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ELEMENTS OF SUBMARINE TACTICS

CAPTAIN CONANT TAYLOR, U.S.N.

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Naval War College

Newport, R. I.

September, 1932

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Individual Attack by Submarines

In order to give to those officers unacquainted with submarines a more concrete idea of how a submarine attacks, plate 1 has been prepared.

The enemy ship starts at 0 in the upper left hand corner and follows the zigzag course shown as a broken line at 20 knots.

Four different methods of attack are shown. Most submarine captains use some one of these or some combination of them.

Two initial positions of the submarine are shown marked 0.

Taking the upper one of these, we will follow the attack in detail.

The submarine is assumed to sight the enemy ship at 20,000 yards at position 0. The first thing the submarine captain has to find out is to which side of the line between them the enemy is heading. To do so, he heads directly toward the enemy, being careful to submerge before being in danger of being sighted. At 1 he decides the enemy is heading to the left and he turns to the left and takes a course about perpendicular to the bearing of the enemy. His next object is to see whether he can get ahead of the enemy, remembering that the use of high speed may be impossible when the enemy gets close. He therefore proceeds at 7 knots, watching the bearing through the periscope occasionally. He notices that he is losing bearing until after position 4, when the bearing is nearly steady. He may have seen the enemy change course at 4. Just after position 6, he sees the enemy change course bringing him on his opposite bow. He realizes he must act quickly and so lowers his periscope and turns with full power to a course about at right angles to the enemy's course. Slowing down so as not to have his periscope seen, he takes a look at 10 and finds he will have a fine shot but remembers that the enemy has been on that course nearly twelve minutes and is likely to change. Sure enough, the enemy turns away and he has to fire a fairly long range shot at 1500 yards and with a rather

unsatisfactory track angle. Therefore, he decides to use a spread. Having his periscope angle worked out by his assistants from the ranges, bearings and enemy's course which he has given them, he raises the periscope several times for a few seconds just high enough to catch a glimpse of the enemy's masts and when it appears that her bow is close to his periscope angle he raises it high enough to get a good look and fires the first torpedo when his crosswire is a little ahead of her bow, the second at her foremast, the third at her mainmast and the fourth just abaft her stern, as she draws ahead. This should give him two hits unless his estimates are very far out.

This description applies to the larger turning circle as shown. This is the turning circle of our large submarines. Within it is shown the track of a Holland type S-boat. This takes the submarine in to a firing range of 750 yards and affords time to change course a little to improve the track angle. So the S-boat would give right rudder just before firing the first shot and endeavor to aim all shots at the middle of the enemy ship. The chances for four hits under these conditions are excellent.

The other submarine track shown as starting from the same initial position, follows the same scheme of attack except that at first the submarine heads away instead of toward the enemy. The accident of the position of the enemy's turn at position 10 makes it impossible to close within 2800 yards.

A common modification of this method is to turn parallel to the enemy's course on the final turn and fire angle shots as the enemy goes past.

The two submarine tracks shown from the lower initial position of the submarine illustrate the method of heading toward the enemy firing angle shots on opposite course and the method of heading parallel to the enemy hoping to fire angle shots as the

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enemy passes. In the case shown, it was necessary to abandon this and head in to close the range. This turned out to be a poor method in this case.

The Use of Submarines with the Battle Force

Introduction

It is believed that the proper strategical employment of submarines can only be arrived at by an appreciation of their tactical importance. Therefore, while this paper is confined to tactics, it is desired to point out that before deciding to employ submarines strategically in a manner which makes it impracticable to have them present in the main battle area, due consideration should be given to their value in that area. It is hoped that the tactical considerations discussed will be of some slight assistance in this regard as well as furnishing a basis for the tactical use of submarines. In this connection, it should be understood that when submarines get in to close range of large ships, they may be expected to make a large percent of hits (roughly 25 to 50%) and that therefore, any method which gives promise of success in their getting to close range may be counted on to do very severe damage to the enemy.

In order to get a reasonable basis for studying the use of submarines with the Battle Force, it has been found necessary to go into the probable actions of two fleets during the period between the time information as to the approximate position of the enemy fleet is obtained and the time when the battle lines may be expected to deploy. The distance apart of the fleets at the beginning of this period may vary very widely. Their actions during this period will depend not only on their relative strengths but on their missions. For the purposes of this paper, what is desired is to outline what might be called normal conditions and provide for those conditions. It will then be a matter of judgment to modify the conclusions arrived at in order to meet any particular situation.

After considerable study of this period prior to a Naval Battle, it has been decided to use for this purpose the following

conditions for the general situation:

1. The fleet knows the enemy bearing fairly accurately when the two fleets are about 70 miles apart.
2. The fleets will converge on a nearly constant bearing.
3. The battle lines will deploy when about 40,000 yards apart.

It may be necessary to explain the second assumption further. If we consider two fleets approaching each other it seems that one will practically always desire to shift its position relative to the other before deploying. The reasons for this are numerous: it may desire to avoid action but is constrained to make good distance in a certain direction while doing so; it may be to get to windward or to get some other advantage of position. The most probable reaction of the other fleet is to prevent this. So the net result is an approach on converging courses with very little change in bearing. In other words, only in unusual conditions will one fleet be able to change the bearing which exists on first accurate information. By unusual conditions, I mean for instance, only one fleet having information of the other's position or one fleet being very much slower than the other, or one fleet permitting the other to change the bearing.

The acceptance of the above assumptions leads to the conclusion regarding submarines that there is a profitable field for the study of submarine dispositions prior to and during this contact period so as to insure a maximum effectiveness of submarines against the enemy battle line.

General Considerations regarding Disposition of Submarines

After considering a great many general submarine dispositions on the above assumptions, Plates 2, 3 and 4 were prepared to illustrate the possibilities of attack from the dispositions shown. It will be noted that the distances at which the submarines are placed from their own battle line is such as to make probable attacks getting home on the enemy battle line during the last part of the approach just prior to deployment. In this connection, it is well to point out that the enemy fleet has taken its approach course with some definite object in view and that the attack of the submarines can be based on his desire to continue on that general course up to the time of deployment.

Plate 2 illustrates attack from a disposition in line across the fleet axis. The submarines are initially five miles apart and therefore in sight of each other on the surface. The attack doctrine used in this diagram is as follows:

On contact report by a submarine of the formation assume enemy battle line to be ten miles beyond the light forces sighted from the submarine making the report and enemy course the same as light forces.

Each submarine toward the van of the enemy then proceeds normal to the bearing of enemy battle line at the assumed position, making best speed on the surface until forced to submerge to avoid being sighted. On arriving at a position ahead of the enemy battle line in its assumed course, each submarine heads toward the enemy battle line and attacks independently. On receipt of further information, each submarine will repeat this process.

Submarines toward the rear of the enemy stand toward the estimated position where the enemy will probably deploy his battle line, ready to attack if the enemy stands toward them.

It will be seen from Plate 2 that the result is to form a line of submarines approximately along the enemy battle line's

probable track which should give excellent opportunities to attack. The submarines nearest the enemy battle line may be able to furnish information to those farther away even if unable to attack themselves due to faulty assumptions.

Plate 3 illustrates submarine attack from submarine formation 3 as given in Submarine Tactical Instructions, 1931. Here we have two groups of submarines, each in the above formation, the groups about 40 miles apart on each side of the fleet axis. The plate shows an attack by the right hand group based on information furnished the commander of that group by the OTC or other outside source. This information is assumed to give the position, course and speed of the enemy battle line. The commander of the submarine group sets a course and speed for the formation to intercept the enemy with sufficient leeway to probably place the submarine formation ahead of him. He uses low speed if possible in order to prevent the formation jamming up when the boats in advance have to submerge, in this case 10 knots.

In two hours the positions shown in the insert have been attained and 4 or 5 boats should be able to attack. Complete instructions for attack in this formation will be found in Submarine Tactical Instructions, 1931.

It will be noted that if the fleet axis is correctly pointed toward the enemy and the submarines do not attack until they themselves make contact they will be very favorably disposed to attack the enemy after deployment of the enemy in either direction.

Plate 4 shows attack from a circular screening formation.

Each submarine is represented as attacking independently according to information furnished by those making contact. As would naturally be expected, only a few are able to attack. The screening features of this formation render it weaker in attack. It is, of course, suitable when the direction of the enemy is entirely unknown or when attacks by the enemy may be expected from several directions.

The above considerations and similar ones have led to the preparation of plate 5. These are to be considered merely as reasonable bases for dispositions and should, of course, be modified as the situation warrants and the judgment of the fleet commander dictates.

As an aid to the direction in which they may be modified or different ones devised, the following general factors are offered:

The effective submarines will not generally be those which find themselves directly between the two fleets, but rather those toward the flanks.

This is because during the approach of the fleets on a fairly constant bearing from each other, the submarine which is directly between the two fleets will be forced by approaching enemy light forces to submerge something like 40 thousand yards from the enemy main body and too far from his track to get in an attack unless in the unusual case that the two fleets are heading nearly toward each other.

However, the contact report made by such submarines may be of sufficient importance to warrant placing some in that position.

For Offense

The disposition should be such as to enable the submarines to use their surface speed to get ahead or nearly ahead of the enemy main body. Stated another way, the disposition should be such that when the submarines are forced to submerge, as many as possible should then be ahead or nearly ahead of the enemy main body.

The thing the enemy main body desires to do during the approach ties him to a definite course relative to our main body and this gives a basis for making the submarine disposition which will fulfill the above conditions to the best extent which can be foreseen.

For Defense

The submarine disposition should be on a bearing which is considered to most favor the enemy as an approach bearing. This disposition should be comparatively compact to enable the OTC to maneuver his main body with respect to the position of the submarines.

When on the defense with no such controlling condition the best disposition is probably a circular one.

Submarine Dispositions
as applied to particular cases

The War Instructions, the Fleet Dispositions and Battle Plans, the Submarine Tactical Instructions 1931, contain all that is officially laid down regarding the use of submarines in the Naval Battle. They are all very general in this respect, much too general to be of much assistance. The War College Pamphlet on the Naval Battle contains considerations regarding the use of submarines which are much more valuable. In order to offer something still more specific in the study of submarines in the Naval Battle, an attempt will be made to consider how the circumstances under which such a battle may be fought may lead to more definite plans as to the use of submarines.

To illustrate this idea, plate 6 was prepared. In case 1, the two fleets are shown in approach dispositions with submarines disposed. These two fleets are assumed to be equal. Fleet A is on a purely offensive mission, determined to defeat Fleet B at the first opportunity. Fleet B is willing to fight Fleet A but the strategic situation is such that the status quo is fairly satisfactory so that Fleet B will seek action only under favorable conditions. It is assumed in this diagram that Fleet B has elected to fight Fleet A if the approach can be made with Fleet A bearing to the northwest. Fleet B therefore has its submarines disposed so as to be best placed for that condition.

The submarines of Fleet A, however, are disposed for an engagement on any bearing since Fleet A will not take a chance of losing an opportunity to engage by protracted maneuvering.

In case 2, Fleet A is inferior and is endeavoring to proceed east to join reinforcements or to reach a base in that direction without decisive engagement. In order to provide against Fleet B getting a great advantage by interposing itself east of Fleet A, Fleet A's submarines are disposed in a large open formation to

the eastward. Here they may attack and slow down Fleet B if approached from the eastward and Fleet A may maneuver around them forcing Fleet B to accept their attacks or give up his attempt to defeat Fleet A.

Fleet B, having to attack from such direction as happens, would probably dispose his submarines in a distant circular disposition but if sufficiently informed of Fleet A's position might use the disposition shown for Fleet B in case 4. Fleet B's submarines will be of use by doing only a small amount of damage if this forces Fleet A to slow down. Hence, Fleet B's submarines should be widely spread.

In case 3, the superior Fleet B is advancing to occupy a base which will permit more effective operations. The inferior Fleet A has been endeavoring to reduce B's strength by submarine and night attacks. It is here supposed that important units of Fleet A, having become involved in a dangerous situation, Fleet A is approaching in hope of extricating them by a partial engagement and retirement.

It is evident that Fleet B can only use submarines for defense since there is not time to dispose them with respect to the particular axis called for by A's approach. Nevertheless, disposed in a circle as they are, the very few which may attack A may well wipe out such attrition as has been suffered because in this situation the slowing down of any of A's units almost insures their loss in the presence of B's superiority.

Case 4. A represents an inferior fleet which has made a sortie from its base to the eastward, in hope of cutting off an important detachment belonging to superior fleet B.

In order to guard against Fleet B cutting him off from his base, he has disposed his submarines as shown. Even though his main body had steamed too fast for the submarines to maintain the position shown, they could be interposed between him and an enemy to the eastward by steaming back to the southward while the sub-

marines continued to the northward.

Fleet B would use his submarines spread out as shown in hope of damaging A sufficiently to slow his speed and thereby assist in preventing A's escape to the eastward even though A would otherwise be able to evade B. However, the speed of B's submarines might be too low to make this a practicable disposition.

In case 5, we have a variation of case 3, the principal difference being that the train has slower speed than the fleets.

A is relying primarily on his submarines to inflict serious damage on the train while the rest of the fleet engages at indecisive ranges. A's light forces will be used to help break off the action. A will select the windward position for this attempt.

The slow, but superior, fleet is constrained to dispose its submarines in a circular disposition.

I should like to point out that while these illustrations of the use of submarines are confined to the particular cases mentioned, it is hoped that it will be appreciated that other cases may be solved along similar lines.

I do not want to be understood as over emphasizing the importance of submarines in the naval battle in general. My idea is that to take full advantage of them requires a definite plan to make for them an opportunity to attack, and that where such a plan necessitates certain actions by surface forces, any objections to such actions should be carefully weighed against the advantages from the added effectiveness of the submarines.

Submarines as Part of the Light Forces

In studying a still more definite role of submarines in the Naval Battle, the possibility was developed of using submarines in place of the usual light forces on one flank.

This idea is illustrated in plate 7.

This represents two fleets approaching for battle. The northern one is in conventional approach formation. The southern fleet is in an approach formation based on the usual one, but the forces on the left flank are replaced by a group of submarines in Formation 3 and the forces in the center are strengthened to two thirds of the light forces available. This formation commits this fleet to a deployment on easterly courses in general and permits the concentration of all light surface forces in the van. A variation, perhaps preferable, would be to place two thirds of the light surface forces on the right flank initially.

It is conceived that the most probable reaction of the enemy would be to deploy on westerly courses, and this is shown in the diagram. As the battle develops, the battle lines are bound to follow something like the circular tracks indicated. The tracks shown are those necessary to close to 25,000 yards and then maintain that range. It can easily be seen how the attempt on either side to open or close the range would vary these tracks.

The position of the submarines shown is their position at the time the battle lines deploy. It is evident that the submarines will have excellent opportunities to attack if the battle is fought in this manner. It is also evident that the light forces of the northern fleet will be given no opportunity to attack the van of the southern fleet, being outnumbered 3 to 1.

To get an idea of the effect of other actions on the part of the northern fleet, plate 8 is shown. This is not to scale, but is merely a diagram to illustrate the opposing forces on each flank.

In the upper left is the situation if the northern fleet deploys on opposite course with all light forces in the rear. This gives equality on that flank or such superiority as the total light forces of one may have over the other. The submarines should get in their attacks.

The upper right diagram shows the case treated in plate 7.

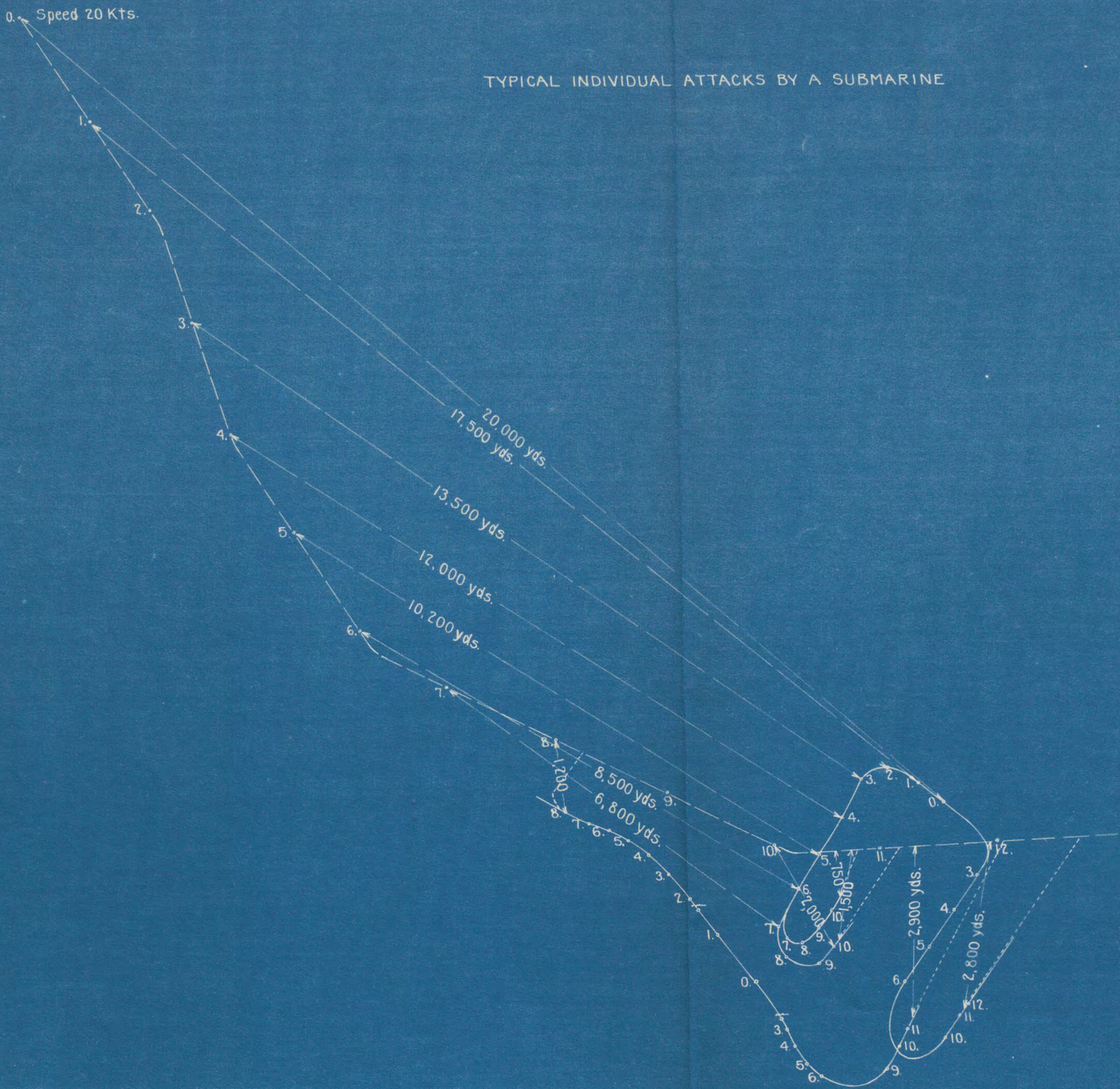
The lower left shows the northern fleet deploying in the same direction with all light surface forces in the van. This is a difficult thing to accomplish but should be regarded as a possibility. This would result in equality as far as the tactical situation is concerned, with a reversal of course the only possibility of the submarines attacking.

The lower right diagram shows the northern fleet deploying in the same direction with two thirds of the light surface forces in the van. This gives the southern fleet superiority in the van and if this superiority forces a reversal of course on the northern fleet should give the submarines an opportunity to attack.

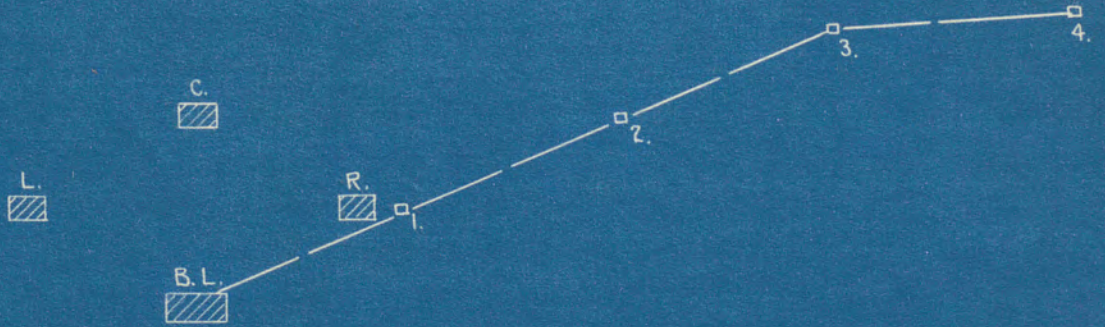
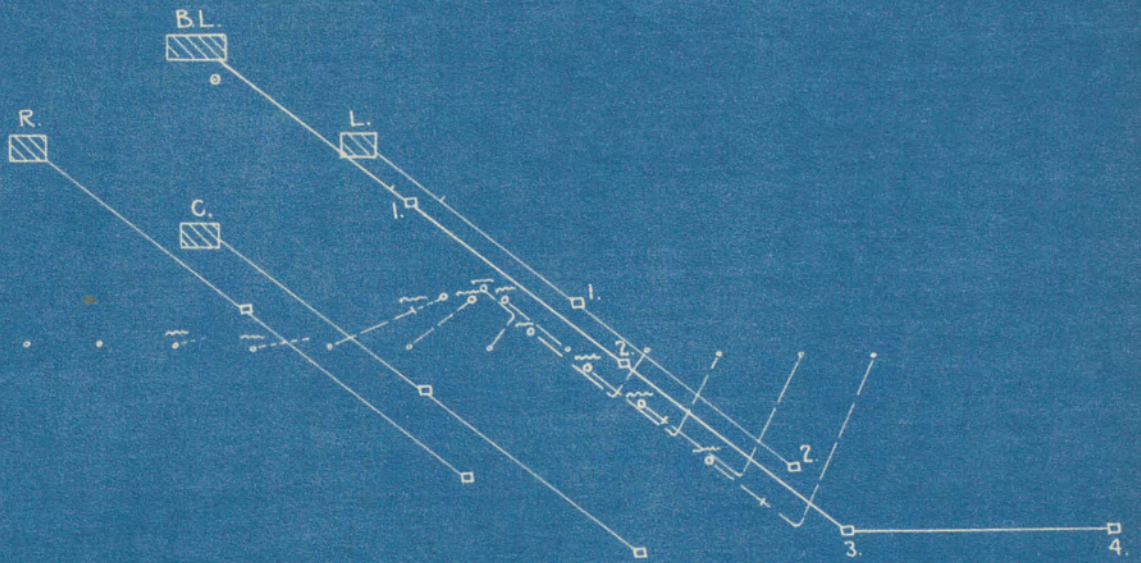
This is an attempt to co-ordinate the efforts of the submarines and the light surface forces. If this is not done by this or similar means they often work against each other. Frequently by the usual hap-hazard methods of employing submarines, the attacks of the light surface forces turn the enemy away from their own submarines whereas they should do the opposite.

This plan has not been tried out on the game board or in the fleet. It is offered as an example of what it is believed should be tried. There are doubtless variations of this plan which might work better. There is a distinct need for development in this direction.

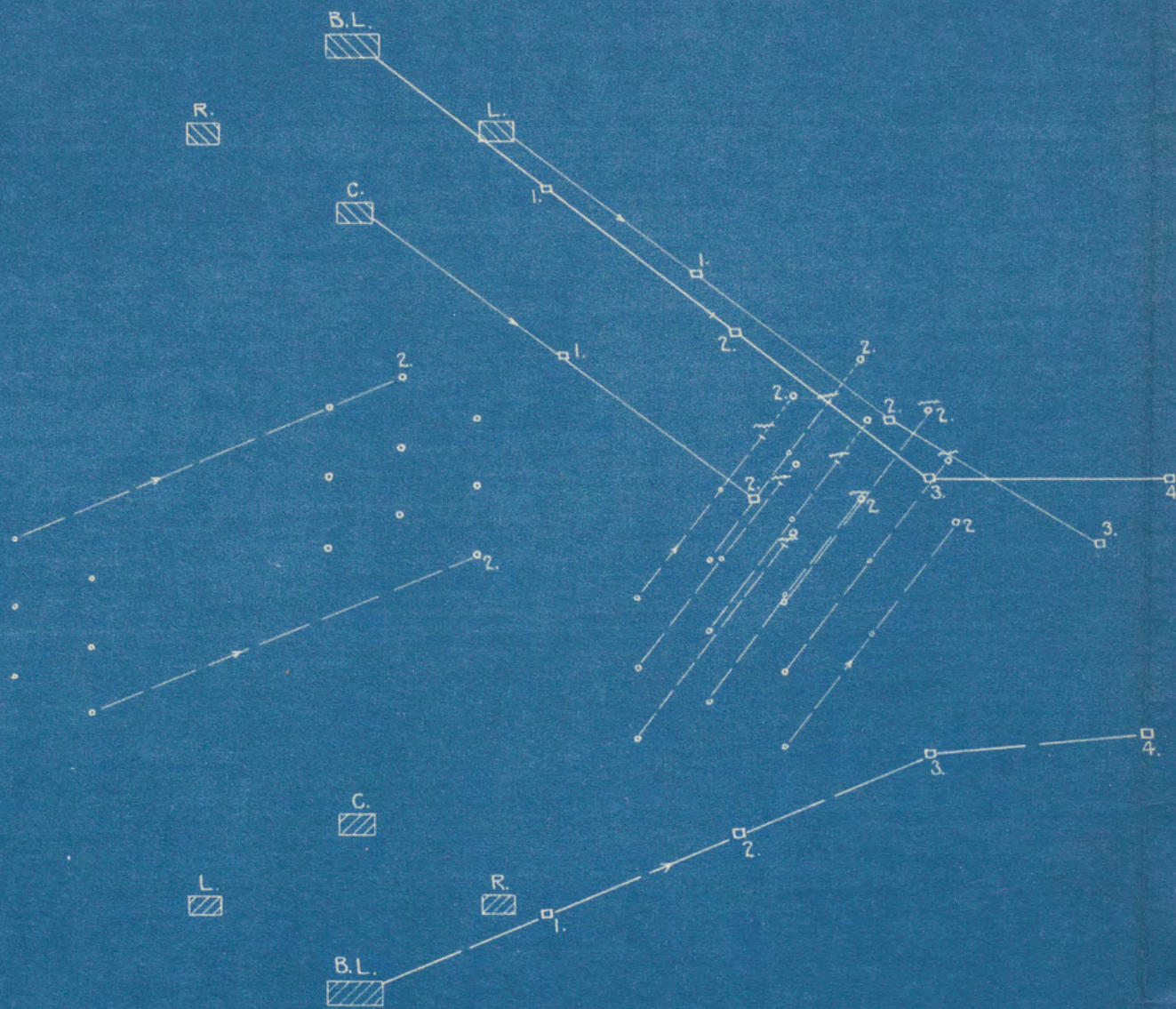
TYPICAL INDIVIDUAL ATTACKS BY A SUBMARINE



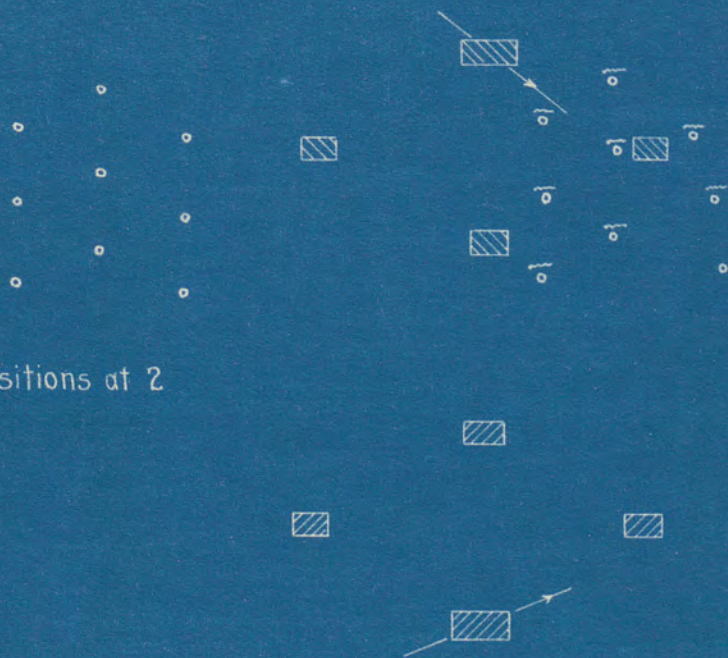
SUBMARINES ATTACKING FROM LINE DISPOSITION



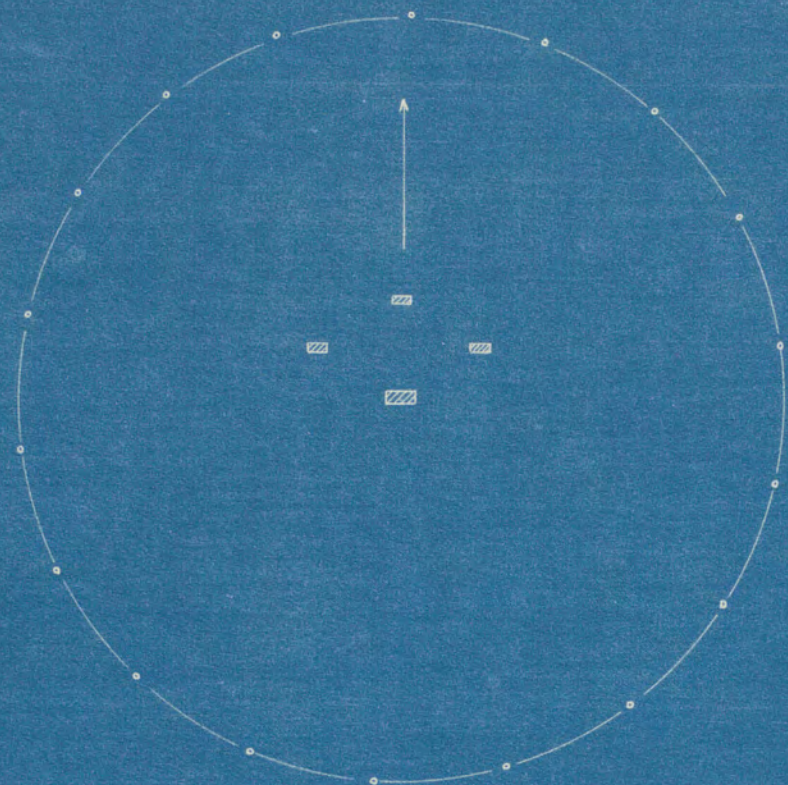
SUBMARINES ATTACKING FROM STANDARD
OPEN FORMATION



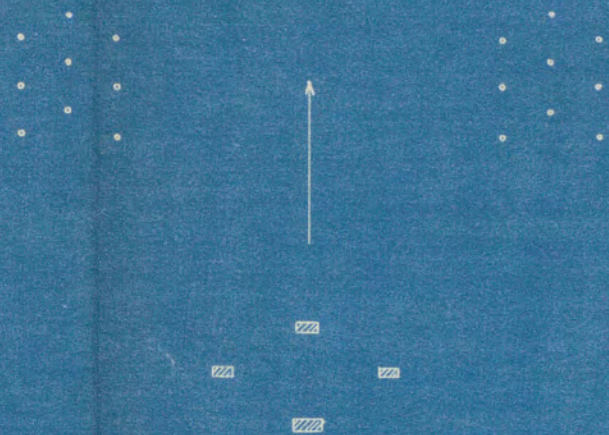
Positions at 2



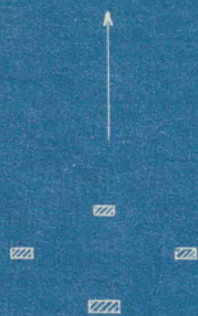
TYPICAL SUBMARINE DISPOSITIONS



1. Slow speed Convoy



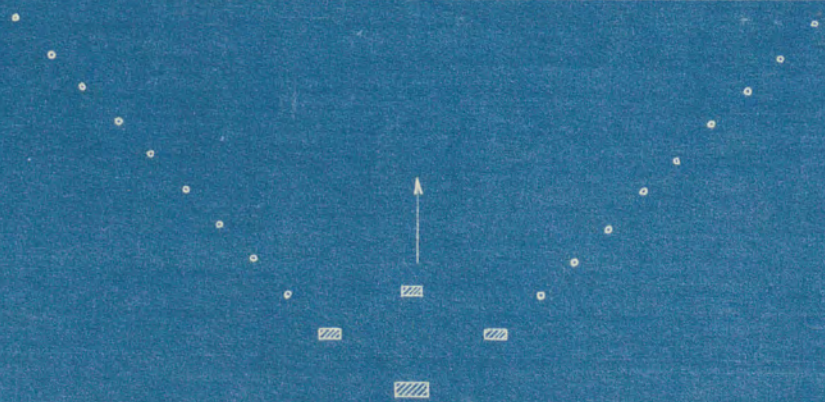
2. Enemy approach on converging course



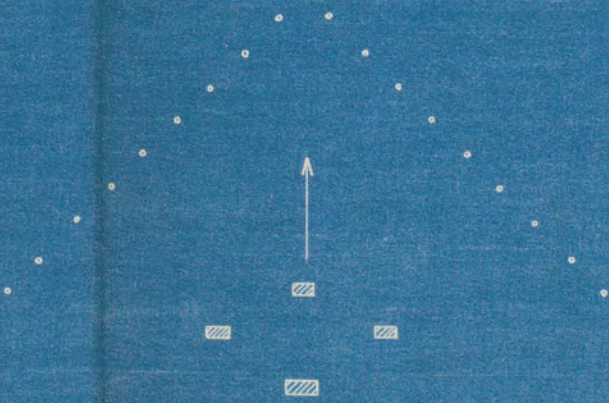
3. Enemy approach on course opposite to own fleet axis



4. Enemy approach on converging course



5. Disposition to cover enemy retreat



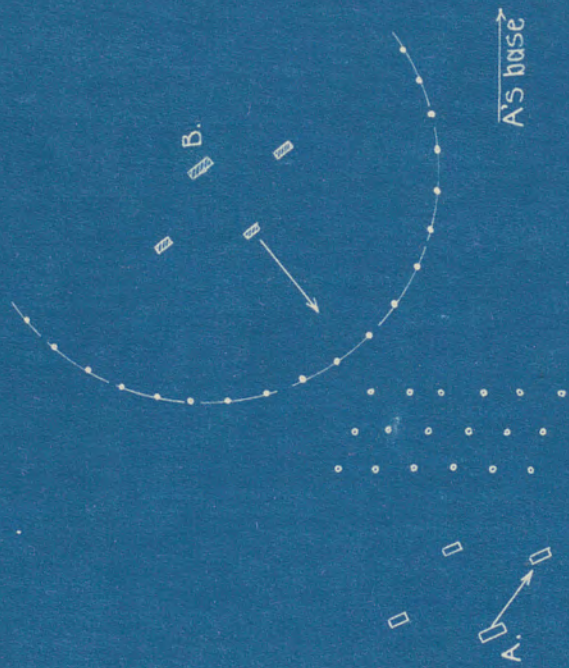
6. Same as 2&4 giving more screening

SUBMARINE DISPOSITIONS TO MEET PARTICULAR SITUATIONS.
CASES 1, 2, 3, 4, 5



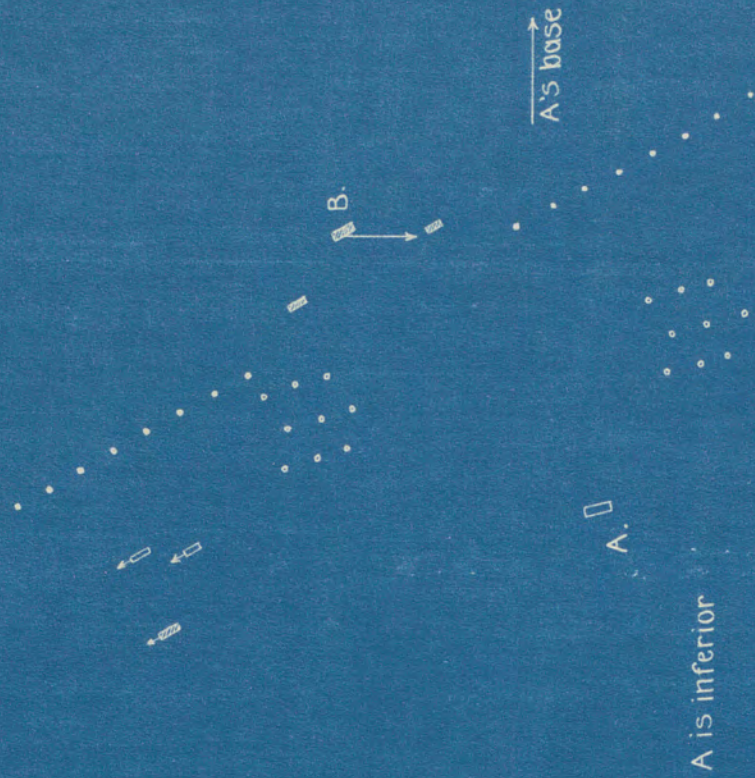
A & B are equal

1.



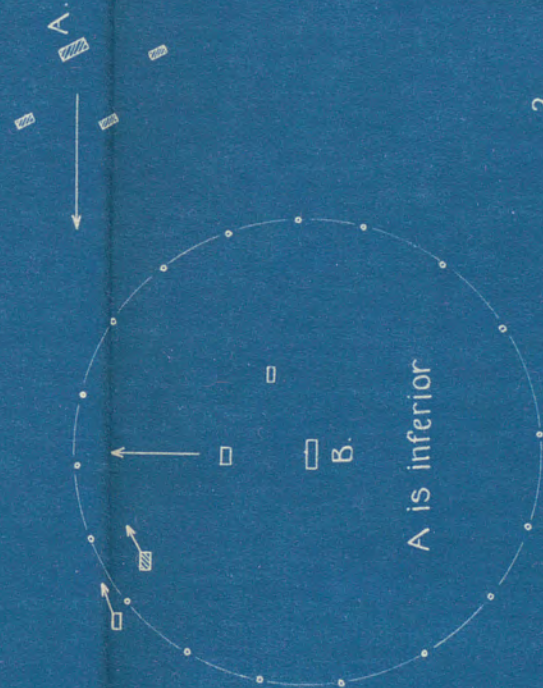
A is inferior

2.



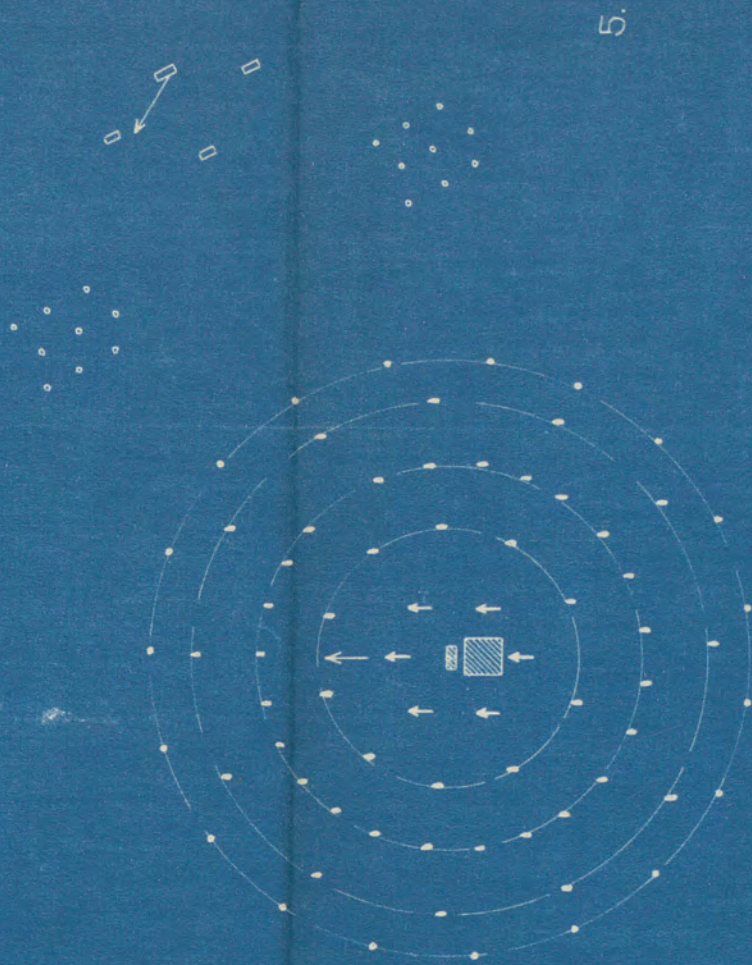
A is inferior

4.



A is inferior

3.



5.

PROBABLE SITUATIONS RESULTING FROM USE OF
SUBMARINES AS BATTLE FLANK FORCE

