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Flagship of the Commander-in-Chief

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June 6, 1942

PACIFIC FLEET CONFIDENTIAL MEMORANDUM 29CH-42.

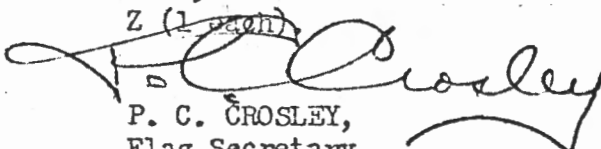
From: Commander-in-Chief, United States Pacific Fleet.
To: PACIFIC FLEET.
Subject: Gunnery Information.
Enclosure: (A) Gunnery Bulletin No. 2-42.

1. Enclosure (A) is forwarded for information.
2. This bulletin covers lessons gained in action up to 31 May, 1942. It is issued to help you get the most out of your equipment in training and in action. Please forward promptly any suggestions on how it can be made of greater aid.

DISTRIBUTION: (21CM-42)

List II, Case 2;
P, X, EN3, EN6,
ND11-ND14, NY8-10,
NB49, NT1-11.
Z (1 each)

L. J. WILTSE,
Assistant Chief of Staff.


P. C. CROSLEY,
Flag Secretary.

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I-RADAR -

1. Radar again shows that it is the outstanding development of the war in fire control. There has been much improvement in the technique of its use, and, as ships have gained experience with it, a steady decrease in casualties; but we are still not getting all that we should out of this splendid instrument, partly because of poor communication of data. The more important points in connection with Radar follow:

(a) Targets have been almost invariably picked up by one or more ships in a formation at long ranges of 40 to 70 miles (sometimes only 20 to 25 miles with very low planes).

(b) There are still some cases in which the warning from Radar guard ship is not getting to other ships in the formation in time to be of any use for gunnery. Even in a ship obtaining the Radar contact there are instances in which the data have not got through to gunnery stations. All ships must maintain Radar plots, must stress coordinated Radar and fire control drills, must develop suitable communication procedure, and having selected capable talkers must drill them constantly. One of our weakest links in battle is still communications.

(c) When, as in most instances, Radar information is received in time by the gunners, as one gunnery officer puts it, picking up the distant planes and tracking "is just like a Baker run".

(d) In every action TBS has been cited as being invaluable for transmission of Radar information from ship to ship, in preventing firing on own planes, etc.

(e) Despite the excellence of Radar, don't get the feeling that lookouts are not as important as ever. Radars are not perfect yet. In some instances they have failed mechanically at a critical moment. There have been times when Radar like any other lookout made the error of staying concentrated on a single target instead of sweeping through the full arc. In a general melee, such as the Coral Sea, lookouts must keep on the alert to prevent guns from firing on own planes and to give warning of approaching planes which may be difficult to pick up on the Radar, screen already filled with plane "pips".

(f) There is still plenty of need for guns too! Enemy planes still get through our fighter plane protection. The advantage that we have over the enemy in Radar and fighter direction is not being exploited to its fullest extent because of lack of experience and training. The most notable

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failure in fighter direction was in the Coral Sea action when a host of planes was picked up by Radar at 68 miles; yet out of 17 fighters in the air only 3 were vectored on the enemy before the attack developed. Intensive training and standardization of methods are necessary.

(g) Radar as a part of fire control itself becomes more and more promising as we gain experience with it. The FC set is being used extensively at sea. One destroyer reports that five ranges from it give a perfect setup of range rate and that bearing accuracy is good enough for gunfire. Ranges as high as 25,000 yards on cruisers have been reported by large ships with high antenna. Destroyers with lower antennas report ranges of 17,000 yards on cruisers -- which looks very promising for surprise night attacks. A battleship reports being able to range on 14" projectiles to about 13,000 yards. A new cruiser conducted a night shoot using FD Radar with excellent results: the first eleven salvos straddled!

(h) Even the submarine Radar, after early disfavor largely because of unfamiliarity with the set, is now gaining many advocates. One submarine commander reports that his Radar consistently picked up targets before surface lookouts saw them. Some of his personnel doubted that the pip on the screen really represented a plane until one time, as they crash dived to 140 foot after a "supposed" Radar plane contact, depth charges went off close aboard.

II.- ENEMY ATTACKS AND FIRE CONTROL.

A. High Level Bombers.

1. Bombers approached generally as previously reported, that is nine or less planes in a very flat vee formation. Most rangekeeper solutions varied between 155 and 170 knots; some were higher. Approach altitudes have started at about 10,000 or 15,000 feet with apparently a gradual glide or climb to about 11,000 feet for the final approach.

2. The Japanese are careful bombers taking advantage of the sun when it is high or of the wind, clouds and visibility in general. They look over the formation and, other factors being equal, bomb from the direction in which fewest guns can bear. So you can expect them from any direction, especially one favorable to them.

3. They use various ruses including having a shadower stay out of range for some time and then start a bombing approach. If ship observers are fooled and concentrate on the shadower, which frequently happens, the high level bombers may then come in undetected. This emphasizes the

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serious consequences of lookouts and other gunnery personnel being distracted from their assigned sectors.

4. They even try the old hidden ball play. While a high level formation is coming in, a low plane may make a sneak run hoping that it will either distract the ships' attention or itself get in undetected. You must be alert to get ahead of the Jap.

5. They are generally credited with coming in persistently to the point of release regardless of antiaircraft fire. Some do attack in this manner and some will attempt to crash a ship when they are shot down. However, there are lots who would rather run away to fight another day. One report has the remark "The first Japanese formation gave up the attack at a position angle of about 50°, turned to the right, and then became heavily engaged by our fighters. Our antiaircraft fire contributed materially to turning away the attack. My lookouts said they saw some bombs two miles outside the disposition."

B. Gunfire Against High Level Bombers.

1. Gunfire has improved in effectiveness. However, many faults still show up. Most first bursts are far off the target, being low and widely dispersed. With several ships firing, it is difficult to spot; as one gunnery officer put it, "the entire sky is covered with bursts". Some "gunners" said they could not pick out their bursts throughout the run. Others felt that they had the rhythm of their own fire and could spot effectively. One tried the questionable method of spotting off radically and then bringing his bursts on; this may work against a slow target making a long run, but against a modern fast bomber wastes most of the firing time. With good ranging and good director operation, it is believed that rate control without spotting is the best method of controlling the fire. By daily stereo trainer exercise and daily comparative ranging runs by all operators, any ship can insure that it will have good ranges. Radar increases this assurance.

2. The tendency is to open fire too soon at 12,000 or even 15,000 yards. 10,000 yards appears to be a desirable maximum because of poor optical ranging at greater distances and the lag that enters into the solution causing first bursts to be almost invariably low. With FD Radar we may be able to increase the range of opening fire to 12,000 yards or more.

3. There is evidence of poor director training so that bursts oscillate in deflection. Radical maneuvering to avoid bombs is a factor.

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in disrupting rangekeeper solution and accuracy of director laying, especially on destroyers.

4. Fuse setters and gun crews in general are still not trained to that point that they instinctively do the right thing. A large percentage of fuses are still set incorrectly or not at all; one ship reports being in danger from duds fired by its companions. Few men think when the battle is on; most act instinctively from habits they have formed in drill.

5. Guns still fire at targets going away. This is very dangerous not only to adjacent ships and to own fighters coming in on the target, but primarily because it fixes the ship's attention away from the real enemy - the next plane attacking.

6. Ships must fire more practices, devising means to do so at sea; and must conduct more intensive drills of condition watch crews to fix good habits of fire discipline.

C - Dive Bombers and Torpedo Planes.

1. The Japanese dive bomber tactics varied widely even in the same attack group. The following methods were observed in the Coral Sea action:

- (a) Long low glide at 35-45°.
- (b) 45-60° dive with sharp 65-70° turnover just prior to release, and a sharp pull out.
- (c) 70° dive from about 10,000 feet.
- (d) Releases as low as 700 feet are reported though usually aircraft were turned back by AA fire and dropped sooner.

2. Dive bombing was coordinated with torpedo plane attacks. Torpedo planes used two methods of attack in the Coral Sea action. After closing our ships at 10,000 to 12,000 feet altitude (one reason for the fighters not making contact was that the formation was expected at a lower altitude), when within 10 to 20 miles they lost altitude and then

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approached in one of the following manners:

(a) From about 10,000 yards planes flew in low level flight, like our own method, and dropped from about 100 to 200 feet altitude.

(b) One group, using the British system, stayed in formation to about 6,000 yards at high elevation then broke formation and attacked individually in 20-30° glides, dropping torpedoes from 200 to 500 feet at 150 - 200 knots speed. Some releases were as close as 700 yards to the ship attacked, others as far as 4,000 yards.

3. There was much difficulty with target designation. Type and number of targets, relative bearing, and range, should all enter in the reports. Control and Battery Officers or even individual Gun Captains on a surprise target should open fire on the nearest and most dangerous attacking plane without awaiting designation. Proper designation, however, speeds up taking the target under fire in adequate time.

There were so many planes in the air in the Coral Sea action that instances were again numerous of dangerous targets not being sighted because personnel attention was diverted by crashing or retiring planes. The following is a typical report: "The first thing I saw was two bombs falling and the plane pulling out of a dive. Not a shot was fired. The lookout had been looking at the debris also."

4. The value of screening vessels around the carriers in repelling torpedo attacks was outstandingly demonstrated in the Coral Sea. Since torpedo planes approach either from a low level or on a glide, for much of the run they are a straight, no deflection shot for screening ships.

Many torpedo planes were shot down by the screen. The following comments appear:

"One plane seemed to break up in the air and burning portions fell around us."

"One plane burst into flames and made a perfect spiral of smoke and crashed off the port bow."

"A torpedo plane approached at at least 200 knots, turned under heavy fire and dropped at 2,000 yards."

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"In the second torpedo attack, four were shot down almost simultaneously by the 5" fire of the LEXINGTON, a heavy cruiser, and a destroyer."

5" fire appeared to be very effective, especially when in continuous automatic, director controlling, continuous rate control and no spotting.

The screen's close range weapons were also very effective against torpedo planes as they crossed close aboard or overhead:

One 20mm sawed a plane in two.

Several ships give their 1 1/2" and 20mm batteries credit for shooting down one or more planes.

The distance of the screen from the carriers depends of course on many factors, all of which must be evaluated on the spot by the Task Force Commander; but from experience so far it seems that for best protection against torpedo plane attack a distance of about 2,000 yards or less is satisfactory. Some of the carrier guns may thereby be blanked off, but this is immaterial if the attacking plane is prevented from making a straight approach, is damaged by the screen vessel, or is forced to drop torpedoes at extreme range.

5. Fire control in the Coral Sea action and battery performances were much improved over previous engagements. The consensus of gunnery officers in the action is that about half the planes attacking were shot down by gun fire (in this action very few were shot down by fighter planes, so the ship had to depend primarily on guns and maneuvering for safety).

However, the fire could have been even more effective. The following faults were frequent:

(a) Targets were not fired upon because of poor alertness of gunnery personnel.

(b) Initial fire in most cases was erratic, especially of 1 1/2" and 20mm guns. Bursts were behind and low. Pointers and trainers were slow in correcting. In some cases automatic weapon fire was opened at 4 or 5 thousand yard ranges.

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- (c) Some ships checked fire to spot, which is disastrous against a fast target.
- (d) The 5" battery performed well as far as materiel casualties were concerned, showing excellent upkeep. Fire discipline, as noted earlier in bulletin, is still weak.
- (e) The 1!1 battery performed excellently on some ships and very poorly on others. One ship reported "over a hundred casualties". This unhappy condition is directly due to poor upkeep and untrained loading crews. The 1!1 gun will fire with few casualties if care is taken to keep it absolutely clean, free of burrs, parts replaced in time, hard grease removed from parts, properly lubricated, etc. In other words, religiously follow the check off list and fire (only test rounds if im- possible to do any better) every two to four days.

6. Ammunition Expenditures were much lower than many of our pessimistic gunnery officers have prophesied.

Despite almost continuous firing at every opportunity when a plane was even in eye-sight, the following average expenditures of ammunition occurred in the last day of the Coral Sea heavy fighting:

(a) Destroyer Division.

- 1. 5" - 65 rounds per gun.
- 2. 1!1 - 500 rounds per gun.

(b) YORKTOWN:

- 1. 5" - 50 rounds per gun.
- 2. 1!1 - 180 rounds per gun.
- 3. 20mm - 330 rounds per gun.
- 4. .50 cal. - 880 rounds per gun.

It may be noted that the screening vessels fired considerably more than the screened vessel against which most of the attacks were directed.

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"D" 4. CONCLUSION

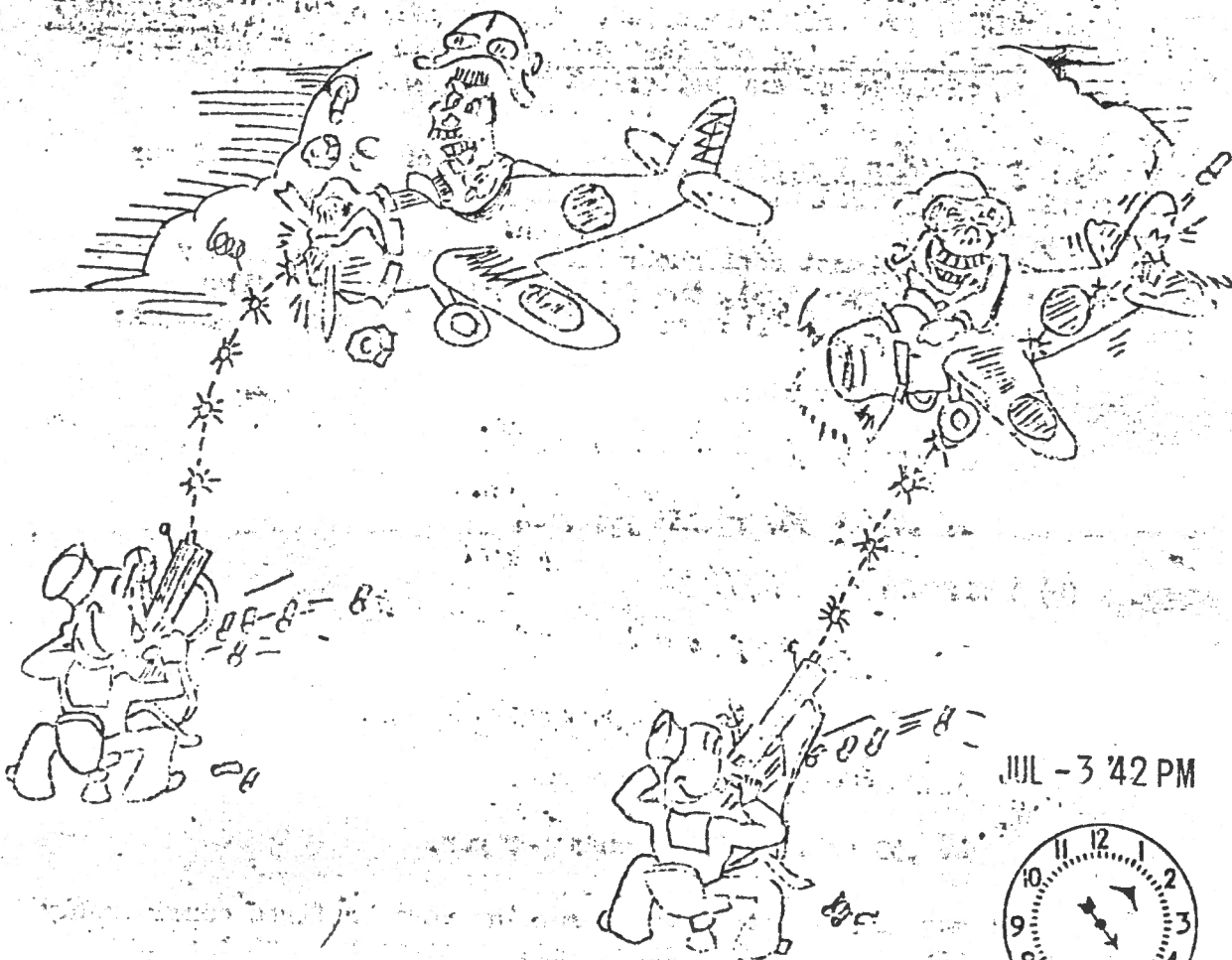
If this Bulletin accomplishes nothing else, it is hoped that it will reduce (before the Jap does it in another way) a discouragingly large number of gunners who are BEHIND AND LOW and never catch up. In this connection the following extract from a recent despatch is quoted for information and guidance and for promotion of good health and safety:

"If you shoot him in the prop,

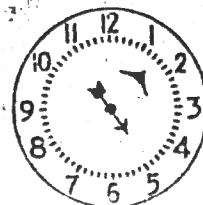
You'll make the basket flop.

If you shoot him in the rudder,

You'll only make him shudder."



JUL - 3 '42 PM



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