equipment and clothes were lost. Men jumped into the water trying to push the boats through the short, sharp surf, only for the most part to be forced to give up in exhaustion and return ashore. Several were probably drowned at this time. Hardly more than one-third of the men reached the two submarines. The remaining 120 men assembled on the beach with a little equipment salvaged from the water, set up sentries, and waited miserably in the rain for dawn and another attempt to pass the surf.

Lack of training in handling boats in surf.

At 2100 one of the sentries encountered a Japanese patrol of eight men and killed three of them before falling seriously wounded by a shot through the chest. Because of the possibility of Japanese reinforcements in the morning, prospects looked dreary.

NAUTILUS and *ARGONAUT* waited off the appointed beach throughout the night. At daybreak boats were again loaded and set against the surf. several containing a total of about fifty men got through. Volunteers in one boat returned from *NAUTILUS* to the surf with a line throwing gun and with a message that though the submarine might be forced down by aircraft they would return, and would remain as long as necessary to remove all troops ashore. The boat had scarcely delivered its message when *ARGONAUT* submerged on false contact and *NAUTILUS* followed. They surfaced about 0901 but were almost immediately forced down again, this time by true radar contacts. The boat from the *NAUTILUS* with its volunteer crew of five men was strafed by one of the planes and its crew probably killed. One man from ashore who had decided to swim to the *NAUTILUS* arrived exhausted just as she went down. He was at the "limit of his endurance" but nevertheless swam back ashore.

Japanese planes were over the atoll much of the day from about 0920 to 1730. Four large flights bombed and strafed the length of the main island, the smaller island to the north, and Little Makin to the south. Our forces remained under cover during the bombing and received no casualties except for those strafed in the rubber boat.

With no chance of reaching the submarines during daylight, the marines on the beach turned back ashore; and now the good fortune of their disaster was revealed. As patrols spread out over the island they discovered that contrary to the opinion of the previous evening there was no strong resistance remaining. In fact, there was practically none.

Reconnaissance patrols would have been invaluable the previous evening.

On the "front" Japanese were lying dead around their machine guns or behind palm trees which had been cleanly pierced by our .50 caliber AP bullets. Throughout the day only two snipers were encountered. They were shot. Total enemy dead counted on the field of battle was 83. These with personnel on the two sunken ships, resulted in a total loss to the enemy of 100 to 150 men.

Patrols fired gasoline stowage of 700 to 1,000 barrels, destroyed the main radio station, and carried out other demolition. No heavy gun fortification existed. When the submarines reappeared off the landing beach at 1930 they were requested to proceed to the quieter water at the lagoon entrance. A sloop in the harbor had appeared to be likely transportation for our troops but on inspection, after a single Japanese Marine defending it was killed, it was found unseaworthy. Remaining rubber boats and a native outrigger were used, the submarines being reached at 2330, 18 August, after nearly two days ashore.

The return journey was without event except for the excellent surgery of the accompanying Navy doctors under difficult conditions. *NAUTILUS* moored at Submarine Base, Pearl Harbor, about noon, 25 August, and *ARGONAUT* at 1245 (-9½) 26 August.

CONCLUSIONS

SUBMARINES WERE EXCELLENTLY HANDLED and proved themselves well suited for raider operations; however, they need several changes to improve habitability. Humidity and heat were severe even though additional air conditioning units had been provided. It would have been impossible to take care of the large number of men aboard with existing equipment had most of the cruise not been made on the surface. *ARGONAUT* is now being converted into a submarine transport, with necessary changes to make her more suitable for prolonged cruising with a large number of men aboard.

THE RAIDER LOADING AND LANDING PLAN had several defects which should be eliminated in subsequent operations. A single unit with all boats should be in one ship. Units should load in boats in desired landing order, and boats should proceed in waves to the beach so that reorganization will not be necessary ashore. Frequent drill in this phase of landing is essential.

IN RAIDS OF THIS NATURE WHICH DEPEND ABOVE ALL ON SURPRISE and swiftness of execution, the raiding force cannot let itself be tied down by position fighting. It must maintain mobility, striking rapidly, seeking to surprise and rout the enemy before they can recover and organize defenses. Should the force be pinned down by a "fire fight," it must continue offensive reconnaissance instead of retreating or remaining static.

After the first part of the engagement, the raider force did not strike aggressively; for example, the platoon on the left flank suffered no casualties and made slow progress.

THE PLAN OF OPERATIONS, INCLUDING WITHDRAWAL, MUST BE ON A DEFINITE TIME SCHEDULE, as in the subject operations. It is necessary to coordinate the raid with the movements of ships. With effective anti-submarine measures the Japanese could have prevented the submarines from remaining an extra day.

RECONNAISSANCE PRIOR TO LANDING MUST BE EXTENSIVE. Raiders landing without organization on the beach might have been stopped by a single machine gun. In addition to periscope reconnaissance, ground reconnaissance or information is desirable. In this operation it could have been obtained by landing a man ashore in advance of the raid.

NATIVE REPORTS SHOULD BE CONSIDERED WITH SUSPICION. The Japanese may have deliberately spread the rumor of reinforcements in order to influence the decisions of the raider commander. Active patrols would have given him sound information as to the location and strength of the enemy.

The old story in war of the *importance of the offensive* was again demonstrated. On the afternoon of August 17, had the raiding force sent out reconnaissance patrols and pushed forward instead of withdrawing, they would have discovered that the apparent heavy resistance was the fire of only a handful of men fighting to the death. They could have destroyed installations on the island and reembarked at their leisure, probably saving most of the loss of life from drowning and from strafing by planes on 18 August.

RADAR WAS INVALUABLE both for plane contacts and for navigation close to the beach in strange waters at night. SD radar picked up one group of planes at sixteen miles.

COMMUNICATION appears to have been satisfactory between submarines but they had difficulty receiving messages from the portable radio sets ashore, especially when these were carried across the island and were transmitting through trees. Similar experience in Guadalcanal confirms the need for an improved portable voice radio.

DIESEL-POWERED SUBMARINE BOATS would have been valuable on this expedition and will be carried in future ones.

A MORE RUGGED TYPE OF OUTBOARD MOTOR than the Evinrude is needed. If better ones are available, it is requested that a suitable supply be obtained.

SEVERAL MEN, HIGHLY TRAINED IN HANDLING BOATS THROUGH SURF, should be attached to each raider unit.

BOMBARDMENT AMMUNITION for 6" guns, under production at the time of this expedition, has now become available and is being supplied to submarines mounting this caliber of gun.

JAPANESE DEFENSE FORCES were very good at camouflage, were bold and resolute, and fought until killed. Apart from these excellent characteristics, however, they appeared to have been inferior to our marines. Their fire power was weak, their aim poor, and their dispositions faulty, most of the men being bunched so that they were killed in groups. With equal courage, approximately equal numbers, and equal boldness of leadership, our marines will defeat the Japanese every time.

At no danger of too frequent repetition, the final recommendation of the raider commander, wrought from sore experience, is set down here again: "The night of August 17 * * * emphasizes the truth that is as old as the military profession: No matter how bad your own situation may appear to be, there is always the possibility that the situation of the enemy is much worse." To this might be added another truth that a few resolute men seem like battalions.

Through the courage and endurance of the marines and cool headed cooperation of submarine personnel, this expedition was successfully carried to completion against and by the aid of various chances of fortune. Losses were somewhat larger than they should have been but the goals of the expedition were achieved. Considerable damage was inflicted on the Japanese, and at a crucial time in the Solomon Islands operations they were forced to divert men, ships, and planes to the relief of Makin Island.

The Task Group Commander made the following pertinent remarks:

NAVIGATION

This constituted one of the most baffling angles of the problem as aside from so called tangents on the island there were practically no distinguishing landmarks. These tangents when ships were in position for landing troops crossed at an angle of approximately 160° thus being of little value in establishing position laterally along the beach. It was discovered moreover, that existing charts of the atoll were quite inaccurate in this area. It was also indicated that contrary to information contained in the Coast Pilot, depths to eastward of the barrier reef did not drop off sharply but rather shelved in from a distance of about 1½ miles from the reef.

COMMUNICATIONS

This proved to be one of the most unsatisfactory features of the operations, particularly with regard to ship to shore communication. The need for supplementary means of communication to voice radio was apparent, particularly during daylight hours, and in future operations. this feature should be gone into more thoroughly.

In the apparent absence of anti-submarine craft free use was made of the QC equipment for communication between the two submarines during daylight, but in an area adequately patrolled by anti-submarine craft this would prove impracticable, as would the use of flashing light at dark, a method which was also sparingly used.

PLANNING

This was faulty in that the matter was not placed in the hands of those responsible for this phase of staff work as a concrete proposition, in sufficient time to permit a thorough and unhurried survey of the problem.

It is believed that the tendency was to make the plan in too detailed form and too inflexible. This undoubtedly stems from the history of guerrilla warfare and previous commando experience. It is submitted however, that in guerrilla warfare as well as in commando work the attacking force has most accurate knowledge of the terrain either from local knowledge or from intelligence reports, and in most cases detailed knowledge of the strength and disposition of the enemy forces as well. When such information is available detailed planning is an assurance of success. On the other hand where the unknown both in regard to enemy terrain and forces and to the capabilities of our forces assumes as large proportions as was the case in this instance, an inflexible plan is an invition to catastrophe.

It is realized that with the element of surprise so important a factor, communication at the scene of action must be held to a minimum, but it is believed that by means of a general plan with wide latitude for change, and by more thorough indoctrination of the intentions and methods of the leader, plus as much field training of the entire naval and marine units as possible, that greater assurance of success under various conditions will be had, even if not of the magnitude of the one lucky one achieved where everything went according to plan.

SUMMARY AND COMMENT

The experience had in this instance when efforts to reembark in the face of practically impossible surf conditions, almost resulted in disaster, indicates that the time and locality of embarkation within certain limits, should be designated by the commander of the shore forces, and not set forth arbitrarily in the operation order. In this connection it was revealed here that the time necessary to complete mopping-up operations is greatly in excess of that previously thought necessary. This might not be the case if accurate knowledge of terrain and enemy forces were available prior to the raid.