

Articles on the Fred Jane Naval Wargame

Fleet Tactics Memo by Admiral Fiske, USN, 1912

No. 729.

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To: Fleet Tactical Board.

Subject: Fleet Tactics

1. Inasmuch as the work outlined for the Board is of a very general character, and it will probably be difficult to hold many meetings, I beg leave to present the following general considerations to the Board, in order to start the work.
2. The fact that none of us can be said to have had very much experience in fleet tactics, or even in tactical drills, seems to make it impossible for the Board to state any opinions dogmatically, or to make any recommendations except tentatively, and modestly.
3. In making the following suggestions to the Board, I wish it to be clearly understood that I have not myself, personally, come to any decided views. The present status of our system of fleet tactics seems to me to have some defects; and I take this opportunity to bring them to the attention of the Board, with the idea that the Board may determine whether, in their opinion, they are defects, and, if so, if any means can be suggested for remedying them; or whether it would be better, before formulating opinions, to undertake some systematic investigations as to the relative advantages and disadvantages of certain formations and evolutions.
4. As a starting point, it seems desirable to come to an understanding as to the scope of "fleet tactics." Before doing this we must first agree as to what is a "fleet."
5. Probably there will be little disagreement as to the proposition that a fleet is a unit made up of a number of vessels of different classes, that unit being subdivided into as many parts as there are classes, and those classes being again subdivided into squadrons, divisions and groups.
6. Our Atlantic Fleet is divided into battleships, cruisers, torpedo vessels, submarines and auxiliaries; and these classes of vessels are subdivided into squadrons, divisions and groups.
7. These classes are wholly distinct from each other. They are so distinct that they must be handled according to different principles; and though they may act in conjunction with each other, there are very few conditions under which they would act absolutely together. It is easy to realize battleships acting together, destroyers acting together, submarines acting together and auxiliaries acting together; but it is impossible to imagine a battleship, a destroyer, a submarine and an auxiliary acting together in the same sense as that in which four battleships are said to act together.
8. In order to have a system of fleet tactics which may be of the maximum value in a war, it seems clear that it should be designed for use against a fleet of a strength about equal to ours. It would seem idle to attempt to devise a system of tactics for use against a fleet much more powerful, and foolish to devise a system for use against a fleet decidedly inferior; and not only because this is the natural basis to work on, but because a real war with a fleet

practically equal to ours would be not only more important and more critical but more probable.

9. It is also suggested, for the consideration of the Board, that the fleet tactics used by the United States Navy in peace should be those which the United States Navy would use if we should go to war in the near future. If this idea be correct, then our fleet tactics should be designed for the ships which we have now, and will have in the next two or three years; and should not be designed for any ships, or any kinds of ships, which we do not have now or expect to have in the very near future. That is, we should not in our fleet exercises, assume, as we sometimes have done, that a cruiser is a battleship, or an armored cruiser is a scout, or that a destroyer is anything except a destroyer; but we should exercise on the basis that the various ships are exactly what they are. Of course, this does not mean that we might not oppose to our fleet in an assumed battle, some vessels, say destroyers, representing say the fast battleship wing of an enemy; but it does mean that the ships which we are using as United States ships should be distinctly the United States ships which we have or expect to have very soon.

10. It is also suggested, that our tactics and war games should represent conditions which probably may occur within the next two or three years. This would mean, for instance, that we should not engage our fleet against submarines near the coast, or anchor our battleships in the vicinity of destroyers; because these are things which we would probably not do in any war in the near future. There is unquestionably in the Service a widespread doubt as to the practical value of many of our formations and evolutions; a feeling that our System of Tactics is not a system of tactics at all, but merely a collection of drills, in which officers are exercised at grouping and regrouping ships in arbitrary formations, many of which have no military value.

CRUISING TACTICS, APPROACH TACTICS AND BATTLE TACTICS.

11. Tactics may be divided into three parts, Cruising Tactics, Approach Tactics, and Battle Tactics.

CRUISING TACTICS

12. Cruising Tactics may be divided into two parts: Peace Cruising Tactics and War Cruising Tactics. Peace Cruising Tactics would naturally govern simply the going of a naval fleet from one place to another in time of peace; War Cruising Tactics would govern the formations, maneuvers and general disposition of the fleet, including the train while making speed at sea in time of war.

13. Peace Cruising Tactics, so far as absolute necessity is concerned, do not seem to need any other formation than the column. It is evident that a fleet can go all over the ocean, enter and leave all ports, without using any other formation. With a great number of ships, however, it would probably be convenient, though not necessary, to put the fleet into more columns.

14. War Cruising Tactics do not seem to require complicated formations; but if there be a train to be protected, scouts to be handled, and destroyers to be maneuvered, it would seem that some simple formations should be adopted in which the various units could be handled by their own commanders largely at their own discretion, though in obedience to the instructions from the Commander-in-Chief. The speed in the case of the scouts would be that

of the slowest in the formation, and the formation need not, probably, be deviated from materially until battle became imminent.

15. Approach Tactics would include the handling of an actual fighting force in the immediate presence of the enemy, but beyond the reach of the enemy's gun fire.

16. Approach Tactics seem to be those which comprise the greater part of the tactics prescribed in our Signal Book. As these tactics are to be carried on while not under gun fire, it seems obvious that every formation and maneuver should be used which the Commander-in-Chief might need in the vicinity of the enemy. Inasmuch, however, as we know from long experience that we get very little time for tactical drills, and as it is highly important that in time of war we should make no mistakes in handling our vessels and fleets, it is suggested that no formation or maneuver should be included in our scheme of proposed tactics whose usefulness cannot be explicitly stated and described, in order that our efforts may be concentrated in getting the utmost skill in making the maneuvers we would actually use in war. Inasmuch as every Commander-in Chief will realize when near the enemy, that he must not be brought to a serious battle when not in column, or with his divisions and squadrons separated, we seem led to question the necessity for having many formations, and therefore the necessity for having many evolutions or maneuvers. Is there any necessity, for instance, for any compound formation whatever? If there be no necessity for any compound formation, then there is no necessity for changing from a simple to a compound formation, or from a compound to a simple formation. If we could eliminate all compound formations, we could cut down our tactical work by more than a half; and this would give us whatever time we can spend on tactical drills for drilling at handling our vessels under conditions such as we would handle them in battle, or in the approach to battle.

17. If we have any compound formations such as line of divisions then we must have also column of divisions; because just as soon as we go ships right or left from line of divisions we find ourselves in column of divisions. And the handling of these separate units as one unit (fleet), wherein all the divisions, squadrons and ships are compelled to devote a great deal of attention to keeping exact bearings and distances, is not an easy matter, even in peace times and in good weather. If we have such a formation as line of divisions, and try to direct the whole fleet as a unit, (as we do now), then we must have also many signals and maneuvers whereby this collection of many units can be turned in any direction; and the formation changed to column and vice versa; and this necessitates most of the difficult maneuvers which are found in the Signal Book.

18. It need not be supposed that, even if such formations as line of divisions or line of squadrons were eliminated, the Commander in-Chief would be debarred from sending any division or any squadron in any direction that he wished, or to any place; but if he did so detach any division, squadron or ship, that squadron, division or ship would be sent for a specific purpose, and would be handled directly by its commander, who would devote his energies to carrying out the object intended, and not to keeping at a certain distance and direction from the flagship, prescribed in the Signal Book. If, for instance, the Second Squadron of our present fleet should be sent off, say to the eastward, for any purposes, the purpose itself would indicate the proper bearing and distance of the squadron from the fleet flagship; and the commander of the squadron would maneuver it accordingly. In other words, it may be suggested that whatever reason there would be for having the fleet divided up into separate columns or detachments would carry with it the idea that those separate columns or

detachments would, by the very intention, be separate, and not simply a part of a solid fleet, and would not be required to keep, a fixed geometrical relation to the rest of the fleet.

19. Cruising Tactics and Approach Tactics would not seem to require that the personnel should occupy battle stations; but approach tactics would seem to require that the personnel should be able to take up their battle stations very quickly before gun fire should begin.

20. Battle Tactics would include the handling of a fighting force while actually under gun fire.

21. In a war with a fleet practically equal to ours, it seems logical to suppose that both fleets would be kept concentrated as much as possible. This does not mean that circumstances might not make it advisable, or even necessary, to send parts of our fleets on detached service at times; but it does mean that when the critical battle occurs, we must have all our fleet at the place of battle, and fitted in the best possible way to fight it.

22. It seems plain that we should keep clearly before our eyes the fact that the most important duty that our fleet will have to do in the next war will be not so much to "conduct operations," not so much to "scout," or "to convoy," or to move across the ocean, as to fight a stand-up, pitched battle, just as brutal as any battles that have ever occurred in the past, which will be decided in the same way as that in which battles have always been decided, simply by ability to inflict injury, and ability to withstand injury.

23. Of course this does not mean that we should neglect schemes for scouting and receiving information, or ignore questions of logistics and supplies, but it does mean that these questions must not be allowed to cloud our minds to the fact that the principal thing that our fleet will have to do will be to fight a battle like the Battle of Tsushima; and the question with us will be simply whether in that battle we shall play the role of the Japanese or the role of the Russians. A great many reasons have been given why the Russians were whipped so quickly, and a great deal of fault has been found with the Russians for what they did preliminary to the battle, and a great deal of praise has been given to the Japanese for what they did preliminary to the battle; but the real thing which decided that battle was the fact that the Japanese hit the Russians with their projectiles more often than the Russians hit the Japanese. The Russian ships may have been dirty, may have been undisciplined, may have had too much coal on, and the Russian Commander-in-Chief may not have conducted his fleet to Asia as wisely as he might; but if, when he came to the actual battle, he had hit the Japanese with his projectiles more often than the Japanese had hit him, the Russians would have been the victors and not the Japanese.

24. There seems to be no reason why a similar battle would not be reenacted between two fleets in any naval war of the near future. It is true that we can imagine cruisers, destroyers and auxiliaries merged in the organization of the various divisions and squadrons of the fleet in such a way that when any squadron or division was acting singly the cruisers and destroyers would be maneuvered by the Division or Squadron Commander. But even if the various vessels were so merged, we can hardly imagine them remaining with their divisions in an actual hotly contested battle, without doing probably occur under gunfire, we might find that we had a good deal to learn.

29. I, personally have never seen a column being drilled at changing course very gradually, as a column would have to do under battle plan No. 1; and yet it is obvious that it must be rather difficult to do it, especially if everybody is at his battle station.

30. We have not devoted much thought to this maneuver. We are quite convinced of the necessity of having an accurate sight-bar range, of keeping up a uniform speed, and of changing the relative bearing of the enemy both from our column and from each ship as little as possible; also of maintaining control of the fleet by the Commander-in-Chief, and of each ship by her captain as long as possible in the battle. And yet we propose fighting at a high speed, regardless of the fact that the very first 12-inch shot that lets water into any one of the rapidly moving ships, (maybe the ship of the Commander-in-Chief itself) is going to cause that ship to slow down immediately. This would disarrange the plan at once, because that ship would either have to be left behind, thus reducing the number of ships, or else the entire column would have to slow down. As this would probably be impracticable, and would produce confusion in the entire column if it were attempted, because no one would know how much to slow down and signals would be difficult, the ship would probably be left behind, and also the next ship that received a similar injury. Our system of tactics has taken no account whatever of this contingency; and yet it is one of the very first contingencies that would occur in battle. Besides, we have no means by which the Commander-in-Chief will be kept informed of every happening in his long column, or by which the slowing down of any ship can be made known to other ships, except by the sheering out of column of that ship. Our tactics even include such disaster producing maneuvers as changing line of bearing as much as four points in battle, with all the changes of speed and course produced thereby throughout the entire fleet!

31. In considering whether the one formation, column, (including line and line of bearing), be sufficient for time of war, it must be borne in mind that at the present time destroyers, submarines and mines have become such a menace to battleships, that battleships will have to keep pretty well away from land, at least from land in possession of the enemy. But if one fleet keeps away from the land, the other fleet will have to keep away from the land also, if it is to fight the first fleet. This seems to mean that in any probable battle between large fleets, the fleets will be out on the open ocean, with plenty of sea-room. A probable "objective," or cause of battle, will be the attempt of one fleet to drive off another, which is attacking a trade route, or perhaps is supporting "commerce destroyers" that are cruising on a trade route.

32. It is true that history does not bear out this statement; but it would seem that fleets are now in a different category from any that they have ever been in before. Fleets have never before been under the necessity of keeping away from the land, but they are now under that necessity. It may seem at first glance that this necessity of keeping away from the land impairs a great deal the efficiency of an attack of a fleet upon the enemy's coast. Doubtless this is true in a measure; in other words, destroyers, submarines and mines have brought about such a condition that the enemy's fleet must keep away from the coast. But nevertheless, under the conditions of sea trade now prevailing, a fleet even far off the coast, may blockade that coast very effectively, by cruising on the trade routes of steamers from its principal ports. A foreign fleet could almost obliterate the entire foreign trade of New York, without going within a hundred miles of the port.

33. If it be true that in the near future, fleet battles will be fought out on the ocean far away from land, it would then seem that, for purposes either of preparation for battle or battle itself, there is no reason why the fleet should not be always in a simple formation. For a fleet,

column is what in the Army is called "line of battle." It is the formation in which the guns can be used with the most effect. If a fleet is in column, then it is in "line of battle," and ready for battle, so far as its formation is concerned.

34. But even if the circumstances of war require a fleet to maneuver near a coast, the advantages of keeping in a simple formation seem to remain. In fact, the advantages of keeping in a simple formation seem to be even greater than if there be plenty of sea-room, because the difficulty of handling a large number of ships in compound formation near the shoals and headlands and in the crooked passages that exist in most navigable waters near a coast is exceedingly great-much greater than that of handling them in simple formation. As has been said before, this does not mean that different parts of a fleet may not be sent to different places, or in different directions, for specific purposes; it merely means that if the fleet is to remain in any regular formation wherein the parts maintain fixed relations to each other, the formation in which it is the most easily handled is column; and next to column come the derivatives of column,-line of bearing, and line.

35. It may be considered that the head or rear of a very long column would be exposed to attack from two sides; that if we had our fleet in one long column and the enemy had his in two columns, the enemy would get the head of our column between his two columns and crush it. But it can hardly be imagined that our Commander-in-Chief would not so maneuver the head of his column as to keep it outside of the enemy's column, so that he could attack one column or the other, or at least threaten it:-either of which maneuvers would compel the enemy to go into column.

36. It may be held that we should continue to have evolutions in compound formations, because they give us excellent drill in handling ships. To this it may be replied that this reason is not, in itself, sufficient, unless there is no other means by which we can get skill in handling ships. It is plain that we need skill in handling ships for two purposes, one is for handling them under the conditions of battle, and the other for handling them under the conditions of peace: If the conditions of war and peace were the same, and if handling ships in compound formations would give us skill for the conditions of both war and peace, then we ought to continue drilling in compound formations. But if the thing which we want to learn to do in battle is to handle one long column, with the utmost skill; and if the things which we want to learn to do in peace are to keep our ships clear of each other and of other vessels, while making passages at sea, and going in and out of port, then clearly, we should have two different exercises for these two different kinds of conditions. Furthermore, when we are having any exercise we should hold clearly in mind the object of that exercise and carry it out in such a way as to achieve that definite object. If we do not do this,-if we have exercise with merely a vague idea of learning to handle ships,-then our tactical exercises will have the same relation to the purposes of tactics that the setting up drill has to the daily life of the men; and will partake more of the nature of what might be called "tactical gymnastics" than of tactical exercises.

37. Our exercises in compound formations do not seem, if carefully analyzed, to be good training for either war or peace. The only training they give is in handling ships in compound formations. They do not train for battle; they do not train for avoiding vessels on the high sea under ordinary conditions, and they do not train for handling ships when going in or out of port, except very indirectly.

If we wish to train the fleet for battle, let us train the fleet in the formation and under the conditions that would prevail in battle; if we wish to train the ships, and the fleet itself, for going in and out of port, let us go in and out of port as often as necessary in order to get the necessary training.

38. Inasmuch as we have never trained our fleet to maneuver in one long column against an enemy going at an unknown speed and in an unknown direction, and since according to Battle Plan No. 1, this is exactly the thing we shall do in battle, why not hold a few exercises with the entire available fleet in one long column, and with some destroyers representing an enemy? In case the two columns go ahead at exactly the same speed, and in exactly the same direction with the various ships abeam of each other, then no special skill will be required, and no training will be had. But, if the two forces meet on the ocean without either knowing the direction in which to expect the other one, the chances are extremely small that those relative formations will be taken up immediately. As both "fleets" will be assumed to want to fight, they will maneuver to bring on a fight, and each one will try to get the advantageous position, relative to the sun and the wind. Approach Tactics will be employed here; and the exercise will clear up our ideas on this matter. After a time, however, perhaps a long time, perhaps a short time, the fleets will line up in columns approximately parallel.

39. After the columns are lined up, the obvious drill for our fleet would seem to be to maneuver so as to keep the enemy's column abeam of our column; and, as far as possible, for each ship to keep her opposite approximately abeam of herself. If the enemy is going at considerably greater speed than we, (say, for instance, if our fleet were going five knots, and the enemy were going fifteen knots), this would result after a while in our fleet being drawn up on an arc of about 90° , steaming around a circle whose radius was 5,000 yards; and the enemy on an arc about 30° , of a circle whose radius was about 15,000 yards. Of course, such relative positions would be very unfavorable to our fleet, and therefore we ought not to allow them to be assumed, unless the time required to take up such positions would prove to be so great that the enemy's force would long before have lost its speed, and therefore be unable to take her position. If our fleet were going five knots and the enemy's fifteen, at the beginning of the gun fire, it is obvious that our fleet would be much less handicapped as regards speed by injuries than the enemy's fleet would; and that it might be that the enemy would be defeated before he could obtain any position of tactical advantage. In other words, we might find that, under certain conditions, we would more than offset the tactical disadvantage of a lower speed by the greater permanency of conditions and consequent superiority of our gun fire; or, to put the matter in other words, we might make the enemy pay more for his tactical advantage than the tactical advantage would prove to be worth. Exactly what would happen, of course, we do not know, but it does seem that it is exactly what we ought to find out. Instead of wasting the small amount of time that we have to spend on tactical drills, in charging around the ocean, making utterly futile and meaningless maneuvers, why not spend time on finding out something definite? What we want to know is what would happen if two columns of opposing battleships should meet on the ocean, and what to do in consequence. Personally I am under the impression that we would find that there is a good deal to learn, and also a good deal which we could learn, and that we ought to investigate this matter first, and put arbitrary "maneuvers" into a secondary place.

SPEED

40. If a fleet be in column, and if it meets an enemy's fleet, the fleets are bound to line up in columns approximately parallel, and fight.

41. So long as the two fleets are lined up side by side, neither fleet has any tactical advantage over the other. In order to gain a tactical advantage on the open sea, almost the only thing that can be done is to cap the enemy or T him, or approximate that position; and usually this can be done only by the fleet that has the superior speed. The idea of capping or T'ing seems to have taken possession of naval tacticians to such an extent that it is no great exaggeration to state that almost the entire underlying idea of naval tactics now is to cap.

42. In order that we shall be able to cap the enemy as quickly as practicable, our ships must go as fast as practicable. It may be admitted at once that it would be very advantageous if we could cap the enemy; but it was very forcibly imprinted on my mind last August, west of Block Island, when the BLUE force capped the RED force, that although this took place under absolutely ideal conditions, yet, nevertheless, it took a long time to get to that capping position, during which time all our ships were under gun-fire from all the RED ships; and also that after the capping position had been attained, it could not be maintained long.

43. Under the conditions prevailing on that occasion, BLUE was able to cap RED without going at high speed, by reason of the directions from which RED came relatively to BLUE; and it then occurred to me that we had gained whatever advantage there was in capping, without having to sacrifice anything to attain it; but that under most conditions, such a position would have cost a great deal.

44. I mean that we would have had to pay for it by high speed; and this suggested the question whether we may not have exaggerated the advantages to be gained by high speed and underestimated its various disadvantages.

45. To make plain the meaning of this idea, it may be pointed out that what really decides and always has decided every modern naval battle, with the possible exception of the Battle of Lissa, is gunfire, or rather hits; and that we ought to determine first what are the best conditions for securing hits, then determine the best tactical plan for obtaining those conditions and preserving them as long as possible in a battle, and then ascertain whether or not high speed is favorable to carrying out that plan.

46. Now there can be no doubt that conditions are favorable to securing hits in proportion as the ship is steady, as everything is quiet, as the change of bearing and distance are small, and as there is an absence of haste in our operations;-also in proportion to the clearness with which we can see the target.

47. Battle will have to be carried on, of course, with the personnel at battle stations; but, clearly, our Battle Tactics should not ignore the fact that these battle stations are not invulnerable and neither are the ships; therefore, our Battle Tactics should be such that favorable conditions will be impaired as little as possible by any damage received. This seems to mean that our formations and maneuvers should be as simple as possible, and as "fool proof" as possible;-also that the speed should be as low as practicable under the circumstances.

48. This does not mean that ships need not be provided with means for going fast, because there is a strategical use for speed, which has nothing whatever to do with its tactical use; and furthermore, all ships, even when going at slow speed in battle, must have a great deal of reserve power, in order to maintain speed in case an injury increases the resistance of the

under water body, in order to back hard if necessary, and in order to take up a high speed, if circumstances should require it.

49. Neither does it mean that there may not be a necessity in battle, for a fleet to go at high speed; but it does mean that we should recognize that this high speed carries with it several distinct disadvantages. Some of these disadvantages are as follows:

(a) A high speed causes greater vibration to a ship, not so much from the engines as from the way the bow meets the waves, thus making it more difficult to use range finders and spotting instruments accurately;

(b) It tends to throw more water over the guns and telescope sights;

(c) It makes more smoke;

(d) In case a smoke pipe is hit, it causes greater and quicker change of speed; and in some cases, a greater amount of smoke between decks;

(e) In case a ship is struck near the water line in such a way as to let in water, the speed of a ship is more reduced. If enough water is let in to reduce the speed of the ship below that of the rest of the fleet, the fleet will either have to slow down, which could not be done without confusion and loss of accuracy of gun fire, or else the ship would have to be left behind, and the size of the fleet reduced;

(f) It reduces the number of ships that could fight in column, because some of the older ships would not be able to keep up;

(g) Under most circumstances, it increases the disturbing influences of the wind.

50. It may seem at a first glance, that one item mentioned above, that of the effect of high speed on the range finders, is hardly worthy of consideration; but it is believed that a more careful consideration of this matter would show that this is very important. Of all the factors that go to make up the accuracy of gun fire, the most important single factor is the determination of the sight-bar range. This matter has not received the consideration that its importance deserves; but a very simple calculation will show that, say at 10,000 yards, a 12-inch gun of 2,700 f.s. whose sight-bar range was given it with an error of only 50 yards would hit its target twelve and onehalf times as often as it would if its sight-bar range were in error one hundred fifty yards. The enormous advantage which could thus be obtained, which would put twelve ships on an equality with one hundred fifty ships is many times greater than any advantage attainable by any tactical maneuver or disposition of forces, and can be gotten under average conditions, by taking the proper measures. It is a matter of fact that a fifteen-foot range finder, used under good conditions of quietness, can determine a range of 10,000 yards with an average error much less than fifty yards; but the disturbing effects of wind and vibration are so great that this error can be very easily increased to one hundred fifty yards, and even much more. Not only is the error increased by unfavorable conditions of wind and vibration, but the rapidity of the observations is very much lessened; so that there are frequent long intervals, when no range whatever can be obtained. It is true that range clocks, and other apparatus, are in use; but these apparatus all require knowledge of the movements of the enemy which we might not be able to obtain in a battle, and probably could not, except approximately.

51. The reason why a seemingly small change in the conditions under which guns are fired makes a great deal of difference in the percentage of hits may not seem clear at first. But it may become clear if we realize how small a change in the way in which a gun is pointed will make the difference between a miss or hit, when the target is small and the probability of hitting also small. Of course, the smaller the percentage of probability, the greater the change in probability which is produced by any error. For instance, if the probability of hitting under given conditions were 1%, and the probability of missing 99%, then any improvement in the conditions under which the guns were fired, by which the chance of missing was decreased from 99% to 98%-(about 1%)-would double the chance of hitting! Similarly, if the chance of hitting were 10% and the chance of missing 90% (which may be assumed as, roughly, service condition), then any improvement which, by lessening the errors, reduced the chance of missing from 90% to 80%, would increase the chance of hitting from 10% to 20%. That is, if by care in avoiding sources of error we reduce the chance of missing by about 11%, we double the chance of hitting. In other words, we double the h.p.g.p.m. [hits per guns per minute].

RUDDER ANGLE

52. While large angles of rudder are undoubtedly necessary at times, and while it is clear that the present ability of ships to turn in small circles must not be surrendered, nevertheless, it would seem that for tactical purposes it might be better to use small angles.

53. At present it seems to be the idea that, in making the approach for a battle, ships should approach at quite a sharp angle, and then make a sudden turn, just previous to opening gunfire. This is the plan used in target practice for the last few years; but it is suggested that this is exactly what a fleet ought not to do. In the First Division, when firing under Plan "B", we found that, if a ten degree angle was used, the guns could be kept on the target with great success; but that this could not be done if standard rudder of about 17° were used.

54. Clearly every means should be employed which will increase the h.p.g.p.m., and all things avoided [which] will decrease them. 55. This seems to mean that we should approach at a small angle, and make gradual turns.

NIGHT MANEUVERS

56. We have been exercising at night maneuvers for several years, with little if any, definite result. We know little more than we did twenty years ago in regard to the best way to repel destroyers at night; and everybody seems to feel that about the only thing to do is to extinguish all lights, spread a "screen" out at least five miles away, and realize that if a destroyer gets within torpedo range we cannot prevent her from firing her torpedo at us.

57. This being the case, would it not be better to drop these highly picturesque and laborious maneuvers for a while, and devote our time and our energies and our mental faculties to solving the practical and urgent problem of how to fight a column of battleships in the daytime?

58. This will not prevent our putting out lights whenever we wish to do so, while cruising at night, and making whatever observations we wish as to visibility under different states of the weather, handling screens, etc. Apparently this is about all we can do, until some genius

invents what may be called a "megaphote," that will enable us to see in the night-time. Such an invention, by the way, does not seem theoretically impossible.

(Signed) B. A. FISKE