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TACTICAL PROBLEM II-1934-SR.

CRITIQUE

by

Captain R.C. MacFall, U.S. Navy

16-17 October, 1933.

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DEPARTMENT OF OPERATIONS
Naval War College
Newport, R.I.
October, 1933

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CRITIQUE.

By Captain R.C. MacFall, U.S.N.

This tactical problem was designed to give the students an opportunity to estimate a tactical situation in which all types of vessels might become engaged in general action, in other words, a Fleet Battle. In addition, base facilities were available to one side and denied the other.

As usual, numerous students became involved in the strategic phases of the problem; consequently, the tactical part of the problem was not as thoroughly treated as would otherwise have been the case. However, many settled down promptly to consider the tactics of the problem and produced well thought out Battle Estimates and Plans.

A careful reading of this problem would have saved a lot of confusion. In each of the Special Situations it is stated that the Commander, after having received information of the numbers and composition of the opposing force, made a Strategic Estimate, deduced his mission and arrived at a decision, and listed the supporting measures (in general) which would be necessary to accomplish his mission. In other words, strategy had determined its course of action and included, among its supporting measures, a decisive engagement. The Tactical Estimate was an estimate to determine the best way to employ the forces available to bring about a victory in the decisive engagement.

Looking further on in the statement of the problem one finds listed the Requirements of the problem - that is what is required to be produced by the student in his solution. Some confusion here undoubtedly was due to the sequence of the stated requirements. The Operation Order was required after the estimate for the battle plan. It might better have been placed before, which is the natural order.

The operation order can be directly developed from the Commander's strategic estimate already stated in the problem. Detailed consideration must be given to the supporting measures in order that the movement of the various forces may be initiated.

In the case of BLUE, the supporting measures were, as laid down in the problem -

1. An off-shore patrol of DDs to cover the approaches to NORTHEAST PASS during the night prior to the sortie.
2. A sortie.
3. A search to locate the enemy and tactical scouting to maintain observation.
4. Maneuvering to effect contact between enemy and own main bodies.
5. A decisive engagement.
6. A chase.

The requirements were -

#5 - The operation Order initiating the movements of mobile combatant forces, and operations leading to the engagement.

#7 - Scouting plan (graphic) to meet supporting measure #3 (Search and contact scouting).

#1, 2 & 3 - An estimate of the tactical situation, a typewritten Battle Plan and Battle Disposition (graphic) to meet supporting measure #5 (a decisive engagement).

#4 to 6 - Cruising and approach dispositions to meet supporting measure #6 (maneuvering to effect contact).

The Sortie plan to cover supporting measures 1 & 2 (off-shore patrol and sortie) were not required nor was a plan for a chase (Supporting measure #6) required. Possibly because such a plan depends upon a knowledge of who and what remains to be chased!

Requirement #8 (Communication Plan) is one that, like the poor, is always with us. It is a part of any major operation order and requires an intimate knowledge of our communication facilities and capabilities. The War College Rules give a very close approximation of the possibilities and limitations of communications; the recent pamphlet on the subject (Communication Instructions Issued as Annexes to Operation Plans and Orders), gives an indication in general terms of what should be their content and arrangement.

If BLUE solvers had carefully read the "Requirements" of the problem, they would have saved confusion and unnecessary labor and would have had that much more time to devote to their real problem.

The same applies to the ORANGE solvers: their Strategic Estimate had been made and certain things were required of them to cover certain selected supporting measures.

We will now get back to the problem itself.

We have our directive from strategy, ships are about to move and we must consider the tactics of the situation in order to develop a battle plan, cruising and approach dispositions, contact scouting, etc., etc.

Looking at it from the BLUE side, BLUE, as stated in the General Situation has accomplished wonders in the first six months of the war. BLUE controls the PHILIPPINES and has ousted ORANGE from the MANDATED ISLANDS. ORANGE has no bases south of Lat. 20 N. BLUE convoys have moved with only minor damage. BLUE is ready to move northward from the PHILIPPINES as soon as needed supplies are received.

BLUE morale is high and ORANGE must be impressed by this fact. Furthermore, BLUE efficiency must have been amply demonstrated by now. ORANGE will not underestimate these vital factors. ORANGE must realize that BLUE has valuable base facil-

ities at TRUK for TRUK has been the focus point of BLUE East and West bound convoys. ORANGE will not underestimate this factor. (Most students did).

Seventy percent of the ORANGE capital ships are in a position to threaten BLUE lines of communication - ORANGE has certainly decided upon stronger measures to break BLUE lines of communications, measures which indicate a strong offensive attitude on the part of ORANGE. BLUE, with five capital ships, one third of BLUE's capital ship strength, must expect a fight to the finish if he starts on his way to the PHILIPPINES or moves against ORANGE.

Looking at the situation from the ORANGE side, BLUE advance in six months of the war has reduced ORANGE confidence. Her campaign to date has only resulted in the crippling of three BLUE capital ships. A victory is essential to ORANGE morale and necessary to prevent BLUE movement into ORANGE territory.

The ORANGE commander has been given a major portion of ORANGE fleet to accomplish a victory over a portion of the BLUE fleet. The victory must be decisive in order to break BLUE line of supplies and must have the effect of reducing BLUE's relative strength.

A fight which results in approximately equal losses places ORANGE in a worse situation than she now occupies, relatively speaking.

ORANGE realizes that BLUE knows he cannot move his supplies safely until ORANGE has been defeated or driven off and therefore BLUE is probably anxious to bring ORANGE to action. This urge on the part of BLUE may prove a strength factor to ORANGE, if utilized. ORANGE can deny action until the situation develops to ORANGE advantage.

So both sides are anxious to fight; BLUE in order to remove as soon as possible the menace to his lines of communications;

ORANGE to accomplish a victory which not only delays BLUE's operations against ORANGE home territory but also improves his relative naval strength. ORANGE will have but two days and one night in which to accomplish his mission, but BLUE does not know this.

ORANGE may be able to do something in the next 24 hours to improve his situation - certainly he should try.

BLUE situation remains impossible as long as ORANGE is in the vicinity of TRUK and this will force BLUE to seek action. A decision for BLUE, even if barely a victory, will leave BLUE forces in the PHILIPPINES decidedly superior to ORANGE remaining strength. This to me gives the tactical attitude of the two Commanders.

ORANGE strongly offensive when he has achieved a situation decidedly favorable to himself; denying action, at least for 24 hours, unless such a favorable situation develops earlier.

BLUE anxious to reach a decision as soon as possible so that his supplies can move; willing to fight with even chances on the assumption that this ORANGE force will be so badly mauled in the ensuing action that it will be impotent for some time to come.

Now let us take up the plans of the two Commanders selected for the playing of this problem.

DIAGRAM #1 - BLUE Operation Order.

The BLUE Commander issued his Operation Order #1 in which he stated his Mission in the information paragraph with the result that he reached a decision almost identical with his Mission. The Mission is not ordinarily stated in an Operation Order. It is usually stated in Campaign Plans and Operation Plans.

In the statement of the problem, Vice Admiral S's mission as deduced was given. Also his decision and supporting measures. The details of the supporting measures had to be worked out.

All the BLUE Commander had to do for Par. 1 was to put in what he considered essential new information.

BLUE Commander also gave quite detailed "Assumptions" as to what the enemy might do. Somehow this seems more suitable for campaigns and operation plans. What "assumptions" generally result in is a statement of the most probable course of action of the enemy. A subordinate may be in doubt, in case the enemy doesn't follow this most probable course of action, as to whether or not a new situation has arisen for which the Commander has made no plan or whether the Commander just didn't know his job. Yet a proper decision by the Commander will cover not only the most probable course of action but also other likely courses of action the enemy may take. In other words, assumptions must be handled with care. In this particular case the assumptions were absolutely correct.

For his decision, BLUE Commander had only to take the decision laid down in the problem. As a matter of fact, he did to all intents and purposes.

His supporting measures, Par. 3., were good. One vital feature of his plan as it worked out in the game, was the maneuver which kept his submarines between enemy and own battle line. Yet no mention was made of this in his operation order or battle plan. Possibly this was doctrine.

In game board operations this is so rarely done that it can hardly be considered doctrine, yet such cooperation on the part of surface forces is vital to the success of submarines.

DIAGRAM #2 - BLUE Battle Plan.

You will note that in paragraph 2 of this order the BLUE Commander arrived at a decision which was in complete accord with the Strategic Estimate.

The Strategic Decision as stated in the Problem was:
"To destroy ORANGE Force threatening Convoy 7, by engaging

decisively in a fleet action with all available forces in order to assure the early arrival of Convoy 7 at MANILA."

What was the tactical accomplishment required by this decision? The destruction of the ORANGE force threatening the convoy. The Tactical Estimate is then for the purpose of determining the best way to accomplish this destruction. The decision, as expressed in Par. 2 of the battle plan, is the plan of employment of all the forces to accomplish this end, the destruction of this ORANGE force. Paragraph "3" gives the role each of the parts of BLUE force is to play in the general plan of battle expressed in Par. 2.

Generally speaking, the plan as shown, covered BLUE operations as conducted. As stated before, the very important maneuvers of the surface forces to keep BLUE submarines in an area favorable for attack was not mentioned in the Battle Plan, yet it was BLUE's most effective employment of his forces. It might well have been stated in Par. 3 (x) that BLUE Commander intended to maneuver his surface forces to keep BLUE submarines in a position favorable for attack on enemy capital ships.

BLUE had decided on an action which divided itself into four parts:-

- 1st; An air battle to gain control of the air to insure BLUE plane spot at initial long ranges;
- 2nd; This phase was the long range gun action to take advantage of BLUE long range superiority;
- 3rd; A general action by all forces at decisive ranges;
- 4th; The chase to complete the destruction of enemy forces.

This plan had no unusual features. It was the orthodox battle plan applying force with increasing pressure as the battle closed from air range to decisive battle ranges.

DIAGRAM #3 - BLUE Cruising Dispositions.

BLUE has two cruising dispositions, #2 LB for night, and 2 RB for day. The first is of the rectangle type with forces disposed to meet light force attack from the van or either flank, with submarines disposed some 10 miles in advance of the outlying surface forces and 25 miles in advance of the Main Body. Needless to say, with such a formation, the surface forces will have to govern their movements by the position of the submarines. otherwise the latter will be left out of the action in any situation where the enemy is located in any but the van areas.

Cruising Disposition 2 RB, day cruising disposition, may work if there are no enemy subs in the area. But BLUE well knows ORANGE submarines are present. Moreover the concentration of cruisers as shown is only justified if there is accurate information of the enemy. A fast enemy cruiser force might cut off BLUE cruisers in an attack from the flank, and ORANGE has such a force.

It would seem that the cruisers might better have been stationed to cover both bows as well as the van, and that destroyers might better have been actively employed defending BLUE capital ships against submarine attack until they had to take up their attack stations. This has all been covered in Captain Coffey's paper on "Light Forces in the General Action".

DIAGRAM #4 - BLUE Approach and Battle Dispositions.

BLUE used standard approach and deployment dispositions. He had three specified approach dispositions, which permitted employment of his light forces in various combinations on either flank, the decision as to which was to be used to be made as the situation developed.

Likewise, there were six battle dispositions, which permitted almost any combination of light forces on the flanks.

Needless to say, such a diversity of employment requires an early realization of the situation by the Commander-in-Chief and excellent communication facilities. However, as most of these communications will be required before action is joined, there is reasonable assurance that such communications will get through.

It will be noted that the BLUE carrier is allowed to take position at discretion in the various dispositions. In all of his plans and considerations, the carrier is given a more or less independent status. BLUE planes at TRUK are organized as a separate attack group, VS planes of Crudiv 9 are used for tactical scouting, spotting planes are reserved for spotting purposes.

The carrier VS planes are employed first on a quick search in the area of BLUE advance to locate enemy submarines, then on a widely extended search to locate enemy Main Body and carrier. BLUE bombers and torpedo planes are to be held in readiness to be launched as soon as suitable objectives are located by the search.

The carrier's 4 VJ planes are to patrol the area of BLUE advance.

But no considerable thought is given as to the possibilities of protecting the carrier itself from an attack. Yet this carrier is an invaluable asset to BLUE in the further operations contemplated.

BLUE, in the statement of the problem, has a landing field at TRUK with ample facilities for repairing and fueling planes. All BLUE vessels were fueled by 0100, 15 August.

Would it not have been possible to land all planes from CV-4 before 0100 and then had CV-4 sortie at 0100 and stand away from last known position of ORANGE force at high speed until daylight when further information might be had?

BLUE planes could have operated out of TRUK for the earlier phases of the engagement, if one occurred during the forenoon.

In the meantime CV-4 could have kept pretty well clear of air attack and could have returned to the neighborhood of TRUK after the first flurries of air attack, picked up her planes and continued her operations with the BLUE Escort.

This may not have proved completely effective, but it would have been at least an effort to save the carrier.

DIAGRAM #5 - ORANGE Operation Order.

As in the case of BLUE, ORANGE Admiral O.C. makes an estimate of the strategic situation during the afternoon of 14 August upon information received that day from an air reconnaissance of TRUK.

His Mission: "To interrupt BLUE's OAHU - MANILA line of communications, in order to keep BLUE Fleet immobile".

His decision as to the best way to accomplish this was: "To destroy the first considerable BLUE Force leaving TRUK, by decisive engagement".

His supporting measures were:

1. A general movement to the northeastward during the early part of the night to avoid possible night attacks on surface vessels.
2. A return toward TRUK in the morning in order to facilitate aircraft observation of that base, and to be in a position to intercept any considerable force which may attempt to leave. The Main Body will be 100 miles 40° from the entrance to NORTHEAST PASS at 0500, 15 August.
3. Early observation of the approaches to TRUK, and of the harbor itself, in order to obtain prompt information of the departure of any considerable force.
4. A search to locate any force which departs, followed by tactical scouting to maintain observation of its composition, disposition and movements.

5. Maneuvering to effect contact between the principal forces.

6. A decisive engagement.

7. A chase to complete destruction of all possible enemy forces.

Required of the Solver:

Req. #5 - The operation order to put the strategic decision and supporting measures, already stated in the problem, into effect.

{ Req. #1 - An estimate of the tactical situation,
Req. #2 - a battle plan, resulting from the estimate, and
Req. #3 - Battle disposition (graphic) to fulfil supporting measure #6 - A decisive engagement.

Req. #7 - Scouting plan to fulfil supporting measure #3, early observation of the approaches to TRUK and the harbor itself, and, #4, search to locate any force which departs followed by tactical scouting to maintain observation of its composition, disposition and movements.

{ Req. #6 - Cruising disposition, and
Req. #7 - Approach disposition, to fulfil supporting measure #5, maneuvering to effect contact between the principal forces.

Req. #8 - A communication plan.

Looking at the diagram, this solver used paragraph one for information as it is intended.

He also promptly used the decision arrived at in the strategic estimate, paragraph 3 gives the orders to his subordinate commanders which meet the requirements of the supporting measures and also requires their presence in the general action.

Attention is invited to the task assigned to the submarines, which is almost certain to result in a wide flung scouting line at daybreak. Are submarines proper instruments for scouting?

They are often so used but rarely effectively. Possibly it would have been better to have only used a few for observation and to have retained the major portion for a striking force. After all, two divisions of cruisers and one carrier were to engage in scouting at daybreak.

DIAGRAM #6 - ORANGE Battle Plan.

In the Battle Plan ORANGE took as his Mission the tactical accomplishment required by the strategic decision, the destruction of the first considerable BLUE force leaving TRUK.

ORANGE assumptions were not too detailed and were general enough to cover the likely courses of action.

Coming to the plan itself, paragraph 2, it is quite evident that ORANGE has decided to engage in a hammer and tongs action. And this with a force nearly equal in strength.

Would he have done this in fact? Was this decision reached because the solver, for game board purposes, wished to engage promptly?

In solving, the student should attempt to do what he would do in the actual situation.

An ORANGE victory is necessary, yet ORANGE relative naval situation must be improved. With so little disparity of forces, surely ORANGE was justified in delaying engaging until a favorable situation developed or until he was forced by time and circumstances to engage or otherwise lose his opportunity.

An unusual assignment of forces is made in that the battle cruisers are assigned to defend rear of battle line against light forces. With ORANGE superiority in cruisers it would seem that this is an improper assignment for the battle cruisers. To properly defend against strong attack will require that the battle cruisers use all their guns, main battery and broadside, against the attack, which leaves ORANGE BEs outclassed. Furthermore, their speed advantage is more or less nullified by their station.

The battle cruiser design sacrificed protection for speed. Only by use of speed can they attain positions whose advantages offset their weakness in protection.

One might conceive capping the rear, but when one considers the tremendous increase of torpedo effectiveness on a following target, the rear is scarcely a position to be sought by battle cruisers.

It is noted that ORANGE has decided on a prompt closing of the range to 17,000 yards, where ORANGE has superior range band.

Paragraph 3 (c) assigns considerable of a job to the aircraft. Paragraph 3 (x) makes the battle plan effective for aircraft on discovery of the enemy - yet air torpedo attack is to be coordinated with light force torpedo attack, which is to begin some time after deployment.

That is a minor point; and after all, plans are subject to all sorts of interferences, in the air, especially.

DIAGRAM #7 - Cruising Disposition.

This is the night cruising disposition of ORANGE at 0500 on the day of the action. It has practically equal protection from attack in any direction, except the rear, and even there it is strong.

DIAGRAM #8 - Approach and Battle Dispositions.

Here ORANGE, as did BLUE, kept the destroyers unoccupied where they might well have been screening the battle line.

Also ORANGE carrier is perilously close to ORANGE Main Body. One thing is certain, a large number of ships is more easily located than a single ship. Any enemy force seeking the enemy main body is bound to find the carrier also. All roads are leading to Rome. Here again it would seem that the carrier should not be so near the main body so that sighting one locates the other; nor should it be on the line between the enemy and our main body, as

that is the most likely line of approach of searching planes and ships.

It would seem that it should be on the opposite bearing out to the limit of effective air cooperation. The enemy is less likely to detect it there, and if detected, it may be outside the effective radius of attacking planes.

As seen, in both approach and deployment, the battle cruisers are tied down to the battle line. Such an unbalanced arrangement of light forces as shown here seems only warranted when one can impose the direction of deployment on the enemy or when one is obliged by circumstances to deploy in a pre-determined direction. Otherwise, it handicaps the commander, he has to await enemy deployment in order to place his own light forces where they will be most effective against the enemy.

On the other hand the enemy can make a false deployment and then reverse the direction of deployment, leaving ones light forces in the rear of the action, a position that is ineffective and difficult to correct in time, or without confusion and interference with own gunfire.

DIAGRAM #9 - Moves 1 & 2 (0500 - 0612).

BLUE Commander had decided to sortie using NORTHEAST PASS on the morning of 15 August. At 0500 BLUE Main Body passed thru the Point of Origin, Lat, 7°-35' N.; Long. 152-03 E. The carrier, CV-4 plus 2 DD as screen, the submarine force of 11 subs, cruisers and destroyers had sortied earlier so as to be in the stations as shown at the beginning of this diagram.

The cruiser mine layer and 10 AMs, after having covered the sortie, accompanied the cruiser force, in the van, in a compact formation to the rear of the cruisers. The BLUE Commander had no definite role for this force in his battle plan and apparently expected them to have to return to port without having a chance

to join in the battle. However, these vessels might well have been screening important units of the BLUE Fleet. BLUE destroyers, it will be noted, are kept concentrated in squadrons with the exception of one squadron which is screening the cruisers, and 5 destroyers screening the 5 BLUE BBs.

BLUE carrier is out in the van, about twelve miles on the starboard bow of the eastern BLUE submarines, with two DDs as screen.

During the night of 14-15 August ORANGE had advanced his submarines towards TRUK at high speed and at 0500, 15 August three were in the vicinity of NORTHEAST PASS while 5 more were on a scouting line NW to SE the nearest some 20 miles from the entrance with a majority dispersed to intercept a BLUE movement to the Northwest.

ORANGE Main Body, in night cruising formation, was on course 231, speed 11, fleet guide was about 100 miles bearing 40° from NORTHEAST PASS at 0500.

The game begins at this point.

At 0445 ORANGE sub I-56, on the surface, sighted in the darkness BLUE Desron #5 on ENE course and by 0500 this information was in the hands of ORANGE Commander. However, other important BLUE units had already passed I-56 and were well out to sea. ORANGE submarines, on this contact, started concentrating towards NORTHEAST PASS. A flight of seven ORANGE VS was launched at 0500 to scout radially from NW to SE for a distance of 130 miles.

At 0530 BLUE launched 3 VS and 4 VJ planes to patrol ahead of BLUE Main Body, at a height of 5000 feet.

At about 0545 BLUE carrier, having moved to the NW to a position ahead of BLUE submarine line, launched 15 VS to scout radially in all directions for a distance of 150 miles. At 0530 BLUE and ORANGE submarines submerged to avoid detection during early daylight.

At 0538 ORANGE directed his cruisers to concentrate by divisions and directed order to divisions in formation and their distance ahead of fleet guide.

Three BLUE planes scouting towards the North and Northeast made three contacts with ORANGE destroyers between 0555 and 0557 and reported them as on Southwesterly courses.

ORANGE air activity began promptly at 0500. In addition to the 7 VS launched to scout for BLUE forces at sea, ORANGE sent 2 VS accompanied by 6 VF to investigate TRUK. As soon as these were clear, ORANGE carrier launched all planes to form up into two groups, an attack group of bombers and torpedo planes, and a protective group of VS and VF. The carrier itself then moved to the NE with its planes circling overhead, awaiting order to attack when information of enemy had been received from ORANGE scouts.

There is always a question as to the advisability of launching planes before an objective has been located. Yet to keep them on deck jeopardizes them in case an alert enemy launches an early air attack against the carrier.

Planes once launched, rapidly use up fuel, especially the heavily loaded bombers and torpedo planes. On the other hand in the air, they can be promptly sent against the enemy, once he is located; they are safe from destruction before they can take off and organize; and they are in a position to offer resistance to an air raid. Also, if no objective is located, the planes can be landed on the carrier and refueled. It would seem advisable, for the early morning period and until the area immediately dangerous to the fleet has been thoroughly searched, to get planes off carriers' decks and in the air.

BLUE carrier elected to keep his attack planes on deck until an objective had been located, or until an attack threatened. In the position taken by BLUE carrier, it was especially vulnerable to early attack. It was only by chance that ORANGE air scouts passed, out of visibility distance, on either side of BLUE carrier.

ORANGE submarine I-5, at 0542 and I-4 at 0545 sighted several destroyers on course NE and reported their course and position to ORANGE C-in-C. ORANGE I-57, submerged, heard propellers of large vessels at 0535 and by 0609 have reported their position and course to ORANGE C-in-C and to ORANGE submarines.

Shortly after six o'clock ORANGE scouting plane passed over TRUK and reported the BLUE convoy in TRUK.

ORANGE by six o'clock has a pretty fair knowledge of BLUE Fleet. He knows where the Main Body is, and three groups of destroyers have been located. The convoy is at TRUK. ORANGE flight of 3 VS and 6 VF sent to investigate TRUK reports at 0600 that the convoy only is at TRUK and turns towards the Eastward to gain information of BLUE forces at sea. A BLUE scouting plane, 1-S-10, sights this flight of planes and reports them to BLUE Commander. As a result of this contact BLUE Crudiv 9 launched 6 VS to scout the area 010 - 045 ahead of BLUE Fleet, and to observe the composition and movements of the enemy. This service of information was to be maintained, the planes to reservice at TRUK as necessary. BLUE carrier launched 18 VF, nine to guard the carrier and nine to proceed to the battle line and protect it from the flight of planes reported by BLUE scout 1-S-10.

By 0603 ORANGE flight of 9 planes sight and report the BLUE battleships, destroyers and cruisers. ORANGE, with this information which verified previous reports, starts his attack group of planes on course 210 to attack BLUE battle line. BLUE carrier has not yet been located, although it is almost in the path of the approaching fleets.

ORANGE leaves his 3 VS to observe movements of BLUE fleet and the 6 VF are returning to the carrier.

A BLUE patrol plane over the BLUE fleet sighted and reported a submarine at 0608 so BLUE knows ORANGE has subs in his vicinity. Before the end of this move BLUE scouting planes 1-S-1 and 2 have

sighted ORANGE cruisers and seven large enemy ships on South-westerly courses.

Now each side has an accurate idea of the position and make-up of the enemy forces except for carriers and submarines. The two fleets are approaching each other nearly head on. ORANGE has an air attack organized and on its way.

ORANGE submarines have overshot the BLUE fleet, and due to their dispersion, will have a hard time reaching their objectives, the BLUE capital ships, unless BLUE moves to the Northwest. BLUE submarines, having submerged at 0530 and running at low speed, are being rapidly closed by BLUE surface forces.

DIAGRAM #10 - Moves 3, 4 (0612 - 0648).

This period marks great activity on the part of air forces and submarines. Each side has accurate information as to surface forces and have observing planes over enemy main body, reporting their movements.

At 0625 BLUE scout plane 1-S-2 locates ORANGE carrier and reports its position. ORANGE flight of 6 VF, taking a look at BLUE surface forces, sights BLUE carrier at 0640 and stands toward the carrier, intending to dive bomb if the carrier has planes on deck. In proceeding towards the carrier, these planes sight BLUE submarines and at 0646 report this contact. Now all BLUE forces have been located. As ORANGE submarines are being frequently sighted by BLUE air patrol, all of ORANGE forces are located. Both Commanders have information upon which they can act.

We will now follow the various actions through.

Reports of BLUE submarines from BLUE patrol planes causes BLUE to move to the Southeast and later to the South. BLUE destroyers spread out and sweep the area. ORANGE submarine I-5, periscoping to gain information for attack, is sighted by a plane. Four BLUE destroyers proceed to the area and drop a total of 120 depth charges. But I-5 escaped damage.

ORANGE I-53, 56, 57 on the surface trying to catch up with the BLUE Main Body, are driven down by 3 ORANGE VS in the area, and whom they suspect to be enemy. ORANGE I-4, 3 and 2 are kept down by BLUE patrol planes. The movement to the Southeast by BLUE is away from these submarines but may lead BLUE back to the submarines already left behind. Should not BLUE have heavily screened his important units and driven on through? It is usually bad practice to hover in an area known to contain submarines.

BLUE submarines continue submerged and as a result the movement of BLUE surface forces project the submarines further towards the enemy, a very desirable condition, as BLUE surface forces were rapidly overtaking the submerged submarines.

ORANGE Main Body changed course to 200° at the beginning of this period and concentrated his destroyers and cruisers in his van. ORANGE despatched 10 VS from his Crudivs 5 & 6 to operate over ORANGE carrier. Each was equipped with 2-116# bombs. ORANGE carrier at this time had no protecting planes.

Let us go back to the 6 ORANGE VF standing towards the BLUE carrier. The latter early in this period, had headed into the wind and launched 18 bombers, each armed with 1000# bombs, with orders to attack ORANGE carrier located at 0625 by BLUE scout. BLUE carrier then headed South. Shortly afterwards the ORANGE flight to the Westward was sighted by BLUE VF (9) protecting the carrier. These planes engaged and shot down the ORANGE flight. BLUE lost 5 VF in the action. While this air battle was on, a large flight of planes was sighted to the northward by CV-4. This was the ORANGE attack group which, on its way to the BLUE battle line, sighted BLUE carrier and turned towards it.

Shortly before that, the ORANGE attack group had sighted BLUE attack group north bound. Both groups passed each other without engaging. Would they have done this in battle?

57 ORANGE planes were on their way to attack the enemy battle line - they pass 18 heavy planes of the enemy, bound in the direction of their own carrier. It probably would be futile for ORANGE heavy planes to attempt to pursue, but what about the VF and VS? ORANGE planes had some 40 miles in which to break up the BLUE attack. It would seem something could have been done. Certainly carriers are too valuable to be left at the mercy of chance. Seventeen VF and VS could, through forty miles of air fighting, certainly could have disorganized and materially reduced the effectiveness of BLUE attack.

At the end of the period we find BLUE carrier in a hot spot. She has to turn through 135° to get into the wind, she has a squadron of 18 torpedo planes on deck, together with 9 VT equipped for smoking. Four BLUE VF are 5 miles away, having survived a dog fight with 6 ORANGE VF. And 57 enemy planes are about 12 miles away.

Other significant moves in this period are the movement of ORANGE Main Body to the SW, abandoning the weather gauge position; the BLUE move of his battle line to the SE and South into a known submarine area, and the failure of both Commanders to thoroughly screen their capital ships from submarine attack, when submarines are known to be in the area.

BLUE carrier, between the approaching battle lines, is about to be attacked by a group of planes originally despatched against BLUE battle line, while ORANGE carrier is about to suffer an attack by a group of BLUE planes allowed their opportunity by a superior group of ORANGE planes.

DIAGRAM #11 - Moves 5 & 6 (0648 to 0748).

This period marks heavy air activity and the beginning of submarine attacks. BLUE carrier, CV-4, about to be attacked, headed up into the wind and hurriedly began launching planes. All BLUE planes got off, but were unable to get into any defensive formation or to get altitude before 16 ORANGE bombers, protected by 10 VF, bomb the carrier with 1000 $\frac{1}{2}$ bombs.

This attack destroys CV-4 flight deck, total damage 28% A.W. and 29% U.W. which reduces her speed to 20 knots. CV-4 stands to the south intending to return to TRUK.

In this air attack BLUE had 4 VF standing in to assist in the defense of BLUE carrier. These were shot down. ORANGE lost 3 VF and 5 VB, the latter being shot down by CV-4 anti-aircraft fire.

The seven remaining ORANGE VF joined up with ORANGE torpedo planes and scouts which were standing towards BLUE battle line. The 11 bombers started back for their carrier.

BLUE battle line was protected by 9 VF sent out earlier from the carrier to guard the battle line. 24 VT, 7 VS and 7 VF are about to attack.

The BLUE battleships were in division line of bearing, course NE, speed 16. ORANGE plan of attack was to lay a smoke screen about 3000 yards in advance of BLUE BBs, extending around each bow. Six VTs equipped as smokers were to lay a screen 4000 yards in advance, thus thickening the curtain. The 18 torpedo planes were to approach their target at a good altitude, then dive, come thru the curtain and attack from each bow. The period under A.A. fire would be from the smoke curtain to the point of attack, between one and two minutes. 9 BLUE VF sighted the attack but were met by 7 ORANGE VF. While this action was on, ORANGE launched her attack. BLUE battleships, sighting the attack coming in went ships right as the ORANGE torpedo planes dived behind their smoke.

The 9 planes on BLUE starboard bow found their target angle to be about 80° when they emerged from the smoke, while the 9 on the port beam had a target angle of about 125°.

ORANGE lost 1 VS and 2 VT smokers from A.A. fire in laying their smoke curtain. 5 ORANGE VTs were lost from A.A. fire; thirteen torpedoes were launched and seven ran. TWO BLUE BBs on the right flank and one on the left flank each received one torpedo hit (BB-37, 39, 41).

BLUE fighting planes finally shot down the 7 ORANGE VF, losing all but 2 of their VF in doing it. These two VF attacked the torpedo planes as they were returning from their attack. 2 ORANGE VT and the 2 BLUE VF are lost.

ORANGE scouting planes, joined by the VS of the TRUK flight aided the attack by bombing BLUE BBs with 116# bombs, doing minor damage but disorganizing BLUE A.A. defense. 2 VS are lost. Three ORANGE VS and 11 VT start back towards their carrier.

This attack was a serious blow to BLUE, as three more BLUE BBs now need underwater repairs. Hardly had the excitement died down when BLUE BB-42, on the right flank, is struck by a high speed torpedo coming from the northward. ORANGE sub I-5 finally got an opportunity to attack BLUE battle line.

BLUE BB-42 now has a speed of 17 knots, BB-37 18.5 knots, and BB-39 & 41 each 19 knots, while CV-4 has 20 knots.

Now let us take up the BLUE air attack on ORANGE. At about 0718 the 18 BLUE bombers, each armed with 1000# bombs, reach ORANGE carrier, with only A.A. defense to defend her. ORANGE scouting planes have been recalled to defend the battle line. CV-2 maneuvers at high speed but the attack gets in. Seven BLUE VBs are shot down. The carrier lost her flying deck, suffered 20% A.W. and 15% U.W. damage and has speed reduced to 24 knots.

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BLUE bombers report completing their attack and having seen hits made on ORANGE carrier deck, then start back towards TRUK.

10 BLUE torpedo planes and 8 VTs equipped for smoking stand towards ORANGE battle line, where they are met by defending ORANGE VS, some 11 all told.

BLUE lays a smoke curtain and attacks. But the interference from ORANGE VS and ORANGE anti-aircraft fire reduce the effectiveness of their attack.

3 BLUE VT and 2 smokers are shot down; seven torpedoes are launched, three run, and one hits BB-2, reducing her speed to 20 knots. ORANGE loses 11 VS in defending her battle line. The nine remaining BLUE VT head back for TRUK.

Early in this period 6 BLUE patrol planes leave the TRUK area to attack ORANGE with 1000# bombs. As they near ORANGE battle line, they are met by 5 ORANGE scouts returning from their early morning search. Two BLUE VP are lost, two more shot down by ORANGE A.A. fire but two get in their attack on ORANGE BBs, drop 4 - 1000# bombs and then head back for TRUK. These bombs add to the underwater damage on ORANGE BBs, and cause additional damage on deck.

That practically completes offensive air operations for the time being at least. Remaining ORANGE planes from the carrier have no place to land. BLUE carrier planes are on their way back to TRUK, where they can reservice. Time will play in BLUE's favor.

Let us turn to the other forces. BLUE Main Body early in the period changed course to NE, speed 16. During the air attack course was changed to East. Then came the attack by ORANGE sub I-5.

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All ORANGE subs are now in BLUE's rear. From now on BLUE should keep the submarine threat in his rear - should keep going and not mill around in an area infested with submarines.

BLUE cruisers keep on course NE while BLUE DDs are sweeping. BLUE submarines have surfaced in order to gain ground towards the enemy.

ORANGE Main Body continues on course about 200°, speed 16. Battle cruisers in column behind the battleships which are in column.

ORANGE subs, hampered by planes passing overhead are having a hard time getting up to the BLUE Fleet.

At the end of this period, BLUE and ORANGE cruisers are only 18 miles apart while BLUE submarines are perfectly placed between the approaching battle lines.

DIAGRAM 12 - Moves 7-9 (0748 - 0812).

The cruisers of the opposing forces being in sight, the game was put on the board at this time.

The 15 BLUE VS planes on scouting duty, are returning from their flight. Five of these on the southern search, land at TRUK. Ten in the northern area, having started on their flight equipped with light bombs, attack enemy light forces. Four are shot down by A.A. fire, but six drop their bombs on ORANGE cruisers and destroyers, doing minor damage. The six remaining BLUE carrier VS start back towards TRUK. Six BLUE cruiser VS continue to observe ORANGE surface forces. Four BLUE VJ and 3 VS patrol the area ahead of BLUE advance.

BLUE cruisers now launch their spotting planes and prepare to engage enemy cruisers.

ORANGE is using her carrier VTs to observe and report movement of BLUE battleships. All VS planes are concentrated in the area of ORANGE battle line to protect battle line spotters. Eleven ORANGE bombers are patrolling ahead of ORANGE Main Body, guarding against BLUE subs.

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At the beginning of this period BLUE ordered his mine layers to return to TRUK. As soon as they cleared the destroyer area, these vessels spread out for a sweep. ORANGE sub I-4 was forced down for a time.

BLUE battleships are now in course East, speed 12, zig-zagging. BLUE light forces, to the northward, conform. BLUE cruisers open on ORANGE cruisers at 0800, plane spot. At that time ORANGE cruisers are heading south towards BLUE in division columns, and BLUE cruisers are in a column normal to the bearing line of these cruisers. Only the BLUE CAs can fire and they concentrate on the three ORANGE CL, the nearest ships.

ORANGE opened fire with bow guns but as they have no plane spot, the fire is ineffective. ORANGE cruiser spotters are guarding ORANGE battle line spotters which were launched at 0754, although the battle lines are some 35 miles apart. BLUE destroyers hurry out of the firing area. BLUE cruisers, by line of bearing maneuver, retire slowly towards BLUE Main Body, maintaining broadside fire on ORANGE cruisers. At 0809 BLUE CLs get within range of ORANGE cruisers and open fire.

ORANGE, on course 230, speed 18. ORANGE cruiser fire is ineffective. Furthermore he is receiving enfilade fire from BLUE cruisers. ORANGE begins to find that his CCs are too rigidly placed. In the van they might have driven out and disorganized the BLUE cruisers, so they are starting to move to the van at the end of this period.

Note the position of the BLUE submarines. Also note the remarkable restraint of SS-156, 155 & 154. Maybe they would have done this in action, but I doubt it. Eight CA targets and 3 CL targets coming to them.

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As it turned out, they did not fire at the cruisers and passed under them undetected. They later had more valuable ORANGE units to fire at. But it must have required great restraint and a decided determination to accomplish their mission against ORANGE capital ships.

The present indications are that BLUE intends to deploy easterly and ORANGE light forces move toward the eastern area. ORANGE subs are in BLUE's rear. Any retirement towards TRUK will bring ORANGE subs into action.

ORANGE CL-15 is damaged 20% and CL-16 10% by the end of this period. BLUE cruisers have received no damage.

DIAGRAM #13 - Moves 10-15 (0812-1833)

This period marks the continuation of light force action and the beginning of BLUE submarine offensive.

The air forces of both sides have completed their offensive and are now principally concerned with maintaining plane spot and anti-submarine patrol.

ORANGE carrier planes have no place to land. ORANGE carrier has been ordered to join their main body to reinforce ORANGE cruisers.

BLUE carrier planes are returning to TRUK, BLUE carrier has been recalled to the battle area and is about 9 miles south of BLUE battle line at the end of this period.

2 BLUE VP returning to TRUK sight ORANGE submarine I-3 and report. BLUE A.S. patrol planes and VS planes observing ORANGE main body, running low in fuel, are obliged to return to TRUK. At 0827 VJ-3 sights ORANGE I-56, attacks with 4 - 116 $\frac{1}{2}$ bombs, and reports the contact. ORANGE sub is forced down but is undamaged. All of these contacts indicate that ORANGE submarines are between BLUE main body and TRUK. If ORANGE is also aware of this situation it would seem that ORANGE main body might better force BLUE back against ORANGE

submarines. This would mean a movement to the Eastward and southeastward, which would also keep the weather guage.

Now ORANGE is aware that BLUE submarines are present and know their approximate location. At the end of the last diagram we saw them about to pass under ORANGE cruiser line. ORANGE DDs are in squadron formation in the cruiser area.

We will now follow the gun action thru, then take up submarine activities. BLUE cruisers (CA) continue their concentration on ORANGE CLs 15 & 16 for another 6 minutes, then finding that they have expended 25% of their total ammunition with no evident effect, discontinued gun fire and turn towards their battle line. Their line of bearing formation which has been maintained for some time, has caused considerable interference with their gun fire.

ORANGE CLs 15 and 16 have suffered a total damage of 20% each. This rough handling causes ORANGE to withdraw the CL division from the van. ORANGE commander now considers the advisability of substituting these CLs for the CCs as a rear guard.

The question arises, when is a change of plan justified? As has been said before, the tactical situation must be kept constantly up to date. When a real change in the original situation becomes evident, the battle plan should be changed accordingly. In this case, however, the plan could not have been completely sound if damage to two light cruisers, destroyer squadron cruiser leaders, causes a change of plan. ORANGE's real cause for a change of plan is the improper role assigned to his battle cruisers.

ORANGE cruisers, heretofore without plane spot, were unable to handle BLUE cruisers. Planes have now been assigned the cruisers and they open on BLUE. Eight ORANGE CAs open on BLUE CAs and CLs, ship for ship. But owing to long range, blanketing of fire and change of range, gas penalty, this fire is not effective and ORANGE, to reduce ammunition expenditure, slows his rate of fire, just keeping enough fire to keep the range.

At 0827 ORANGE tries a triple concentration on BLUE CAs 27 & 28 and a double on CA-26. BLUE changes course to the Southeast and ORANGE conforms, changing to course South. This results in a cross fire and also only leading ORANGE CAs can fire, and these only with bow guns.

All of ORANGE gun fire resulted in a total damage of 10% on BLUE CA-28 with very little damage to the other BLUE cruisers.

In the last diagram we saw ORANGE CCs being brought from the rear to reinforce the ORANGE cruisers. This movement continued in this period.

At about 0818 ORANGE air patrol sighted a BLUE sub (SS-157) to the westward of ORANGE leading battleship, distant 5000 yards. This plane dropped a smoke box. A screening destroyer proceeded to the spot at high speed and depth charged. No damage to sub. ORANGE battleships, zigzagging at 18 knots on course 155, made a simultaneous change of course to 85°, away from the submarine last reported. This took the battleships away from SS-158 & 156 who were then getting into attack position.

At 0824, ORANGE CLs changed course to course 42 to avoid further gun damage from BLUE cruisers. At about the same time 2 ORANGE carrier scouting planes had to land, out of gas. At 0829 ORANGE CLs, changing course to the eastward, sighted a periscope. This was BLUE SS-153 about to fire a long range shot at ORANGE battle cruisers. The light cruisers continued their turn passing over the area where the sub was last seen. They made a submarine emergency signal and ORANGE CCs turned towards the danger area and into the torpedo salvo. BLUE SS-153 fired four torpedoes, three ran and one struck CC-3, slowing her to 20.8 knots with 20% damage, underwater. At this time BLUE SS-123, taking a look at the CCs from a position 2000 yards to the southward, fired four torpedoes at them. The torpedo run will be shown in the next diagram.

It will be seen that ORANGE capital ships, at a critical moment, when they should be getting in the gun battle, are in confusion. Nor can ORANGE light force be confident as to what is to happen next. ORANGE destroyers are not helping the situation.

About this time ORANGE battle cruisers are ordered to resume their station in the rear of the battleships.

DIAGRAM #14 - 0833 - 0845 (Moves 16-19).

During the last period and continuing during this period, BLUE battle line continues to close ORANGE on northerly courses, speed 12. Note that 5 BLUE battleships have as a screen a DL and 4 DD. BLUE light forces begin to get into approach positions. BLUE CV-4 is closing slowly on her main body.

ORANGE light forces are closing BLUE main body, but own main body is over 5 miles away from a support position.

BLUE CAs retire towards their battle line and to the westward of it. BLUE CLs move to the eastward. This looks to ORANGE like a probably westward deployment which may bring ORANGE subs into action.

BLUE CAs are firing at the leaders of the two ORANGE cruiser divisions CA-32 and 28. BLUE CLs open on ORANGE DL squadron. BLUE fire enfilades the ORANGE cruisers. In addition at 0836, BLUE BBs 42, 40 and 39, leading BLUE battleship columns, open at 32,000 yards on ORANGE cruiser column leaders. By 0842, ORANGE CA-28 & 32 are each 10% damaged.

ORANGE cruisers fired for three minutes during Move 18 at the BLUE cruisers, no effect. By radical maneuvers and a final turn to the westward, ORANGE cruisers saved themselves from very much damage and got out of an enfilade situation.

At the end of the last move, BLUE SS-123 fired four torpedoes at the ORANGE battle cruisers, then on course East. An ORANGE destroyer sighted the periscope and with the aid of another screening destroyer promptly depth charged and sank SS-123.

ORANGE CCs were on their turn to the North when these torpedoes were fired and escaped damage. They saw the torpedoes pass to the southward of the southern battle cruiser.

ORANGE submarines are again sighted by BLUE planes returning to TRUK. BLUE SS-153, submerged, heard the ORANGE CCs pass close aboard. At 0842 she took a look to the eastward, saw the CCs on a course going away, but also saw ORANGE battleships on course Southeast. She fired four torpedoes, 3 of them running. ORANGE battleships turned to course South and while the column was in the midst of its turn, torpedoes were sighted to the eastward. Before anything could be done, two torpedoes hit BB-3, slowing it to 16.1 knots and damage underwater was 30%.

This was a serious blow to ORANGE. ORANGE has lost her speed advantage. No longer can she choose the time of engaging. Her battle line is now tied down to a battleship with a speed of 16 instead of 23 knots.

In the meantime ORANGE carrier planes are having to land for lack of gas.

Both BLUE and ORANGE spotting planes are principally concerned with maintaining their own spot. As BLUE long range fire advantage is one of ORANGE's most serious problems, might not ORANGE planes have tried to break up BLUE spotting? For neither side to have plane spot would operate to ORANGE advantage.

DIAGRAM #15 - 0845-0903 (Moves 20-25).

This move finds the ORANGE battle line harassed by submarines. It is practically surrounded and this at a time it wishes to close the range rapidly.

ORANGE apparently sensed a Westerly deployment by BLUE, possibly ORANGE hoped BLUE would deploy that way. At any rate, ORANGE inflexible arrangement of light forces, causes a general movement of ORANGE cruisers and destroyers to the Westward.

ORANGE now rearranges his disposition of capital ships and gets them disposed normal to the enemy. Two uninjured BBs form his right wing, two injured BBs and one injured CC form his center and two uninjured CCs form his left flank and probable rear.

ORANGE CV-2 is now within 10 miles of his battle line, and carrier planes are returning to her, to land in the water, personnel being rescued by screening destroyers.

ORANGE is all ready to close through her inferior range bands to a range advantageous to herself.

BLUE battle line closes for a time on Northerly headings, with the CAs and two divisions of destroyers on the left flank,

a CL division and one squadron of destroyers on the right flank and CV-4 trying to join the right flank forces.

Note that destroyers occupy positions outside BLUE cruiser stations. Battle lines are 40,000 yards apart at the beginning of this period.

At 0848 BLUE submarine SS-124 fired four torpedoes at ORANGE BBs to the westward. The latter, reforming in accordance with previous orders, sighted torpedoes to the eastward and are turned away and ran out of the torpedo water.

ORANGE had ordered deployment on course 270 at 0846 - these maneuvers confused and delayed the deployment. Two submarine periscopes were sighted to the Northwest at about this time, and the course of ORANGE battleships and battle cruisers was changed to SE, with a Westerly deployment ordered. The ORANGE light forces must have been disturbed if not actually disconcerted.

BLUE battleships were still firing on ORANGE CA-28 & 32 at 29,000 yards. By 0848, CA-28 was 20% damaged. By 0851 it was 40% damaged and CA-32 damage had mounted to 20%.

At 0851, battle lines came within gun range. BLUE deployed on course NE and opened with a triple concentration on ORANGE BB-3 with BBs 42, 41 and 40. At 0857 BLUE BBs 39 & 37 opened on CC-1. Ranges are about 32,000 yards and by 0857 BB-3 is damaged 10% by gunfire, total damage 40%.

At 0857 ORANGE opened fire all along the line, CAs firing at BLUE CAs, ORANGE battleships and battle cruisers at BLUE battleships. Range is 30,000 yards between battle lines and ORANGE fire is ineffective. BLUE CAs retire towards own battle line and even behind it, range to ORANGE CAs about 28,000 yards.

ORANGE decides to close BLUE battle line rapidly behind smoke, and at 0857 lays an airplane smoke screen close to his own battle line. BLUE continues his fire on ORANGE battle line (indirect fire). At the end of the move ORANGE CAs are only 27,000 yards from BLUE BBs.

BLUE submarine 127 to the south of ORANGE battle line, sees these ships approaching and at 0857 fires four torpedoes at the ORANGE battleships. Shortly afterwards that area was covered with smoke from the ORANGE smoke laying planes. SS-127 was beautifully protected. ORANGE battleships saw torpedoes approaching from the SE and turned simultaneously. But BB-3, with less than a minute to maneuver, was hit by one torpedo.

Again the ORANGE battle line is turned off as it desires to close. Not only is it being delayed, but it is increasing its troubles by permitting outlying BLUE submarines to close to attack positions.

Instead of closing thru smoke, ORANGE battle line is kept behind smoke while ORANGE cruisers are left out in the open, 27,000 yards from BLUE battleships.

ORANGE BB-3 is now 55% damaged with 12.7 knots remaining speed.

DIAGRAM #16 - 0903-0918 (Moves 26-30).

This diagram marks the last moves of the game as played.

By 0900 all of BLUE carrier planes and two patrol planes from TRUK, that have survived the early air action, have returned to TRUK and are being reserviced and re-armed. As soon as all are ready, a mass flight will proceed to attack ORANGE capital ships.

ORANGE carrier planes are landing from time to time as gas is exhausted. 11 ORANGE VB land near CV-2 and personnel are rescued by ORANGE destroyer DD-79.

BLUE has some 15 observations planes and 26 scouting planes maintaining BLUE spot, while ORANGE has 14 observation planes and eight scouting planes maintaining ORANGE spot.

ORANGE submarines are to the Westward and Southwestward of BLUE Main Body, the nearest being 10 miles astern of BLUE battle-ships.

BLUE submarines are finally being dropped behind by ORANGE capital ships. However, BLUE SS-127, operating near the smoke screen protecting ORANGE battle line has had time to reload two tubes and at about 0904, periscopes 1500 yards from ORANGE CCs, then changing course to SW. She fires two torpedoes one of which hits CC-1, slowing her to 22 knots with 20% underwater damage. Two screening ORANGE destroyers are ordered to depth charge the area in which CC-1 saw a periscope. They succeed in damaging SS-12 so that she is unable to operate for six hours.

Except for BLUE SS-130 and 128, ORANGE is free from submarine threat unless she retires to the northward or mills about in the area she now occupies.

For the time being the submarine war is over. It has been especially disastrous to ORANGE. We will now look into the action of the surface forces. A light force action is beginning.

ORANGE, anticipating a deployment to the Westward, had so ordered. Practically all of his light forces were to the Westward of his battle line and in their van at the beginning of this diagram.

But BLUE failed to deploy to the West. After giving enemy indication that he would, BLUE reverses his deployment. This leaves ORANGE to either conform to BLUE deployment, which will leave ORANGE light forces in the rear, or engage in a chase tails action, in which the light forces are generally ineffectively placed.

ORANGE battle line, after maneuvering to avoid submarine torpedoes, again starts to close behind the smoke already laid. But valuable time is lost and the battle lines are still 24,000 yards apart, an effective range band for BLUE, when the smoke screen finally dissipates.

During the ~~last~~ diagram it was shown that the smoke screen protecting ORANGE battle line during its approach thru unfavorable range bands, left ORANGE heavy cruisers unsupported and uncomfortably close to BLUE battle line.

BLUE battleships joined BLUE CAs in firing on these ORANGE cruisers at the beginning of this period. Damage began to mount rapidly. By 0906 ORANGE CA-29 & 31 are each damaged 10%, while CA-32 is damaged 30%. Damaged CA-28 has joined damaged ORANGE light cruiser division which is attempting to guard ORANGE battle line from attack from the Eastward.

By 0909, CA-29 is 20% damaged while damage to CA-31 has mounted to 30%. CA-30 is damaged 10%. ORANGE cruisers turn away.

At 0909 BLUE transfers the fire of BB-41 and 42 to ORANGE BBs 1 and 4 just visible behind the edge of the smoke screen. ORANGE CAs 30 & 34 are damaged 10% each by 0912. By 0912 all BLUE battleship fire has been shifted to ORANGE battle line, BB-40 dividing fire on ORANGE BB-2 and 3, the others engaging ship for ship.

ORANGE CAs, being badly punished, order airplanes to protect them with smoke which is done. This leaves ORANGE destroyers, proceeding East between the battle lines, exposed to gunfire and unsupported, BLUE CLs on the Eastern flank open on the leading destroyers of ORANGE Desrons 1, 2 and 3. And BLUE heavy cruisers open on the squadron of ORANGE destroyer leaders to the Northward, some 16,000 yards away.

Let us look to the ORANGE gun fire. ORANGE battleship fire, due to maneuvers avoiding submarines and to smoke screen, was generally ineffective.

ORANGE heavy cruisers, until smoke was laid to protect ORANGE battle line, were punishing BLUE CAs severely. BLUE CA-24, 25, 26 & 27 were each damaged 10% and CA-28 was damaged 20% by 0906.

When BLUE battleships opened on them, ORANGE effectiveness was lost, and when these cruisers became screened by smoke, their effect was lost entirely.

ORANGE CLs, CA-28, destroyers and destroyer leaders opened on nearest BLUE destroyers but the range was long and no material damage was done by the time the game was called.

ORANGE CV-2 attempted to get into action as she joined ORANGE Main Body but at the end of this period she was still 10 miles from the nearest BLUE forces.

The ORANGE Commander now finds himself about to engage the enemy with his speed advantage of the battle line lost. One BB is 55% damaged and slowed to 12 knots. Two battle cruisers have torpedoes in them and one has considerable gun fire damage.

His CLs have been badly punished and his heavy cruisers as well. His destroyers are practically intact. His submarines are not in a position to attack and his air offense is destroyed.

BLUE battle line is intact. Four of his battleships have a torpedo in each, but his remaining speed is higher than ORANGE. His CAs have been punished but not so badly as ORANGE CAs. His powerful CLs are uninjured. His destroyers, originally more numerous than ORANGE, are uninjured.

BLUE submarines have about exhausted their immediate possibilities, but they have accomplished their mission in an excellent manner.

BLUE air forces are preparing to launch a heavy attack on the ORANGE battle line, within easy range from TRUK.

The next diagram will show the record of damage received by both sides during this action.

CONCLUSIONS:

This game closed, as many games do, just as heavy gun action was beginning. However, many lessons are to be learned from the games as played.

We may not expect that, in battle, two fleets will arrive at decisive gun range without previous damage. This is especially true in modern war where weapons have such a long reach.

We may expect the longest reaching weapons to hit first. Also, if the game board is any guide, we may expect these weapons to exhaust themselves before the main gun action begins. If they do not, then they may be able to break up an action that is tending to be disastrous to one side or the other. The side with superior gun power will try to eliminate any enemy forces which may be able to keep this gun power from being imposed.

In this action ORANGE was unduly aggressive when he elected to fight a decisive action within air range of an enemy base. Certainly he would not give an enemy that advantage in war. Base facilities, other than air, are also a decided advantage. Base defense forces can add to the enemy strength, although BLUE failed to use this factor to its fullest extent. BLUE mine forces were not given any important part to play. BLUE Commander eventually ordered them back into the action, but too late for any good.

Neither side gave enough consideration to the defense of their carriers. That is one of our most important unsolved problems. Something must be done about it. If carriers are to be useful in battle for only one launching of their weapons, they are too expensive. Planes might better be launched from catapults carried by the many combatant units.

Carrier decks are to be landed on and not to be allowed to be so easily destroyed.

Nor should we accept the theory that heavy planes in defensive flight formations cannot be stopped by fighting planes. If such is the case, we have no use for fighting planes.

It is conceivable that these formations can be broken by dropping smoke bombs or smoke curtains into them. It is even conceivable that these formations can be bombed by enemy planes flying over them. Certainly our air forces have enough ingenuity to develop some effective air offense against enemy bombing formations. As a last resort, ramming can be resorted to.

As I understand it, the defensive power of the movable guns in the planes are what stops the fighter. I cannot see this. Dive bombers expect to attack battleships bristling with such guns, mounted on much better gun platforms than the guns in the planes. That is an accepted method of attack. Why not the same attack against bombing formations?

Regarding submarines, this type of weapon must be aided in its attack. Any movement of the surface forces which draws or forces the enemy away from the submarine, nullifies its attack possibilities. In this problem, ORANGE spread his submarines over a large area, on a scouting mission. Consequently, they could not concentrate into attack positions. On the other hand, BLUE maneuvered his surface forces to keep his submarines in favorable attack positions. It is difficult to accomplish such

cooperation, but the effort should be made unless by so doing, the enemy is allowed to escape action. As a defense against submarines, destroyers should thoroughly screen areas suitable for submarine attack, up to the time such destroyers are actually needed for attack purposes.

Further, once in submarine waters, it is advisable to move to some other water in the most expeditious manner. To mill around in the area affords the submarines more time and more targets to attack and allows other submarines to gather for the kill.

Smoke must be used with skill. The wrong use of smoke may result disastrously. There is an old adage that "smoke to be effective, must be laid closer to the enemy than to own forces." That may not be true when smoke is used defensively, but it is pretty close to true in many cases. The enemy light forces may welcome this smoke which protects them during their approach to attack stations when it is close to the ships they are attacking.

Nor should smoke cut off much needed supporting gun fire when other forces are in positions exposed to enemy gun fire.

Care must be taken in organizing for battle that one's plan is flexible enough to meet likely situations. ORANGE plan of deployment practically forced him to wait for BLUE deployment. BLUE sensed this unbalanced disposition of forces and threw ORANGE completely off balance by reversing his deployment.

This problem gave a good picture of what may happen in the preliminary stages of a naval action. Mistakes were made and mistakes will be made again, on the game board and in battle. Pointing out these so-called mistakes aids in fixing such situations in our minds and card-indexing them for handling future situations. For that reason I am sure the game has served a useful purpose.