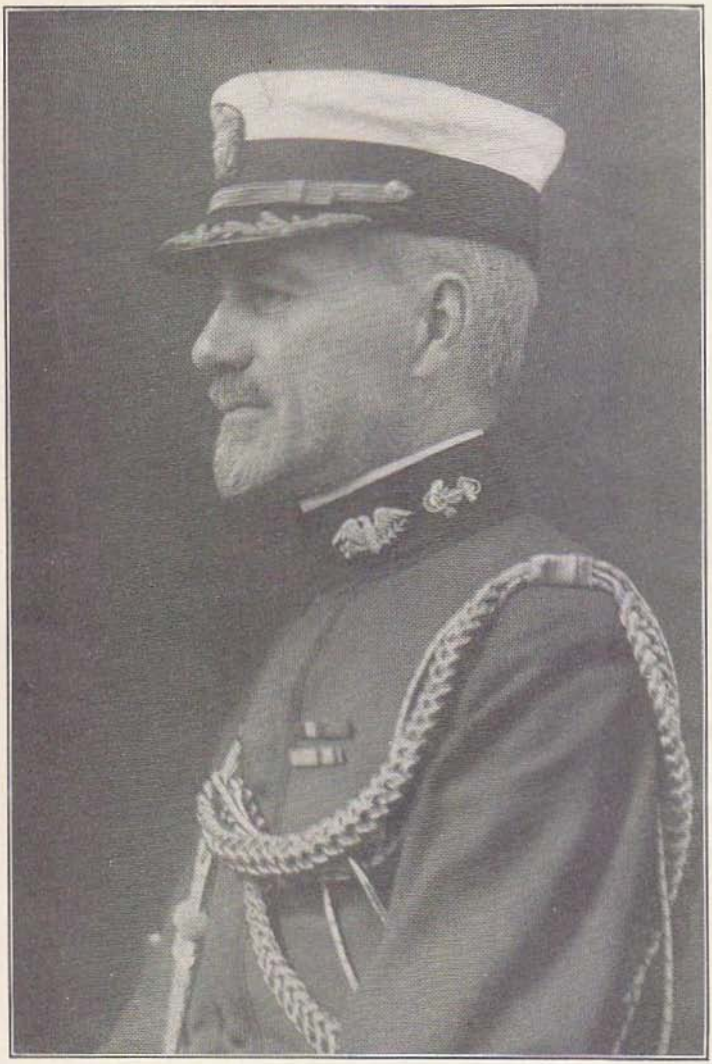

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NAVY DEPARTMENT
OFFICE OF NAVAL INTELLIGENCE
HISTORICAL SECTION

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THE AMERICAN NAVAL PLANNING SECTION LONDON

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PREFACE.

This monograph is virtually a reproduction of the formal records of the American Planning Section in London during the Great War, presented in numbered memoranda from 1 to 71, inclusive. Memoranda Nos. 21 and 67 have been omitted as being inappropriate for publication at this time.

Before December, 1917, all strategic planning for the American Navy was done by a section of the Office of Naval Operations in Washington. Admiral Sims urged the need of a Planning Section at his headquarters in London, where comprehensive and timely information was more available; not only of the activities of American Forces, but of the Allied Navies and of the enemy.

A visit to England during November, 1917, by Admiral Benson, Chief of Naval Operations, coincided with a reorganization of the British Admiralty, which included, as a result of war experience, magnification of the function of strategic planning by their War Staff. Decision was then reached to form an American Planning Section at the London headquarters of the Commander, U. S. Naval Forces Operating in European Waters, with the idea of cooperating more closely with the British and other Allied plan makers. Up to that time the naval strategy of the Allies often appeared to lack coordination and to be formulated primarily by men so burdened with pressing administrative details as to prevent them from giving due attention to broad plans. It was intended that the new arrangements should correct these defects.

The function of the Planning Section corresponded closely to that of similar units of organization in large businesses and in armies. Its work was removed from current administration, yet necessarily required constant information of the progress of events. It comprehended a broad survey of the course of the war as a whole, as well as a more detailed consideration of the important lesser aspects.

From an examination of these records of the American London Planning Section, together with its history contained in Memorandum No. 71, prepared soon after the conclusion of the war, it is evident that the influence of the Section upon the general naval campaign was constructive, comprehensive, and important.

D. W. KNOX,
Captain (Retired), U. S. Navy,
Officer in Charge, Office of Naval Records and Library; and Historical Section.

THE AMERICAN NAVAL PLANNING SECTION IN LONDON.

MEMORANDUM No. 1.

Submitted 31 December, 1917.

THE NORTH SEA MINE BARRAGE.

(See Map No. 1, "The North Sea.")

We have thought that it would assist us in the study of the barrage to have in mind clearly a statement of the mission of the barrage. After study and discussion the following mission has been accepted by all concerned:

MISSION.

To close the northern exit from the North Sea to submarines and raiders with the maximum completeness in the minimum time.

The way of accomplishing the mission is made up of several factors which, for the sake of clearness, may be discussed separately. First, then, let us consider the position of the barrage:

POSITION.

It is unnecessary to consider all the data which led originally to the selection of the Aberdeen-Ekersund line. It is sufficient to note that this line was at the time of its selection believed by both the British and American naval staffs to be the most acceptable position.

The second position considered in this memorandum is the one now proposed by the British Admiralty and accepted in principle by the Navy Department. There are many factors pro and con that entered into a choice as between the two positions, but of these a single factor controlled, viz, that the new position is deemed best by the grand fleet, upon which will rest the responsibility for the support and patrol of the barrage. The new position gives greater freedom of movement and greater ease of support to surface vessels, while it imposes corresponding difficulties upon the operations of enemy surface vessels. The change in position accepts the handicap of an average increase in depth of water about 15 fathoms. This handicap

might be considered serious were it not for the fact that the whole plan of the barrage is based upon the assumption that an effective mine field can be laid in 1,000 feet of water. If this assumption be true, then whether a portion of the mine field be in 40 or in 60 fathoms of water is not material, except as the change of plan introduces delay. If the assumption be not true, then the barrage is doomed to partial failure anyway.

It will be noted that the original line extended from mainland to mainland, while the new line extends from island to island and has in it passages completely navigable to submarines. This condition is, in our opinion, undesirable. We believe it wrong to accept a plan that provides in advance a way by which the plan may be defeated. This point will be discussed more fully when the character of the barrage is considered.

CHARACTER OF THE BARRAGE.

The proposed character of the barrage does not provide for the full accomplishment of the mission. The proposed barrage will not close the northern exit from the North Sea, because—

(*a*) The barrage is not complete in a vertical plane in Areas B and C.

(*b*) The barrage is not deep enough.

(*c*) The Pentland Firth is open.

(*d*) The waters east of the Orkney Islands, for a distance of miles, are open.

(*e*) Patrol vessels on the surface are not sufficiently effective in barring passage to submarines, as witness the Straits of Dover.

The barrage is to be a great effort. It is our opinion that nothing short of a sound design will justify the effort.

The requirements of a sound design are the extension of the barrage complete in the vertical plane from coast to coast. If it be impracticable to carry the barrage up to the Orkneys, and to close the Pentland Firth, then the western end of the barrage should turn south to the Aberdeen Promontory.

The necessity for an opening in the surface barrage is recognized, but it is held that this opening should be in the surface barrage only, and that the deep barrage should be widened so that the difficulties of navigating the opening submerged may be practically prohibitive. Deep mines should cover for a considerable distance all approaches to the barrage opening.

The Norwegian coast presents special difficulties both in mining and patrol, but all of these difficulties will be greatly reduced by carrying the surface barrage up to the 3-mile limit. It will then be practicable to concentrate the strength of the patrol in the very near vicinity of Norwegian territorial waters.

The deep barrage in Norwegian waters should be extended so as to porcupine the coast both north and south of the surface barrage for a considerable distance. The submarine must be taught to fear all Norwegian territorial waters.

The above points concerning the character of the barrage are points to which we attach great importance.

LENGTH OF ANTENNÆ.

British experiments indicate that a length of antennæ greater than 70 feet will not assure the destruction or disablement of an enemy submarine. This length requires three lines of mines in the vertical plane. Three lines permit the vertical barrage to be extended vertically to a depth of 235 feet. It is essential that the upper tier of mines have antennæ of such length that vessels traveling on the surface may not escape, otherwise vessels might escape by the simple plan of making the passage on the surface in Area A. The necessity for short antennæ is not so pronounced for the deeper mines, as the probability that submarines may make contact with the upper end of the deep antennæ is much less than it is in the case of the shallow mines. The length of the antennæ is related directly to the vertical width of the barrage, as follows:

(1) Three 70-foot antennæ cover 235 feet.

(2) Three 100-foot antennæ cover 325 feet.

(3) One 70-foot and two 100-foot antennæ cover 295 feet.

Add 25 feet to each of the above depths and get the prohibited vertical zone for submarines.

We are of the opinion that the third combination should be used, as this combination provides for destruction on the surface and for reasonable certainty of destruction up to 300 feet submergence.

SEQUENCE IN LAYING.

While the sequence of laying the mines is an operating matter, it seems desirable that the situation on the Norwegian coast be cleared up by laying the fields there as early as possible.

In Area A it may be desirable to lay the southern system first and to lay all deep mines before any shallow mines are laid.

TENTATIVE DECISIONS.

1. To accept the new position of the barrage as outlined by the British Admiralty.

2. To urge that the barrage be complete in the vertical plane from coast to coast, except an opening in the surface barrage at the western end and in Norwegian territorial waters.

3. To carry the barrage to a depth of 295 feet.

4. To have surface mines fitted with 70-foot antennæ and other mines with 100-foot antennæ.

5. To urge that deep mine fields be laid at numerous points on the Norwegian coast.

6. To urge that all approaches to barrage openings be mined with deep mine fields for a considerable distance, so as to make the navigation of these openings by submerged vessels as hazardous as possible.

(See British comment in Memorandum No. 3.)

COMMENT OF BRITISH ADMIRALTY.

A. Concur.

B. It is considered this assumption is true as far as can be judged with the knowledge in our possession.

The question as to the greatest depth to which the enemy submarines may be expected to dive was discussed with our submarine experts when the depth of the barrage was decided on.

The matter has been again discussed with them since the receipt of your memorandum and they confirm their former opinion that submarines will not of their own free will dive to a depth exceeding 200 feet.

To dive under the barrage the submarines would have to dive to 240 feet in the American mine field and to 215 feet in the British mine field, measuring to the bottom of the boat, which is the German practice.

It is the considered opinion of the submarine experts that it is of more importance to effectively mine from the surface to 200 feet rather than to mine deeper with a loss of efficiency down to 200 feet.

A question which must be taken into account is whether the explosion of a charge at a depth of 200 feet has a greater radius of destruction than a similar charge at a depth of 70 feet.

Opinions differ much on this point and without direct proof, which is difficult to obtain, it is considered the effect must be assumed to be equal.

A point which requires careful consideration is whether the American mine as now being constructed will withstand the external pressure to which it would be subjected if laid at 300 feet.

The possibility of having to lay mines at 300 feet has been taken into consideration in future orders of British mines.

Taking the above points into consideration, it is requested that you will put forward any proposals you may wish to make regarding the length of the antennæ.

C. The stopping power of a mine barrage such as we propose to lay should not be overrated.

It is considered that if we relied on any mine barrage across such a great width to entirely stop submarines passing out of the North Sea our hopes would be foredoomed to failure, at any rate until the barrage had become very thick.

It is the patrol craft, armed with various antisubmarine devices, on which we must rely to actually kill the submarines.

Now, the efficiency of the patrol depends on its intensity, and it is on the mine field that we rely to give us this intensity.

The introduction of the "Acoustic mine" may, and we hope will, give us an instrument which will enable us to absolutely deny large areas to submarines unless they accept the probability of almost certain destruction.

The acoustic mine is not yet a fait accompli and therefore we can not base our plans on it.

Assuming that we are correct in considering the mine field only as an accessory to the patrol, we must arrange the mine fields to that end.

When looking at the plan of the Northern Barrage it immediately occurs to one, Why not extend the surface mine field right up to the Norwegian coast?

Until we have proved the efficiency of the American mine field we must look upon it as a bluff.

It is not suggested that the American mines will not be efficient, but only whether any system of existing mines will deny an area 150 miles in width to submarines.

We notify an area 150 miles in width as dangerous and hope that the enemy submarines will be diverted into the areas on each side where our patrol craft can deal with them.

If we attempt to put the bluff too high, which it is considered would be the case if we mined the eastern area up to the surface, there would be a chance of forcing the submarines to pass through the mine field, which they might find they could do without prohibitive loss. We should then be faced with the problem of patrolling the whole area between Orkneys and Norway—a task beyond our resources.

By the end of the summer the mine fields in the notified area will, it is hoped, be so dense as to make the danger of passing through them prohibitive, in which case we could then mine the eastern area up to the surface.

It would be desirable to do this, if possible, before next winter, as our patrol craft will find it next to impossible to efficiently patrol the eastern area during the stormy winter days with long nights.

D. (*a*) The reason for not making it complete in Areas B and C has been explained under C.

(*b*) Already discussed.

(*c*) The navigation of the Pentland Firth by submarines when diving is not considered to be a practicable proposition. Patrol craft should prevent submarines passing through it on the surface. Also, as already explained, the patrol areas thoroughly cover the approaches to the Firth, and as it is on the patrol craft we rely to destroy the submarine the fact that it is not covered by the mine field is not considered to be of vital importance. It is clearly recognized, however, that once the barrage has one or more systems completed right across, our subsequent mine laying must be adjusted to meet any new tactics on the part of the enemy. It may for instance be necessary to continue the deep mine field down to the coast of Scotland or to mine an area to cover the western end of the Pentland Firth.

(*d*) The patrol craft in the Straits of Dover are not at present fitted with up-to-date hydrophone gear, nor are strong tidal waters, such as the Straits of Dover, suitable for hunting with the fish hydrophone.

The efficiency of the patrols on the Northern Barrage should not, for the above reasons, be based on results obtained at Dover up to the present time.

Submitted: Question whether the barrage should be completed on the surface up to the Norwegian coast.

The American idea of having a surface mine barrage from the Orkneys to Shetlands is presumably based on the assumption that a mine field 220 miles in length can be made so effective that it will stop submarines passing through it.

The experience of the war, it is claimed, does not bear out this assumption.

Neither do we yet know whether the American mine is efficient.

When the design of the barrage was originally considered, it was estimated that three lines of mines at each depth would be required to make it efficient.

Now, three lines of mines at each depth will not be in place until well on in the summer, even if there are no more delays than we know of at present.

Hence the mine barrage can not be considered really effective until later on in the summer, and therefore we should not attach too much importance to it.

Now, if the above assumption is correct, we should almost certainly create a situation we could not deal with if we followed the American suggestion to mine up to the surface right across, for the following reasons:

(*a*) The submarines would break through the mine field without prohibitive loss.

(*b*) We should then be forced to patrol the whole area between Orkneys and Norway with fish hydrophone vessels. We have not sufficient craft to do this.

In the British plan the patrol vessels, with up-to-date hunting gear, are looked upon as the primary means of stopping the submarines, and the mine fields are only laid with two objects:

(*a*) By means of the notified area to bluff the submarines into using channels which are sufficiently narrow to allow of them being efficiently patrolled.

(*b*) The deep mine fields to help the patrol craft to kill the submarine.

It is submitted that, re Admiral Sims's letter A:

(*a*) It is first necessary to see whether the submarines avoid the notified area. If they do not, it will be necessary to go on strengthening the notified area until they do avoid it.

(*b*) Before committing ourselves to mining the whole area up to the surface it is necessary to find out whether the American mine is efficient.

By the end of the summer the mine barrage should be sufficiently thick to make the passage of submarines through it prohibitive, and it will probably be desirable to continue the barrage up to the surface so as to reduce our patrols on the Norwegian coast to a minimum during the winter months when the weather is bad and the nights long.

It is considered by submarine experts that it is of infinitely more importance to make the barrage efficient down to 200 feet than to have a thinner mine field down to 300 feet.

3. As the Americans are mainly responsible for the center (notified) area it is considered they should have as much latitude as possible, and it is therefore suggested that the proposal to make the length of the antennæ in the lower lines 100 feet should be concurred in.

This should only be done, however, if it is quite certain that the American mines can withstand the pressure at 300 feet.

4. When the main lines of the barrage have been completed the situation should be reviewed and further mine fields laid as proposed by the American officers where experience shows them to be necessary.

5. It is not considered essential to have the bottom of the barrage at the same depth right across. To extend the mine field downward in the case of the American mines only necessitates lengthening the antennæ, whereas in the British mine fields it entails laying extra lines of mines.

As already stated, it is considered of much more importance to make the mine field effective down to 200 feet before extending the

mine field lower, and in the case of the British fields the deeper mines should not be laid until the present barrage is completed.

There does not appear to be any reason, however, why this should prevent the American mine field being extended downward.

Re Admiral Sims's letter B:

1. It is considered the areas allocated to each country should remain as at present until it is seen what progress is made, viz:

British mines to be laid in Areas B and C.

American mines to be laid in Area A.

Should it be desired at a later date to mine Area B (western area) up to the surface with American mines, it could be done with the ordinary sinkers and mooring ropes, e. g., those similar to the ones in the center Area A.

To mine the eastern area up to the surface with American mines will require special long mooring ropes.

It is suggested, therefore, that the principle of the possibility of having to mine the eastern area up to the surface at a later date be accepted, and that the United States be asked on the completion of the mining of the center area with three systems to have sufficient sinkers with long mooring ropes ready to lay two lines of surface mines across that area.

NOTE.—The British mooring ropes provided for the eastern area are of a sufficient length to enable surface mines to be laid in that area should it be desired later.

3. Propose to inform the United States that the necessary navigational buoys and other marks are being provided by us for all mine fields.

[Extracts from Memorandum No. 71, "History of Planning Section."]

MEMORANDA NOS. 1 (31 DECEMBER, 1917), 3 (5 JANUARY, 1918), 17 (12 MARCH), 35 (11 JUNE), 42 (30 JULY), 43 (21 AUGUST), 51A (18 SEPTEMBER).

Subject: "*Northern Mine Barrage.*"

From its organization the Planning Section was thoroughly convinced of the desirability of completing the barrage at an early date according to a design which would render the passage of submarines north about as hazardous as practicable.

Believing that the speedy completion of an effective barrage required agreement in advance upon a plan by the two navies which had jointly undertaken the project, frequent discussions and conferences were held with British officials. These developed important differences of opinion as to the general characteristics of the barrage. Repeated efforts were made to reconcile these differences and to reduce to writing a concrete plan which would be acceptable to both navies. These efforts met with failure in so far as formal agreement upon a written plan was concerned, the British apparently desiring to reserve the privilege of altering the plan when expediency so dictated. They were probably influenced to adopt this attitude by the intentions (not then disclosed) to undertake extensive mining operations in "the Bight," and at

Dover, which might interfere with any agreements they made with respect to the Northern Barrage. Possibly some skepticism also existed as to the ability of the Americans to execute satisfactorily their part of the project. Doubt as to the practicability of the barrage, as well as to its strategic importance, was frequently manifested by many high British officials, notably the Commander in Chief Grand Fleet, under whose general direction the laying operations and their protection were placed. This attitude was reflected in the Deputy Chief of Naval Staff, whose department in the Admiralty handled fleet affairs. It was upon the recommendation of the Commander in Chief that the position of the barrage was moved about 50 miles northward, placing the American Section in depths of water somewhat deeper than the original position. This incident alone put back American preparations about three weeks. It became known in about September, 1918, that the hostility of the Commander in Chief to the barrage was caused in large measure by the interference that the barrage would cause to the weekly Norwegian convoy, for the protection of which the Commander in Chief was held responsible.

The British Assistant Chief of Naval Staff was hostile to the barrage, apparently because of the probable influence which it would have to reduce the number of vessels available for convoys, for which duty he was primarily responsible.

For similar reasons, affecting their own job, practically every influential British official afloat and ashore was opposed to the barrage, except the British Plans Division.

This situation caused the American Planning Section constantly to urge orally expedition in the completion of the barrage, and to emphasize its great importance in the above memoranda, as well as in other papers upon more general subjects.

It is believed that the influence of this Section, exerted so constantly, considerably advanced the completion of the barrage. But for the lack of a proper agreement in the early stages of the project, and for the opposition of British officials, it is probable that the barrage might have become effective in the early summer of 1918.

MEMORANDUM No. 2.

DUTIES OF PLANNING SECTION.

2 January, 1918.

The cablegram from Admiral Benson which expressed his desire that a Planning Section be organized in London stated as follows:

[Cablegram.]

From: Admiral Benson.
To: Navy Department.

From my observation and after careful consideration, I believe that plans satisfactory to both countries can not be developed until we virtually establish a strict Planning Section for joint operations here (in London), in order that the personnel therein may be in a position to obtain latest British and allied information and to urge as joint plans such plans as our estimates and policy may indicate. This action appears to be all the more necessary considering the fact that any offensive operations which we may undertake must be in conjunction with British forces and must be from bases established or occupied within British territorial waters. The officers detailed for this duty should come here fully imbued with our national and naval policy and ideas. Then, with intimate knowledge which they can obtain here from data available, actual disposition of allied forces, the reason therefor, they will be in a position to urge upon British any plans that promise satisfactory results.

(Signed) BENSON.

NOTE.—Above cablegram was dated November 19, 1917.

In conversation with the First Sea Lord on New Year's Day, he expressed the opinion that one of the Planning Section might be attached to the staff of Rear Admiral Keys at Dover; that another might be detailed in the Material Section of the Admiralty; and that the third officer might possibly be in the Operations Section of the Admiralty. The First Sea Lord offered these suggestions as tentative only, but seemed to dwell with some insistence on the Dover detail.

The proposed arrangement is not at all in accord with the expressed ideas of Admiral Benson and would but serve to nullify our usefulness as a Planning Section.

It is therefore proposed that it be pointed out to the First Sea Lord that the duties of the Planning Section must necessarily be more general. The United States is now involved in this war to an enormous degree. The naval vessels, and the troops on this side of the

water, are no correct measure of our participation in the war. Loans to the Allies, aggregating seven billion dollars, are being made with prospect of further loans. Our entire military effort is by way of the sea. We are intensely concerned in the measures taken to drive the Germans from the sea and in the measures taken to handle shipping at sea.

It is therefore appropriate that the Planning Section of Admiral Sims's staff shall be free to consider those questions that seem to him and to the members of the section most urgent.

It appears to us that the principle that should govern our relations with the Admiralty is: The privileges of the Admiralty with complete freedom of action so far as the Admiralty is concerned.

These privileges and this freedom of action are essential if the Planning Section is to attain its maximum usefulness to our joint cause.

In presenting to the First Sea Lord such of these ideas as may be approved, we recommend that emphasis be placed upon our keen desire to be of the maximum possible usefulness to our joint cause.

It appears to us that we can be of most use if we work as a unit—all of us—considering, as a rule, the same subject simultaneously.

We think it desirable that we keep a continuous general estimate of the naval situation.

We think that the following special subjects should be studied by us very carefully at as early a date as possible:

(1) The Northern Barrage.
(2) The English Channel.
(3) The Straits of Otranto.
(4) The tactics of contact with submarines.
(5) The convoy system.
(6) Cooperation of United States naval forces and naval forces of the Allies.
(7) A joint naval doctrine.

Other subjects will undoubtedly present themselves faster than we can consider them, but the above illustrates the lines along which we believe our greatest usefulness lies.

102315°—23——2

MEMORANDUM NO. 3.

FURTHER CHARACTERISTICS OF NORTHERN BARRAGE.

5 January, 1918.

On January 4 the Planning Section discussed with the British Admiralty Planning Section our memorandum regarding the Northern Barrage, which was submitted on January 1, 1918.

Captain Pound stated that his Planning Section did not consider that it was necessary to carry the barrage to a vertical depth of 300 feet nor to close the ends of the barrage by a surface barrage. He stated that he was preparing a typewritten exposition of his views on the subject. He stated further that he saw no reason whatever why the American part of the barrage should not be laid down in accordance with the principles set forth in our memorandum of January 1. He said also that the British Admiralty would be prepared to extend their barrage to a greater depth if found necessary and to mine the surface should that become desirable.

We are informed by Commander Murfin that our memorandum of January 1 was shown to Captain Lockhart Leith and by him accepted in toto as sound.

Pending the decision of all points regarding cooperation in the laying of the mine barrage, we think it very desirable that the following information which bears upon the manufacture of mines should be transmitted to the Navy Department without delay:

The American Planning Section, plus Commander Murfin and Lieut. Commander Schuyler, recommend the following characteristics of mine barrage in Area A:

Length of antennae for upper mines, 70 feet from mine to top of upper float.

For all other mines, 100 feet.

Three levels of mines.

Depth of upper float of upper level of mines below surface not more than 8 feet.

Depth of lower tier of mines below surface, 298 feet.

The above characteristics of American mine field have been discussed with Admiralty Planning Division and accepted.

British propose placing their deepest mines 180 feet below surface, but will be prepared to extend barrage downward if found neces-

sary. The desirability of a deeper barrage has been urgently discussed with Admiralty Planning Section. Suggest department express its opinion that British barrage be deeper and that it be a complete barrage from coast to coast, rather than a barrage including many miles of deep mine fields only.

We recommend that strong pressure be brought to bear to have the barrage include the characteristics outlined in our memorandum of January 1, 1918.

MEMORANDUM No. 4.

NOTES ON SUBMARINE HUNTING BY SOUND.

4 February, 1918.

FOREWORD.

The following notes are based upon the best experience to date. They have been prepared by the Planning Section in collaboration with Capt. R. H. Leigh, United States Navy. Sources are—

(*a*) A limited experience in hunting enemy submarines.

(*b*) Reports and suggestions from officers engaged in antisubmarine warfare.

(*c*) Experimental work with friendly submarines.

(*d*) Deductions from tactical studies on the maneuver board.

It is realized fully that the operation of hunting submarines by sound is too new to justify hard-and-fast rules of conduct, yet better results can be obtained at the start if the rules already tentatively arrived at, and based upon experience to date, are accepted and followed than if each hunting unit determines its own rules without reference to the experience of others.

As hunting units gain experience, it is proposed to have conferences from time to time at the Admiralty of officers commanding units in various areas, so that these officers, by the exchange of ideas and by discussion, may assist in the formulation and development of the tactics most suitable for the hunting of submarines by sound-detection devices. Meanwhile all officers are cordially urged to assist in this important work by submitting criticisms of methods of hunting and suggested improvements both in methods and in material. We want the service of the best brains and energy available for this important work.

INSTRUMENTS.

No description of the instruments used in submarine detection by hunting units will be attempted here, as suitable descriptive pamphlets have been—or will be—issued. The instruments will simply be enumerated and a brief statement given of their capabilities.

1. *The fish* is for use under way with engines stopped. Can be used when anchored in a tideway except for about one hour on each side slack water. Can be towed at any reasonable speed; can hear

submarines about 4 miles when engines of towing vessel are stopped; with amplifier this range is increased. Indicates direction of sound with a probable error of 5° to 10° if sound is distant. If sound is close aboard, directional quality disappears. Requires about three minutes after engines are stopped for an observation. Is short-lived on account of multiple wire cable.

2. *The K. tube* is for use when drifting, coasting (head reaching slowly), with engines stopped, or when anchored in a tideway. No towing model is available as yet. Instrument must be streamed for each observation and then taken on board before getting under way again.

Can hear submarines as follows:

Speed of submerged submarine:	Distance (yards).
0.6 knot	2,500– 3,000
2 knots	8,000–10,000
4 knots	15,000–20,000

Indicates direction of sound with probable error of 5° to 10°. If sound is very close aboard, directional quality disappears.

Requires five to eight minutes from signal to stop engines until observation is obtained and instrument is on board again ready for going ahead.

Instrument is very simple, sturdy, and reliable.

Efficiency is not interfered with by water noises of the surface in rough weather.

3. *The S. C. tube* is for use when stopped, when drifting, or when head reaching slowly, with engines stopped. Instrument is always in place ready for use.

Can hear submarines as follows, depending on state of sea and speed of vessel heard:

Speed of submerged submarine:	Distance (yards).
0.6 knot	500– 700
2 knots	1,200–2,500
4 knots	2,000–4,000

Indicates direction of sound with probable error of less than 5° at all ranges.

Requires about two minutes from signal to stop engines to get observation and be ready to go ahead again.

Instrument is simple and sturdy—never gets out of order.

Efficiency is interfered with by water noises and by excessive motion of vessel.

Not suitable for use in rough weather.

4. *The trailing wire* is for towing at slow speeds to detect a submerged submarine and especially a submarine resting on the bottom. Contact of the wire with the submarine gives instant indication of the contact.

Organization.

All listening vessels should be organized into units of three vessels each, to be known hereafter as hunting units. The vessels of each unit will habitually operate in tactical support of each other. They should be sufficiently well armed—

(*a*) To protect themselves against the gun attack of a submarine.

(*b*) To attack successfully a submerged submarine when it has been located.

(*c*) To prevent a submerged submarine from coming to the surface and escaping by superior speed.

Note.—Hunting units operating in areas exposed to the raids of enemy surface vessels may require supporting vessels.

It is desirable that one vessel of each hunting unit be powerful enough and fast enough to cope with an enemy submarine on the surface. Whenever the hunting unit is of a class of vessels that can not meet the requirements (*a*), (*b*), and (*c*) above, then a special vessel, P-boat or destroyer, should be added to the unit as a support. When the listening devices are developed so that they can be used efficiently on P-boats and destroyers, these vessels, when assigned to hunting units, should replace one of the other listening vessels, so that the units shall consist of three instead of four vessels.

It is essential that the organization of units shall be permanent, so that the same vessels shall always work together. This will permit the development of real team work in tactics and in signals. The utmost skill in operation can be obtained only by continuity of association of ships and personnel.

In the matter of recognition of services rendered, it should be a principle that all vessels of a unit that actually participate in an operation shall share equally in the honor of success.

Tactics of Submarine if Pursued.

The principal cases of submarine pursuit will be—

(1) Daylight—on soundings.

(2) Daylight—off soundings.

(3) Night—on soundings.

(4) Night—off soundings.

During daylight in crowded waters the submarine operates, as a rule, submerged. If pursued on soundings during daylight while submerged, the submarine may—

(*a*) Attempt to escape by proceeding at maximum speed.

(*b*) Attempt to escape by proceeding at slow speed—say 2 to 3 knots.

(*c*) Attempt to escape by resting on the bottom. Submarine will probably not attempt this operation in water more than 30 or 35 fathoms deep, and will always seek bottom free from rocks and other dangers to bottoming.

(*d*) If near bottoming ground, may attempt to escape by proceeding slowly, stopping and balancing occasionally to listen, or stopping synchronously with the hunting unit.

(*e*) May anchor submerged—submarines frequently rest on the bottom; when so doing they are apt to drift slowly.

NOTE.—A submarine proceeding submerged can probably continue under way as follows:

	Hours.
Speed 1½ to 2 knots	60
Speed 5 knots	12
Speed 7 knots	3
Speed 8 to 9 knots	1½
Speed 10 to 11 knots	1

These rough estimates are based on the capabilities of the average submarine. Later types of enemy submarines have greater submerged radius. The surface speed of enemy submarine varies in different classes from 10 to 18 knots.

At night submarines are usually to be found on the surface charging batteries, cruising to new stations, or operating. One of the first concerns of a submarine is to keep its battery fully charged. In crowded waters the submarine finds it too dangerous to charge batteries except at night.

When operating far offshore it has much more latitude, and doubtless charges its batteries while cruising on the lookout for victims. When on the surface a submarine will probably have a little of the upper deck showing. It may be stationary or under way, depending on circumstances. If under way it can submerge in from 30 to 40 seconds; if stationary time to get under way must be added.

If discovered at night on the surface the submarine may—

(*a*) Attempt to escape on the surface by use of superior speed.

(*b*) Attempt to escape by submerging. If submarine submerges, tactics of escape will be similar to daylight tactics.

The submarine's chance of escape when off soundings are less than when on soundings because it has no refuge and must keep under way.

In every case of attempt at escape we must expect that the submarine will use every possible means to shake off pursuit. A good guide to measures to take in pursuit is to place one's self in the position of the pursued submarine and decide upon what steps would be taken to escape under the circumstances. It is, of course, necessary to assume that the submerged submarine can hear pursuing vessels, and that it makes no noise when its engines and motors are stopped.

TACTICS.

The tactics of submarine hunting by sound may be divided into three stages:

(1) Search.
(2) Pursuit.
(3) Attack.

SEARCH.

Information of the approximate position of an enemy submarine may be gained by—

(*a*) Report from shore listening stations.
(*b*) Reports from directional wireless telegraph stations.
(*c*) S. O. S. calls.
(*d*) Reports from aircraft and vessels at sea or reports from coastal stations.

When reports of the above nature are received, hunting units will be designated to search the area near the reported position of the submarine. In the absence of such reports, the hunting unit will seek enemy submarines in areas or along routes assigned.

Three methods of search will be considered:

(1) Anchored patrol.
(2) Drifting patrol.
(3) Running patrol.

The *anchored patrol* may be used to establish a sound barrage along a line, or around an area in which an enemy submarine has bottomed.

Advantages are:

(*a*) Ease and certainty of maintenance of position.
(*b*) Each vessel knows bearing and distance of all other vessels f units at night or in thick weather.
(*c*) No necessity for using lights for position signals.
(*d*) Possibility of a continuous watch on all short-range listening equipment and, except at turn of tide, a continuous watch on other listening equipments.

Disadvantages are:

(*a*) Impracticable in rough sea.
(*b*) Probable delay in getting under way for pursuit.
(*c*) At slack water there is a period of about one hour when directional quality of all long-range listening devices disappears—this because fish and K tube do not remain on a constant heading.
(*d*) Loses submarine if it drifts along the bottom.

When *anchored patrol* is decided upon—

Use a hawser instead of chain for anchor cable, as handling chain betrays you to the submarine.

Be ready to slip instantly.

Keep the support under way always.

The best formation for anchored patrol is in line normal to the probable course of enemy submarines. In the case of a bottomed submarine the best formation is a triangle inclosing probable position of enemy submarine.

The *drifting patrol* may be used to establish a sound barrage along a line that shifts with the current, or around an area in which an enemy submarine is believed to be drifting. It is particularly applicable off soundings in an area where a submarine has been seen to submerge and within which the submarine must surely be.

The advantages are:

(*a*) No necessity for using lights.

NOTE.—Relative bearings can be ascertained by tapping a prearranged signal at specified times on vessel's hull inside, below water line. Loudness of sounds will indicate approximate distances. Bearings within 3° to 5° of accuracy may be obtained by this method.

(*b*) Possibility of a continuous watch on all listening equipment, due to fact that own noises are not present to interfere.

(*c*) Enemy receives no sound warning from noises of hunting group.

Disadvantages are:

(*a*) Hunting unit will drift out of touch with a bottomed submarine.

NOTE.—Remedy by day is to anchor a buoy as a guide. In planting buoy, speed up engines to drown sound of buoy, anchor, and cable; or lower anchor by hand quietly.

(*b*) Submarine may attack with good chance of success.

(*c*) Difficult to maintain position.

NOTE.—Effort to regain position will betray presence of units. If all vessels move simultaneously one might continue out of sound range of the submarine, to convince submarine that area was clear.

NOTE.—In both the drifting and anchored patrol extreme caution is necessary to avoid making noises. Do not throw things about the deck or against the hull of the ship. Do not break up coal while drifting. Do not hammer, except when necessary, for position signals.

(*d*) Fish hydrophones may not be used.

(*e*) Engines have to be kept warmed up, thus causing noise.

The best formations for drifting patrol are the same as for anchored patrol.

The *running patrol* is for use in searching a large area for submarines under way. It should be used in going to and from station unless proceeding to intercept a reported submarine, when the running patrol need not be taken up until within the area of possible contact with the submarine reported.

The running patrol may sometimes be used in advance of, and out of sound of, a convoy, as a measure of protection.

In the running patrol vessels proceed on course assigned, stopping engines and auxiliaries for listening observation simultaneously at predetermined intervals. The efficient working of a running patrol requires that timepieces be kept in exact step.

The running patrol is particularly applicable for day use, as vessels are made safer from attack when under way, and if various other vessels are operating in the vicinity, these latter may be avoided, so as to prevent sound interference.

Advantages are:

(*a*) Covers a large area.

(*b*) Easy to maintain position.

(*c*) Engines ready for emergencies at all times.

Disadvantages are:

(*a*) Enemy submarines have opportunity to hear hunting unit.

Formation.—The best formation for a hunting unit of three vessels to take in running patrol is line abeam. This formation should be used in proceeding to the patrol area and while on patrol.

Support.—If the support is a destroyer or similar vessel, it should zigzag within supporting distance in rear of the listening vessels at a distance sufficiently great to prevent its noises from interfering with the sound detection of submarines.

Distance.—Distance between listening vessels is dependent on efficiency of listening equipment.

If sound radius is 3 miles, vessels may be stationed 4 miles apart; they should then stop to listen every 20 minutes.

If sound radius is 2 miles, vessels may be stationed 3 miles apart; they should then stop to listen every 15 minutes.

If sound radius is 1½ miles, vessels may be stationed 2 miles apart; they should then stop to listen every 10 minutes.

If sound radius is 1 mile, vessels may be stationed 1½ miles apart; they should then stop to listen every 8 minutes.

PURSUIT.

The pursuit of an enemy submarine by a hunting unit requires a thorough understanding of the game by all concerned. There must be teamwork in listening, signaling, and maneuvering. Each vessel of the unit should require practically no direction from the flag boat.

Each ship commander must be kept fully informed of all matters that bear upon the success of the pursuit. The commander of each unit is responsible for the development of the "team spirit" and "teamwork" of his group. He should hold frequent conferences of the officers of the unit while in port, for an interchange of ideas, for discussing improved methods, for eliminating causes of failure,

or lack of complete success in teamwork. He should propose situations and ask officers in turn for their decisions to meet the situations proposed, correcting decisions, and explaining corrections as necessary. It is an invaluable practice for the hunting unit commander and his subordinates to work out tactical problems on a maneuver board and to discuss each successive phase of each problem until they are all thoroughly conversant with likely situations and the ways of meeting them.

Once sound contact with a submarine has been made, nothing but bad weather should be accepted as legitimate reason for losing sound contact. The detection instruments already provided and about to be provided should enable a competent personnel to run the submarine down.

When a submarine is heard, the vessel hearing submarine reports immediately—

(1) The magnetic bearing.

(2) Estimated distance.

(3) Whether submarine is on surface or submerged; and heads toward submarine. Other vessels maneuver to take position at one-half mile distance, in line abeam of vessel that made sound contact. All vessels observe the silent interval of the pursuit, if not otherwise signaled by unit leader. The silent interval of the pursuit should be sufficiently frequent to prevent any possibility of—

(1) Submarine passing beyond hearing between silent intervals.

(2) The submarine being overrun between silent intervals.

Immediately upon the reporting of an enemy submarine, all vessels must keep a specially sharp lookout for signals from the hunting unit leader. The hunting unit leader should keep plotted the bearing of the submarine from the leader, and the approximate relative positions of the vessels of the unit. The position of the submarine may be determined more accurately if the unit leader is given simultaneous bearings of the submarine by two or more vessels and if these bearings are plotted on cross-section paper on which has previously been plotted the relative positions of all vessels of the hunting unit. The hunting unit leader should keep all vessels of hunting unit informed of estimated position of submarine.

In moderately rough weather it is advisable to keep "weather gauge" of the submarine, as water noises interfere considerably when attempting to head into the sea, but are negligible when drifting or running before the sea.

In pursuing a submarine, assume its speed is 4 knots per hour, unless listener can give a good estimate of submarine's speed by counting the number of revolutions of its propellers.

Overrunning a submerged submarine places the hunting unit at a distinct disadvantages, as noises astern can not be heard with any-

thing like the same efficiency as noises on the beam or ahead. Neither can the bearing of the noises heard be so accurately determined.

During the pursuit in line abeam, vessels of the hunting unit should close gradually to a distance of 400 yards, providing the submairne is heard clearly.

In the pursuit if enemy submarine attempts to synchronize use of his propellers with the hunting unit, so as to avoid danger of sound detection, one vessel of the unit should stop her engines a minute ahead of the other vessels so that it may begin its observations instantly the other vessels stop.

In inclosed or crowded waters it will be difficult to pursue a submerged submarine to exhaustion. It is therefore very essential so to maneuver as to bring about the attack as soon as possible after contact.

If during the pursuit sound contact is lost, the circumstances should indicate whether the submarine is beyond range of the listening devices, balancing, or bottoming; if balancing or bottoming is suspected, a judicious use of depth charges may cause a submarine to betray its position.

ATTACK.

Preceding the attack vessels should have been so maneuvered as to close the submarine, but with the submarine still ahead should be in line abreast, distant not more than two cables apart.

The support should not close the attacking vessels in daytime until specifically so ordered, as the noise of the machinery of the support interferes too seriously with the tracking of the submarine. Time for attack should be chosen when the indications are that the submarine is on a steady course and when the submarine is as close aboard as it is practicable to get it without overrunning it. The signal for attack should immediately follow the expiration of a silent interval. Upon signal to attack all vessels should proceed at maximum speed, the center vessel toward the estimated position of the submarine, the flank vessels toward a position that will be 200 yards on either beam of the center vessel when it begins dropping depth charges. The center vessel should drop first depth charge 100 yards short of estimated position of submarine and successive depth charges as rapidly as possible, being careful not to drop any depth charge until the preceding one has exploded or until the vessel is beyond countermining distance of the preceding depth charge. The flank vessels should begin dropping depth charges immediately after the first depth charge of the center vessel has exploded, and successive depth charges according to the rule just laid down for the center vessel. All vessels during the depth-charge attack should steer a course parallel to the course they were steering at the time the

attack was ordered, unless the submarine gives positive indication of its presence in another area.

Time for ordering the attack will depend entirely upon the judgment of the commander of the hunting unit, unless the submarine shows itself in position for attack, when the nearest vessel should attack immediately and without signal. Vessels should not expend all their depth charges in an attack that is guided by sound alone.

If during the pursuit touch is lost with the submarine, the commander of the hunting unit must determine upon his procedure, having in mind the capabilities of his various listening devices, the advantages and disadvantages of the various forms of patrol, and the probabilities as to what the submarine would do under the circumstances.

Summary of Tactical Procedure.

PREPARING FOR SEA.

(1) See all instruments in working order.

(2) See that listeners are trained in their duties.

(3) Unit commander assemble commanding officers and explain plans, then by question and answer and by instruction on maneuver board make certain that tactical plans are so thoroughly understood that no tactical signals will be necessary in pursuit except—

(*a*) Submarine heard.
(*b*) Bearing and distance.
(*c*) Stop and start.
(*d*) Attack.
(*e*) Course to be steered.

(4) Each commanding officer of ship assemble ship's officers, petty officers, and listeners and instruct them in plans so that they will be able to work together as a team and each one will know exactly what to do under all conditions.

(5) Set all clocks by time signal.

(6) Determine and announce frequency and length of silent interval when on running patrol.

(7) Determine and announce frequency and length of silent interval in pursuit.

PROCEEDING TO STATION.

(1) As soon as clear of harbor, form line abeam. Unit leader in center; distance between vessels as predetermined, support zigzagging a predetermined distance astern.

(2) Proceed to station carrying on running patrol unless special circumstances make it necessary to arrive on station as soon as possible.

ON RUNNING PATROL.

(1) Begin first silent interval on signal.
(2) Start and stop thereafter by clock time.
(3) Use only those instruments ordered.
(4) First vessel hearing submarine heads for it at once. Other vessels conform to the change of course, directing their movements to get in line abeam on new course at pursuit distance.
(5) All vessels at once take up frequency and length of silent interval previously described.

IN PURSUIT.

(1) Center vessel keeps submarine ahead. Right-flanked vessel keeps submarine on port bow. Left-flank vessel keeps submarine on starboard bow.
(2) Regulate speed so as not to overrun submarine previous to decision to attack.
(3) Flank vessels of pursuit line close gradually to 400 yards distance from center vessel.
(4) All vessels signal bearing and estimated distance of submarine at end of each silent interval.
(5) All vessels change course to conform to movements of submarine and requirements of subparagraphs (1) and (3) above, without signal. Guide on flag boat of pursuit line.
(6) All vessels keep sharpest possible lookout for submarine. If sighted, attack immediately.

THE ATTACK.

(1) Get as close to submarine as possible and locate its position as accurately as possible.
(2) Begin attack at full speed, center vessel heading for last reported position of submarine; other vessels closing to 100 yards on center vessel, maintaining formation line abeam and taking up parallel course.
(3) Center vessel drops first depth charge 100 yards short of estimated position of submarine. Drops succeeding depth charges as rapidly as possible, avoiding danger of countermining.
(4) Flank vessels drop first depth charges immediately after first depth charge of center vessel has exploded and drop successive depth charges according to rule just laid down for center vessel.
(5) All vessels conserve a part of their depth charges unless attack is based upon " close aboard " sighting of the submarine.

MEMORANDUM No. 5.

EMPLOYMENT OF AUXILIARY CRUISERS.

10 January, 1918.

One of the most urgent problems of the hour is the immediate increase of tonnage to augment the supply of food and munitions. Actual sinkings by submarines do not give a true indication of actual losses in carrying capacity incident to submarine warfare. To the sinkings must be added:

(1) Vessels damaged by submarines.

(2) Vessels damaged in collisions incident to convoy operations and to running without lights.

(3) Losses in ton-miles per day due to convoy operations.

(4) Delays in port due to inadequate port facilities.

(5) Employment of merchant tonnage in naval operations.

All of these factors are cumulative and of such a serious nature as to demand the closest scrutiny to determine if it is not possible to reduce their unfavorable effect.

We have considered especially the employment of merchant tonnage as auxiliary cruisers. It is used for patrol and escort duties. It is in no sense at any time a reply to the submarine, but rather an additional target in each instance. The principal usefulness of merchant vessels as auxiliary cruisers is protection of convoys against raiders. There are no known raiders at sea now. The present situation requires that no move in the game be lost and that some risk be accepted if we are to continue the war. We therefore recommend the immediate acceptance as a principle of action: "The maximum possible employment of all auxiliary cruisers in the ocean transport of food and munitions for the support of the war."

The following-named vessels of the Royal Navy appear to be employed in a manner not in harmony with the above principle:

Name.	Gross tonnage.	Name.	Gross tonnage.
Teutonic	9,984	Arlanza	15,044
Columbella	8,292	Avoca	11,073
Alsatian	18,485	Ebro	8,480
Hildebrand	6,991	Almanzora	16,034
Orotava	5,980	Orcoma	11,571
Mantua	10,885	Orbita	15,678
Patia	6,103	Moldavia	9,500
Patuca	6,103	Himalaya	6,929
Virginian	10,757	Gloucestershire	8,124
Motagua	5,977	City of London	8,917
Changuinola	5,978	Princess	8,684
Edinburgh Castle	13,326	Morea	10,890
Armadale Castle	12,973	Knight Templar	7,175
Kildonan Castle	9,692	Mechanician	.....
Otranto	12,124	Wyncote	.....
Orvieto	12,130	Currigan Head	.....
Ophir	6,942	Coronado	.....
Calgarian	17,515	Bayano	.....
Victorian	10,635	Discoverer	.....
Macedonia	10,512		
Marmora	10,509	41 vessels	[1] 400,000
Andea	15,620		

[1] Approximate.

MEMORANDUM No 6.

CLOSING THE SKAGERRACK.

11 January, 1918.

(See Map No. 2, "Entrance to the Baltic Sea.")

Admiral Oliver, D. C. N. S., at the British Admiralty, requested through Captain Fuller, R. N., of the Admiralty Plans Division, that the American Planning Section consider the problem of the Great Belt. Later the details of the problem were communicated to the Planning Section orally and were assembled into the statement of the problem which follows.

The Planning Section considers it desirable to state that their method of solving a problem is to conclude as to the way of accomplishing the mission. They accept the mission imposed by the statement of the problem and thereafter give their exclusive attention to the accomplishment of that mission. In some problems the mission imposed may be unsound, but the problem solver is nevertheless bound to determine a way of accomplishing the mission.

Some observations have been appended to the solution transmitted herewith.

PROBLEM 1.

[Proposed by British Admiralty, 5 January, 1917.]

General situation: The war continues.

The Allies have succeeded in blocking the entrances to German North Sea ports, except Helgoland and the Belgian ports, denying exit of enemy submarines and surface vessels. The High Seas Fleet was behind the Elbe barrage when that barrage was completed and is unrestricted in its operations except by the Elbe barrage and by such additional measures as may be taken. Enemy submarine warfare continues by submarines passing through the Sound and the Belts and issuing from unblocked ports.

Special situation: The Allies decide to deny passage of enemy vessels into the North Sea through the Skagerrack.

Required: Estimate of the situation and plans to carry the above operations into effect.

Estimate of the Situation.

Mission.—To deny passage of enemy vessels in the North Sea through the Skagerrack.

Enemy forces—strength, disposition, probable intentions.

Strength.—The enemy naval forces consist of approximately the following:

High Seas Fleet:
- 20 dreadnoughts.
- 5 battle cruisers.
- 11 light cruisers.
- 2 mine-laying cruisers.
- 66 destroyers.
- 100 T. B.'s (organized as mine-sweeping divisions).
- 45 trawlers.

Flanders:
- 14 destroyers.
- 13 T. B's.
- 3 light cruisers.
- 42 destroyers.

Flanders—Continued.
- 6 T. B's.
- 80 trawlers.

Unassigned:
- 17 old battleships and coast defense ships.
- 3 cruisers.
- 12 light cruisers.
- 38 mining vessels.
- 34 destroyers.
- 44 T. B's.

About 200 submarines, of which 30 are based in Flanders.

We may assume:

(1) 40 submarines at seas from German ports.
(2) 45 U, U. B., and U. C. boats in the Mediterranean.
(3) 20 destroyers in Belgian ports.
(4) 20 U-boats based on Helgoland.
(5) 30 U. B. and U. C. boats based in Flanders.

We may assume all other enemy mobile naval forces as behind the barrages with no available exit to the North Sea except the Skagerrack.

The first move toward blocking operations will immediately force upon the enemy the consideration of the problem of keeping the Skagerrack open. If the blocking is complete as to the High Seas Fleet, and reasonably complete as to submarines, the Skagerrack problem immediaely becomes one of first importance to the enemy. He now controls all approaches to the Baltic from the entrances to the Belts and Sound south. Blocking operations will compel him to advance his control as far north as possible. He can not afford to hold his barrage lines as at present, for then the High Seas Fleet could never hope to gain the open sea in condition for general action.

It is quite possible that the enemy may not plan any general engagement with the Grand Fleet and that he may desire to avoid precipitating such an engagement, but immediately that the High Seas Fleet is shut in the Baltic the great influence of the High Seas Fleet on allied operations in the North Sea disappears. The allied

fleets are then at liberty to close the Helgoland Bight and to guard the barrages of the North Sea ports. Further, the Allies may concentrate their forces to cover the single exit of the High Seas Fleet into the open sea. The enemy understanding this position quite as thoroughly as we do will be compelled to adopt simultaneously two courses of action:

(1) To clear the barrages of the North Sea ports.

(2) To secure to himself freedom of exit for all his forces through the Skagerrack.

By the terms of the problem we omit the consideration of (1) above and assume that the barrage is maintained. We have to consider (2). What does the enemy require for freedom of exit of all his forces through the Skagerrack?

As to submarines he requires that the Kattegat shall be free of mines and patrol craft and especially that Danish and Swedish territorial waters shall contain no submarine traps. He requires that submarines may gain the deep water of the Skagerrack without unusual risk.

As to the High Seas Fleet he requires for it an even greater degree of security in the Kattegat than for his submarines. How will he go about getting this security? There is but one answer to his situation, and that is to advance his barriers to the deep water of the Skagerrack. He would then be in touch with water across which no passive barrier could be erected and would secure to himself as much freedom of exit as possible without establishing a base in Norwegian waters.

Any barrier which the enemy may establish in the vicinity of the Skaw in order to be complete must extend into the waters of Denmark and Sweden. Under present conditions there is no doubt that he could bring sufficient pressure on those countries to cause them to mine their own waters in such a way as to join up with a German barrier outside of neutral waters. The northern barrier once in position, other mine fields in the Kattegat would be laid by the enemy in positions calculated to give tactical support to the necessary effort of his mobile forces in maintaining the barrier.

The Skaw is about 240 miles from Kiel and about 480 miles from Cromarty Firth. Whoever attempts to maintain a barrier at the Skaw must be ready to support it with capital ships and to give those ships the shelter of shore protection. Foreseeing such a necessity, it is probable that the enemy as soon as he becomes convinced that his North Sea ports are effectively blocked will occupy so much of Denmark as may be necessary to control absolutely the Belts and the Sound, the vicinity of his northern barrier, and an advanced anchorage for supporting vessels.

The enemy submarines at sea will necessarily be directed to ports other than North Sea ports of Germany. They may go to Helgoland, but the presumption of the problem is that they will return by way of the Skagerrack. It therefore becomes a matter of importance to arrange for them a proper reception. They will, so far as practicable, assist the enemy to hinder our operations.

The enemy is favored as late as the middle of March by the fact that ice may embarrass operations undertaken by us in narrow waters.

To summarize probable intentions of enemy, he will:

(1) Attempt to establish a mine barrier with suitable gates near the Skaw, requiring the participation of Denmark and Sweden or else violating the neutrality of their waters.

(2) He will occupy shore positions in sufficient force to control the northern approaches to the Belts and the Sound.

(3) He will probably occupy shore positions in the north of Jutland, so as to control his mine barriers and guard his supporting vessels.

(4) He will use every effort to keep the Kattegat completely within his control, occupying so much of Denmark as may be necessary and possibly forcing Sweden into the war.

OUR OWN FORCES—THEIR STRENGTH, DISPOSITION, AND COURSES OF ACTION OPEN TO US.

The strength of our naval forces need not be enumerated here. It is sufficient to state that they are so far superior to enemy naval forces that he is unlikely to accept a general engagement until he has first induced a partial separation of our forces. The distribution of forces is as indicated in official publications. The nearest base is about 480 miles from the Skaw.

The decision to deny passage of enemy vessels (including submarines) into the North Sea through the Skagerrack compels at once that the operations to accomplish this mission shall be to the southward of the Skaw. The Skagerrack does not lend itself to mining operations, to net protection, or to any form of passive defense. It is true that the control of the shore would cover a certain area of water contiguous to the shore, but our mission requires that whatever steps are taken shall be effective from shore to shore.

Experience has shown that a surface patrol is not in itself a barrier to submarines, even though the tendency of the surface patrol is toward greater efficiency due to advances made in submarine detection apparatus and the increased skill of the personnel operating this apparatus. We are therefore obliged to resort to mine barriers—and possibly net barriers—and to supplement these by antisubmarine patrol and by a powerful support by surface vessels. The first

question to decide then in our measures is the position of the mine barriers. We have two cases to consider:

(1) Mine barriers protected by military as well as naval forces.

(2) Mine barriers protected by naval forces only.

From the investigation of the enemy situation it is evident that no permanency in barrier arrangements that will be effective against submarines can be attained except by the military protection of the shore ends of the barriers. Barriers may be placed anywhere in the Kattegat. The farther south they are placed the greater opportunity there is to establish successive barriers, while still retaining maneuvering room for supporting vessels. The most southerly position that may be considered accessible is across the channels on either side of Samso Island. Assuming no resistance from shore, this is probably the easiest place to close both the Great and Little Belts, but from the assumptions already made it is evident that we can not expect to maintain the position except by the occupation of Samso Island, Tuno, Tuno Knob, and Seiro Island. These positions are more remote from land attack and therefore, with a given defending force, should last longer than others farther south, as, for instance, the Kullen Peninsula position, which can be attacked by land from Siaelland.

The Sound remains to be closed by a barrier and the ends of that barrier to be protected from shore. If the barrier be placed in the narrow part of the channel north of Helsingor, both ends may be protected from Siaelland.

As a delaying operation we may consider it possible to close the Belts and the Sound by the occupation of Samso, Tuno, Tuno Knob, and Seiro Islands, and of land positions near Helsingor. The Sound is the weak point in this barrier, since the shore ends can not be made secure except by military operations on a large scale—probably beyond the capacity of available forces and facilities. But since the Sound will not accommodate vessels of over 24-feet draft it will be of decided advantage to close the Belts there by shutting in the High Seas Fleet. The continuous enlargement of mine fields in the vicinity of the Sound will compel the enemy to expose his surface craft or to accept a barrier of extreme danger to his submarines.

The position next north of the Samso Island position is the Siaelland-Odde-Heilm Island-Hasenore line. Heilm Island and Siaelland-Odde Peninsula, if securely held, would give the necessary support to the shore ends of the barrier. The line is easier to patrol than the Samso Island position, but the shore position at the eastern end is far less secure. The barrier might be considered as auxiliary to the Samso Island barrier, but would by itself offer less resistance than the Samso Island barrier. The treatment of the Sound would remain unchanged were this position adopted.

The Stamshead-Anholt-Morup Tange line may be considered as the most available barrier position in its vicinity. The occupation of Anholt would give the line strength in the center, but the ends would soon be exposed to attack from shore unless a large shore force supported the ends or unless large ships were used to cover the ends.

It is, of course, understood that the mission of enemy shore activities is to cover their surface craft while they break down our barriers. The enemy will naturally desire to compel our ships to work under his guns whenever possible, as this is a distinct advantage for him. It is, in fact, sound strategy when the question is considered by itself to arrange so that enemy ships will be provoked into fighting shore batteries. We should avoid such provocation so far as foresight will permit. The Anholt line would require above 7,000 American mines as against 4,500 for the Samso Sound barrier. One-third this number of mines will put one system across at either place.

The Anholt position offers less navigational dangers for patrolling vessels.

Laeso Island might be used as the center of a barrier still farther north. Here deeper water would be encountered, requiring more mines per mile for an antisubmarine barrier. The number of American mines required would be about 7,500 for three systems. There would be the usual difficulties regarding the ends, which, however, would be some distance from rail communications.

The only remaining position for a barrier that need be considered is from the Skaw to the vicinity of Klofero Island. Whatever other barriers may be established farther south, this barrier seems to be an essential protection to vessels supporting the southern barriers against enemy submarines, as well as an additional obstacle to returning submarines. In case of the breakdown of other barriers and of the pushing back of our patrol forces from the Kattegat the Skaw barrier offers a most desirable line to hold.

The closure of the Kattegat would secure for us an area within which traffic might be regulated so as to permit efficient use of submarine-detection apparatus. The Skaw barrier would require the occupation by land forces of the north of the Skaw Peninsula and the occupation of an island position; possibly Klofero, on the Swedish coast. With a given force these positions could probably be held more securely than any of the necessary land positions of the barriers farther south. The number and character of troops and equipment necessary for this work is an Army question. It is sufficient to indicate here that the cooperation of the Army on a large scale will be necessary to any permanency of barrier effort in the Kattegat. Large land forces, however, will entail excessive demands on shipping which, at the present time, will be most difficult to meet. In view of the military and aerial advantages that the

enemy may possess in having Jutland contiguous to his territory, together with good rail communications on the Swedish coast, it is essential that our land positions be susceptible of being held with as small shore forces as possible, and be capable of being well supported by our fleet.

We come now to the consideration of mine barriers protected by naval forces alone—unsupported by the Army. We may assume at the outset that the positions already discussed are as suitable as any others for the barriers. We must recognize that mine barriers, as a submarine obstacle, can only be regarded as effective until such time as the enemy occupies the shores with shore forces and furnished protection, with his artillery, to close-in sweeping operations. We have, however, a decided advantage in that the Kattegat is generally shallow, rendering effective patrol much easier than in deep water. There are no harbors available for patrol craft and supporting vessels except on the Swedish coasts or in Danish waters in the vicinity of Samso Island. These would probably become untenable shortly, so that we should have to look for a base in Norwegian waters. Christiansand, together with adjacent waters, is a suitable place tactically. Its strategic position is excellent except for proximity to probable enemy air bases in Jutland, but this disadvantage is partly compensated for by the dispersion of anchorage ground. The irregular bottom and great number of rocks will render submarine navigation difficult and hazardous.

There is no Norwegian ports farther east equally suitable tactically which will meet strategic requirements. Skudesnaes Fiord is 100 miles farther from the Skaw than is Christiansand. It thus offers greater security against air attack, but corresponding disadvantages for a fleet endeavoring to support operations in the Kattegat. The waters of Skudesnaes are so deep as to render very difficult the berthing of a large fleet. Its defense against submarine attack is more difficult than that of Christiansand.

In view of the measures likely to have been taken by the enemy in anticipation of our projected effort, we must count on strong resistance to our operations and must count further on supporting the operations with the Grand Fleet.

Decisions.

(1) To prepare an expedition establishing a mine barrier at any one of the three southerly positions above discussed, plus the Skaw position.

(2) To provide a gate in the skaw barrier, but no gate in the southern barrier.

(3) To place the southern barrier in the most southerly of the three positions discussed, but to be prepared to accept a more

northerly position if enemy arrangements make the southern barrier an unprofitable undertaking.

(4) To establish an operating base at Christiansand.

(5) To support the whole position with the Grand Fleet.

(6) To arrange, if possible, for the cooperation of the Army.

APPENDIX.

In presenting the above solution to the Skagerrack problem we submit the following comments on the problem:

(*a*) Any attempt to block the North Sea ports of Germany against the exit of submarines by means of sinking ships, lighters, and so forth, in its channels, in our opinion is foredoomed to failure.

(*b*) The Elbe is the most useful of all exits to block, but even there the problem is so difficult that the greatest efforts will have no more than an even chance of temporary success.

(*c*) The element of surprise is most desirable in dealing either with the Skagerrack or with the Elbe. If circumstances prevent dealing simultaneously with both problems, then the Skagerrack should receive attention first.

(*d*) The prohibitive features of the military problem in Denmark makes the occupation of an operating base at Christiansand for the Grand Fleet a necessity if the Skagerrack is to be closed.

[Extract from Memorandum No. 71, "History of Planning Section."]

Subject: "*Kattegat Problem.*"

This was the first strategic problem solved by the Planning Section.

Its solution was undertaken at the request of the Admiralty Deputy Chief of Naval Staff. We were informed that the British Plans Division had already solved a similar problem, and were requested to refrain from consulting the previous solution.

Consequently, and in view of certain improbable hypotheses made in the problem, we felt that it was in the nature of a test of our abilities and that our solution could be of no direct utility in connection with the war. These beliefs determined us to set our own problems in the future, at least until certain aspects of the war which we deemed of great importance should be examined.

MEMORANDUM No. 7.

ASSIGNMENT OF DESTROYERS TO THE GRAND FLEET.

14 January, 1918.

Whenever the subject of a reassignment of naval forces comes up, we are obliged to consider first the missions of naval forces in this war and then to determine if the proposed reassignment is in harmony with the adopted mission and with the decisions arrived at for the accomplishment of the mission.

The naval missions deduced from present conditions and from our war aims are, proceeding from the most general to the concrete, as follows:

Basic Mission.—To further a victorious decision on land.

General mission.—To obtain command of the sea.

Special and immediate mission.—To obtain subsurface command of the sea while still retaining command of the surface of the sea.

This latter mission may be stated in a still more concrete form, as follows: To defeat the enemy submarine campaign while still retaining command of the surface of the sea.

We have to consider the advisability of detaching six destroyers from the Queenstown force for service with Division Nine. The first question of all to decide is, Will the proposed assignment assist more in defeating the enemy submarine campaign than the present assignment? It is obviously unnecessary to argue the question; the answer is "No." The proposed assignment is not an antisubmarine campaign measure. The enemy submarine campaign is primarily against merchant tonnage; it is directed against our armies in the field.

The second question to decide is, Is the proposed assignment of destroyers necessary to retaining command of the surface of the sea? It is over two years since the enemy made any bid for command of the surface of the sea. The present strategic position and condition of the enemy does not require of him that he bring his High Seas Fleet into action. He is accomplishing his ends by a sure, and, to him, satisfactory attack on our communications. The efficiency of this attack would be lessened greatly were his High Seas Fleet to suffer defeat. The fact that his fleet has not risked an engagement for over two years is ample justification for assuming that our con-

trol of the surface of the sea is not in jeopardy. Further, we ourselves know that we have sufficient superiority in numbers and in skill to defeat the High Seas Fleet whenever it throws down the gauge of battle. Knowing this, and knowing further that as yet we are far from successful in our antisubmarine effort, we conclude:

That no destroyers can be diverted to the Grand Fleet from the guarding of merchant tonnage or from any form of antisubmarine effort.

APPENDIX.

The advantage of a closer association of American destroyers with the tactics of the Grand Fleet, as well as the advantages of an occasional change of duty for the destroyers basing on Queenstown, is recognized.

We therefore recommend that 12 American destroyers of the Queenstown force exchange duty with an equal number of British destroyers from the Grand Fleet, and that after a suitable period a second group of American destroyers relieve the first group, and so on, until all have had service with the Grand Fleet.

We recommend that destroyers arriving on the station from America be assigned first to antisubmarine work.

[Extract from Memorandum No. 71, "History of Planning Section."]

Subject: "*Assignment of Destroyers to the Grand Fleet.*"

Prepared in response to a recommendation by the commander, Division Nine (American battleships serving with the Grand Fleet), that American destroyers be assigned to duty with the Grand Fleet, in order that valuable experience might be gained.

MEMORANDUM No. 8.

ESTIMATE OF THE GENERAL NAVAL SITUATION.

21 January, 1918.

PROBLEM NO. 2.

(See Maps Nos. 1, 3, 5, and 6.)

General situation: As at present.

Special situation: The Allies and the United States have decided to continue the war to a victorious peace.

Required: Estimate of the general naval situation in relation to the war as a whole.

CONCLUSIONS REACHED IN THE FOLLOWING PAPER.

GENERAL.

1. To provide for united action of allied naval efforts, in conformity with the naval missions, and irrespective of local situations and special interests.

2. To unify commands where desirable in certain areas; such as the English Channel and the Adriatic.

3. To reinforce the Grand Fleet with Japanese battle cruisers.

4. To reinforce the Grand Fleet with United States battleships if the barrage operations require it, or if thereby troops in Great Britain can be released for service in France.

5. To develop plans for concentrated air attacks on enemy submarine bases in the North Sea and the Adriatic.

6. To develop plans for attacks with surface vessels against enemy Adriatic bases.

7. To prepare to destroy Russian Baltic ships should their capture by the enemy become imminent.

8. To give special study to the matter of mine barrages in the English Channel and the Adriatic and Aegean Seas.

9. Unless loss of imports is a controlling factor, to immediately occupy a base in Norway, south of the proposed barrage.

NOTE.—This decision to be abandoned, should it appear probable that the devastation of Norway would result therefrom.

10. To base in Norway a force of battle cruisers, light cruisers, and destroyers superior to any similar force which the enemy is likely to employ in raiding.

ANTISUBMARINE.

1. To devote the maximum possible antisubmarine force to offensive operations.

2. To divert destroyers and other antisubmarine types from Japan, and from other sources, in as great number as practicable to antisubmarine work.

3. To develop with the greatest possible rapidity hunting groups equipped with listening devices, and manned by the best-trained personnel available from all sources.

4. To equip vessels engaged in antisubmarine warfare with adequate means for taking the maximum tactical advantage of every contact with an enemy submarine.

5. To arm heavily (with full gun's crew for each gun) about 1 merchant ship in 10, of each general class, in the North and South Atlantic; and as far as practicable to escort convoys with such heavily armed merchant ships.

Discussion of Problem.

The following discussion of the problem was set down by the Planning Section, in order to clear up their understanding of the problem and thereby facilitate its solution.

The problem proposed is the most general of all naval problems of the war now in progress.

From the standpoint of joint naval action, the statement of the special situation and of what is required in the solution must be accepted as sound. If we aim at anything less than a victorious peace, we are led to put forth less than our maximum effort, and we commit ourselves to a military policy which can never support properly the aims of belligerents. War has for its object to impose our will upon the will of the enemy. The surest method of achieving this object is by victory, for then the enemy is compelled to submit, and the maximum degree of permanency is given to our achievement.

If we determine upon lines of procedure that are not in proper support of the war as a whole, we thereby favor special interests and introduce friction among Allies that may create dangers of the first magnitude.

METHOD OF SOLUTION.

The solution of a problem so general as this one is the first step in the formulation of a general plan of action. The first step in the

solution is to determine a statement in concise form of that which the conditions of the problem required should be accomplished. This statement in the first instance takes a sufficiently inclusive form to cover the entire task to be undertaken. A further examination of the task thus determined, in connection with special circumstances, may enable us to determine upon a more concrete statement of the task. When the most thoroughly concrete, and at the same time inclusive, statement of the task is determined, we thereafter investigate the ways of acomplishing the task determined upon, and finally decide upon a definite way for its accomplishment. Thereafter when any related question arises for decision we must examine it in the light of the task to be accomplished, and decide the question in the way best calculated to support the effort to accomplish that task. If the most concrete statement of the task is not sufficiently general to guide us in our decision, we must refer our question to the next general statement of the task, or, as we call it, the mission.

In the problem under consideration, we approach the determination of our naval missions as follows:

DETERMINATION OF OUR NAVAL MISSIONS.

The fundamental end in view of sea power is the support of land power. Success on the sea alone can not force peace terms as favorable as those to be gained by corresponding success ashore. The effectiveness of sea power is therefore to be measured by the degree of success with which it fulfills its rôle as the support of land power.

From these considerations are deduced the basic naval mission in this war—

"To further a successful decision on land."

The best general means of bringing about sea conditions favorable to shore success lie in the establishment of command of the sea. Such command is useful only in so far as it furthers command of the land, and is not therefore within itself an ultimate objective, but merely one of the preliminary means essential to that end. When it is accomplished, the resources of the friendly and neutral world are made available for the logistical support of our Army and people, and we gain the strategic freedom offered by the sea to strike with, or at, shore power in otherwise inaccessible places, while the enemy is at the same time correspondingly restricted.

The general naval mission is therefore—

"To obtain command of the sea."

Command of the sea may be established either by destroying enemy naval forces, by effectually containing them, or by so nullifying the effect of their activities as to reduce it to negligible proportions.

At the present time partial command of the sea has been established by the forces of the Allies and the United States. The enemy's surface craft are effectually contained by an overwhelming force within the immediate vicinity of his home waters—the Adriatic and the Baltic. The enemy fleet commands the Baltic and is free to enter the North Sea, but no movement on its part in those waters can have a serious influence upon our land operations.

The High Seas Fleet is rendered practically impotent by the mere presence of the Grand Fleet covering the exits of the North Sea. On the other hand, the subsurface command of the sea has not been even approximately established. The enemy submarines enter freely the Atlantic and prey upon commerce with the avowed object of impairing the supply and morale of allied civil populace and armies in the field. In other words, submarine warfare is directed against land power, upon which sea power rests, and for the maintenance of which it exists solely.

The enemy is making of submarine warfare his principal naval effort, thus conforming directly with his basic naval mission of "Furthering a successful decision on land." We are concentrating our major effort on maintaining surface command of the sea, which is doubly assured, while by virtue of his command of the subsea the enemy is placing our land power in serious jeopardy.

Our tonnage losses, with corresponding shortages of fuel, food, and munitions, are already having a great influence on the morale of the civil populations, elevating the enemy's morale, depressing our own. These losses and shortages are already affecting seriously the main land strategy in Italy and France. They have already made it impossible for the United States to develop quickly its full strength on the western front.

Sinkage of, and damage to, shipping, due to torpedoes, mines, and accidents attributable to the submarine warfare, continue greatly in excess of repairs and new construction, and at a rate which is alarming when viewed from the standpoint of that support to the land power that is essential to prevent defeat.

Our special and immediate mission therefore becomes—

"To obtain subsurface command of the sea, while still retaining command of the surface of the sea."

ENEMY FORCES—THEIR STRENGTH, DISPOSITION AND PROBABLE INTENTIONS.

Allied Naval Forces.	Enemy Naval Forces.
BRITISH ISLES (BRITISH AND UNITED STATES).	NORTH SEA.
(*a*) Grand Fleet:	(*a*) High Sea Fleet:
41 dreadnoughts.	19 dreadnoughts.
	5 battle cruisers.

11 battle cruisers.
31 light cruisers.
7 cruisers.
13 flotilla leaders.
111 destroyers.
12 T. S. mine sweepers.
36 trawlers.
18 sloops.
38 submarines.
5 hydrophone ships.
3 seaplane carriers.

(*b*) Harwich force:
11 light cruisers.
4 flotilla leaders.
21 destroyers.

(*c*) Dover force:
15 monitors.
1 light cruiser.
5 flotilla leaders.
24 destroyers.
4 patrol boats.
2 torpedo boats.

(*d*) Portsmouth force:
7 destroyers.
31 patrol boats.
4 torpedo boats.

(*e*) Devonport force:
40 destroyers.

(*f*) East coast convoys:
28 destroyers.
4 patrol boats.

(*g*) Queenstown force:
1 light cruiser.
37 destroyers (U. S.).
4 torpedo boats.
11 sloops.
9 sweepers.

(*h*) North coast of Ireland:
12 sloops.
27 destroyers.

(*i*) Firth of Forth:
10 torpedo boats.

(*k*) Local defense:
10 destroyers—Scapa Flow.
12 destroyers, 13 torpedo boats } The Nore.
4 destroyers, 18 torpedo boats } Portsmouth.
6 torpedo boats—Portland.
3 destroyers, 7 torpedo boats } Devonport.
4 torpedo boats—Pembroke.

(*l*) Submarines:
68 subs. at various ports.

10 light cruisers.
2 mine-laying cruisers.
88 destroyers.
50 torpedo boats.
30 M. boats.
45 trawlers.

(*b*) Harbor flotillas:
13 destroyers.
24 trawlers.

(*c*) Naval forces in Flanders:
15 destroyers.
16 torpedo boats.

(*d*) Naval forces in Baltic:
3 light cruisers.
42 destroyers.
6 torpedo boats.
6 M. boats.
116 trawlers.

(*e*) Submarine force (including Flanders force):
5 light cruisers (old).
9 destroyers.
16 torpedo boats.
6 U. cruisers.
54 U. type.
50 U. B. type.
20 U. C. type.

(*f*) Training center:
8 old battleships.
3 light cruisers.
12 destroyers.
3 torpedo boats.
20 submarines.

(*g*) Vessels not embodied in regular formation:
10 old battleships.
6 coast defense ships.
3 cruisers.
13 light cruisers.
2 mine-laying cruisers.
33 mining vessels.
21 destroyers.
51 torpedo boats.
50 armed merchant vessels.
6 auxiliary mine layers.

Summary of British (and U. S.) forces available for fleet engagement:

Assuming that forces (*b*), (*c*), and (*f*) are available, also local defense destroyers at Scapa Flow, there can be assembled to meet enemy force—

41 dreadnoughts.
11 battle cruisers.
43 light cruisers.
7 cruisers.
22 flotilla leaders.
194 destroyers.
Submarines.

If the above assumption shall not hold, the Grand Fleet will have—

31 light cruisers.
13 flotilla leaders.
111 destroyers.

Probable additions by July 1, 1918:

4 dreadnoughts (U. S.).

Total forces in British waters apart from Grand Fleet (*a*):

13 light cruisers.
213 destroyers.
9 flotilla leaders.
15 monitors.
68 submarines.
64 torpedo boats.
23 sloops.

The above vessels are engaged in escort duty and anti-submarine work. (Does not include trawlers or small patrol boats.)

French forces in Atlantic:

24 destroyers.
59 torpedo boats.
25 submarines.
92 trawlers.
40 sweepers.
100 patrol boats.
10 gunboats.

These vessels are distributed in the Channel and Bay of Biscay ports.

Summary of North Sea forces:

The following summary gives the maximum number of vessels that Germany could bring to bear in a general fleet engagement:

19 dreadnoughts.
5 battle cruisers.
34 light cruisers.
4 mine-laying cruisers.
196 destroyers.
146 torpedo boats.
18 old battleships.
3 old cruisers.
6 auxiliary mine layers.
150 submarines.

The torpedo boats are of no value except perhaps in an engagement near the German coast. Probably not more than 8 or 10 of the old battleships are in condition for sea.

Probable additions by July 1, 1918:

2 dreadnoughts.
2 battle cruisers.
2 light cruisers.
2 mine-laying cruisers.
12 destroyers.
Torpedo boats.
70 submarines.

Possible addition of Russian Baltic fleet. (It is possible that the following units may be captured or turned over to Germany):

4 dreadnoughts.
3 predreadnoughts.
9 cruisers.
60 destroyers (approx.).

United States naval forces in French Atlantic:
- 30 armed yachts and trawlers.
- 7 destroyers.

French forces in Mediterranean:
- 7 dreadnoughts.
- 8 predreadnoughts.
- 4 armored cruisers.
- 6 old cruisers.
- 75 destroyers.
- 48 torpedo boats.
- 37 submarines.
- 17 gunboats.
- 160 trawlers.
- 250 vessels (miscellaneous).

British forces in Mediterranean:
- 3 predreadnoughts.
- 4 cruisers.
- 12 light cruisers.
- 14 monitors.
- 28 sloops.
- 45 destroyers.
- 18 torpedo boats.
- 12 submarines.

Italian forces in Mediterranean:
- 5 dreadnoughts.
- 4 predreadnoughts.
- 5 old predreadnoughts.
- 7 cruisers.
- 10 light cruisers.
- 7 flotilla leaders.
- 43 destroyers.
- 26 R. S. torpedo boats.
- 50 submarines.

Japanese forces in Mediterranean:
- 14 destroyers.

United States forces in Mediterranean (Gib.):
- 4 destroyers.
- 20 other craft.

Summary of Mediterranean forces:
- 12 dreadnoughts.
- 20 predreadnoughts.
- 23 cruisers.
- 22 light cruisers.
- 7 flotilla leaders.
- 181 destroyers.
- 92 torpedo boats.
- 100 submarines.

Austrian Fleet (Mediterranean):
- 4 dreadnoughts.
- 6 predreadnoughts.
- 4 old predreadnoughts.
- 2 cruisers.
- 10 light cruisers.
- 16 destroyers.
- 42 H. S. torpedo boats.
- 2 mine layers.
- 54 submarines (including German).

Probable additions by July 1, 1918:
- 2 dreadnoughts.
- 3 light cruisers.
- A few destroyers and submarines.

Turkish Fleet:
- 1 old battleship.
- 1 battle cruiser.
- 2 light cruisers.
- 8 destroyers.
- 8 torpedo boats.
- ? submarines (German).

Summary of Mediterranean forces:
- 4 dreadnoughts.
- 11 predreadnoughts.
- 1 battle cruiser.
- 2 cruisers.
- 12 light cruisers.
- 24 destroyers.
- 50 torpedo boats.
- 60 submarines.

From an examination of the above disposition of enemy forces, we see that they are divided into three general groups:

(1) The North Sea.
(2) The Adriatic group.
(3) The Sea of Marmora group.

In every case the surface craft are contained and the submarines have exit to the high seas.

POLITICAL CONSIDERATIONS.

The entire subordination of the military and naval strategy of the enemy to his State policies requires that we have in mind his State policies and his present conditions.

POLICIES.

(1) Domination of Balkans and Asiatic Turkey.
(2) Extension of colonial possessions.
(3) Commercial supremacy.
(4) Military domination of Europe.
(5) Ultimate naval domination of the sea.
(6) Annexation of provinces rich in mineral resources.
(7) Annexation of ports on the North Sea.

POLITICAL CONDITION.

(1) A spreading socialism in Germany and Austria.

(2) War weariness and unrest throughout the Quadruple Alliance. Dangerous conditions in Turkey due to bankruptcy and loss of territory.

(3) A growing apprehension amongst Germany's allies of conditions which would result from a victorious Germany, unrestrained by a balance of power on the Continent.

(4) Necessity for continued military success to prevent social unrest and to insure continued cohesion of his alliance.

(5) Probable dangerous reaction which would follow a great military reverse, or even partial failure of a great offensive.

(6) Necessity for victory preceding peace, in order to insure continued predominance of present political and military system.

(7) Great opportunity for commercial expansion in Russia beyond any dream Germany might have had at the beginning of the war; modifying her essential requirements with respect to over-seas trade.

(2) Definite renewal of the postwar Slav threat, permitting a large reduction in the peace standing army and a corresponding increase of naval power.

(9) Antagonism of pan-Germans and nonannexationists.

MILITARY POLICY.

The only guide to the future policy of the German Army which we can follow is the presumption that the policy it has pursued in the past will be continued. We may assume that Germany plans to hold the western front and to direct her military offensive first against

the remaining weak points of her enemies—the Palestine front, the Salonika front, and the Italian front, unless—

(1) Conditions in Germany are such as to demand an immediate decision on land; or

(2) The Germans believe that their reinforcements on the western front, together with some recently developed surprise weapon, may give them reasonable assurance of victory.

In examining the probable intentions of the enemy, we have first of all to consider the mission imposed upon his naval forces by his situation and aims.

The war that the enemy is waging is a land war. He must succeed on land if he is to dictate the terms of peace. In order to dictate the terms of peace, he must break down the will of his strongest enemies. His strongest enemies are on the western and on the Italian fronts. If he succeeds on both of those fronts, he will win the war. His strategy to date has been to strike on the weaker fronts while holding the stronger fronts. He has endeavored to deprive one front after another of the ability to take the offensive. He has been successful in this on all important fronts, except the western front. He has utilized his successes to strengthen his forces on the more important fronts.

From the beginning of the war he has realized that the great effort of his enemies on the western and on the Italian fronts had to be supported by way of the sea. He has organized the support of his own forces and directed his own land strategy, so that he could do without sea communications outside the Baltic. His basic naval mission has therefore been—

To give the maximum support to his land forces in obtaining a successful decision on land.

The special features of his strategic position have caused him to conclude that he could best support his land forces by naval effort if he concentrated that effort on—

The maximum possible sustained attack on the sea communications of the Allies.

There can be no question that this is the governing mission of his active naval forces to-day, and that it will continue to be their governing mission. Knowing this fact we must not lose sight of its importance nor fail to avail ourselves of the opportunities that the knowledge gives us. The enemy thinks and acts according to his training. He has been taught the doctrine of concentration of effort so long that now it is a part of his nature. He first determines his mission and then devotes all his energy to the accomplishment of that mission. He never loses sight of his mission. Offside effort is no part of his plan, except it promises more toward the accomplish-

ment of his mission than direct effort. He sees his goal and goes toward it with all the power at his disposal.

The enemy has found that his High Seas Fleet can not attack the sea communications of the Allies. He has found that his submarines alone are capable of a sustained attack on the sea communications of the Allies. These facts compel him to assign the principal active rôle in the accomplishment of his naval mission to his submarines. Such assignment appears to leave his High Seas Fleet without a clearly defined mission. This, however, is not the case. His submarines can not do their work unless they have access to the high seas. His submarines are incapable of maintaining for themselves a freedom of exit to the high seas, but must depend for this upon the High Seas Fleet.

The mission of the High Seas Fleet is therefore, as far as their principal activity is concerned—

To further the submarine campaign to the maximum degree.

This mission includes as an immediate and continuous mission—

To maintain a freedom of passage to and from the high seas for submarines.

Enemy surface craft in the Helgoland Bight, in the Adriatic, the Kattegat, and the Straits of Dover have always striven to keep clear the way for his submarines to the open sea. Their activities have not indicated any other definite intention—any other mission than that given above. We do not refer here to isolated instances of raids and raiders.

The High Seas Fleet serves other and very important purposes for the enemy. Without the High Seas Fleet Germany could not even dream of an invasion of England; with the High Seas Fleet the threat of invasion is sufficient to immobilize a large number of troops in England that might otherwise be on the western front. Further, the High Seas Fleet, by its mere existence in readiness, compels the immobilization of a superior naval force that must be held ready to meet any move the High Seas Fleet may make, which force might, except for the existence of the High Seas Fleet, be used in antisubmarine effort. It would obviously be unsound for the High Seas Fleet to engage in any enterprise that would greatly impair its threat or its holding power, unless that enterprise gave promise of a favorable decision of the war.

The enemy's strategy on land is closely associated with his strategy on the sea. The enemy attack of the communications of our armies is not for enemy naval forces alone. Enemy armies participate in this attack. The defeat at the Dardanelles was a distinct blow to our communications. It denied to us the war treasures of the Black Sea and equally denied to the Russians a channel of reinforcement. The enemy advance in Belgium to the coast was a distinct attack on

the communications of our armies on the western front. It opened the Belgian ports to his submarines, and gave them the great advantage of proximity to areas congested with our shipping.

We are now in a position to examine the probable intentions of the enemy and then to make use of these in determining upon our courses of action.

In striving to accomplish his missions we may expect the enemy to—

(1) Continue his present submarine campaign.

(2) To enlarge the theater of submarine activity as fast as our antisubmarine measures become effective in congested waters.

(3) To operate his cruiser submarines in distant waters to encourage a dispersal of our forces and to give his cruiser submarines greater tactical freedom. The locality in which a vessel is sunk is no longer of great importance. Quantity of tonnage sunk is what the enemy desires first.

(4) To continue to control the Helgoland Bight, the Kattegat, and the Baltic with his High Seas Fleet.

(5) To concentrate his air activity in support of his land forces, except in so far as aircraft may be required for the protection of naval vessels near their bases.

(6) To intensify his submarine campaign in support of his military offensive—wherever that may be.

(7) There is one possible intention of the enemy that needs careful consideration. We must assume that he knows of the proposed barrage. He must know that we expect to make that barrage effective. He will surely see that we would not make so great an effort without at the same time closing the Straits of Dover. The two efforts, if successful, mean the blocking of his submarines. The mission of his High Seas Fleet is to prevent such a blockade. How will that fleet accomplish that mission? On account of his numerical inferiority in surface vessels, the enemy will foresee the necessity for a base nearer to the barrage than any base that we possess. He will not hesitate to secure the great advantage such a base would give him.

We may expect the enemy to seize a base on the Norwegian coast as soon as we begin laying the barrage, if not before. If such an act is permitted, the barrage will be ineffective until the enemy is driven from his base, or unless we, too, seize a base near him and operate from it with superior forces.

(8) To withhold his High Seas Fleet from operations not directly in support of its mission.

(9) To encourage a dispersion of our air effort and our antisubmarine effort to the detriment of a purely offensive effort on our part.

(10) To handle his High Seas Fleet in such a manner as to immobilize the maximum number of our naval units that might otherwise be used in antisubmarine effort.

OUR OWN FORCES—STRENGTH, DISPOSITION, COURSES OF ACTION OPEN TO US.

Strength and disposition.—As shown above.

Courses open to us.—It is well to repeat the mission of the allied naval forces: "To obtain subsurface command of the sea while still retaining command of the surface of the sea."

The attainment of the subsurface command of the sea is to-day of paramount importance to the allied forces. Victory or defeat depends upon an immediate solution of this problem. Submarines have sunk 12,000,000 tons of merchant shipping since the beginning of the war, and the sinkings continue at an average rate of 500,000 or 600,000 tons per month. The effect of the shortage of shipping is apparent on the whole allied front from the North Sea to Mesopotamia.

CONCENTRATION OF EFFORT AND UNITY OF ACTION.

These conditions are necessary for the successful prosecution of war, and are especially so in the antisubmarine campaign, where the maximum effort of all the Allies is essential, and where escort requirements have led to a great dispersal of force.

Greater results can probably be obtained with our air forces and with inshore forces by placing all operations in certain areas, such as the English Channel or the Adriatic, under one command.

The Allies and the United States are handicapped by the lack of central direction to political, military, and naval effort, and by the difficulties of coordination, due to differences of language, race, and political aims, as well as to lack of common doctrines of war.

Individually, we are handicapped by a less perfect system than that employed by the enemy to harmonize military effort, naval effort, and State policy, and to organize and use the entire resource of the State for war. The success or failure of the present military and naval councils will depend on the extent to which they can harmonize and coordinate the allied efforts and bring about unity of action for the purpose of winning the war.

COMMAND OF THE SEA.

Command of the sea includes two distinct ideas:

(1) The free use of the sea for one's own forces and commerce.

(2) The denial of such use of the sea to the enemy.

Both of these advantages may be obtained by driving all enemy fighting craft from the sea. During the period when the command of the sea is not complete, we require two forces of military effort:

(1) Offensive effort directed against all enemy vessels, and, where possible, against their bases.

(2) Defensive effort, which in general gives local protection to vessels at sea.

The Allies have retained surface command of the sea since the beginning of the war. Isolated raiders have escaped from the North Sea, and attacks have been made on the English coast and Norwegian and Dutch convoys; but such enemy action can not be entirely prevented, and has but a small influence on the course of the war.

The Grand Fleet has a superiority of nearly 2 to 1 over the High Seas Fleet in all units except destroyers.

The mission of the High Seas Fleet is—

"To further the submarine campaign to the maximum degree."

We are reasonably certain that the High Seas Fleet will never seek decisive action, nor place itself in serious jeopardy, unless it is necessary to secure the free passage of submarines to the open sea.

The following present and future features of the North Sea situation may render an increase of the Grand Fleet necessary:

(1) The possible addition of the Russian Navy to enemy forces—4 dreadnoughts and about 60 destroyers.

(2) The added sense of security that the Grand Fleet reinforcements will give to Great Britain against any fear of invasion.

(3) Future developments in connection with the North Sea barrage which may require considerable detachments from the Grand Fleet.

(4) The escape to the Atlantic of enemy battle cruisers as commerce destroyers.

The addition of Russian battleships to enemy forces can be met by the transfer of United States battleships to European waters. The Russian destroyers may be met by new construction, the transfer of destroyers from antisubmarine operations, or the addition of Japanese destroyers.

Our submarines in the Baltic may destroy Russian ships when danger of the enemy taking them over becomes imminent. It is important that the enemy be prevented from getting many Russian destroyers, if possible.

In detachments for the protection of the North Sea barrage, or for running down enemy battle cruisers in the Atlantic, battle cruisers are of great value. The only available additional units of this class are the four J battle cruisers, and their addition to the Grand Fleet is most desirable.

If the transfer of United States battleships to the Grand Fleet will allay in Great Britain the fear of invasion to such an extent that a considerable number of troops will be released for service in France, then such a transfer is justified. The aim always is greater strength on the fighting fronts. It is immaterial how that strength is obtained.

In the Adriatic, surface command is held in great force by the Allies over the Austrian and Turkish fleets. Even the withdrawal of Italy would still leave a sufficient excess of force.

Owing to future probable difficulties of maintenance of capital ships in the Mediterranean, the destruction of the Austrian Fleet is of importance. Of greater importance is the destruction of enemy submarine bases, which may be undertaken by our surface and air forces.

ATTACK ON ENEMY BASES.

The destruction of the submarine bases would be an effective method of solving the submarine problem.

The enemy North Sea bases may, however, be considered as impregnable. Apart from fortifications, the physical features of the coast with the extensive banks and reefs, lowland, and narrow and tortuous channels, leading up to the principal naval bases, render a combined naval and military expedition against them a desperate undertaking with practically no chance of success.

The destruction of these bases depends upon the future development of air craft. Present machines have insufficient radius to attack Wilhelmshaven or Kiel.

Zeebrugge, however, is within easy air distance of England or France. Numerous raids have been made on this place, but owing to the provisions made to protect submarines from air attack, and to the advantage offered by the Bruges Canal to disperse and hide submarines, it is probable that the results have been small.

Zeebrugge appears to be of sufficient importance to warrant the concentration of adequate air power to maintain a permanent air superiority and to continue bombing it until it becomes untenable as a submarine base. Such an effort will also undoubtedly have a direct result on the military campaign in France.

The Adriatic bases are all within easy air distance of the Italian coast, and an intensive attack on all these bases should be considered. The additional destruction of the Austrian surface fleet would have a valuable effect in releasing colliers and supply vessels required for the allied containing force.

Such a campaign on a large scale against submarine bases in both the North Sea and Adriatic will involve withdrawal of many airplanes from present patrol work, and will require a reconsideration

of the present plans of widely distributing air stations along the coasts.

During the month of December, British aircraft covered 140,000 miles in antisubmarine work; 23 submarines were sighted, 20 attacked, and none was sunk. The effort seems out of proportion to the results achieved. Beyond any doubt, a concentration of this effort on a known base, easy of access, would have yielded greater results.

Concentrated offensive air power in Flanders and southeast England will not only accomplish greater results against submarines, but it will also relieve the air threat against London, definitely give us command of the air at a great strategic point, and directly assist the armies in the field—the ultimate object of all our naval and air effort.

MINING IN SUBMARINE BASES.

This has been tried, both off Zeebrugge and off Helgoland during the war. While it may have resulted in the losses of some submarines, the general result has been a failure, as the enemy soon clears a passage. In such future operations it may be assumed that to be effective the barrage must be patrolled. The laying of mine barrages in the Adriatic and Aegean Seas should receive consideration.

DOVER AND NORTH SEA BARRAGES.

At present there is under way the placing of the Dover and North Sea barrage in an effort to contain submarines in the North Sea.

As this effort is on as great a scale, certain features which involve its success or failure should be discussed in full.

We have recently had an example of a barrage patrol in the Straits of Otranto. The supporting bases were near. The weather conditions better than in the North Sea. Capital ships in comparatively great strength were in the near vicinity, and yet it was not practicable to maintain a patrol barrage. The attacking force could attack and get away without serious danger of being cut off because it occupied an interior position. Information of its movements always came too late to permit any action by allied forces that were not at sea on the line of retreat. The patrol had to be abandoned.

We may expect similar action and similar results in the North Sea unless we station our supporting forces in advance of the barrage. Manifestly it is impracticable to hold supporting forces of large vessels continuously at sea in advance of the barrage. The Scotland-Norway patrol was abandoned because of submarine activity. The problem then is to find a way of holding strong forces

in readiness between the enemy naval bases and the barrage. We see no way of doing this except by occupying a harbor on the Norwegian coast. Fanciful schemes of mined-in areas at sea might be discussed, but the conclusion would still be the same.

A harbor south of the barrage on the Norwegian cost is the only satisfactory solution to the support of the barrage as a whole.

In considering harbors that may be available we should give preference to those harbors having the greatest capacity that are capable of secure temporary defense. As the war progresses and the passive features of the barrage become more effective, we must expect increased effort to break the barrage so that the attacking defense of the barrage may become a matter of fleets. We shall be in a strong position if we can, at will, base the Grand Fleet on the Norwegian coast.

There is an advantage in selecting a base some distance south of the barrage for the following reasons:

(1) Increased probability that a movement toward the barrage will be detected in time to give warning.

(2) Increased opportunity to intercept any force that raids the barrage patrol.

(3) Denial to the enemy of all positions north of the base selected.

Assuming for the moment that a base can be acquired on the Norwegian coast, the question arises as to what force should normally be based there.

The mission of the force will be—

"To intercept and destroy any enemy force of surface vessels that may approach the barrage."

Enemy forces that have operated so far from base as the barrage are of three classes—submarines, merchant-ship raiders, and light cruisers. If greater strength is needed in the raiding force, the next step would be to send battle cruisers.

Whatever is sent on these expeditions will have high speed. The mission of the expedition will be the destruction of patrol craft, since these are the vessels that block the way of the submarine. Having destroyed the patrol craft, the next mission of the expedition will be to get home. If it is pursued by slow vessels—battleships, for instance—it will experience no difficulty in getting home. We are, therefore, compelled to assign powerful high-speed vessels to operate from the proposed base. The number of these vessels should exceed the number of similar vessels likely to be sent against the barrage. They should be reinforced by an information service of light cruisers, and of listening vessels capable of giving timely warning.

It is, of course, desirable that the base for patrol craft should be near the area they patrol. If we are to acquire any base at all in Nor-

wegian waters, the acquisition of an additional base will not unduly complicate the political situation.

We have now arrived at the following conclusions:

(1) A base on the Norwegian coast is essential to the maintenance of an effective barrage.

(2) The base for supporting vessels should be between the barrage and the enemy bases.

(3) The supporting vessels should be battle cruisers. Battleships may be used in addition, but would be of small use unsupported by battle cruisers.

(4) The supporting force should include an information service of light cruisers and listening vessels.

The question then at issue regarding the maintenance of effective barrage is, Shall a Norwegian base be acquired?

Answer: If Norway consents, and without danger of war with Sweden or Germany—Yes, immediately.

NOTE.—The possibility of war between Norway and Sweden, or between Norway and Germany, as a result of the occupation of a base by us must be considered. If we knew that such a war would occur as a result of the occupation, we would decide against the act, because the strategic value of the base and of the barrage does not, in our opinion, warrant the devastation of Norway. Attention is invited to a previous memorandum concerning the characteristics essential to an efficient mine barrage.

CONVOY OF SHIPPING.

This has greatly reduced the loss from enemy action, and must be adhered to until losses have been considerably reduced from the present rate. Convoy has serious disadvantages, however, among which are:

Reduction of efficiency of shipping (estimated to be about 50 per cent).

Losses by collision.

The loss of efficiency can be decreased by—

Better utilization of speed.

Convoys to make the best possible speed from port to port.

Thorough instruction of merchant officers in rules for convoy.

Placing all merchant vessels and personnel of the allied countries under Government control.

ENEMY ANSWER TO A CLOSE INSHORE OPERATION.

When operations inshore become too dangerous, the enemy submarines will naturally move further offshore. Forcing them to this will be a decided gain, as shipping will be harder to find and the

maintenance of submarines on station more difficult. On the other hand, the greater number of patrol vessels are unsuited for deep-sea work, and the greater immunity of submarines will partially counterbalance the difficulty in finding shipping, and the disadvantage of the necessarily reduced number of submarines on station.

It is probable that the development of antisubmarine methods on the European coast will result in an attack in force on shipping along the United States Atlantic coast, Gulf of Mexico, and Caribbean. Submarine fuel carriers will permit of submarines remaining for a considerable period in the western Atlantic.

SUBSURFACE COMMAND OF THE SEA.

As has been stated, this is the greatest and most vital problem that confronts the Allies to-day. It must be solved and solved quickly. The outcome of the war depends upon it. In its achievement, the line of action will be guided by the following principles:

1. The offensive should be followed in every possible case.
2. Greater results are promised by action close to enemy bases.
3. A pure defensive leading to the dispersal of units over great areas has practically no hope of success. The effort involved is prohibitive, as compared with that of the enemy.
4. Every contact with a submarine should be followed by the maximum tactical offensive effort for its destruction.

The present surface command of the sea is largely a passive effort governed by the idea of an offensive whenever the opportunity presents itself. Subsurface command can be obtained only through offensive effort. All other effort is palliative. The conclusive effort must be offensive, even in its palliative measures. The offensive idea in antisubmarine warfare is of specially great importance. The submarine navigates in three dimensions. Every time it is forced to submerge it enters a danger zone disturbing to morale. Every time it is forced to submerge off soundings it enters a zone of special danger where any outward event may mean disaster. When we limit our antisubmarine measures to escort duties, we do the thing most calculated to favor the morale of the submarine personnel. The crews lead a comparatively placid life except when they are about to attack; then all hands are called and they go about their duties deliberately according to plan. If, however, we can convert this feeling of comparative security to one of constant tension, the effect will show immediately in increased submarine losses. Greater strain, more frequent emergencies, and the consequent general feeling of insecurity incident to being the chased instead of the chaser can not but have a marked effect.

We therefore adopt as a principle that "The maximum possible antisubmarine force shall be devoted to offensive operations." Offensive operations against submarines finally culminate in tactical situations where one or more submarines are pitted against one or more submarines or surface vessels. The entire submarine problem as it exists to-day is nothing but the assemblage of a multitude of tactical situations of the above nature. The successful solution of two or three typical situations would mean the ultimate solution of the entire problem. The ultimate solution to the submarine menace is tactical and not strategic.

We understand that the enemy entrusts his submarine to skilled officers specially trained to perform their specific duties. If we are to defeat an effort in which initiative clearly lies with the enemy, we must oppose skill with greater skill; we must make of our antisubmarine effort a major effort that claims the best brains and the best tactical skill of the naval services. We must assure ourselves that on every occasion of contact with a submarine the maximum tactical use shall be made of that contact. To realize this aim we must prepare both vessels and personnel for their mission.

As to personnel, the solution is to be found in the best available personnel thoroughly trained in the best known methods. We feel that every branch of the United States and allied naval services is fully justified in giving large numbers of its best people to the antisubmarine service. The recent rapid development of submarine-detection devices is of such a nature as greatly to modify the tactics of submarine search and attack. It is therefore necessary to train personnel in the new tactics as fast as possible. It is suggested that conferences at the Admiralty of the best qualified officers actually operating at sea in antisubmarine work would be useful in determining, improving, and disseminating tactical methods.

As to vessels and their equipment, they must be ready to deliver the maximum possible attack. We may assume readiness as to the gun attack. The depth-charge attack is still in an unsatisfactory condition, but rapidly being improved.

In reports from American destroyers there have been several instances of depth charges failing when, if they had not failed, the submarine would have been put down. Such instances indicate the desirability of adopting the rule of always dropping at least two depth charges simultaneously. Experience has demonstrated that the position of a submerged submarine is known with more accuracy immediately upon the arrival of the attacking vessel near the point of submergence than it is at any later time. This fact indicates the desirability of making the first depth-charge attack a maximum effort. Vessels should therefore be provided

with means for projecting depth charges from the stern and from the beams so that a large area of water—say two or three hundred yards in diameter—may be covered by the simultaneous discharge and dropping of depth charges. Dropping gear for two depth charges with projectors for two depth charges located near the stern and three or four on each beam or quarter is suggested. In addition as many depth charges as can be carried aft should be in readiness for running over the stern (mine-laying style) so that they may be laid on retiring curves. It should be a principle of action that—

The first contact with an enemy submarine shall justify the expenditure of all depth charges on board but two.

The after gun and torpedo tubes of destroyers used in antisubmarine work can be landed to make way for more depth charges and the gear necessary for using them expeditiously.

To summarize our antisubmarine effort:

(1) Emphasize the offensive as much as possible.

(2) Put the best brains and skill available into the antisubmarine service.

(3) Develop group tactics and organization by conference and otherwise. Disseminate results.

(4) Make maximum possible use of each contact with a submarine.

(5) Always drop at least two depth charges in first salvo, and as many more as possible. Expend all but two depth charges on first contact with a submarine.

(6) Fit vessels to carry maximum possible number of depth charges in readiness for laying expeditiously. Remove after gun and torpedo tubes on destroyers if necessary.

The question of the cruiser submarine is one very difficult of solution, because of its extensive field of operations. Tactically it is less efficient than the small submarine, except for the increased range of its guns. The tendency of our answer to the cruiser-submarine attack will be toward a further diversion of forces to defensive arrangements and a further slowing up of shipping through extension of the convoy system. Even were it sound policy it is impossible to guard shipping in distant waters against the torpedo attack of cruiser submarines. Greater zigzag areas, increased armament of merchant ships, increased numbers and skill of armed guards, increased vigilance regarding lights, smoke, etc., all palliative measures, is the best reply available at present to the cruiser submarines. In connection with the increased armament of merchant vessels as a reply to the gunfire of the cruiser submarine, we suggest the special arming of about 1 merchant ship in 10 of each class with

a battery of at least four 5-inch or better guns, and the assignment to those ships of a full gun's crew for each gun. As the convoy system becomes more fully organized, it will then be possible to place one specially armed ship in each convoy, and thus be sure that in the absence of an ocean escort we will still have sufficient gun power with each convoy to reply to the gunfire of a cruiser submarine.

The Mediterranean situation is entirely satisfactory as to the containing of enemy capital ships, but the submarine situation is very unsatisfactory. Submarines cruise at will and safely throughout the Adriatic and Mediterranean, basing chiefly on Adriatic ports. The principal obstacle to patrol operations in the Adriatic has been the activity of enemy light cruisers and destroyers. We recommend no withdrawal of forces from the Mediterranean, but that closer study of the Adriatic situation be made with a view of a greater concentration of offensive effort against enemy naval forces. We consider the entire naval problem of the Mediterranean and Adriatic a major problem in which the United States and the Allies are all greatly interested.

The successful solutions of this problem might well mark the turning point in the war.

DECISIONS.

GENERAL.

1. To provide for united action of allied naval efforts, in conformity with the naval missions and irrespective of local situations and special interests.

2. To unify commands where desirable in certain areas, such as the English Channel and the Adriatic.

3. To reinforce the Grand Fleet with Japanese battle cruisers.

4. To reinforce the Grand Fleet with United States battleships if the barrage operations require it, or if thereby troops in Great Britain can be released for service in France.

5. To develop plans for concentrated air attacks on enemy submarine bases in the North Sea and the Adriatic.

6. To develop plans for attacks with surface vessels against enemy Adriatic bases.

7. To prepare to destroy Russian Baltic ships should their capture by the enemy become imminent.

8. To give special study to the matter of mine barrages in the English Channel and the Adriatic and Aegean Seas.

9. Unless loss of imports is a controlling factor, to immediately occupy a base in Norway, south of the proposed barrage.

NOTE.—This decision to be abandoned should it appear probable that the devastation of Norway would result therefrom.

10. To base in Norway a force of battle cruisers, light cruisers, and destroyers superior to any similar force which the enemy is likely to employ in raiding.

ANTISUBMARINE.

1. To devote the maximum possible antisubmarine force to offensive operations.

2. To divert destroyers and other antisubmarine types from Japan and from other sources in as great numbers as practicable to antisubmarine work.

3. To develop with the greatest possible rapidity hunting groups, equipped with listening devices and manned by the best-trained personnel available from all sources.

4. To equip vessels engaged in antisubmarine warfare with adequate means for taking the maximum tactical advantage of every contact with an enemy submarine.

5. To arm heavily (with full gun's crew for each gun) about one merchant ship in ten, of each general class, in the North and South Atlantic, and, as far as practicable, to escort convoys with such heavily armed merchant ships.

[Extract from Memorandum No. 71, "History of Planning Section."]

Subject: "*Estimate of the General Naval Situation in Relation to the War as a Whole.*"

This was the first strategic problem set itself by the Planning Section. It was selected partly with a view to self-education, but also with a desire to contribute something useful toward the prosecution of the war.

Following favorable comment from the Force Commander and the Admiralty, it was thought that the solution might prove of greater value if it received wider circulation and if the conclusions reached should be approved in principle by the Inter-Allied Council.

It was accordingly submitted as a part of the agenda for the Inter-Allied Council and subsequently received the approval of that body. It was the subject of favorable informal comment by French and Italian officers.

The influence which the paper exerted upon the conduct of the war is difficult to estimate. Some of the conclusions reached were already in process of design or execution by the Allies; others were rendered impracticable by subsequently changed conditions. Nevertheless it was apparently the first comprehensive examination of the naval aspects of the war made by any of the allied staffs, and as such it served to clarify thought and to unify conceptions and effort among the Allies.

Forwarding comment by the Force Commander on 31 May follows:

"1. Inclosed herewith are corrected pages 17 and 18 for Planning Section Memorandum No. 8, a copy of which was forwarded to the Department on February 22.

"2. The changes from the pages 17 and 18 previously forwarded are such as to eliminate from the memorandum all references to the seizure of a base in Norway.

"3. All copies of this memorandum which were furnished to the Allied Naval Council and to the British Admiralty were altered in accordance with the inclosed corrected sheets."

MEMORANDUM NO. 9.

ADRIATIC SITUATION.

30 January, 1918.

(See Maps Nos. 6 and 7.)

FOREWORD.

In judging the soundness of the conclusions arrived at in the following paper, which may be found upon the last pages, it is urged that the following points receive consideration:

(1) The value of an offensive attitude whenever such offensive attitude is possible.

(2) The soundness of the principle of concentration of effort.

(3) The great importance of unity of command, and, in the case of allied operations, the extreme importance of deciding beforehand upon spheres of activity.

(4) The principle of attacking the enemy where he is weakest. Enemy morale in Austria and in Turkey is weaker than in Germany. The attack upon the morale in either of these countries is a flank attack upon German morale; this we can not afford to neglect.

(5) The weakened morale of Italy, due to recent reverses, requires of the Allies that an extraordinary effort be made to build that morale up again to its former high standard.

(6) That success in the Adriatic would release large forces for other important operations and make possible a still greater concentration of effort in the areas which finally must be the areas of critical importance.

PROBLEM NO. 5.

General situation: As at present. Enemy submarine activity in the Mediterranean causes serious losses to allied and neutral shipping. Practically all submarines operating in the Mediterranean base on ports in the Adriatic and pass through the Straits of Otranto.

Special situation: The Allies and the United States decide to prevent the use of ports in the Adriatic as bases for enemy submarines operating in the Mediterranean.

Required: Estimate of the situation and plans for—

(*a*) Decreasing immediately losses due to submarine activity in the Mediterranean.

(*b*) Denying the use of Adriatic ports as bases to enemy submarines.

(*c*) Organization of allied command. Scheme for cooperation of forces.

FOREWORD.

On January 21, 1918, the Planning Division submitted a solution of the following problem:

PROBLEM NO. 2.

General situation: As at present.

Special situation: The Allies and the United States have decided to continue the war to a victorious peace.

Required: Estimate of the general naval situation in relation to the war as a whole.

In solving the above-quoted general problem the Planning Section determined, first of all, that the basic naval mission in this war is—

"To further a successful decision on land."

From this basic mission the general naval mission was derived, as follows:

"To obtain command of the sea."

Since the command of the surface of the sea had already been obtained, the special and immediate mission was determined to be—

"To obtain subsurface command of the sea while still retaining command of the surface of the sea."

In the general and detailed investigation as to methods of obtaining subsurface command of the sea, while still retaining command of the surface of the sea, the following conclusions were arrived at:

CONCLUSIONS REACHED IN THE PREVIOUS PAPER.

GENERAL.

1. To provide for united action of allied naval efforts, in conformity with the naval missions and irrespective of local situations and special interests.

2. To unify commands where desirable in certain areas, such as the English Channel and the Adriatic.

3. To reinforce the Grand Fleet with Japanese battle cruisers.

4. To reinforce the Grand Fleet with United States battleships if the barrage operations require it, or if thereby troops in Great Britain can be released for service in France.

5. To develop plans for concentrated air attacks on enemy submarine bases in the North Sea and the Adriatic.

6. To develop plans for attacks with surface vessels against enemy Adriatic bases.

7. To prepare to destroy Russian Baltic ships should their capture by the enemy become imminent.

8. To give special study to the matter of mine barrages in the English Channel and the Adriatic and Ægean Seas.

9. Unless loss of imports is a controlling factor, to immediately occupy a base in Norway, south of the proposed barrage.

NOTE.—This decision to be abandoned should it appear probable that the devastation of Norway would result therefrom.

10. To base in Norway a force of battle cruisers, light cruisers, and destroyers superior to any similar force which the enemy is likely to employ in raiding.

ANTISUBMARINE.

1. To devote the maximum possible antisubmarine force to offensive operations.

2. To divert destroyers and other antisubmarine types from Japan, and from other sources, in as great number as practicable to antisubmarine work.

3. To develop with the greatest possible rapidity hunting groups, equipped with listening devices and manned by the best trained personnel available from all sources.

4. To equip vessels engaged in antisubmarine warfare with adequate means for taking the maximum tactical advantage of every contact with an enemy submarine.

5. To arm heavily (with full gun crew for each gun) about 1 merchant ship in 10, of each general class, in the North and South Atlantic; and as far as practicable to escort convoys with such heavily armed merchant ships.

Of the above general conclusions in the solution of the general problem, the following conclusions bear directly upon the problem now under consideration: 1, 2, 5, 6, and 8; and of the conclusions regarding antisubmarine warfare, the following bear upon the problem now under consideration: 1, 3, and 4.

ESTIMATE OF THE SITUATION.

Mission: To prevent the use of ports in the Adriatic as bases for enemy submarines operating in the Mediterranean.

ENEMY FORCES—THEIR STRENGTH, DISPOSITION, AND PROBABLE INTENTIONS.

Strength and disposition naval forces (January 1, 1918).

First squadron based on Pola:
- 4 dreadnoughts (Uiribus Unitis—12–12″ guns).
- 3 predreadnoughts (Radetzky—4–12″ guns; 8–9.4″ guns).
- 3 predreadnoughts (Erzherzog—4–9.4″ guns; 12–7.5″ guns).
- 3 predreadnoughts (Habsberg—3–9.4″; 12–5.9″).
- 2 predreadnoughts (Monarch—4–9.4″; 12–5.9″).

Additional vessels based on Pola:
- 1 battleship, second class (Mars).
- 2 light cruisers (old—19 knots).
- 3 torpedo vessels (old—14–20 knots).
- 2 mine layers.
- 18 auxiliaries (mine vessels, tenders, yachts, colliers, etc.)

Cruiser flotilla based on Cattaro:
- 2 cruisers (Sankt George—21 knots; 2–9.4″; 5–7.5″).

Cruiser flotilla based on Cattaro—Con.
- 6 light cruisers (4 of 27 knots; 2 of 20 knots).
- 16 destroyers (400–800 tons; 28–33 knots).
- 42 H. S. torpedo boats (200–250 tons; 25–29 knots).

Additional vessels based on Cattaro:
- 1 battleship, second class (old).
- 2 light cruisers (old—19 knots).
- 2 auxiliary cruisers.
- 1 torpedo vessel.
- 1 mine depot vessel.
- 2 submarine depot ships.
- 1 mining tender.
- 1 repair ship.
- 13 Austrian submarines.
- 12 U. submarines (German).
- 12 U. B. submarines (German).
- 15 U. C. submarines (German).
- Also some torpedo vessels and H. S. torpedo boats.

Based on Lussin: A few torpedo boats.

Based on Sebenico:
- 2 repair ships.
- 1 gunboat.
- 4 coastal torpedo boats.
- 1 sloop.
- 3 auxiliaries.

Vessels where station is not known:
- 5 torpedo vessels.
- 6 destroyers (probably at Cattaro).
- 9 H. S. torpedo boats.
- 18 torpedo boats first class (some at Lussin).
- 28 torpedo boats second class (6 used as mine sweepers).
- 2 submarines.

There are also the following:
- 8 armed auxiliaries (4 at Trieste).

Summary of enemy forces—Adriatic:
- 4 dreadnoughts.
- 11 predreadnoughts.
- 2 cruisers.
- 4 light cruisers (27 knots).
- 6 light cruisers (20 knots).
- 22 destroyers.
- 51 H. S. torpedo boats.
- 18 torpedo boats, first class.
- 28 torpedo boats, second class.
- 54 submarines (Austrian and German).
- 10 torpedo vessels (old).
- 8 mining vessels.
- 8 armed auxiliaries.

Vessels building—Adriatic:
- 4 dreadnoughts (2 laid down in 1914).
- 3 light cruisers (1 laid down in 1914).
- 4 destroyers.
- 13 torpedo boats.
- 8 submarines.

Turkish forces—In general based on Constantinople:
- 1 predreadnought.
- 1 battle cruiser—Goeben. (Probably damaged so as to be unserviceable for some time.)
- 1 light cruiser.
- 8 destroyers.
- 7 torpedo boats.
- 3 Turkish submarines.
- 4 or 5 German U. B's. and U. C's.

STRENGTH—MILITARY FORCES.

In the following summary of military strength, only those forces which have to do directly with the defense of enemy bases are considered.

Trieste.—Fortified; several batteries, including 14 heavy guns, caliber not known. Shipbuilding plants and fuel depots; probably all oil fuel for submarines comes into Trieste and is sent to Pola and Fiume by rail, and by water to Cattaro. Approaches to Trieste are comparatively shallow, so that submarine operations against any surface craft in that vicinity would be correspondingly difficult. Position of Trieste, 60 miles from Venice, makes it within easy reach of air attack.

Pola.—Heavily fortified. Important naval base. Considerable repair facilities. Twenty fathoms of water off the port. Seventy miles from port Ravenna or Rimini. Bombardment by fleet not promising.

Fiume.—Fortification unknown. Important repair facilities. Approaches difficult and fortified. Ninety miles from Venice.

Lussin Piccolo.—Torpedo-boat station. Unimportant; well fortified. Garrison in 1915 reported to be 1,500.

Zara.—Torpedo-boat station. Unimportant; no permanent modern defenses.

Sebenico.—Destroyer base and seaplane station. Coal depot—120,000 tons in 1915. Fortified. Considered impracticable by Austrian officers to attack from sea.

Scardona.—Coal mines close at hand; coal of poor quality.

Spallato.—Torpedo-boat station. Has considerable military importance. Has no railway communication with rest of Empire. Submarine base at Trau. Oil-fuel store there.

Gravosa.—Naval coaling station. Probably a torpedo-boat station. When Austrian fleet anchors off this port it enters Ombla Inlet.

Cattaro.—Naval base, with stores and workshops. Strongly fortified by 14 modern forts and batteries mounting guns up to 12-inch. The defenses are reported to have been added to since the war began. Montenegrin heights to the east of Cattaro completely dominate it and render its capture by land difficult. Permanent defenses include the following guns:

Twenty-five 21-centimeter mortars.
Sixteen 15-centimeter guns.
Twelve 9-centimeter guns.
Twelve 7-centimeter guns.
Numerous field guns.

Cattaro is connected to bases farther north by a narrow-gauge railroad, 30-inch, which has many very steep grades necessitating rack and pinion at several points. The road has tunnels both in the coast section and in the interior section. The road lies along the coast for a distance of 20 miles north of Cattaro, and then for 30 miles farther runs within 10 miles of the coast before it turns inland. The capacity of the road to support forces based on Cattaro does not exceed 10,000 men. A broad-gauge road is under consideration from Cattaro to Mostar, a town on the narrow-gauge railroad about 120 miles from Cattaro.

In addition, defensive works have been established at Duino, Salvore Point, Robigno, Lovrano, Bucari Bay, Zengg, Carlopago, Brazza Island, Narento River, and Ragusa.

Submarine bases have been established at Port Rose, Istria, Port Salbore, Lagosta, Meleda, Trau, Umago, Primero, and Cattaro.

The enemy has an extensive coastal signal system, including stations at Lagosta and Pelagosa Island (south of Curzola Island).

The enemy has strong military forces against Fiume and along the Semini River, just north of Valona. In the intervening coast districts, however, he has but relatively weak land forces distributed about as follows(numbers are approximate only) :

Sebonica, 8,000 (Bosnian Landsturm).
Spallato, 2,000.
Gravosa, 2,000 (Landwehr).

The country lying between the enemy's principal forces in the North and the South Adriatic is very rugged and mountainous, with but few good roads, and these principally near the coast.

Wireless stations of the enemy are located at—

Cattaro—medium power.
Lissa Island—low power.
Lussin Piccolo—low power.
Sebonico—medium power.
Pola—high power.
Trieste—high power.
Guippana Island—low power.

Fuel.—The principal sources of coal supply are the Dalmatian mines, which furnish coal of an inferior quality. Fuel oil for submarines probably comes by rail from the Galician and Roumanian oil fields to the northern bases.

STRATEGIC POSITION OF THE ENEMY.

Any survey of the enemy strength on the Adriatic would be incomplete without pointing out the value of his stragetic position in the Adriatic in its relation to our lines of supply and operation in the Mediterranean. The Adriatic positions, and specially Cattaro, lie close on the flank of all communications between Gibraltar and Saloniki and between Gibraltar and Egypt. They also threaten with almost equal facility all lines of communication leading from Gibraltar to Italian and French Mediterranean ports.

In addition to the value of these positions and their relations to the Mediterranean, the enemy derives further strength from the nature of the eastern coast line of the Adriatic from Cattaro to Trieste. In this region water communication for the enemy is favored by numerous inland passages sheltered by islands and by the high land of the mainland.

ENEMY PROBABLE INTENTIONS.

In examining the probable intentions of the enemy in the Adriatic region we have first of all to consider the mission imposed upon his naval forces by his situation and aims. The Adriatic situation is one

of the factors in the great problem of the present war, and a most important factor.

The war that the enemy is waging is a land war. He must succeed on land if he is to dictate terms of peace. From the beginning of the war he has realized that the mission of his naval forces was to support his land forces in order that the position on land might be in his favor. This idea might be expressed more concretely by saying that the enemy's basic naval mission is—

"To give the maximum support to his land forces in obtaining a successful decision on land."

The special features of his strategic position from the naval point of view have caused him to conclude that he can best support his land forces by naval effort, if he concentrates that effort on—

"The maximum possible sustained attack on the sea communications of the Allies."

There can be no question that this is the governing mission of his active naval forces to-day, and that it will continue to be the governing mission.

The enemy has found that his surface vessels could not attack the sea communications of the Allies without such danger as to render their annihilation practically certain. He has found that his submarines alone are capable of a sustained attack on the sea communications of the Allies. These facts compel him to assign the principal active role in the accomplishment of his naval mission to his submarines. His submarines can not do their work unless they have access to the high seas. They are incapable of maintaining for themselves a freedom of exit to the high seas, but must depend for this upon the activities of surface vessels. The mission of the enemy surface vessels in the Adriatic therefore becomes—

"To further the submarine campaign to the maximum degree."

This mission includes an immediate and continuous mission—

"To maintain freedom of passage to and from the Adriatic to the Mediterranean for submarines."

The presence of the enemy surface vessels in the Adriatic serves to immobilize a superior naval force of the Allies, in order that the Allies may guard surely against raiding activities of enemy surface vessels.

Enemy operations in the Adriatic so far, both of his surface vessels and his submarines, have resulted in making the Adriatic practically an Austrian lake in which no allied naval operations of importance are undertaken. This status of the Adriatic facilitates greatly the use of Cattaro as a base, and thereby adds to the efficiency of the submarines operating in the Mediterranean by reducing the distance from their bases to their field of operations.

When we examine the probable intentions of the enemy we have to consider them first on the presumption that present conditions in the Adriatic continue without marked change. Under these conditions it is safe to assume that the enemy will—

(*a*) Hold his capital ships in reserve in northern Adriatic bases as at present, and will not offer action with them unless such action is necessary to keep open the Adriatic for the exit of his submarines.

(*b*) Base his submarine operation on Cattaro and operate from there to the maximum of his ability.

(*c*) Base enough light cruisers, destroyers, and so forth, on Cattaro, to make it difficult to maintain a surface patrol or barrage in the Straits of Otranto, and to continue to operate these craft as heretofore offensively against exposed forces of the Allies.

(*d*) Continue to raid Italian coast towns for the moral effect of such raids.

In case allied operations in the Adriatic are such as to separate Cattaro definitely from northern bases, and to establish a barrage between northern bases and the Mediterranean, we may expect that the enemy will—

(*a*) Shift the base of his submarine operations to Constantinople.

(*b*) Attempt to break the barrage in the Adriatic and drive the allied forces back as far as their present position.

(*c*) In case it is impracticable to shift his submarine base to Constantinople, the enemy may attempt by land operations in Grecian territory to gain new positions for submarine bases.

(*d*) The enemy will not, under any avoidable conditions, accept a principal base of submarine operations inside of an effective allied barrage.

(*e*) If Cattaro should be separated from the northern bases simply by the interposition of an allied base, the enemy would not withdraw his submarines to northern bases until local conditions of supplies and fuel at Cattaro compelled such a withdrawal.

The points already mentioned bear upon the general situation of the enemy, and upon measures which may be taken to further successful war against him.

At present the enemy is assisted in his naval operations in the Adriatic by his ability to escape to a conveniently located base after each raid on surface vessels in the Otranto region.

The enemy is assisted in all his operations by his present occupation of islands in the eastern Adriatic.

The enemy is hampered somewhat in the operations of his surface craft by poor coal and a possible insufficiency of fuel oil.

The inhabitants of the islands in the eastern Adriatic are not staunch supporters of the enemy.

The communications, both by land and sea, of Cattaro are poor.

The enemy morale is good, but not so good as that of the Germans, nor need we expect any particular efficiency in the operations of his surface vessels if opposed to vessels of equal strength.

An active naval offensive, if only partially successful, would have a very depressing effect on his morale, as present reports indicate decided unrest and hardship in Austria.

The great depth of water in the southern part of the Adriatic, together with the clearness of the water, make this region one specially adapted to the search for submarines by aircraft and to the pursuit of submarines by hunting groups of surface vessels.

OUR OWN FORCES—THEIR STRENGTH, DISPOSITION, AND COURSES OF ACTION OPEN TO US.

Strength and disposition.—The following enumeration of ships is subject to change and correction, owing to new dispositions that are made from time to time, but is sufficiently accurate for our present purposes.

French vessels in the vicinity of the Adriatic:
- 7 dreadnoughts.
- 7 predreadnoughts.
- 4 armored cruisers.
- 24 destroyers.
- 14 submarines.
- 8 auxiliary cruisers.

Italian vessels in the vicinity of the Adriatic:
- 5 dreadnoughts.
- 4 predreadnoughts.
- 5 armored cruisers.
- 4 light cruisers.
- 14 destroyers.
- 24 torpedo boats.
- 14 submarines.

British vessels in the vicinity of the Adriatic:
- 5 light cruisers.
- 5 monitors.
- 6 destroyers.
- 91 net drifters.
- 6 trawlers.

There is a force near the entrance to the Dardanelles sufficient to contain any surface vessels that may issue from Constantinople.

Courses of action open to us.—It is well to repeat the mission of the allied naval forces as a preliminary to the consideration of methods of accomplishing that mission.

"To obtain subsurface command of the sea while still retain command of the surface of the sea."

The attainment of the subsurface command of the sea is of immediate and paramount importance to the allied forces. Victory or

defeat depend upon the solution of this problem. Submarines have sunk 12,000,000 tons of merchant shipping since the beginning of the war, and destruction continues at a rate of about 500,000 tons per month. At least 30 per cent of all sinkings occur in the Mediterranean. The effect of the shortage of shipping is apparent on the whole allied land front from the North Sea to Mesopotamia. This effect is increasing daily.

In considering the effect of a continued loss of tonnage on the general situation, we have to consider specially the critical situation in the Adriatic and the important adverse influence that is bound to be felt should these sinkings continue unabated. It would appear that the political situation in the Adriatic is such as to demand that extraordinary effort be made to revive a confidence in both the military and civil forces that victory will eventually rest with the Italian forces in that region.

So far the naval effort has been defensive, except for occasional brushes with enemy submarines. There has been no decisive and inspiring naval effort at naval offensive. There has never been a time in the conduct of the present war when the inauguration of an offensive was more needed than now. Their barrage operations in the Otranto Straits have failed completely to check enemy submarine operations throughout the Mediterranean. It would appear that some new form of effort must be undertaken if we are to accomplish the mission which has been laid down.

In considering any new form of naval effort in the Adriatic we must bear in mind the great advantage accruing to a concentration of effort and a unity of action. The Allies and the United States are handicapped by the lack of a central direction of political, naval, and military effort, and by the difficulties of coordination incident to the differences of language, views, and political aims, as well as by a lack of common doctrines of war; so that one of the problems in the local Adriatic situation is to remove, so far as may be possible, the difficulties indicated above by an organization of command, and by foreseeing and arranging for the difficulties likely to be encountered.

The courses of action open to us fall under four general heads:

(1) Reduction of enemy bases in the Adriatic.

(2) Destruction of enemy naval forces in their bases.

(3) Destruction of enemy naval forces at sea, either in the Adriatic or the Mediterranean.

(4) The containing of the enemy forces in the Adriatic.

(1) *Destruction of enemy bases.*—The only means of destroying enemy bases by naval forces is by bombardment, either at short or long range, depending upon circumstances. Assuming that it is not practicable to carry on simultaneously bombardment operations

against the enemy bases in the Adriatic, we have to consider the various bases with a view to determining which of these should receive first attention, should bombardment or other form of naval attack be decided upon.

Our mission requires that we do our utmost to obtain subsurface command of the sea. Cattaro is the base from which vessels operate to interfere with our obtaining the subsurface command of the sea. It is the base which is nearest to the lines of communication which we desire to protect, and one within which the largest number of submarines, destroyers, and light cruisers may be found.

It is so situated geographically that if we occupy a position to the north, enemy forces operating from Cattaro might be denied the support of their larger surface vessels based on Pola, which support, under special circumstances, might be essential to the operation of submarines from Cattaro.

We have already seen that the communications of Cattaro are inadequate for the support of large operations, either military or naval, should the water communication of Cattaro with northern Adriatic bases be interrupted.

We have also seen that the land communication of Cattaro lies in the near vicinity of the shore and is at several points exposed to attack by raiding forces. The above considerations indicate the desirability of devoting our first attention to this base, if any base whatever is to be the objective of naval and military operations. In deciding whether or not to make an effort either direct or indirect on Cattaro, we have to consider first that the only other method of accomplishing our mission is the containing of enemy forces in the Adriatic. Effort of this kind has been continued during the war without success. We are therefore compelled to adopt a method of either a direct or indirect attack on enemy bases.

A study of geographical conditions in the eastern Adriatic has already indicated to us the detached position of Cattaro, and has suggested the desirability of occupying a position north of Cattaro with surface forces superior to those of the enemy based on Cattaro. It should be thoroughly understood that such a line of action must be undertaken with vigor and with a decided superiority of force, in order to insure a success. Half-hearted measures are better not undertaken at all.

The occupation of a position north of Cattaro is not sufficient in itself to interrupt sea communication. We have therefore to consider what other means would be essential to interrupt completely sea communication with Cattaro. A mine barrage appears to be the most effective method of controlling a narrow area of the sea, provided it can be supported by the patrol of surface craft. We

should therefore consider in the selection of our base a position adapted to the support of a mine barrage across the Adriatic. On account of the depth of water no position south of the line Gargano Head-Curzola Island can be used for a continuous barrage from shore to shore. We might consider a partial barrage of anchored mines in the Otranto region, connected by a floating barrage, but experience to date has not warranted an expectation that the floating barrage would be effective. We would therefore be compelled to rely for the effectiveness of a barrage in the Otranto region on the patrol of the gap between the ends of the inshore mine fields. The depth of water in this region and proximity to the enemy base at Cattaro do not justify an expectation that such an effort would be effective.

In addition to the line Gargano Head-Curzola Island there is a second position which might be considered as available for barrage operations, namely, the line Nuovo Point-Grossa Island. The line Gargano Head-Curzola Island is about 130 miles nearer to the bases which it would be necessary to use for the mining force. Moreover, the adoption of the northern line would tend to scatter our efforts over a larger portion of the Adriatic, without thereby increasing the efficiency of that effort. The southern line is in close proximity to what appears to be a very convenient anchorage between the Curzola Island and Sabbioncello Peninsula, capable of easy and quick defense against both sea and land attack. The decision, therefore, is to seize this base as a preliminary to further operations.

The land communications of Cattaro should be interrupted at the same time that the base is seized. Apparently this can be accomplished by a raiding expedition, landing at the same time, in the same vicinity, but on the mainland. This expedition should be equipped especially for the expeditious destruction of bridges, tunnels, and the railroads so far as possible, and should be prepared to retire, when so compelled, upon the Sabbioncello Peninsula, and thereafter form the permanent holding force on that peninsula. As fast as resources permit, land and sea effort should be directed against the occupation of Lissa, Lesina, Brazza, and Meleda Islands. Independently of the military value of occupying these islands, the effect of public opinion in Austria would be most beneficial to our cause.

As soon as possible after the occupation of the base at Curzola, the laying of the mine barrage should be undertaken. The successful completion of the barrage would separate the entire northern Adriatic from the Mediterranean. There would then remain the problem of dealing with Cattaro; undoubtedly enemy operations would continue from that base until their supplies were exhausted.

Cattaro may be attacked—

(1) By air raids.

(2) By land attack.

(3) By a mine barrage encircling entrance to the port.

(4) By raids of surface vessels.

Air attack is supplementary to other forms of attack, and does not interfere with them. We can not expect great results from air attack until there is a pronounced concentration and continuity of effort in this form of attack. It is therefore desirable that immediately succeeding the land operations against Cattaro, there should be a continued operation of aircraft against Cattaro of the greatest possible strength, diverting aircraft from other employments to this one employment until the desired result is achieved. It appears that there are about 150 seaplanes available on the Italian coast—there are no doubt considerable numbers of land machines capable of bombing operations.

In designing air attacks it will no doubt be found desirable to time the original attacks in such a manner as not to cause a dispersal within the harbor of enemy craft previous to any bombardment and raid by surface vessels that is to be undertaken. It is desirable that future bombing operations be provided for by the manufacture of large numbers of bombing machines and by the manufacture of the necessary supporting fighting machines. The United States should participate in this effort. As the destruction of ship yards, dry docks, etc., is possible if undertaken on an adequate scale, an intensive campaign by aircraft gives promise of success against Pola, Fiume, and Trieste. Pola suggests itself as the first base to be attacked after the Cattaro situation is cleared up.

The land attack on Cattaro would involve such large forces and give such doubtful promise of success that the problem is merely suggested.

Any mine barrage about the entrance to the harbor of Cattaro to be effective would have to rest its two ends on the enemy shores and would have to be defended there by land forces. Difficulties of such an operation are very great and not considered practicable under present conditions. Occasional mine fields may be laid as traps for submarines and surface craft basing on Cattaro. A raid on Cattaro by surface vessels, if successful, would have a more profound morale effect on the general situation in the Adriatic than any other single operation can have, as it would indicate a change of attitude on the part of naval forces that might be most disturbing to the enemy. The approaches to Cattaro are not difficult from a navigational standpoint. Batteries are undoubtedly strong enough to resist any attempt of bombardment from the sea, but are probably not strong enough to prevent the running of the batteries at night. The tactical

problem involved is somewhat intricate and difficult, but the advantage of success would be so great that the risk of four or five battleships with the necessary sweepers and destroyers, is more than counterbalanced by the possible results that they could achieve.

It is suggested that the morale effect of a raid on Cattaro would be increased if it were made by American forces, as the advent of fresh forces in a region is always discouraging to the enemy, and especially so if their advent is coupled with a change of attitude from the defensive to the offensive.

Auxiliary to the mine barrage and to the various forms of attack on Cattaro there will necessarily be patrol operations and submarine hunting group operations to interfere, so far as possible, with enemy submarines still attempting to operate from the Adriatic.

Recent development of submarine listening devices enables listening vessels to hear surface vessels and determine their direction when they are within a range of 20 miles, either night or day. This development in itself is a great advantage, since raids on patrol craft in the Otranto region have heretofore been made by surface vessels coming out of Cattaro at night undetected, delivering their attack, and returning before there can be a gun attack of surface vessels. With the new listening device, it should no longer be possible for these operations to occur if listening vessels are properly stationed. Immediately a surface vessel is heard at night, our surface forces should take up a position between the enemy surface vessels and their base. Thereafter the problem is one purely of relative strength and relative tactical skill of the enemy forces and our own. Further, listening devices for the detection of enemy submarines have been perfected to such an extent that it will be very difficult for them to issue through narrow waters without detection, if vessels are properly stationed. In waters like the English Channel, where enemy submarines may go to the bottom and remain quiet, the use of listening devices is less efficient than in waters like the Straits of Otranto, where submarines are compelled to keep going, and thereby betray their presence, their course, and direction to the hunting groups. It is true that submarines may ground close to the shore in the Otranto region, but such action can be rendered extremely dangerous by the planting of deep mine fields as traps.

Whatever forms of operation are decided upon in the Adriatic there must be continued a constant patrol and hunting of submarines issuing from or returning to the Adriatic, until such time as the major measures which we take there shall have excluded submarines from that area. The greatest immediate step that can be taken in increasing the efficiency of patrol operations is the fitting of all suitable patrol craft with the most modern listening devices and the arming of those craft with weapons of such a nature that they may—

(1) Cope successfully with submerged submarines that may be discovered.

(2) Prevent submarines that are submerged from coming to the surface and escaping by superior speed.

(3) Defend themselves against the gun attack of submarines operating on the surface.

All patrol operations should be augmented so far as practicable by aircraft patrol, with the exception that no aircraft specially suited for bombing operations directed against enemy bases should be diverted to patrol operations. Supplementary to the patrol operations and the operations of hunting groups of vessels fitted with listening equipment, there should be operations by allied submarines in areas restricted to their exclusive use. The allotment of areas to various types of vessels and the coordination of patrol efforts is a semi-tactical problem that can best be left for solution to the senior naval officer in the Adriatic region.

General estimate of vessels required.—4 dreadnoughts; 10 pre-dreadnoughts; 20 light cruisers; destroyers; trawlers and sweepers; submarines, listening groups, mine layers, transports, and auxiliaries; 30,000 troops.

System of command.—In the Adriatic theater the success of operations in which forces of several allied nations are necessarily engaged requires the most careful consideration and agreement in advance with regard to the allocation of tasks and responsibility, as well as agreement as to the higher command. Success positively demands that the combined international forces, afloat and ashore, engaged directly in the execution of the plan above outlined, shall be specifically under the command of a single naval officer. In general, the tasks should be assigned according to the facilities available for each nation, and care should be exercised that these tasks harmonize with the war aims and special interest of participating powers.

With regard to the allocation of tasks, the Italians are best able to conduct air raids, but in this they should be assisted as much as possible by all other nations. The Italians are better able to supply troops quickly in landing operations in Adriatic waters. The landing of such troops will also harmonize with the war aims and general policies of Italy. The other Allies might well reinforce Italian troops by any special troops which they have that have been trained in landing operations; for instance, American marines.

The proximity of Italy to the theater of operation requires also that she render the assistance at her command with respect to the mining bases and mining operations. She would naturally be charged with the convoy of her own troop transports and supply ships. The nation to which is allotted the laying of the mine barrage should control the surface defense of that barrage and should be

charged with preventing surface raiders from escaping through it to the Mediterranean. The barrage command naturally includes the command of supporting points of the barrage, such as Pelagosa Island, Gazza Island, Lagosta Island, and the defenses of the base at Curzola Island.

The proximity of Italy to the theater of operations requires also power in the Mediterranean, should supply battleships for naval raids upon enemy bases. The United States should furnish and transport the necessary mines for that portion of the barrage assigned to United States forces and should be in charge of the shore mine bases. The United States should also furnish listening devices of American pattern, together with personnel for operating them and as many patrol boats as can be spared from other areas.

DECISIONS.

(1) To seize and secure a base between Curzola Island and Sabbioncello Peninsula.

(2) Simultaneously with the seizure of the base, to raid the railroad in its vicinity, destroying tunnels and bridges, and occupying a position astride the road as long as possible. When compelled to retire from this position the forces to retire on Sabbioncello Peninsula and thereafter hold it permanently.

(3) To place sufficient naval forces at Curzola Island to interrupt completely all traffic of surface vessels between northern Adriatic bases and Cattaro.

(4) When troops and transports become available, to seize and hold the islands of Lissa, Brazza, Lesina, Lagosta, Meleda, Gazza, Pelagosa.

(5) To fortify Agosta Island, Gazza Island, Pelagosa Island, so that light vessels patrolling in this region may find refuge from attack under the guns of these islands.

(6) To lay a mine barrage from the Italian coast to Curzola Island, and to support this barrage by vessels based on Curzola Island and Brindisi.

(7) To organize and carry out as a surprise attack a raid on Cattaro which shall have for its mission the sinking of all enemy vessels in the harbor, provided subsequent information indicates conditions to be such as to warrant the effort.

(8) To assign immediately areas of operation for the patrol of the southern Adriatic, the mission of the patrol being to make it increasingly difficult for the exit and entrance of enemy submarines in the Adriatic.

(9) To equip the maximum possible number of patrol vessels with efficient listening devices, and to arm them in a manner suitable to their employment.

(10) To assign the general command of all these operations to a single naval officer of one of the cooperating powers.

(11) To assign the task of the raid on Cattaro to the American battleships, supported by such sweepers and destroyers of other nations as are best suited to the task.

(12) To carry on a continuous air attack on Cattaro and the vessels basing there. For this purpose to concentrate a maximum possible number of suitable aircraft.

(13) To hold a force of surface vessels in readiness at Corfu sufficient in strength to prevent the escape of enemy cruisers from the Adriatic.

(14) In directing the air offensive to concentrate first on Cattaro and then successively on the ports at which most enemy submarines may be building or may be harbored.

(15) To augment patrol effort by all available aircraft not specially suited to the attack of enemy bases. To select mining bases after consultation with the Italian authorities.

(16) To plant special mine fields as submarine traps in the vicinity of Cattaro, but to do this subsequent to the raid.

2 FEBRUARY, 1918.

MEMORANDUM.

Subject: Memorandum No. 9, dated 30 January, 1918.

In the original memorandum the matter quoted below followed the paragraph ending "War aims and special interests of participating powers."

It is believed that there are no suspicions on the part of any nation in Europe, hostile or friendly, that the United States has any ambitions or intentions looking toward a foothold in Europe or its vicinity, or that she has any ulterior motives whatever in prosecuting the present war. The sole aim of the United States at present is that the war shall be won as speedily as possible. It is therefore suggested that an American commander in chief for the joint forces engaged afloat and ashore in the Adriatic special operations that have been outlined, could best assure that cordial and energetic cooperation of the forces engaged that is essential to success.

The detail of an American admiral to this post would also have a more pronounced naval effect than would the appointment of an admiral of any other nationality. Such effect would be favorable to us not only in the enemy countries of Austria and Germany, where the feeling that the weight of the United States was now being exerted in the war would take hold, but also in Italy, where a similar feeling is desirable to assist Italian morale in regaining its former high standard.

In the original memorandum the "Decisions" (p. 74) included a decision—

To assign the general command of all these operations to an American naval officer.

I have thought it best to omit the above quoted matter from the copies of the memorandum as circulated and to introduce the proposals they contain in another way.

[Extract from Memorandum No. 71, "History of Planning Section."]

MEMORANDA NOS. 9 (30 JANUARY, 1918), 16 (7 MARCH), 31 (27 MAY), 37 (17 JUNE), 53 (23 SEPTEMBER).

Subject: "*Situation in the Mediterranean.*"

Memorandum No. 9 was initiated by the Planning Section as being the most important special problem at that time requiring solution after examination had been made of the general naval situation as a whole.

After reaching a solution on 30 January, 1918, the Planning Section was so much impressed with the importance of undertaking without delay the tentative decisions reached that it obtained permission of the Force Commander to endeavor to get the paper before the Inter-Allied Council at its next meeting, to be held soon after in Rome.

Under the rules of the Council, however, the subject was presented too late for consideration at that session and consequently discussion of it by the Inter-Allied Council was postponed until the session which met in London on March 12. A decision was then reached approving the paper, but inasmuch as execution of the plan required military assistance, reference to the military representatives of the Versailles Council was necessary before allocation of the required troops could be obtained.

By that time the military situation in France had become so grave that the Versailles Council decided no troops could be spared then. However, a subcommittee of the Council, including among its members Capt. H. E. Yarnell and Col. R. H. Dunlap, both of the United States Planning Section, met in Rome on 15 May and prepared detailed plans.

Meantime a mobile floating barrage across the Otranto Straits had been instituted and the laying of a net mine barrage continued slowly. These measures were moderately successful, but did not appear to be, nor likely to become, a satisfactory solution of the submarine situation in the Mediterranean.

By May, 1918, it appeared unlikely that any troops could be spared for a considerable time for the Sabbioncello operation; so the Planning Section again undertook a solution of the submarine situation in the Mediterranean on a purely naval basis. During the preliminary consideration of the subject, cablegram was received from Operations suggesting the Cape Bon-Sicily mine barrage.

On 17 June formal solution (P. S. Memo. 37) was submitted to the Force Commander, who brought the subject to the attention of the Admiralty.

On 23 July an emergency meeting of the Inter-Allied Council was held in London to consider mining operations in the Mediterranean. Capts. N. C. Twining and F. H. Schofield, both of the Planning Section, represented the United States at this meeting.

On 23 July, previous to the Council meeting, the Planning Section prepared a digest of its solution to the Mediterranean problem (P. S. Memo. 37). This was submitted to the Inter-Allied Council (see Council files No. 168), where it received consideration at the emergency meeting.

The Council approved the principles affecting mine barrages in general, and decided to request a commission at Malta, then studying various matters in connection with the Mediterranean mining operations, to examine in detail the definite proposals made by the United States for Mediterranean barrages.

Rear Admiral Joseph Strauss, U. S. N., commanding the United States Mine Force in European Waters, was appointed as United States representative to attend the conference at Malta, and took with him a complete copy of Planning Section Memorandum No. 37 to present to the Malta conference.

After Admiral Strauss's deparature from London a cablegram was received from the United States Navy Department directing him to support the Cape Bon-Sicily project.

The Malta conference adopted the general features of the United States proposal contained in Planning Section Memorandum No. 37, so far as they related to mining (see report of conference—Inter-Allied file No. 188).

On 15 September, at the next meeting of the Inter-Allied Naval Council, the report of the Malta conference was approved in general. Our proposal to continue plans for the Sabbioncello barrage was rejected.

The history of Mediterranean mining plans illustrates several important points.

I. *The inherent difficulty of allied operations.*—Definite conclusions were reached on 30 January, 1918, as to important active operations which should have been undertaken promptly in the Mediterranean against the enemy submarine campaign.

Authoritative and concrete decision to undertake them was not reached finally until 15 September.

In the early stages of the conference the Italians were not prepared to accept the United States proposals, and there was an undercurrent of Italian opposition throughout, apparently due to political jealousy. Some delay was caused, also, by the inability of the military command to provide necessary military support when asked for, though an earlier request might have received favorable action. But the principal cause for delay was the cumbersome method adopted for coordinating the naval effort of the Allies. A permanent council, similar to the Versailles Military Council, probably would have been able to insure prompter decisions and more timely coordinate action.

II. *The need for close cooperation between Navy and Army planning.*—Had the Navy planners been sufficiently informed continuously of the military situation in this case to know the probabilities of obtaining military assistance in the Adriatic, they would have been able to have adopted its naval plans accordingly. Similarly, the Army would have been able to plan with greater facility with respect to new lines of supply in the Mediterranean, about which inquiries were made during the period under discussion. It appears important that Army and Navy planners should be located near enough together to permit ready conferences.

III. *The great importance of the planning function within a naval organization.*—As far as known, the American solutions of the Mediterranean problems, together with others, including their estimate of the general naval situation, are the only comprehensive estimates made by any allied naval staff. This is remarkable, particularly in view of the lateness of the entry of America into the war. The allied naval strategy was formulated almost invariably by men burdened with war administration, who concerned themselves chiefly with questions most pressing from an administrative point of view. Even after the British Admiralty instituted a Plans Division the former method was continued and the Plans Division had little influence upon the broad aspect of the war.

In consequence, allied naval strategy in the main was the child of expediency. It lacked comprehensiveness, continuity ,and oftentimes even soundness.

MEMORANDUM No. 10.

CRUISER-SUBMARINES.

30 January, 1918.

SPECIAL PROBLEM.

(See Map No. 5, "The North Atlantic Ocean.")

General situation: As at present.

Special situation: Germany has seven completed cruiser submarines in commission. They are of the converted mercantile type; radius of action, 17,000 miles at 6 knots. Armament, two 5.9-inch guns, two 22-pounders, six inboard torpedo tubes. Speed, 11½ knots on the surface; 8 knots submerged.

Germany is building twelve cruiser submarines, having a speed of 16 to 18½ knots on the surface, 9 to 10 knots submerged; crusing radius about 20,000 miles. Armament, two 5.9-inch guns, two 4.1-inch guns, or four 4.7-inch guns; eight inboard torpedo tubes. The first of these vessels will probably be commissioned shortly and all should be in service by August, 1918.

Required: Estimate as to the probable employment of these vessels and the measures that should be taken in consequence.

ESTIMATE OF THE SITUATION.

Our special and immediate naval mission in this war is—

"To obtain subsurface command of the sea while still retaining command of the surface of the sea."

The problem with which we are dealing is but a special phase of the general antisubmarine problem, so that no statement of the mission other than the general mission need be made in the solution of this problem.

ENEMY'S PROBABLE INTENTIONS.

In examining the probable intentions of the enemy, we have first of all to consider the mission imposed upon his naval forces by his situation and its importance. The war that the enemy is waging is a land war; he must succeed on land if he is to dictate the terms of peace. In order to dictate the terms of peace he must break down the will of his strongest enemies, and his strongest enemies are on the

western and on the Italian fronts. If he succeeds on both of these fronts he will win the war.

From the beginning of the war the enemy has realized that the great effort of his enemies on the western and on the Italian fronts had to be supported by way of the sea. He has organized the support of his own forces and directed his own land strategy so that he can do without sea communications outside the Atlantic.

His basic naval mission has therefore been—

"To give the maximum support to his land forces in obtaining a successful decision on land."

The special features of his strategic position and the relative strength of his own and enemy surface forces have caused him to conclude that he could best support his land forces by naval effort if he concentrated that effort on—

"The maximum possible sustained attack on the sea communications of the Allies."

There can be no question that the above mission is the governing one of his active naval forces to-day and it will continue to be their governing mission.

The enemy cruiser submarines now under consideration are, or will be, a part of his active naval forces and will share in the enemy's attempt at the accomplishment of this mission, viz:

"The maximum possible sustained attack on the sea communications of the Allies."

We are sufficiently familiar with the character of the enemy to determine that he understands and practices the doctrine of concentration of effort. He has done this so long that it now is a part of his nature—a habit from which he does not avoidably depart. Offside effort is no part of his plan. We may therefore expect that the enemy cruiser-submarines will reinforce to the maximum degree possible the present submarine campaign which the enemy is carrying on. We have then solely to consider what areas will be most profitable for the operation of these vessels. Success of enemy submarine operations is measured, first, by quantity of tonnage sunk; and, second, by the character of the tonnage. There are three classes of things that come over the sea to support allied operations in France and Italy and these are: Food, munitions, men. At present the greatest need is for food because of the unfavorable reflex action that the scarcity of food exerts on the civil populations, thereby tending to break down the will to win. Food is now coming principally from two sources—South America and North America.

The building of the enemy submarines of the type under discussion in itself indicates determination to operate over wider areas of the sea, and to be able to remain away from base longer than heretofore.

So far unrestricted submarine warfare has been limited to zones declared by Germany.

On account of the general arming of merchant vessels and the consequent difficulty that submarines will encounter in boarding merchant vessels for visit and search, even in distant areas, we may be certain that Germany will—

(1) Operate in present declared zones; or

(2) Declare new zones; or

(3) Make a declaration that all the high seas are barred zones.

In other words, Germany will not submit her cruiser-submarines to the practice which has now become dangerous to submarines, to visit and search, previous to the sinking of vessels. German submarine warfare to date has been limited so closely to the barred zones as to indicate a firm policy on the part of Germany to use these zones in accordance with her declaration and not to carry the same class of warfare into unannounced zones.

The lack of tactical handiness of the submarine-cruisers, especially when submerged and when submerging, will prevent the cruiser-submarines from operating in crowded waters where they are liable to the sudden attack of surface craft or aircraft. The cruiser-submarine will naturally avoid convoys on the high seas if they are accompanied by fighting vessels of greater tactical handiness or greater gun power; it will avoid shallow waters. As it is designed for operating a long time without returning to base, it will naturally seek, other things being equal, an area of operations in which it may find an opportunity of refuge or a convenient bottoming ground. It will naturally be attracted by localities in which it may make occasional captures of vessels, may replenish its fuel and provision supplies. Since it is designed to operate for long periods at sea, it will trust more to the gun attack than to any other form of attack, as it can carry sufficient munition to attack more ships in this way than by any other method. Secondary to the gun attack will be the torpedo attack—the mine attack by cruiser-submarines is such an unprofitable form of attack in distant areas that it can be treated as a negligible quantity, requiring no unusual precautions.

A large quantity of grain comes from South America about this time of year, so that it will be natural to suppose that for the present the operations of cruiser-submarines should be directed against South American trade as well as against South African trade, in or near the zones of the Azores, and of the Cape Verde Islands. When the South American trade becomes of less importance and the North American trade becomes of great importance, we may expect a shifting of the area of operations of cruiser-submarines to the western Atlantic, as far south as the Gulf of Mexico and the Caribbean. The present situation on the American coast in the Gulf and in the

Caribbean Sea is one not calculated to give great concern to enemy operations in that region. Further, the appearance in that region of enemy submarines the enemy knows would tend to encourage the dispersal of our naval effort, with consequent loss in the general efficiency with which the war was being conducted. Political conditions at present indicate that the enemy has refrained from unnecessarily molesting trade on the American coast, in order that American public opinion would be in a more receptive mood for advances such as those recently made by the Austrian Prime Minister. By May or June of this year, the political situation should have cleared up sufficiently to enable the enemy to judge whether it is any longer profitable for him to refrain from operations in the western Atlantic, which, from a strictly naval and military standpoint, promise to be the most profitable to him. It would appear that the trend of events will convince the enemy that he must use his maximum power to interfere with the support America is giving the Allies without curtailing his present submarine effort near the focal areas on the coasts of Great Britain, France, and Italy.

COURSES OF ACTION OPEN TO US.

As the principal effort of the enemy cruiser-submarines will probably be to sink tonnage by the use of guns, our principal concern should be in methods to defeat that effort.

His cruiser-submarines are to be armed with a battery far superior to that of the average merchant ship of to-day. The only merchant vessels carrying a battery sufficient to cope with the enemy cruiser-submarine are auxiliary cruisers and American transports; the latter class of vessel should, when loaded with troops, never be required to engage cruiser-submarine except while escaping his attack.

These conditions compel the adoption of the convoy and escort system in order that a sufficient number of guns may be assembled to be an adequate reply to the gun attack of the cruiser-submarine. It is doubtful if the guns and the guns' crews assigned to the average merchant ship (American merchant vessels excluded) are adequate to cope with the gun attack of an enemy submarine, unless the convoy is more numerous than it has so far been expedient to make it. In other words, a special ocean escort will always be necessary to guard against the gun attack of the cruiser-submarine.

A general extension of the system of ocean escorts to traffic in the North and South Atlantic will probably eventually require more ocean escort vessels than could be made available unless battleships were used. A large number of merchant vessels of various types are now on the stocks in both England and America and will be available in increasing numbers. To meet the probable shortage of

ocean escort and to decrease the demand for nonproductive fuel at stations where it is supplied would require the obligation of ocean tonnage, it is suggested that certain of these merchant vessels be given a special armament of not less than four high-powered guns, with a complete trained gun's crew for each gun, all under the command of a competent naval officer.

Vessels so armed would remain in the carrying trade and would be available for use as ocean escorts of convoys throughout their voyage. If the war continues for a considerable time still, the tendency will be toward the constant regrouping of commercial traffic to the end that vessels of similar speeds may be grouped in the same convoy, so that the loss now incident to requiring fast vessels to proceed in slow convoys will be largely eliminated. This regrouping of vessels will probably entail an increase in the number of convoys, with consequent increased demand for ocean escorts. Demand for increased zone escorts of destroyers may possible be met by the increased production of destroyers, but more likely by the lessened activity of enemy submarines in narrow waters should measures now under way prove successful, as torpedo attacks by cruiser-submarines in distant waters are more difficult to deal with than the gun attack, since the type of vessel best suited to ward off torpedo attack does not exist in sufficient numbers to permit its employment in any but focal areas. Security for vessels on the high seas against torpedo attack of cruiser-submarines must be obtained through increased precautions, rather than through escort by destroyers. If the time ever comes when we have enough destroyers and when they have sufficient cruising radius, it will doubtless be advisable to furnish one or two destroyers to accompany each convoy through the areas of cruiser-submarine operations, in order that they not only may guard the convoy against attack but may convert themselves immediately upon a submarine attack into a hunting group that shall thereafter pursue the submarine which made the attack to its destruction.

CONCLUSIONS.

In considering the measures that may be taken against the enemy submarine we conclude that—

(*a*) The maximum possible effort should be made to destroy the enemy cruiser-submarine when it leaves or returns to its base.

(*b*) That when it causes losses of sufficient gravity in distant areas the system of convoy and ocean escort should be put into effect in that area until the threat disappears.

(*c*) That when sufficient destroyers become available without undue neglect of the focal areas or without departing from the policy of hunting groups, one or two destroyers might be assigned to each important ocean convoy, which destroyers would convert

themselves into a hunting group immediately when contact with enemy cruiser-submarine was obtained.

(*d*) That no destroyers now operating in European waters should be sent in distant areas at present because of the enemy cruiser-submarine threat.

(*e*) That merchant ships to be armed in the future be given one and if possible two 5-inch or 6-inch high-powered guns.

(*f*) That selected merchant vessels in proportion to about 1 vessel in 10 should be specially armed with four 5-inch or 6-inch guns and specially manned with full gun's crews for each gun, under command of a competent naval officer.

(*g*) That the organization for placing into effect ocean escort system in areas likely to be areas of submarine-cruiser operations should be perfected at once and that suitable dispositions of ocean escort vessels should be made in readiness for instituting extension of the convoy and ocean escort system.

(*h*) That merchant vessels specially armed with four or more high-powered guns should also be given a special long-range radio equipment.

(*i*) That the extension of the present system of radio warnings by means of land stations be made so as to cover the maximum possible area and thereby enable the direction of shipping at sea.

(*j*) To organize hunting groups of submarines based on the American coast in readiness for operation against any enemy submarines that may visit these waters.

MEMORANDUM No. 11.

MORALE—ALLIED AND ENEMY.

13 February, 1918.

PROBLEM NO. 3.

General situation: War as usual. Our maximum antisubmarine effort can not be developed for several months.

Special situation: The Allies and the United States decide to make the best possible psychological use of situations and events to strengthen the morale of their civil and military forces, and to weaken the morale of enemy civil and military forces—especially the morale of enemy submarine personnel.

Required: Estimate of the situation and decisions.

GENERAL CONSIDERATIONS.

The world's mind—the mind of both friend and enemy—has reached a condition of acute tension. Civil populations in all the countries at war are beginning to doubt the wisdom of fighting longer. Popular wills are in unstable equilibrium. There is no longer the fixity of purpose that characterized the earlier stages of the war. Colossal events and extraordinary effort have dazed understanding and shaken faith, until now the hope of all whose understanding is clouded, and whose faith is not firm, is a return to peace in the hope that antebellum conditions will come with peace. These symptoms are forerunners of a breakdown in national wills.

War is fundamentally an attack on national will power. A war is won when—and not before—the enemy's will is broken.

We are confronted now with a great opportunity and a highly dangerous menace, both of which reside in the minds of men. This opportunity and this menace is the increased suggestibility of the masses, due to the spiritual tension of their present state.

As a rule, we have sought to break the enemy's will by physica means exclusively, by the acts of physical war, leaving those acts to work as they might for or against us. We have failed to marshal and to organize the impressions of events as real forces in the war. We have concentrated on the physical and have neglected the spiritual elements of war. Under present conditions, the marshaling of

morale against morale is as worthy an employment of national genius as can be found. We can not place too much emphasis on the mission in this problem.

MISSION.

"To strengthen our own morale and weaken that of the enemy by psychological means, so as to give the maximum support to physical effort."

ENEMY FORCES.

The enemy forces to be considered are the brains of the best civil and military psychologists that the enemy possesses, reinforced by a system of publicity and by a system of financial propaganda which, in the magnitude of their accomplishments, is second only to the great accomplishment of their war machine. These special forces have been in operation for years. The strength of these special forces is not found in their numbers, but in the skill and persistency of the few individuals who direct enemy psychological effort throughout the world. The skill of the individuals lies in their ability to understand and to predict the effects of events on the mind and character of the people; to shape impressions of events so as to influence the masses in a predetermined direction; to readjust facts in support of their own morale; and to invent reports and rumours suited to the breaking down of our morale.

Instances of enemy offensive in this direction are—

(*a*) The propaganda work in Russia.

(*b*) The purchase of Russian leaders.

(*c*) Propaganda work in Italy.

(*d*) Propaganda work in the United States, by which he fosters so far as possible the belief that American assistance is not needed in Europe; this campaign is falling through.

(*e*) Air raids.

(*f*) Propaganda in Spain and Scandinavia.

(*g*) Extravagant claims regarding loss of shipping.

On the psychological defensive the enemy—

(*a*) Persistently minimizes actual and prospective efforts of the United States in support of the war.

(*b*) Withholds information of his submarine losses; we assist him in this.

(*c*) Carries on a constant campaign of encouragement for both his army and civil population.

Nothwithstanding a strong socialist party, food shortage, economic depression, and general war weariness, the psychological skill of the enemy has succeeded in holding his people well in hand, and in

making them believe they will win. Recent strikes and mutinies indicate a weakening of enemy morale, which, however, is not yet at the breaking point.

In addition to the forces that are active against us through enemy intention, there are influences within our own control that march favorably to enemy ends; some of these influences are—

(*a*) New hardships to our own civil populations, such as food rationing, fear of food shortages, high prices.

(*b*) Lack of knowledge of current events by civil populations.

NOTE.—War aims are not stated in simple personal terms understood by all—probably not more than 1 person in 10 can tell what we are fighting for. News is suppressed to such an extent that there is perpetual fear of the unknown. Even now rumors of extreme shortage of food gain credence among educated people. The things that are accomplished, the difficulties that are overcome successfully and creditably, receive scant notice in the press because of censorship or other reasons.

(*c*) The general military situation in France and Italy, which causes the public to lose hope of material success on the western front in the near future.

(*d*) The long duration of the war, and consequent apathy of those who did not hear the roar of battle.

(*e*) Lack of imagination by many people in high places, and consequent sluggishness of mind that may follow.

(*f*) The dissatisfaction of labor with existing conditions.

(*g*) The public belief that America may not support the war soon enough.

(*h*) The belief that we are not holding the submarines.

(*i*) Pernicious activity of socialists and labor unions, and the resulting distrust and unrest—partly the result of German propaganda.

(*j*) Suspicion of discrimination in food distribution.

These and many other adverse conditions demand attention. There can be no doubt that the attitude toward unfavorable conditions, even when those conditions grow no worse, is now one of augmenting dissatisfaction.

There can be no doubt that enemy intentions are to continue to use every means known to his psychologists to improve his morale and to weaken ours.

OUR OWN FORCES.

Now, when sufficient physical force to win the war is coming within our grasp, is the time to stiffen our own morale and to attack the morale of the enemy. With every country at war (except America) war weary, we must be sure that no collapse of the people's will shall cause defeat on the eve of victory.

The passive attitude toward psychological considerations must give way to an active campaign that shall meet every enemy move and anticipate him whenever possible. Brains must work to their utmost; character must stand stancher than ever; sacrifices must be made even more willingly than in the past. Confidence, the basis of morale, must be restored. The determination for victory must weld our efforts into unity. These steps require expert direction. The experience and success of our enemies suggest we employ the best psychologists to formulate a psychological policy, to draw up rules for applying the policy, and to instruct subordinates in the application of these rules and in the principles that underlie them. The proposed organization of psychologists should be in close touch, through designated individuals of the organization, with the people of all classes and with all departments of the Allied Governments, so that they may be constantly in a position to meet and solve problems concerning influence of events on the minds and characters of the masses. Psychological conditions are not permanent, nor are they restricted to any one phase of activity. The setting of each problem of morale changes from day to day, and so requires a ceaseless attention. No great problem should receive final solution without full consideration from the standpoint of mass psychology.

Auxiliary to the main international organization above indicated, there should be national committees giving attention to the problems of each country at war. No attempt will be made here to indicate how these committees should be subdivided or organized.

The immediate general problems confronting psychologists are—

(*a*) The arousing of a new enthusiasm for the war.

(*b*) The reestablishment of belief in the soundness of the Allied Governments.

(*c*) The reestablishment of confidence in the truth of what is published.

(*d*) The instruction of all, from the highest to the lowest mentalities, in the reasons why we are fighting.

NOTE.—These reasons should be reiterated from day to day, with illustrative incidents and discussion to make the fact plain and convincing to people of every profession, trade, and occupation that the personal interest of each individual is bound up in victory; that a peace by compromise means economic slavery, low wages, German domination, German commercial reprisals—a shamefaced existence for generations.

(*e*) A revival of interest in the smaller events of the war.

NOTE.—We venture to suggest that war news should immediately take on a personal aspect—that names of officers and men at the front should always figure in dispatches, and that all news items should carry with them the atmosphere of the battle field and the consequent picture of the supreme sacrifice that is a matter of daily occurrence along the entire front. The sufferings of friends, and pride in their deeds, will stimulate the determination to win.

(*f*) The uniting of all classes in a common purpose and determination to support the Government's efforts toward victory.

NOTE.—The word "Propaganda" should not be applied to any effort which we make or are going to make. This word has taken on a sinister meaning of deceit and corruption to such an extent that statements issued from or efforts made by a minister of propaganda are discredited in advance.

The problem of the psychologists is not alone to build up our own morale, but also to attack the enemy morale. The points of weakness seem now to be in Turkey, Bulgaria, and Austria. It appears a propitious time to detach Turkey from her alliance. We suggest—

(1) The reestablishment of diplomatic relations between Turkey and the United States.

(2) The negotiations by the United States for a peace between Turkey and the Allies, special means being adopted to bring this about at the earliest possible date.

The question of indirectly assailing the morale of enemy submarine crews through such means as the press requires special treatment. A committee of naval officers with submarine experience or knowledge should be formed to devote their exclusive attention to the problem. They should have all advice and assistance from the psychology and publicity committees.

To affect directly the submarine morale requires naval effort, which can be exerted in the following forms:

(*a*) Hunting to the maximum possible degree with available hunting forces. They must be not only active, but also persistent whenever contact is made.

(*b*) Hunting by destroyers assigned to convoy work whenever at sea and not actually engaged in escort duty. When proceeding to sea to pick up convoys, and when returning to port after dropping them, destroyers may deploy so as to sweep a large area.

(*c*) By making the maximum offensive effort possible at every contact with an enemy submarine. For example, whenever a convoy is attacked, several destroyers may abandon their escort duty and make an intensified depth-charge attack on the submarine, remaining in the vicinity several hours, if necessary, hunting.

(*d*) A liberal use of depth charges on all contacts, even though the submarine position may not be known accurately, will disturb the enemy morale, as it is difficult to estimate the distance off of an exploding depth charge.

(*e*) By periodically scouting at night over areas probably used by submarines for charging batteries under cover of darkness. The middle of the Channel and of the Irish Sea are areas probably utilized for this purpose.

(*f*) By spreading rumors of new devices effective against the submarine; harrowing circumstances connected with submarines destroyed; numerous losses of submarines, etc.

DECISIONS.

(1) To organize commissions of psychologists in each country and to provide for the systematic association of these commissions in order that they may—

(*a*) Study and solve the specific problems already enumerated.

(*b*) Advise the several departments of their respective Governments on current problems of a similar nature.

(*c*) Organize publicity campaigns of education and truth, so that the people may understand thoroughly existing conditions and the reasons for a continuance of the war.

(*d*) Devise means for making the maximum possible use of events to break down enemy morale.

(2) To organize a psychological commission, consisting largely of naval officers, to give special attention to the question of enemy submarine personnel, with a view to determining how the morale of this personnel can best be attacked.

Pending the organization of these commissions, it will be necessary to take steps to achieve the objects already indicated. We suggest the following notes for consideration:

A. One of the present difficulties of our situation is to provide a mental diversion from the hardships of war, and at the same time an influence that will stimulate patriotism and loyalty.

Suggestion: To make a concerted attempt at a religious revival, the mission of the revival (aside from its religious aspects) being the support of the State through the stimulated conscience and loyalty of individuals. As a means of carrying out this suggestion, we suggest—

(1) The sending of Billy Sunday to England, and the support of his efforts by a carefully organized press campaign.

(2) The sending of other American and English evangelists on a similar mission.

(3) (1) and (2) above should appear under religious auspices and not under political auspices.

B. Another difficulty of our situation is lack of a thorough understanding and appreciation on the part of the English, the French, and the Italian people of the magnitude of the efforts that America is undertaking in the present war. Statements by the press do not convince the working people as thoroughly as they should. To make these statemnts more convincing and more vivid, we suggest—

(1) That Colonel Roosevelt visit the principal manufacturing centers of Great Britain, France, and Italy to address the work-

men. This would require the invitation of the Allied Governments and the hearty approval of the President of the United States.

(2) That other qualified Americans (and especially great labor leaders of America) join in this campaign.

C. The people of England are accustomed to the leadership of the King. We think that possibly the influence of the King's leadership would be greater and more stimulating were he to occupy field headquarters in France. It would seem that such an action on his part would stimulate greater devotion of the civilian population.

D. The question of food is now uppermost in the minds of a very large number of people in Great Britain. It appears that the working classes are prepared to accept hardship, provided they feel that the food shortage does not fall more heavily on them than on others. It is presumed that this question is receiving careful attention; but we suggest that concrete instances of the equitable division of food be a matter of daily comment in the press. The impression prevails that the rich get meat, butter, and sugar in larger quantities than the poor, whereas the reverse is the truth. This fact should receive constant prominence in the press.

E. The morale of the enemy submarine personnel has stood the silence treatment for three years, and probably can continue to stand that treatment. We suggest that a change in policy be made, as follows:

(1) To publish broadcast and frequently general statements concerning the submarines lost and missing in comparison with the number of submarines operating or afloat.

(2) The publication of the details of sinkings of enemy submarines, together with the attendant circumstances that would most influence the fear of the personnel.

(3) The publication of scientific advances made in the detection of submarines when submerged.

(4) The publication of veiled references to new inventions that will destroy submarines when cruising submerged on soundings.

(5) The distribution of leaflets containing information of this character in the enemy country—by aircraft.

[Extract from Memorandum No. 71, "History of Planning Section."]

Subject: "*Morale—Allied and Enemy.*"

This problem was set itself by the Planning Section at a time when the morale of the European allied civil populations appeared to be on the verge of some impairment.

The solution was circulated by the Force Commander among a large number of prominent British persons, including Lord Northcliffe. It was received very favorably and is believed to have been of utility in Great Britain.

It is understood that the paper proved of considerable value to the United States Bureau of Public Information, at Washington, D. C.

MEMORANDUM No. 12.

FURTHER DEVELOPMENT OF UNITED STATES NAVAL AIR EFFORT IN EUROPEAN WATERS.

[A. Remarks by Commander United States Naval Aviation Force.—B. Remarks by British Plans Division.—C. Remarks by British Officer in Admiralty.]

15 February, 1918.

(See Maps Nos. 1, 3, and 6.)

PROBLEM NO. 6.

General situation: War as at present. United States naval air effort still in its initial stages.

Required: The policy that should govern further developments of United States naval air effort in European waters.

The following decisions have been arrived at in the study of the aircraft situation, which follows:

PRELIMINARY DECISIONS.

OPERATIONS.

1. To make our primary air effort a continuous bombing offensive against enemy bases, avoiding sporadic offensives.

2. To make our secondary air effort a patrol in readiness for tactical offensive.

3. To depend principally upon kite balloons for patrol and escort work.

AREAS.

4. To concentrate our principal air effort in the Felixstowe-Dunkirk area in sufficient force to get local control of the air.

5. To direct all air effort we may make in the Adriatic against enemy bases in succession, choosing areas to fit conditions.

6. To make our patrol areas, whether patrol be by flying boats or by kite balloons, coincident with the operating areas of our surface vessels, with the greatest effort where shipping is most numerous.

7. To plan and build for our air effort against the Helgoland area.

TYPES.

8. To abandon the dirigible for use in European waters.

9. To concentrate our efforts on bombing machines capable of—

(*a*) Great radius of action.
(*b*) All-around defensive fire.
(*c*) Carrying the heaviest bombs.
(*d*) Efficient radio work.
(*e*) Efficient navigation.

10. To build fighters as necessary to get air control in the Felixstowe-Ostend area.

NOTE.—In fighters and bombers we should endeavor to outclass the enemy.

11. To build kite balloons for patrol and escort work.

AUXILIARY DECISIONS.

12. To build air stations that are difficult of access to enemy aircraft, and where great effort in a congested area is planned to scatter aerodromes in small units.

13. To build kite balloon stations at the bases of the vessels that are to use the kite balloons.

14. In the distribution of preliminary resources and preliminary effort to give our principal attention to the Felixstowe-Dunkirk area.

15. To build as few types of aircraft as possible.

16. To consider the abandonment of flying boat type of aircraft for bombing attack on enemy bases and as fighters over narrow waters.

17. To continue the seaplane stations already authorized, but to use them as auxiliaries of bombing effort against shore objectives.

18. To equip present seaplane stations with machines suitable for use in bombing enemy bases.

SOLUTION.

GENERAL CONSIDERATIONS.

In the general estimate of the situation submitted by the Planning Section on January 21, 1918, it was shown that the special conditions at sea in the present state of the war imposed upon the Navy as its principal and immediate mission—

"To obtain subsurface command of the sea while still retaining command of the surface of the sea."

The investigation of naval aircraft effort that follows is based wholly upon the above-quoted mission, which mission imposes the following mission for United States naval aircraft in European waters:

Mission.—To render the maximum possible support to the anti-submarine effort.

ENEMY FORCES—THEIR STRENGTH, DISPOSITION, AND PROBABLE INTENTIONS.

The enemy forces to be considered in this problem are enemy submarines and, in special localities, enemy aircraft and enemy antiaircraft batteries. The numbers and types of enemy submarines are well known and will not be discussed. The intention of submarines can be fairly well predicted from their past performances. In bad weather they operate in the lee of the land, as far as possible. The English Channel, the Irish Sea, and the south coast of Ireland are favorite hunting grounds during the winter months. During the summer months they extend their operations well to seaward and south into the Bay of Biscay. The east coast of England and Scotland and all parts of the Mediterranean Sea are operating areas throughout the entire year.

As for enemy aircraft we know that they have air superiority in the east part of the North Sea from Dunkirk north.

Enemy antiaircraft batteries compel an ever-increasing altitude in flying.

OUR OWN FORCES.

Courses open to us.—We shall consider first that the courses open to us are uninfluenced by steps already taken by us. Then we shall consider what influence steps already taken will exert on decisions.

There are three types of antisubmarine air effort:

1. Patrol in readiness for tactical offensive.
2. Escort in readiness for tactical offensive.
3. Attack of enemy bases by bombing.

PATROL.

The object of patrol is first of all to sight the submarine and then—

(*a*) To attack.

(*b*) To report its position.

(*c*) To make the submarine submerge if it is in the vicinity of shipping.

The attack so far has failed because bombs have been too small and too few, and because the submarine gets ample warning and submerges. The latter reason is one which may not be avoided, so that we may expect the attack of submarines by aircraft to fail in the great majority of cases. In shallow, narrow waters that submarines must pass, the aircraft attack has its greatest opportunity.

In examining a large number of cases of attack, we have found that the first bomb dropped is the one most apt to do damage and that subsequent bombs that are dropped do not have the same chance of being effective. For this reason big bombs should be carried so that the most favorable opportunity will not be lost through the bomb being too small. Some German reports refer contemptuously to the effect of small bombs as fleabites.

The reporting of submarines is an important function of aircraft on patrol. Heretofore this function has not been exercised efficiently. It should be the principal field of usefulness of aircraft of all kinds that are on patrol. The prompt reporting and the efficient use of information gained by aircraft requires—

(1) Expert radio work by aircraft.

(2) Good navigation by aircraft.

(3) An organization to receive aircraft messages and to act upon them at once. Such action to be—

(*a*) To warn shipping.

(*b*) To send antisubmarine craft in pursuit.

The third function of aircraft on patrol is to keep the submarine submerged. This function will not be of any great use except in the presence of shipping. At sea, if the submarine submerges, all trace of it is lost, and the aircraft is bound, in the absence of landmarks, to lose track of the locality. The submarine will then resume operation without inconvenience.

Patrol may be by—

(*a*) Heavier-than-air machines.

(*b*) Dirigibles, both rigid and nonrigid.

The positive effect of patrol is measured best by the submarines that have been sunk by aircraft.[1]

From August, 1914, to December 31, 1917, there were one sure and six probable sinkings by aircraft, all types included. Not more than half the probable sinkings are really sinkings, so we may say that aircraft have not sunk over one submarine per year.

Aircraft patrol may give information of enemy submarines. Records of performance in this line indicate that many sightings occur without any real advantage to us—this on account of—

(*a*) Difficulty of communication.

(*b*) Absence of patrol craft in vicinity.

(*c*) Absence of merchant vessels in vicinity.

(*d*) Inaccuracies of aerial navigation.

Patrolling for information that is not actually used is wasted effort. Use the information or else do not go after it.

[1] Comment by section member: "Not altogether."

During July, August, September, October, and November, 1917, British naval aircraft—

Heavier-than-air type:	
Flew	360,000 miles.
Sighted	74 submarines.
Attacked	50 submarines.
Average length of flight	124 miles.
Average flight distance to sight a submarine	4,740 miles.
Dirigibles:	
Flew	262,981 miles.
Sighted	16 submarines.
Attacked	9 submarines.
Average length of flight	146 miles.
Average flight distance to sight a submarine	16,346 miles.

From these figures we see that seaplanes and flying boats are about four times more efficient per mile of flight in sighting submarines than dirigibles. Attacks of submarines sighted may be neglected, since all were unsuccessful. It is obvious, however, that the dirigible is more vulnerable, more unwieldy, and less fitted for attack. Both types are about equally safe for personnel. Navigational difficulties are about equal in both types.

As to patrol, then, we conclude—

(1) To abandon the dirigible type.

(2) To concentrate our efforts on the heavier-than-air type, and to equip this type with large bombs and with efficient radio and navigational equipment, so that all submarines sighted may be reported without delay.

(3) To organize a radio service in connection with aircraft patrol.

(4) To coordinate air and surface patrols.

ESCORT.

Escort duty for aircraft appears attractive because of the fact that the aircraft can see, and because also submarines submerge on sighting aircraft, thereby giving up the great tactical advantage of maneuvering on the surface to a favorable position for attack. When, however, we examine the possibilities of escort duty by aircraft, we find—

(*a*) The average speed of convoys less than 10 knots.

(*b*) The average speed of aircraft over four times as great.

(*c*) The average flight period of aircraft less than three hours.

(*d*) That aircraft are restricted to operations near shore.

(*e*) That aircraft fly in good weather when submarines operate off shore, and that when submarines are driven inshore by bad weather, aircraft can not operate efficiently.

(*f*) That for escort duty the efficient range of aircraft does not exceed 30 miles with slow convoys and 50 miles with fast convoys, unless relays are used.

(*g*) That although dirigibles once they are in the air are more suitable for escort duty—as lookouts—than heavier-than-air craft are, the advantage they possess is not sufficient to justify their existence when other employments are considered.

(*h*) That the kite balloon (discussed later) is a more satisfactory solution of the escort problem.

We conclude as to escort duty that neither dirigibles nor heavier-than-air machines should be designed for this duty, although they may be employed as escorts on special occasions.

ATTACK ON ENEMY BASES.

The third employment for naval aircraft is the attack of enemy bases. The arguments for such attack are so well known as to need little discussion. Bases are certain to contain submarines. Their location is known exactly; the destruction of bases destroys the submarines' ability to operate. The points for attack are few, permitting concentration of effort.

The attack of bases is a pure offensive effort. Palliative efforts against submarines have failed, and are continuing to fail.

In the attack of bases capacity of aircraft for useful load is a prime requisite. This requirement is directly in line with the requirement for patrol and escort efforts. We have studied many reports on all forms of air effort and conclude from them that—

(1) Our primary air effort should be offensive against enemy bases.

(2) Our secondary air effort should be patrol for information, in readiness for the tactical offensive.

AREAS OF OPERATION.

The natural areas of the massing of resources to carry on an air offensive against enemy bases are the east of England and the east of Italy, the localities nearest to enemy submarine bases.

The relative importance of patrol effort in various areas is indicated in the following:

Seaplanes and airplanes.

	Miles.
Average flight to sight a submarine, all stations	5,335
Dundee	12,410
East coast	5,460
Yarmouth	7,800
Felixstowe	1,894
Westgate	5,415
Dover and Dunkirk	3,022
Portsmouth	7,280
Plymouth	6,841

From this it appears that the Felixstowe area is the most fertile of all fields for air patrol, and that the only other area comparable with it is the Dover and Dunkirk area. It is also of great strategic importance, since the exclusion of submarines from these areas would be a more important accomplishment than the exclusion of them from any other area of equal extent outside the Mediterranean. Further, if we are to undertake bombing operations against enemy bases, there are no bases in such easy reach as Ostend and Zeebrugge, which lie within the Felixstowe-Dover areas.

The important bases of Helgoland, Wilhelmshaven, Emden, Bremerhaven, Cuxhaven all lie within 300 miles of Felixstowe. No other point in England is more than 40 miles nearer to these bases than is Felixstowe. These facts indicate the great importance of an air concentration in these areas when judged solely from the naval standpoint; but when we realize that such air concentration is also on the immediate flank of the enemy land forces, the soundness of air concentration in this area becomes doubly evident.

Air operations in the Dunkirk area have so far been handicapped by enemy control of the air. The necessity the enemy is under of navigating his submarines through narrow, difficult waters—and through shallow waters in order to reach the Dover exit—makes control of the air for him an essential.

The aircraft problem, then, in this area is—

(1) To assemble at operating bases enough aircraft and personnel to give numerical superiority in the air at all times.

(2) To build machines adapted to the locality to be controlled—fighters with long radius of action and the most approved armament.

(3) To build bombers to attack enemy bases.

KITE BALLOONS.

Kite balloons do not properly belong to an air-effort classification, but may be discussed here, as their influence is similar to and almost as effective in escort and patrol duty as the influence of aircraft.

Kite balloons in the five months for which preceding aircraft data are given—

Patrolled	40,334 miles.
Sighted	3 submarines.
Average length of patrol	333 miles.
Average patrol distance to sight a submarine	13,445 miles.

In the sighting of submarines the kite balloon appears as efficient as dirigibles. The kite balloon offers certain advantages in escort work not possessed by other aircraft. Among those are:

(1) The distance patrolled equals the distance advanced by the convoy during daylight—fog neglected.

(2) A surface vessel can be directed with precision toward any object sighted.

(3) An efficient lookout can be kept, as basket is steady and no noise distracts attention.

(4) Information becomes instantly available to surface craft.

(5) Can operate in weather not suitable for other aircraft.

(6) Radius of action can be indefinitely increased by carrying booster charges. Weight of boosters equals about 1 ton per day of service.

The disadvantages of any lighter-than-air aircraft when escorting convoys is their visibility and the consequent guide they may be to submarines attempting to get in touch with the convoy. Careful investigation of the problem indicates that vessels in convoy escorted by two kite balloon vessels are three times as safe from attack as when they are not so escorted.

We decide therefore—

To use kite balloons for escort and patrol duty when practicable.

Kite balloon stations should be at bases for the naval vessels that are to use them, and not elsewhere.

TYPES OF AIRCRAFT.

Having decided to focus effort on two kinds of aircraft—the heavier-than-air and the kite balloons—we shall now consider what types should be developed, and what should be the tendency of further development.

There are two principal areas in which aircraft will operate:

(*a*) Where enemy aircraft may be met.

(*b*) Where enemy aircraft may not be met.

In both areas the capacity to carry useful load is of prime importance. In area (*a*) a part of the useful load must be devoted to armament which has for its missions the attack of enemy aircraft and defense against enemy aircraft. The final aircraft objective in every case is on land or on water, so that useful load must always be conserved to make the attack on the land or on the water as decisive as possible. These requirements can be met only in big machines. Big machines are unwieldy. They can not dodge the small fighter, so they must meet his attack in some other way. It would appear that all big machines should be designed for all-around fire and that they should plan for air actions on the basis of a minimum of maneuvering in the air. If their armament is powerful enough to keep enemy fighters at a distance they will go through to their objective—which is what we desire of them.

As we desire to attack distant points, and as we desire increased length of time in the air on each patrol—great radius of action—at least 1,000 miles is essential.

Preliminary Decisions.

OPERATIONS.

1. To make our primary air effort a continuous bombing offensive against enemy bases, avoiding sporadic offensives.

2. To make our secondary air effort a patrol in readiness for tactical offensive.

3. To depend principally upon kite balloons for patrol and escort work.

AREAS.

4. To concentrate our principal air effort in the Felixstowe-Dunkirk area in sufficient force to get local control of the air.

5. To direct all air effort we may make in the Adriatic against enemy bases in succession, choosing areas to fit conditions.

6. To make our patrol areas, whether patrol be by flying boats or by kite balloons, coincident with the operating areas of our surface vessels, with the greatest effort where shipping is most numerous.

7. To plan and build for our air effort against the Helgoland area.

TYPES.

8. To abandon the dirigible for use in European waters.

9. To concentrate our efforts on bombing machines capable of—

(*a*) Great radius of action.
(*b*) All-around defensive fire.
(*c*) Carrying the heaviest bombs.
(*d*) Efficient radio work.
(*e*) Efficient navigation.

10. To build fighters as necessary to get air control in the Felixstowe-Ostend area.

Note.—In fighters and bombers we should endeavor to outclass the enemy.

11. To build kite balloons for patrol and escort work.

Auxiliary Decisions.

12. To build air stations that are difficult of access to enemy aircraft, and where great effort in a congested area is planned, to scatter aerodromes in small units.

13. To build kite balloon stations at the bases of the vessels that are to use the kite balloons.

14. In the distribution of preliminary resources and preliminary effort to give our principal attention to the Felixstowe-Dunkirk area.

15. To build as few types of aircraft as possible.

16. To consider the abandonment of flying-boat type of aircraft for bombing attack on enemy bases and as fighters over narrow waters.

PRESENT AIR STATIONS.

The following air stations have been planned, and work on them is in hand:

Seaplane stations, France:		
Dunkirk, for	36	seaplanes.
Treguier, for	24	HS–1.
Aber Vrache, for	24	HS–1.
Brest, for	24	H–16.
Ile Tudy, for	24	HS–1.
Le Croisic, for	24	HS–1.
Fromentine, for	24	H–16.
St. Trojan, for	24	HS–1.
Arcachon, for	24	H–16.
Seaplane stations, Ireland:		
Bantry Bay, for	24	H–16.
Wexford, for	18	H–16.
Queenstown, for	24	H–16.
Lough Foyle, for	24	H–16.
Seaplane stations, England:		
Killingholme, for	30	H–16.

These stations cover both the north and south coasts of Ireland and the entire western coast of France from the English Channel south. The plan is to supply them with machines of the HS–1 and the H–16 types. None of the machines are yet in existence so far as known, so their qualities are not known with sufficient exactness to determine suitability for operations.

The above-mentioned distribution of air stations in France and Ireland indicates a dispersion of effort and an employment of aeroplanes in areas where their use can not be profitable.

The station at Dunkirk appears unnecessarily close to enemy lines, and, as the British have already been compelled to abandon their station there, we suggest the advisability of further consideration of this location with a view to its possible abandonment in favor of a position somewhat more retired. The stations above mentioned can be justified in part if the missions of aircraft operating from these stations are announced as—

(1) To prepare to operate against enemy bases and enemy aircraft.

(2) Search for and attack enemy submarines.

These missions, if accepted, require that aircraft assigned to stations already authorized shall be of a type suitable for operations in the Felixstowe-Ostend area, and suitable for bombing operations.

Dirigible stations, France:
- Paimboeuf, for ..... 2 dirigibles.
- Rochefort, for ..... 2 dirigibles.
- Arcachon, for ..... 2 dirigibles.
- Guipavas, for ..... 2 dirigibles.

NOTE.—As these stations have not yet been begun, we recommend that no work be done upon them.

Kite-balloon stations, France:
- Brest.
- Mindin.
- La Trinite.

Kite-balloon stations, Ireland:
- Berehaven.
- Lough Swilly.

It is noted that the kite-balloon stations are not in all cases located at the operating bases of the vessels which are to use them. No American vessels are to operate from the north coast of Ireland.

As the experience gained by pilots in flying over the water from stations already authorized will be valuable in preparing them for bombing fights, and as the air patrol in these areas may be of some use, we do not recommend the abandonment of any stations, but that they be recognized as auxiliary to the bombing stations.

The preliminary decisions are therefore adhered to with the addition of the following decisions:

17. To continue the seaplane stations already authorized, but to use them as auxiliaries of bombing effort against shore objectives.

18. To equip present seaplane stations with machines suitable for use in bombing enemy bases.

A. COMMENTS OF COMMANDER UNITED STATES NAVAL AVIATION FORCES, FOREIGN SERVICE.

The 18 decisions arrived at in this problem seem to cover completely the entire field of our aircraft situation in Europe; and, where disagreement with a decision is noted, a brief discussion is submitted.

No. 1. To make our primary air effort a continuous bombing offensive against enemy bases, avoiding sporadic offensives.

Agreed to.

It would be found in all probability that night bombing will be profitable, and also other aerial activities will be necessary to carry this out, such as bombing enemy aerodromes, photographing, and the necessary fighting machines to accompany them.

No. 2. To make our secondary air effort a patrol in readiness for tactical offensive.

Agreed to.

It must be remembered, however, that the patrol will surely drive the submarine offshore to a certain extent, which will render his task all the more difficult. We should not abandon the patrol, for we can not neglect to fight the submarine on his hunting ground simply because we are bombing him in his bases. This matter should be viewed from the standpoint of ships saved as well as submarines destroyed—the presence of patrol aircraft undoubtedly protects ships from submarines, as shown by the records. It is the belief of our organizations that we can destroy some submarines by air patrol craft, and although we are less effective on patrol than in bombing bases, we can not afford to abandon the patrol. It would seem to be wisest for us to be on the sea in force where our transports are navigating dangerous waters, whenever possible, which is another reason for patrol. To say that the positive effect of patrol is measured by the submarines destroyed is, we think, an entirely incorrect point of view. The better measure is by the number of ships saved—for that is the object of the patrol.

(NOTE.—The Planning Section was unable to obtain any data as to the positive effect of air patrol on the sinking of ships, and, therefore, adopted the somewhat less inclusive data of sinkings of submarines by aircraft.)

No. 3. To depend principally upon kite balloons for patrol and escort work.

Disagree with this in part.

Undoubtedly kite balloons are of value for patrol and escort work, but should not be the principal dependence. After all, they are only a very effective lookout station, and have no offensive value themselves. They betray the position of the convoy or patrol to the same extent as a dirigible, and much more so than do seaplanes. It is true that they have been very successful at a small outlay up to the present time, but it is possible that this success may be based on an incorrect estimate of their effectiveness by the enemy. At any rate the enemy have avoided attacking ships protected by kite balloons, but this may be said also in the case of seaplanes or dirigibles. Should we rely solely on kite balloons and the enemy find a method of successful attack, the result would be serious, and it is not certain that he may not discover after all that he has overestimated the value of kite balloons. In this connection it would be entirely feasible to carry out practical experiments to determine the comparative efficiency of kite balloons, dirigibles, and heavier-than-air craft in sighting submarines and attacking after discovery.

It is possible to establish kite balloon stations at all places from which destroyers are operating, and, to supply as many as are needed, leaving ample resources for the operation of other types.

(NOTE.—The Planning Section has not revised its decision regarding the usefulness of kite balloons for escort and patrol duties; but recognizes that with the data at hand, the difference between it and that of the Commander United States Naval Aviation Forces, Foreign Service, is one of opinion.)

No. 4. To concentrate our principal air effort in the Felixstowe-Dunkirk area in sufficient force to get local control of the air.

Agreed to.

A preliminary survey of the situation on the east coast of England should be made, with a view to establishing bases for bombing operations, especially in the Canterbury region. Bases on the southeast coast of England will probably be freer from molestation by the enemy than those in the Dunkirk area.

Our heavy bombing machines could be assembled at Pauillac and flown to their aerodromes in the same manner as those used in France.

No. 5. To direct all air effort we may make in the Adriatic against enemy bases in succession, choosing areas to fit conditions.

Agreed to.

No. 6. To make our patrol areas (whether patrol be by flying boats or kite balloons) coincident with the operating areas of our surface vessels, with the greatest effort where shipping is most numerous.

Agreed to.

No. 7. To plan and build for our air effort against the Helgoland area.

Agreed to.

Do not think this should be confined to Helgoland area.

(NOTE.—The Planning Section made recommendation No. 7 to plan and build for air effort against the Helgoland area specifically, because of the importance of that area; and because also it believed that whatever would be suitable type for that area would be a suitable type for any other probable operations.)

No. 8. To abandon the dirigible for use in European waters.

Not agreed to.

It would seem that the actual conditions of the coast of France have not been fully considered as a field of operation for the dirigible. It is very well to give preference to offensive operations; but where we have troop transports and supply vessels constantly making the French west coast ports, it is unsound to discard the dirigible—an instrument that certainly has merit from a defensive standpoint, as it can in certain weather go well out to sea and escort convoys into port. They can surely be of use on the coast in escort work with the coastal convoys; and, while probably not as effective in this as seaplanes, commanding officers of ships with whom I have talked

and who have been escorted by dirigibles always recommend them. It may be that the small dirigibles are lacking in offensive power as used in England, but those we propose to operate in France are larger and we believe more suitable for the purpose. The dirigibles we propose can carry on the average bombs up to 800 pounds, and provide an excellent field for the operation of radio as well as a comfortable lookout station for a large number of men. Their slow speed enables them to hover over any spot, keep rendezvous, and accompany convoys under advantageous conditions. Our dirigibles will be able to remain in the air 24 hours at slow speeds, and we hope to better to some extent the vulnerability to damage in bad weather by building more efficacious avant ports to our hangars.

To condemn dirigibles for lack of offensive powers and rely on kite balloons would seem to be a mistake, when a dirigible can do all that a kite balloon can and a great many things in addition—for example, cover the sea in a very efficient manner around a convoy and actually inflict damage on submarines, for it must be remembered that a submarine can not man his guns in the presence of a convoy. The French (who have had much experience in dirigibles and have developed an efficient type) prefer them to kite balloons.

(NOTE.—The Planning Section has not revised its opinion as to the principle of abandoning dirigibles for use in European waters; but on account of the partial engagements already entered into, considers it inadvisable to set aside the present program for dirigible stations. The Commander United States Naval Aviation Forces, Foreign Service, states that in deference to the opinions expressed by the Planning Section he is reducing the program for dirigibles one-half. The Planning Section therefore recommends that the determination of future policy regarding dirigibles be left open for the present, pending the accumulation of sufficient data regarding operations from the American stations now authorized.)

No. 9. To concentrate our efforts on bombing machines capable of—

(*a*) Great radius of action.
(*b*) All-around defensive fire.
(*c*) Carrying the heaviest bombs.
(*d*) Efficient radio work.
(*e*) Efficient navigation.

Agreed to.

No. 10. To build fighters as necessary to get air control in the Felixstowe-Ostend area.

Agreed to.

It is not believed that we can get control of the air in the Felixstowe-Ostend area by simply building fighters. Probably systematic bombing of aerodromes, with only sufficient fighters and photographing machines to do this effectively, is necessary.

No. 11. To build kite balloons for patrol and escort work.

Agreed to.

No. 12. To build air stations that are difficult of access to enemy aircraft, and where great effort in a congested area is planned, to scatter aerodromes in small units.

Agreed to.

Other means will also be necessary, such as the employment of lighters or floating bases, flying machines up to starting points as far forward as possible by daylight, and scattering machines and personnel as well as possible.

No. 13. To build kite balloon stations at the bases of the vessels that are to use kite balloons.

Agreed to.

This is being done in every case except Queenstown, and could easily be done there. Stations at present are located at La Trinite, La Pallice, Loch Swilly, and Berehaven.

No. 14. In the distribution of preliminary resources, and preliminary effort, to give our principal attention to the Felixstowe-Dunkirk area.

Agreed to.

It will be impossible at this time, because we can not get the type of machines from home at present, and our Allies can not spare them.

No. 15. To build as few types of aircraft as possible.

Agreed to.

No. 16. To consider the abandonment of flying boat type of aircraft for bombing attack on enemy bases and as fighters over narrow waters.

Agreed to.

It is probable that as seaplanes and flying boats are improved they will not only make more effective the patrol, but other uses will develop, such as carrying listening devices for use when on the water.

No. 17. To continue the seaplane stations already authorized, but to use them as auxiliaries of bombing effort against shore objectives.

Agreed to.

It must be clearly understood, however, that the seaplanes necessary for patrol will not be efficient for bombing operations. Patrol pilots will require special training for bombing against shore objectives, which can be given to a limited extent at the present seaplane bases. With these exceptions, the bases could be used to great advantage in organizing personnel and preparing for bombing against shore objectives.

No. 18. To equip present seaplane stations with machines suitable for use in bombing enemy bases.

Not agreed to.

This is impracticable at some of the stations where landing fields are not available. These stations, where possible, should have some of these machines, but only sufficient for personnel to become acquainted with the machine. Actual flying at night can be done as a practice. The seaplane stations have a distinct use in our antisubmarine campaign, and require a special type of seaplane for their work which is not suitable for bombing shore objectives. These stations should be retained as patrol stations, using them to assemble personnel for other operations where this can be done to advantage.

NOTE.—Regarding the specific recommendations made by the Commander United States Naval Aviation Forces, Foreign Service, the Planning Section understands that all the questions therein raised will be taken up under the direction of the force commander.

The following recommendations are submitted:

1. That the Planning Section consider this matter in England with the planners of the British Admiralty, inviting assistance from the French as to matters around Dunkirk and from the Italians as to matters in the Adriatic.

2. When the work to be undertaken has been decided on, the amount which each nation is to undertake should be determined by the Inter-Allied Aircraft Council or some committee of air representatives of the different nations.

3. When the work to be undertaken by us has been determined, our organization to then determine the types and numbers of machine to be used, after consultation with allied experts.

4. That the United States representatives consider different projects in the following order of importance:

(*a*) Concentrate in the southeast coast of England—Dunkirk area.

(*b*) Undertake operations against submarine bases in the Adriatic.

(*c*) Maintain a coastal patrol against submarines.

(*d*) Undertake operations against Helgoland or other enemy bases on the North Sea or in the Baltic.

In conclusion, the following comment on the paper of the Planning Section is set forth:

It would seem to me that this paper lays too much stress on the failure of air patrol to destroy submarines, and on page 93 it is stated that the reason of failure to destroy is because a submarine gets ample warning and submerges; this protects friendly shipping—the object of patrol.

The statement on page 94, that the positive effect of patrol is measured best by the submarines that have been sunk, I can not agree with, as it seems to me the best measure of patrol is the amount of protection afforded our own shipping. It can be positively stated that our aircraft patrol, when officially established, will be well

equipped both in matériel and personnel for reliable communication, and there is no reason why proper reports and information should not be forthcoming. Coordination of air and surface patrols should be perfected, as the air patrols are under the direct orders of the officers controlling the surface patrols.

The observations on aircraft which point out that the slow speed of the convoys is a disadvantage does not apply to the dirigible, but favors that form of aircraft.

The average flight of aircraft certainly should be increased much beyond 3 hours; in the case of dirigibles it should be beyond 10 hours.

It must be remembered that control of the air in the Dunkirk area will not prevent submarines from coming out at night; hence bombing operations are all the more desirable.

With reference to the statement on page 98, where it is indicated that vessels in convoy escorted by two kite balloons are three times as safe from attack as when they are not so escorted, would seem to apply equally well to dirigibles.

The statement on page 100 that the distribution of air stations in France and in Ireland indicates dispersion of effort, and the employment of airplanes, etc., for their use can not be profitable, I think remains to be proved. It would undoubtedly have been better could our air activities have been concentrated in one area, but such was not possible.

The view of the station at Dunkirk is correct, and many surveys have been made with a view to securing a better location. I was informed by the officers who selected this site that there was no other available place for seaplanes along the Channel in France. It is proposed to have another thorough search made and see if conditions can not be improved at Dunkirk immediately.

There is no kite balloon station in France at Mindin, but one stationed at La Pallice. With the exception of the station at Berehaven, it would seem that all the other kite balloon stations meet the requirements that they be located at the ports from which the vessels using them operate. It is true that we have no vessels operating from Loch Swilly, but it would appear that the English have, and this station, I believe, was located at this place to supply kite balloons to English destroyers.

B. Remarks by British Plans Division.

The comments made by the Commander United States Naval Aviation Forces, Foreign Section, on Problem No. 6, Memorandum No. 12, agree so closely with the views of the British Plans Division that they may be adopted practically in their entirety, and it is proposed to draw attention only to the few small points of divergence.

Decision 3.—It is considered that kite balloons, while effective for escort work, are not so suitable for patrol, and that antisubmarine patrol work should be carried out mainly by aircraft, both heavier and lighter than air.

Decision 4.—The Canterbury region, while most suitable for the German bases in Belgium, is not so well placed for long-distance bombing raids to German bases in the Bight, and it is considered that for these purposes the Felixstowe area is superior.

Decision 6.—It is considered that the most economical and effective use of patrols is to maintain sea lanes rather than to patrol wide areas. It is recognized, however, that this is a matter of operational arrangement, and that the distinction is largely a verbal one.

Decision 7.—The United States Planning Section's remarks are concurred in.

As regards the other decisions, the remarks by the Commander United States Naval Aviation Forces, and his final comments, are concurred in.

C. Remarks by British Officer in Admiralty on Memorandum from the Force Commander, United States Navy.

(Policy that should govern development of United States naval effort in Europe.)

This memorandum is of great interest and should serve a useful purpose in calling into prominence certain large issues which affect the employment of naval aircraft in the present and near future. It is no detraction from the value of the paper that exception must be taken to some of the views expressed and conclusions reached.

In reviewing the arguments raised, it is proposed to state, in the first instance, the main issues of the present moment and to indicate their growth and relative importance; then to discuss each in relation to the points covered by the memorandum.

I.

The assistance which can be given by aircraft to the antisubmarine effort falls broadly under three main headings:

(1) Attack on enemy submarine bases by aerial bombardment.

(2) Action to bar the passage of submarines through narrow or restricted waters which must be passed by the enemy.

(3) Defensive measures, including patrol and escort.

(1) Hitherto a bombing offensive against enemy bases has not been the primary effort of the Naval Air Service, though it is a subject which has always received attention.

Three main objectives are offered for the attack—the German North Sea ports in the Helgoland Bight, the Belgian coast bases, and Austrian bases in the Adriatic.

In the first year of the war a bomb attack was carried out by seaplanes against Cuxhaven, but the weight of bombs dropped was insignificant; an attempt to renew this form of offensive indicated that little can be expected from the type of aircraft available when starting from ships in the open sea.

The idea of developing attacks on these bases has, however, always been kept in view, and a proposal to carry out a more extensive endeavor by large flying boats refueling at sea was considered in the latter part of the year 1916. At the present day the range of available aircraft still renders the problem difficult, but it is hoped to carry out attacks of some importance this year by utilizing towing lighters to convey the aircraft to within 100 miles of their objectives before a flight is commenced.

The objectives on the Belgian coast offer a much easier target, and it must be admitted that more might have been undertaken in this area than has actually been the case.

A long period elapsed before the possibilties of bombarding by aircraft were adequately realized, and it is due to this fact that various mistakes have been made such as the dispersion of force and lack of concentrated effort with the Handley Page machines, the first numbers of which were ready in November, 1916, and were sent to the eastern end of the western front in winter (where they were of little value), instead of being used against the important submarine objectives close at hand. Further, there have been long periods during which bombardment of the submarine objectives on this coast have been suspended by order; and again, the work of the forces available has been divided between attacks on naval objectives and points of military importance.

The opinion is held by many officers, and particularly by those best qualified to judge, that the submarine activity on the Belgian coast might have been affected adversely in no small measure if the whole naval bombing resources available in 1917 had been devoted to this single purpose.

Up to the present Great Britain has been unable to provide sufficient naval bombing aircraft to undertake attacks on the Austrian submarine bases in the Adriatic.

(2) The policy of attempting to close the channels through which the enemy's submarines pass to the open sea, in which aircraft will take an important part, is one of comparatively recent date. The establishment of a barrage can only be rendered effective by a proper coordination of all arms, and in this respect the aircraft action must necessarily be dependent on the development of action by surface craft.

In the coming summer serious effort is to be made to close the Straits of Dover, the Straits of Otranto, and to hamper the passage of submarines passing to the Atlantic by the northern route between the Shetlands and Norway. It is essential to realize that where only a limited number of aircraft is available, better results may be anticipated from such work than can be expected in bombing attacks which necessitate the continuous employment of large forces.

(3) In considering defensive measures it should be remembered that with the craft available in the early stages of the war, patrols in the vicinity of the coast were practically the only form of work which could be carried out. Up to the end of 1916 attempts were chiefly devoted to the question of reconnaissance flights to seaward in the North Sea, with a view of detecting movements of enemy surface vessels.

As the activities of enemy submarines became more serious every endeavor was made to provide improved defensive measures for the protection of the vast number of merchant ships proceeding along the eastern and southern coast of Great Britain. The work of aircraft in this connection has proved of great value and must be gauged by the number of ships which have been saved rather than by the number of submarines destroyed. The resources available have been comparatively small, averaging about 200 seaplanes and 50 airships in the course of the year 1917, and it is unquestionable that far better results have been obtained from these craft so employed than would have been the case by an equivalent effort with contemporary craft expended on bombing of enemy bases.

Great progress has been made in improving the method and system of patrols, and experience of the last year has indicated the points at which stations are principally required; it may generally be said that the system is now in an advanced stage of development. Much yet remains to be effected as regards improvements in the intelligence and communications, but these matters are in hand, and when the organization is placed on a sound basis, when surface craft have developed the practical use of the hydrophone, and when the air units approved are completed to the establishments arranged, efficient protection should be afforded to shipping in coastal waters.

As an indication of the value of these palliative measures it should be realized that in the Portsmouth command, an area of approximately 9,000 square miles, with waters most suitable to submarine operations, there is a monthly traffic of 2,000 vessels passing east and west and a cross-channel traffic exceeding 600 per month, yet the average losses have not been above five ships per month in the last half year.

It would, of course, be erroneous to ascribe this success wholly to aircraft, but it is unquestionable that the comparatively small force available, roughly, 30 to 40 seaplanes and 6 airships, has contributed in a large measure to the success achieved.

II.

Turning to the proposals contained in the memorandum from the force commander, the importance of maintaining aerial supremacy in the area described as Felixstowe-Ostend is fully agreed. The movements of submarines in these waters from bases on the Belgian coast are of great importance and can be interfered with by aircraft to a degree which can not be obtained by any other arm. In this respect excellent work has been done by large America sea planes operating from Felixstowe, and this has led to opposition on the part of the enemy, the first engagement between a large America and surface craft taking place in May, 1917. Numerous engagements have occurred since this date, and it is necessary to provide defense for these bombing sea planes; an attempt has been made to establish cooperation with the naval fighting machines at Dunkirk, but there is little doubt that the question will not be adequately dealt with until arrangements are made for two or three large Americas to proceed from Felixstowe in company, escorted by a flight of two-seater fighter machines of the De Haviland 4, or improved type.

It is the case that the enemy has been allowed to have too much control in this area and that he is in an ascendancy on the eastern side at the present moment. This state of affairs can only be altered by the employment of increased forces and a radical change in our system of control and administration. One centralized command, extending from the latitude of 53° north to the southward, must be established.

NOTE.—This small part of the North Sea, known to the enemy as De Hoofden, is essentially a single area from an operations point of view and it is remarkable that there is no expression in use in the British Navy to indicate it briefly. It is suggested that the term "Hinder Sea" should be employed.

On several occasions it has been suggested that the control of aircraft on the western seaboard of the Hinder Sea should be centralized, and that there should be a senior officer at Harwich controlling the naval units at Yarmouth, Harwich, and Westgate. Arrangements are already in progress to establish a main base intelligence office at Harwich to deal with all movements of craft in the Hinder Sea, and when effect is given to both these schemes a very great increase in efficiency may be expected.

With regard to the class of machine required for operations in such areas, where the enemy's craft are to be encountered, a large machine

with great weight carrying capacity and all-round arc of defensive force is eminently desirable, but as experience has shown is by no means easy to achieve. For the present, requirements can be adequately met by the large America seaplane for antisubmarine bombing, provided it is escorted by land fighters as described above; working in cooperation the two types mutually support each other, and in the event of engine failure over sea by one of the land machines, the crew can be saved by the seaplanes.

Looking to the future it is impossible to overstate the danger we are in of the work at Felixstowe suffering serious interference by heavy bombing attacks undertaken by the enemy; it is therefore considered advisable that in arranging for an increase of the fighting forces for this area attention should be paid to the alternative of utilizing land bombing machines operating from a base farther inland less liable to attack by enemy.

As to the forces which would be required to maintain an adequate superiority, it is far from easy to lay down any definite figures. To a considerable extent the enemy can choose his own time for the departure and arrival of submarines, and it is therefore necessary for the allied force to keep up a more or less continuous patrol of the area. The power of selecting a suitable time for undertaking an attack on the patrolling force with a concentrated force of fighting machines gives the enemy an initial advantage that is difficult to counter.

AERIAL BOMBARDMENT OF SUBMARINE OBJECTIVES IN THE HELGOLAND BIGHT.

As already stated, arrangements are being made for attacks to be carried out by large Americas, operating from east coast ports, towed within striking distance of their objectives in special lighters. In view of the weight of bombs which can be carried and the special conditions required for this form of attack to take place, it can not be expected that the damage inflicted on the submarine objectives will be comparable to that possible in the case of the Belgian coast, where constant bombardments can be carried out from a shore base.

The possibilities of bombardment by bombing craft carried in ships has also been discussed and is considered impracticable. The main points involved in this question are as follows:

(*a*) Machines might be dispatched from carriers with flying decks and be compelled to land in the sea after the attack, the pilots being saved by destroyers or submarines.

(*b*) Longer range machines might be used; to be flown from ships within a hundred miles of the objective and after delivering the attack to fly back the full distance and land in England in the vicinity of Yarmouth.

(*c*) Machines to start from Norfolk, carry out the attack, flying the full distance to the objective and back.

Of these alternatives, (*a*) is considered out of the question as unduly wasteful of machines, which could be better employed in ordinary work elsewhere.

Both (*a*) and (*b*) involve large supporting forces of ships of the fleet, in which case the fact of fleet fuel consumption, etc., has to be taken into account.

In comparing (*b*) and (*c*) it is to be noticed that the difference is roughly a matter of flying an additional 140 miles, say 2 hours, or the equivalent of, roughly, 700 pounds weight in machines of the Handley Page type, approximately six 112-pound bombs. This addition to the length of flight is no light matter, but it is probable that the bombing machines of the near future will be able to fly such a distance and to carry an adequate weight of bombs, the saving which would be derived in avoiding the risk to ships of the fleet and in economizing in fuel must be given careful consideration when framing future policy.

It should be noted that the flight from Yarmouth is 108 miles over sea, after which the coast of Holland can be skirted, machines coming down in a neutral country in the event of engine failure, and in the case of Wilhelmshaven only the last 60 miles has to be flown over enemy territory.

AERIAL BOMBARDMENT OF AUSTRIAN SUBMARINE BASES.

As at present arranged this work is principally assigned to the Italian Air Force. Any additional force which can be supplied to supplement their efforts should prove of value.

Barrage work.—It is noticed that the memorandum makes no reference to barrage work at exits used by enemy submarines. As arrangements are well in hand for this work to be carried out by British aircraft at the three points of strategical importance, it is agreed that it would be better for American forces to be employed on other work.

Defensive work.—It is considered that the views expressed in the memorandum convey an inadequate appreciation of the value of patrol and escort work. As already stated, the criterion of success or failure is the number of ships saved rather than the number of enemy submarines destroyed. It is true that the results of attacks on enemy submarines have proved somewhat unsatisfactory, but though the number of cases of positive destruction are few, other cases are known in which damage has been caused, or the deflection of the submarines from the work in progress has occurred. Every endeavor is being made to increase the offensive power of patrol ma-

chines; the size of bomb has been raised from 100 pounds to 230 pounds, and it is hoped to increase to a weight of 320 pounds in the coming summer. At the same time great attention is being paid to the accuracy of bomb dropping, and it is reasonable to expect that cases of definite destruction will be more frequent in the year 1918. Experience has shown that patrols are specially useful in weather of low visibility, when the seaplane comes upon a submarine suddenly and the latter is unable to completely submerge before the attack is delivered.

Whatever statements may be made to the effect that the crews of the enemy's boats regard aircraft attacks as of little importance, there can be no question that every endeavor is made to avoid such attacks, and in thick weather the enemy is in continuous danger of serious attack in any area where adequate patrols are carried out.

These patrols are, however, less important than convoy work, and it is considered that the memorandum is liable to give an erroneous impression of this important function of aircraft work. All experience tends to show that the presence of aircraft with a convoy acts as one of the greatest deterrents to submarine attacks, and in this respect no class of craft is superior to the small airships which are capable of a flight of 10 hours and can keep in station on a convoy whatever the speed. It is indisputable that a very considerable number of merchant vessels have been saved by the patrol airships, and on this account the employment of these craft is being extended in the fullest limits possible by the establishment of new stations and the employment of mooring-out positions. With heavier-than-air craft there is a difficulty as stated in the large difference in speed of the seaplane and the convoy, but it is found that great benefit is derived not only from machines flying with and around the convoy, but from the patrol of the traffic routes before the arrival of the convoy.

A word should be said in regard to kite balloons. It is recognized that the kite balloon is no more than a special lookout position in the carrying ship, and it is true that exceptional success has accompanied the employment of balloons up to the present. It may be, however, that this success is based on a false foundation in that the enemy, who has consistently avoided attacking ships with balloons in the past, and may find it probably easier than he anticipates when the increased number of kite-balloon ships will reduce the number of unprotected targets. Should a policy of solely relying on kite balloons for the protection of vessels in convoy be adopted, and should attacks prove successful, the result would be serious.

The airship is altogether superior to the kite balloon in that she is offensively armed, and when stationed to windward of the convoy

is in a position to reach any submarine seen, at a high speed, probably well over 60 miles an hour.

The decision to have no American airship stations is noted, and it is agreed that they should be unnecessary in the British Isles in view of the provision already made.

Great importance is attached to the American seaplane stations in course of preparation around the coast of Ireland and on the western coast of France, and it is considered that any diversion of the resources intended for this purpose would be a grave mistake.

III.

1. To sum up: In view of the present arrangements for patrol of the more important areas and for aircraft to undertake the barrage work at the main exits, it is agreed that any further American naval aircraft can best be devoted to offensive operations against the enemy submarine bases.

2. The proposal to concentrate in the Felixstowe-Dunkirk area in sufficient force to get local control of the area is considered sound and likely to lead to the enemy being compelled to suspend his submarine operations from the Belgian coast. This would be a great advantage, as the activities of the boats at present based on Belgium would be reduced to the extent of at least 50 per cent if driven north to the Helgoland Bight.

3. If sufficient aircraft can be provided for further operations, the Adriatic objective should next receive attention, the Helgoland Bight bases being ignored for the time being except in so far as present arrangements with large Americas from Harwich and Killingholme are concerned.

4. In considering types for use in areas where enemy aircraft are to be met, it is considered that a combination of fighters and bombers for daywork against submarines would prove more satisfactory than big machines with all-round fire.

5. Fully concur in the desirability of building air stations in positions difficult of access to enemy aircraft; to this end it may be necessary to have a main station well to the westward of London, using advanced aerodromes on the east coast for operations over the Hinder Sea.

[Extract from Memorandum No. 71, "History of Planning Section."]

Subject: "*United States Naval Air Effort in European Waters.*"

This paper was initiated by the Planning Section.

In view of the comparative ignorance of the Planning Section of the technical side of aviation and its complete lack of aviation experience this solution was intended only as a preliminary study of the subject and the decisions only as tentative.

Notwithstanding the objections made by the Commander United States Naval Aviation Forces in Europe to some of the decisions, the action of the Planning Section in submitting the solution met with his enthusiastic approval. It resulted in his consulting the Planning Section frequently, when opportunity offered, and in the initiation of conferences between allied naval aviation representatives to determine the policies and principles which should govern their future joint action.

When demobilized the Planning Section was about to solve a problem to determine the policy that should govern the peace-time development of the Air Service for the Navy.

On 15 March the Force Commander forwarded this memorandum with the following comment:

"1. I forward herewith copy of the comments of the Commander United States Naval Aviation Forces, Foreign Service, on the Memorandum No. 12 of the Planning Section of my staff regarding aircraft, together with notes (in brackets) made by the Planning Section on the comments of the Commander United States Naval Aviation Forces, Foreign Service.

"2. The comments of the Commander United States Naval Aviation Forces, Foreign Service, are based upon a thorough study by his organization of all the questions raised by the Planning Section. Attention is invited to the close agreement of the Planning Section and the Commander United States Naval Aviation Forces, Foreign Service, on all the essential points of the air program."

MEMORANDUM No. 13.

EMPLOYMENT OF K. TUBES.

23 February, 1918.

[Prepared at the suggestion of and in collaboration with Capt. R. H. Leigh, U. S. N., following a raid by the enemy against the Dover barrage patrol.]

(See Map No. 1, "The North Sea.")

PROBLEM NO. 7.

General situation: As at present.

Special situation: Enemy forces are able to make surprise raids on Dover barrage forces at night.

Required: A plan for getting advance information of approach of enemy forces, so that they may always be met in superior force.

SOLUTION.

The solution that follows is based on the use of a recently perfected sound-detection device, the K. tube. No other methods are considered, as it is assumed that methods for preventing surprise not based on recent scientific developments have been fully considered and experimented with.

The K. tube is a microphone listening device, consisting of three microphone units so arranged and wired that the direction of any sound heard may be ascertained with reasonable accuracy.

K. tubes are particularly applicable for use—

(*a*) From drifting vessels.

(*b*) From vessels anchored in a tideway.

(*c*) From tripod stations on the bottom of the sea.

K. tubes used from drifting or anchored vessels are usually suspended about 70 feet below the surface of the water and are trailed two or three hundred feet from the vessel, in order that water noises may not interfere with listening.

K. tubes from an anchored or drifting vessel will indicate the direction of a sound with a probable error of 5° to 10°. K. tubes from stations anchored on the bottom of the sea should be of sufficient distance above the bottom to prevent any noises on the bottom interfering with listening. The directional qualities of anchored K. tubes are better than the directional qualities of K. tubes

trailed from vessels, as the errors of direction incident to trailing are entirely eliminated.

The K. tube's efficiency is not interfered with by surface water noises, so that the state of the sea does not affect its sound-receiving qualities.

It is possible by the use of the K. tube to get the direction of at least three vessels at the same time when these vessels are on widely separated bearings.

The range of the K. tube depends largely upon the noise made by the vessel heard, which generally depends upon the speed of the vessel. The ability to hear vessels within range is seriously interfered with by local noises, such as own ship noises, so that the efficient use of the K. tube requires that own ship noises be reduced to a minimum. All machinery should be stopped during the listening period. It has been found by actual experiment in rough weather that an American submarine can be heard as follows:

Speed of submerged submarine:	Distance (yards).
0.6 knots	2,500– 3,000
2 knots	8,000–10,000
4 knots	15,000–20,000

At higher speeds the range is greater, vessels having been actually heard at a range of 26 miles.

The K. tube, when used from anchored or drifting vessels or from stations anchored on the bottom, is always ready for instant use. It requires no elaborate installation and no silent rooms at the listening stations. K. tubes used from anchored or drifting vessels require great care in observations taken when the vessel is drifting very slowly, or when the tide is slack, as at these times the K. tube may not tow with its head directly toward the vessel; but by a system of reciprocal sound bearings the error of K. tubes can be determined and applied in each such case. When a sound is heard, its bearing may be taken in less than one minute, and continuous bearings may be taken thereafter at any desired interval. A vessel with a high-speed engine can be readily distinguished from one of low speed, and a submerged submarine from one running on the surface.

In the case of K. tubes on tripods anchored on the bottom, the shore listening station or the ship listening station connected to the tube by cable may be at a distance not greater than 20 miles.

Having the above qualities of the K. tube in view, the following plan for its use in a sound barrage to the northward of Dover Straits is suggested (see British Admiralty Chart No. 1406):

(1) From North Foreland Lighthouse, on a line running east, true, place two anchored K. tubes—one at 10 miles, the other at 19 miles from the lighthouse; and on a line running N. 52 E., true, place a

third K. tube 18 miles from the lighthouse. Connect each of these K. tube stations by cable to a listening station in the lighthouse; connect the lighthouse by telephone to Dover.

(2) From Dunkirk Lighthouse on a line running north-northwest, true, place two anchored K. tubes—one at 11½ miles and one at 19 miles from the lighthouse. On a line running N. 10. E., true, place a third K. tube 18 miles from the lighthouse. Connect these K. tube stations to a listening station in Dunkirk Lighthouse. Connect Dunkirk Lighthouse by telephone with the operating station for Dunkirk naval forces and with Dover naval forces.

In case it is impracticable to establish these listening stations at once, temporary arrangements may be made for listening stations in the same approximate localities by stationing monitors as listening stations for drifting K. tube sets. If monitors are used, it will be necessary for them to keep their machinery shut down, and to maintain quiet during a sufficient part of each hour to insure that timely notice of any vessels moving in the vicinity shall be given to the K. tube listeners.

Destroyers in making raids travel at high speed. The assumption that they will be heard when within 10 miles of the above outlined K. tube stations is conservative; the chance is great that they will be heard within 20 miles of these stations. When heard, their bearing can be easily determined, and by using the bearings obtained from different stations a correct idea can be reached as to their location, and by subsequent bearings their course and speed can be ascertained.

Taking the conservative estimate of 10 miles sound range from K. tube stations, the nearest approach the destroyers are likely to make to the Dover-Calais line before being heard would be 33 miles, from which an hour's warning could be had of any raiding vessels under way for that line, thus giving ample time to withdraw drifters and other unprotected vessels, or to send a suitable armed force to meet the raiding vessels.

The one difficulty to be encountered in such a sound barrage as is proposed is sound interference. This can be minimized and more or less overcome as follows:

(*a*) By regulation of the hours in which shipping may pass through an area of 10 miles on each side of the sound barrage lines, thus making as nearly as possible a silent area.

(*b*) By limiting to a minimum the operation of British naval vessels in this area.

(*c*) By requiring British naval vessels which do operate in this area to stop their engines at given times for short intervals (five minutes).

The silent area desired in this case is not large, and there is at present little traffic in it. As raids are undertaken at night, it could be arranged so that ordinary shipping would pass through the silent area during daylight. At night there would be no great danger for British naval vessels which must operate in this area stopping their engines at given times, it being understood that in case of emergency the stop was not to be made.

An objection may be made to the sound barrage on the ground that there would be numerous false alarms, due to friendly vessels passing through this area. If the conditions outlined in the foregoing paragraph are complied with, there would be few false alarms, and even these could be materially reduced, if not altogether overcome, by a simple system of recognition signals. To make these signals would require no special devices on the vessels; taps with an ordinary hammer on the underwater hull is all that would be needed. Morse code could be used for this purpose, a specified letter or combination of letters to be made at a given time each day, at each specified time a different signal to be used. The signals would be changed daily as in the case of recognition signals.

MEMORANDUM NO. 14.

DENIAL OF ENGLISH CHANNEL TO ENEMY SUBMARINES.

25 February, 1918.

[Initiated by the Planning Section in accordance with Decision 8 of the estimate of the general naval situation.]

(See Maps 1 and 3.)

FOREWORD.

The solution of this problem was undertaken from data available in London, and is submitted tentatively until opportunity is had to examine local conditions in the Channel and to consult data at Channel bases.

PROBLEM NO. 4.

General situation: Enemy submarines continue to use the Straits of Dover as a passage between the North Sea and their operating areas in the English Channel and the Atlantic Ocean. During the month of December about 50 per cent of total merchant ship losses outside the Mediterranean occurred in the Channel. Most of the other losses occurred close to the shores of Great Britain and France.

Special situation: The Allies and the United States decide to deny passage through the Channel to enemy submarines, and to render the Channel safe for merchant ships.

Required: Estimate of the situation and plans for—

(*a*) Decreasing immediately losses in the English Channel.

(*b*) Denying the English Channel to enemy submarines while still permitting commercial traffic.

(*c*) Organization of channel command; cooperation of forces; convoy system with special reference to assembling from, and separation to, various ports of vessels of convoy.

CONCLUSIONS REACHED IN THE FOLLOWING PAPER.

1. To unify the Channel command.

2. To man with American crews the present French antisubmarine Channel forces, exclusive of harbor defense craft.

3. When practicable to augment the present antisubmarine effort at Dover by—

(*a*) A mine barrage (deep and surface) from Kentish Knock to Dunkerque.

(*b*) A deep mine barrage from Hastings to Touquet Point.

(*c*) A system of ground listening devices operated from shore, located about 20 miles eastward of Dover Straits.

4. To organize immediately a continuous surface patrol east of line Start Point-Sept Isles, with a total force of 30 destroyers or P-boats, the patrol to be assisted by ground listening devices operated from shore, by air patrols, and by kite balloons.

5. To augment the above patrol by a series of deep mine fields; planting continuously in the usual areas of enemy operation until he abandons the Channel.

6. Until extensive deep mine fields can be laid, to employ a few hunting groups in the eastern Channel in conjunction with the patrols, and to develop tactics for "mining in" a bottomed submarine with deep mines.

7. To concentrate hunting effort west of the line Start Point-Sept Isles; and to assist this effort by deep mine fields and patrols in waters favorable to bottoming, off both Cornwall coasts.

8. To place orders immediately for 70,000 additional mines.

9. To increase the efficiency of the Channel convoy system by the following measures:

(*a*) Carrying a kite balloon on one ship of each escort.

(*b*) Placing convoys in a formation of wide front which decreases as the depth increases.

(*c*) Adopting a policy of determined depth-charge attack by several escorts against every attacking submarine.

(*d*) Arranging convoy sailings so as to avoid passage at night during moonlight.

MISSION.

(*a*) To decrease immediately shipping losses in the English Channel.

(*b*) To deny English Channel to enemy submarines, while still permitting commercial traffic.

ENEMY FORCES—STRENGTH, DISPOSITION, AND PROBABLE INTENTIONS.

Enemy submarines operate from the northern bases in general as follows:

Normally about 10 big submarines per month use the Channel for passage, going past Dover as a rule on the surface at H. W. slack, and during darkness. Lately this number has decreased, probably

due to the increased efficiency of the Dover barrage. They usually keep in the deep gut so as to facilitate diving.

There are generally 3 or 4 small U. B. or U. C. submarines from the Flanders Flotilla operating in the Channel; principally against overseas through-channel traffic, which normally brings them nearer to the English than the French coast. In bad weather they usually bottom in Lyme Bay, the Plymouth Bight, or other bights where sea is smooth. At night they probably cruise slowly at from 1 to 3 knots.

Strategic value of the Channel to the enemy.—The great focal area of shipping, lying in general between the south coast of Ireland and the French northwest ports, must continue to be the center of the enemy submarine effort, if his submarine campaign is to succeed. The distance to this area via the Channel is 480 miles from Zeebrugge and 660 miles from Helgoland. North-about via Fair Island these distances become 1,320 and 1,300 miles, respectively.

If passage through the Channel is denied, there will result a reduction of about 40 per cent in the number of small submarines that can be maintained in the focal area, and about 20 per cent in the case of the larger type.

Besides its value as a passage to and from the focal area, the Channel is also of immense value as an operating theater. Of all traffic to and from the United Kingdom, more than half passes through the Channel, exclusive of the vast crosswise traffic on military service. The Channel is itself a concentrated focal area, offering to the enemy the further advantage of narrow width, great length, and sheltered waters.

Moreover, cross-channel traffic is a vital link in the communications of the British Army in France.

The enemy's probable intentions.—

1. The desire to reduce passage time and thus increase the number of boats operating, as well as to take advantage of good hunting en route, will persuade the enemy to proceed to station via the Channel unless it is too dangerous.

2. An enemy submarine operating in the Channel has two main problems to consider (mine-laying submarines not included).

(*a*) The problem of getting in touch with shipping.

(*b*) The problem of charging batteries.

As a rule, shipping keeps to the north side of the Channel, so that must be the operating area for submarines.

The submarine, to get into touch with merchant shipping during daylight, will keep a periscope watch when vessels are near, and will operate on the surface at other times. The submarine has always in mind the possibility of attack and plans to avoid attack by—

(*a*) Submerging and running.

(*b*) Bottoming.

The increasing ability of the antisubmarine craft to pursue submarines when submerged will increase the tendency of submarines to "bottom;" so that submarines will always prefer positions where water is less than 40 fathoms deep and the bottom is not rocky.

As listening devices become fitted to seagoing vessels, the danger to submarines operating off soundings will increase, possibly sufficiently to counterbalance the tendency to operate offshore during good weather; in other words, the operations of hunting groups may drive submarines to operate in narrow waters the year round. If this should be the case, it would be doubly important to make those waters highly dangerous for submarines.

3. The submarine fears—

(1) Destroyer attack.
(2) P-boat attack.
(3) Depth charge attack—any vessel.
(4) Aircraft attack.
(5) Deep mine fields.

In general, the avenue of escape from (1), (2), (3), and (4), above, might lead into danger of (5), particularly if the submarine were pursued. If, however, the submarine knew that there was real danger of (5), then its correct course should be to bottom immediately until danger has passed or until dark.

4. Undoubtedly submarines charge their batteries during daylight whenever possible to do so unobserved. At night they prefer to charge where there is small chance of interruption.

5. The geographical position of Cornwall, combined with shelter afforded on one coast or the other in almost all weathers, will make that immediate locality a desirable hunting ground for the enemy in rough weather.

OUR OWN FORCES.

The enumeration of our forces is omitted. They comprise numerous units for all varieties of antisubmarine effort, and are being increased constantly.

They are divided into six separate major commands, having no coordinating heads—three British and three French. Coordination between British and French forces is accomplished through their respective Governments. These conditions render it impossible to cope adequately with an enemy whose forces, by means of a flexible system of command, are enabled to conform quickly to changed conditions. For example, a group of submarines known to be operating just south of the Isle of Wight would be met only by our forces based on Portsmouth, while at the same time we might have large British and French forces in other near-by areas, some unemployed, in readiness, others operating in regions vacant of submarines.

While it is true that the various Channel commands are supposed to, and do, cooperate, the extent to which such coordination prevails necessarily depends upon the personalities of the respective district commanders and upon the cordiality of the relations existing between them. Furthermore, any commander will be reluctant to detach forces specifically assigned to him for the protection of a given area for duty elsewhere, unless the responsibility for such a move is taken by a senior.

Obviously the organization of our Channel forces prevents their employment in accordance with the best principles of warfare. Without unity of command our forces can not be operated with the necessary flexibility, nor be employed as a whole to the best advantage.

Our present Channel command is about to be further complicated by the addition of American vessels, thus introducing a third nationality in forces already suffering the handicap of two languages. It would be desirable to man with American crews the French antisubmarine forces (exclusive of those assigned to harbor defense) now operating in the Channel. Incidentally, this transfer would permit France to commission certain cruisers needed for ocean escort work, but laid up owing to lack of sufficient personnel.

The importance of denying passage through the Channel is heightened by the present plans for the Northern Barrage, which, if successfully completed while Dover remains unblocked, will prove a wasted effort and serve the enemy better than ourselves by forcing him to use the route most advantageous to him.

Owing to its narrowness, the Dover Strait appears the most logical point at which to block passage to enemy submarines. If this be successfully done, it also will fortify other effort having in view the denial of the Channel as an operating ground.

Efforts to block Dover have been vigorously prosecuted for two years and are greatly hampered by strong currents, smooth bottom, heavy seas, great rise and fall of tide, and comparatively great depths of water. While present prospects for successful blocking at a comparatively early date appear good, the great importance of denying passage through the Channel to enemy submarines renders it imperative that we augment the present effort at Dover by other means, if practicable.

In considering mine barrages to the eastward of Dover, we prefer to go far enough east to insure weak currents; but we are limited by the necessity of having the line near enough to receive proper surface support against raids. The line Harwich-Dunkerque is as advanced as we can well protect. Here currents reach 2.3 to 4 knots occasionally, the rise and fall of the tide is between 10 and 20 feet, the hold-

ing ground is good, and depths of water moderate. It will suffice to mine only between Kentish Knock and Dunkerque, through a distance of about 40 miles, with an average depth of 20 fathoms; 12,000 American or destructor mines would give theoretical immunity against surface or submerged passage. This barrage would afford some protection against raids to the Dover patrol forces.

West of Dover the first position which offers any considerable advantage over the practical difficulties encountered in the Straits is the line Hastings-Touquet Point, 37 miles long, and requiring 10,000 American or destructor mines for theoretical immunity against passage. The great amount of shipping passing this vicinity requires that a mine barrage here should be deep. This barrage would be practically immune against surface raids.

The line Isle of Wight-Cape Barfleur has the distinct advantage of permitting a barrage to be laid to the surface if shipping can all be diverted through the Solent. It has the great disadvantage of strong currents, which, at springs, reach 5.4 knots near the French coast and 3 knots throughout the rest of the line. Consequently, this position should not be chosen if it can be avoided.

The last position which we need consider is the line Start Point-Sept Isles, 90 miles long, and requiring 40,000 American or destructor mines for the theoretical immunity against the passage of submarines. It is across currents not exceeding 2 knots, except close to the French coast. The southern half of this line is little frequented by incoming traffic, and therefore surface mines would not present much danger to shipping; the northern half, however, could be a deep mine field only.

The necessity for making this line, as well as all others, at least in large part a deep field, requiring a great patrol force, leads to the conclusion that the Dover area, where lines are shorter, is the best locality in which to deny passage.

In the Dover area the efficiency of the patrol may be increased and its protection facilitated by the installation of a system of ground listening devices operated from shore. To avoid noise interferences due to ordinary traffic (as well as to the movement of loose material on the bottom) such a system would have to be placed about 20 miles to the eastward of the Straits.

We now come to the consideration of the other phase of the Channel question—that of denying the Channel as a theater of operations.

Unless both entrances can be practically closed, there will always exist some probability that submarines will enter from one end or the other to prey upon the large volume of concentrated traffic. We have examined the possibility of closing the western mouth and concluded it to be impracticable, so that, regardless of the efficiency

of our effort at Dover, the enemy will want to operate in the Channel, and will enter from the west if it is unprofitable to pass from the east.

With the means at our disposal it is practically impossible to absolutely deny the Channel to enemy submarines, so that our problem assumes the form of how to render this area so unprofitable a hunting ground as to make the enemy practically abandon it.

Were it not for the ability of a submarine to bottom, and thus destroy sound touch, hunting groups equipped with listening devices could probably make the Channel untenable to the enemy. West of a line Start Point-Sept Isles the depths are generally more than 40 fathoms, and therefore too deep for bottoming. Here listening-hunting groups may be profitably concentrated, whereas farther east such an effort will be somewhat wasted, owing to the prevalence of depths which permit bottoming.

In the eastern section the best means at our disposal appear to be surface patrols in combination with deep mine fields. A force of 30 destroyers or P-boats, 15 on station at a time, day and night, could patrol this area very effectively, and thus instill the constant fear of being hunted into submarine personnel, prevent him from peacefully charging batteries, and generally hamper his operations. There are now 19 French destroyers assigned to hunting squadrons in their Channel command, which should be available for this duty. A system of ground listening devices, installed in areas free from excessive sound interferences from ordinary traffic, or where in clear daylight good vision is permitted from the shore station, would facilitate putting the patrols in touch with the enemy. Air patrols and kite balloons installed on surface patrol vessels would serve the same purpose.

The patrol effort should be augumented by a series of deep mine fields, so that at every dive submarines will feel that they are running a great risk. It would be necessary to use a type of mine which would become inoperative on breaking adrift, or else, in deep water, a ground mine of destructor type. There are in the Channel large areas of ground so rocky as to render it dangerous for submarines to bottom except with great care. By taking advantage of this fact the requisite number of mines may be reduced greatly. Probably a total of 40,000 would suffice.

It should be noted that with deep mine fields planted on or near traffic lanes the merchant ships will themselves constitute an important element of the patrol, and submerged submarines can attack them only at great risk.

The localities in which deep mine fields should be laid are those most frequented by the enemy. As he selects new areas, they should

be mined, until he is finally driven out, which will come not so much as a result of the small tonnage sunk per submarine in comparison with other areas as on account of the great moral strain on personnel when operating and having to dive frequently in mine-infested area.

Until extensive deep mine fields can be laid, and a ground listening system installed, it will be necessary to assist the patrols by at least a few listening units. During this interregnum one of the principal problems of the operations will be how to deal with a bottomed submarine. The trailing wire and depth charge method will always be a good procedure when the submarine is no longer heard, but it abandons for the time being any possibility of listening, and will probably not give very good results in a tideway against a drifting submarine. An alternative method is to mine in the bottomed submarine. Assuming the bottomed submarine to be within 500 yards, and direction known, the prompt anchoring of a buoy and the planting of deep mines downstream will give good promise of success. Five or six American or destructor mines planted 200 feet apart might be sufficient. Those mines which are not then exploded by the submarines will remain a menace to others forced to dive in that vicinity in the future, thus assisting the general plan of making submerged navigation dangerous.

West of the line Start Point-Sept Isles the general principle already applied to the eastern area, viz, to exclude the enemy from shallow water by the mine, combined with surface patrols, in order to enable more profitable employment of hunters in deeper waters, should govern. The areas from Start Point to Lands End and thence northward off the Cornwall coast should be mined irregularly with deep fields, where the ground is favorable for bottoming, and patrolled. The French coast in this area is bold, rocky, exposed, has strong tidal currents, and consequently requires no special treatment of this nature. Probably 5,000 mines would be necessary for this purpose.

Including barrages in the Dover area and deep mine fields in the Channel, a total of about 70,000 mines will probably be required. In view of the importance of these projects, and the ordinary delays incident to obtaining large numbers of mines, orders for their manufacture should be placed immediately.

Channel convoy system.—With regard to the convoy system in the Channel, comment upon assembling from and convoy to various ports is omitted, because it is assumed—

(*a*) That to improve present methods will require more escorting vessels than are available.

(*b*) That measures advocated above will eventually eliminate the necessity for convoys in the Channel, at least eastward of Cherbourg, or else render escort requirements very light.

Independent of the above questions, we may increase the efficiency of the Channel convoy system by—

(*a*) Carrying a kite balloon on at least one vessel of the escort.

(*b*) Placing convoys in a formation of wide front, and reducing its front as the depth of the formation increases: Thus

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(*c*) Adopting the policy of a determined depth-charge attack with several vessels of the escort against every attacking submarine. In time this will make him less willing to approach near a convoy. As this policy is principally an attack upon enemy morale, and since a submarine can not estimate within probably a thousand yards of the distance from her at which a depth charge explodes, the attacking escort vessels should make a liberal use of depth charges, whether or not the position of the enemy is accurately known.

(*d*) Laying a zone of deep mine fields along the usual routes of traffic. Zones 10 miles wide from Lizard Head to Dungeness and from Portsmouth to Havre will require about 50,000 American mines if spaced at intervals of 500 yards. The application of the method advocated in the discussion of the problem of "denying the Channel as a theater of operations," by which deep fields were to be laid in the areas most frequented by the enemy, as an adjunct to a system of surface patrols, would finally result in zones of deep mine fields practically coinciding with steamer lanes.

(*e*) Arranging convoy sailings so as to avoid passage at night during moonlight. This is desirable, owing to the high percentage of sinkings during these conditions.

NOTE.—Should experiments now in hand demonstrate that the large-mesh torpedo net is of value at convoy speeds, steps should be taken immediately to equip merchant ships with torpedo nets.

DECISIONS.

1. To unify the Channel command.

2. To man with American crews the present French antisubmarine Channel forces, exclusive of harbor defense craft.

3. When practicable to augment the present antisubmarine effort at Dover by—

(*a*) A mine barrage (deep and surface) from Kentish Knock to Dunkerque.

(*b*) A deep mine barrage from Hastings to Touquet Point.

(*c*) A system of ground listening devices operated from shore, located about 20 miles eastward of Dover Straits.

4. To organize immediately a continuous surface patrol east of line Start Point-Sept Isles, with a total force of 30 destroyers or P-boats, the patrol to be assisted by ground listening devices operated from shore, by air patrols, and by kite balloons.

5. To augment the above patrol by a series of deep mine fields; planting continuously in the usual areas of enemy operation until he abandons the Channel.

6. Until extensive deep mine fields can be laid, to employ a few hunting groups in the eastern Channel in conjunction with the patrols, and to develop tactics for "mining in" a bottomed submarine with deep mines.

7. To concentrate hunting effort west of the line Start Point-Sept Isles; and to assist this effort by deep mine fields and patrols in waters favorable to bottoming, off both Cornwall coasts.

8. To place orders immediately for 70,000 additional mines.

9. To increase the efficiency of the Channel convoy system by the following measures:

(*a*) Carrying a kite balloon on one ship of each escort.

(*b*) Placing convoys in a formation of wide front which decreases as the depth increases.

(*c*) Adopting a policy of determined depth-charge attack by several escorts against every attacking submarine.

(*d*) Arranging convoy sailings so as to avoid passage at night during moonlight.

A. Remarks of British Admiralty on Memorandum No. 14.

The question of unity of command is a large one, and involves many susceptibilities. Patrol vessels are slow and must therefore be stationed in different areas. Administration and repairs must be a local matter, as also mine sweeping and salvage work. The two points on which unity of command seems practicable are the routing of traffic and the control of the hunting forces. So far as these two points are concerned, the routing of convoys is carried out already under admiralty direction, the coastal traffic only being decentralized in the areas through which it passes. Hunting forces, independent of areas, are already being instituted; and these will be moved as required when ready to act as self-contained forces. There is, no doubt, room for improvement, which may lie in the direction of coordinating the hunting forces as they develop. The question of their command is also being gone into.

It is doubtful if the best way of dealing with the submarine menace is to treat the subject in sections. The problem as a whole is to confine the submarine to as small an area as possible, e. g., to the North Sea. This involves concentration of effort and material at the

Dover and Northern barrages. To choose an area such as the Channel and aim at keeping the submarine out of it involves dispersion of effort, and merely intensifies submarine operations in adjoining areas, such as the entrances to the Channel and the Irish Sea.

To block the Straits of Dover is the first step. This is essential, for, unless passage through it is denied to enemy submarines, neither a northern barrage nor one to the west of the Channel is of any avail.

2. The measures proposed by Memorandum 14 are—

(*a*) A mine barrage (deep and surface) from Kentish Knock to Dunkerque.

(*b*) A deep mine barrage from Hastings to Touquet.

(*c*) A system of ground listening devices about 20 miles eastward of Dover Straits.

(*a*) This barrage could be passed to westward of Kentish Knock. It is 35 miles between the Shoals, with tides up to 4 knots at times. There would be a considerable "dip" on surface mines laid on this line, and they could hardly be trusted to act against submarines on the surface, except at slack water.

(*b*) This line does not seem to have any advantage over the Dungeness-Gris Nez, or Folkestone-Gris Nez, and is longer.

Two barrages involve two sets of patrol craft and again dispersion of effort; it is better to have one barrage thickly patrolled than to divide the patrols between two. No barrages are of much avail without light, and probably a barrage of deep mines watched by patrol craft with searchlights continually in use is the only really effective block.

Assuming that a barrage in the Straits of Dover can be rendered effective, it is considered that all efforts not required there should be concentrated on the Northern Barrage to the exclusion of that proposed at the western end of the Channel.

The opinion expressed that the closing of the western mouth of the Channel is impracticable is concurred in. The proposal is to make it unprofitable for submarines to use it by means of deep mine fields, T. B. D's, or P-boats. It is not possible at present to spare any such vessels. Patrolling the line would therefore have to be undertaken by trawlers with little or no support; and the enemy submarines would have practically no difficulty in avoiding them at night or in bad weather. The effect of withdrawing trawlers for the barrage would be that the enemy submarine would find little to interfere with his passage after passing the barrage.

It is proposed that deep mines should be laid in Lyme Bay and in places on the Cornish coast where the enemy submarines can bottom. Also along the traffic lanes in the Channel. This proposal is concurred in, and might be extended to the Irish Sea. It is a question of priority with present resources.

(*c*) The installation of listening devices—K. tube or other—to the eastward of Dover is already being dealt with.

3. With reference to proposal No. 8, there appears to be no limit to the number of mines required, but an increase in minelayers is equally important.

4. The convoy proposals (*a*), (*b*), (*c*), and (*e*) are already in operation. Kite balloons are used when weather permits, where they are available, while airships and aeroplanes or seaplanes are also used to a great extent.

MEMORANDUM No. 15.

PEACE WITH TURKEY.

4 March, 1918.

(Forwarded to British Admiralty, March 11, 1918.)

[Initiated by the Planning Section. This paper received the warm concurrence of the British Plans Division. Memorandum No. 15 was submitted to the Inter-Allied Naval Council (see papers No. 69, 88, and 129, Council files), which disagreed with the general conclusions of the Planning Section.]

PROBLEM NO. 8.

General situation: Germany and Austria have made a peace by secret treaty with the Ukraine, and are lending the Ukraine military assistance against the Bolshevists. Germany is dictating a peace with Russia greatly to her advantage.

Required: Estimate of the situation and decisions as to changes in the grand strategy of the Allies incident to the new conditions in the Black Sea region.

SOLUTION.

MISSION.

To determine—

(1) Changes that should be made in the grand strategy of the Allies to meet the new conditions in the East.

(2) Changes that should be made in the disposition of allied naval forces.

ENEMY FORCES.

The special naval forces to be considered are not enemy forces as yet, but potential enemy forces, viz, the Black Sea Fleet of the late Russian Empire, as follows:

2 dreadnoughts.
4 predreadnoughts.
2 light cruisers.
4 auxiliary cruisers.
11 submarines.
27 destroyers.

Political conditions in the Black Sea during the past year have not been favorable to the upkeep of vessels. So that, even should

the enemy get control of all the vessels formerly belonging to Russia and now in the Black Sea, we need not expect any of those vessels to be ready for service before 1 June, 1918. At that date we estimate that—

2 dreadnoughts,
2 light cruisers,
2 auxiliary cruisers,
4 submarines,
16 destroyers

might be ready for a limited service, and that other vessels might be ready in the course of time. The forces above enumerated are all the naval forces available to influence a redistribution of allied naval forces to the Dardanelles area. Any redistribution of allied naval forces to the Dardanelles area not designed solely as a containing force for any possible accretions to the force based on Constantinople will come from an altered intention of the Allies.

Peace with the Ukraine was accompanied by a secret treaty with the Ukraine. We do not know the terms of peace. Secrecy may be concerning—

(*a*) A transfer of naval vessels.

(*b*) The control of the country during the present war to guarantee crops and their safe transport to Germany and Austria.

(*c*) Commercial relations.

(*d*) Restrictions regarding intercourse with the Allies and with other parts of Russia during the continuance of the peace.

(*e*) Black Sea naval base.

(*f*) Postwar conditions.

We may be certain that Germany has sought to secure for herself every possible military and commercial advantage, as well as benevolent neutrality of a pronounced type. She thus secures—

(*a*) The release of her prisoners of war.

(*b*) The safety of her eastern front.

(*c*) A new and vast source of food supply—probably available in important quantities after August, 1918.

NOTE.—If food shortage is thus relieved, Allies will have lost advantages of food blockades—one of their most powerful weapons. Most of the grain from the Ukraine must be transported by water to the Central Powers, as rail transportation is inadequate and rail equipment in poor condition. Allied naval control of Black Sea would deflect all water-borne commerce away from the Central Powers.

(*d*) A possible addition to her Constantinople naval force.

(*e*) The release of many army divisions for transfer to other fronts.

(*f*) The practical security of Turkey from Russian attack.

TURKISH MORALE.

We have reason to believe that Turkey is dissatisfied with her present alliance and is war weary. Turkish character and temperament do not harmonize with the German. The Turk came into the war primarily to protect himself against Russian aggression; and now that that danger is eliminated he does not relish the inevitable German domination which will follow a German victory. Turkey sees large sections of her richest territory in allied hands.

It is possible that Turkey would welcome a separate peace with us.

OUR OWN FORCES.

At present we are holding the Saloniki-Valona line. This immobilizes a portion of the Bulgarian Army and other enemy troops. Our forces are in Mesopotamia. Their presence there can have no influence on the outcome of this war, unless their achievement is used to induce Turkey to a peace.

Our forces are in Palestine. Their value there is due to the protection they give to the Suez Canal. They will have no other influence on the outcome of this war, unless their achievements are used to induce Turkey to a peace.

We have to decide if a peace with Turkey would be more to our advantage now or later. It is well known that we can not increase greatly our efforts in either Palestine, Mesopotamia, or Saloniki without such an obligation of additional tonnage as greatly to decrease the possible efforts of America in France; in other words, without insecurity in the west. We are now as far advanced in Turkey as at any time during the war.

A peace with Turkey now enables us to use such a peace as a great political and moral lever. Later, if events do not mend, even this lever may be too weak; we are certain it will never be stronger. The advantages to be gained are—

(*a*) Release of shipping to other employments from Mesopotamia and from Egypt.

(*b*) Release of military forces from those fronts to other employments.

(*c*) Denial of Turkish waters to German submarines—especially valuable if Adriatic is denied them.

(*d*) Opening of Dardanelles to commercial traffic.

(*e*) Release of about 200,000 gross tons of shipping now shut in the Black Sea.

(*f*) Possible diversion of Black Sea wheat to Mediterranean markets, and consequent saving in tonnage due to short hauls.

(*g*) Great moral advantage of detaching a support of the Central Powers.

(*h*) Naval command of the Black Sea.

NOTE.—The privilege of passing our naval vessels into the Black Sea should be insisted upon as one of the peace terms.

The disadvantages of a peace with Turkey are all to be found in "the cost of the peace."

CONCLUSIONS.

From the above we conclude that the eastern situation as well as the course of the war as a whole, demands that—

(1) We conclude a peace with Turkey.

(2) The terms of the peace shall counteract, so far as possible, the advantages of the enemy's peace with the Ukraine.

NOTE.—We have in a previous paper, "Memorandum No. 11," recommended such a peace on other grounds.

As to Saloniki, we recommend that all ports now held continue to be held, to prevent them from becoming bases of submarine operations.

Allied naval forces now in the Mediterranean may be redistributed by the commander in chief as occasion requires, in order to contain any accretions to enemy forces based on Constantinople.

MEMORANDUM No. 16.

MEMORANDUM ON ADRIATIC PROJECT.

7 March, 1918.

The British and American Planning Sections are in agreement on the essential features of the Adriatic project. These are—

(*a*) The seizure of a base at Sabbioncello.

(*b*) The laying of a mine barrage, Gorgona-Curzola.

(*c*) The denial of Cattaro to enemy submarines.

Owing to the large number of people who have access to the minutes of the Allied Naval Council, it is considered undesirable that any detailed plans should be submitted to that body.

The agreement of the council should be obtained at the coming meeting of the council:

(*a*) Agreement to undertake the general features of the plan as above indicated.

(*b*) Agreement on nationality of Commander in Chief.

(*c*) Agreement on resources to be supplied by each nation.

(*d*) Agreement by each nation to appoint an officer who will serve under the Commander in Chief as the representative of that nation.

The resources that will be required of each nation are, roughly:

ITALY.

Naval forces in Adriatic.
Mines.
Mine layers.
Use of ports as bases.

FRANCE.

Naval forces in or near Adriatic.

GREAT BRITAIN.

Troops and transports.
Light cruisers.
Destroyers.
Harbor defense nets.

UNITED STATES.

Predreadnoughts.
Destroyers.
Mines.
Mine layers.
Troops and transports.

The detailed plans of operations should be decided upon by the Commander in Chief appointed to carry out the operation.

It is well to bear in mind the extreme importance of planning the operation on an adequate scale with regard to forces. It may be necessary to make some radical reductions in the number of naval units at present assigned to other theaters of war; but the great number of forces that will be released in the Mediterranean if the operation is successful may be the deciding factor of the war.

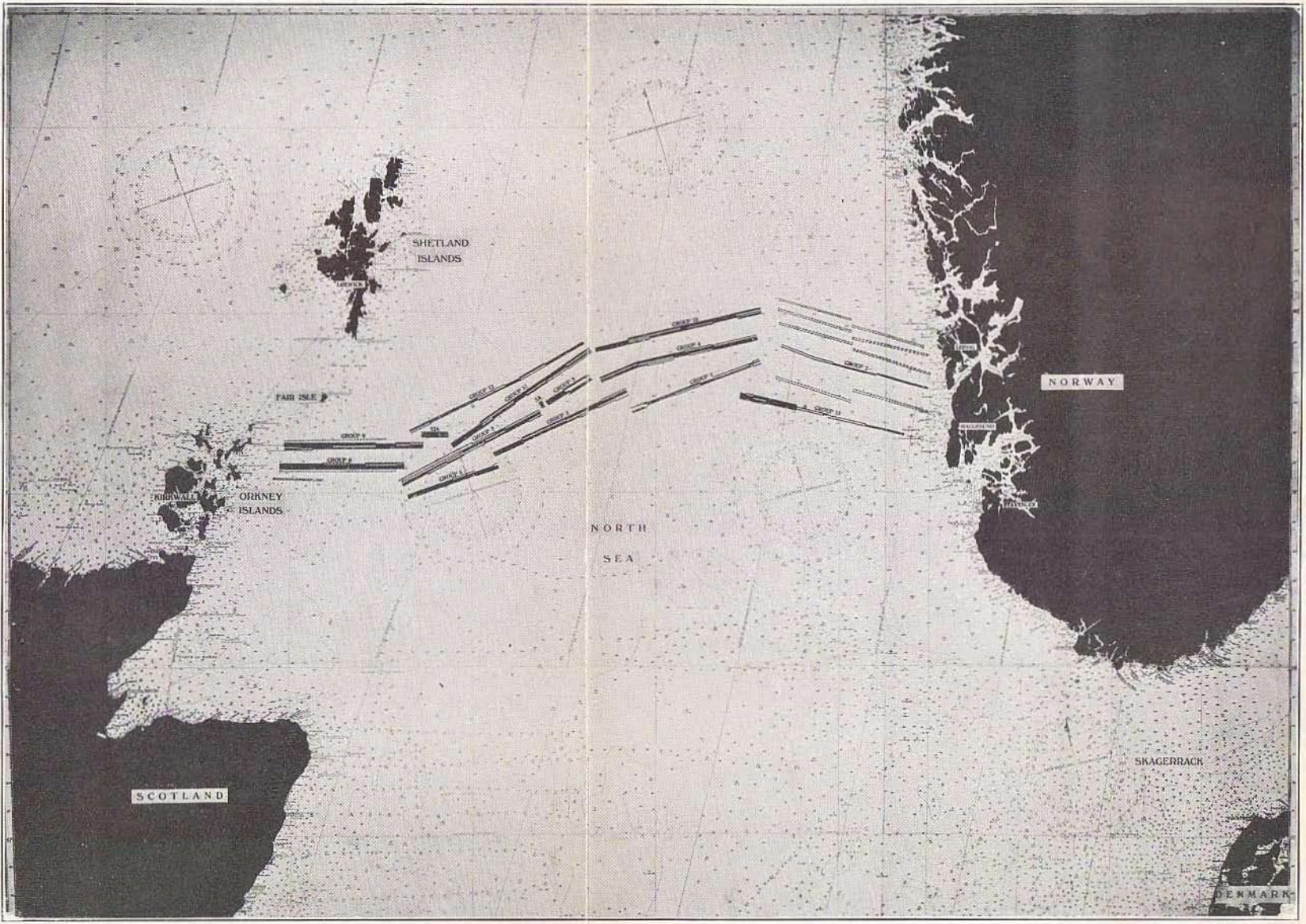
The forces employed should be seasoned forces, speaking the same language. American marines or British Mediterranean troops, or both, are suggested.

As the operations after seizing the base will include a vigorous offensive patrol of the Adriatic to prevent the movement of enemy surface craft, the vessels for this duty should be in adequate force.

The Planning Section is constrained to believe that, unless the Allies are able to inaugurate offensive operations in contradistinction to purely defensive operations, the outlook as to our success in this war is extremely dubious.

Forwarding comment by the Force Commander follows:

"In this connection please refer to my letter No. CS–13279 of April 5, 1918 with which was forwarded Allied Naval Council Paper No. 81 on this subject. Attention is also invited to my cablegram No. 6077 of April 5, which gives the latest information concerning this matter."



THE NORTH SEA MINE BARRAGE, CONSISTING OF 56,611 AMERICAN AND 13,652 BRITISH MINES. THE DOTTED LINES INDICATE THE BRITISH MINE FIELDS.

MEMORANDUM No. 17.

REVIEW OF MINING POLICY.

(A) PRELIMINARY STUDY; BEFORE JOINT CONSIDERATION.

12 March, 1918.

PROBLEM NO. 9.

(See Maps Nos. 1, 2, and 6.)

General situation: As at present. British vessels have begun laying the Northern Barrage. American vessels will not begin before April.

Special situation: The British and American Planning Divisions decide to review the present and future mining policy, with particular regard to the Northern Barrage.

Required: Estimate of the situation and decisions covering—

(*a*) Advisability of retarding the laying of the barrage.

(*b*) Details of any mining plans proposed as a substitute for, or in addition to, the Northern Barrage plan.

SOLUTION.

MISSION.

To determine present and future mining policy with particular regard to Northern Barrage.

GENERAL CONSIDERATIONS.

The general situation is such that continuance of present rate of tonnage losses can not be permitted without ultimate defeat. The next six months will present the gravest tonnage difficulties.

Time is an important factor; a submarine locked in or put down now is worth three submarines treated similarly six months from now.

The proved efficiency of the submarine mine as a defensive weapon against the submarine renders it imperative that we utilize this weapon to the maximum possible extent.

While the supply of mines at present is limited, we are in a position to produce them rapidly in large numbers from this time forth.

The question really at issue is, What is the best possible use of our present available mining resources?

Our special and immediate naval mission in this war is to obtain subsurface command of the sea, while still retaining command of the surface of the sea. The character of our mining operations is dependent on this mission.

If, instead of scattering our mining effort over the whole theater of operations, we concentrate upon containing the enemy, we at once keep our expenditure of material and our operating effort within reasonable bounds; while at the same time we derive the maximum benefit from each mine planted.

Experience has demonstrated the necessity of locating mine fields sufficiently near our own bases to insure proper support both to the mines and to the patrols.

We therefore conclude our basic mining policy to be—

"To concentrate mining effort upon containing enemy submarines, locating barrages sufficiently near our bases to insure adequate support to mines and to patrols."

Obviously the exits from the most important bases need blocking first. Present plans to barrage Dover and Scotland-Norway are therefore sound. In view of the shorter distance to the operating ground offered by the Dover route to the enemy, we conclude—

"First to make the Dover passage unprofitable to the enemy."

We suggest the desirability of a surface barrage from Kentish Knock to the vicinity of Dunkerque, and of a deep barrage from Hastings to Touquet Point, as desirable measures additional to the present effort at Dover.

NORTHERN BARRAGE.

The present plans for the Northern Barrage have been discussed in previous papers. The net result of collaboration of the British and American authorities has been—

(*a*) The joint decision to lay the Northern Barrage.

(*b*) The British decision to stop the barrage outside neutral waters.

(*c*) The British decision to support the patrol of the barrage from home waters—this decision being necessary because of political considerations.

(*d*) The British decision to adhere to the open-ended barrage until its efficiency is demonstrated by experience.

The efficiency of the open-ended barrage depends on the efficiency of patrol support as a means of keeping submarines submerged beyond 40 feet. The waters that must be patroled are:

	Miles.
Deep mine field, Area B	50
Open water, Area B	15
Deep mine field, Area C	50
Norwegian waters, Area C	30
Total patrol line	145

Assume most favorable conditions, viz:

(*a*) Good weather.
(*b*) Good visibility.
(*c*) No breakdowns of trawlers.
(*d*) Listening equipment good for 2 miles.
(*e*) Speed of trawlers, 10 knots.
(*f*) Stay at sea 8 days.
(*g*) Stay in port 8 days.
(*h*) Perfect position keeping is possible.

	Miles.
Average distance of Area C trawlers from base is	160
Average distance of Area B trawlers from base is	35
Allow one trawler on station every 4 miles:	
Trawlers required on station will be—	
Area B	16
Area C	20
Total trawlers required for—	
Area B	32
Area C	52
Total	84

If, instead of the most favorable operating conditions and the greatest possible efficiency of units, we assume excellent average conditions, not less than double the above number of trawlers will be required to maintain a semblance of efficient patrol, which exceeds the number available.

In bad weather the patrol will offer no opposition to the passage of submarines; witness recent efforts in Fair Island passage, where trawlers were driven off by bad weather repeatedly, and thus allowed submarines to pass whose approximate time of arrival was known.

Bad weather will scatter patrol forces, with all the consequent damage to vessels, vessels' equipment, and to personnel. The usual practice now is to send trawlers in every four days for provisions; for trawlers to seek shelter in bad weather; and for the trawlers to stay out a total of eight days per trip. In spite of these comparatively mild operating conditions, trawler service is very strenuous. It is now proposed to make the service in Area C at least twice as strenuous as heretofore and to expect efficiency. There will be no

efficiency in rough weather, nor for a day or two after bad or thick weather.

Trawlers are not accustomed to deep-sea navigation, so that position keeping is going to be bad. Thick weather will invariably favor the submarine.

From these considerations we conclude that Area C (if deep mined only) will never present any real deterrent to the passage of enemy submarines. Those that pass to the eastward of Area A, however, will have to travel about 90 to 120 miles farther to reach the Atlantic than they travel at present when using the Fair Island passage. Were Area C mined to the surface and up to the territorial waters of Norway, enemy submarines would (if they avoided the barrage by passing through Norwegian waters) travel 120 to 150 miles farther to reach the Atlantic. Either of these detours means only the loss of one operating day per trip—a loss not sufficient to justify so great an effort on our part as the laying of the barrage.

The difficulties of the patrol of Area B and of the open water to the westward are far less than the difficulties in Area C, and more like the well-known difficulties at Dover, minus raids.

Assuming that the enemy will know of the clear water west of Area B, we see no great difficulty for him in gaining the Atlantic by this route, thereby avoiding the loss of a day in making the eastern detour.

It is obvious that if State policy or other considerations require gaps at each end of the line, such gaps must be greatly reduced. We believe that the eastern gap should not exceed 3 miles in length and the western 20 miles.

We must recognize the ultimate necessity of closing these gaps altogether, and must so draw our original plans as to cause ourselves no unnecessary inconvenience or delay in taking these final steps when necessity arises.

The effectiveness of the barrage will eventually require a Norwegian base. While we will not need the services of the base until patrol of Area B is begun, it is highly desirable that the enemy be prevented from securing for himself the base which we desire. We should at once seize the base; or, if State policy does not permit this step at present, we must be prepared to drive the enemy out very promptly should he forestall us.

In view of the probable completion of the barrage in the autumn if pushed to completion continuously, we should consider the alternative of postponing the laying operations so as to finish next spring, when patrolling can be more efficiently conducted. Reasons which favor postponement are:

(*a*) Winter weather, which will damage the barrage and require renewals.

(*b*) Difficulty of winter patrolling and consequent relative inefficiency of the barrage during bad weather and long nights.

(*c*) Pressing need for mining elsewhere in northern waters.

Reasons against postponement are—

(*a*) A concentration on this project to the exclusion of others in northern waters may expedite its final completion so as to have it effective in the late summer.

(*b*) The barrage will be partially effective at all stages of completion.

(*c*) The sooner we approach to the fundamental principle of preventing egress from enemy bases the greater will be our freedom and flexibility of action in undertaking offensive antisubmarine measures.

(*d*) Deep mines can be but very little affected by winter weather, and they constitute the major portion of the barrage.

(*e*) A shipping crisis may arise requiring the virtual or partial abandonment of the convoy system in order to reduce the loss of efficiency in freight carriage which the system entails. If, then, we have the Northern Barrage completed, or even completed in the deep fields only, we are in a position to effectively vary our antisubmarine strategy and concentrate several hundred destroyers and many more trawlers, etc., in the North Sea.

(*f*) The barrage must not be considered as an undertaking which will ever be complete while the war lasts. It is a project requiring almost continuous mining. The greater the number of mines laid the more effective it will be. The project is such a great one that wisdom requires us not to delay in reaching even partial efficiency.

(*g*) American mines whose upper antennæ become destroyed by wave action are still effective as deep mines.

With respect to the Northern Barrage, we therefore deduce our policies to be—

1. To concentrate upon vigorous mine-laying measures to the exclusion of other northern theaters except Dover.

2. To modify original plans so as to cause ourselves no unnecessary inconvenience in the final stages of closing gaps.

3. To seize a Norwegian base; or, if State policy forbids this at present, to be prepared to drive out the enemy promptly should he seize such a base.

4. To abandon the Northern Barrage unless its design is corrected.

THE MEDITERRANEAN.

The area next in importance after the North Sea is the Mediterranean, where the enemy has bases in the Adriatic and inside the Dardanelles. The shipping losses by enemy action in this area amount to 30 per cent of the total.

Recent political events may result in the enemy becoming a Black Sea naval power. It is important, therefore, that the Dardanelles exit be mined.

Plans now under consideration contemplate an allied naval offensive in the Adriatic, which includes "mining-in" Adriatic bases. Should such a decision be reached it will be possible to undertake some mining there without interfering with the effort at Dover or in the North Sea. It may possibly require a slight retardation of the Northern Barrage to insure the early completion of the Adriatic Barrage.

Sound strategy requires a concentration of our strength at points of enemy weakness. We will be justified in somewhat retarding the Northern Barrage if, by so doing, the Mediterranean situation can be adequately dealt with promptly. In this case the general strategic principles are fortified by the promise of an early release of large antisubmarine forces for employment in the north, as well as by partially relieving the acute shipping situation through the abandonment of convoy operations in the Mediterranean.

We therefore conclude our policy to be:

A. When decision is reached for an Adriatic offensive to lay a barrage there, retarding the Northern Barrage if necessary.

B. To "mine-in" the Dardanelles entrance.

AUXILIARY MINING OPERATIONS.

Until the foregoing primary policies are completed, we can not afford to engage in any secondary mining operations which will interfere with them. To do so will mean long continued inefficiency of our measures as a whole. The interval of comparative inefficiency must be made as short as possible, which necessitates concentration of present effort upon primary needs.

The only justification of a departure from these principles will be a crisis of a nature which will not permit sufficient time to complete the major projects. Such a crisis is not to be expected before autumn, which coincides with the approximate date of completion of the largest project—the Northern Barrage—if it be pushed vigorously to completion.

Auxiliary operations in support of the major projects should receive first consideration.

The mining in of the Helgoland Bight and the Kattegat accords with our general mining policy of containing the enemy; but we can not rely upon the efficiency of such operations. During the winter we have had considerable success in the Bight with the ordinary type of mine. A nonsweepable type will be essential to equal success during the summer. In the Kattegat, unless we are prepared

to undertake a major operation, and to violate the neutrality of Sweden, Denmark, and Norway, we can not have an efficient barrage. The best auxiliary effort we can make is a deep barrage combined with a patrol of submarines.

The second form of auxiliary effort to be considered is the defense of shipping. For this work the mine is especially useful in coastal waters where traffic becomes concentrated, and in waters less than 40 fathoms deep where hunting is difficult owing to the ability of the submarine to bottom.

As the Dover and Northern Barrages become effective, we must expect increased enemy activity on the east coast trade of Great Britain. Here water is less than 40 fathoms, so that the mine may be used profitably in conjunction with other forms of defense. This area requires special study.

Similarly the Irish Sea and English Channel require separate treatment.

Summary of Mining Policies.

1. To concentrate mining effort upon containing enemy submarines, locating barrage sufficiently near our bases to insure adequate support to mines and to patrols.
2. First to make the Dover Passage unprofitable to the enemy.

NORTHERN BARRAGE.

1. To concentrate upon vigorous laying of the Northern Barrage to the exclusion of other northern theaters except Dover.
2. To modify original plan so as to cause ourselves no unnecessary inconvenience in the final stages of closing gaps.
3. To seize a Norwegian base; or, if State policy forbids this at present, to be prepared to drive out the enemy promptly should he seize such a base.
4. To abandon the Northern Barrage unless its design is corrected.

MEDITERRANEAN.

1. When decision is reached for an Adriatic offensive to lay a barrage there, retarding the Northern Barrage if necessary.
2. To mine in the Dardanelles entrance.

AUXILIARY MINING.

1. To refrain from auxiliary mining except such as will not interfere with the main projects, and except in the event of a crisis of nature which will not permit sufficient time to complete the major projects.

2. To give special study to the question of the protection of merchant vessels by mining operations on the east coast of Great Britain, in the English Channel, and the Irish Sea.

(B) PRESENT AND FUTURE MINING POLICY.

[Joint estimate of the situation by the British and American Planning Divisions. 18 March, 1918.]

General situation: As at present. British vessels have begun laying the Northern Barrage. American vessels will not begin before May.

Special situation: The British and American Planning Divisions decide to review the present and future mining policy, with particular regard to the Northern Barrage.

Required: Estimate of the situation, and decisions covering—

(*a*) Advisability of retarding or modifying the laying of the barrage.

(*b*) Details of any mining plans proposed as a substitute for, or in addition to, the Northern Barrage plan.

MISSION.

To determine present and future mining policy, with particular regard to Northern Barrage.

GENERAL CONSIDERATIONS.

1. The Northern Barrage can not be completed before the autumn. One system should be completed by about July 1.

2. It is of vital importance to keep down our tonnage losses this summer. The measures taken must, therefore, be such that they become effective to some degree at once, and improve as they approach completion.

3. The object in view is to decide what is the best use to make of the resources available for mining operations.

4. If we vigorously oppose the enemy's submarines with mines and patrol craft, he will attempt to remove the obstacle by strong raiding attacks. The mine fields must, therefore, be placed so as to obtain the utmost concentration of our patrol forces in positions from which the enemy can not drive them.

5. We therefore conclude that our present policy of concentrating our main mining effort on confining the submarine to the North Sea and locating the barrages in the Norway-Orkney and Dover areas is sound and should be continued.

6. Although alternative proposals to block the Helgoland Bight and Kattegat by intensive mining have been examined (vide P. D. 054) and rejected, this policy may eventually become necessary, and

with this end in view it is strongly recommended that a large reserve of mines should be accumulated, the British and United States of America mine-laying capacity increased, and that the Allies should quickly make themselves independent of Swedish supplies.

THE NORTHERN BARRAGE.

7. It is assumed that the present plans for the Northern Barrage are known.

8. It will not be complete during the summer months of 1918, when the best value can be got out of our patrol craft.

9. It may be, therefore, all the more important to obtain the maximum concentration of patrol craft in these waters as early as possible.

Further study to this subject should be given by the British and American Planning Sections as soon as possible.

9a. It is considered that the sequence of laying the deep mine field in Area B (western section) should be so arranged as to obstruct the normal approach of submarines to the Fair Island Channel as early as possible. It is understood that this is being arranged.

10. The following previous decisions appear to require examination:

(*a*) The decision to stop the barrage outside neutral waters.

(*b*) The decision to support the patrol of the barrage from home waters, thus abandoning the idea of a Norwegian base.

(*c*) The decision to adhere to the open-ended barrage only until experience shows that it can not be effectively patrolled.

11. To economize patrols in Area B provision should be made to extend the surface mine field west from Area A as soon as our resources admit, so as to reduce the width of the western gap to not more than 20 miles.

12. Area C—the portion next the Norwegian coast—is difficult to patrol without a base on that coast. With the present arrangements for patrolling Area C, the work will be at least twice as strenuous as any hitherto demanded of the trawler service.

13. It is therefore considered that if Area C is deep mined only it will never present any real deterrent to submarines.

14. The efficiency of Area C would be increased by laying a surface mine field also and reducing the gap at the Norwegian end of the barrage to the 3 miles of territorial water.

15. If Area C is closed as above, and proclaimed, submarines can avoid it by using Norwegian territorial waters, and unless it is decided to attack them in neutral waters, this gigantic mining effort will be rendered useless.

16. Norway can hardly be expected to resist the passage by German submarines; and should the situation arise, it would be neces-

sary to exercise a control over Norwegian territorial waters or to seize a Norwegian base.

17. The course of action which would best overcome all the difficulties detailed in paragraphs 12 to 16 would be to seize, at the earliest possible moment, a base in Norwegian waters. This subject has been investigated more fully in P. D. 049.

18. It must be recognized that the establishment of such a base is necessary to render the Norwegian barrage complete, and it is for the government of the day to decide whether the great naval advantages which would follow from this course of action would justify the infringement of Norwegian neutrality.

19. It is assumed that if this is decided in the negative we shall still be prepared to attack enemy submarines in Norwegian territorial waters; otherwise the laying of the barrage would be a gigantic waste of effort, and should be abandoned forthwith.

20. As the Northern Barrage can not be completed before autumn, it has been suggested that the laying operations should be postponed so as to finish next spring, when patrolling once again becomes effective.

21. Reasons which favor the postponement are:

(*a*) Difficulty of winter patrolling, and consequent inefficiency of the barrage during bad weather and long nights.

(*b*) Wastage of barrage and patrols may be out of proportion to the results obtained.

(*c*) Possibility of using the mines more effectively elsewhere.

22. Reasons against postponement are:

(*a*) The barrage will be particularly effective at all stages of completion; and the need for dealing with submarines at once is pressing.

(*b*) The deep mines, constituting the greater part of the barrage, will be little affected by next winter's weather. American mines whose upper antennæ are destroyed by wave action are still effective as deep mines.

(*c*) If a shipping crisis arises, requiring the virtual or partial abandonment of the convoy system in favour of the blocking of the North Sea, exists, the existence of part of the Northern Barrage will economize patrols.

CONCLUSIONS.

23. It is considered that our policy should be—

(*a*) To concentrate our main mine-laying resources upon the Northern Barrage and Dover.

(*b*) To arrange the sequence of laying deep mines in Area B, so as to cover the approach to the Fair Island Channel as soon as possible. It is understood that arrangements have already been made to do this.

(*c*) To provide for the ultimate extension of the surface mine field over Area C to Norwegian territorial waters and part of Area B.

(*d*) To be prepared to patrol Norwegian territorial waters, or to seize a base in Norway, so as to facilitate the patrol of Area C; or, if State policy forbids the latter course, to be prepared to eject the enemy promptly should he seize such a base.

24. It is almost certain that the Northern Barrage, as at present designed, will not fulfill its purpose; and great importance is attached to the above recommendations.

25. In view of the coordination required between the mine laying, the patrols, and the Grand Fleet, the whole of the operations should be conducted by commander in chief, Grand Fleet, and all the necessary vessels should be under his command. It is understood that the admiral now commanding the Northern Barrage patrol is acting under the commander in chief's orders.

26. Similarly, the whole of the operations in the Narrow Seas, including the blocking of the Dover Straits, should be under one command.

MEDITERRANEAN.

27. The shipping losses by enemy action in the Mediterranean are 30 per cent of the total. This area, therefore, is second to the North Sea in importance.

28. The enemy has bases in the Adriatic and inside the Dardanelles; and extension of his resources within the Dardanelles exit in the future is by no means improbable.

29. Plans now under consideration contemplate an allied naval offensive in the Adriatic, which includes mining-in Adriatic bases. Vide American Problem No. 5. Steps should be taken now to provide any additional facilities required.

AUXILIARY MINE-LAYING OPERATIONS.

It would be bad policy to undertake any auxiliary mine-laying operations which did not assist—or, at any rate, tended to interfere with—the execution of the main operations already discussed.

The only justification for departure from this principle would be the anticipation of a crisis of such a nature that the major operations could not be finished in time to effect our object.

The mining of the Helgoland Bight has had considerable success; but reliance can not be placed on the efficiency of such operations in future, especially during the summer when sweeping is easier.

For the defense of shipping the mine is useful in coastal waters, where traffic becomes concentrated, and in water of less than 40 fathoms, where hunting is difficult, owing to the ability of the submarine to lie on the bottom.

Auxiliary mining operations of this description, in conjunction with other forms of defense, are likely to be profitable on the east coast of Great Britain, in the English Channel, and in the Irish Sea. Each of these areas requires separate study and treatment. If these operations released patrol craft for Dover or for the Northern Barrage they would directly assist the main projects.

SUMMARY OF CONCLUSIONS.

It is considered that our general policy should be—

(*a*) To concentrate our main mine-laying resources upon the Northern Barrage and Dover.

(*b*) To modify the Northern Barrage in accordance with the suggestions in paragraph 23.

(*c*) Until Dover is complete and the Northern Barrage well advanced, to undertake no other extensive mine-laying operations which might interfere with these projects.

(*d*) To be prepared to undertake rapidly an operation on the Norwegian coast, should the political situation give an opening for it, or should Germany take the initiative.

(*e*) To give further study to the question of concentrating as early as possible, a proportion of the auxiliary patrol trawlers and escort destroyers in the northern area, and placing the whole of the operations in these waters under the control of the commander in chief, Grand Fleet.

(*f*) To undertake mining operations in the Adriatic and at the Dardanelles, and to provide any additional facilities required.

(*g*) To refrain from auxiliary mining, except such as will not seriously interfere with the main projects.

(*h*) To give special study to the protection of merchant vessels, and the economizing of patrol vessels by mining operations on the east coast of Great Britain, in the English Channel, and in the Irish Sea.

(*i*) To increase British and American mine-laying capacity, and to accumulate a large reserve of mines.

(C) MINING POLICY IN THE KATTEGAT.

[As prepared by Plans Division, British Admiralty. March 15, 1918.]

Particular attention is drawn to paragraph (*d*) in the summary of contents and paragraphs 17 and 18.

Very extensive and continuous mining operations in the Kattegat and Helgoland Bight may eventually prove necessary as a last resource for dealing with the submarine menace during the winter.

In order that we may be prepared to carry out the policy a large reserve of mines should be accumulated, the present mine-laying

capacity increased, and the Government urged to make definite arrangements for rendering the Allies independent of Swedish supplies.

SUMMARY OF CONTENTS.

This paper examines the question of mining the Kattegat and comes to the following conclusions:

(*a*) The comparatively small delay which a deep and shallow mine field completely blocking the Kattegat might exercise on the enemy's submarines would not repay the extreme probability of Swedish and Danish hostility, and this course of action is not recommended at present.

(*b*) If a clear channel were left on both sides of mine field for the passage of neutral shipping through territorial waters, the neutrality of Sweden and Denmark would probably be maintained, but there would be great difficulty in supporting the mine field and preventing the passage of submarines through territorial waters. Although the laying of such a mine field is examined in Appendix II, it is not recommended.

(*c*) Mining operations in the Kattegat should for the present be confined to deep mine fields, watched by submarines and occasionally patrolled by surface craft as recommended in P. D. 041 or 20/1/18.

(*d*) Mine laying on a very large scale, commencing in the vicinity of the Sound and Belts, in conjunction with similar operations in the Helgoland Bight, may eventually become necessary as a last resource. In anticipation of this the British and American Navies should increase their mine-laying capacity and the Allies should make themselves independent of Swedish supplies.

Appendix I deals with the economic effect of Swedish and Danish hostility.

Appendix II examines in detail the laying of a combined deep and shallow mine field in the Kattegat, on the assumption that a clear passage must be left for neutral shipping.

[Reference: Chart No. 2114.]

1. It has been suggested that the idea of the Northern Barrage should be modified in favor of deep and shallow mine fields in the Kattegat and Helgoland Bight.

2. The main spheres of mining effort are at present—

(*a*) The Northern Barrage.

(*b*) Dover.

(*c*) The Helgoland Bight.

3. The mining policy with regard to (*b*) and (*c*) does not appear to be questioned, and the matter resolves itself into the possibility

of mining the Kattegat, with consequent modifications in the plans or time-table of the Northern Barrage.

4. An operational distinction must be drawn between patrolled and unpatrolled mine fields, for the latter can never be a permanent obstacle. The comparative success of those in the Bight are due to special circumstances, and the fact that the enemy prefers the line of least resistance through the Kattegat.

5. The possibility of mining the Kattegat has been carefully considered on various occasions, and in January, 1918, it was suggested that a deep mine field should be laid on the east side of Laeso Island, between Kobber Grund Light and Malo Island, with occasional surface craft patrols as an essential part of the operation (vide P. D. 041 of 20/1/18).

6. If this plan had been carried out submarines entering or leaving the Kattegat submerged would have had to pass through mined areas and these would have been temporarily controlled by destroyer forces supported by the Grand Fleet during periods of special submarine activity.

7. A shallow mine field right across the Kattegat would for all practical purposes shut off Sweden and Denmark from the outside world. It would exercise the severest pressure on Sweden, and besides making her entirely dependent on Germany, would deprive the Allies of certain important supplies (vide Appendix I).

8. The risk of Sweden and Denmark joining Germany should, however, be accepted, and no question of international law should be allowed to stand in the way if the suggested mine field were likely to limit to any great extent the enemy's submarine activities.

9. Once, however, the passage of submarines was seriously threatened, the enemy would strike at the points of resistance, and unless we are prepared to fight the enemy fleet simultaneously in the Bight and Kattegat, the permanent blocking of these areas does not appear to be practicable (vide Appreciation on blocking the German rivers and Baltic, prepared by the Planning Section in August, 1917).

10. Also if the Kattegat were completely blocked by mines, it is almost certain that the Danes and Swedes would join Germany in assisting to clear a passage up the coast, and the sweeping operations would be supported by the High Seas Fleet from convenient Swedish anchorages such as Marstrand Fiord.

11. The conclusion is that the comparatively small delay which such a mine field might possibly exercise on the enemy's submarines would not repay the extreme probability of Swedish and Danish hostility.

12. If, however, a deep and shallow mine field (for details of mine field vide Appendix II) were laid in the area lying between the Skaw and the Patternoster Rock, and particular care were taken to leave

a clear passage for neutral trade through Danish and Swedish territorial waters, these countries would not be seriously affected, and their neutrality would probably be maintained.

13. But the dangerous areas would have to be notified and there is little doubt that neither the Swedes nor Danes would seriously dispute the passage of enemy submarines through their territorial waters. The efficiency of such a mine field would, therefore, depend on our ability to prevent sweeping operations and the use of territorial waters by enemy submarines.

14. No reliance should be placed upon our submarines for exercising this control, and the most we could do in that direction would be an occasional patrol by destroyers supported by the Grand Fleet. The mine field would also require about 4,000 mines, thus delaying the Northern Barrage by about three weeks.

15. Although a plan (vide Appendix II) for a combined surface and deep mine field in the Kattegat has been worked out, it is not recommended for adoption.

16. It is considered that mining operations in the Kattegat should for the present be confined to deep mine fields occasionally patrolled by surface craft (vide P. D. 041 of 20/1/18) and that during the forthcoming summer we should concentrate our patrol and mining efforts on the areas where they can be supported.

17. Although the blockade by shallow mines of the Kattegat is not recommended at the present time, it may eventually be found necessary as a last resource, especially during the winter months when sweeping operations in the Helgoland Bight are difficult.

18. For such a campaign to have any considerable delaying action on the submarine campaign it would have to be carried out on an exceptionally large scale and operations would have to commence well to the southward in the vicinity of the Sound and Belts. It would first be necessary to increase the British and American mine-laying capacity, and the Allies would have to make themselves independent of Swedish supplies.

Appendix I.

1. The situation, if all sea-borne traffic via the Skagerrack and Kattegat were cut off from Sweden and Denmark, requires to be examined under four headings:

(1) The effect on Sweden.
(2) The effect on the Allies as regards Sweden.
(3) The effect on Denmark.
(4) The effect on the Allies as regards Denmark.

The following authorities have been consulted: Trade Division, War Trade Int. Department, M. I. 6 B., Iron and Steel Production

Department (of Munitions Supply Department), Director of Ball Bearings (of Small Tools Department), and Explosives Supply Department.

THE EFFECT ON SWEDEN.

(*a*) Sweden would practically starve.[1] At the best she would be reduced to the same condition as Germany, provided she placed herself unreservedly in Germany's hands and invoked her economic assistance. In short, she would be driven into Germany's arms.

(b) As regards coal, however, Sweden depends on our supplies[2] to enable her to eke out her requirements; as it is, wood is being largely used on the railways. Germany would not be able to make good the loss of our coal exports to Sweden, owing to her impaired railway facilities.

NOTE.—Access to the ports of Stromstak, Uddevalla, and Gothenburg would probably permit of sufficient supplies reaching Sweden to keep her from actual starvation. But there is little doubt that the indignation and feeling aroused would very seriously prejudice important supplies of ball bearings and carbide and would shatter any chance of effecting an arrangement for limiting Swedish exports of ore to Germany. (See par. 3.) Indeed the probability is that Sweden would join the Central Powers.

EFFECT ON THE ALLIES AS REGARDS SWEDEN.

(*a*) One-third of our requirements of ball bearings is supplied by Sweden. We have recently had to offer her inducement to increase her output in order to enable us to cope with aircraft, tank, and other construction. Our own output is increasing, but in the most favorable circumstances we should not be self-supporting in respect of bearings for at least four months, and then only if our requirements had not materially increased in the meantime. The Small Tools Department of the Ministry of Munitions consider that deprivation of Swedish ball bearings at the present juncture would be in the nature of a disaster.

(*b*) With regard to Swedish iron ore, we have a year's requirements waiting shipment at Narvik. The Foreign Office, however, attach great importance to bringing off a contract with Sweden for 2,450,000 tons of ore. This would reduce the amount exportable to Germany from 5 million to 3½ million tons per annum—an amount which is considered inadequate for Germany's needs and which will result in disorganization and an increased demand for fuel and labor combined with a diminished output. The Foreign Office attach great importance to the completing of this contract as a measure calculated to hinder gravely Germany's conduct of the war. They do not

[1] Sweden imported 120,000 tons of corn and grain and 45,000 tons of fodder during 1917 from overseas.

[2] We supplied 700,000 tons of coal and coke during 1917.

credit Dutch reports as to the large reserves of Swedish ore held by Germany.

(*c*) By the terms of an agreement which it is expected will be ratified shortly, the Allies will obtain practically the bulk of Swedish shipping.

(*d*) France depends on the Norsk Hydro for ammonium nitrate.[1] The Norsk Hydro produces this synthetic nitrate from cyanamide, the great bulk of which is provided by the North Western Cyanamide Co. of Norway. In its turn the cyanamide is formed from calcium carbide, obtainable only from the Alby Carbide Co. of Sweden.

THE EFFECT ON DENMARK.

(*a*) Denmark depends on our exports of coal to eke out her requirements. It is not considered that Germany could make good the deficit [2] consequent on our stoppage of export.

(*b*) Denmark would certainly be driven commercially into the arms of Germany, although she would have sufficient food for her own requirements.

(*c*) By an agreement which it is expected will shortly be ratified we shall obtain a large proportion of Danish shipping in return for supplies on what is considered a satisfactory rationed basis.

EFFECT ON THE ALLIES AS REGARDS DENMARK.

Danish exports of food to the United Kingdom are convenient but not essential.

APPENDIX II.

MINE FIELDS IN KATTEGAT.

[References: Charts Nos. 2114 and 129; Tides and Tidal Streams, 1909, p. 158; North Sea Pilot, Part IV, p. 308 (Skaw); Norway Pilot, Part I, pp. 412–424 (Swedish coast).]

1. Owing to the delay in the completion of the Northern Barrage, the possibility of interim schemes requires consideration.

2. The object in view is to produce the maximum interference possible with the passage of submarines through the Kattegat, while leaving a free passage open to neutral shipping.

3. Two proposals have been considered:

I. Mine fields on either side of Laeso Island (57° 16′ N., 11° 0′ E.), the eastern one running to Tistlarne (57° 31′ N., 11° 44′ E.)

II. A mine field from the Skaw to the Paternoster Rocks (57° 54′ N., 11° 30′ E.), on the Swedish side.

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[1] In a note (dated 16/12/17) from the French General Staff it is stated that it is quite out of the question for France to dispense with her supplies of ammonium nitrate.

[2] We supplied 900,000 tons of coal and coke during 1917.

4. *Laeso field.*—This field includes four strips of territorial water, two of which present no serious difficulty to submarines on the surface:

(i) Land Deep, between Jutland and Laeso Channel light vessel (57° 13′ N., 10° 42′ E.).

(ii) Off Syr Point, the northeast corner of Laeso Island.

There is no good channel for neutral shipping, except the inner channel on the Swedish side, north of Varo Island (57° 33′ N., 16° 48′ E.).

This mine field, therefore, would obstruct neutral shipping and, if proclaimed, would not seriously incommode submarines unless the exits were patrolled.

5. *Skaw-Patternoster field.*—A clear passage must be left for neutral shipping both sides of the Skaw light vessel.

If territorial waters are respected, a channel must be left to the west and north of the Paternoster Rocks.

An inner channel passes west of Vanholmar Island (57° 57′ N., 11° 31′ E.).

In view of the easterly set and the danger of passing close to the Paternosters in a westerly blow, it appears possible that neutral shipping would use the inner channel in preference, although local pilots would be necessary. The complete closing of this channel within the territorial limits might not therefore be greatly resented.

As the depth of water increases to the northward of the proposed field, it does not lend itself to reinforcement.

The current off the Skaw rises to 4 knots in gales, particularly from the west, but is normally 1¼ knots.

6. The Skaw field leaves one good exit and one awkward one unobstructed; the Laeso field, two good exits and two awkward ones, all being farther from British bases. The Skaw field is therefore considered the better one; but owing to the difficulty of patrolling neutral waters, neither can be considered as a satisfactory obstacle.

7. *Details of proposed Skaw-Paternoster mine field.*—

Safe channel: From Skaw light vessels to Laeso Trindel light vessel (139° true).

Southern boundary: 81° 6 miles from Skaw to 252° 3 miles from Paternoster Lighthouse. If it is decided not to respect territorial waters at this point, the mine field may be carried in as close to Paternoster Rocks as weather conditions at the time of laying permit.

Mines.

H. 11, 150 feet apart in 5 rows, at 8, 38, 68, 98, and 128 feet; length, 18 miles:

Number of mines	3,600

Additional 2 rows, at 158 and 188 feet, closing the lower depths of Rannan Deep; length, 4 miles:

Number of mines	320
Total mines	3,920

Dip, 1 foot in 50 fathoms; rise, 1 foot; probability for submarine on surface, 5 to 10 per cent.

8. If the field is carried into territorial waters at the Paternosters another 400 mines will be required.

9. *Estimated time to lay 4,000 mines in this field.*—If the mine layers *Princess Margaret*, *Angora*, *Amphitrite*, and *Wahine* were used, carrying 1,230 mines in all, the field would take three weeks to lay.

10. To complete the obstacle, patrols are required—

(*a*) Off the Skaw.

(*b*) Northwest of the Paternoster Rocks. (*b*) can not be carried out unless the weather is settled. It will be unnecessary if the weather is bad.

11. As the position of the mine field, when proclaimed, will be known to the enemy, he can only be stopped from sweeping it by regular patrols or checked by irregular raids. As there is little space for extending the field to the northward, it can not resist sweeping operations for very long.

(D) ANTISUBMARINE CAMPAIGN, 1918.

[Appreciation by British Admiralty, Plans Division. February 7, 1918.]

SUMMARY OF CONTENTS.

General situation.—The strategical aspect of the enemy's submarine campaign. Its defeat depends on establishing a definite control over the North Sea exits. The Northern Barrage is a very important means to that end, but its success will depend entirely on the possibility of supporting the patrols in Area C. It is clearly demonstrated that this can not be done from Scapa or Rosyth and that, like a girder supported at one end, the plan will collapse unless a base is established in Norwegian waters.

General disposition for control of barrage.—Reasons why the establishment of a base in Norwegian waters will advance the Allies' cause. Alternative proposals as to the size and nature of the detachment. Sums up in favor of battle cruisers, submarines, etc. Discusses the relative advantages of Skudaenaes and Selbiorns Fiord, and concludes that the former is preferable.

Patrol of the North-Sea barrage.—The part which the Grand Fleet plays in the control of the Northern Barrage is the crucial question in the 1918 antisubmarine campaign. Is the battle fleet to

be primarily disposed for securing the antisubmarine blockade, and the Grand Fleet destroyers employed hunting submarines where they will also be available to support the battle fleet in performing that function, or is it to be kept ready and equipped to dash after the High Sea Fleet, irrespective of the enemy's object? If the latter course is followed and the patrol of the barrage is delegated entirely to trawlers and sloops, the submarine will probably continue to pass. It is suggested that the primary function of the Grand Fleet should be defined as the support of the barrage and the prevention of submarine passing out of the northern exit. This policy would entail the acceptance of certain minor risks which are dealt with in detail. Measures for strengthening the control of the southern area and east coast communications. Remarks on the patrol of the barrage. General strategical policy is summarized.

Political aspects of the question, etc.—The Norwegian people would have welcomed the seizure of a base early in 1917. The preservation of strict neutrality now the guiding idea of the Government. This change of attitude simplifies the situation in certain respects. Most important that the anchorage should be seized without any preliminary overtures. Norway's probable attitude and possible courses of action. Arguments justifying the proposed course of action. International relations based on reciprocity; and to adhere to conventions, whilst the enemy abandons those that do not suit him, is suicidal. The rights of small nations can not be reestablished unless the submarine is defeated. The question of territorial waters. Analogy from the Helgoland Bight and enemy use of Danish territorial waters.

Decisions Required.

Decisions would appear to be necessary on the following points:

1. Is the 1918 antisubmarine campaign to be directed mainly toward obtaining a control of the North Sea exits?
2. If so, is a base in Norwegian waters necessary for the support of the patrols in Area C of the barrage?
3. If it is not necessary, how are the patrols to be supported?
4. If it is decided that a base is necessary, what is to be the size and nature of the detachment, and where is it to be based?
5. What are to be the functions of the Grand Fleet in the 1918 antisubmarine campaign?
6. If its correct functions are those suggested in this paper, is the control of the southern area to be strengthed by a modern battle squadron in the Swin, etc.?
7. If it is decided to seize an anchorage in Norwegian waters, when is it to be done, what procedure is to be followed, and what excuses are to be made?

GENERAL SITUATION.

1. Attempts to defeat the submarine campaign mainly on a basis of local trade protection have been a failure, in the sense that if sinkings are not permanently reduced during 1918 the war will probably have an unsatisfactory ending.

2. Success in the future depends on the possibility of establishing control of the North Sea exits, conjoined with convoy protection.

3. It can not be too strongly emphasized that the enemy's main line of strategy lies in submarine activity against commerce. If we vigorously oppose his submarines with mines, light craft, and aircraft, he will be forced to reply with light cruisers and destroyers. If we can drive these back he will be forced to bring out more powerful vessels, and finally his battle fleet may be drawn into the arena to becide the issue. This is briefly the stategical aspect.

4. The success then of the gigantic mining operations in the North Sea will finally depend on our ability to concentrate superior forces at any threatened point of the barrage.

5. The position of the barrage most liable to attack is that lying between 60° and 61° N., and extending about 50 miles from the Norwegian coast (Area C). It is to be permanently patrolled by 24 trawlers, 6 sloops, and 1 bulged predreadnought battleship.

6. Their function is to drive the enemy's submarines down to the deep mine field, which will extend across this area in 150 fathoms at a minimum depth of 65 feet below the surface. Also to hunt them with hydroplanes and depth charges.

7. It is doubtful whether 30 vessels can exercise this function over 3,000 square miles of water unless they compare very favorably with the submarines as regards speed and gun power; but this is not the case, the ordinary U-boat being credited with 17 knots on the surface and a 4.1-inch gun, whilst the large submarine-cruisers carry two 5.9-inch.

8. It is unlikely that trawlers and a few sloops with a cruising speed of about 10 knots will force submarines to submerge over such a large area. On various occasions, both at home and abroad, trawlers hunting submarines have been able to do nothing when the latter have come to the surface and continued their journey. If the mine field is to fulfill its real purpose, destroyers must support the sloops and trawlers.

9. But whether these trawler patrols are able to make the enemy submerge or not, their presence will soon be known, and the whole system will break down unless they can be supported and strongly supported.

10. Ability to support the patrols depends upon our ability to concentrate superior forces against the enemy before he attacks, but, failing that, it will be possible to maintain the patrols if we can

intercept the enemy before he reaches the south of Norway on the return journey through the Kattegat.

11. As the distances from the Naze to the center of Area C, Rosyth, and Scapa are 190, 370, and 350 miles, respectively, this can not be done from Rosyth or Scapa unless early and accurate information is received of the enemy's outward journey.

12. It is proposed to station submarines in a southwesterly direction from the Naze, but they will be submerged during the greater part of the day and will be practically useless at night as lookouts. Their hydrophones, which are supposed to detect surface vessels up to 10 miles, will be of very little service in this respect because they can not differentiate between types and numbers of ships.

13. If the support of the patrols in Area C is to be dependent on these submarines, and forces are to be rushed across the North Sea in response to vague, and possibly inaccurate, hydrophone reports, the supporting forces, as well as the trawler patrols, will be exposed to serious risks.

14. If the enemy brings out his battle cruisers, as he undoubtedly will sooner or later, their speed and gun power will render this blockade extremely hazardous and inefficient, unless the light craft are closely supported by capital ships.

15. The blockade force has the great advantage of the initiative. It can come out at any time of the night or day with concentrated forces tuned up to the highest point of preparedness, whereas the movements of the defending force are probably based on vague and inaccurate reports.

16. Under these circumstances a process of attrition will set in in Area C. Trawlers, sloops, and bulged battleships will, unless they are strongly supported, gradually disappear, whilst, even if early and accurate information is received of the enemy on his outward journey, Scapa or Rosyth are too far away to cover the large margin of error arising from limited visibility, enemy's course alteration, and inaccurate dead reckoning of submarines and trawlers.

17. Nor can the patrols in Area C merely be ordered to retire to the northward on enemy movements being reported, for in that case he would achieve his purpose without having even to fight for it.

18. To summarize the above—the difficulty of supporting the patrols in Area C from Scapa or Rosyth will be very great indeed, and in default of other arrangements the Northern Barrage will probably fail, and the sinkings will consequently continue on a large scale during 1918. There appears to be only one solution, the establishment of a base in Norwegian waters.[1]

[1] This question has been previously dealt with in the following Plans Division papers: Future policy, (A) 64; Naval policy, P. D. 06; Control of the Norway-Shetland-Orkney Area, (A) 166; Norway and the Allies, P. D. 31; Political effect on Denmark of the seizure by the Allies of a base in Norway, M. 016859; Northern Barrage, points for decision, M. 0917.

GENERAL DISPOSITIONS FOR CONTROL OF BARRAGE.

19. The expediency of seizing or acquiring a base in Norway will be considered later. Only its purely naval aspects are now under consideration.

20. The main argument in its favor is that it will consolidate the control of the northern area, on which the economical protection of the Allies' commercial and military overseas communications largely depends, and will therefore greatly improve the general strategical situation.

21. It will also facilitate the control of the North Sea and east coast by making the Kattegat exit dangerous, thus confining raiders to the mined waters of the Helgoland Bight.

22. The ideal strategical distribution in the North Sea would be the Grand Fleet in Norwegian waters, with a detachment at Rosyth or in the harbor. But difficulties of supply and anchorage necessitate the main fleet being kept on this side, and in practice the best distribution appears to be the main fleet at Rosyth and a detachment capable of successfully engaging the enemy battle cruiser fleet, say, 5 powerful battle cruisers, with the *Furious* or other suitable aircraft carrier, 6 light cruisers, 10 destroyers, and 15 submarines in Norwegian waters.

23. This detachment, which would be as much part of the Grand Fleet as the battle cruiser fleet now at Rosyth, would prevent the enemy attacking Area C, except with strong forces, which would then be exposed to the danger of concentrated submarine attack and interception by the Grand Fleet.

24. A protective force of submarines would be required constantly at sea within 50 miles or so of the harbor and an airplane carrier capable of keeping up with the squadron would also be necessary. In case of attack by superior forces, the squadron would retire to the northward so as to give the battle fleet a better chance of cutting off the enemy.

25. As an alternative to this proposal, a battle squadron of eight powerful battleships, light cruisers, etc., might be substituted, the battle cruisers being retained with the main fleet. If the whole United States dreadnought fleet were sent over here,[1] this would be a good deployment of our surplus battleships power. This squadron would also have to be protected from surprise by submarines and aircraft.

26. On the whole, the battle cruiser detachment appears to be the sounder of the two, but much may be said on the other side, and a decision would be necessary on this point (Point A—Strength and com-

[1] This question has been previously raised in the following Plans Division papers: Cooperation of the British and American battle fleets, P. D. 05; Control of the Norway-Shetland-Orkney area, (A) 166; Future policy, (A) 64; Naval policy, P. D. 06.

position of eastern detached force). If the battle cruiser detachment is carried out, the question of strengthening it with Japanese battle cruisers is worthy of examination. Certainly, if the general plan is approved, every inducement should be offered to the Japanese to send these ships to the North Sea manned by Japanese.

27. The next question is that of bases. It is essential that the selected anchorage should be easily defended from submarines, and that superior forces attacking from the sea should be at a disadvantage. For reasons which will be given later, the anchorage must also be detached from the mainland and invulnerable to land attack.

28. There is a large anchorage in Skudesnaes Fiord, including Mastra Fiord (see Chart No. 1662, Skudesnaes Fiord, lat. 59° 4′, long. 5° 46′ E.) which fulfills all these requirements, and a detailed plan for its occupation and defense has been worked out. From this anchorages to the center of Area IV, Rosyth, and Scapa are about 100, 350, and 300 miles, respectively.

29. There are also certain anchorages on the south side of the Selbiorns Fiord, such as Fitjebugten (see Chart No. 510, Hisken to Tofto), which appear to be suitable, but both in this case and the Skudesnaes Fiord the anchorages would have to be surveyed or swept before large ships could anchor in safety.

30. As far as the support of the barrage is concerned, a detachment in Skudesnaes is probably better placed than one in Selbiorns Fiord, but the latter is about 60 miles farther north and is less liable to surprise by superior forces. Skudesnaes is probably the better anchorage and is on the whole considered to be the more suitable of the two.

A decision is required on this point (Point B—Choice of Selbiorns Fiord or Skudesnaes.

Patrol of the North Sea Barrage.

31. It is believed that with the assistance of the mine barrage and a base in Norwegian waters the exits from the North Sea can be made so dangerous as definitely to defeat the submarine campaign during the summer months.

32. But the task will be a difficult one, requiring a large force of ships, thorough organization, and the best executive talent of the Navy. A large proportion of these elements are locked up in the Grand Fleet, and it appears that the success or failure of the barrage will depend upon them being partly freed for antisubmarine operations.

33. If the antisubmarine campaign is definitely accepted as the primary task, the battleships of the Grand Fleet will be mainly disposed to engage enemy surface vessels trying to break the antisub-

marine blockade, and its destroyers and other resources will be used for hunting submarines.

34. If, on the other hand, the governing factor is the desire to engage the High Seas Fleet irrespectively of the enemy's object or locality, its dispositions and movements will be dictated from Wilhelmshaven, its destroyers being reserved for an action which may never take place.

35. The High Seas Fleet being the power behind the submarine, its destruction is very desirable. It can not be forced to fight, however; and in order to develop our maximum efforts against the submarines it is necessary to combine offensive antisubmarine measures with a defensive attitude toward the High Seas Fleet. The Grand Fleet must be prepared to fight and defeat the enemy, but under our conditions of time and place.

36. The submarine is the active and principal weapon of the German Navy; and until the Grand Fleet combines with the remainder of the British Navy to defeat the submarine, the High Seas Fleet can hardly be expected to accept battle. The submarine will probably not be defeated if the patrol of the barrage is delegated to trawlers and sloops, largely manned by unskilled and untrained officers and men.

37. If all the power and resources of the Grand Fleet are concentrated on securing the control of the northern area, the enemy must endeavor to break down the blockade; and sooner or later the High Seas Fleet will come out and fight in the area where our destroyers are available both for hunting submarines and supporting the Grand Fleet in battle. Thus he will be forced to conform to our plans or admit the defeat of the submarine.

38. But this policy involves certain risks; for, if an intensive patrol is to be exercised in the north, the Grand Fleet, deprived of a proportion of its destroyer strength, can not be expected to dash south in the event of an enemy force threatening the Dover or Thames approaches. It is presumably this idea of a rush to the south that has tied up from 40 to 60 destroyers at Scapa and Rosyth, whilst enemy submarines are continually passing within 100 miles of the former port without any systematic attempt to hunt them.

39. To guard against this risk, it is proposed that a squadron [1] of 4 to 8 dreadnought battleships should be stationed in the Swin to consolidate the control of the vitally important Dover and Thames area and to support the Harwich and Dover light forces; thus the enemy would have to expose considerable forces to submarine attack in order to raid this area. There would be no difficulty in providing this

[1] The strength of this squadron to be governed by the consideration that the superiority of the Grand Fleet must not be imperiled.

squadron if all the United States dreadnoughts joined the Grand Fleet.

40. In the comparatively narrow waters of the southern area submarines and mines also act as a deterrent to enemy raids; and provided there is a high degree of cooperation among them and the surface and aerial craft on the south and east coasts, the Grand Fleet can be safely freed from the responsibility of dealing with battleship and battle cruiser raids in the south; but plans alone are not sufficient; the operations must be examined and practiced by the flag officer who is to execute them in face of the enemy.

41. Further, with a large proportion of its destroyers allotted to antisubmarine warfare, the Grand Fleet can not be expected to protect the east coast from battle-cruiser raids. These, however, should be viewed as diversions designed to immobilize destroyers from antisubmarine work or to draw the fleet into mined and submarine traps. After educating the public to this effect, they should be left to the local mine and submarine defenses. These raids (as well as attacks on the east coast trade) could be made extremely dangerous to the enemy by laying a few thousand mines off the vulnerable east coast points; 10,000 would suffice to lay a continuous line from the Humber to St. Abbs Head.

42. If the enemy attempted the extremely improbable operation of landing an invasionary army on the east coast, the Grand Fleet would, of course, have to move south as rapidly as possible after collecting a sufficient force of destroyers. Air reconnoissance should be able, however, to obtain at least 12 hours' warning of any such operation, and the mere fact that 150 machines could be concentrated to bomb the beaches and transports within 12 hours, to say nothing of attack by submarines, might render the presence of the Grand Fleet unnecessary. If the operation were organized and prepared it is estimated that something like 400 airplanes and seaplanes could be assembled within 24 hours.

43. It is evident that if the foregoing policy is to be adopted all plans in connection with the control of the barrage must be drawn up under the direction of the commander in chief, Grand Fleet, the main function of the Admiralty being to define the general strategic policy and to supervise the disposition as a whole.

44. It may be suggested, however, that an elastic and variable system of patrolling will give the most satisfactory results, and that it will be better to concentrate strong forces in the areas where aircraft and other sources of information indicate the passage of submarines rather than to rely on any fixed geometrical distribution.

45. Groups of light cruisers and destroyers should be continually at sea, covering and assisting in the operations of the hunting flotillas, every possible use being made of aircraft and kite balloons.

Probably about one-half the destroyers would be in harbor resting and fueling, and they would be available to escort the battle fleet to sea in an emergency.

46. The general strategical policy which is proposed for the control of the Northern Barrage may be summarized as follows:

(*a*) The function of the Grand Fleet, including all available destroyers, trawlers, sloops, etc., to be defined as the support of the Northern Barrage and the prevention of submarines passing in and out of the Northern Barrage.

(*b*) A battle-cruiser detachment, with submarines, etc., to be based in Norwegian waters, in order to protect the eastern part of the barrage and to cover the Skagerrack passage. In the event of attack by superior forces it would refuse action, endeavoring to inflict damage with its submarine flotilla. It would be directly under the commander in chief, cooperating with the battle fleet in case of necessity.

(*c*) All available destroyers, trawlers, etc., supported by light cruisers, to be systematically used for hunting submarines in the northern exit, these forces being gradually strengthened from the convoys as the barrage commenced to take effect.

(*d*) The battleships generally to be based at Rosyth, but sometimes at Scapa, and always to be ready to offer battle in support of the antisubmarine operations, but not to move from its area of immediate control until it had collected and fueled a sufficient number of light craft.

(*e*) The control of the Dover area to be strengthened by stationing a modern battle squadron in the Swin, and the cooperation of all forces on the south and east coasts to be thoroughly organized and practiced, particular attention being paid to the use of mines for protection against coastal bombardments and to the organization of aircraft in case of attempts to land troops.

(*f*) It is not intended that this general policy should prevent the withdrawal of Grand Fleet forces for other operations initiated by the British, such as raids or antisubmarine operations in the Kattegat or Helgoland Bight.

Political Aspects of the Questions, etc.

47. The anchorages are situated between thinly inhabited or barren islands, and it would only be necessary to occupy a very small part of Norwegian territory. They are easy to defend, and only a few troops would be required.

48. So severely has Norway suffered from the submarine campaign that at one time the prospect of war with Germany was openly discussed in the Norwegian press, and there is reason to

believe that the occupation of a base by British or American naval forces would have been welcomed by the majority of the Norwegian people early in 1917.

49. Since then the collapse of Russia and other causes have diminished the prestige of the Allies, and the preservation of neutrality has apparently become the dominant aim of the Norwegian Government.

50. Some of the objections which were formerly offered to the occupation of a Norwegian harbor—e. g., the difficulty of guaranteeing her military assistance and protecting her coast from raids—were based on the assumption that Norway would openly join the Allies or at least tacitly agree to the infringement of her neutrality.

51. If a base were seized, however, in spite of Norwegian protests, the situation would be simplified, because Germany would have no legitimate excuse for bombarding her towns from the sea or air.

52. Neither Germany, Norway, nor Sweden could prevent the British Fleet making use of Skudesnaes once the anchorage was occupied. If Germany attacked Norway, it would merely stop her valuable Norwegian imports and might incur Swedish hostility. Germany could retaliate by seizing a south Norwegian port, but that would not interfere with our main object and her detached force would be exposed to considerable risks.

53. It seems most important from every point of view that the anchorage should be occupied without any preliminary overtures to Norway, and it is strongly urged that this course be followed. The possibility that Germany may forestall us and establish a submarine base at Skudesnaes must also be kept in view and is another reason against compromising diplomatic conversations.

54. The seizure of a Norwegian base primarily concerns this country, but the United States would have to supply the additional battleships for the Grand Fleet, and the few troops that would be necessary might be supplied by her in order to accentuate the temporary nature of the occupation.

55. If Norway is presented with a fait accompli, she will, no doubt, protest very vigorously, but taking into consideration her sufferings from the submarine campaign and her dependence on this country and the United States for food and coal, she will probably be inclined to accept the inevitable with a good grace.

56. Norway should under these circumstances be granted compensating advantages in the way of supplies. The Norwegian flag should continue to fly at the base and no allied flag should be allowed to fly on land. Sudden seizure, with a contemporaneous presentation of arguments, is infinitely better than negotiations, which might lead to preparations for defense, and bloodshed, which should be avoided at all costs.

57. As a protest Norway might refuse to trade with the Allies, but with a base at Skudesnaes we could in that case retaliate against German trade, and the result would be that Germany would suffer as much as ourselves and Norway would be worse off than either of the belligerents. If Norway continued to trade with us, it is proposed that her German trade should be allowed to continue.

58. We should be prepared for all these eventualities, but if a base in Norwegian waters is essential to the defeat of the submarine none of them should be allowed to influence the decision.

59. Justification for the proposed action is the next question. It would, of course, be an infringement of neutral rights, but in her submarine campaign Germany has definitely repudiated and abandoned the accepted rules of civilized war.

60. A well-known writer [1] on international relations points out that "the whole international code is founded on reciprocity," and if an enemy violates the established usages of war his adversary may be forced by necessity to follow suit.

61. War is an appeal to force; and to adhere to conventions whilst the enemy abandons those that do not suit him is a suicidal policy.

62. The rights of small nations will not be reestablished unless Germany is punished for her violation of Belgium; and she will not be punished unless the submarine is defeated. The Northern Barrage will protect neutral as well as allied rights, and, if successful, will be welcomed by the Norwegian people; but whether it is or not, self-preservation is the first law of nature, and considerations of expediency are the only sure guide in the present case.

63. We should state that our object in seizing a base is to prevent the enemy evading our blockade by making use of territorial waters as a privileged channel of egress and ingress, and that we are forced to do it because we do not consider Norway strong enough to resist the passage of enemy submarines.[2]

64. It can be explained that when we mined the Helgoland Bight, Danish territorial waters were respected by us; but that the enemy submarines continually used them to avoid our mine fields and so obtained free passage to the high seas.

65. We should deny the right of an enemy to demand, under the pleas of international law and the immunity of territorial waters, a free and unrestricted passage to the ocean, there to wage war in defiance of all international law.

66. It should be explained that, in order to prevent such action on the part of the enemy, we are forced to establish a temporary control over Norwegian territorial waters which will only be directed against enemy belligerent vessels.

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[1] Treatise on International Law. Hon. Hannis Taylor, LL. D., 1902.

[2] Reliable information indicates that the Norwegian Government would not resist the passage of enemy submarines through her territorial waters (vide M. 0917).

67. One thing is certain, that without a Norwegian base the Northern Barrage will be in the air, like some great girder supported only at one end.

[Extract from Memorandum No. 71, "History of Planning Section."]

Initiated by the American Planning Section.

At the suggestion of the Force Commander, in order that he might better support our recommendations at the daily staff meeting at the Admiralty, it was proposed to the British Plans Division that this problem and future important problems be solved jointly by the two Sections.

The practice adopted was for each Section to reach a tentative solution independently and then to reconcile differences before preparation of a joint resolution.

The principal recommendation in this paper—i. e., to concentrate mining effort upon the Northern and Dover barrages, excluding any other mining that would interfere with these projects—was not accepted. The very extensive mining operations in the Bight then in progress were continued, and considerable mining in the Kattegat was undertaken subsequently. The American Planning Section always believed these efforts to be unsound, and so stated repeatedly and emphatically. It was apparent that closing either the Bight or the Kattegat was of little value unless both could be closed, and it was impossible to close the Kattegat without violating the neutrality of two Scandinavian nations. Furthermore, the proximity of these mine fields to enemy bases rendered impossible the prevention of enemy sweeping operations.

Undoubtedly some inconvenience was caused the enemy by this auxiliary mining. He sustained some losses in both fields. There were periods when weather prevented sweeping and when the danger of the passage through the Bight led the enemy to use only the longer Kattegat route. Nevertheless the auxiliary effort necessarily restricted the effort on the task of laying the Northern Barrage which promised much greater results than could be obtained by mining in the Bight and Kattegat.

The British mining activities during the war emphasizes the importance of—

(*a*) Formulating sound strategic policies and plans before undertaking operations.

(*b*) Concentration of effort.

Forwarding comment of the Force Commander on this paper follows:

[Forwarded 18 April.]

"2. The Department is of course aware that there has been in the past very extensive mining in the Helgoland Bight, both by the British Admiralty and by the enemy. Mining in that locality is still carried on whenever circumstances appear to render it desirable, but it is not regarded as important as it was early in the war. There is a very large number of mines in this area and very few enemy submarines come out from Germany by this route.

"3. The Admiralty has also directed certain mining operations in the Kattegat with a fair degree of success. This work was begun about the end of March and has been carried on continuously when weather permitted.

"4. Mining has also been undertaken in the North Channel leading to the Irish Sea. It is upon this mining project that the U. S. S. *Baltimore* has been employed since her arrival in these waters.

"5. Laying mines in Area B of the Northern Barrage was begun by the British about three weeks ago, but owing to unexpected and unexplained difficulties

with the mines themselves the operations were suspended temporarily before one complete line had been run. Numerous mines failed to take the correct depth, a considerable number floated, and there were a number of premature explosions. H. M. S. *Gaillardia*, while accompanying a mine layer, was sunk by striking a mine.

"6. Since the British mine was supposed to be entirely safe if laid at a depth materially different from that intended, this behavior of the mines was very puzzling and disconcerting. A 35-foot sweep was made along the mines already laid, and a number of mines were picked up, although they were supposed to have been laid at a depth of 65 feet. Most of the mines that were picked up by the sweep exploded.

"7. The Commander in Chief of the Grand Fleet was naturally very much disturbed by these unsatisfactory results of the first mine laying, and the Admiralty have felt that they could not continue laying the barrage in Area B until the faults in the mines had been discovered and removed. I am not aware that they have as yet discovered what the difficulty is.

"8. With respect to Area B: I have from the first consistently urged that this area be made as narrow as was practicable, considering the requirements of the Grand Fleet and of commerce, and I have also held that the deep mining should be carried close up to the islands of the Orkney group.

"9. With respect to Area C: I have equally held from the first that this could be made effective only by supplementing the deep mine field with a surface mine field of American mines, and that the mining should be carried up to Norwegian territorial waters, but not into them.

"10. My views with respect to Areas B and C have previously been accepted in principle by the Admiralty, and the department has been advised to be prepared to furnish surface mines for both of these areas.

"11. Owing to an apparent uncertainty in the Admiralty as to the further execution of the plans for the Northern Barrage, I caused the matter to be brought up at the staff meeting this morning, at which I proposed the following:

(*a*) We to lay two single lines of surface mines over the southern portion of Area C, 40 to the mile.

(*b*) British to lay one "system" of deep mines over the northern portion of Area C.

NOTE: A "system" of English mines comprises five parallel lines of different depths.

(*c*) We to run the two above-mentioned single lines in Area C and a single "system" entirely across Area A as early as practicable.

NOTE: A "system" of American mines consists of mines at 80′, 160′, and 240′ depths, respectively.

(*d*) Whether "C" or "A" is mined first is not very material, but if the mines and sinkers for Area C can be sent over without delay, it would be better to mine that area first.

(*e*) In view of the great difficulty of efficiently patrolling so wide an area as the present designed Area B, it seems necessary to surface mine a portion of it in the same manner as is proposed for Area C, leaving a portion without surface mines as an exit of the Grand Fleet, this exit to be as narrow as it can safely be made.

(*f*) Area B to be deep mined as already planned, except that the mines are to be carried close up to the coast (islands) without leaving the 7-mile channel now shown on the chart.

"12. Rear Admiral Strauss, commander of the mine force, was present at the meeting, and he and I were at entire concurrence at all points. The Admiralty

Staff did not reach a decision, owing, I believe, to their desire to consult the Commander in Chief, Grand Fleet, before reaching final decision. I have every reason to believe, however, that they will accede to all of the above proposals with the possible exception of (e).

"13. A proclamation notifying the mining of Areas A and C will be issued at an early date by the British Government.

"14. As soon as the proposal to lay a double row of surface mines across Area C is acceded to, I shall cable to the Department requesting that the necessary material be shipped."

MEMORANDUM No. 18.

ANTISUBMARINE POLICY.

28 March, 1918.

[Study made preliminary to the joint consideration of British and American Sections.]

PROBLEM NO. 10.

(See Maps Nos. 1 and 3.)

General situation: As at present. The shipping situation is becoming more and more critical. Unless a check is placed on the enemy's submarines it may become necessary to cease the transport of United States troops and stores to France, in order to meet the urgent requirements of the Allies as regards food and raw material.

Special situation: The British and United States Planning Divisions decide to review the antisubmarine policy of the immediate future, bearing in mind that the Northern Barrage can not be moderately effective before July.

Required: Estimate of the situation and decisions as to antisubmarine measures that should be taken now.

SOLUTION.

MISSION.

To determine the best employment of our present forces to defeat the enemy submarine campaign.

GENERAL CONSIDERATIONS.

Our present situation renders it imperative that we clearly recognize the import of our special and immediate naval mission, which has been determined previously to be—

"To obtain subsurface command of the sea while still retaining command of the surface of the sea."

If the soundest employment of our forces is to be made, this mission must serve as the directive force for all allied naval activity; it must immediately become the basis for every naval plan of operations; to it must be referred every decision of importance; to it must be subordinated all other naval requirements for the time being.

The degree with which our command, high and low, becomes indoctrinated with the immediate importance of this mission will

determine the extent to which we make good use of the forces at our disposal.

It is apparent that an immediate acceptance of this mission will—

(*a*) Alter the primary rôle of the Grand Fleet from that of maintaining readiness to meet the High Seas Fleet on very short notice to that of combating enemy submarine activities.

NOTE.—It has been pointed out in a previous estimate that the enemy's principal naval mission of preying upon our overseas communications will induce the High Seas Fleet to accept action only in support of his submarine campaign. It therefore follows that the Grand Fleet's best chance of bringing the High Seas Fleet to action will flow from engaging in and supporting antisubmarine measures.

(*b*) Give an offensive tone to the efforts of all our forces engaged in antisubmarine warfare.

(*c*) Require that a considerable portion of our forces be allocated to offensive work.

(*d*) Require that our organization and allocation of forces, and our system of command of them, shall permit the most economical and effective antisubmarine use of the means at our disposal.

(*e*) Focus mining effort upon an attempt to exclude submarines from the high seas.

NOTE.—Examined in previous estimate.

(*f*) Focus naval air effort upon attacks on submarine bases, and restrict air patrols to areas where submarines are numerous.

NOTE.—Examined in a previous estimate.

(*g*) Require a development of our information service, such as will readily put our forces acting offensively in contact with hostile submarines.

(*h*) Require the development of doctrine such as will permit the ready coordination of units and of the various arms in combined offensive operations.

(*i*) Require a naval offensive against submarine bases where practicable.

NOTE.—The Adriatic is at present the only theater where this is practicable. This subject has been examined in a previous estimate.

COURSES OF ACTION OPEN TO US.

Since we have examined already in other papers the best employment of mines and aircraft, as well as the value of an Adriatic offensive, the forces which we will consider herein as possibly available for reassignment of employment are—

(1) The Grand Fleet.

(2) District craft.

The Grand Fleet is practically now excluded from antisubmarine work, due to being held in readiness for quick action against the High Seas Fleet. In order to conform with our mission it is essential that all Grand Fleet units suitable and available for antisubmarine warfare be employed in such work. Other units of the fleet should furnish support to the antisubmarine forces in the northern theater.

Our district craft are comprised principally of types suitable for antisubmarine work—destroyers, P-boats, sloops, trawlers, drifters, etc.

They are distributed among nine principal districts about the coasts of Great Britain, and six on the French coast; each under a commander responsible only to the Admiralty (British or French, as the case may be).

These forces are employed almost exclusively in defensive work—patrolling and escorting. A few are engaged in supporting the Dover barrage. On April 1 there will be about 33 trawlers equipped with listening devices and supported by a few sloops engaged exclusively in hunting. It is expected to increase largely this force of hunting groups as new vessels are completed.

One of the principal virtues of the convoy system lies in the fact that, in order to attack, the enemy must come into close contact with our antisubmarine forces. In order to obtain the full value offered by these situations it is imperative that our forces temporarily divest themselves of their protective rôle and at once assume a vigorous offensive. At least half of the escorting vessels should engage in an intensified attack; and in the case of a small escort, all of the suitable ones should do so. The offensive operation should include not only an immediate depth-charge attack but also a persistent hunt during the remainder of that daylight by a large proportion of the escort. A doctrine along these lines should be promulgated at once.

It may be that the adoption of this general plan will prove our best course of action if at the same time accompanied by a redistribution of escort duties, so that escorts may be reduced in comparatively safe areas and increased in dangerous waters.

The value of a vigorous counterattack by a large proportion of each escort should be demonstrated by immediate trial.

Until this is done it will be difficult to decide whether to adopt such a course without reducing the total number of destroyers allocated to escort duty or to make such a reduction and assign the surplus to hunting duties.

Any radical and immediate change from convoy and escort work to hunting on a large scale must involve a large reduction in the numbers of craft, particularly destroyers, now assigned to convoy and patrol duties.

The justification for taking such steps will depend on—

(*a*) The extent to which mercantile losses will be increased by a reduction of convoy escorts.

(*b*) The probable destruction of enemy submarines and the extent of interference with their operations that will result from intensified hunting.

With regard to the probable effect on losses in convoy:

So long as the enemy continues his practice followed during the last six months of concentrating submarine operations within coastal waters, the destroyer offshore escort may be greatly reduced without materially affecting our losses. Similarly, destroyer requirements may be reduced by meeting convoys farther east than is now customary.

If in addition the doctrine be established of a vigorous counter-attack and a determined hunt by a large portion of the destroyer escort on each occasion of an attack on a convoy, the number of attacks on convoys will be reduced.

For slow convoys, slow escorting vessels, such as trawlers, yachts, sloops, etc., may be taken from patrol work and substituted for destroyers.

Air patrols may be substituted for surface patrols along the coasts to a greater extent than at present by utilizing for patrol work our air pilots under training.

If these measures be taken, we believe that the present efficiency of the convoy system will not be materially reduced if we divert as much as 30 per cent of our destroyers from escort work to hunting. There are approximately 400 British, American, and French destroyers operating in northern waters, so that about 120 should be available for hunting.

A still greater number can be made available by consolidating our coastal commands into a few groups, so that greater flexibility in operations and consequently more economical employment of forces is permitted. The following is suggested as a sounder grouping of command than that now in force:

1. *Commander in Chief, Grand Fleet.*—North Sea and antisubmarine operations from Firth of Forth north about to Hebrides, inclusive.

2. *East Coast Command.*—Coastal and antisubmarine work from Firth of Forth to Yarmouth.

3. *Hinder Sea Command.*—Yarmouth to Dover, inclusive.

4. *Channel Command.*—English Channel (exclusive of Dover), including French Channel forces.

5. *Ireland Command.*—Coasts of Ireland and approaches, including Irish Sea.

6. *Biscay Command.*—French west coast.

We therefore conclude that at least 120 of our destroyers may be diverted to hunting without material increase of mercantile losses. It is necessary to examine whether such an employment will be profitable.

HUNTING BY DESTROYERS.

If we can hunt the enemy to such an extent as to make him feel repeatedly harassed during long periods of time, we should gradually wear down his morale. We may expect the resulting nervous strain to cause accidents to and losses of boats due to internal causes, in addition to increased destruction caused directly by our own action.

Hunting will be most profitable—

(*a*) Over depths which forbid bottoming.

(*b*) During seasons of long daylight.

(*c*) During good weather.

(*d*) In areas not subject to much fog.

(*e*) Along routes leading to and from operating ground, where the direction of advance can be generally predicted.

(*f*) Against homeward-bound submarines, whose radius of action is restricted and who may be damaged.

Hunting will be facilitated by—

(*a*) A well-organized information system which will put hunting groups in touch with submarines. Present means of locating them should be augmented by a system of ground-listening devices around the Orkneys, Shetlands, and Hebrides.

(*b*) One or more airships or kite balloons in each hunting group.

(*c*) Listening devices carried by destroyers.

NOTE.—All new American destroyers will arrive equipped with an efficient device for short range. These destroyers should be assigned to this duty, if hunting by destroyers is decided upon.

The object of a hunt would be to destroy the submarine or to keep her submerged until batteries were exhausted.

Assuming visibility at 5 miles, a group of 18 destroyers can deploy so as to cover a circle of 25 miles radius. A submarine can reach the edge of this circle in 3½ hours at 7 knots—batteries then exhausted; in 5 hours at 5 knots—batteries 40 per cent exhausted; in 12 hours at 2 knots—batteries 20 per cent exhausted.

Having deployed with center over the last known position of a submarine, the destroyers would then probably have from 5 to 12 hours of patrolling in which to sight or hear the submarine. Formation may then move its center over the new position and start afresh, with the advantage of having partially exhausted the submarine batteries. The operation may be repeated until the submarine must emerge. Meantime there may be opportunities for depth-charge attacks.

Should the hunters fail to sight the submarine by the end of the time when it is judged that the submarine may have run out of the patrolled area, an estimate must be made of the probable course and speed of the submarine and the formation as a whole moved accordingly. This estimate may be made with reasonable accuracy if the hunt is being conducted along the usual track between the submarine's base and its operating ground and if it is known whether she is outward or inward bound.

In the event of fog or darkness the general formation should be preserved but each unit take up a wide zigzag, the formation as a whole advancing according to the estimated course and speed of the enemy.

Submarines have recently made such passages in groups of four or five. This will assist the hunters.

The chance of "getting" a damaged submarine by this means appears good. Some delay will be caused all submarines with which contact is made. Whether or not this general method will pay us in the case of undamaged submarines can be determined only by actual trials.

Trials should be begun at once with destroyers drawn from the Grand Fleet and not at present engaged in escort duties.

The data obtained will serve as a basis for future decision. Until such experience has been gained we can not afford the risk of radically reducing our convoy escorts.

Decisions.

1. To indoctrinate our command with the necessity for offensive antisubmarine effort whenever possible.

2. To make the primary mission of the Grand Fleet that of combating enemy submarine activity.

3. To immediately thin destroyer escorts for offshore convoy and thicken them in coastal waters.

4. To indoctrinate destroyer escorts so as to make their primary mission the counterattack and hunt of all submarines which may attack convoys.

5. To substitute trawlers, sloops, yachts, etc., for destroyers in escorting slow convoys as practicable.

6. To substitute air for surface patrols as practicable by utilizing air pilots under training for patrol duties.

7. To immediately reorganize our forces into six commands as follows:

(1) *Commander in Chief, Grand Fleet.*—North Sea and antisubmarine operations from Firth of Forth north about to Hebrides, inclusive.

(2) *East Coast Command.*—Coastal antisubmarine work from Firth of Forth to Yarmouth.

(3) *Hinder Sea Command.*—Yarmouth to Dover, inclusive.

(4) *Channel Command.*—English Channel (exclusive of Dover), including French Channel forces.

(5) *Ireland Command.*—Coast of Ireland and approaches, including Irish Sea.

(6) *Biscay Command.*—French west coast.

8. To augment our present means of obtaining information of submarine positions by a system of ground listening devices around the Orkneys, Shetlands, and the Hebrides.

9. To immediately employ the Grand Fleet destroyers in hunting along northabout submarine routes between their bases and hunting grounds; hunting groups to include new American destroyers equipped with listening devices.

10. To employ airships and kite ballons in conjunction with hunting groups of destroyers.

11. To give further consideration, after experience in hunting has been gained, to the question of withdrawing a large number of destroyers from escort duties and of assigning them to hunting.

Joint Appreciation by the British and American Planning Divisions.

[March 28, 1918.]

SUMMARY OF CONTENTS.

Present policy.—Present submarine policy mainly a system of local trade protection. No concentrated attack on submarines, except in the Dover area. Convoy escorts have the great advantage of getting in touch with the submarines, but their tactics are generally defensive, and they seldom kill. Lack of cooperation characteristic of the present system.

Suggested modifications.—Immediate policy—a concentrated offensive in North Sea exits, combined with a modified system of local protection. An intensive patrol of the Fair Island Channel approaches. The functions of the Grand Fleet—the crucial question. The idea of inveigling the High Seas Fleet into a fleet action should be abandoned in favour of an antisubmarine blockade of the northern exit. The leadership and organizing power of the Grand Fleet higher command and staff, as well as a small proportion of its destroyers, are essential to effective antisubmarine measures. The ocean escort destroyers and the coastal trawler patrols reduced by 30 and 50 per cent, respectively, to obtain the remainder of the required forces. Probable effect of these reductions. Offensive meas-

ures on a small scale recommended in other areas to be brought about by a reorganization and consolidation of the coastal commands. Summarized conclusions.

PRESENT POLICY.

1. The forces directly employed fighting the submarine are to be found in two organizations: Convoy escort vessels and auxiliary patrol craft, the former escorting ships through the submarine zone, the latter being distributed round the coast.

2. These forces are given in the following table under the headings "Escort duty," "Patrols," and "Mine sweeping."

[S1=Sloop; D1=Modern destroyer, F. class and later; D2=Older destroyer; P=P-boat; S=Submarine; T=Trawler; W=Whaler.]

Nature of work.	S1.	D1.	D2.	P.	S.	T.	W.
Ocean escorts	24	[1] 110	.....	13	.....	.....	.....
Cross-channel escorts	.....	1	12	31	.....	246	.....
Coastal escorts	.....	.....	24	.....	.....	.....	.....
Total escorts	24	111	36	44	.....	246	.....
Coastal patrols	.....	.....	.....	.....	.....	248	6
Submarine patrols	.....	.....	.....	.....	38	.....	.....
Mine sweeping	.....	.....	.....	.....	.....	410	.....

In addition to the above, a force of about 21 trawlers is being prepared, fitted with fish hydrophones, for submarine hunting.

[1] Includes 38 United States destroyers at Queenstown and 6 destroyers at Granton for Scandinavian convoys. Does not include any of Harwich force, which nevertheless is employed as Dutch convoy escorts.

3. In addition to the forces in foregoing table there are the Grand Fleet and the Harwich and Dover forces. The task allotted to the Grand Fleet and its accepted policy is to be ready to engage the High Seas Fleet at any time and anywhere in the North Sea.

4. The number of destroyers allocated to the Grand Fleet is only sufficient for battle purposes, and this policy, therefore, immobilizes them from any extensive or continuous antisubmarine operations.

5. In the south, on the other hand, the primary task is to bar the Dover Straits, and the primary function of the Dover and Harwich forces is to support the barrage. Dover, therefore, is the only area in which any concentrated attack is being made on the submarine. The results are seen in Appendix I, which shows the soundness of this policy.

6. It is clear that the vast majority of the antisubmarine forces in the vicinity of the United Kingdom are spread over a wide field and are not concentrated to attack submarines. We try to be strong everywhere, and are strong nowhere.

7. Part of the protective system, viz, the escort of convoys by fast vessels, has, however, the great advantage of forcing the submarine

to attack in the vicinity of the escort, and gives it a chance of counter-attack. In practice, however, only a few submarines are destroyed under these circumstances. This may be due to the fact that the forces on the spot are insufficient to bring about results.

8. It may also be due to faulty tactics, and in order that full advantage may be taken of these contacts, it appears essential that the escorting destroyers should drop the defensive rôle and assume a vigorous offensive, which should not only include an immediate depth-charge attack but also a persistent hunt during the remainder of the day by a large proportion of the escort. The question whether any destroyers should remain with the convoy would depend on the locality and probability of further attacks.

9. So far as trawlers are concerned, they have little offensive value, except in cooperation with faster vessels, and this emphasizes the necessity of coordinating the work of all craft and weapons. Each type possesses a certain degree of offensive power, but unless these powers are used in combination, successful results can not be expected. The deep mine field is dependent upon surface patrols. Hydrophone trawlers are practically useless without faster vessels, and aircraft greatly increase the hunting power of destroyers.

PROPOSED MODIFICATIONS TO PRESENT POLICY.

10. Instead of the above system of dispersion of force, it is urged that we should eventually aim at closing the northern exit by a great offensive effort in that area.

11. Decisive results will not be obtained until a very strong mine barrage is completed, and it would be inexpedient to abandon the local protection of trade until the hydrophone is more fully developed. It is urged, however, that a concentrated offensive effort, covering the reported track of submarines, be instituted in the northern area as soon as possible.

12. In February about 70 per cent of the submarines operating outside the North Sea passed northabout, and the number will tend to increase. Also, a certain number were probably damaged or defective on reaching this area, homeward bound.

13. At the present time submarines passing northabout confine themselves almost exclusively to the Fair Island Channel, the passages averaging one a day during February, 1918. The approximate times of passing through the channel are shown graphically in Appendix II.

14. An intensive patrol in this area could be quickly moved to another track, and would be flexible in its dispositions, enabling the utmost use to be made of any information available, which, at present, is certainly not utilized to its fullest extent.

15. It is most strongly urged that the success of the above policy rests on allotting certain definite antisubmarine functions to the Grand Fleet, for unless its present functions are modified, neither sufficient destroyers nor the necessary standard of organization will be forthcoming.

16. So long as the movements and dispositions of the Grand Fleet are based on the idea that the High Seas Fleet is likely to be inveigled into action by any other means than the defeat of the submarine, the most efficient part of the British Navy must play a comparatively minor part in defeating the enemy's primary line of attack. It must stand aside and leave the real battle to the militia of the sea—the trawlers, mercantile marine, etc.

17. On the other hand, if the primary function of the Grand Fleet during the summer months is defined as the barrage of the northern exit to submarines, the High Seas Fleet will only become an object of immediate attack if it threatens the barrage.

18. The proposed policy amounts to exercising an intensive and immediate control over the northern area, while the control over the rest of the North Sea will be less immediate and less intensive. It involves certain minor risks, such as exposure to bombardment, etc. These risks, which have been referred to in other papers, should be accepted and the necessary precautions taken. (Vide P. D. papers 049, 37, and 053; also American P. D. Problem No. 2.)

19. By assembling the whole Grand Fleet at one base, and freeing it from the responsibilty of dashing after the High Seas Fleet at short nottice, except in support of antisubmarine operations, a flotilla of destroyers could probably be released for hunting submarines, but the commander in chief might allocate more or less, according to circumstances.

20. In order to provide the remainder of the antisubmarine destroyers and patrol craft, it is proposed to reduce the escort destroyers, sloops, and P-boats by approximately 30 per cent and the trawlers round the coast on patrol duties by about 50 per cent.

21. The withdrawal of trawlers from coastal patrol will probably not influence the shipping losses one way or the other. The effect of reducing the convoy destroyers can not be exactly foreseen, but no appreciable increase in sinkings is expected. The great initial success of the convoy system was due more to the concentration of shipping in a comparatively small space, and the consequent difficulty of locating it than to the protective power of the escort. This is illustrated by Appendix III, which shows how the enemy attempted to meet the convoy system by transferring his attack to the coastal and terminal areas, where his submarines would have a better chance of

finding the convoys; also, by the fact that out of 57 attacks in which torpedoes were fired on ocean convoys between July, 1917, and March, 1918, in only two cases did the escort sight the submarine before the torpedoes were fired.

22. The proposed reduction in destroyer escorts might be compensated by increasing the destroyers in the dangerous zones at the expense of the comparatively safe areas. For example, whilst the submarine campaign is mainly confined to the coastal areas of the United Kingdom, escorts to the westward of, say, 10° W. might be greatly reduced.

23. In addition to the proposed operations in the northern area, it is suggested that yachts, older destroyers, and the remaining trawlers employed on coastal patrols should carry out similar operations on the east coast, Channel, and Irish Sea, in conjunction with drifters and mined nets, and that the coastal commands be consolidated into a few groups, so as to obtain greater flexibility and more economical employment of the available forces. The following grouping is suggested:

(1) *Commander in Chief, Grand Fleet.*—North Sea and antisubmarine operations from Firth of Forth northabout to Hebrides, inclusive, with particular regard to the blockade of the northern exit.

(2) *East Coast Command.*—Coastal antisubmarine work from Firth of Forth to Yarmouth.

(3) *Narrow Seas Command.*—Yarmouth to Dover, inclusive, with particular regard to the blockade of Dover Straits.

(4) *Channel Command.*—English Channel (exclusive of Dover), including French Channel forces.

(5) *Ireland Command.*—Coasts of Ireland and approaches, including Irish Sea.

(6) *Biscay Command.*—French west coast.

Under the present system of scattered coastal commands, it is most noticeable that submarines frequently operate for days in very limited areas without any large forces being brought to the spot, although they might be concentrated in a comparatively short time.

24. The foregoing may be summarized by saying that the principal factor in the solution of the submarine problem is a new orientation of the functions of the Grand Fleet, and that if the commander in chief is allotted the primary task of preventing submarines passing northabout, and is freed from responsibilities which interfere with that duty, everything else will follow in due course. A consolidation and reorganization of the coastal commands are also required.

APPENDIX I.

[From information supplied by I. D. Section 25.]

Comparison of passage (submarines) through Dover Straits and northabout.

	North-about.	Dover.
December:		
Out	10	25
Home	13	13
January:		
Out	12	8
Home	7	9
February:		
Out	18	5
Home	11	7
Mar. 1–15:		
Out	7	6
Home	14	2

Comparison of passages (large submarines only).

	Boats.	Passages.	North-about.	Dover.
December	21	42	17	19
January	13	26	18	5
February	21	42	39	1

No large submarines are believed to have passed through Dover Straits since the 18th of February.

APPENDIX III.

Statement showing British merchant steamships over 500 tons gross sunk by enemy submarines in home waters during 11 months ended December, 1917, divided as to distance from nearest land.

[Convoy system commenced on a large scale in July, 1917.]

Month.	Distance from nearest land.									
	Within 1 mile.	1–2 miles.	2–4 miles.	4–6 miles.	6–8 miles.	8–10 miles.	Total under 10 miles.	10–50 miles.	Over 50 miles.	Total.
February	.....	1	7	2	1	5	16	17	16	49
March	.....	1	5	5	2	5	18	28	20	66
April	.....	1	1	2	3	1	8	12	63	83
May	.....	1	2	2	7	6	18	12	22	52
June	.....	1	.....	4	1	1	7	9	46	62
July	.....	.....	3	1	1	2	7	13	33	53
Total	.....	5	18	16	15	20	74	91	200	365
Average per month	.....	1	3	3	2	3	12	15	34	61
Percentage of total	.....	.....	.....	.....	.....	.....	20	25	55	100
August	.....	2	5	6	7	3	23	16	11	50
September	.....	2	4	2	3	1	12	8	4	24
October	1	3	6	4	4	9	27	12	1	40
November	.....	5	6	3	3	5	22	8	.....	30
December	2	1	13	4	2	4	26	21	1	48
Total	3	13	34	19	19	22	110	65	17	192
Average per month	.....	3	7	4	4	4	22	13	3	38
Percentage of total	.....	.....	.....	.....	.....	.....	58	34	8	100

[Extract from Memorandum No. 71, "History of Planning Section."]

Initiated by the American Planning Section; solution submitted jointly by American and British Sections.

The principal points of difference between the preliminary independent solutions of the two sections were:

(*a*) British solution included proposed tactical plans in some detail for hunting with a large group of about 20 destroyers (suggested originally by American Planning Section), and for an elaborate patrol of trawlers, P-boats, etc., in the approaches to the Fair Island passage. We believed these proposals somewhat academic in form and concurred only in the general recommendation that operations of that nature be undertaken. The appendixes on these subjects were therefore omitted from the joint solution, though submitted to the Admiralty independently by British Plans Division. The patrol was subsequently instituted off Fair Isle, and, after several months' trial without any greater success than occasional contacts with enemy submarines, was abandoned.

(*b*) The British desired to divert at once large forces from convoying to hunting. The Americans desired to divert at first sufficient forces only to demonstrate the value of hunting, and if results warranted, then to increase hunting forces gradually at the expense of convoying. In reconciling differences this point was conceded to the British.

This paper caused much comment among British officials—principally unfavorable, on account of the recommendation that convoy escort forces be reduced.

The Force Commander took the view that any extensive reduction of convoy escorts was unwarranted and highly dangerous, and that hunting which depended principally on sight was futile.

Admiral Sir Lewis Bayly, Commander in Chief, Coast of Ireland, is reported to have said that to reduce the convoy escorts would be to "tamper with the safety of the Empire."

It is understood that the Commander in Chief, Grand Fleet, was in accord with the idea of giving him command of the antisubmarine measures at the northern exit to the North Sea, but was not willing to undertake such a task without an increase in the antisubmarine forces, particularly destroyers, assigned to him.

The written comment of the Deputy Chief of Naval Staff follows:

"The analyses in Appendixes I and III are most instructive. Three points can be deduced from them, and in any discussion of submarine measures they should be taken into account:

"(1) The effectiveness of the Dover patrol has increased enormously; this combined with the intensive mining of the Bight has had the result of deterring submarines from attempting the Dover passage. More submarines proceed northabout, and urgency of offensive operations in the north is enhanced.

"(2) The convoy system has had the effect of causing the vast majority of successful attacks to be made comparatively close to the coast.

"(3) The above fact has rendered possible more concentration of antisubmarine force, and in areas more favorable for its operation. Consequently losses have diminished.

"With the general policy advocated in this paper I am in agreement. The trend of the remarks on the function of the Grand Fleet appears to be somewhat academic. The state of preparation of the Grand Fleet must be in every respect the same if it is to engage the High Seas Fleet, whether it is to do so

'at any time or anywhere in the North Sea,' or only 'if it threatens the barrage,' since there is no more reason to expect warning if the High Seas Fleet comes out to operate in the south than if it comes out to operate in the north.

"I do not agree with any reduction of convoy escorts; indeed, if it were possible, which it is not without detriment to other services, I would increase them in order that a margin of force might be available to attack a submarine which has attacked a convoy.

"I do not agree with the statement in paragraph 5 that the primary function of the Harwich force is to support the Dover barrage. It is rather to interfere with any operations in the southern area of the North Sea which the enemy may attempt with light forces and to observe any movements of his heavy forces in the southern area.

"Propose that the paper be taken to the Commander in Chief, for VA northern patrol, for his perusal.

"S. R. F."

The written comment of the Assistant Chief of Naval Staff is quoted below:

"I would suggest that Plans should supplement this interesting study with a thorough investigation of the antisubmarine policy at the moment. A study of the measures in force and in preparation, with the actual employment of the forces available and the reasons underlying their employment, would show that many of the proposals have been anticipated and either are in operation or in process of being put in operation when the necessary resources, provision for which we made many months ago, materialize.

"The paper would have been more valuable had it been written in connection with the departments who from day to day study the varying aspects of the submarine situation and the most effective methods of dealing with it."

The forwarding comment of the Force Commander on 29 May follows:

"2. This paper is forwarded as a matter of interest to the Department, although it does not meet with my entire approval. Few of the recommendations have been put into effect.

"3. Viewing the paper broadly, it proposes three radical changes from the present practice, viz:

(*a*) A change in the mission and functions of the British Grand Fleet.

(*b*) A reduction of danger zone escorts by 30 per cent.

(*c*) A reduction in coastal patrol by 50 per cent.

"4. It would, perhaps, be nearer the mark to state instead of (*a*), above, that the proposal is to effect a change in the Commander in Chief's conception of his own mission and to cause him to feel the same responsibility for closing to submarines the northern exits from the North Sea as is felt by the vice admiral at Dover to close the Dover Straits.

"5. It is, of course, not proposed that the capital ships of the Grand Fleet shall engage in antisubmarine warfare. The destroyers and other vessels of similar types now attached to the Grand Fleet and needed for screening purposes would, of course, be very useful in assisting to close the northern exits from the North Sea and in an antisubmarine offensive. Their allocation to this sort of employment would necessitate putting the battleships into one or two harbors on about 20 hours' notice for sea instead of 4 hours as at present. The result of such action might conceivably be a very serious raid on the east coast of England by the enemy's High Seas Fleet, of which the political if not the military results would be most harmful to the allied cause.

"6. It is difficult to say just what the size of an escort should be for a convoy of a given size, and it may be that it is the presence of escorting vessels rather than their number that deters the submarine from attacking. We have no assurance of this, however, and must assume the contrary. It is, therefore, not wise at present to reduce the strength of escorts.

"7. The coastal patrols might perhaps be reduced without loss of efficiency if a vigorous offensive were directed against submarines in other areas, but unfortunately vessels of the class engaged in this patrol work are the least efficient for offensive operations, having low speed and offensive power.

"8. The laying of the mine barrage across the North Sea will begin very soon, but, owing to defective functioning of the British mines, the deep mining of the section of the barrage nearest the Scottish coast can not be undertaken at once, so that the only means for preventing the passage of submarines across that area will be the establishment of a patrol. Whether or not this can bring the decisive results contemplated by Paragraph II of the inclosed paper is questionable. Certainly no extensive reduction in the protection now given to shipping could be considered, unless we could be assured that both the Dover Strait and the northern exit from the North Sea were closed with a reasonable degree of tightness against the passage of submarines.

"9. With respect to the suggestions in Paragraph 23: I am quite in agreement that the present division of command about the British Isles is not a satisfactory one, nor one that is conducive to the highest efficiency, but this is, of course, a matter so intensely domestic in its nature that the Admiralty could not be approached on the subject in any official way. I believe the Admiralty itself is not satisfied with the division of command in the Channel, and it is probable that some change will be made in the near future.

"10. A considerable amount of effort has recently been devoted to an attempt to prevent the passage of submarines through the Fair Island Passage, or to operate offensively against any that may use that passage. There have been some encounters with submarines in that locality without definite results, and it is supposed that recently the German submarines have been acting under orders to avoid that passage by going north of the Shetland Islands.

"(Sgd.) WM. S. SIMS."

MEMORANDUM No. 19.

REORGANIZATION OF UNITED STATES NAVAL FORCES IN EUROPEAN WATERS.

26 March, 1918.

PROBLEM NO. 11.

General situation: United States naval forces afloat in European waters are as at present, with the expected addition of 144 submarine chasers, 100 Ford destroyers, and new destroyers at an average rate of six a month. United States naval aviation forces at 15 stations on shore.

Required: An organization of forces, together with the principles that shall govern their administration.

SOLUTION.

GENERAL CONSIDERATIONS.

(*a*) "The Organization of United States Fleets" of November 3, 1917, with corrections, and General Order No. 218, have been used as the basis of the within organization.

(*b*) Vessels not built for naval use, but capable of similar employment, have been grouped together in tactical units.

(*c*) Commanders of naval forces who have their administrative headquarters habitually in port have been given geographical titles.

(*d*) Commanders of naval forces having their administrative headquarters on mobile units may be given titles based on the character of the task of the forces they command; but tactical titles in accordance with General Order 218 shall be made to serve wherever possible.

(*e*) In administering the organization, the principle of continuity of association should govern as far as possible. This is of particular importance in the destroyer force. To this end transfers to new operating areas should be made by divisions. While operating in any one area there should be a constant effort to keep vessels of a division working together at sea, no matter what the duty they may be per-

forming. The fixed pursuit of this policy will build up teamwork and constant readiness for new employments.

(*f*) We recommend that the destroyers be reassembled in divisions as indicated, according to their characteristics; and that in future the departmental organization be maintained, as confusion is bound to result from any departure from the department's organization when the forces involved are as numerous as they soon will be.

(*g*) We recommend that no more vessels be assigned to escort work, but that accretions to the force be used in continuous offensive work.

(*h*) In the organization sheets of naval forces afloat that follow the pages are numbered to correspond with the sheets they should replace in the "Organization of United States Fleets" of November 3, 1917.

BATTLESHIP FORCE TWO.

Assignment.	Ship.	Flag officer and comdg. officer.	Present assignment.
Squadron Four.			
Division Nine.			
Flag	New York		Grand Fleet.
	Wyoming		Grand Fleet.
	Florida		Grand Fleet.
	Delaware		Grand Fleet.
	Texas		Grand Fleet.

PATROL FORCE.

Assignment.	Ship.	Flag officer and comdg. officer.	Present assignment.
Squadron Two. Division Four.			
	Birmingham		Ocean Esct. Gibraltar.
	Chester		Ocean Esct. Gibraltar.
	Salem		Not yet arrived.

PATROL FORCE—Continued.

Assignment.	Ship.	Flag officer and comdg. officer.	Present assignment.
Division Five.			
	Machias		Zone Esct. Gibraltar.
	Castine		Zone Esct. Gibraltar.
	Paducah		Zone Esct. Gibraltar.
	Wheeling		Azores.
	Nashville		Zone Esct. Gibraltar.
	Sacramento		Ocean Esct. Gibraltar.
Division Six.			
	Seneca		Ocean Esct. Gibraltar.
	Tampa		Ocean Esct. Gibraltar.
	Ossipee		Ocean Esct. Gibraltar.
	Yamacraw		Zone Esct. Gibraltar.
	Manning		Ocean Esct. Gibraltar.
	Algonquin		Ocean Esct. Gibraltar.
Squadron Three. Division Seven.			
	Corsair		Offshore Esct. Verdon.
	Aphrodite		Offshore Esct. Verdon.
	Noma		Offshore Esct. Verdon.
	Wakiva II		Offshore Esct. Verdon.
	May		Offshore Esct. Verdon.
Division Eight.			
	Christabel		Coastal Esct. Brest.
	Wanderer		Coastal Esct. Brest.
	Emeline		Coastal Esct. Brest.
	Remlik		Coastal Esct. Brest.
	Sultana		Coastal Esct. Brest.
	Harvard		Coastal Esct. Brest.
Division Nine.			
	Corona		Coastal Esct. Brest.
	Rambler		Coastal Esct. Brest.
	Victorine		Coastal Esct. Brest.
	Vidette		Coastal Esct. Brest.
	Nokomis		Coastal Esct. Brest.
	Piqua		Coastal Esct. Brest.
Squadron Four. Division Ten.			
	Anderson		L'Orient Mine Swprs.
	McNeal		L'Orient Mine Swprs.
	Cahill		L'Orient Mine Swprs.
	James		L'Orient Mine Swprs.
Division Eleven.			
	Hinton		L'Orient Mine Swprs.
	City of Lewes		L'Orient Mine Swprs.
	Douglas		L'Orient Mine Swprs.
	Hubbard		L'Orient Mine Swprs.
	Courtney		L'Orient Mine Swprs.

PATROL FORCE—Continued.

Assignment.	Ship.	Flag officer and comdg. officer.	Present assignment.
Division Twelve.			
Squadron Five. Division Thirteen.			
	Yankton		Gibraltar.
	Surveyor		Zone and Oran Escort.
	Nahma		Zone and Oran Escort.
	Lydonia		Zone and Oran Escort.
	Arcturus		Zone and Oran Escort.
	Venetia		Zone and Oran Escort.
	Cythera		Zone Escort.
	Wenonah		Zone Escort.

DESTROYER FORCE.

Assignment.	Ship.	Flag officer and comdg. officer.	Present assignment.
Flotilla A. Division A.			
	Stewart		Brest.
	Whipple		Brest.
	Truxtun		Brest.
	Macdonough		Brest.
	Worden		Brest.
Division B.			
Division C.			
	Barry		Gibraltar.
	Decatur		Gibraltar.
	Dale		Gibraltar.
	Bainbridge		Gibraltar.
Flotilla One. Division One.			
	Smith		St. Nazaire Escort.
	Flusser		St. Nazaire Escort.
	Lamson		St. Nazaire Escort.
	Preston		St. Nazaire Escort.
	Reid		St. Nazaire Escort.
	Isabel		St. Nazaire Escort.

DESTROYER FORCE—Continued.

Assignment.	Ship.	Flag officer and comdg. officer.	Present assignment.
Division Two.			
	Monaghan		Brest Escort.
	Roe		Brest Escort.
	Terry		Queenstown.
	McCall		Queenstown.
	Jouett		United States.
	Beale		Queenstown.
Division Three.			
	Paulding		Queenstown.
	Jenkins		Queenstown.
	Walke		United States.
	Warrington		Brest.
	Sterrett		Queenstown.
	Drayton		Brest.
Tender	Dixie		
Flotilla Two. Division Four.			
	Burrows		Queenstown.
	Trippe		Queenstown.
	Ammen		Queenstown.
	Patterson		Queenstown.
	Fanning		Queenstown.
	Jarvis		Brest.
Division Five			
	Balch		Queenstown.
	Aylwin		Channel.
	Duncan		Queenstown.
	Downes		Queenstown.
Division Six.			
	Cassin		Queenstown.
	Cummings		Queenstown.
	Parker		Queenstown.
	Benham		Queenstown.
Tender	Melville		
Flotilla Three. Division Seven.			
	O'Brien		Queenstown.
	Nicholson		Brest.
	Winslow		Queenstown.
	McDougal		Queenstown.
	Cushing		Queenstown.
	Ericsson		Queenstown.

DESTROYER FORCE—Continued.

Assignment.	Ship.	Flag officer and comdg. officer.	Present assignment.
Division Eight.			
	Tucker		Queenstown.
	Conyngham		Queenstown.
	Porter		Queenstown.
	Wainwright		Queenstown.
	Wadsworth		Brest.
Division Nine.			
	Sampson		Queenstown.
	Rowan		Queenstown.
	Davis		Queenstown.
	Allen		Queenstown.
	Wilkes		Queenstown.
	Shaw		Queenstown.
Flotilla Four. Division Ten.			
	Stockton		Queenstown.
	Caldwell		Queenstown.
	Connor		United States.
	Manley		Queenstown.
	Gwin		United States.
Division Eleven.			
Division Twelve.			
Flotilla Five. Division Thirteen.			
Division Fourteen.			
Division Fifteen.			

SUBMARINE FORCE.

Assignment.	Ship.	Flag officer and comdg. officer.	Present assignment.
Flotilla Two. Division Four.			
Support	Tonopah		Azores.
Tender	Fulton		Azores.
	K-1		Azores.
	K-2		Azores.
	K-5		Azores.
	K-6		Azores.
	K-1		Azores.
	E-1		Azores.
Division Five.			
Tender	Bushnell		Berehaven.
	A. L. 1		Berehaven.
	A. L. 2		Berehaven.
	A. L. 3		Berehaven.
	A. L. 4		Berehaven.
	A. L. 9		Berehaven.
	A. L. 10		Berehaven.
	A. L. 11		Berehaven.

MINE FORCE.

Assignment.	Ship.	Flag officer and comdg. officer.	Remarks.
Mine Planters.			
	San Francisco		
	Baltimore		
	Shawmut		ex S. S. Massachusetts.
	Aroostook		ex S. S. Bunker Hill.
	Canandaigua		ex S. S. El Siglo.
	Canonicus		ex S. S. El Cid.
	Housatonic		ex S S. El Rio.
	Roanoke		ex S. S. El Dia.
	Quinnebaug		ex S. S. Jefferson.
	Saranac		ex S. S. Hamilton.
	Bridgeport		ex S. S. Breslau.
	Black Hawk		ex S. S. Santa Catalina.
Mine Sweepers.			
	Ontario		
	Patapsco		
	Patuxent		
	Sonoma		
	Avocet		
	Bobolink		
	Tanager		
	Cardinal		
	Lapwing		
	Owl		
	Widgeon		
	Finch		

UNASSIGNED.

Assignment.	Ship.	Flag officer and comdg. officer.	Present assignment.
	Prometheus		Repair ship, Brest.
	Panther		Repair ship, Brest.
	Carola IV		Barrack ship, Brest.
	Concord		Tug, Brest.
	Montauk		Tug, French Coast.
	Barnegat		Tug, French Coast.

UNASSIGNED—Continued.

Assignment.	Ship.	Flag officer and comdg. officer.	Present assignment.
	Gypsum Queen		Tug, French Coast.
	Nahant		Tug, Genoa.
	Penobscot		Tug, Genoa.
	Druid		Barrack ship, Gibraltar.
	Margaret		Azores.
	Galatea		Azores.
	Marietta		Gibraltar, to go to Azores.
	Santee		Repairs.

SUBMARINE CHASER FORCE ONE.

Assignment.	Ship.	Flag officer and comdg. officer.	Present assignment.
Squadron Two.			
Squadron Tender.			
Division Four.			
Division Five.			
Division Six.			

SUBMARINE CHASER FORCE TWO.

Assignment.	Ship.	Flag officer and comdg. officer.	Present assignment.
Squadron One.			
Division One.			
Division Two.			
Division Three.			

MEMORANDUM No. 20.

DOCTRINE OF ANTISUBMARINE ATTACK.

3 April, 1918.

[For joint appreciation by British and American Planning Sections, see Memorandum No. 20 A.]

Subject: Doctrine that should govern the action of escorting vessels (destroyers, trawlers, and P-boats) when contact with an enemy submarine is made in the vicinity of a convoy.

The following is a paraphrase of a report recently received concerning the contact of an escorting vessel with an enemy submarine:

At 10.45 a. m., while in position 3 miles ahead, and zigzagging at 13 (?) knots across the front of convoy ———, a disturbed oil streak was observed crossing the front of the convoy in a southwesterly direction, convoy steering 54 S. E. Proceeding to investigate, the ship was maneuvered into a position alongside and parallel to this streak, increasing to full speed (about 17 knots). Shortly after the streak took a turn 90° to starboard, running parallel to the convoy at a distance of about 1 mile from it.

It being undoubtedly the wake of a submarine, on obtaining a position about 50 yards ahead of the end of the wake (which was clearly defined) a Type "D" depth charge was dropped, set to 100 feet; this exploded well. We then turned around and passed over the spot where the depth charge had exploded, clearly marked by the usual brown deposit, etc., the residue from a depth charge exploding, and observed a bright streak of fresh oil moving slowly away. Ahead of this, at 11.15 a. m., another Type "D" depth charge was dropped, set to 100 feet; this also exploded. Turning round again, fresh streaks of strongly smelling oil, together with bubbles and a disturbance in the water, was noticed, and a third depth charge, set to 150 feet, was dropped on this position. After the explosion the ship was brought over this spot at slow speed; much strongly smelling oil and a small quantity of bubbles were coming to the surface.

As the convoy was now at a safe distance away (about 10 to 12 miles), and as there would be very little chance of the submarine renewing the attack on the convoy in my opinion, I decided to rejoin the convoy, resuming position ahead shortly before 4 o'clock.

Fresh oil was coming to the surface in patches when we left the vicinity, and my opinion is that the submarine must have been severely damaged.

The commander of the escort, in forwarding the above report, stated:

As a result of this experience I have no suggestions to make.

We submit that the action of the escorting vessel as above reported and the tacit approval of the escort commander are not in accordance with sound practice.

The "General estimate of the situation," which has received the official approval of the Allied Naval Council includes among the measures to be taken in the following:

We must assure ourselves that on every occasion of contact with a submarine the maximum tactical use shall be made of that contact.

The report of the escorting vessels shows that the idea of defense and not offense was uppermost in the minds of both the captain of the vessels and of the escort commander. They left the scene of action when no decision had been reached, and when every indication favored an expectation of destroying the enemy. The incident shows that the officers concerned were not familiar with the accepted policy. We therefore recommend that the following be issued as a doctrine of antisubmarine attack to all hunting vessels and to all zone escort vessels:

Doctrine of Antisubmarine Attack.

The enemy's submarine campaign can not be defeated by defensive measures alone.

The system of escorting convoys is in part a deployment in readiness, and serves to bring hostile submarines into close tactical contact with a concentrated force of our antisubmarine vessels more frequently than is possible by other means.

It is imperative that full advantage be taken of such contacts to destroy the enemy, to accomplish which the rôle of escorts of antisubmarine types must instantly be transported from defensive to offensive, and a vigorous counterattack prosecuted. Every submarine destroyed saves about 40,000 tons of shipping per year.

To cover such cases the following is tentatively prescribed as—

COUNTERATTACK DOCTRINE.

1. The maximum possible advantage must be taken of each and every close contact with an enemy submarine to pursue it to destruction. The mission of protecting the convoy becomes secondary to the destruction of the submarine.

2. The pursuit and attack will be made by at least half of the escorting force, and will be continued until no reasonable hope of destroying the submarine or of sighting it again before dark exists. An exception may be made in the case of a troop ship convoy, but the pursuit shall even then invariably be made by one or more of the escort.

3. As a rule every close contact with an enemy submarine shall be construed as an order to attack until not less than three-quarters of all depth charges on the attacking vessels have been expended.

This rule shall not operate to prevent the expenditure of more depth charges if considered necessary. In general, the attack should be as heavy and persistent as possible.

4. If the attacking submarine is not seen, a number of depth charges will nevertheless be dropped at random in the most promising area.

5. In cases where the presence of a submarine is not definitely known, but suspicious indications are sighted, the above rule regarding number of depth charges to be dropped does not apply.

[Extract from Memorandum No. 71, "History of Planning Section."]

Initiated by the American Planning Section with a view to emphasizing principles brought out in previous papers as well as indoctrinating the anti-submarine forces. The need for further special treatment of this subject would not have been apparent to the Planning Section but for the routine practice of scrutinizing operational reports. The incident points to the necessity of a Planning Section keeping in close touch with operations. The forwarding comment of the Force Commander on 29 May follows:

"2. Memorandum No. 20 was prepared by the Planning Section of my staff after having read a report by an escorting vessel in which it was made plain that the escorting vessel considered that it was unnecessary to insure that it could not attack the convoy. Memorandum No. 20a is a joint memorandum by the Planning Section of my staff and the Plans Division of the Admiralty on the same subject.

"3. The broad idea expressed in both memoranda is that on every occasion of contact with an enemy submarine it should be pursued to destruction if possible, since the enemy's submarine campaign can not be defeated by merely defending shipping.

"4. The problems and situations presented by the naval warfare that is now being carried on are new to naval experience, but a doctrine is being gradually evolved and it is important that the basis of this doctrine should be the offense rather than the defense.

"5. The 'guiding principles and general instruction' as appearing on pages 3 and 4 of Memorandum No. 20a are, in general, approved, and will doubtless appear in the final doctrine evolved from current experience. With particular reference to Item VI it may be said that the protection of the convoy may often be best accomplished by a vigorous attack on the threatening enemy. With this fact in mind it is apparent that the initiation of an attack on the submarine is not in fact a subordination of the protective mission to the offensive mission. It is furthermore the fact that certain limited areas, such as the North Channel leading to the Irish Sea, submarines do not operate in pairs or groups but practically always singly, so that there is little danger of the convoy being attacked by any submarine other than the one that is being hunted."

Memorandum No. 21.

(Not to be published at this time.)

MEMORANDUM No. 22.

VISIT TO DOVER.

10 April, 1918.

(See Map No. 1, "The North Sea.")

Through the kindness of the Plans Division of the Admiralty arrangement were made with the vice admiral commanding at Dover by which the Planning Section was given an opportunity to visit Dover and to become familiar with the efforts being made by the force under Vice Admiral Sir Roger Keyes, R. N.

We (Planning Section) left London on April 3 for Dover. The following morning we called on Vice Admiral Keyes, who received us very cordially, and immediately said that he was ready and willing to tell us anything we wished to know about the Dover barrage and other activities under his command. He gave us a copy of general orders governing activities in the district, and showed us his "war room," where a watch is kept night and day by a commissioned officer. There was nothing of particular interest in the war room, except that an hour-to-hour record was maintained of everything that was going on in the district. The methods of keeping this record were by means of charts and movable pins carrying the names of the vessels that were operating. The war room is connected by telephone with Dunkirk, Calais, the Admiralty, and operation points within the district, so that any movements that may be observed can be reported quickly to the war room for plotting and subsequent decision. At night the duty officer is in constant telephonic communication with either Admiral Keyes or his staff commander, so that any situation that may develop during the night can be handled with practically no delay.

Vice Admiral Keyes and Rear Admiral Tyrwhitt (who commands at Harwich) are very warm personal friends, and consequently cooperation between the two stations is of the most thoroughgoing kind.

Operations within the Dover command include the following:

(*a*) Bombardment of the Belgian coast, and especially of Zeebrugge and Ostend.

(*b*) Patrol of the mine barrage.

(*c*) Extension of the mine barrage by the laying of additional mines.

(*d*) The protection of coastal traffic which comes through the Downs.

(*e*) The protection of barge traffic from Sandwich across to Calais, Dunkirk, and especially to the Belgian Canals still within allied lines.

(*f*) The escort of troops from Folkestone and Dover across the Channel.

(*g*) The patrol of the mine fields by P-boats.

(*h*) The support of the mine-field patrol by monitors, destroyers, and other light craft.

The Mine Barrage.

The present mine barrage is composed of upward of 14 rows of mines planted at various depths from 25 feet below the surface to a depth sufficient to prevent submarines from successfully diving under the mine barrrage. The northern line of mines extends from the vicinity of Cape Gris Nez to a point midway between Dover and Folkestone. The mine field is being thickened and repaired constantly, and extends from coast to coast without any gaps.

As those submarines that have passed the barrage usually go through on the surface, the question at once arises as to why the mine barrage is not carried up to the surface.

There is a rise and fall of tide of from 18 to 20 feet in the Dover Straits. Experience to date has demonstrated that it is impracticable to have a mine exposed on the surface of the water, on account of the action of the sea in causing the mine to come adrift very soon; and also on account of the practical impossibility of replacing mines that do so come adrift.

The practice is to place the mines sufficiently below the surface to insure that they shall continue to watch during a reasonable period of time. The effect of this system is that mines planted 8 to 10 feet below the surface of the water at low water are 28 to 30 feet below the surface at high water. It is known that submarines invariably choose a point near high water to attempt to force the barrage.

Since it has been found impracticable so far to develop a mine or a mine gear that will rise and fall with the tide and watch properly, it has been found necessary to keep the mines sufficiently below the surface of the water at low water to enable the entire barrage to be patrolled in all directions by surface craft without danger to themselves. It would be perfectly practicable to have the mine barrage complete to the surface at low water; but if this were done, it would not be practicable to patrol the barrage at any time by surface craft.

We have learned recently that the Mines Division of the Admiralty were not cognizant of the special problem presented in the mine barrage effort at Dover until two months ago—about the time

that Vice Admiral Keyes took over the command at Dover. Until that time the Mines Division at the Admiralty were under the impression that the Dover Straits were tight, and consequently needed no special mine treatment. They now understand fully that the problem is to produce a mine and mine gear that will watch at a constant distance below the surface of the water, no matter what the state of the tide.

The Planning Section suggests that this problem be considered by the Bureau of Ordnance, with a view to developing, if possible, an American solution. The Planning Section has already indicated this problem to Lieutenant Commander Thompson, and has suggested to him that we get a digest from the Admiralty of all efforts that have so far been made to solve the problem, and the results of each one of these efforts in order that the Bureau of Ordnance in its investigations may not have to go over the same ground that the Admiralty has already covered.

The Bureau of Ordnance, in its study of the problem, should consider that the principal difficulties presented at Dover are—

(*a*) A strong tidal current.

(*b*) Rise and fall of tide of about 20 feet.

(*c*) Poor holding ground.

(*d*) Heavy seas.

(*e*) Countermining of mines in the barrage either by explosion due to the attempted passage of submarines or by accidental explosion of mines.

Coastal traffic through the Straits of Dover will not interfere seriously with a surface barrage, since all traffic now is compelled to pass through a barrage gate over a deep mine field.

The necessity of a barrage to the surface is understood and fully appreciated by everyone. The most promising development at present for the mining to the surface is found in the acoustic mine, which we understand is now on a manufacturing basis, experimental work having been practically completed.

PATROLS.

The system of local protection of the barrage, and of the effort to compel all submarines attempting to pass the barrage to dive into the mine field, consists in general of two lines of trawlers in position on the edges of the barrage, one to the north and one to the south, supported by P-boats. At night the trawlers burn flares which light up the water in favorable conditions for a couple of miles around, thus making it hazardous for a submarine to attempt to go through on the surface. Between the two lines of trawlers there are drifters, which themselves show no lights, and which maintain themselves

in readiness with 12-pounder guns to attack any submarine which may be seen going through between the trawlers. Both the trawlers and the drifters are at great disadvantage because they are slow and unable to catch a submarine that runs through at its best speed. The difficulties of hitting targets at night from a lively vessel are of course fully understood.

In order to meet this deficiency of speed in the trawlers and drifters the vice admiral at Dover recently has added to his command a considerable number of P-boats, which maintain themselves also in readiness between the lines of trawlers. There are about to be added to this system of protection of the mine field and guarding against the passage of submarines two additional lines of vessels which will be moored in position, one line to the north of the barrage and the other to the south, each fitted with four searchlights, which will be in constant employment when the weather is suitable in searching for enemy submarines.

As the enemy has from time to time made raids on the light craft patrolling the barrage, the necessity for rallying points has developed and is now being solved by monitors, which are suitably spaced on the northern side of the barrage.

In addition there are patrol lines still farther to the northward of the barrage, where strong destroyer forces are kept under way in constant readiness to meet any attack the enemy may make by surface craft in the direction of Ostend.

It has been found that the flares on the trawlers are more effective on cloudy nights, when their light is reflected onto the water by the clouds, than on starlight nights. Trawlers showing flares are themselves unable to see anything.

When submarines are sighted, the light of the flares is augmented for fire-control purposes by star shells and, if possible, by searchlights from the firing ship.

As an indication of the efficiency of the present form of the barrage and patrol effort, the following comparison of vessels (large submarines only) through the Straits of Dover is cited:

Month.	Number of boats.	Number of passages.	Number of passages northabout.	Number of passages via Dover Straits.
December	21	42	17	19
January	13	26	18	5
February	21	42	39	1

NOTE.—No large submarines are known to have passed through Dover Straits since 18 February.

* * * * * * *

During the time of our visit to Dover several destroyers had been loaned to Dover from Harwich on account of the extra strain placed

on the Dover command by the necessity of escorting troops to France. A movement was in progress for reinforcing the British forces in France through Dover and Folkestone, which involved a transfer of about 300,000 troops.

* * * * * * *

On the first day of our visit Admiral Keyes took us in a torpedo boat to witness the laying of smoke screens by coastal motor boats. A single coastal motor boat, using sulphonic gas in its cylinders, was able to lay a very dense white screen that remained effective for a considerable time.

Admiral Keyes told us that recently a small coastal motor boat, well to the northward of the barrage, had been able to engage a little after dawn an enemy destroyer and by firing its torpedo blow the stern off the destroyer, and then by maneuvering behind its own smoke screen had escaped the pursuit of other enemy vessels in the vicinity. The captain of the motor boat received the D. S. O. for his exploit.

* * * * * * *

On the second night of our visit two officers, Captains Knox and Yarnell, went onto the monitor *Sir John Moore*, which was stationed in support of and close to the barrage through the night. On the same night Captain Schofield went in a destroyer leader, *Whirlwind*, on the central patrol to the northward of the barrage; in these ways we were able to get in touch with some of the difficulties that attend operations in the Straits.

The principal difficulty of the patrol and support is due to the frequency of thick weather. Whenever a fog sets in light craft become very quickly scattered; long experience has demonstrated that the best procedure is to get to an anchorage and remain in readiness to resume station immediately the fog lifts sufficiently to permit safe navigation. It appears that the tides in the Straits of Dover are not dependable, being subject to considerable fluctuations, owing to weather which may not be felt in the Straits.

In addition to the support that is constantly under way to the northward of the barrage, there are other supports anchored in or near the Downs in readiness to attack any submarine which may hazard a passage through the shallow waters of the Downs. The great danger to submarines in shallow waters has resulted in making the Downs practically a safe passage; but notwithstanding this safety the usual precautions are taken to guard anything which may be in the Downs.

* * * * * * *

The last instance of the bombardment of Dover by an enemy submarine was an effort on the part of the submarine to trap destroyers

which were supposed to be lying inside. The submarine first approached Dover and laid a mine field off the entrance to the harbor, then withdrew to a slight distance and fired into Dover. As a matter of fact, its aim was bad and no shells landed within the city limits, but in the outskirts. British destroyers outside heard the fire, came promptly to the rescue, and compelled the submarine to dive. The mines were discovered and swept up before they had done any damage.

In the case of the loss of several drifters and trawlers in January considerable blame was attached to officers on duty that night, both in the support and in the patrol. The trawlers and drifters behaved with a good deal of spirit. The escape of the enemy destroyers was due largely to the assumption that the failure of the enemy to make the proper recognition signals did not necessarily indicate them to be enemy vessels, and to the fact that the vessels attacked had no radio. Further, the engagement with the trawlers did not become known to other parts of the line until it was too late to interpose in force between the enemy and its home port. The general mix up resulted in two or three court-martials and in the loss of his command by an officer who has two submarines to his personal credit and the D. S. O. with bar.

* * * * * * *

We visited the air station at Dover, where two of our naval airmen are now acting as pilots of British airships. Conversation with the British and American airmen (who were all pilots of lighter-than-air craft) did not cause us to change in any way our conclusions as to the relative usefulness of lighter and heavier than air craft in the present war.

* * * * * * *

On April 6 we called on Admiral Keyes at his residence to say good-by and found him out. We left messages of thanks with the chief of staff, Commodore Boyle, and then went to the railway station. Just previous to the departure of the train Vice Admiral Keyes and his flag lieutenant appeared on the platform to say good-by. The railway station was some 2 miles from Admiral Keyes's office, and we were very much pleased with his courtesy in seeing us off in this way.

Throughout our visit there was the utmost cordiality on the part of all British officers with whom we came in contact. We were particularly impressed with the loyalty and affection felt for Vice Admiral Keyes by all those portions of his command which we visited. Our personal impression was Vice Admiral Keyes was a man of such high caliber and character that he would undoubtedly rise some day to the highest command possible in the British Navy.

MEMORANDUM No. 23.

MILITARY UNIFORMS.

23 April, 1918.

The following are questions asked of the Planning Section by the Force Commander and the Planning Section's replies thereto:

Question 1. As all nations since time out of mind have put the officers of their armies and navies in uniform instead of in citizen's clothes, it may be assumed that in the opinion of the world the reasons for doing so are considered sound. What are these reasons?

Answer. (*a*) Uniforms give a feeling of unity and strength among military or naval forces that can not be obtained in any other way.

(*b*) Uniforms simplify the clothing of military forces.

(*c*) Uniforms are necessary for the easy recognition of friend and enemy.

(*d*) Uniforms elevate morale.

Question 2. In all services officers are provided with certain uniforms that are embellished by various means—by colors, brass buttons, gold braid, embroidery, plumes, etc.

(*a*) What is the reason for this embellishment?

(*b*) Why does the degree of embellishment vary with the grade?

Answer. The embellishments of officers' uniforms are primarily to indicate the degree of their authority and to aid in the maintenance of discipline. The embellishments of officers' uniforms call the attention of enlisted men who are required to salute. This results in—

(*a*) A constant training of the men in attention.

(*b*) The formation of the habit of looking to officers.

(*c*) The unquestioning recognition of the officer as a source of authority.

The degree of embellishment varies with grade to indicate the direction of the flow of authority, and, further, to train subordinate officers along the lines indicated above for enlisted men.

Question 3. Is there any good reason why all uniforms should at least be "smart"? If so, why?

Answer. Smartness of uniforms increase the effect of uniforms in raising the morale of officers and men. There is no valid objection to "smartness" of uniforms, unless it is obtained at a real cost of personal efficiency in movement.

Question 4. Is there any good reason why all uniforms should at least be of military appearance? If so, why?

Answer. There is every reason why uniforms should be military in appearance, distinctive of the nature of the service of the organization.

Question 5. The uniforms of the officers of the armies of the various nations are different. The same is true to an even greater degree of the navies.

(*a*) Is this necessary or desirable?

(*b*) If so, why?

Answer. Differences in the uniforms, both military and naval, of officers and men of different nationalities—

(*a*) Serve to build up and protect national prestige and the prestige of national forces.

(*b*) Make the work of spies more difficult.

(*c*) Assist in preventing friendly forces from coming into collision with each other.

Question 6. If it is desirable that a uniform should indicate the nation and service to which an officer belongs, should not the uniform be such that the nation and service of the wearer should be recognizable at a considerable distance—say, across a street?

Answer. Yes.

Question 7. When a uniform has been worn for many years and consequently represents both at home and abroad, the wearer's nation, in much the same way that the national flag does, should there not be reasons much more urgent than convenience, position of pockets, etc., for changing it?

Answer. Yes; but it is not admitted that there are not more urgent reasons than convenience, position of pockets, etc., for changing the uniform. Serviceability as well as appearance are necessary qualities of a proper working uniform.

Question 8. Assuming that the reasons for changing our uniform are so urgent as to render a change imperative, should not the new uniform be distinctive? That is, should it not be such as to be at once recognizable as that of an American naval officer, say, at a considerable distance?

Answer Yes.

Question 9. The photographic records of this war, already made and to be made, will become historical. Is it desirable that the final records of our Navy be confused by changing the uniform to one so nearly identical with that of the British as to be practically unrecognizable in such records?

Answer. No. But it is not believed that the proposed change in the cut of the coat will render our uniform practically indistinguishable from the British. It is possible to put distinctive rank marks upon the proposed coat so as to make it unmistakably American.

MEMORANDUM No. 24.

TENDERS.

2 May, 1918.

The following vessels are building at present for employment in the war zone: Destroyers, 265; Ford destroyers, 100.

The following tenders have been assigned for service with these vessels: *Buffalo*, destroyers; *Bridgeport*, destroyers; *Prairie*, destroyers.

Experience has shown that the maximum number of destroyers that can be maintained by a single tender is 18, except that the destroyers be new, when a tender may take care of 24 destroyers. Accepting the latter number as the basis of estimate, the following tenders will be required: For destroyers, 1918, 1 additional; for destroyers, 1919, 7 additional; for Ford destroyers, 4.

The total tonnage required for this program does not exceed 100,000 tons displacement, which corresponds to average sinkings for a single week.

We have consulted with Vice Admiral Bayly, commander in chief, Ireland; Capt. J. R. P. Pringle, United States Navy; Capt. H. B. Price, United States Navy; Capt. R. H. Leigh, United States Navy, all of whom are cognizant of operating conditions in the war zone, and all of these officers concur with us in the recommendation that the tenders above be furnished for the maintenance of destroyers and Ford destroyers in the war zone. In making this recommendation we have considered fully the great shortage of merchant tonnage and the corresponding necessity for economy in its employment.

The reasons which lead us to recommend a tender for every 24 destroyers or Ford destroyers are:

(*a*) Repair and upkeep facilities in the United Kingdom are already taxed beyond their capacity; they will be entirely inadequate to handle the upkeep work on the prospective increases in our forces in the war zone.

(*b*) The labor supply is diminishing.

(*c*) Civilian labor is not as efficient as enlisted labor and is not sufficiently under control. It may strike at pleasure and usually selects a critical time for doing so.

(*d*) The presence of a tender enables the senior officer present to adjust demands for work to meet operating needs. The tender is always at the operating base and ready to undertake emergency work. The personnel of the tender and of the destroyers belong to the same service and are governed by the same motives.

(*e*) Experience has shown that any task within the capacity of the tender is done in much less time by the tender than by a repair station.

(*f*) The criterion of efficiency is percentage of operating days. The lack of tenders as recommended will inevitably reduce percentage of operating days to an extent that will more than justify the allocation of the tonnage recommended.

(*g*) The tenders will be mobile and therefore permit operating bases to be shifted with the minimum interruption to upkeep.

(*h*) The tenders will be available after the war to relieve the great pressure that must inevitably fall on our Navy Yards.

CONCLUSION.

One tender for each 24 destroyers and one for each 24 Ford destroyers should accompany or precede these vessels to the war zones.

MEMORANDUM No. 25.

CONVOY ORDERS.

8 May, 1918.

We recommend that a uniform system of convoy orders be instituted in the interest of clearness, precision, and easy reference. At present orders relating to any one convoy in general consist of the following:

(*a*) *Sailing orders.*—These orders go to the commodore, commander of ocean escort, to O. P., P. C. O., R. O., naval secretary, vice commodore.

(*b*) Letters of transmittal of "(*a*)."

(*c*) Orders to leaders of divisions.

(*d*) Formation of convoy—orders.

(*e*) Information sheets.

(*f*) Lists of signalmen.

(*g*) Lists of ships in convoy.

(*h*) Plan of formation of convoy.

The same system of order writing is not used everywhere, so that the various forces concerned are sometimes a little confused by the multiplicity of documents necessary for them to consult. In some cases separate orders are issued to the commodore, the vice commodore, the ocean escort commander, the danger zone escort commander, and to masters of the convoy. When this is done much repetition is necessary.

We propose the following system of orders:

(*a*) *Sailing orders.*—To be issued as a combined order to the commodore, the vice commodore, the commander of the danger zone escort, the commander of the ocean escort.

(*b*) Instructions to masters.

(*c*) Sealed instructions to masters in case of becoming separated from convoy.

Sailing Orders.

In order to insure uniformity in the writing of sailing orders and the consequent convenience in consulting them, we suggest that the following order form be used:

Sailing Order Form.

H. M. Dockyard, ------,
------, 1918.

Convoy Order ------
Sailing Orders.

FORCES.

(*a*) *Convoy* (enter name of convoy here).
(*b*) *First Danger Zone Escort.*

(Enter escort commander's name on this line.)

(Enter names of escorting vessels on these lines, one name on each line, and indicate which vessel the commander of the escort is in.)

(*c*) *Ocean Escort.*

(Enter escort commander's name on this line.)

(Enter names of vessels of ocean escort on these lines, one name on each line, and indicate which vessel the commander of the escort is in.)

Note.—Indicate on same line with his name which officer is the senior officer.

1. Enter in this paragraph information of enemy forces and of our own forces and convoys other than the ones given above, or tell where and when such information should be obtained. Give complete information regarding the meeting of *escorts* through other danger zones and what further orders may be expected from them. *No orders*, but information only, are to be put in this paragraph.

2. Use following form in this paragraph: The *convoy* is to proceed in one body in prescribed formation, guarded by designated escorts from ------ to ------, passing through the following positions:

(1) Lat. ------° ------", Long. ------° ------".
(2) Lat. ------° ------", Long. ------° ------".
(3) Lat. ------° ------", Long. ------° ------".
(4) Lat. ------° ------", Long. ------° ------".
(5) Lat. ------° ------", Long. ------° ------".
Thence toward----------

3. This paragraph should contain all the detailed orders that relate to the forces given in the lettered subdivisions at the top of the first page of the order. The orders for each part of the force to be segregated in lettered subparagraphs to correspond with the original lettering of the subdivisions at the beginning of the order.

(*a*) Begin this subparagraph by the name of the *Convoy*, then follow with orders as to time of sailing, forming up, rendezvous, wasting time detaching vessels, etc.; in fact, all orders that relate to the merchant vessels of the

convoy which are not given elsewhere. Do not repeat in order instructions included in the publications: B. 648, C. B. 648A, C. B. 585, as this only serves to make the order longer.

(*b*) Begin this subparagraph "*First Danger Zone Escort,*" then follow with necessary orders.

(*c*) Begin this subparagraph by "*Ocean Escort*" and then follow by necessary orders.

4. Enter in this paragraph any references to printed instructions.

5. Enumerate in this paragraph all papers that accompany the order. In preparing the papers to be attached to the order, letter and name them in the same way as they are lettered below, viz:

(*a*) *List and data of vessels of convoy.*
(Copies have been furnished to _____.)

(*b*) *Plan of convoy formation.*
(Copies have been furnished to each vessel of convoy.)

(*c*) *Instructions to masters.*
(Copies have been furnished to each vessel of convoy. These instructions include detailed orders for forming convoy, procedure in case of fog, etc.)

(*d*) *Information in relation to enemy submarines, mines, our convoys, etc.*

(*e*) *Signals additional to those in C. B. 585,* for use with this convoy only.

6. Enter in this paragraph all necessary instructions relating to reports to Admiralty, communication with escorts, cipher to be used, time to be used, and special call letters if they have not been given otherwise.

_____
(Signature.)

Copies to—
Commodore_____S. S._____
Vice Commodore, S. S._____
Commander Ocean Escort, U. S. S._____
Commander First Zone Escort, H. M. S_____
O. P., B. C. O., R. O.
Naval Secretary.
Flag Secretary, U. S. N.

A sample order according to this form follows to illustrate the scheme. It is based on actual orders for convoy H. G. 50 from Gibraltar:

Convoy Order H. G. 50.
Sailing Orders.

H. M. DOCKYARD, GIBRALTAR,
30 January, 1918.

FORCES.

(*a*) *Convoy H G. 50.*
Commodore, Acting Commander F. G. Thompson, R. N. R.;
Vice Commodore, Master of S. S. *Merchant Prince;*
17 merchant ships (see Appendix A and B).

(*b*) *Gibraltar Danger Zone Escort.*
Commander Cochrane, R. N., S. O. until ocean escort joins.
H. M. S. *Dianthus,* senior officer's ship.
H. M. S. *Laggan.*
H. M. S. *Hibiscus.*
U. S. S. *Dale.*

(*c*) *Ocean escort.*
Captain C. L. Hussey, U. S. N., senior officer.
U. S. S. *Birmingham.*

1. Information of enemy forces and of our own convoys will be furnished commodore and commander of escorts, who will visit "Operations" just

before sailing. An escort of destroyers and trawlers is to meet *Convoy* H. G. 50 at 9.30 a. m., 7 February in latitude _____ N.; longitude _____ W. The destroyers of this escort will bring instructions as to route for *Convoy* H. G. 50 to follow in British waters and as to point when *Ocean Escort* will part company with convoy.

2. The *Convoy* is to proceed in one body guarded by designated escorts from Gibraltar to the United Kingdom, passing through the following positions:

(I) _____ miles _____ Magnetic from _____
(II) Latitude _____ N.; Longitude _____ W.
(III) Latitude _____ N.; Longitude _____ W.
(IV) Latitude _____ N.; Longitude _____ W.
(V) Latitude _____ N.; Longitude _____ W.
(VI) Thence toward _____

3. (*a*) *Convoy H. G. 50.* Leave Gibraltar noon, 1 February, 1918. Form up before leaving position 7 miles north (mag.) of _____ and proceed along designated route so as to arrive at latitude _____ N., longitude _____ W., at 9.30 a. m. 7 February. If time must be wasted, waste it on that part of the route south of latitude _____ N., and west of longitude _____ W. Speed, 7 knots. Detach S. S. *Basse Terre* in latitude _____ N. for _____.

(*b*) *Gibraltar Danger Zone Escort* guard convoy from Gibraltar to latitude _____ N., longitude _____ W., then proceed to meet O. M. 42 (see Art. 60, C. B., 648).

(*c*) *Ocean Escort* leave Gibraltar in time to join convoy during daylight, and before convoy passes latitude _____ N., longitude _____ W., guard convoy from time of joining until relieved by destroyers.

4. Be governed by C. B. 648 (particular attention invited to Articles 38 and 51); C. B. 648A; and C. B. 585 with recent modifications to conform to C. B. 648.

5. The following papers are appended to this order:

(*a*) Plan of Convoy Formation.
(*b*) List and Data of Vessels in Convoy.
(*c*) Instructions to Masters.
(*d*) Information Relative to Enemy Submarines and Mines and our Convoys.
(*e*) Signals additional to those in C. B. 585 for use with this convoy only.

6. Report to Admiralty by W. T. via Brest (enter call letter here). Destroyers will answer (enter call letters here) call if they do not hear Brest answer. Use Convoy Cipher No. 2. Use G. M. T. For this convoy use call letters as follows: _____.

_____.
(Signature.)

Copies to—
Commodore.
Vice Commodore, S. S. *Merchant Prince.*
Commanding Officer, U. S. S. *Birmingham.*
Commanding Officer, H. M. S. *Dianthus.*

APPENDIX A.

[NOTE.—Burn this sheet as soon as convoy finally disperses.]

Plan of convoy formation.

Convoy.....

"Ocean Escort" { H. M. S.....
Call Flag.....
W/T Call.....
M. H.[1] from water line .....feet.

Commodore in S. S.....

W. T. Call.....
Ships in column to be.....yards apart.
Columns to be.....yards apart.
Cruising speed to be.....knots.
Convoy guide to be S. S.....

Vice Commodore in S. S.....

Port Columns.				Starboard Columns.			
Spare Column S. A.	Spare Column T. A.	Column U. A.	Column V. A.	Column W. A.	Column X. A.	Column Y. A.	Column Z. A.
S. S..... Flag...S. A. W/T..... M. H....feet	S. S..... Flag..T. A. W/T..... M. H...feet	S. S..... Flag..U. A. W/T..... M. H...feet	S. S..... Flag..V. A. W/T..... M. H...feet	S. S..... Flag..W. A. W/T..... M. H...feet	S. S..... Flag..X. A. W/T..... M. H...feet	S. S..... Flag..Y. A. W/T..... M. H...feet	S. S..... Flag.Z. A. W/T..... M. H..feet
S. S..... Flag...S. B. W/T..... M. H....feet	S. S..... Flag..T. B. W/T..... M. H...feet	S. S..... Flag..U. B. W/T..... M. H...feet	S. S..... Flag..V. B. W/T..... M. H...feet	S. S..... Flag..W. B. W/T..... M. H...feet	S. S..... Flag..X. B. W/T..... M. H...feet	S. S..... Flag..Y. B. W/T..... M. H...feet	S. S..... Flag.Z. B. W/T..... M. H..feet
S. S..... Flag...S. C. W/T..... M. H....feet	S.S..... Flag..T. C. W/T..... M. H...feet	S. S..... Flag..U. C. W/T..... M. H...feet	S. S..... Flag..V. C. W/T..... M. H...feet	S. S..... Flag..W. C. W/T..... M. H...feet	S. S..... Flag..X. C. W/T..... M. H...feet	S. S..... Flag..Y. C. W/T..... M. H...feet	S. S..... Flag.Z. C. W/T..... M. H..feet
S. S..... Flag...S. D. W/T..... M. H....feet	S. S..... Flag..T. D. W/T..... M. H...feet	S. S..... Flag..U. D. W/T..... M. H...feet	S. S..... Flag..V. D. W/T..... M. H...feet	S. S..... Flag..W. D. W/T..... M. H...feet	S. S..... Flag..X. D. W/T..... M. H...feet	S. S..... Flag..Y. D. W/T..... M. H...feet	S. S..... Flag.Z. D. W/T..... M. H..feet

[1] M. H. is height of mainmast head above water line.

List of ships in convoy No. ———.

Name of ship.	Flag.	Gross tonnage.	Speed.	Destination.	Cargo.	Nature of gun.	Whether fitted with W/T.	Number of W/T operators.	Number of signalers.	Position in convoy.	Remarks.

Instructions to masters ——— form.

H. M. DOCKYARD ———

———, 1918.

Convoy Order ———

Instructions to Masters.

1. The ———, commanded by ——— ———, is Ocean Escort. ———, in ——— commands First Danger Zone Escort ———, is Senior Officer.

Add in this paragraph any additional information that may be deemed appropriate, but no orders should be in this paragraph.

2. The Convoy _____ is to proceed in one body guarded by Escorts from _____, to _____, through positions already communicated to the Commodore and Vice Commodore.

3. Have steam by_____ a. m. _____, 1918.
p. m. _____,
Be at short stay by_____ a. m. _____,
p. m. _____,
Weigh anchor at_____ a. m. _____,
p. m. _____,
Then take assigned position in convoy astern of your column leader.
Column leaders by distinguishing flags of their columns below code pennant and form as follows:

_____

Formation will proceed when and as directed by_____

_____

4. Enter in this paragraph and references to printed instructions.

5. In the event of fog when forming the convoy you will_____

_____

Fill in special instructions on dotted lines, but do not repeat instructions already contained in printed book of instructions.

In the event of fog at other times_____

6. Enter in this paragraph all necessary instructions relating to reports to Admiralty, communication with escorts, cipher to be used, time to be used, and special call letters if they have not been given otherwise.

7. The following papers are appended:
(*a*) Plan of Convoy Formation.
(*b*)
(*c*)

_____
(Signature.)

Copies to—
Masters.
Commodore.
Vice Commodore.
Commander First Zone Escort.
Commander Ocean Escort.
O. P., B. C. O., R. O.
Naval Secretary.

[Extract from Memorandum No. 71, "History of Planning Section."]

The necessity for this memorandum became apparent after discussing the subject with several commanding officers of ocean escort vessels and examining the form of orders then in use.

In forwarding this memorandum to the Department on 10 June, the Force Commander made the following comment:

"1. There is forwarded herewith for the information of the Department one copy of Planning Section Memorandum No. 25 on the subject of 'Convoy orders.'

"2. It will be noted that the proposed form for convoy orders is based on the standard campaign order form recommended for adoption by the Department.

"3. It is proposed to adopt this form for issuing convoy orders whenever such orders are issued by United States naval authorities in Europe.

"4. The proposed form of order has been brought to the attention of the Admiralty."

MEMORANDUM No. 26.

BATTLE-CRUISER RAID.

17 May, 1918.

PROBLEM NO. 13.

(See Maps Nos. 1, 3, 4, and 5.)

General situation: As at present.

Required: An estimate of the threat of a raid by a German battle cruiser in the Atlantic.

SOLUTION.

Our constant naval mission in the prosecution of this war is, so far as it is related to raiders—

(1) To destroy the raider.

(2) To maintain sea communications.

ENEMY FORCES, THEIR STRENGTH, DISPOSITION, AND PROBABLE INTENTIONS.

Enemy strength in this problem is assumed to consist of one battle cruiser, latest type, plus submarines.

The mission of the battle cruiser would be "To destroy maximum amount of shipping possible with special reference to troop convoys, and to return to a home port."

NOTE.—The accelerated rate of delivery of American troops in France will soon have a very important bearing on the military situation in France; this fact can not but be known to the enemy and may therefore cause him to take extraordinary measures to interrupt the supply of men from America.

The problem of the battle cruiser assigned to operate against shipping in the Atlantic naturally divides itself into three phases:

1. The escape from the North Sea.
2. The operations.
3. Return to a home port.

The battle cruiser in deciding upon the route by which to gain the Atlantic will consider the Dover Straits and the route northabout.

Enemy knowledge of the barrage of the Dover Straits, the numerous mine fields in the narrow seas, the destroyers at Dover, Harwich, and in the Channel ports, of the monitors and other fighting vessels at Dover and in the Channel ports, will all serve to deter the battle cruiser from using the Dover Straits. In addition, his knowledge that all incoming transports and convoys are escorted

by destroyers; that in the Channel there are numerous ports to which shipping can escape; that convoys outside the Channel would have about 24 hours' notice of his approach; that destroyers in the Channel could trail him, rendering secrecy of his movements impossible; that he would have to use high speed and thereby reduce his cruising radius; that it would be impossible for him to take fuel ships with him; that the probability of complete failure of the effort through loss in the Channel is great—are all arguments against the use of the Dover Straits route.

The northabout route has the advantages of—

(*a*) Secrecy.

(*b*) Moderate cruising speed until operating area is reached.

(*c*) Possibility of taking one or more fuel ships along.

(*d*) Possibility of using submarines as a scouting screen for the battle cruiser.

(*e*) Small risk of loss when outward bound.

For these reasons the battle cruiser will undoubtedly choose the northabout route.

The fuel requirements for the two routes to an operating ground in the vicinity of the west coast of Ireland are not materially different.

In deciding upon the operation, the enemy will undoubtedly consider that the hazard to the battle cruiser is great and that in order to justify the hazard he must make certain that the results will be at least commensurate with the hazard involved. The operations possible are very closely dependent on the available fuel and consequent cruising radius of the battle cruiser.

	Miles.
Cruising radius at 10 knots, about	8,800
Cruising radius at 15 knots, about	6,000
Cruising radius at 24 knots, about	3,600

In planning fuel expenditure preceding the operation the enemy would probably formulate a table somewhat like the following:

Percentage of fuel supply necessary to reach a point midway between Faroe Islands and Iceland, outward bound, on basis of two-fifths power	16⅔
Percentage of fuel supply necessary as a reserve when returning by same route on basis of maximum speed	23⅓
Percentage of fuel available for operations south of Iceland-Faroe Island line	60
Allow cruising speed of 15 knots and radius for full speed on short notice at a 15 per cent extra expenditure of fuel. Then available cruising south of Iceland-Faroe line is	Miles. 3,130
If, however, provision is made for one day's steaming at 24 knots, the above cruising radius is reduced to about	2,800
Nearest point to a probable convoy route, northabout to Irish Sea, from Iceland-Faroe line is about	600
The nearest point to a probable southabout route to Irish Sea is about	900
The distance to Cape Finisterre via direct route is about	1,200

From the above it appears that under the most favorable circumstances for the battle cruiser she might steam at 15 knots a total of 1,600 miles in an area where convoys might be encountered. This is equivalent to a total of four days' operation in the Atlantic south of latitude 55° north.

In considering the foregoing tabular statement he would undoubtedly conclude that it was necessary to take fuel ships with him.

In making his exit from the North Sea he will probably be preceded by cruiser-submarines acting as scouts, to insure the secrecy of his movements, and may have, in addition, submarines posted in the general vicinity of our bases to observe movements that may indicate a knowledge on our part of his intentions.

Having made a safe exit, the battle cruiser will probably refuel previous to beginning his operations, and will station his fuel ships at one or more points well clear of all traffic.

THE OPERATIONS.

In order to make the battle cruiser fully effective in the execution of its missions, the enemy will undoubtedly arrange for scouting by the numerous submarines he is able to send to sea; these submarines, in order to be free to operate and to get contact with convoys beyond the region of destroyer escort, would be stationed somewhere in the vicinity of the twentieth meridian west. Other submarines stationed near ports from which convoys issue, might be directed to trail them on their westbound course to sea and to keep the battle cruiser informed of progress.

Similarly, eastbound convoys which may coss the scouting line of submaines would probably be trailed by submarines, who would keep the battle cruiser informed of progress.

The battle cruiser would endeavor to make its first attack an overwhelming one, because thereafter it would expect a lively pursuit, which would interfere with its operations.

As a successful attack in any area will unavoidably drive shipping from that area, the battle cruiser will foresee this effect and plan to shift its operations to a second area, either farther west or to the Gibraltar route, submarines being stationed in that area also to give information.

The battle cruiser will expect the return of many merchant ships to port, and in order to make full use of the possible panic his operations may cause, will station submarines in the vicinity of those ports nearest to the attack, in order that they may operate against returning vessels.

After the first attack by the battle cruiser it is possible that it may withdraw to again refuel and in order for its scouting submarines to take up new positions.

THE RETURN.

The longer the operations last the greater the tendency toward dispersal of allied fighting forces. When the operations of the battle cruiser are finally concluded, the greatest chance of success in returning to a home port would be for it to delay several days in a region remote from sea traffic before making the attempt.

SUMMARY AS TO THE BATTLE CRUISER.

(1) Would use the northabout route.

(2) It will take one or more fuel ships, fitted for refueling at sea.

(3) Will operate against convoys outside of the zone of destroyer escorts.

(4) It will use submarines as scouts to assist it in gaining contact with convoys.

(5) It may remain at sea for many days, shifting its area of operations to suit conditions.

(6) It may delay its return to port in order to increase its chances of success.

(7) Increased submarine activity may be expected near ports nearest to the first attack by the battle cruiser.

OUR OWN FORCES—THEIR STRENGTH, DISPOSITION, AND COURSES OF ACTION OPEN TO US.

No ocean escorts are now strong enough to oppose effectively a battle cruiser. If we assume, as we have, that the battle cruiser can remain at sea for an indefinite period, fixed detours to avoid danger will not be effective, as the battle cruiser may estimate that just such detours will be made.

As to the measures against the battle cruiser, two steps are necessary:

1. To get contact with one or more vessels having speed equal to the speed of the battle cruiser.

2. To bring at least two battle cruisers against it.

The accomplishment of (1) should enable continuous warnings to be sent out and should further enable our own battle cruisers to bring the enemy to action.

Destroyers are suitable for (1) and will probably be nearest to the battle cruiser when it is first heard of.

In order to make use of them it will be necessary to reduce temporarily the number used in escort work. Available destroyers should proceed in scouting formation at moderate speed toward incoming convoys and adjust their movements to reported positions of the battle cruiser. If contact is gained the sole missions of the destroyers should be—

1. To keep touch with the battle cruiser.
2. To send out warnings.
3. To report positions.

Destroyers should exhaust their fuel and then drift rather than lose a contact once gained. Fuel ships and tugs can be sent in relief of them.

Destroyers, if unsupported, can not destroy a battle cruiser except under fortunate conditions, so it is necessary to back up their scouting effort by battle cruisers, to insure success of the operation. There are 10 battle cruisers available, but since a superiority over enemy battle cruisers is needed with the Grand Fleet, 3 battle cruisers should be assigned to proceed toward the last reported position of the enemy battle cruiser. Since the cruising radius of our battle cruisers is small, fuel ships should be sent to sea rendezvous for their use if required.

As to protection for convoys, there are three principal methods of protection:

1. Evasion by predetermined plan.
2. Evasion in response to warnings.
3. Local protection.

Evasion by predetermined plan may be successful if battle cruiser can not refuel, and consequently is limited in its operations to four or five days in the area between latitude 55° north and 43° north. In this case, convoys might be sent to the southward of a circle 1,200 miles distant from the Faroe-Iceland line. Eastbound convoys within this circle would in general shape their course for destination if east of battle cruiser, making local detours as circumstances warranted. Westbound convoys that were east of battle-cruiser position return to port; other convoys proceed, keeping stern to reported position of battle cruiser until outside of 1,200-mile circle; Gilbraltar convoys to continue if north of 45° north and to take refuge as necessary if south of 45° north.

Evasion by predetermined plan is not so apt to succeed as evasion by a system of reliable warnings, leaving the route to be determined by the senior officer with each convoy. In addition, evasion to the extent of new destinations will congest shipping and cause great loss of time.

Evasion in response to warnings is applicable to all situations and is now in practice. It requires—

(*a*) Long-distance radio equipment.

(*b*) Good operators.

(*c*) Continuous radio watch.

Two general principles should govern—

(1) Convoys to proceed to destination whenever reasonable safety is assured.

(2) If obliged to run, run directly away from last reported position of battle cruiser until a safe offing is made, then proceed according to circumstances, and if possible toward destination.

Local protection.—The only efficient local protection to convoys against battle cruisers is superior gun power in a battle cruiser or a battleship. No battle cruisers are available as escorts. The only battleships that are available are United States battleships. A modern battleship is a sufficient escort to a convoy, as the battle cruiser would have to accept battle in order to attack the convoy unless convoy dispersed, which, of course, it should not do. One predreadnought can be outranged by a battle cruiser, and therefore is not so good a reply, but two predreadnoughts are considered adequate to discourage an attack on a convoy by one battle cruiser.

An examination of this problem indicates the desirability—in fact, the very great desirability—of having additional battle cruisers conveniently situated for intercepting any enemy battle cruiser effort on our lines of communication with America.

This point is so important that it is recommended that an effort be made to have the battle-cruiser division of Japan transferred to European waters.

NOTE.—The situation at the Dardanelles is another situation of the same general type as the one now under discussion and one which could best be met by two or three battle cruisers, supported by destroyers.

DECISIONS.

1. To scout for the battle cruiser by destroyers and other light vessels having sufficient speed that may be available.

2. To instruct the scouting vessels to trail the battle cruiser.

3. To support the scouting effort with two or three of our own battle cruisers, in order to destroy the enemy.

4. To send fuel ships to sea rendezvous for the use of our battle cruisers and scouting force.

5. To adopt the principle of evasion by convoys in response to warnings rather than the principle of evasion by predetermined plan.

6. To protect important convoys by battleships of the United States fleet during the time when battle cruisers are out or believed to be out.

A. PLANS DIVISION, BRITISH ADMIRALTY, UNITED STATES MEMORANDUM: "BATTLE CRUISER RAID."

[No date.]

The only important difference from P. D. 080 is that United States Planning Section consider the enemy will conclude he must take fuel ships with him. (Pages 215, 216.) P. D. 080 consider, on the other hand, the case of the enemy capturing fuel ships.

This is concurred in, if his object is to inflict serious losses; but if it is to create a diversion or for political effect the first overwhelming blow (as described at bottom of page 215) will be sufficient.

Provision for refueling makes the operation more complicated and more dangerous for him; the cause of his not attempting it may be that he has taken the United States view, and thinks the risk too great in comparison with the probable result.

The United States view does not conflict, however, with the action proposed in P. D. 080, the object of which is to reduce the risk of the enemy getting in a "first overwhelming blow."

DETAILS.

(Page 6.) *T. B. D. running out of fuel.*—This is considered unjustifiable, in view of the probability of bad weather, nor is it deemed advisable to reduce the present T. B. D.

(Page 7.) The escort force's objections to sending out B. C. after the enemy are that he is practically bound to assume he may be chased, and will take the best steps he can to evade pursuit, whether B. C. go after him or not. As the chances of locating him under these circumstances are exceedingly small, the B. C. are better employed awaiting his return, unless special intelligence is received of enemy's intended movements.

(Page 8.) The Japanese battle cruisers would probably deter him more from attempting to break out if they were in the North Sea than if they were on the trade routes.

[P. D. 080.]

PROPOSED MEASURES TO BE TAKEN IF ENEMY BATTLE CRUISERS ENTER ATLANTIC.

The conclusions which have been arrived at, and on which decisions are required, are as follows:

(1) The Grand Fleet to make every effort to intercept the raider on his return journey, the commander in chief to be informed in the sense of paragraph (2) below.

(2) Battle cruisers not to be detached to hunt the raider in the open Atlantic, unless special circumstances arise, such as intelligence being received of coaling bases, enemy's objectives, etc.

(3) Secret instructions to be issued to ocean escorts and commodores of convoys, detailing the action to be taken on receipt of a warning signal. In these they would be directed either to proceed to their destinations or other port, or return to their port of sailing, by routes passing clear of the danger area. Various rendezvous to be given, so as to facilitate diversion by W/T.

(4) Generally speaking, convoys to remain in the ports to which they have been diverted or recalled until the danger has passed or until battleship escorts have been provided.

(5) United States to be asked to provide battleship escorts for troop transports and convoys sailing from Halifax or American ports on informatiaon being received of an enemy battle cruiser in the Atlantic.

(6) Steps to be taken to accelerate the completion of merchant cruisrs and commissioned escorts with W/T capable of receiving across the Atlantic, and to provide them with an adequate number of operators.

(7) Instructions to be issued to ocean and destroyer escorts on importance of and procedure for quickly communicating information of enemy movements. It is understood that instructions as to procedure for scattering in the event of attack are being issued in the Allied Signal Manual to Merchant Vessels.

[Extract from Memorandum No. 71, "History of Planning Section."]

MEMORANDA NOS. 26 (17 MAY), 26A (UNDATED), 44 (6 AUGUST), 46 (10 AUGUST), 50 (SEPTEMBER, 1918), 51 (26 SEPTEMBER, 1918).

Subject: "*Battle Cruiser Raid.*"

Problem 13 (Memorandum 26) was initiated by the Planning Section after decision was reached to accelerate greatly the transport of American troops to Europe. It was submitted 17 May, 1918. We knew that consideration had been given sometime previously by the British to this question, but we were not satisfied that their plans, which contemplated no effort to search for or to attack the raider except during her exit to or return from the open Atlantic, were the best that would be devised.

During the preparation of Memorandum 26 the Operations Section of the Force Commander's Staff was freely consulted and it concurred in decisions reached.

The essential difference between the British and American views become apparent when Memorandum 26 and the Admiralty Plans Division remarks upon it, together with British Plans Division Paper P. D. 080 (appended to Memorandum 26) are compared. We believed the British aversion to scouting for the battle cruiser to be due partly to their lack of familiarity with and practice in scientific methods of scouting. A copy of Commander Pye's confidential book on Information and Security had been presented previously to

CAPT. LUKE McNAMEE, U. S. N., MEMBER OF PLANNING SECTION.

the British Admiralty and comment by British officers indicated possibly that these subjects had not been well developed in their service.

Memorandum 46 was prepared immediately upon receipt of Navy Department telegram Simben of 31 July, 1918 (quoted in Memorandum No. 50).

The Department plan was deemed unsatisfactory by the Planning Section and the Force Commander, as set forth in dispatch of 3 August, as follows:

"Urgent. Simben 21. Your Simben 8. I believe it extremely dangerous to base on assumption that information of enemy's escape will be obtained otherwise than through news of an attack. There is certainly a small chance that this information will be available, and in long nights of winter chances will be very much against this early information. I believe safety requires plan should be based on assumption that one or more battle cruisers will be at large in Atlantic with ample fuel supply and in a position to attack convoys before we have any knowledge of their exit from home ports. Only possible protection against this danger is battleship escort of convoys inaugurated before the danger arises. This would subject the battleships to a relatively small risk of being torpedoed as compared with the great risk of one or more convoys of many thousand troops being destroyed before measures could be taken to protect them. I have consistently advocated this plan, and am convinced that no other can offer the same certainty of protection to troops and other convoys. The following comments are submitted on the Department's plan as set forth in its cablegram: Assembly of large number of merchant ships at Azores dangerous because of possible submarine attack and extraordinary marine risks due to assembly so many vessels. Think general principle of action should be to keep all convoys moving toward destination. To turn back shipping or to deflect it toward other than terminal ports would make antisubmarine escort impossible in many cases and would introduce refueling difficulties that would tie up many vessels until fuel could be sent to them.

"Battleships based on Irish port as proposed would be available to escort to safe positions such troop convoys as might be in danger area when alarm was given, and this is deemed a safer plan than to have such convoys proceed to destination unescorted or to have them proceed to Azores. If Department should decide to adhere to its plan of having battleships go to the Azores to furnish escort to shipping assembled there, it is suggested that the Tagus River would be a better base than an Irish port, being 300 miles nearer the Azores. When Department has decided on general principle of plan I will take up whole question with British Admiralty. The final plan must be a joint plan, taking cognizance of all allied shipping."

To this the Department replied:

"Simben II. Your 21. Our 8. The details of the plan drawn by the Department were laid down to accord in general with the decision of your planning section as revised by the Admiralty Planning Department. As to your first point, viz, that safety requires plan should be based on assumption that one or more battle cruisers will be at large in Atlantic with ample fuel supply and in position to attack convoy before we have any knowledge of their exit from home port, this statement seems to be in contradiction to statement in P. D. 080, paragraph 5, and opposed to the actual information which you have from time to time furnished us. It is, however, so important a point that a direct statement should be had ——— the Admiralty as to their ability to provide the necessary information. You will notice in our plan that it is Department's intention to furnish old battleship escort to number of two for each important convoy when necessity arises, but there have been many reasons why we did not wish to do this in advance of the

necessity, one being that we did not desire to give advance information to the enemy as to one of the most important elements in the plan and thus give him the opportunity to plan an answer. In this matter also you should get a direct statement from the Admiralty as to the advisability of our using our pre-dreadnoughts for escort and when the operation, in their opinion, should go into effect. With regard to the rest of our plan and your comment on same: Even when battleship escort is provided, this in itself, on account of its fixed character, is still only a partial answer and can be countered by the enemy by an increase in power of his raiding force. It therefore becomes necessary to provide for further contingencies and this the plan submitted attempts to do. It differs only from the decision of your Planning Section in introducing the scheme of premeditated diversion. In general, an account of the few dreadnoughts available, their slower speed than that of battle cruisers, the number of convoys to be protected, and the great area over ——— these convoys operated, it seemed first necessary to divert according to a plan which might at same time get our dreadnoughts in touch with battle cruisers and afford greatest protection with minimum number of convoy ships. Second, nothing in the above prevents Department from immediately proceeding on the plan of evasion by warnings either before or after the premeditated plan is operative, and, lastly, as a final resort, it is always in the province of the escort commander to scatter his convoy. Therefore the Department still adheres to its predetermined plan, introducing the element of evasion by warnings, and, lastly, proposes that the movement to scatter be left in escort commander's hands as last resort. The Department prefers to base Division 6 at Berehaven, and does not consider the Tagus a good position from many points of view. U. S. S. *Oklahoma* and U. S. S. *Nevada* will sail in a few days. The plan above outlined will apply to our troop convoys to France and to the direct cargo convoys to French bay ports. It is desired that this plan be taken up immediately with Admiralty to get their concurrence as to HX and HC convoys carrying our troops, or for such modification of the plan as they suggest. 18006. Simben II.

"BENSON."

N. B.—Two words evidently omitted in coding, as blank spaces indicate.

Meantime, since the receipt of the first departmental telegram (Simben 8) the two Planning Sections had been at work upon a joint solution of the problem, upon the basis of maintaining a force of United States battleships in Irish waters, which before had been deemed unacceptable to the United States Navy Department. It was the intention to produce a paper at once acceptable to both Planning Sections, to the Admiralty, and the Navy Department. The British Director of Mercantile Marine and the Operations Section of the Force Commander's Staff collaborated in the solution.

After a tentative solution had been practically completed, a false report was received of the sighting at night in the North Sea of one or more large vessels proceeding at high speed outward. This information was transmitted to the Navy Department, which then sent its telegram No. 724 of 31 August announcing that a system of battleship escort would be inaugurated on 9 September. The joint plan was then modified on the basis of continuous battleship escort for important convoys—a system previously assumed unacceptable to the Navy Department.

A telegraphic summary of the joint plan was forwarded to the Navy Department and its telegraphic approval was received by the Force Commander on 21 September, 1918, Memorandum 26 having been submitted 17 May, 1918.

The history of this incident illustrates the difficulties of cooperation during war between Allies—more especially when far apart.

The following forwarding comment was made by the Force Commander:

"MEMORANDA NOS. 26 AND 26A.

"1. The inclosed Memorandum No. 26, from the Planning Section of my staff, has as an Appendix comment by the Plans Division of the British Admiralty, and also a statement of the measures proposed by the Admiralty Plans Division to be taken if enemy battle cruisers enter the Atlantic. These proposed measures have not been approved by the Admiralty, as it is not their custom to reject or adopt the recommendations of the Plans Division in advance of any necessity for action.

"2. I regard the estimate of the situation made by the Planning Section of my staff, and the decisions reached, as sound, and believe that battle cruisers should be made available for the purpose of searching for enemy battle cruisers in case they enter the Atlantic. I am informed that Great Britain has made the strongest possible effort to induce Japan to send her battle cruisers to the war zone, but without success. It is possible that the United States Government might be more successful, and it is suggested that an effort be made to persuade Japan to this end.

"3. It would be extremely undesirable, in my opinion, to adopt the passive waiting attitude expressed in paragraph 1 of the "Proposed measures," etc.

"4. The Department's attention is particularly invited to paragraphs 5 and 6 of the 'Proposed measures,' etc. It is recommended that plans be prepared for providing battleship escorts, in case of necessity, and that a certain number of merchant vessels now building in the United States be equipped with high-power radio.

"MEMORANDUM NO. 44.

"1. There is forwarded herewith inclosed for the information of the Navy Department copy of Memorandum No. 44, prepared by the Planning Section of my staff on the subject of enemy raiders.

"2. I propose to address a letter, in the sense outlined in this memorandum, to the British Admiralty, and to include therein the additions mentioned in paragraph 2 of my indorsement, approving this memorandum.

"3. Upon receipt of a reply from the Admiralty, the contents thereof will be communicated immediately to the Navy Department.

"4. An extra copy is inclosed for transmission to the Bureau of Ordnance.

"MEMORANDA NOS. 46, 50, 51.

"2. Memorandum No. 46 was prepared as a study of the means for immediately putting into execution the plan outlined in Department's cablegram Simben No. 8 of July 30, 1918. As no occasion ever arose to act on this plan the memorandum is forwarded merely as a matter of interest to the Department.

"3. Memorandum No. 50 is also based on cablegram Simben No. 8 and also on cablegrams Nos. 724 and 857 and sets forth the instructions which were prepared and issued to transports, United States men-of-war, and escort ships and to American merchant vessels. Since the adoption of the joint plan set forth in Memorandum No. 51, steps have been taken to cancel the instructions contained in Memorandum No. 50.

"4. Memorandum No. 51 is a joint paper by the Admiralty Plans Division and the Planning Section of my staff, covering a plan for dealing with convoys during a battle cruiser raid in the Atlantic. This is the plan of which the substance was cabled to the Department in cablegram No. 4523 and which was finally approved in Department's cablegram No. 1869."

Memorandum No. 27.

THE ADRIATIC.

16 May, 1918.

In considering a redistribution of naval forces in the Mediterranean the following should be kept in mind:

(1) The superior efficiency of homogeneous forces as against forces composed of several nationalities.

Note.—In the Adriatic there are now three nationalities attempting to cooperate closely. If American battleships were sent there, a fourth nationality would be added. The chaser effort is somewhat independent and need not complicate matters, but battleships would have to cooperate tactically with destroyers, cruisers, and battleships of the Allies.

(2) That any capital ships sent to the Adriatic should be free to operate against any vessels issuing from the Dardanelles.

Note.—We are not at war with Turkey, so could take no action against the *Goeben*, even if we came in contact with her.

(3) The advantage to us as Americans of keeping our capital ships concentrated rather than scattered.

(4) The necessity for speed in capital ships watching the Dardanelles.

(5) The advisability of a mine barrier near the Dardanelles.

Suggestions.

Assuming more American battleships are needed in European waters—

(1) Send them to the Grand Fleet to relieve British battleships in equal number.

(2) Send British battleships thus relieved to Adriatic.

(3) Give Dardanelles task to French.

(4) Italians as at present.

[Extract from Memorandum No. 71, "History of Planning Section."]

This memorandum was submitted with reference to a suggestion that American battleships be sent to the Mediterranean in order to assist in meeting the situation brought about by Germany taking ex-Russian battleships in the Black Sea.

MEMORANDUM No. 28.

UNITED STATES RELATIONS WITH TURKEY AND BULGARIA.

17 May, 1918.

[Prepared for the Force Commander when the Inter-Allied Naval Council was considering recommending a declaration of war against Turkey and Bulgaria by the United States.]

Secret Paper 129 deals with the question of the advisability of a declaration of war by the United States against the Ottoman Empire and Bulgaria.

Attention is invited to the following:

(1) The President of the United States has decided, at least for the time being, against this policy.

(2) The question is purely a question for statesmen of the United States to decide. If they decide for war, then the allied council may consider very properly how we can best wage war against a common enemy.

(3) Paper No. 69 of the Allied Naval Council contains an estimate of the Turkish situation with special reference to the Black Sea Fleet. The conclusions arrived at in that paper, which paper has been for some time in Washington, were—

(1) The Allies should conclude a peace with Turkey.

(2) The terms of the peace should counteract, so far as possible, the advantages of the enemies' peace with the Ukraine.

Decisions (3) and (4) of the same paper were not related directly to the question now being considered.

To join in a recommendation now to declare war on the Ottoman Empire would not be consistent with the President's policy nor with Secret Paper No. 69, above mentioned.

Even if a declaration of war appears desirable, the United States representative should refrain, under the circumstances, from joining in the recommendation.

AS TO THE DESIRABILITY OF WAR.

Three reasons are given for declaring war against the Ottoman Empire and Bulgaria:

1. Moral effect—showing Allies in unison in every theater of war.

NOTE.—The moral effect of a paper declaration that is not followed by active participation in the war would probably not be very great in Turkey when censorship is strict and the people ignorant. The military representatives do

not propose to use United States forces in Turkey, so that the net effect of the declaration will be to close the door to any possible negotiations favorable to the Allies.

2. Readiness for United States participation in the eastern theater which might otherwise require legislative action that could not be obtained in time to meet an emergency.

NOTE.—Participation in the eastern theater can be on land or at sea. The only naval participation possible, therefore, would be—

(*a*) Guarding the Dardanelles.
(*b*) Pursuit of vessels escaping from the Dardanelles.
(*c*) Escort and transport of land forces to Turkey.
(*d*) Bombardments.

Of these activities, (*b*) is the only emergency activity. If the *Goeben* escaped, we might desire to pursue her, but this is too remote a possibility to justify a declaration of war.

3. Encouragement of peoples of the Middle East, who are now hesitating to put forth their strongest efforts.

NOTE.—No information; no comment.

As to the proposition as a whole, viewed from the standpoint of the United States:

The whole Asia Minor, Palestine, Mesopotamia, and Persia area is wrapped up in spheres of influence and charged with international jealousies to such an extent that our active participation there, no matter how impartial it might be, would probably result in our becoming involved in the international jealousies now existing, to the detriment of our usefulness in the essential theaters.

A declaration of war would remove the chance we now have of being useful in propaganda and in preliminary negotiations. The resumption on our part of diplomatic relations would place us in a position better to push allied interests and would still leave us the option of declaring war when such action was deemed appropriate.

SUMMARY OF RECOMMENDATIONS.

(1) Maintain that the question is for American statesmen to decide.

(2) Decline to participate in any recommendation in the sense of (1) above.

SUMMARY OF OBSERVATIONS

(1) President has already decided question.

(2) Secret Paper No. 69 is not in accord with proposal and sets forth reasons for an opposite course.

(3) Greater usefulness of United States in reestablishing diplomatic relations.

(4) Danger of getting involved in international jealousies in eastern theater to the detriment of our usefulness elsewhere.

(5) Inadequate cause for war.

MEMORANDUM No. 29.

SUBMARINE-CHASER BASES.

25 May, 1918.

(See Maps Nos. 1 and 3.)

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1. About 108 submarine chasers are to be added to the United States forces in European waters on or before August 15, 1918. They are due to arrive about as follows:

June 15	18 chasers.
July 1	24 chasers.
July 15	24 chasers.
August 1	24 chasers.
August 15	18 chasers.

Six submarine chasers are to be sent to complete the two squadrons at Corfu.

2. Preliminary arrangements have been made for basing 36 chasers on Plymouth at the property now being commandeered by the Admiralty for United States bases. The question remains as to the disposition of two other detachments of 36 chasers each.

3. The following points bear on the decision so far as the shore end of the chaser operations is concerned:

(*a*) The personnel of the submarine chasers is as yet untrained in methods of operation. Their doctrine is not developed. They must attend conference in port where experienced officers may instruct them.

(*b*) The reserve officers commanding the vessels and the divisions are not sufficiently experienced to operate efficiently without close association with regular officers.

(*c*) Small repairs to the boats will frequently be needed. Provisions will have to be taken on board after every trip at sea.

(*d*) Service on the boats will be very arduous. The men have no opportunity for suitable exercise on board and very little room for moving around, so that they will need room on shore very much for more freedom of movement. This point is very important. The chaser effort will fail unless the personnel is kept thoroughly fit both in mind and body. To keep them fit we must have facilities that we can afford only in case of a large group using a single base. Four days should be the average trip at sea.

(*e*) When boats return from a trip at sea the personnel will require facilities on shore for recreation, scrubbing clothes, access to fresh water for use on shipboard, and access to canteen.

(*f*) It is very desirable that chasers lie at a dock. They can berth six abreast.

4. The following points bear on the decision as to operating areas:

(*a*) The efficient use of the listening equipment requires the closest possible coordination of all vessels in the hunting area. If the chasers are mixed with trawlers, the usefulness of their special equipment will be greatly reduced.

(*b*) Deep-water hunting areas are very desirable, as then submarines must keep underway and be pursued by the sound they make when underway.

(*c*) The operations of the vessels should be in areas where other fighting vessels are met but infrequently. The chasers—

(i) Are slow in signaling,

(ii) Have too few officers for decoding or coding,

(iii) Resemble submarines in appearance, especially at night, and therefore will be liable to get into trouble if they are exposed too much to other friendly war vessels.

(*d*) Their usefulness will be increased if they can cooperate with American aircraft patrols. Cooperation will be more complete if there is some association of the personnel of the two services.

(*e*) The chasers can cruise safely about 600 miles without refueling.

5. We now have bases at Brest, Queenstown, Berehaven, and Plymouth. All of these bases are adjacent to suitable operating areas, and all except Plymouth are air stations as well as naval bases.

6. Ordinarily it is much simpler and more economical to increase the facilities of an operating base than to establish a new base.

7. A study of the whole situation, including prospective assignment of the Eagle boats, indicate that—

(*a*) The Plymouth base should be developed.

(*b*) That 36 boats should be based on Brest.

(*c*) That the *Hannibal*, with 36 boats, should be based during the summer either at Berehaven or Queenstown, and that the winter base should depend on possibilities of operation as indicated by experience.

8. We therefore recommend—

(1) That the first 36 chasers be sent to Plymouth and operated from there under the personal supervision and training of an American naval officer.

(2) That investigation of conditions at Brest be made with a view to basing the second 36 chasers at Brest.

(3) That the third 36 chasers be based at either Queenstown or Berehaven—preferably Berehaven if submarines are operating near there—and that, previous to the decision in this matter, an officer

should be sent to Ireland to consult with Admiral Bayly and Captain Pringle.

[Extract from Memorandum No. 71, "History of Planning Section."]

MEMORANDA NOS. 29 (25 MAY), 32 (30 MAY), AND 34 (7 JUNE, 1918).

Subject: *"Submarine Chasers."*

These memoranda were prepared in anticipation of the arrival of large reinforcements of chasers to European waters.

The Planning Section felt that the chasers offered the most promising means for tactical offensive operations against enemy submarines, and that if this means could be favorably developed that a solution to the submarine menace would be approached.

We combated constantly the British desire to split up the United States chasers into small detachments for use under British command in a manner similar to the employment of their small motor craft in patrol work within small coastal districts.

We believed that the proper evolution and success of the chaser effort required the organization of these craft into large units to operate offensively only, and under American command, with freedom to proceed within the limits of their radius to the reported positions of submarines, irrespective of the small geographical division which fixed the limits of the numerous British coastal commands.

Forwarding comment by the Force Commander follows:

"MEMORANDUM NO. 29.

"1. Thus far decision has been reached to base 36 chasers at Corfu, Greece, Base 25, and 36 at Plymouth, England, Base 27. It is probable that the third group of 36 chasers will be based at Queenstown, Ireland, leaving the question of basing the fourth group of 36 open for decision.

"2. The area at the north of Ireland, including the North Channel, is one in which there are at nearly all times one or two submarines operating, and it is quite possible that it may be found that our fourth group of submarine chasers operate in that area instead of operating from Brest. The approaches to Brest and to the English Channel will be fairly well covered by the 72 boats based on Plymouth and Queenstown, but it may be found desirable to cover the Bay of Biscay with the fourth group instead of sending it to the north of Ireland. The Bay of Biscay is not a favorite place for submarines to operate, so that for the present it does not seem advisable to decide to assign 36 chasers to that locality.

"MEMORANDUM NO. 32.

"1. There is forwarded herewith for information Planning Section Memorandum No. 32, containing certain recommendations regarding the submarine chaser base at Plymouth.

"2. The recommendations have been approved and are being placed in effect.

"MEMORANDUM NO. 34.

"1. The inclosed memorandum by the Planning Section was prepared by direction of the Force Commander as a reply to certain proposals made by the British Admiralty as to the allocation of submarine chasers and their arrival in these waters. The Admiralty suggestions were contained in Allied Naval Council Paper No. 146a, and the essential portions of this memorandum were embodied in Allied Naval Council Paper No. 150. Copies of both of these papers have already been furnished to the department."

MEMORANDUM No. 30.

VISIT TO ROSYTH AND MINE BASES.

(By Capt. D. W. KNOX.)

24 May, 1918.

On May 18 I proceeded to Rosyth, Scotland; on May 21, to Inverness; and returned to London this date.

While at Rosyth I lived on board the *New York*, and also visited the *Queen Elizabeth*, as well as the hydrophone experimental station at Hawk Craig.

It is very apparent that the Grand Fleet, including the American battleships, is thoroughly indoctrinated with the single mission of destroying the High Seas Fleet at the earliest possible moment. So far are the minds of personnel impregnated with this idea that they seldom think of antisubmarine warfare or other questions in connection with the war.

For example, I was told that certain German mine-laying submarines were known to visit the entrances of harbors at regular intervals for the purpose of laying mines, and that the time of their visits, as well as the location in which the mines would be laid, can be very accurately predicted. I suggested that, acting upon such information, it might be possible to mine against the submarine with our own mines, but the reply was that they were not interested in submarines; that submarines did not bother them very much, and that antisubmarining belonged to some one else. This conversation occurred with American officers, and it may be that the commander in chief views such questions more broadly.

It is suggested that since the mine barrages are expected to become a strong deterrent to enemy submarines passing out of the North Sea, the question of antisubmarining on the east coast of Great Britain should receive attention by the Planning Section.

While on the *New York* I had an opportunity of reading the battle orders issued by Admiral Beatty. These orders are not allowed to be taken out of the Grand Fleet. They are quite voluminous and prepared with great care. It is perfectly evident that they have been written with a view to profiting to the maximum possible extent by the experience gained at Jutland. In my opinion, the tactical con-

ceptions expressed in the battle orders are sound. Having regard to their highly secret nature, it is not deemed desirable to discuss them further herein.

A great part of the battle orders would be unnecessary in a fleet whose admirals and captains had received intensive tactical training and indoctrination. Probably the battle orders as existing now will themselves serve as the indoctrination, if they are thoroughly studied and digested by all concerned.

Apparently our own admirals and captains have thoroughly studied them.

It is very evident that extremely cordial relations exist between our officers and the British in the fleet, and there is a very highly developed spirit of cooperation among them. Vice Admiral Evan Thomas, R. N., remarked to me, "We all belong to the same fraternity here." Admiral Beatty, in speaking to me of the commander of the Sixth Battle Squadron, referred to him as "Hugh Rodman."

The manner in which our ships are kept up, both as regards their cleanliness and mechanical efficiency, is the object of much comment among the British. The *New York* has been inspected by practically every admiral in the British Fleet, and each one of them (following his inspection) has sent the captains of his squadron over at odd times to inspect the *New York*.

Admiral Beatty's concern principally seemed to be the lack of a sufficient number of destroyers attached to the Grand Fleet; he complained that he could spare none whatever for antisubmarine work. He inquired as to the availability of our submarine chasers, stating it to be desirable that some high-speed supporting antisubmarine vessels be detailed to assist the present patrol operation round the Fair Island Passage.

Commander Bellairs, of Admiral Beatty's staff, thanked me for certain documents which had been sent him from this office, and requested that others be sent. He said those received had been of the greatest value to him. They included Commander Pye's book on Information and Security, Planning Section Memorandum on "Submarine Hunting by Sound," and copies of orders relating to the use of depth charges by our destroyers.

At Hawk Craig I was received with the greatest courtesy by Commander Ryan, R. N. He showed me a model of the acoustic mine, and gave me a demonstration of its effectiveness by having a motor boat proceed over a mine which had been in the water for about a year, connection being made so as to explode a primer on the shore by the mechanism of the mine. The demonstration was entirely successful.

I was allowed to examine and test superficially a hydrophone mounted on shore in a steel plate simulating the side of a ship. The

hydrophone was insulated with rubber and metallic lead from the steel plate, with the object of excluding ship's noises. When compared to another hydrophone of the same type, mounted in the usual way, the efficiency of the insulated apparatus was very apparent.

I was also shown two recently developed types of towing fish, one of them being about 3 feet long by 1 foot in diameter, made of metal and wood, while the other was made of rubber and was about 18 inches long by 4 inches in diameter. The larger of the two fishes was intended to be towed by its insulated cable containing six wires, and the internal apparatus was capable of rotation through two of these wires, and thus to give a directional reading to recorded sounds.

The small rubber fish had no directional quality, but was designed for use while under way. I listened while our own launch was under way, and the apparatus appeared to be efficient.

I understand that details of these two devices are known to our antisubmarine division, and their qualities completely understood by them.

I also made a short trip in a motor launch about 100 feet in length, while both the engines and the helm of this launch were controlled by radio from the shore.

The two bases at Inverness and Invergordon are complete and ready for operations, except for some mine equipment. They appear to be well-organized, going concerns, with a fine spirit, and may be expected to be very efficient in operation.

It is apparent that no large mining project should be undertaken without proficient and well-organized bases.

If extensive mining is to be undertaken in the Adriatic, a base should be prepared at once. I discussed this question with Captain Murfin, who suggested that perhaps it would be more expeditious in the event of a sudden decision to mine the Adriatic to use the northern bases. The combined capacities of all of our mine layers is approximately 6,000 mines, which would be sufficient for one system across the Adriatic. Since the time of laying and also that of loading the mine layers at the bases is negligible, the period required for laying the complete Adriatic barrage would be practically that necessary for two and a half round trips of all of our mine layers (about 42 days).

I also discussed with Captain Murfin the question of mine laying in the Channel in the event of its becoming necessary to abandon the Dover barrage. In this contingency the mine layers could operate from the bases on the east coast of Scotland, or else from the terminal ports of the transportation systems on the west coast of Scotland of the same bases. So far as practicability is concerned in handling mines, the latter method would involve no great inconvenience to the base forces, because the barges which deliver mining materials to

the bases for assembly now return empty to the terminal ports and could be sent back almost equally well loaded with the assembled mines for delivery to the mine layers. We now have at each of these terminal ports a force of about 60 men who are employed in discharging the mine carriers, and this force of men could be easily increased.

I inspected the mine carrier *Ozama* at Corpach, at the western entrance to the Caledonian Canal. Everything in connection with her discharge was going smoothly, and the organization at that end of the line seemed to be excellent. The captain of the *Ozama* expressed some concern about having to proceed to Glasgow on his way home, in order to take bunker coal and to discharge about 300 tons of fuel oil which he had brought over in his double bottoms. This trip would involve passing through the North Channel twice and would be comparatively hazardous. It is my understanding that the commander of the mine force has taken up this question and is endeavoring to arrange for the discharge of the oil fuel from all mine carriers, and for their bunkering at some port in the approaches to the Caledonian Canal.

I visited the mine layer *Roanoke*. Her mining arrangements are apparently entirely satisfactory. The vessel's crew had been drilled in mining before coming to European waters with about 160 mines, which were afterwards delivered at the base. The captain was not on board, but the executive officer expressed himself confidently with regard to the probable efficiency of the ship in performing her functions. He stated that he could take on mines with ship appliances at the rate of about 200 per hour, and that once laying was begun the entire cargo could be discharged in one operation without interruption. The rate of laying will depend upon the distance between the mines to be laid, but will approximate two or three hours for the entire cargo. Mines have been laid efficiently with the ship rolling 10° from the vertical.

MEMORANDUM No. 31.

DEVELOPMENT OF SPECIAL MINE.

27 May, 1918.

The Planning Section recommends that the following cablegram be sent to the Navy Department:

"To OPNAV.:

"Foresee need for a type of mine capable of being laid in five hundred fathoms of water. Recommend development of such a mine proceed and be considered urgent."

MEMORANDUM No. 32.

BASE AT PLYMOUTH.

30 May, 1918.

On May 28 Captain Schofield, Surgeon Thompson, and Lieutenant Dam visited Plymouth for the purpose of making preliminary plans for the use of the Victoria wharves and pier at Plymouth by 36 submarine chasers that are to be stationed there.

Special attention was given to the matter of finding sites for necessary barracks for the permanent personnel of the base and for overflow personnel from the submarine chasers, together with the usual lavatories, washrooms, and facilities for scrubbing clothes.

The following is the basis of their recommendations (which are to follow):

(*a*) Thirty-six submarine chasers are to base on the Victoria wharves.

(*b*) The "warehouses" are to be used for reserve stores, but are also available for submarine chaser stores.

(*c*) A total enlisted personnel of 150 are to be housed either on the property or in the near vicinity of the property in suitable accommodations for disciplinary oversight. In addition to the above personnel the submarine chaser personnel will require special facilities for rest, scrubbing clothes, reading and recreation rooms.

(*d*) The property now being commandeered includes not only all of the buildings the railroad and ground facilities inside the wall, but also the following buildings as designated on the company's chart:

1. Hotel and offices on right side of entrance.
2. Offices on left side of entrance, together with public house and three dwellings.

(*e*) Houses Nos. 4, 5, and 6 on the east side of the property are not being commandeered; nor are the houses in the northeast corner of the property.

(*f*) The property to the east of the "Deep-water basin" is rather dirty and dusty, irregular in grading, and, in ungraded parts, rocky.

(*g*) The wharves on the west side of the "Deep-water basin" are clean, well paved, and can be kept absolutely shipshape and sanitary.

(*h*) The public house and three dwellings to the left of a weigh bridge entrance are dilapidated and would be of no use.

(*i*) The hotel is an old building, but in fairly good condition. It has 10 sleeping rooms.

(*j*) The offices to the right of the entrance are in good condition—two stories and basement. The "offices" to the left of the entrance are now a private house recently modernized, which would be needed for offices of the base. Houses Nos. 4, 5, and 6 are well above the level of the rest of the plant, and are conveniently located, both for seeing what is going on in the plant and as living quarters. They are old houses, in each of which two or more families now reside. There are pipes with running water, but no bathrooms. They would require considerable repair and painting to make them suitable for use.

(*k*) There are no buildings or sites suitable for barracks in the vicinity of the Victoria wharves.

(*l*) The owners of the Victoria wharves are particularly desirous of retaining office room on their premises. The general manager states that offices, if provided in the hotel, would be satisfactory.

Recommendations.

1. That the transit shed adjoining the "Basin for small craft" be fitted as barracks, and that a third story of wood be added to it. That an outside covered stairway to the third story be built.

2. That lavatories, wash rooms, and galleys be installed in the southerly extension of the transit shed, and that two additional stories of wood be built over this extension.

3. That the entire west side of the long wharf be made available for a two-story wooden structure to be used as barracks, reading rooms, and recreation rooms. The erection of these structures would cover up the most westerly track on the dock, but this track would not be needed.

4. That a hut for the use of submarine-chaser officers while in port be erected on the plot of ground just to the westward of the "Basin for small craft." That this hut provide facilities for the officers for reading, bathing, etc., but that it includes no bedrooms.

5. That the total barrack accommodation for the present be for 150 permanent personnel of the base and 100 personnel of the submarine chasers, but that wash room, lavatory, recreation, and reading rooms to be provided for a total of 600 men—all on the west wharf.

6. That the transit shed to the east of the "Deep-water basin" be used as a machine shop, but for the present its upper story to be fitted up as a storeroom for spare parts and accessories of submarine chasers, and for a stock room for the machine shop.

7. That the flat ground to the east of the "Deep-water basin" be cleared up as far as possible, but that no barracks be built in this area, as it may later be necessary to expand the repair facilities of the base on the available ground.

8. That a docking grid for docking two chasers simultaneously be erected in the "Basin for small craft."

9. That the dwelling No. 6 be used as sick quarters and necessary repairs and alterations be made.

10. That dwellings Nos. 4 and 5 be used for officers or chief petty officers assigned for duty permanently at the base.

11. That the office buildings on either side of the weigh-bridge entrance be used for the administrative offices of the base, as determined by the officer appointed to command the base.

12. That should it be necessary to build more barracks than the west wharf can accommodate that a vacant field on the water front about 200 by 75 feet be obtained. This field is about 400 feet from Victoria wharves in plain view and easily accessible.

13. That an officer of suitable rank be assigned immediately to the command of the base and of the vessels operating from the base, and that every effort be made to get the base in condition for use by June 20.

MEMORANDUM No. 33.

LAND BATTERIES FOR DEFENSE OF AIR STATIONS.

3 June, 1918.

The Planning Section concurs in the opinion of the commander, United States Naval Aviation Forces, Foreign Service, to the effect that land batteries should not be provided for our naval air stations in Europe. The probability of successful bombardment of these stations by submarines is too remote to justify the allocation of guns and necessary personnel for their operation to these stations. Bombardment by night would be highly ineffective; bombardment in the daytime should not be possible when the machines are flying. When the weather is too bad for the machines to fly, the sea will be too rough for the submarines to use their guns with effect.

MEMORANDUM No. 34.

ALLOCATION OF SUBMARINE CHASERS.

7 June, 1918.

[References: (*a*) Planning Section Memorandum No. 29; (*b*) Allied Council Secret Paper No. 136; (*c*) Allied Council Secret Paper No. —.]

(See Maps Nos. 3 and 4.)

On March 10, 1918, the secretary of the Admiralty stated that—

As a provisional allocation they (the Admiralty) contemplate that the distribution of the remaining (after 36 at Corfu) submarine chasers might be as follows:

Gibraltar	18
Holyhead or Kingstown	18
Penzance	18
Plymouth	18

Remaining 36 to be allocated later.

The decision of the March Allied Council was that the decision as to the remaining chasers would be deferred until a later date.

On March 28, 1918, the force commander informed the secretary of the Admiralty that—

One hundred and eight submarine chasers will probably be allocated to waters contiguous to the British Isles * * * and that about 20 of the Ford chasers will base at Gibraltar.

This assignment was provisional.

Cable of March 28, 1918, to Navy Department stated specifically:

Our craft are to be used purely for offensive operations.

Careful study of the entire subject of submarine-chaser operations has demonstrated the necessity for operating these vessels in large groups (36). Personnel is untrained, and not of sufficient naval experience to detach them from closest association and supervision of officers of the regular service. Further, it will be necessary to provide special facilities for the rest and recreation of the personnel on shore during the time when they are in port. It will be impracticable to do this unless the vessels are assembled in large groups.

The efficient use of the listening equipment of the vessels requires the closest possible coordination of all vessels in the hunting area. If the chasers are mixed with M. L's, C. M. B's, and so forth, the usefulness of their special equipment will be greatly reduced.

If the vessels are assigned to areas in small groups, the unavoidable tendency will be toward the special character of their effort being swallowed up in the efforts of other types of vessels; whereas if they are assigned in large groups, they can take over the hunting in areas of sufficient extent to enable them to operate unhampered by other vessels.

As regards operating areas, careful study indicates that the Irish Sea, English Channel, and the coast of France are not only suitable hunting grounds for these vessels but that these areas are most frequented by enemy submarines.

In addition these areas are of special interest to the United States and to the Allies. There is no doubt that the expectation at present is that the man power and munitions, which are to come from America, will turn the tide of battle to the western front. It is of primary importance, therefore, that the areas through which this relief is to come should be thoroughly hunted. The outcome of the war depends upon the control of the submarines in this area.

The United States have several air stations in the vicinity of the western entrace to the channel. It is expected that the operations of United States chasers in the western entrance of the channel would promote a cooperation between our aircraft and our chasers that would increase the efficiency of both types of effort.

The Navy Department desires especially, and has so informed the force commander, that every effort be made to insure the safe ar-arrival of our troops in Europe. In view of these specific instructions and to the further fact that the decision of the Allied Council is purely advisory regarding the location of these vessels, it is recommended that the Council accept the allocation suggested in the American Memorandum (No. 136).

The importance of Gibraltar and of hunting operations in the vicinity of that base are understood fully. In fact, after the allocation of the first 144 chasers had been decided upon the Navy Department was requested to detail additional chasers for service in Europe in order that some of them might be based on Gibraltar.

Although suggestions from time to time have been made to allocate submarine chasers in small groups at various ports, the force commander has consistently adhered to the opinion that these vessels should be based on large groups and used offensively against submarines, and that the areas to be covered by them should be the Irish Sea, the English Channel, and, possibly, the coast of France, and the approaches to these areas.

MEMORANDUM No. 35.

NORTHERN MINE BARRAGE—AREA A.

11 June, 1918.

The plan for the mine barrage in Area A contemplates three systems of mines, each system complete in a vertical direction. The barrage, when laid according to plan, will be equally thick on all horizontal planes from 270 feet depth to the surface.

There is to be no patrol of the barrage in Area A. There are likely to be seen no surface vessels at any time in Area A.

Enemy submarines submerge only when they are about to attack, or when they are seeking to escape. Since neither of these reasons will operate to make them dive in Area A, it is practically certain that they will remain on the surface when crossing this area. It is therefore important that they should find the greatest danger from mines on the surface.

We recommend that the barrage in Area A consist of two systems of mines complete on the vertical plane; and that the third system of mines consist of three parallel rows of mines, all laid so as to constitute a surface barrage exclusively.

We recommend, further, that the antennæ of the mines laid in the third system be 45 feet instead of 70 feet in length, so that each mine shall be certain of destructive effect on any vessel making a contact on the surface. Attention is invited to the fact that if this recommendation is approved, the third system of mines will be effective up to a depth of 70 feet below the surface.

If both of the above recommendations are approved, the mine barrage in Area A will consist of—

(*a*) Two systems complete in the vertical plane as at first designed.

(*b*) A third system of mines consisting of three parallel rows laid at a depth below the surface of 50 feet, making a total of five rows in the surface barrage and two rows of mines at each depth below the surface.

Forwarding comment by Force Commander:

"2. The proposed change has been made the subject of cable communications between the Force Commander and the Department, and at the time of writing a decision has not been reached as to the practicability of making the change at the present.

"3. Calculation shows that assuming three systems of mines as originally contemplated, the probability of contact by a submarine passing through the area, either on the surface or submerged, when mines are laid 150 feet apart, is 33.6 per cent; with the proposed change the probability of contact by a submarine passing through the area on the surface becomes 50.4 per cent, while the probability in case of passing through below the surface is 24.4 per cent. Assuming that of every three submarines that attempt to pass the barrage two make the attempt on the surface and one submerged, the average probability of contact under the proposed plan would be about 42 per cent."

MEMORANDUM No. 36.

DEPTH-CHARGE EQUIPMENT OF SUBMARINE CHASERS.

12 June, 1918.

The six submarine chasers now operating in the Channel are supplied with eight depth charges. Two of these depth charges are carried in a Y-gun and two more are carried ready to drop one from each quarter; the remaining four are stowed in the magazine or lashed on deck.

The chaser effort will probably not be effective except through the use of depth charges. It is therefore recommended that each chaser operating in European waters be fitted immediately with depth-charge racks of the destroyer type for carrying five depth charges on each side of the quarter ready for dropping.

The depth-charge racks now on chasers are too far outboard. New racks for depth charges on chasers should be as close as possible to the center line and so located that no matter how much the chasers may be rolling the depth charges on one chaser will not be able to touch any part of a chaser lying alongside.

The personnel of the chasers are not sufficiently familiar with depth charges and the possibilities of accidents due to collision. It is recommended that an order be issued to the chaser force warning them against coming alongside of other vessels in such a manner as to make it possible that the depth charges carried on their quarters should come in contact with such vessels. In other words, chasers should invariably make bow landings.

SUMMARY OF RECOMMENDATIONS.

1. Fit depth-charge racks for 10 depth charges on each submarine chaser.

2. Fit these racks as far inboard as possible, so that it will be impossible for the depth charges on one chaser to come in contact with any part of another chaser lying alongside.

3. Issue an order to the chaser force warning them against coming alongside of other vessels in such a manner as to make it possible that the depth charges carried on their quarters should come

in contact with such vessels. In other words, chasers should invariably make bow landings.

The forwarding comment of the Force Commander on 17 June follows:

"2. The recommendations of the Planning Section, as summarized on the second page, have been approved, and will be placed in effect as rapidly as possible for the submarine chasers now in service in European waters.

"3. It is recommended that similar action be taken respecting those submarine chasers not yet dispatched to European waters and those intended for service in home waters."

MEMORANDUM No. 37.

ESTIMATE OF GENERAL SITUATION IN THE MEDITERRANEAN.

17 June, 1918.

(See Maps Nos. 6, 7, and 8.)

General situation: As at present, May 30, 1918.

Required: Estimate of the general situation in the Mediterranean and decisions covering:

(*a*) The Adriatic.

(*b*) The Dardanelles.

(*c*) A possible evacuation of Salonika.

(*d*) An enemy advance in Greece of sufficient extent to open new ports to submarines.

Assume: A long war.

SOLUTION.

The situation in the Mediterranean is discussed in Planning Section Memoranda Nos. 8 and 9—

(1) "The General Estimate of the Situation."

(2) "The Situation in the Adriatic."

Since the two estimates above mentioned were made the naval situation has retained the same general characteristics, consequently the naval mission in all seas remains unchanged. The naval mission in the Mediterranean is as follows:

Mission: To obtain subsurface command of the sea, while retaining command of the surface of the sea.

ENEMY FORCES—STRENGTH, DISPOSITION, AND PROBABLE INTENTIONS.

Strength of enemy surface forces is so far inferior to allied forces in the Mediterranean that the latter may be disposed to contain them effectually or to engage them should they issue from their refuges. No special study of surface forces will be made in this paper.

Enemy submarines as follows:

Based in Adriatic:	
Austrian	31
German U. boats	12
German U. B. boats	13
German U. C. boats	12
	68
Based inside Dardanelles:	
German U. B. boats	4
German U. C. boats	2
Turkish	1
Ex-Russian	14
	21
Total in Mediterranean	89
Total elsewhere, about	100
Total building, about	180

Note the importance of enemy submarine force in Mediterranean.

Enemy land forces.—Very strong in eastern Adriatic north of Valona, and in Aegean from vicinity Saloniki to Scala Nuova. No military operations of enemy in Italy, short of complete defeat of Italy, will improve enemy submarine facilities in Mediterranean.

Enemy advance in Greece might wrest both Saloniki and Valona from Allies and have great influence on submarine operations. This fact important in considering mine barrage operations.

Saloniki and Smyrna are suitable for submarine bases. Pireaus is a suitable base for repairs, but not for refueling. Other Greek ports are harbors of refuge only, on account of no fuel or repairs facilities and no rail communication.

Mediterranean enemy submarines operate there from bases in—

(*a*) Adriatic—Principal effort, central position, best repair facilities.

(*b*) Dardanelles—Secondary effort, plenty of fuel.

(*c*) Germany—Reinforcing effort.

Cattaro, the principal operating base in the Adriatic, and Durazzo are supplied via sea routes. Cattaro is 400 miles nearer western Mediterranean than Constantinople is.

If enemy is blocked from Adriatic he will operate from Dardanelles. If both exits are blocked enemy will use land and sea forces to clear obstructions and will meanwhile operate submarines from Germany of cruiser type, and other submarines from Smyrna.

Best operating areas for enemy submarines are along traffic routes, especially at converging points—

Between Cape Bon and Sicily.

North coast of Algeria.

Coast of Spain.

Gulf of Genoa.

Vicinity of Port Said.

OUR OWN FORCES AND COURSES OPEN TO THEM.

Relative strengths of forces have been discussed in previous papers. We have here to consider principally steps to be taken to combat submarines in the Mediterranean.

Allied traffic routes are principally between—

(*a*) Gibraltar and ports of Italy and France.

(*b*) Gibraltar and ports east of Cape Bon.

(*c*) Algeria and France.

(*d*) Port Said to Mediterranean ports.

The amount of traffic east of Cape Bon is approximately two-thirds of that west of Cape Bon.

Submarine operations in the Mediterranean would now be impossible if—

(1) Submarines could not pass Gibraltar.

(2) Submarines could not pass the Straits of Otranto.

(3) Submarines could not pass to and from the Aegean Sea.

No probable military action of the enemy will alter this condition unless France or Italy is wholly defeated.

There are but three methods of preventing navigation of waters by submarines:

(1) Patrol—Has never been reasonably successful.

(2) Mine barrage—Best example: The Bight, where submarines do not pass except through swept channels.

(3) Combination of (1) and (2)—Best example: Dover, which is reasonably effective.

The mine barrage is the cheapest and most effective barrier to submarines if it is not subject to enemy sweeping, and if depth of water, tidal conditions, and weather permit a reasonable integrity of the barrage.

The following are important considerations in all barrage operations:

1. Our present mine gear is suitable for mine laying in 200 fathoms of water.

2. Submarines are now known to dive voluntarily to 300 feet; in some cases deeper.

3. Mines can be laid in any depth of water if designed for the depth. The only obstacle to their watching properly is deep current. Ordinary surface currents up to 10 fathoms in depth will not deflect mine moorings sufficiently to submerge mine to ineffective depth.

4. Present mines can be used for any depth of water if a buoy of proper size is worked in the anchor cable below the mine. Such buoy should watch below the deepest current, and at the same time

should be so placed as to give maximum pull of mine on the cable between the buoy and the mine, as this pull reduces deflection of cable from the vertical when there is a current.

5. Both ends of a mine barrage should rest in own territorial waters to avoid necessity for special military operations.

6. Both ends of a mine barrage should be secure against enemy military operations, so that any possible military advance of enemy will still leave barrage effectively intact. If enemy holds shore ends he can sweep a channel safe for submarines under cover of his shore batteries.

7. Barrages should be as short as possible and as close as possible to exits from enemy bases.

8. There should be a secure harbor in advance of a barrage, so that any enemy naval raiding force reaching the barrage may be cut off.

9. No deep barrage is effective unless it is thickly patrolled.

10. It is not reasonable to expect any mine barrage to destroy more than 25 per cent of the vessels attempting its passage.

11. A mine barrage extending to the surface is much more effective than any patrol can be, since it watches day and night with equal efficiency.

12. Wherever a barrage to the surface is laid, the surface part of the barrage should be densest, because submarines prefer to navigate on the surface, and will dive only when their mission requires them to do so.

We shall examine mine barrage possibilities—

1. In the Adriatic.
2. In the Aegean.
3. In other localities.

THE ADRIATIC.

We adhere to the solution of the situation in the Adriatic contained in Planning Section Memorandum No. 9, of January 30, 1918. As troops are not now available for that project, other possibilities permitting quick action must be examined.

A combination of an explosive net and a mine barrage has been in preparation for some time from Cape Otranto to Corfu. At present about 15 miles of deep mines and 6 kilometers of explosive net are in place and 22 kilometers more of explosive net is ready for laying. A duplicate net barrage is projected from Cape Otranto to Cape San Giorgia near Valona Bay. It is not likely that either barrage will be completed this calendar year. When completed it will be a deep barrage requiring a thick patrol about 40 miles in length.

NOTE.—In the following discussion "special type mines" mean mines suitable for laying in water from 200 to 600 fathoms deep.

Other barrage positions in the southern Adriatic are as follows:

1. Otranto to Cape Linguetta, 40 miles: Maximum depth of water, 560 fathoms; mines required, 6,120 present type, 8,280 special type; enemy answer, capture of Valona Bay.

2. Rocca Vecchia, northeast to parallel 40° 30′, thence east to Saseno Island, 57 miles: Maximum depth of water, 420 fathoms; mines required, 10,000 present type, 6,840 special type; enemy answer, capture of Valona Bay.

3. Otranto-Tano Island-Corfu, 54 miles: Maximum depth of water, 560 fathoms; mines required, 9,000 regular type, 10,800 special type; enemy answer, capture of Corfu.

The Otranto-Corfu barrage, although longer, is selected as being a sound strategic position, whereas the other positions farther north are open to enemy land attack.

THE AEGEAN.

Possible barrages in the Aegean are:

1. Tenedos-Imbros-Cape Suvla, 34 miles: Maximum depth of water, 60 fathoms; mines required, 12,240 present type; enemy answer, heavy batteries on Gallipoli will interfere with mine laying and protect mine sweeping; enemy may shift base to Smyrna.

2. Cape Santos-Lemnos-Tenedos, 62 miles: Maximum depth of water, 600 fathoms; mines required, 12,240 present type, 10,800 special type; enemy answer, occupation of Akte Peninsula will permit clearing a channel near Cape Santo or enemy may shift base to Smyrna.

3. Euboea-Andros-Kios-Cape Bianco, 68 miles: Maximum depth of water, 400 fathoms; mines required, 3,920 present type, 20,160 special type; enemy answer, establish strong batteries on Cape Bianco and sweep channel around cape; position is close to Smyrna.

4. Euboea-Andros-Tinos-Mykoni-Nikaria-Furnia-Samos-Cape Kanapitza, 45 miles: Maximum depth of water, about 350 fathoms; mines required, 11,520 present type, 4,680 special type; enemy answer, establish strong batteries on Cape Kanapitza and sweep channel around cape; this is a very difficult operation, as channel is very narrow and easily commanded from Samos.

5. Euboea-Andros-Tinos-Mykoni-Nikaria-Furni-Kos, 72 miles: Maximum depth of water, 350 fathoms; mines required, 21,240 present type, 4,680 special type; enemy answer, batteries on mainland and sweeping operations in Kos Channel; extremely difficult.

6. Euboea-Andros-Mykoni-Naxos-Amorgos-Lero-Kos, 80 miles: Maximum depth of water, about 300 fathoms; mines required, 19,800 present type, 9,720 special type; enemy answer, same as in (5) above.

The Doro Channel is common to positions (3), (4), (5), and (6). On account of strength of current there, a deep barrage only might be necessary, requiring patrol craft. There are small harbors in the near vicinity.

The channel between Mykoni and Nikaria is common to positions (4) and (5) above. It is deep, and currents are strong during strong winds. Patrol vessels might find it difficult to maintain position during the strong winds. A barrage to the surface, in spite of the current, would probably give better average efficiency than a deep barrage patrolled.

The current west of Lero is less than between Mykoni and Nikaria.

Position (4) might possibly be raided from Smyrna, but if the barrage is a surface barrage there need be no resultant loss to us, while a force at Mitylene could easily prevent such a raid. The more southerly positions are more free from threat of raids.

Considering all the requirements of a barrage position, as well as the characteristics of the above positions, we recommend position (4). Whichever position is selected, current observations and accurate soundings should precede final decision.

OTHER BARRAGES.

1. Sicily-Cape Bon, 73 miles: Maximum depth of water, 180 fathoms; mines required, 26,280 present type.

This barrage would—

(*a*) Increase safety of communications in western Mediterranean.

(*b*) Interfere with reinforcement of submarines operating in eastern Mediterranean.

(*c*) Reduce generally the hazard to shipping in the Mediterranean, since there is more shipping in western Mediterranean than in eastern.

The risk to vessels proceeding entirely through the Mediterranean would not be increased by the barrage, but vessels between Suez and east Mediterranean ports would be subjected to extra risk until hunting operations reduced the number of submarines operating from eastern bases. Italy, Greece, Saloniki, and Palestine, and interests centering in those areas might object to a Sicily-Cape Bon barrage.

2. Gulf of Saloniki-Cape Kissobo-Kassandra Point, 25 miles: Maximum depth of water, 180 fathoms; number of mines required, 9,000 present type.

This barrage might be a temporary reply to the evacuation of Saloniki and the withdrawal of allied forces as far as the Salambria River. It would be necessary to hold the Pallene Peninsula. The barrage might interfere with the use of Saloniki as a submarine base. It would be difficult to support against sweeping operations, since

there would be no harbor between the barrage and Saloniki from which to operate.

Neither the Sicily-Cape Bon nor the Gulf of Saloniki barrage appears desirable to undertake at this time.

3. Dardanelles trap barrage, 25 miles; maximum depth of water, 55 fathoms.

Between Imbros and Tenedos and between Imbros and Gallipoli Peninsula mines may be laid to advantage to deflect surface craft from a direct exit. The base at Lemnos is not far enough removed from the Dardanelles to insure that capital ships based there will always meet a force coming out of the Dardanelles. A trap barrage would compel surface forces to turn north along the Gallipoli shore to the deep water before turning west, and would increase the distance they had to travel to reach the twenty-fifth meridian by at least 20 miles, thereby giving the Lemnos force that much extra time. A K tube listening station on Rabbit Island would increase greatly the night efficiency of the lookouts there.

As nearly all desirable barrage operations in the Mediterranean are in great depths of water, where the nature of deep currents is not fully known, and in some cases where depths of water are uncertain, we recommend that current observations and soundings be made without delay.

Further, as the barrages in most cases require mines that can be laid in very deep water, we recommend that the development of mines that can be laid in 600 fathoms of water be considered urgent.

There seems to be no mine barrage possible in Gibraltar Straits, but the problem of a barrage there should receive special technical attention.

BASES.

Lemnes appears the best covering base for the Dardanelles and Mitylene for Smyrna. Mitylene answers best for a covering base of all the Aegean barrage starting from Doro Channel.

Valona and Brindisi are the natural bases from which to support the Otranto barrage, but do not compare in effectiveness with a base at Sabbioncello.

MINE BASES.

As it will be impracticable to establish more than one mine base in the Mediterranean, we recommend a special investigation of sites by officers best informed on requirements for a base. Bizerta and Malta appear very likely to meet more essential requirements than any other ports.

OPERATIONS OF ANTISUBMARINE CRAFT.

Present operations of antisubmarine vessels in the Mediterranean are directed toward—

(1) Escort of convoys.
(2) Patrol in Straits of Gibraltar.
(3) Patrol of Otranto Straits.
(4) Operations among Dalmatian Islands.

All of these operations are necessary and sound. They should be continued and reinforced when possible.

It is of special importance to interrupt the sea communications of Cattaro and Durazzo. Small convoys are reported to go to these ports from Pola about twice a week.

NOTE.—The enemy has but two small tankers in the Aegean. If these were sunk he would probably have to abandon Cattaro soon. He has but 69 merchant ships of more than 1,000 tons in all the Adriatic, and only 1 merchant ship building there.

As the depth charge is the best-known method of attacking enemy submarines from surface vessels, all escorting vessels should be supplied with as many depth charges as they can use effectively. The chance of successful depth-charge attack is almost directly proportional to the number of depth charges carried. Escorts should invariably take the tactical offensive and continue it until dark.

AIRCRAFT.

Recent experience has demonstrated the soundness of directing a continuous air effort against enemy bases. Durazzo, Cattaro, Pola, Trieste are all within air range. They should be subjected to a continuous bombing offensive.

DECISIONS.

1. To continue present plans for the Sabbioncello barrage.
2. To develop a mine and mine gear suitable for use in 600 fathoms of water.
3. To investigate deep currents in useful locations of mine barrages.
4. To establish a mine base in the Mediterranean after inspection of possible sites by experts—Malta or Bizerta suggested.
5. If practicable, to lay a complete barrage Otranto to Corfu.
6. If practicable, to lay a complete barrage Euboea-Andros-Mykoni-Nikaria-Furni-Samos-Cape Karrapitza.
7. To lay trap surface barrages Tenedos-Imbros and Imbros-Gallipoli.

8. To be in readiness for other barrage operations as necessity arises—special reference to Sicily-Cape Bon barrage.

9. To direct technical attention to the Gibralter problem.

10. To establish K. tube listening stations on Rabbit Island.

11. To arm with large number of depth charges all escort vessels in the Mediterranean.

12. To direct all escort vessels to invariably assume the tactical offensive on contact with an enemy submarine, and for a portion of the escort to continue the offensive until dark.

13. To make special effort to interrupt the sea communications of Cattaro and Durazzo.

14. To continue the frequent bombing of all enemy bases in the Adriatic and to reinforce the facilities for bombing operations.

APPENDIX.

In order to establish more clearly the relation of a Sicily-Cape Bon barrage to the general situation in the Mediterranean the following statistics have been arranged, based on the shipping returns for April 1 to 20, 1918, the only dates available.

Daily average in numbers and tonnage of merchant steamships of 500 tons gross and over at sea in the Mediterranean April 1 to 20, 1918.

	Number.	Tonnage.
On voyage between points to the west of Cape Bon:		
Well escorted	57	207,000
Poorly escorted	17	76,000
Unescorted	26	77,000
	100	360,000
On voyage between ports to the east of Cape Bon:		
Well escorted	18	67,000
Poorly escorted	18	68,000
Unescorted	14	35,000
	50	170,000
On voyage from a port in the western Mediterranean to a port east of Cape Bon and vice versa:		
Well escorted (destroyers)	28	135,000
Poorly escorted	9	44,000
Unescorted	3	11,000
	40	190,000
Grand total	190	720,000

We thought it further useful to analyze the voyage of each vessel during this period to determine the number of ton-miles traveled east of Cape Bon and west of Cape Bon as being the best measure of sea traffic. Ton-miles were determined for each ship by multiplying the gross tonnage of the vessels by the number of miles actually steamed. Results were grouped as shown below:

UNESCORTED.

	Ship miles.	Tonnage.	Ship-mile tonnage.
West of Cape Bon	236,190	712,912	168,383,684,280
East of Cape Bon	45,070	323,159	13,554,776,130
Passage between Cape Bon and Sicily—			
West of Bon	26,395	180,501	4,764,327,895
East of Bon	36,970		6,673,121,970

WELL ESCORTED.

West of Cape Bon	237,920	857,206	193,946,451,520
East of Cape Bon	78,130	514,019	40,170,288,470
Passage between Cape Bon and Sicily—			
West of Bon	69,430	918,260	63,754,991,800
East of Bon	124,430		114,259,091,800

POORLY ESCORTED.

West of Cape Bon	89,890	850,853	77,191,186,170
East of Cape Bon	56,105	279,313	15,670,655,865
Passage between Cape Bon and Sicily—			
West of Bon	20,150	431,665	8,697,949,750
East of Bon	46,790		20,197,605,350

From this it is seen that the ton-miles to the west of Cape Bon are to the ton-miles east of Cape Bon as 516 to 210, about two and one-half times as great.

Forwarding comment by Force Commander:

"1. There is inclosed herewith for the Department's information two copies of Planning Section Memorandum No. 37, which is an estimate of the general situation in the Mediterranean and having particular reference to certain possible and proposed mining operations in the eastern Mediterranean.

"2. I concur in general in the conclusions reached and in the recommendations made. The matter will be brought up before the Allied Naval Council at its next meetings, about the 24th instant, but not in such a way as to commit the United States to the project unless it is approved by the Navy Department.

"3. In case the Council accepts in principle the proposal to lay additional barrages in the eastern Mediterranean, a tentative decision will be reached as to the time and manner of laying the barrage, and as to the distribution of the various portions of the tasks among the several navies concerned, the final complete proposal will then be submitted to the Department for its action.

"4. Particular attention is invited to the portions of the paper, pages 13 and following, which have been numbered in pencil. Of these items it seems that Nos. 1, 4, and 6 might best be left to some of the allied navies, while the selection of the base and the actual operation of laying the mines might be undertaken by the United States.

"5. It is requested that one copy of the inclosed memorandum be forwarded to the Bureau of Ordnance. It is to be noted that the matter of the Sicily-Cape Bon barrage suggested in the Department's cable No. 6489 has been considered, but for various reasons is not considered the most desirable of those examined."

MEMORANDUM No. 38.

USE OF GRAND FLEET DESTROYERS ON THE NORTHERN PATROL.

[Joint memorandum by the British and American Planning Sections.]

13 June, 1918.

1. The recently instituted policy of attacking enemy submarines on the northabout route appears to be thoroughly sound, but its chances of success largely depend on a sufficient number of destroyers working in cooperation with the sloops and trawlers employed in that area.

2. Destroyers, however, can only be obtained by decreasing the number on convoy duty or by utilizing those attached to the Grand Fleet. The former course of action appears to be undesirable at present, owing to the large number of United States troops crossing the Atlantic, and the latter is impracticable if the Grand Fleet is likely to be called upon to fight the High Seas Fleet at short notice.

3. The chances of bringing the High Seas Fleet to action, however, may at times be so remote as to warrant a state of less immediate readiness on the part of the Grand Fleet and the employment of its destroyers on the northabout submarine route. Such conditions might be brought about by damage to some of the enemy's capital ships, the absence of certain ships in the Baltic, etc. Also, when it is expected that a large number of submarines may be passing northabout, the temporary risk of failing to intercept the High Seas Fleet should it come out may be justified by more effective antisubmarine measures.

4. The High Seas Fleet's chances of successful action decrease the farther it gets from Helgoland and the German rivers, owing to the limitations placed on many of its torpedo boats and destroyers to break off an action, etc. If it sought action with the Grand Fleet in the vicinity of the Orkney Islands the superior gun power of the British fleet would justify the latter engaging the enemy fleet with a shortage of light craft.

5. A temporary withdrawal of destroyers, however, might be extremely dangerous if the Grand Fleet were expected to fight in the vicinity of the Bight or in the southern part of the North Sea. The practicability of the proposed policy depends, therefore, on a

concentration of all the battleships and battle cruisers at Scapa, which is in the vicinity of the proposed area of antisubmarine operations, and on instructions being issued to the commander in chief that they are not to and will not be called upon to seek action with the High Seas Fleet whilst short of destroyers except in the immediate vicinity of the Orkney and Shetland Islands.

6. It is possible, of course, that in the meanwhile the enemy might threaten the English coast or the Narrow Seas; but, even then, this would only mean delaying the intervention of the Grand Fleet by about 16 hours, whilst the destroyers were recalled and refueled. And this danger could be guarded against to a certain extent by intensive mining operations in the Bight and by temporarily strengthening the control in the southern part of the North Sea by a concentration of submarines.

7. The present moment may not be favorable for the proposed policy, owing to the critical situation in France, but opportunities will probably occur in the future. If this policy is approved in principle it is suggested that the Plans Division might go into it in greater detail, in conjunction with the Operations Division and the commander in chief, Grand Fleet, so that if a suitable opportunity occurred the necessary measures could be executed at short notice.

[Extract from Memorandum No. 71, "History of Planning Section."]

This memorandum was initiated by the British Plans Division. We were in such accord with the proposals made therein as to be very glad of the opportunity to join in them.

Forwarding comment by Force Commander on 13 July follows:

"2. No action has been taken by me on this paper, as it seems to be a matter affecting the British Admiralty principally. I am quite in accord with the opinions expressed in the paper to the effect that there may, and doubtless will be, occasions when it will be safe to reduce very considerably the number of light craft serving with the Grand Fleet, and that vessels thus relieved might advantageously be used in antisubmarine work.

"3. The preservation without serious reduction in strength of the British Grand Fleet is so important to the allied cause, and the necessity for protecting troop and store ships, and in fact all cargo-carrying vessels, is so great that much as it may be desired to undertake offensive operations this can not be done on a large and permanent scale until many additional vessels are available for service."

MEMORANDUM No. 39.

TESTS OF SURFACE MINE BARRAGE AND OF LOOP LAYING BY SINGLE VESSEL.

27 June, 1918.

[These tests were witnessed by Capt. D. W. Knox on June 26, 1918.]

SURFACE MINE BARRAGE.

Efforts have been made since the early part of the war to mine Dover Strait to the surface. These failed repeatedly, and finally the present deep mine field, combined with a surface patrol, was adopted. While partially efficient, the present methods do not offer sufficiently great obstacles to the passage of Dover Strait by submarines on the surface during fog, rain at night, etc. It is possible, also, that submarines may pass over the deep mines at high water by submerging only to a very shallow depth.

Recently efforts have been made to develop a mine which will maintain set depth irrespective of the tidal level; and other schemes for preventing passage on the surface have been experimented with, but none have been considered satisfactory except the one described below, which has but just passed out of the experimental stage.

In the plan as it now exists the barrage consists of a series of anchored buoys, between which are laid floating mines connected to each other and to the buoys.

The buoys are about 175 yards apart; seven mines are laid between each pair of buoys. The distance between mines is about 75 feet, and the distance from each buoy to the nearest mine is about 37 feet.

The group of seven mines between each pair of buoys constitutes a separate unit of the barrage. They are connected by a wire jackstay, hove fairly taut, and an electric lead which hangs in a loose bight between mines. For each unit there is a battery box on one of the buoys, which furnishes current to explode any mine struck.

Mines and buoys have sufficient buoyancy to keep them on the surface in a tideway. The mine carries 300 pounds of high explosive; it has four horns in the upper hemisphere, the breaking of any one of which will complete the electric circuit and explode the mine.

The mine could be made a pure contact mine except for danger to friendly craft should it break adrift. As now designed the mine is dangerous only while the electric connections remain intact.

The laying of one unit was witnessed. It was easily and quickly done in smooth weather by a mine-laying trawler.

Tests were then conducted by a "G" type submarine on the surface. On the first test a mine was rammed at slow speed, the engines being reversed just before striking the mine and the ship backed clear after the mine had reached a point about 30 feet abaft the stem. The mine did not fire because no horn was damaged. This failure was probably due to the slow speed, to the fact that the wire jackstay restricts the freedom with which the mine rolls when struck, and to the positions of the horns, all of which are near the top of the mine case.

On the second test the submarine in the light condition steamed at slow speed midway between two mines. The vessel rode over the jackstay without breaking it; neither mine came in contact with the hull.

On the third test the submarine stood at slow speed across the barrage at an angle of about 30° between keel and jackstay. Again the vessel rode over the jackstay without breaking it; but she came in contact with two mines, horns on both of which were broken and the primers fired.

For the fourth and last test the submarine was trimmed down to the awash condition. She ran squarely into the barrage at good speed (about 10 knots), striking the jackstay near one mine. The mine primer fired and jackstay was carried away. The opposite mine also fired on striking the vessel's quarter—helm had been put hard over soon after the ship struck the jackstay.

The tests were considered sufficiently satisfactory to warrant proceeding with the laying of a surface barrage across Dover Strait.

Loop Laying.

In general terms a loop-mine field is a group of observation mines surrounded by a loop of wire cable with a lead running to the observing station. A steel vessel passing over the loop deflects a galvanometer and the whole mine field may then be exploded by the observer.

It is useful in narrow channels or off points of land or navigational marks which vessels usually pass close aboard. In waters frequented by friendly vessels its usefulness is limited to periods of good visibility. Where the bottom is rocky and the currents strong the vibration and movements of the cable will deflect the galvanometer when no steel object is near.

The difficulties and delays incident to the laying of a loop-mine field by two or more vessels led to the fitting up of a trawler to lay in one operation a loop, together with its interior mine field.

Everything had been rigged previous to the arrival of the obsering party on board the trawler, and she proceeded at once to lay out the loop and mines very smartly at about 6 knots speed. The loop as laid was about 25 yards wide and 600 yards long; five mines were laid about 250 feet apart along the major axis.

The necessary spread of 25 yards in width between the two legs of the loop was obtained by a boom projecting from each side of the trawler from amidships. The main cable was flaked down in the forehold, whence it went aft through a metal trough laid in the starboard gangway, and thence outboard on each side to the forecastle, where most of the bight of the loop was flaked down on deck in two coils. From the coils it led to blocks at the end of each boom, the bight passing under the ship's bottom. After the loop proper had been completely paid out, the shore lead (single) was allowed to pay out from the forehold through the metal trough on deck.

The mines were laid by the usual means from tracks on the port quarter. Being observation mines, they were necessarily connected to each other by electric cables, the end of which led into the single part of the main cable to the shore.

The method of paying out the cable lead between mines was new. The cable between each pair of mines was coiled in two parts upon special spindles attached to each mine anchor, so that the wire would be paid out simultaneously from both, and thus avoid excessive strains.

Mine Testing Tank.

There is under construction at Portsmouth a steel tank, 30 feet diameter by 60 feet high, which is to be used for testing out the operation of mines while being laid. It will have a false bottom which can be adjusted to various heights in the tank to represent different depths of water. The tank has the following advantages:

1. Tests can be made in any weather.
2. A great deal of boating and time is saved.
3. Glass portholes in the tank permit the observation of the anchor gear while in actual operation.

MEMORANDUM No. 40.

GERMAN HIGH SEAS FLEET ACTIVITY.

PROBLEM NO. 14.

(See Map No. 1, "The North Sea.")

General situation: As at present (July, 1918).

Special situation: Germany decides to employ the surface craft of her navy in a more active effort to assist land operations, and to sustain the morale of the populace.

Required: (*a*) Probable methods Germany will employ; (*b*) steps to be taken by Allied Naval Forces.

SPECIAL NOTE.—*This problem is solved from the German side.*

MISSION.

To employ our surface forces so as to render the maximum possible assistance to the land operations.

ENEMY (ALLIED) FORCES—STRENGTH, DISPOSITION, AND PROBABLE INTENTIONS.

Surface strength available for North Sea operations is given on the following table:

Forces (North Sea.)

Grand Fleet:
- 39 dreadnoughts (including 5 United States).
- 9 battle cruisers.
- 37 light cruisers(with Grand Fleet).
- 13 flotilla leaders.
- 134 destroyers.
- 35 submarines.
- 4 seaplane ships.

Harwich and Nore:
- 9 light cruisers.
- 4 flotilla leaders.
- 33 destroyers.
- 30 submarines.

Dover:
- 16 monitors.
- 6 flotilla leaders.
- 32 destroyers.

Humber-Tyne convoys:
- 26 destroyers.
- 8 submarines.

High Seas Fleet:
- 19 dreadnoughts.
- 5 battle cruisers.
- 200 destroyers.
- 100 submarines.
- 70 torpedo boats.
- 6 Zeppelins.

Russian (Baltic forces):
- 4 dreadnoughts.
- 9 cruisers (old).
- 70 destroyers.

NOTE.—92 German destroyers burn oil and have 34 knots speed. The torpedoboats are 200 tons, 28 knots speed. 19 Russian destroyers are oil burning, 1,100–1,600 tons, 34 knots.

Total allied forces in North Sea:
- 39 dreadnoughts.
- 9 battle cruisers.
- 46 light cruisers.
- 23 flotilla leaders.
- 225 destroyers.

In addition to the forces listed above, the Allies can reinforce the Grand Fleet by American dreadnoughts. Probably they fail to do this because they consider themselves sufficiently strong to defeat the High Seas Fleet, and desire further to economize merchant tonnage.

Roughly, the allied North Sea preponderance is in—

Battleships	2 to 1
Battle cruisers	2 to 1
Light cruisers	3 to 2
Destroyers	5 to 4

The most striking feature of the British distribution is that there are no capital ships south of Rosyth, which is 60 miles farther than Helgoland from Dover. Frequently all British capital ships are at Scapa, which is 200 miles farther than Helgoland from Dover. Between Dover and Portsmouth lies the main communications of the British Army.

Also striking is the fact that the British destroyer strength is widely distributed, and that it will be necessary for them to make a difficult concentration in order to equal the High Seas Fleet destroyer strength if met in the northern North Sea. If the Harwich, Dover, Humber, and Nore destroyers be eliminated, the relative strength in destroyers will be—

Grand Fleet	147
High Seas Fleet	200

The superior strength of British units will partially compensate for their inferiority in numbers, but in an engagement near German bases German torpedo boats may be employed if weather is good to increase still further German superiority in torpedo vessels.

A source of weakness to the Allies is the fact that a large proportion of supplies for Army, Navy, and civil populations must come overseas and therefore be subjected to submarine attacks. The shortage in allied shipping accentuates this weakness. Any extraordinary demands for tonnage for support to the allied fleet will lessen the support which can be given to the land operations and the civil populations.

Other sources of allied weakness are the vulnerability to sea attack of the cross-channel communications of the British Army and the comparative inadequacy of eastern French channel ports to handle shipping and supplies. Dunkerque, Calais, Boulogne, and Havre are all small harbors of restricted depth and narrow entrances. They are vulnerable to blocking and to bombardment from sea.

BRITISH INTENTIONS.

The British have chosen a dual mission for their naval forces. The Grand Fleet is held in constant readiness to attack the High Seas Fleet at every possible opportunity, while numerous antisubmarine forces are engaged in protecting sea lines of supply.

But for the menace of mines and submarines the Grand Fleet would prefer a base nearer to the Dover area than Scapa or Rosyth, because the Grand Fleet would then be situated near both to Helgoland and to the vulnerable cross-channel communications. On the other hand, the northern position facilitates watching for surface raiders and the protection of Norwegian convoys.

Experience has shown that the Grand Fleet will come out in great force upon the slightest intimation of the presence of the High Seas Fleet in the North Sea. The persistence and regularity with which the Grand Fleet responds to movements of German forces in the North Sea may be utilized to German advantage.

The British antisubmarine policy appears to be principally passive in character. It includes—

(*a*) Attack on German Flanders bases by blocking and bombardment.

(*b*) Escorting merchant ships.

(*c*) Closing exits from North Sea by mines and patrols.

(*d*) Hunting, to a limited extent.

The demands for escort work are so excessive that the Grand Fleet destroyers strength is reduced greatly.

Hunting effort may be expected to increase, both in extent and efficiency. It is undesirable that this type of effort be allowed to increase. We can restrict its growth by making our submarine attacks felt over a larger area, so that escorting of convoys will have to be greatly extended.

The northern mine barrage will not render the passage northabouts hazardous for our submarines unless Norwegian territorial waters are mined. It will require a large force for its patrol, and the patrols will require support from the Grand Fleet. This barrage, therefore, will result in a more certain commitment of the Grand Fleet to the Scapa base, although anxiety concerning the Channel communications will probably keep the British battle cruisers at Rosyth. The mining of Norwegian waters would be most embarrassing for the German Navy. It would force the High Seas Fleet to operate against the barrage in order to provide for a continuance of the submarine campaign; and during such operations the High Seas Fleet necessarily would be exposed to grave danger by the menace of an attack by the Grand Fleet in an area far from German bases.

OWN FORCES (GERMAN)—STRENGTH, DISPOSITION, AND COURSES OF ACTION OPEN.

Relative strength of the two fleets has been given previously.

The High Seas Fleet is greatly outgunned; in a fleet action its only chance for victory lies in its superior torpedo power or else in some tactical surprise.

German superiority in torpedo power will be greatest near our home bases, where coal-burning destroyers will be most effective; torpedo boats may be employed in good weather, and a concentration of submarines most easily made. The most favorable locality for a fleet engagement would be in the Kattegat, since it favors the employment of German torpedo craft, and also would embarrass the British in deploying and handling their great number of large vessels. The restricted waters would, to some extent, counteract the superiority in speed of the Grand Fleet.

Tactical surprises which appear possible are—

(*a*) Trap anchored mine fields over which the enemy may be lured. In the heat of action such fields may be as great a danger to ourselves as to the enemy.

(*b*) Floating mines planted during the action by torpedo craft, fast cruisers, submarines, or aircraft. We can not count up on the submarines reaching the proper position for mining—if they do their torpedoes are a better weapon. Unless well supported, fast cruisers are not likely to attain favorable mining position; we have not adequate support for them. For torpedo and aircraft the torpedo will be a more useful weapon than the mine.

(*c*) Air attack with bomb or torpedo. In an action near our bases we may concentrate a large air force to assist the fleet. Planes may be carried safely even upon comparatively slow vessels into the Kattegat or for about 100 miles beyond Helgoland in rear of the fleet; and fast carriers may accompany the fleet. Small planes can carry only bombs; large planes may carry torpedoes. Zepps may carry bombs. To be of effective help the air force must be large; we have numerous Zepps and an ample supply of both planes and of vessels suitable for carriers.

(*d*) Gas shells. The efficiency of these will not depend upon proximity to our bases. An effective gas shell may serve to put a dreadnought out of action with a few hits, if the enemy be not prepared with preventive measures.

(*e*) A concentration of submarines within the battle area. It may be accomplished if we can choose the theater for the engagement in advance.

(*f*) High-speed motor boats carrying torpedoes.

It appears, therefore, that under the following conditions the High Seas Fleet need not greatly fear an engagement with the Grand Fleet, and may even hope for victory—

(*a*) An action in a predetermined area, near the Bight or in the Kattegat.

(*b*) The employment of large air forces and submarines acting in conjunction with our fleet.

(*c*) The employment of all of our torpedo craft, including torpedo boats and high-speed motor boats carrying torpedoes.

(*d*) The use of an effective gas shell.

It probably will not pay us to risk a fleet action, however, except that it be necessary in the event of serious reverses on shore. The loss of the High Seas Fleet would seriously jeopardize the submarine campaign, while the existence of the High Seas Fleet diverts a great allied force from antisubmarine work.

During the season of long nights we may utilize German torpedo preponderance by enticing the Grand Fleet into the area near German bases. This may be done by the High Seas Fleet making its appearance in the desired area. If the operation be properly timed, the German capital ships may withdraw under cover of darkness and leave their torpedo craft to make concerted attacks in masses upon the British main fleet during the greater part of a night.

Such an operation might prove very successful and would involve but slight risk to German capital ships. It may be useful to reduce enemy strength in dreadnoughts and to elevate German morale.

Owing to British barrage operations in the North Sea, it may become desirable at any time to support by the High Seas Fleet the exit of groups of submarines through the barrage. This may bring on a fleet engagement beyond the area in which our maximum torpedo and air strength can be brought to bear. This risk will be lessened greatly if the British are not aware of our departure from Helgoland for 12 hours, as then our escape to the Kattegat would be practically assured. Here the British might be able to bring on a running fight through their superior speed, but a concentration in advance of submarines, aircraft, and torpedo forces, together possibly with the placing of trap mine fields, should insure a safe return to Kiel. Such a situation might bring about conditions favorable to us for inflicting serious reverses upon an eagerly pursuing enemy.

This operation may be tried at any time, irrespective of passing submarines through the barrage, with a view to leading the enemy into rashness by which we may profit.

The southwestern theater is also worthy of attention. There extensive mining has continued for several years; the waters are com-

paratively narrow, and there are numerous shoals, so that the maneuver of a large force would be hazardous. But with proper provision for mine sweeping, the risk to a division or squadron of capital ships should not prohibit German operations. Light forces at Zeebrugge and Ostend may assist in mine sweeping. At least as far as the Texel, however, it will be safe for the entire fleet to venture and to give support to detachments which may operate farther south.

The mine fields which the British have laid in the Bight will serve as good protection to the flank of our fleet proceeding between Helgoland and the Texel. We may lay additional mine fields to increase the value of the British one to us, the only necessity being for us to insure a clear channel along the shore—a matter rendered simple by the close proximity of a neutral coast.

The blocking of Dunkerque, Calais, Boulogne, or Havre is comparatively easy, and would seriously embarrass the British Army lines of communication. The lesson of Zeebrugge should not be lost to the Germans. A blocking expedition supported by the battle cruisers has an excellent chance of success. The distance from the Texel to Calais and return is about equal to the distance from Rosyth to the Texel, so that it would be advisable to support our battle cruisers with battleships held in the vicinity of the Texel.

Our battle cruisers can make the run from off Emden to Calais during the darkness of autumn nights. The Grand Fleet dreadnoughts could not intercept our battle cruisers on their return off Texel without starting from Scapa before our battle cruisers left Helgoland.

A blocking raid could start just after a Grand Fleet excursion into the North Sea, and before the Grand Fleet could completely refuel, and have increased chances of success. A feint to the northward by a part of our fleet will almost invariably draw the whole Grand Fleet into the eastern North Sea.

Activity on our part, either to the northward or southwestward, whether or not with a specific objective, will cause disproportionately great activity on the part of the Grand Fleet and divert large forces from antisubmarine efforts. If we are frequently active it will draw seriously on the Grand Fleet reserves of fuel, which will result in greater tonnage demand for replacements. In this manner we can divert shipping from military and civil purposes and accomplish the equivalent of sinking tonnage.

We therefore conclude that our fleet should be kept active, irrespective of any other objective, in order—

(*a*) To divert large forces from antisubmarine work.

(*b*) To induce great activity to the Grand Fleet.

RAIDING.

Heretofore German raiders have destroyed a great amount of shipping. Now that the convoy system is so generally used, raiding may not be so successful unless raiders are stronger than the convoy escorts.

We have about 10 light cruisers, of sufficient speed and endurance for short distance raiding, carrying seven or eight 5.9 guns. If these worked in pairs, they would be much stronger than the average escort. We have also two battle cruisers of sufficient radius for short-distance raiding. A surprise raid with these types would doubtless result in sinking a great number of merchant vessels before the enemy could readjust his convoy system and provide strong escorts. In any event, it would so disorganize the allied sea communications as to embarrass him seriously in supplying troops and materials for the western front. Such an operation would be of great value to our land operations if done during a critical period. Long nights will favor the raiders. The need for light cruisers and battle cruisers with the fleet will necessarily require their early return, and hence limit their raiding to short-distance surprise operation.

Distant raiding will require fast auxiliary cruisers of great radius. They will be useful in remote regions where the convoy system is not in force. Even though they may not sink a great deal of shipping, this form of raiding will be useful in forcing the Allies to place practically all shipping in convoy, and thus reduce net efficiency of tonnage by causing delays and extra demands for escort bunker coal.

GERMAN DECISIONS.

1. To engage in frequent operations in the North Sea, with a view to keeping the Grand Fleet active, and thus diverting forces from antisubmarine work, and as well as increasing the demands upon tonnage for fleet supply.

2. To avoid a fleet action if possible, but in any event not to accept action except near the Bight or in the Kattegat.

3. To be prepared during the season of long nights to entice the Grand Fleet near German bases, and there to attack it with torpedo craft only, withdrawing German capital ships to secure waters.

4. To prepare to use the following tactical measures in a fleet action:

(*a*) Gas shells.
(*b*) Torpedo boats and fast motor boats carrying torpedoes.
(*c*) Large air forces.
(*d*) Submarines.

5. To undertake blocking operations against French channel ports.

6. To lay a mine field between Texel Island and the British mine field in the Bight.

7. To make surprise raids with battle cruisers and light cruisers upon convoys in the eastern Atlantic during the coming period of long nights.

8. To undertake distant raiding with auxiliary cruisers.

9. To extend our submarine operations over a larger area, in order to restrict the hunting effort which the Allies are developing.

COUNTER STEPS TO BE TAKEN BY ALLIED FORCES.

1. If the High Seas Fleet can be destroyed, we shall be able to so mine in all German ports as to make it very difficult for submarines to operate. We may also then command the Baltic and circumvent enemy ambitions in Finland and partially nullify his influence in Russia.

But the chance of completely destroying the High Seas Fleet is very small, and its partial destruction would not materially alter our present difficulties with respect to supporting mining operations, unless our losses in the fleet action were proportionately very much less than those of the enemy.

The Battle of Jutland took place before the intensified submarine campaign began. When that campaign started, the principal mission of the High Seas Fleet became to render the maximum possible support to the submarines; therefore it is not probable that the High Seas Fleet will risk destruction now.

Meantime the enemy submarine campaign is doing execution very detrimental to our cause. We can not afford any losses to merchant shipping which we can possibly prevent. Our general naval mission has become "To obtain command of the subsurface, while retaining command of the surface of the sea."

We should adopt a partial strategic surface defensive, in order to undertake a more vigorous strategic subsurface offensive.

It is not essential that we should seek eagerly to engage the High Seas Fleet in any part of the North Sea; only that we shall be prepared to fight it at a distance from the Bight, where its preponderance of torpedo and air craft can not be brought effectively into play.

In this manner we may defeat an enemy purpose of diverting an undue number of our forces from antisubmarine work, as well as avoid traps and spare ourselves embarrassment on account of fuel requirements.

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2. In order to induce a fleet action in an area far from German bases, as well as to combat the submarine campaign, we should make the northern barrage complete to the Norwegian coast.

3. We should meet probable tactical surprise by some of our own. We should develop gas shells, torpedo planes, and radio-controlled motor boats. The two latter devices will be particularly useful in the narrow seas to counter probable efforts against Channel ports by capital ships. We should be prepared against the latest gas-shell developments of the enemy.

4. The great vulnerability of our position in the narrow seas requires that at least a division of dreadnoughts be stationed in the Thames estuary or the Downs. If necessary, American dreadnoughts should be brought over for this purpose, though such a reinforcement of capital ships is not absolutely necessary if the Grand Fleet will adopt the strategic surface defensive.

Our position in the narrow seas should be strengthened further by mine fields in the eastern approaches to Dover Strait, and if necessary the gun bombardments from sea of Ostend and Zeebrugge should be given up to permit mining. They can probably be bombarded more effectively by shore batteries mounted near Nieuport.

5. During the present land crisis in France we positively can not afford a shipping calamity. We must prepare for prompt and vigorous counter measures against battle-cruiser raids. These recommended in American Planning Section Problem No. 13 are adhered to. The adoption of the strategic surface defensive by the Grand Fleet will make such measures more practicable and more effective.

6. We must be prepared to place convoy system into effect in distant theaters so soon as it is known that a long-distance raider is at sea.

[Extract from Memorandum No. 71, "History of Planning Section."]

Initiated by the Planning Section with the object of deducing the naval measures likely to be taken by the enemy in support of his land operations and civilian morale.

The forwarding comment of the Force Commander on 23 July follows:

1. There is forwarded herewith for the information of the Department one copy of Planning Section Memorandum No. 40, which is a solution of Problem No. 14, and is an estimate of the situation from the German point of view.

2. This memorandum contains a study of considerable interest and is forwarded to the Department for that reason and not with any expectation that the Department will take any action.

3. A copy has been transmitted unofficially to the Chief of the Naval Staff of the British Admiralty.

MEMORANDUM No. 41.

ANTISUBMARINE TACTICS.

13 July, 1918.

General situation: War as at present (July, 1918).

Assume: (1) That the final answer to the submarine will be tactical; (2) a long war.

Required: Estimate of the situation and decisions as to tactical weapons and tactical methods that should be employed in combating submarines.

MISSION.

To determine the best tactical weapons and tactical methods for combating enemy submarine.

ENEMY FORCES.

We need to consider the following concerning enemy submarines:

(1) *Tactical characteristics.*—

(*a*) Ability to rest on the bottom for 72 hours.

(*b*) Ability to remain submerged under way 60 hours at 1 to 2 knots; 36 hours at 3 knots; 12 hours at 5 knots; 3 hours at 7 knots (*Sterrett*, 7 hours at 7 knots); 1½ hours at 11 knots.

(*c*) Increasing ability to run nearly silent when submerged.

(*d*) Surface speed 10 to 16 knots.

(*e*) Ability to submerge in 20 to 90 seconds.

(*f*) When submerged can hear pursuing vessels.

(*g*) With upper end of periscope showing, hull is too deep for torpedo running at 25 feet, the maximum depth setting.

(*h*) Torpedo range is limited to 3,000 yards. The most favorable range is about 300 yards.

(2) *Operating areas.*—

(*a*) English Channel and Irish Sea. Submarines can bottom.

(*b*) West coast of France and the Atlantic. Submarines can not bottom.

(*c*) North Sea. Can bottom in places, but not on the northabout route.

(*d*) Mediterranean Sea. Submarine can not bottom.

(*e*) United States Atlantic coast. Submarine can bottom, but as a rule U-boats never bottom—only the smaller boats bottom.

Converging points are still favorite hunting grounds. Good weather permits offshore work. Bad weather and long nights bring the submarines into narrow, sheltered waters. Large submarines prefer deep water and waters not frequented by patrol craft. We may expect operating areas to be extended in order to create corresponding extension of the escort system and prevent the formation of hunting units. The submarine does not like to be hunted. It much prefers to determine for itself the time when all hands must be on the alert.

(3) *Numbers.*—

German submarine situation, 1 June, 1918.

Class.	Total built.	Sunk.			Not yet operating.	Total in actual commission.	School Subs.	Total actively operating.	Total remaining in commission.
		Identified.	Not identified.	Total.					
Cruiser	19	1	.....	1	12	6	.....	6	18
U	121	56	4	60	5	61	11	45	61
U. B	122	37	5	42	6	80	8	66	80
U. C	79	51	2	53	.....	26	3	23	26
Total	341	145	11	156	23	163	22	140	185

On April 20, 1918, enemy submarines were distributed as follows:

German:	
Home ports	77
Flanders	24
Adriatic	43
Constantinople	[1]21
Total	165
Austrian:	
Adriatic	31

(4) *Submarine tactics.*—

The following are extracts from the German Submarine Manual:

TORPEDO FIRING FROM SUBMARINES.

Assume that firing at a range of over 3,000 meters (3,280 yards) is useless, and therefore better not attempted (for single boats).

The rule for submarines as before. Proceed unobserved to a position from which a high-speed shot can be fired and a hit certainly obtained.

[1] Include 14 captured Russians.

I. Most Favorable Side for Attack.

When choice is possible, the sunny side should be chosen, particularly when the sun is not too high, and provided the shot can be fired more or less from the direction of the glare of the sun.

In a strong breeze the weather side is preferable.

II. Strength of Wind and Sea.

Do not fire in a calm with a perfectly flat sea (except from the direction of the glare of the sun or at a slow cargo steamer).

Force of wind 3–4, and sea 2–3, present the most favorable conditions for attack.

If the sea is 5–6, when it may be just possible to fire, fire at right angles to the direction of the sea.

Do not attack in a heavy sea and a long Atlantic swell.

III. Use of Periscope.

Periscope showing 1.5 to 2 m. can not be seen more than 4,000 m., provided a suitable speed is maintained and the favorable side for attack chosen.

With binoculars it has not been possible to distinguish the periscope even at 2,000 m.

An unseen attack (periscope used sparingly) implies keeping the periscope low and showing it frequently but for quite short periods (a few inches of periscope only, so that the object glass is almost awash).

You must not for any length of time omit to take a look around.

Lower the periscope completely and go to a depth of 18 m. (59 ft.) when high speed (full speed or utmost speed) is necessary to attain the position for firing.

Never show two periscopes at the same time.

Come to the surface with periscope lowered.

Handling of periscope immediately after firing. (*a*) Lower the periscope and dive to the greatest possible depth (45 m.) (148 ft.); this applies particularly to small boats with only one periscope.

A better method. (*b*) Observe the shot and the hit; also whether a second shot is necessary and possible.

For this purpose after firing show the periscope as sparingly as possible in every way; that is, show very little of it, and as the boat invariably rises somewhat, always first lower the periscope a little; then raise it again according to your depth.

After observing the hit and the counter measures adopted, then (and not till then) proceed for about 15 minutes at the greatest possible depth. Lower the periscope completely and preserve silence in the boat.

IV. Speed When Attacking.

The speed of the submarine is a vital factor in an "unseen" attack.

1. To close the enemy, first proceed at high speed until the bearing does not change. When actually attacking, endeavor to limit yourself to the lowest speed at which the boat keeps her depth well.

2. Before using your periscope, always "reduce speed."

3. If the enemy is zigzagging, it is advisable not to proceed at too low a speed.

V. Firing Range.

The most favorable firing range is 200 to 300 m. (219 to 328 yards).

It is advisable, in addition, after firing to turn away in the direction of the enemy's stern.

Note.—On active service the most favorable firing range, in the case of ships with which you are not absolutely acquainted, is 300 m. (328 yards).

When attacking ships in a formation do not fire at less than 500 m. (547 yards) range, particularly if the vessels are disposed toward you.

(*a*) Do not fire at less than 170 m. (186 yards) in the case of a direct bow or stern shot.

(*b*) Whitehead torpedoes must not be fired at a range of less than 250 m. (273 yards).

For a long-range shot, only a quadruple salvo promises success, and then only under 3,000 m. (3,281 yards).

VI. Procedure When Pursued With Hydrophones.

1. A rough sea is the best natural protection.

2. The reduction to a minimum of the sounds caused by your own boat is an effective protection.

(*a*) Connect the vertical rudder and hydrophones for hand working.

(*b*) Stop your ballast and trimming pumps. Use compressed air in lieu.

(*c*) Let your main motors run at the lowest possible number of revolutions, stopping frequently. Keep the boat trimmed on the periscope.

3. Proceed at a depth of 45 m. (148 ft.).

4. It is better to keep near the coast than out in the open sea in cases where the depth is greater than 70 m. (230 ft.).

5. Lying on the bottom is a good way of evading hydrophone pursuit, provided that the hull is absolutely tight.

No leakage of air, and, above all, no oil bubbles.

6. Make the most of your time when your pursuer is going ahead, in order to increase your distance from him.

The submarine must, however, stop frequently to listen, even at the risk of not increasing her distance from the enemy so rapidly.

When attacked and forced to submerge, a submarine may—

(*a*) Attempt to escape by proceeding at maximum speed.

(*b*) Proceed at slow speed.

(*c*) Proceed slowly, stopping and balancing occasionally to listen, or to synchronize the stops of hunting units.

(*d*) Bottom (in water 40 fathoms or less).

(*e*) Anchor submerged.

When making an attack on a vessel or convoy, a submarine normally must submerge a considerable distance away, and then maneuver while submerged for position. This may require the use of high speed and consequently exhaust much of her battery power.

By day in crowded waters, or in localities where our own submarines operate or our patrols are thick, the enemy must spend most of the daylight hours submerged, and devote much of the

night to recharging batteries. Recharging may be done while proceeding on the surface at moderate speed.

5. *General intentions of enemy—*

(*a*) To continue submarine warfare to the end. Its effect is still of the first importance. To give up submarine war on commerce would be a blow to enemy prestige.

(*b*) New construction will probably be stronger, to permit deeper diving and to withstand better the effect of underwater explosions.

(*c*) Will attack points of weakness, like slow convoys, vessels in areas where escorts are thin.

(*d*) Will give greater attention to submarine cruiser warfare. The recent trip of *U 151* to American waters accounted for more than one-fourth of the tonnage sunk last month.

Our Own (Allied) Forces.

We should consider here the types of the vessels available, and the success that has attended different kinds of effort. The types of vessel available are—

(1) *Destroyers.*—Suitable for escorts, and for offensive work generally. Must depend at present principally upon sight contact. The Mason gear will enable destroyers to follow submerged submarine if close contact is made and submarine is not noiseless. Numerous depth charges.

(2) *Eagle boats.*—Special listening equipment. Suitable for offshore work. Primarily a sound hunting vessel, but sight lookout important. Should be able to keep the sea in all weathers.

(3) *Submarine chasers.*—Sound hunting vessel. Efficient in smooth water. Too small to keep the sea in rough weather and be efficient. Very apt to make sight contacts at night.

(4) *P-boats, Q-ships, and sloops.*—Seaworthy. No special listening equipment. Depend on sight contacts.

(5) *Trawlers and drifters.*—Have some listening equipment—Fish hydrophones. Stay out about four days, but seek shelter in bad weather.

(6) *Motor launches and coastal motor boats.*—Suitable for work in quiet waters. Are being fitted with listening equipment.

(7) *Dirigibles.*—Suitable for convoying and for scouting and reporting submarines, and giving information to surface vessels.

(8) *Seaplanes.*—Suitable for patrol and for attack on submarines; also for giving information to surface vessels.

(9) *Submarines.*—Very good lookouts. Frequent contacts. Fault is in weapon—the torpedo—which more often than not misses its target. Excellent listening vessels.

METHODS OF SINKING SUBMARINES.

The following methods of sinking submarines have been employed with the success indicated:

	Sure.				Probable.
	German.		Austrian.	Total.	
	To 31 March, 1918.	Since 31 March, 1918.	To 30 June, 1918.		
1. Man-of-war rammed	3	.....	1	4	.....
2. Destroyers and patrols:					
Rammed	7	1	.....	8	2
Gunfire	6	3	1	10	6
Depth charge	14	6	1	21	12
Indicator net	.....	.....	1	1	1
Modified sweep	1	.....	.....	1	2
Paravane	2	.....	.....	2	1
Bomb	1	.....	.....	1	.....
Total	31	10	3	44	24
3. Merchant vessels rammed	2	2	.....	4	1
4. Decoy ship gunfire	11	.....	.....	11	7
5. Submarine torpedo	14	4	1	19	2
6. Decoy and submarine	4	.....	.....	4	.....
7. Armed smack	1	.....	.....	1	2
8. Mined nets towed	1	.....	.....	4	1
9. Mined nets anchored	4	.....	.....	4	1
10. Mines	9	4	1	14	2
11. Subs., own mines	6	.....	.....	6	.....
12. Air attack	2	2	.....	4	5
13. Accident	2	.....	.....	2	.....
14. Strandings	5	.....	.....	5	.....
15. Unknown	32	3	4	39	.....
16. Interned	5	2	.....	7	.....
Total	132	27	10	169	48

It will be noted from the above that the use of the following has proved most successful in the attack of submarines:

(*a*) Gunfire, all classes of vessels ..... 21 sinkings.
(*b*) Depth charges, all classes of vessels ..... 21 sinkings.
(*c*) Torpedoes, fired from submarine ..... 19 sinkings.
(*d*) Ram, all classes of vessels ..... 16 sinkings.
(*e*) Mines ..... 14 sinkings.

(*a*) Gunfire has largely been successful on close contact as at night, or in thick weather, or on Q-ship. We may expect it to be less effective in future, due to the wariness of enemy submarines of approaching vessels that they think may be traps. The constant readiness of one or more guns on each vessel at night joined to a better distribution of information concerning our own vessels in any given area should enable us to be quicker on the trigger at night, and consequently more dangerous to the enemy submarine. Every vessel should consider its guns its most effective antisubmarine weapon at night, and take measures accordingly. If each vessel can

step up its gunfire efficiency against submarine 25 per cent—a small increase—the cumulative effect throughout a very few months will be extremely valuable.

(*b*) Depth charges are now considered the principal weapon for attacking submarines. Two or three thousand charges a month are used with only a small number of successes. The problem of the more efficient use of depth charges is one that requires the most constant and painstaking thought and organization of which the service is capable. We can not expect any revolutionary results, but if we can increase, by more careful methods, the efficiency of several contributing factors, we may very possibly increase total efficiency by 50 per cent. If there be four contributing factors of efficiency, and if our present efficiency is represented by 80 per cent, and if we by increased effort raise these factors to a 90 per cent efficiency, we shall have increased our total efficiency by 60 per cent plus. The following discussion may therefore not be out of place:

When a submarine is sighted by an antisubmarine vessel in its near vicinity there are several problems that must be solved correctly in rapid succession, in order that the submarine may be sunk by depth charges. The end in view is to explode a depth charge within 70 feet of the submarine. The problems requiring solution are, in chronological sequence:

(1) *To mark the spot on the surface of the water where the submarine was seen.*

Comment.—It must be presumed that the submarine will submerge promptly and leave no trace of its position. An unmarked spot on the surface of the water can not be followed by the eye; therefore the inevitable result of a submarine disappearing below the surface is for the unaided eye to lose track of the point of submergence. If the vessel on which the observers are is obliged to turn through a considerable angle, the uncertainty of the submarine's position when last seen is greatly increased. Numerous reports from both American and British sources indicate that many depth-charge attacks take place at points quite distant from the submarine, because the position of the submarine when last seen could not be marked, and because it was in consequence wrongly estimated while maneuvering for attack. The consensus of opinion is that the distance of the submarine is usually underestimated.

No complete solution to these difficulties has been found. Ensign H. J. Nichols, U. S. N. R. F., of the U. S. S. *Emeline*, has suggested a marker shell that can be fired at the submarine, which shell upon hitting the water will explode and leave a small smoke producer where the shell struck the water. If the fall of this shell is spotted

with reference to the submarine, it should furnish a good guide to subsequent maneuvers. A second or third shot may be spotted closer to the submarine. No shell of this nature is, as yet, developed. There is urgent need for such a shell.

Lacking a marker shell, we must consider how best to solve the problem without it. We can always mark a line on which the submarine was seen by observing the compass bearing of submarine, and by dropping at the same time a buoy. If in addition an estimate is made as to the distance of the submarine, we obtain a valuable point of departure for all subsequent maneuvers.

The following rules should govern the dropping of the buoy:

(*a*) Drop buoy as near as possible to submarine, but drop it before submarine disappears.

(*b*) Note compass bearing of submarine at instant buoy is dropped.

(*c*) Estimate distance of submarine from buoy at instant buoy is dropped.

(*d*) Start stop watch at instant buoy is dropped.

(*e*) Note course of submarine with relation to line from buoy to submarine, then convert to compass course.

(*f*) Transfer data to mechanical mooring board.

(2) *To maneuver into position for attack.*

Comment.—The attacking vessel should work out in advance plans for approaching the submarine, based on all the typical positions and courses of the submarine with relation to the buoyed line of position, so that every officer will be ready instantaneously with the correct decision, no matter in what position the submarine may be, nor what course it may be steering. To be thus ready may result in saving just that minute that will give success. The commanding officer of each vessel should hold school for officers on this and similar points.

As the turning circle of submarines is smaller than that of destroyers, and as submarines almost invariably turn or zigzag when they submerge to escape, it may frequently be advisable to head the attacking destroyer for a point to one side of the submarine, such that if the submarine turns toward that side a depth-charge barrage will get him. The attack can then be continued along a retiring search curve toward the other flank in such manner that the first circle of the destroyer will cover 360° of the submarine possible courses, instead of 180° provided for by plan given in force commander's letter of March 29, 1915.

(3) *To drop depth charges in the most probable positions of the submarines.*

Comment.—There are two principal cases under this heading:

(*a*) Submarine leaves visible trace of oil or bubbles.

(*b*) Submarine leaves no visible trace.

In the first case the attacking vessel must—

(*a*) Determine distance ahead of oil or bubbles that submarine is.

This distance depends upon submergence of submarine and submerged speed of submarine. Submergence is always an uncertain quantity. U-boats dive voluntarily to over 300 feet. *U–104* used 98 feet depth to escape, and *164*, 197 feet when forced to dive where mines were considered probable. Cruiser-submarines dive to 492 feet, and are to be tested to 525 feet. At least one U-boat made a practice of remaining as near the surface as possible, in order to avoid depth charges and in order to watch attacking vessels.

As to speed submerged when being attacked, it appears most probable that a speed near the maximum, 9 knots, is used until a considerable distance is run from the point of complete submergence.

Tables have been prepared giving the distance in yards the submarine is ahead of the oil or the air bubbles under various assumptions as to submergence and submerged speed. In order to determine the point for dropping depth charges, allowance has to be made for travel of submarine after bubbles or slick are passed, and until depth charge explodes. As the bow wave may obliterate the slick so that the depth-charge officer can not see it, it is desirable to mark the end of the slick by dropping a buoy from the bridge. The depth-charge officer may then use this as a point of departure for his depth-charge calculations.

Depth charges sink 6.5 feet per second.

Depth charges countermine at 245 feet.

At 9 knots a submarine travels 5 yards a second, or 38.5 yards, while a depth charge is sinking 50 feet—$2\frac{1}{3}$ times as fast as a depth charge sinks.

In estimating course of submarine assume—

(*a*) That if submarine is attacking, it will continue in an effort to get in its shot—and may not see attacking vessel.

(*b*) That if submarine is escaping it will turn sharply, and will make wide zigzags.

(*c*) That after an attack, submarines as a routine will turn toward direction from which convoy came.

The following points have been emphasized by the chief of staff at Queenstown:

(1) There should be on each antisubmarine vessel a depth-charge officer with battle station aft, who should supervise the handling, depth setting, and dropping of depth charges in accordance with

signals from the bridge, or according to his own judgment if signals fail.

(2) There should be a depth-charge crew, thoroughly organized and trained in handling, setting, and dropping depth charges. This crew may be that normally stationed at the aftergun. The after-magazine ammunition crew might be stationed to reload the Y-guns.

(3) There should be an efficient system of depth-charge signals from the bridge—capable of repeat back. Following suggested:

Siren whistle signal.
Electric bell.
Electric gong.
Klaxon horn.
Ship's whistle.
Air whistle.

The following should be kept in mind:

Experience indicates that vessels almost invariably underestimate—

(*a*) Distance submarine is ahead of slick or bubbles.

(*b*) Distance traveled by submarine from point of submergence until attacking vessel arrives.

(*c*) Distance traveled by submarine while depth charge is gaining its depth.

When submarine leaves no visible trace entire dependence must be placed on calculations based on the original observation and corresponding marks. Nearly all reports indicate that the desire of the commanding officer of the submarine to have a look around will bring the submarine up within half an hour. The best answer to this habit is special lookouts, and special vigilance after a daylight attack or a daylight sighting, in the hope that a new point of departure may thus be gained.

As to methods of getting depth charges in the water.—These are—

Y-guns.
Throneycroft throwers.
Depth-charge racks.

For all depth-charge attacks made soon after the submergence of the submarine, the initial attack is of special importance, for then the position of the submarine is known better than it will be known until it is sighted again. Y-guns and throwers make it possible to enlarge the pattern of the attack. If a submarine appears inside the turning circle of a vessel there is only one way to drop a depth charge near the submarine, and that is to turn away and stand off until submarine can not get again inside turning circle before attack is delivered. Y-guns and throwers may throw depth charges toward the submarine and thus meet in a way this special situation. The use-

fulness of the thrower would be greatly increased if it could be trained.

The consensus of destroyer opinion is in favor of more than one depth-charge thrower on each vessel; of permitting a 300-foot depth-charge setting; of carrying a few 600-pound depth charges on the later destroyers.

Radius of destruction of a 300-pound charge is 70 feet; of a 600-pound charge is 95 feet; 600-pound depth charge weight, 800 pounds. Depth-charge throwers capable of throwing a depth charge containing 260 pounds T. N. T. 300 yards weighs about 4,000 pounds.

Torpedoes fired from submarines have been very effective against enemy submarines, but many opportunities for success have been lost through the difficulty of hitting so small a target as a submarine. With the enemy submarine showing its periscope only and probably in the act of diving, the torpedo set for 25 feet is apt to miss. Experienced officers believe that the depth setting should be changed to permit of a 60-foot setting. Independent, however, of depth of submergence, the submarine is a very difficult torpedo target. The problem of increasing the probability of torpedo hits is of extreme importance. There are two ways of increasing the probability of hits.

(1) *Firing more torpedoes.*

Comment.—It has been suggested that a small torpedo be developed that can be fired in groups simultaneously from the same torpedo tube, so directed as to scatter shotgun fashion.

It is, of course, assumed that every care is taken to keep each torpedo in efficient condition, and that on each occasion of a profitable opportunity to fire at any enemy submarine, every torpedo that can be fired effectively will be fired.

(2) *Increasing the danger space of torpedoes.*

Comment.—Each torpedo carries an explosive charge, which, if detonated within 70 feet of a submarine, will sink or disable the submarine. Many torpedoes fail to hit the submarine, but still pass within 70 feet of it. It is probable that the number of successful shots would be increased not less than 50 per cent if each torpedo passing within 70 feet of a submarine detonated. No other torpedo problem in design is of such immediate importance as the following:

To attach to all torpedoes now used by submarines a device that will detonate the torpedo should it, while making a war run, pass within 70 feet of any vessel.

The ram as a weapon needs little discussion here. Prompt, bold seamanship is all that is required for its successful use. No captain should ever hesitate to ram if his vessel is strong enough to damage

seriously the submarine. Every submarine sunk is ten million dollars a year saved to the Allies.

Mines.—The enemy submarines that have been sunk by mines have been sunk in fields of anchored mines. In previous studies we have pointed out the importance of making our primary mining effort barrages, closing the exits to enemy submarine bases. No change in conditions has altered our opinion as to the soundness of this policy. When mines are available over and above those required for barrage operations, they may be used as deep trap mine fields in localities where submarines are apt to bottom, or where patrol vessels may force them to submerge. The danger that deep mine fields offer to shipping makes it advisable that mine fields should not be laid on traffic routes.

Wherever a surface mine field is laid as an antisubmarine measure, it should be above a deep mine field, otherwise the submarine will soon learn to dive under the surface mine field.

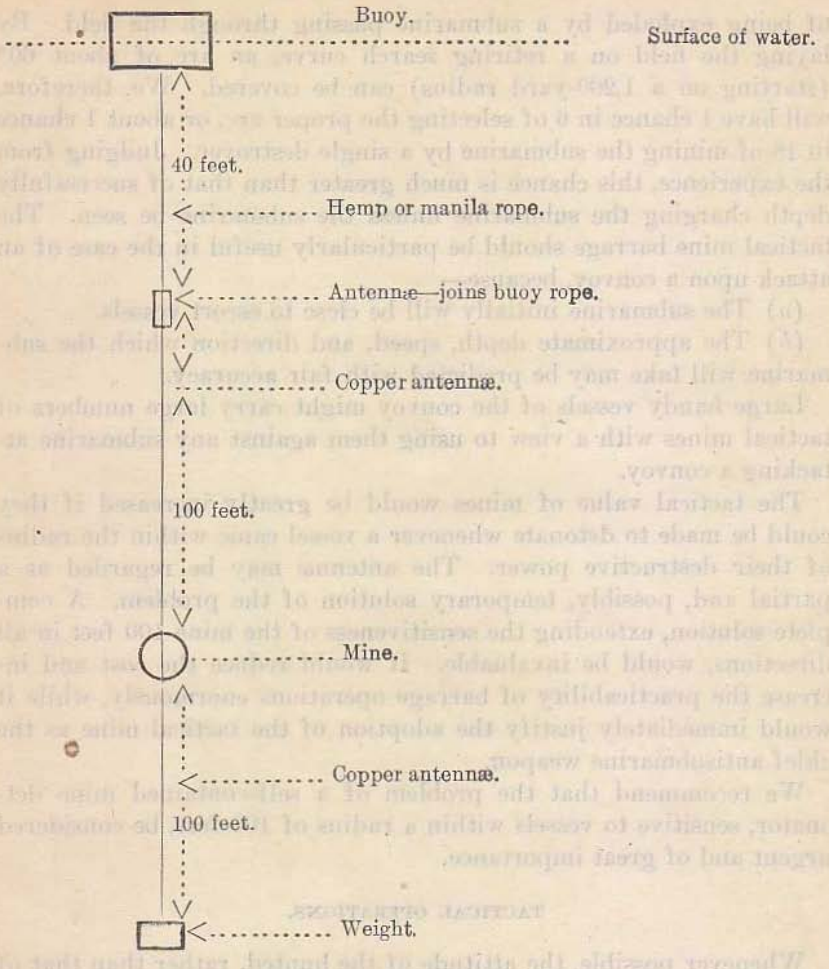
The suggestion has been made that since a small mine detonating in contact with the hull of a submarine will destroy the submarine, it might be profitable to attach to a single mooring rope as many as five 100-pound horn mines of the existing type, spaced 25 feet apart. This arrangement, although possibly difficult to lay, would economize greatly in wire rope, and might be considered a substitute for our antennæ mine should an answer be found to that mine.

We must always consider the possible necessity of abandoning the antennæ mine, and therefore should complete without delay, up to the point of readiness for quantity production, a type of mine that does not depend in any degree for its efficiency on secrecy regarding its design.

The foregoing discussion on mines does not bear directly on the tactical use of mines in antisubmarine warfare. We shall now consider the tactical use of mines against submarines.

The depth charge detonates without reference to the presence or absence of a submarine within its restricted area. If it is to be effective, the depth charge must arrive at its set depth at a time when there is an enemy submarine within the radius of its destructive effect. When we consider the great number of depth charges that are expended without definite known result, we are led to inquire if there be not some other more effective way of using underwater explosives. The following is suggested:

A tactical antennæ mine to be laid from antisubmarine vessels in a barrage around all submarines with which close contact is made. The present United States mine to be used as indicated in the sketch:



The mine is suspended from the buoy. Forty feet of buoy rope makes the mine dead to surface craft. The buoy furnishes an additional safeguard to vessels navigating on the surface. The antennæ both up and down make the mine effective over the entire depth of any ordinary submergence of a submarine. The mine is not anchored, and must be arranged to sink after a reasonable period—say two hours.

Assuming contact with a submarine which permits locating the point of her submergence within 200 yards and allows the attacking vessel to reach that point within three minutes, the submarine may then be as much as 1,200 yards from the point of submergence when the attacker arrives on the scene. If the attacker carries 50 antennæ mines, she can lay a mine field of about 2,000 yards in length (at intervals between mines of 120 feet) which will give a good chance

of being exploded by a submarine passing through the field. By laying the field on a retiring search curve, an arc of about 60° (starting on a 1,200-yard radius) can be covered. We, therefore, will have 1 chance in 6 of selecting the proper arc, or about 1 chance in 18 of mining the submarine by a single destroyer. Judging from the experience, this chance is much greater than that of successfully depth charging the submarine unless the submarine be seen. The tactical mine barrage should be particularly useful in the case of an attack upon a convoy, because—

(*a*) The submarine initially will be close to escort vessels.

(*b*) The approximate depth, speed, and direction which the submarine will take may be predicted with fair accuracy.

Large handy vessels of the convoy might carry large numbers of tactical mines with a view to using them against any submarine attacking a convoy.

The tactical value of mines would be greatly increased if they could be made to detonate whenever a vessel came within the radius of their destructive power. The antennæ may be regarded as a partial and, possibly, temporary solution of the problem. A complete solution, extending the sensitiveness of the mine 100 feet in all directions, would be invaluable. It would reduce the cost and increase the practicability of barrage operations enormously, while it would immediately justify the adoption of the tactical mine as the chief antisubmarine weapon.

We recommend that the problem of a self-contained mine detonator, sensitive to vessels within a radius of 100 feet, be considered urgent and of great importance.

TACTICAL OPERATIONS.

Whenever possible, the attitude of the hunted, rather than that of the hunter, should be imposed upon the enemy submarines. Every time that an enemy submarine is forced to submerge it enters a danger area, where machinery accidents and errors of personnel produce their maximum effect.

The fact that 32 enemy submarines have been lost through unknown causes is an indication of the value of making submarines navigate submerged.

Drive them under, keep them under.

The tactical operations that we have to consider are—

(1) Hunting by sound.

(2) Hunting by sight.

(3) Counterattack by escorts.

In all hunting operations it is essential that the services of information and communications be sufficiently and intimately co-

ordinated with the hunting efforts, to the end that hunters may make frequent and timely contacts with the enemy. There should be a constant inspection and checking of the communication system and a flexibility of hunting arrangements such that, whenever a submarine appears on the coast, it shall meet with a reception suited to its important character. Aircraft, surface vessels, and friendly submarines must all have their efforts coordinated. There must be the freest possible flow of information to and from all units.

In general, hunting will be most profitable—

(*a*) In water over 40 fathoms deep, where submarines will not bottom.

(*b*) Immediately after submarine has made an attack (battery power reduced).

(*c*) After a submarine has passed through a thick patrol (battery power reduced).

(*d*) At night; in areas where during the day our own submarines operate, or where there has been much traffic (battery power reduced, submarine probably on surface).

(*e*) After a submarine's hull has been caused to leak air or oil, or has been otherwise damaged by depth charges or other causes.

(*f*) In narrow waters, requiring the submarine to make frequent observations for navigational purposes, and restricting his choice of courses while submerged.

(*g*) Along routes of passage to and from operating grounds of submarine. The general course most likely to be taken after submerging can then be predicted.

(*h*) For hunting by sound, in areas where there is little traffic.

(*i*) During summer; good weather and long days.

The primary object of hunting by sight is to force the enemy submarine to remain submerged until she is compelled to emerge. Incidental opportunities for attack will of course be taken advantage of.

Owing to submerged radius of submarines and to their ability to proceed unobserved, this form of hunting can not be successful except that an area of at least 25 miles radius be placed under good observation.

A submarine can proceed 25 miles submerged in 3½ hours at 7 knots, batteries exhausted; 5 hours at 5 knots, batteries 40 per cent exhausted; 12 hours at 2 knots, batteries 20 per cent exhausted.

A formation deployed so as to have an area of 25 miles radius under observation, with center over last known position of submarine, will then have from 5 to 12 hours in which to sight the submarine before she can escape.

Meantime if the submarine is sighted, the formation may move its center over the new position and start afresh, with the advantage

of having partially exhausted the submarine's batteries, and perhaps of having shaken its morale by a depth-charge attack.

Aircraft and kite balloons would be of great assistance to the hunting group. Listening devices also would be of great assistance.

At dark, in fog, or at the end of the time when it is judged that the submarine may have reached the limit of observation without discovery, it will become necessary to move the formation in the supposed direction which the submarine may have taken and at her assumed speed.

For these reasons this form of hunting will be most profitable in northern latitudes during summer, and also along the route of passage between enemy operating ground and bases. Deep water is essential to prevent the submarine from economizing power through bottoming.

In order to cover an area 25 miles in radius, about 20 vessels are required with visibility of 5 miles. If vessels are equipped with kite balloons, able to see a submarine on the surface 15 miles, only 6 vessels will be required for observation; but they will require additional vessels to prevent the submarine from remaining on the surface for considerable periods of time out of gun range from them, which periods he may utilize for recharging batteries.

Owing to the necessity for driving submarines under promptly with gunfire, the interval between units of a group hunting by sight should not exceed 15 miles even when equipped with kite balloons.

Twenty-two vessels 15 miles apart can cover an area of 45 miles radius. If the center vessel and the outer line carry kite balloons having visibility of 15 miles, but 14 of the 22 need to carry kite balloons.

The enemy can reach the outer limits of observation starting from the center of the formation in $7\frac{1}{2}$ hours at 6 knots with batteries exhausted, in 9 hours at 5 knots with batteries 75 per cent exhausted, in 23 hours at 2 knots with batteries 40 per cent exhausted.

If units of a sight hunting group are equipped with listening devices, the opportunities for obtaining information of the enemy's approximate location will be increased. His escape on the surface, even at night, will be rendered difficult by this means.

Even in the large groups sight hunting, coordinated starting and stopping of the engines of all units will be essential if listening devices are used, although the sound interferences between units will not be so serious in the large sight hunting group, owing to the great intervals of development.

Destroyers, Eagle boats, P-boats, are suitable units for sight hunting groups in the open sea. Trawlers, submarine chasers, motor launches, and coastal motor boats, are suitable units for sight hunting groups in sheltered waters.

In general, the hunting procedure would be about as follows—operations being conducted in northern latitudes during summer, over deep water, and preferably along passage routes, and near any patrols that may be operating:

1. Information received of submarine position near by.

2. Deploy at 15 miles intervals, with center of formation last known enemy position, getting kite balloons out.

3. Zigzag at 15 knots about center of formation.

4. Stop simultaneously about three times per hour for five minutes to listen.

5. Upon getting sight or sound contact, shift center of formation over new enemy position, vessels making sound contact retaining it, and other vessels stopping and starting, so as to facilitate hunting by sound.

6. Move whole formation in direction enemy is assumed to have taken, at such speed as to keep center of formation over enemy assumed position.

7. If enemy is heard at night on surface, or charging batteries, search for him to drive him under, closing intervals if necessary, and keeping formation center near his last known position.

Patrols.—A system of patrol of a large area by a few vessels, generally speaking, is unprofitable. It is expensive in wear and tear and fuel; it is not an economical distribution of forces, because areas in which the enemy is operating are covered no thicker than other areas; contact with the enemy depends largely upon chance; and even when contact is made, there is insufficient force present to deal with the enemy efficiently.

The most useful thin patrol is by means of our own submarines, whose operations will annoy and handicap the enemy (and occasionally damage him) by inducing him to remain submerged during most of the day, rather than risk a surprise torpedo attack.

The next most useful thin patrol will be at night, in areas which the enemy is suspected of using to recharge batteries.

Air patrols will be useful in obtaining information which will put our forces into contact with the enemy, and occasionally useful in attacking him.

Thick patrols are very useful in narrow passages through which the enemy must pass frequently; provided the patrol has a formation of great depth, or is maintained over a deep mine field.

Convoy counterattack.—The opportunity normally presented for effective action against enemy submarines immediately following an attack upon a convoy is so good as to warrant unusual efforts to take advantage of it.

(*a*) There is present a large concentrated force of antisubmarine craft.

(*b*) The position of the enemy submarine is near, and is usually known within narrow limits.

(*c*) His probable immediate action may be predicted with fair accuracy.

(*d*) His battery power is usually reduced considerably.

(*e*) Usually the water is too deep for bottoming.

(*f*) Immediate further danger to the convoy has been eliminated, except in the very rare case of another submarine being in the near vicinity. This possibility is so remote as not to justify serious consideration, until at least several hours have passed.

Under the circumstances we are fully warranted in employing practically the entire escort force in a counterattack, and, should the counterattack fail, in a search for a number of hours by a part of the escort. As destroyers become more numerous, it will be desirable to organize a part of each escort into a hunting group that shall leave the convoy upon contact with an enemy submarine, and shall thereafter hunt that submarine until obliged to abandon the hunt to get fuel. The antennæ tactical mine already discussed should be specially useful on escorting vessels.

The frequency with which convoys get close contact with the enemy as compared to close contacts obtained in other ways may justify special hunting vessels, such as Eagle boats, accompanying convoys in good weather through a part of the zone, in order that a hunt may be initiated under very favorable circumstances. No decision in this matter can be reached until the capabilities of these vessels are known more fully.

In fast convoys, where vessels have on board experienced personnel, it is desirable that the vessels of the convoy carry a considerable number of depth charges, and that whenever the tactical situation makes the safety of the vessel lie in turning toward the submarine, that each vessel so turning shall use its depth charges freely. Important vessels manned by naval personnel should carry depth-charge throwers.

Attack of enemy bases.—The blocking of exits from enemy submarine bases by block ships has not been attended with sufficient success to justify further effort. Destruction of enemy bases and of enemy vessels therein is valuable. The discussion of such efforts is outside the scope of this paper.

Aircraft.—The United States is about to undertake a very extensive system of aircraft antisubmarine patrol. Its success will depend very largely upon cooperation with surface vessels through an efficient communication system.

DECISIONS.

GENERAL.

1. To perfect services of information and communication, so that hunters will be given timely information of enemy submarines operating in their vicinity, and so that aircraft, surface vessels and friendly submarines may all have their efforts coordinated. There should be the freest possible flow of information to and from all units.

WEAPONS.

2. Every vessel should consider its guns and ram the most effective antisubmarine weapons at night or in thick weather and plan its actions accordingly.

3. To determine experimentally the relative value of heavier depth charges; lashing two 300-pound depth charges together is suggested as a substitute for our 600-pound depth charge.

TACTICS.

4. To mark the line on which close contact with a submarine was made by dropping a buoy and simultaneously observing the compass bearing of the submarine, and thereafter to use this line as an origin of maneuver. See rules on page 275.

5. To organize on each vessel a depth-charge crew under a depth-charge officer, and to give special attention to the training of these and to the system of signals and the doctrine governing their action. See page 278.

6. To experiment with the antennæ mine as a tactical antisubmarine mine, and to supply a part of all escort vessels with these mines as soon as developed. Large handy vessels in certain convoys to be used as tactical mine barrage vessels.

7. To continue present plans for hunting by sound with chasers and submarines; areas for the latter to be separated from other antisubmarine effort.

8. To counterattack with a large force on each occasion when a convoy is attacked, and to continue the attack with a considerable portion of the escort. Drive the submarine under, keep him under, and impose upon him the attitude of the hunted instead of the hunter.

9. To organize in each escort a regular hunting unit with definite plans of action.

10. To organize sight hunting units for operations in northern latitudes during summer and along routes between enemy bases and operating grounds.

11. To organize similar units of small vessels for narrow waters.

12. To use kite ballooons whenever possible.

13. To issue depth charges to vessels of fast convoys so that whenever the tactical situation makes the safety of the vessel lie in the turning toward the submarine it may use depth charges freely.

14. To place depth-charge throwers on transports and cargo vessels which have a suitable personnel.

15. To direct submarines to use torpedoes freely upon every profitable opportunity for attack.

INVENTIONS.

16. To develop a marker shell that can be fired at a submarine about to submerge, which, upon hitting the water, will explode and leave a small smoke producer on the surface at the point of impact is urgently needed.

17. To design depth-charge throwers so as to permit of variations of range and train.

18. To develop as soon as possible up to the point of readiness for quantity production a type of mine that does not depend in any degree for its efficiency on secrecy regarding its design.

19. To develop a torpedo-firing mechanism that will be sensitive to the presence of a vessel within 70 feet of the torpedo, and to attach this firing mechanism to all torpedoes used in antisubmarine warfare.

20. To develop a mine-firing mechanism that will be sensitive to the presence of a vessel within 100 feet of the mine, with a view to using this mechanism in antisubmarine mines.

[Extract from Memorandum No. 71, "History of Planning Section."]

This problem was undertaken by the Planning Section because we felt that antisubmarine methods and means then employed were not sufficiently effective to meet the menace against allied sea communications. The recent enemy successes on land appeared to render important a consideration of the subject. Believing that the best solution of the submarine problem was tactical, we endeavored to deduce the best tactical methods for combating submarines.

This memorandum was mimeographed and distributed to United States vessels in the war zone.

MEMORANDUM No. 42.

TESTING MINES.

30 July, 1918.

Sixteen thousand American mines have been laid in the Northern Barrage without any means of testing them as to the efficiency of their depth-taking gear. It is possible that the mine anchors are not functioning properly. It is extremely important that every possible assurance be given that the mines and mine anchors are functioning as designed.

RECOMMENDATION.

(*a*) That experiments be conducted immediately in Loch Ness with a considerable number of mines, laid as nearly as possible under service conditions, in order to check up the reliability of the depth-taking mechanism. Mines thus laid may be rendered safe by removing the K device previous to laying.

(*b*) That the surface mine barrage already laid be tested as soon as possible by running a skimming sweep, set for a depth of 10 feet, across the barrage and normal to it, in several places, so as to determine the effectiveness of the mines nearest the surface that have already been laid. Unless this is done we shall have no conclusive assurance of the effectiveness of our mining effort.

MEMORANDUM No. 42a.

NOTES ON VISIT TO FRANCE, JULY, 1918.

(By Capt. D. W. KNOX and Capt. H. E. YARNELL.)

[Data relating to quantities of materials and troops to be handled at French ports, together with data concerning port facilities, are appended.]

5 August, 1918.

BREST.

Ten thousand troops can be handled daily, and 150,000 can be quartered in the immediate vicinity; 40,000 were landed recently in 12 hours. It is understood that the United States Army will sooner or later take over the railroad from Brest, which will considerably increase its capacity. The troop capacity of Brest would appear to indicate the desirability of making it the only port for landing men; present plans contemplate landing 60 per cent there. The facilities for handling stores are greatly congested at present, and steps are under way to increase the capacity by driving piles alongside the breakwaters to add to berthing space. However, Brest will probably be a secondary port so far as the landing of supplies is concerned.

The relations between the Army and Navy are most cordial, and complete cooperation exists.

Brest is greatly congested and sanitary conditions are poor. Steps are under way to increase the water supply of the city, which will improve conditions.

The destroyers at present based on Brest are worked to the limit, and an early addition to this force seems a necessity. No more than 12 additional destroyers can be accommodated at present. By January next expected developments should provide harbor facilities and fuel for a total of about 60 destroyers. There will be storage capacity for 28,000 tons of oil by September first.

L'ORIENT.

At present there is no need for destroyers, so long as the practice of routing convoys via Brest is continued.

The convoys eventually should be routed direct to and from Loire ports, and then destroyers should be based at L'Orient.

CAPT. DUDLEY W. KNOX, U. S. N., MEMBER OF PLANNING SECTION.

About 1 October fuel tanks will be completed to provide for about 12 destroyers. Shop facilities on shore are now adequate to care for 12 to 15 destroyers. Eventually about 24 destroyers can be accommodated at L'Orient.

Gironde River.

Six destroyers are needed at once. The *Buffalo* is due to arrive August 7, when destroyers can be accommodated. By 1 October 12 destroyers will be needed, and eventually 18. Repair facilities of Bordeaux are good but expensive.

Present port facilities limit the handling of merchant ships in the district to about 180 per month. Minimum escort requirements, 6 yachts and 12 destroyers.

It is recommended that 12 destroyers be sent to the Gironde River at an early date, and convoys routed directly in and out of that district (including Bayonne). This will greatly reduce the coastal convoy requirements south of St. Nazaire and increase the efficiency of coastal escorts north of the latter port. Some vessels now employed as coastal escorts might be diverted to assist the destroyers in escorting directly in and out of this district.

Marseille.

This port was not visited, but the rapid expansion of Marseille, Toulon, and Cette as terminal ports for our Army appears to render it desirable that the force of United States destroyers at Gibraltar soon be increased materially.

Cherbourg.

It is understood that the Army may make use of Cherbourg as a landing port. Twelve destroyers could be accommodated there with present facilities.

Air Stations.

A number of the air stations along the coast were visited. Some of these are operating; others are in course of construction. The dirigible balloon station at Paimboeuf is operating. The repair base at Pauillac is well under way and will be able to handle an immense amount of work in the way of assembling, repairing, and overhauling airplanes. Forty seaplane bodies had arrived at Brest, but other necessary parts to complete the assembling were not yet to hand. The Liberty engine was pronounced by the experts at Pauillac to be a success.

The general impression gathered from the air stations along the French coast is that they will be of great service for patrol, the pro-

tection of convoys, and as training stations. An increase of these stations, however, is not considered desirable. Our main air effort should be directed toward the bombing of enemy bases and toward a patrol in waters which the submarine must use in going and returning to their bases. The northern bombing project gives great promise, is an effort along correct lines, and should have an appreciable effect as soon as it is well under way. It is our opinion that a similar project in Italy directed against the ports of Pola and Cattaro should be developed as early as practicable.

The United States bombing stations in the vicinity of Dunkirk were visited. These stations have been begun, but considerable delay is being experienced through lack of material. It is desirable that this project be speeded up, so that effective work may be done before winter weather interferes.

The regular practice of clearing the harbors of shipping whenever Ostend and Zeebrugge are bombed suggests that the cooperation of our surface craft might result in sinking enemy craft while outside the harbor.

A coastal patrol of very fast land machines 30 miles off the coast is carried out daily by British flying machines of the DH–4 and DH–9 type. These machines on their return drop their bombs on Zeebrugge or Bruges.

Sea patrol by this type of machine is made possible by the reliability of the Rolls-Royce engine with which they are equipped. They are a high-speed machine capable of fighting or carrying bombs. We are inclined to think that a land machine of this type, in which the pilot has confidence in his engine, will take the place of seaplanes for coastal patrol, especialy in areas where fighting may be expected. A seaplane is not able to compete with a land machine in fighting ability, owing to the weight devoted to the hull of the plane.

We were informed by British aviators that the gates of the Bruges Canal are heavily protected by concrete covers, and that so far all efforts to destroy them have not succeeded. Submarines are able to use both Zeebrugge and Ostend at the present time.

Our seaplane station at Dunkirk is operating a number of small French seaplanes in conjunction with French patrols over an area generaly north of the port. The type of machines limits the duration of each flight to two hours. The patrol is maintained practically constantly during daylight, and has for its object the destruction of enemy submarines.

The operations of our Dunkirk planes are handicapped by lack of information of the approach of submarines toward their operating area. British machines operating in an adjacent area receive such information. Our efficiency is reduced also by a lack of general

instructions and of operating doctrine. At present the commanding officer of our detachment has to depend solely upon his own judgment from day to day, according to the existing circumstances. On several occasions, when the Hun has been particularly active in the air, we have sent out purely offensive patrols against his aircraft.

The enemy's air activity in the Dunkirk vicinity has been irregular in both extent and character. Last spring he sent a number of his best land pilots there and operated offensively against allied aircraft. This was suddenly abandoned—probably owing to the requirements of his land operations—but we should expect a repetition of this effort whenever it will pay the enemy to try it.

At present the enemy is not seeking engagements with our aircraft in the Dunkirk vicinity. He has recently brought out a new monoplane seaplane, which is lightly armored and is fast. These are appearing in large and rapidly increasing numbers, and are operating against shipping—occasionally as far afield as the English coast. These craft are at liberty to interfere with our seaplane patrols at any time, and would be effective against us, owing to their superior speed and numbers.

An adequate reply to enemy offensive efforts against our seaplane activities in this vicinity can not be made by means of seaplanes, because the local conditions forbid the handling of large seaplanes or of great numbers of them in the harbors which are available to us. Furthermore, it would take us a long time to develop a machine capable of successfully competing with the type now in use by the enemy. A land machine with a very reliable motor is the only reply open to us. If it be of speed superior to the enemy, we need not fear superior numbers that he may possibly bring to bear. It will be necessary for us to undertake counter measure in this form should the enemy attack shipping on a large scale with his new seaplane.

As a rule, air stations are located at isolated points where little news is received. It appears important to sustain the present high morale that arrangements be made to keep them generally informed daily of the course of military and naval events.

DOVER.

In a call on Admiral Keyes at Dover he showed a chart giving the location of 22 submarines which he considers as practically certain of having been destroyed since June 1. A number of these have been visited by divers.

A searchlight patrol is now maintained on both sides of the deep mine field, and has replaced to a considerable extent the use of flares. Submarines occasionally manage to slip through the Straits, one having recently passed through the Folkestone Gate. Their passage is usually known to the authorities at Dover.

Shipping Board Ships.

It was recommended at Brest that all Shipping Board ships should be placed under the authority of the Navy Department—at least for the purpose of discipline. At present the naval commander at any of the French ports has no authority over the movements or discipline of such vessels.

Summary of Conclusions.

1. To allocate destroyers as follows at an early date:
   Brest, 12.
   Gironde River, 12.
   Gibraltar, material increases of present force.
2. No further increase in French coastal air stations.
3. Dunkirk bombing project should be speeded up, and surface craft should cooperate with it when bombing is begun.
4. Develop immediately a large Italian bombing project.
5. Our seaplane forces at Dunkirk should—
   (*a*) Receive better intelligence.
   (*b*) Be given general operational instructions.
   (*c*) Be indoctrinated.
6. We should equip Dunkirk station with fast land machines, having a very reliable motor, for use against latest type of enemy seaplane.
7. Isolated stations should be sent telegraphic news daily of current military and naval events.
8. Shipping Board ships should be placed under naval control.

Tons of freight into French ports for United States Army (exclusive of animals).

Handled in June, 1918	884,741
Expected to handle in July, 1918	691,000
Expected to handle in August, 1918	803,000
Expected to handle in September, 1918	903,000
Expected to handle in October, 1918	1,021,000
Expected to handle in November, 1918	1,131,000
Expected to handle in December, 1918	1,220,000
Expected to handle in July, 1918	2,225,000

Above is based upon probable requirements.

The Shipping Board says they can provide ships for the above amounts.

United States troops into Europe.

Landed in June, 1918	249,000
Landed in July, 1918	315,000
Monthly minimum to be landed indefinitely	200,000

CAPT. H. E. YARNELL, U. S. N., MEMBER OF PLANNING SECTION.

Number of berths at French ports for United States Army.

Port.	Berths now in use.	Probable additional by Jan. 1.	Additional projected.	Remarks.
Havre	4	2	.....	
Seine River	3	3	3	
Cherbourg	.....	.....	.....	No plans yet made. Endeavoring to avoid this port if possible, but may have to include it.
Brest	1	2	.....	10 lighter berths to be obtained. It is expected that in the future Brest will handle 60 per cent of troops landed from United States direct; St. Nazaire, 20 per cent; Bordeaux 20 per cent.
Loire River:				
St. Nazaire	14	3	.....	
Montoir	.....	16	.....	
Douges	.....	4	.....	Explosive terminal.
Nantes	12	.....	.....	
La Pallice	4	.....	.....	
Rochefort	6	2	.....	
Gironde River:				
Bordeaux	7	10	.....	Ready Aug. 15.
Pauillac	6	.....	.....	Now used only in emergency.
Talmont	.....	.....	15	Ready about July, 1919.
Bayonne	4	4	.....	
Marseille	7	4	.....	October.
Toulon	.....	4	.....	
Celle	.....	3	.....	

SUMMARY OF ABOVE BY DISTRICTS.

District.	Berths now in use.	Additional by Jan. 1.	Berths projected.	Remarks.
Channel	7	5	3	
Brest	1	2	.....	Ship.
		10	.....	Lighter.
Loire	26	23	.....	
Gironde	21	[1]10	[4]15	
	[2]6	[3]6	.....	
Mediterranean	7	11	.....	
Total	68	67	18	

[1] Aug. 15. [2] Emergency. [3] October. [4] July, 1919.

MEMORANDUM No. 43.

BRITISH ADMIRALTY MEMORANDUM — "HISTORY OF NORTHERN BARRAGE FROM ITS INCEPTION TO 28TH JULY, 1918."

21 August, 1918.

(See Map No. 1, "The North Sea.")

A copy of the British Admiralty Memorandum of August 4, 1918—"History of Northern Barrage from its Inception to 28th July, 1918"—is attached.

As this memorandum is written from the British point of view, it is suggested that a copy of it be furnished to the commander, mine force, to Operations, and to the Bureau of Ordnance, in order that the data for a similar history from the American viewpoint may be collected and sent to the force commander.

Upon receipt of this data the Planning Section will undertake to supplement the British memorandum by an American memorandum setting forth more fully the American participation in the mine barrage.

HISTORY OF NORTHERN BARRAGE FROM ITS INCEPTION TO 28TH JULY, 1918.

This history has been compiled from papers supplied by M. Branch and others in possession of the Plans Division. It is believed that the most important details are included herein, but this history can not be considered absolutely complete in every particular. The references in the left margin refer to the various sources of information mentioned above—P. D. C. I. signifying the Plans Division Card Index Docket, kept in Room 26, Block II.

(P. D. C. I. 62.) 2. Toward the end of August, 1917, Commander (Acting Captain) Alan M. Yeats-Brown, D. S. O., R. N., after having made various proposals during the preceding two months with regard to antisubmarine measures, produced a paper entitled "Antisubmarine Mining Proposals." This paper was referred to O. D. Section XVI, which developed subsequently into the Plans Division. O. D. XVI had already been considering these matters for some time, and after consulting with Captain Yeats-Brown on several points which he had brought forward, suggested certain modifications to

the proposals and wrote an appreciation on Captain Yeats-Brown's paper. The conclusions arrived at were brought up for discussion at the next allied naval conference by the First Sea Lord, who, it is believed, had previously discussed the matter with Admiral Mayo, of United States Navy.

(M. 012845.) 3. On 4th–5th September, 1917, at an allied naval conference, Admiral Jellicoe put forward the suggestion of laying "an efficient mine barrage, so as to completely shut in the North Sea."

He computed that 100,000 mines would be required. He remarked:

(*a*) I do not think we get many German submarines by mines.

(*b*) It appears that the result of our mine fields (in the Bight) is to force the submarines, or a very large proportion, to go in and out of the German bases through territorial waters or Dutch territorial waters.

(*c*) There is the alternative of laying a mine field in the North Sea in a position where the enemy sweepers can not reach without running very considerable risk. In view of our present experience I do not think that would have much more result than our present policy; but if a mine is produced which is more effective against submarines than our own mines, the matter, perhaps, becomes somewhat different. * * * We get our mines slowly. Our problem is, then: Is it better to put them down as we get them, or is it better to wait until we get a very large number and lay a complete barrage across the North Sea? * * * It is obvious a mine field so laid would have to be at some considerable distance from German ports, because it would require to be watched. * * * A great deal depends upon whether the mine is a satisfactory one. If we get a satisfactory mine, it might be worth while laying a barrage when we get a sufficient number.

Admiral Mayo approved the idea of a mine barrage involving patrol by the Allied Fleet, provided always that we had confidence in the efficiency of the mine which would be laid. He thought that this promised really more in the way of results than the proposed operations in regard to the convoy of ships.

Vice Admiral Sims said:

It must be successful completely or it is not successful at all. Either the barrage is successful absolutely or it fails absolutely.

Sir Eric Geddes said:

I do not understand from the remarks of the First Sea Lord that the barrage should take the place of other offensive measures. It is not considered that the barrage can be sufficiently relied upon to take the place entirely of other measures for hunting and destroying submarines.

P. D. C. I. 65/0. 4. On 14–9–17 O. D. Section XVI, by directions of C. N. S., produced a paper for Admiral Mayo, of the United States Navy, entitled "General Future Policy, Including Future Mining Policy," with appendix, "Mine Barrage Across the North Sea."

EXTRACTS FROM THIS PAPER.

The enemy submarine campaign now dominates and overshadows every other consideration, and any increase in the present rate of sinking might bring about an unsatisfactory peace.

* * * It therefore appears that our future policy must be directed toward a more concentrated and effective control in the areas between the enemy's ports and our trade routes.

Some form of barrage corresponding to that which was formerly established by the battle fleet * * * must be reconstituted in such a form that the enemy submarines can not venture into it without considerable risk to themselves.

Broadly speaking four forms of barrage may be considered:

Firstly. A barrage of mines only.

Secondly. A combination of deep mines with surface and aircraft.

Thirdly. Surface and aircraft patrolling a wide belt * * *.

Fourthly. Sealing the submarine exits.

The fourth form of barrage * * * is the only radical cure * * * but the difficulties * * * are so great that it is not recommended to attempt it.

It is therefore proposed to use a combination of the first three.

* * * The enemy submarines would thus be subject when on the surface to attack of one kind or another from shortly after leaving their bases until they cleared the Orkney-Shetland-Norway line, in addition to passing through a mine barrage * * *.

The paper also dealt with the Protection of the Barrage, remarking—

* * * With our fleet based on Rosyth, we should be in a position to insure protection even to the area between the notified area and the Norwegian coast.

The use of neutral waters by enemy submarines was also dealt with—

* * * This can only be overcome by converting the neutral into an ally or by ourselves preventing the enemy submarines from using these waters * * *. Should Norway come in on our side, Stavanger * * * could be used as a base for a fleet or for the light watching forces as desired. Should, however, the general situation render it undesirable to include Norway among the Allies, any development of the Selective type mine would enable us to deal with the passage * * *.

The appendix dealt with the details of the mine barrage which it was proposed to establish on the Aberdeen-Ekersund line.

As a result of this paper, it was decided to proceed with preparations for laying a barrage on the Aberdeen-Norway line.

The date of this decision is not known.

P. D. C. I. 65/1. 5. On 18–9–17 O. D. Section XVI produced a paper on the Aberdeen-Ekersund barrage.

The following points were considered:

Reasons for shape of notified area—no clue to existence of deep mine fields on flanks.

Reasons for depth of area—

(*a*) Small indication of positions of deep mine fields on flanks.

(*b*) Battery exhaustion resulting from diving throughout the passage of the area.

(*c*) Chances of extension without further notification.

Southern half of notified area to have "surface mines." Northern half of notified area to have "deep mines." Comparison of H. 2., E. C., and American mines.

Recommendation to use latter.

Northern half of notified area presumably not to be mined unless it was found that submarines were passing through it.

Flank deep mine fields to be northward of surface mines in central area, so as to allow vessels patrolling former to work close up to latter.

Notify central area (A) only.

Western deep mine area—B.

Eastern deep mine area—C and D.

Area B.—Proposed to lay deep mines in echelon formation over a belt 20 miles wide. Fixed moorings—advantageous from manufacturing point of view—would require careful selection of positions. Special chart being prepared.

Area D.—Fixed moorings proposed.

Mines required.—112,500 British; 54,000 American.

Time required.—Seven months.

Forecast of mines available made on assumption that no more H. mines will be laid except for an operation already approved and for Dover.

This paper was sent to C-in-C.

P. D. C. I. 65/14. 6. On 25-2-17 C-in-C replied.

He understood that no T. B. D's would be supplied by Grand Fleet. He suggested moving Areas C and D 26 miles to northward, to increase their distance from enemy bases. No objection seen to basing Grand Fleet at Rosyth. No difficulty anticipated in providing supports for patrol flotillas, but more detailed consideration would be necessary. It would be necessary to prevent submarines passing through Norwegian waters.

P. D. C. I. 65/2. 7. On 8-10-17 Plans Division produced a paper entitled "Patrol of the North Sea in combination with Aberdeen-Norway barrage."

"Remarks on air questions" were attached. This paper included remarks on the following points:

Principles on which patrols are arranged:

Patrol deep fields sufficiently to force submarines to dive.

Patrol a belt 100 miles in depth. Hydrophones, depth charges. H. S. sweep. Air patrol whenever possible.

Submarine patrols north and south of other patrols.

Sweep areas south of barrage to catch damaged submarines.

Each square to have one fast vessel capable of making submarine dive.

Division into areas and squares:

Each square 30 miles each way, except near deep mines, where they are 20 miles each way, so as to have some intensive patrol. Squares near coast of Norway to be smaller. Patrol chart required, marking limits of areas by buoys.

Numbers and types of vessels required in each area:

Area A.—No surface vessels possible, owing to surface mines. Aircraft proposed, two to three airships during daylight when weather permits.

Areas I–V.—Proposed method of using surface patrols and aircraft.

Area V.—T. B. D's only, as desired by C-in-C G. F.

Method of use and relief—fish hydrophones.

Possibility of attack from Bight and of intercepting attacking vessels.

Intereception simple if intelligence of enemy sailing is received.

Courses open to us: Air patrol—nil unless Norway enters war. Escort of T. B. D's from bases.

Fair Island Channel.—Proposed to use S. S. airships from Scapa.

Invergordon for assembly of American mines. Rosyth for British mines.

AIR QUESTIONS.

(Quoted M. 05415.) Approval for large America stations at Lerwick and Orkneys, dated May, 1917.

(Quoted M. 09688.) Proposals for additional station at Strathbeg now before board. Proposals for land bombers at Peterhead, Orkneys, and Shetlands now before the board. Station originally approved for South Shields proved unsuitable and has been transferred to Dundee.

(Quoted M. 011999.) Proposed to provide extra sheds in Orkneys, Peterhead, and Lerwick for kite balloons.

Airships.—N. S. type most suitable for Area A; 12 should be delivered by April, 1918. Estimation of results of program.

Aircraft.—Present position. General remarks. Use of Norway. The fate of this paper is not recorded.

(P. D. C. I. 65/3.) 8. On 10–10–17 Plans Division produced a paper entitled "P. D. 5. Laying of Northern Barrage."

(M. 013473.) This dealt with—

Number of mines required in Areas B and C. Estimated rate of production of H. mines. Types of mines and sinkers proposed

for the various depths. Arrangements for laying the mines. American mines.

Decisions on 16 points were asked for. These points covered the distance apart of mines, order of laying, patterns of mines and sinkers, reserve of mines, use of Firth of Forth as a mining base, provision of mine layers, appointments of officers.

On 17–10–17 extracts (and decisions) from above paper were sent to C-in-C G. F.

On 21–10–17 C-in-C asked for a tracing of projected Northern Barrage. Tracing was sent on 24–10–17.

(P. D. C. I. 65/4.) 9. On 13–10–17 Plans Division produced a paper entitled "P. D. 8. Rate of Production of American Mines."

Points dealt with:

American mine output asked for 3,625 per week.

How figures were arrived at.

Additional mine layers required.

Three lines instead of two required in each system, owing to failure of lower antennæ.

Understood that total number asked for is 100,000.

If mine layers are provided the three systems could be laid in a little over three months.

(There is no record in P. D. or in M. as to the fate of this paper.)

(P. D. C. I. 65/6.) 10. On 30–10–17 a conference was held on "Bases for Northern Barrage."

(M. 014018/17.) This conference chiefly considered railway and harbor facilities.

A copy of the report was sent to C-in-C G. F.

(P. D. C. I. 65/8.) 11. On 23–11–17 Plans Division produced a paper entitled "P. D. 88. Support of the Patrol Vessels Working on the Eastern End of Northern Barrage."

Points dealt with:

Necessity of obtaining information of enemy movements.

Possibility of utilizing agents in Sound and Belts.

Submarine outposts for use with hydrophones.

Information requested re hydrophone efficiency.

As a result of this paper, Captain S. made a report on the efficiency of hydrophones in submarines. C-in-C. G. F. also made a report in M. 017070. D. P. (M. 016845) then suggested that submarines should be utilized on probable enemy tracks forthwith (dated 16–12–17) and that steps should be taken to increase efficiency. Harwich and C-in-C G. F. were then ordered to utilize submarines as suggested. (M. 016845 to C-in-C dated 26–12–17.)

D. I. D. was instructed (M. 016146/17 of 2–12–17) to arrange for agents in Baltic entrances.

(P. D. C. I. 65/19.) On 27–11–17 Plans Division produced a paper entitled "P. D. 92. Provision of Light Buoys for Northern Barrage."

(No points of special interest for historical purposes.)

(M. 016119.) 12. On 28–11–17 C-in-C replied to Admiralty re details of barrage. (Letter No. 2948 H. F. 0044 of 28–11–17 in reply to A. L. M. 015215 of 15–11–17.)

No record of this letter has been found, but he gave his opinion that "unless Stavanger is used as a base (*a*) the patrol on the Norwegian coast will be continually below strength, due to weather and other causes, and (*b*) that adequate support can not be arranged."

P. D. C. I. 65/11. 13. On 29–11–17 Plans Division produced a paper entitled "P. D. 013. Proposed Date for American Mine Laying Operations."

EXTRACTS.

From information given to the Planning Division by Admiral (M) it does not seem probable that the Invergordon base will be sufficiently advanced to enable mine laying to commence much before April 1.

* * * It would appear desirable to commence the laying of the American mines at such a date that one complete system will be laid by 1st May.

(NOTE.—1st May was submitted in M. 015215 as the date for the patrol of the barrage to commence.)

(M. 016091.) This was approved, dated 29–11–17.

(P. D. C. I. 65/10.) 14. On 4–12–17 Plans produced a paper entitled "P. D. 102. Alternative Position for Northern Mine Barrage."

Summary:

Quotes C-in-C's letter No. 2948 H. F. 0044 of 28th November, in reply to A. L. M. 015215 of 15th November. Remarks on difficulty of patrolling barrage and of supporting patrols if a base in Norway is not available.

Chances of obtaining a base in Norway unfavorable at present, so alternative position for barrage worked out on Orkney-Bergen line. Proposed alteration should not delay barrage. Material unaltered. Total distance to be mined 240 instead of 260.

Reasons for selection of Orkney-Bergen line. Tide in Fair Island Channel precludes mining, thus Shetlands-Norway line is no good. Question also of Norway trade being north of barrage. Area C moved 100′ farther north—necessity for support thus reduced.

Eastern extremity rest on coast with outlying dangers.

Several other arguments re advantages and disadvantages.

On 6–12–17 Admiralty wrote C-in-C in accordance with above:

The mine barrage is of no value unless the deep portions are patrolled, and the patrols must be adequately supported to be effective. * * * Originally

It was considered that fish hydrophones could be used by destroyers working singly, but it is now open to question whether this would be feasible.

The provision of the 42 destroyers for the patrol of the eastern area would also prove extremely difficult without assistance from the Grand Fleet.

The chances of obtaining a base in Norway do not appear very promising * * *. An alternative position for the barrage has been worked out. (See chart and memorandum attached.)

The material will be equally suitable for the new line.

The proposed alteration should not delay completion.

* * * request that you will telegraph whether you are in general agreement and forward your observations * * * at an early date.

Admiralty also informed Admiral Sims on 6–12–17 to same effect. On 9–12–17 Admiralty informed Admiral Sims that the new proposals would modify the gear for American mines. (This further letter was sent as a result of D. T. M.'s minute, dated 8–12–17, in M. 016119.)

(P. D. C. I. 65/12.) 15. On 10–12–17 Plans Division produced a paper entitled "P. D. 023. Dates for Establishment of Bases and Commencement of Mine Laying."

Points dealt with:

All dates of various phases.

Commence laying Area A on 1st April, 1918.

One system of Area A to be completel by 1st May, 1918.

(P. D. C. I. 65/13. 16. On 11–12–17 Plans Division produced a paper entitled "P. D. 024. Congestion of Mining Stores."

Summary:

Chief cause is delay in assembly of mine parts.

Suggests methods of relieving congestion. Proposals approved on 14–12–17.

(M. 016723.) 17. On 14–12–17 Admiralty wired C-in-C: "It is hoped to commence laying the Northern Barrage about 10th January." This wire also asked for the loan of various light cruisers. This was sent after the receipt of a letter, dated 10–12–17, from R. A. (M), asking for names of mine layers. Also after a minute by Captain Pound to the effect that the original intention was to commence in December * * * but one ship had fallen out till about 1st March, and another was employed at Dover. Suggested asking C-in-C if certain light cruisers would be available.

On 23–12–17 C-in-C sent reply that availability depended on enemy movements in North Sea, but that every endeavor would be made as requested.

On 26–12–17 R. A. (M) wrote:

Owing to delay in output in any quantity of the deep safety switches for H. II mines, it is not considered probable that laying System I of Area B can commence much before February 1.

On 29–12–17 D. C. N. S. wrote a minute to the effect that *London* can be fitted to carry 234 mines. Such fitting out of *London* was approved by First Sea Lord on 1–1–18.

(M. 040.) 19. On 31–12–17 R. A. (M) reported to Admiralty:

It was stated at a meeting presided over by D. T. M. that the necessary Mk. II sinkers required for the two deeper lines in the first system of Area B would not be available till late in April, 1918.

Admiralty replied later (23–1–18) that this delay was not of great importance, provided that it did not extend beyond 1st May. This reply was based on remarks of D. P. dated 2–1–18 (vide P. D. C. I. 65–7).

(P. D. C. I. 65–20.) 19. On 2–1–18 the Operations Committee laid down in paragraph 31:

* * * In view of all the circumstances, it was recognized that the preparations for the laying of the Northern Barrage would have to be proceeded with on the assumption that no Norwegian base is likely to be available.

(M. 0917.) This decision was arrived at after correspondence had taken place with our diplomatic members in Norway (vide P. D. C. I. 65–19 and M. 0917).

(M. 0917; P. D. C. I. 65–21.) 20. On 7–1–18 Plans Division produced a paper entitled "P. D. 1006. Northern Barrage—Points for Decision."

Summary:

Summarises communications resulting from alteration in position of barrage, mentioning United States objection to alterations unless for fundamental reasons, the reply from Admiralty to United States, and observations by C-in-C (M. 017180) resulting from a conference on the proposed alterations.

C-in-C wished western end of American mines moved farther south to cover Fair Island Passage. Admiralty concurred.

Decision requested as to laying deep mines right up to Norwegian coast. Included with this paper were remarks of United States Plans Division and reply by British P. D.

The chief American criticisms were:

(*a*) Undesirable that barrage should extend from island to island, instead of from mainland to mainland as originally intended.

(*b*) Barrage not complete in a vertical plane in Areas B and C.

(*c*) Barrage not deep enough.

(*d*) Pentland Firth is open.

(*e*) Open passage left to eastward of Orkneys.

(*f*) Patrol vessels on surface not sufficiently effective.

(*g*) Absence of deep mine fields on Norwegian coast.

The British P. D. replied to these criticisms as follows:

The stopping power of the mine barrage should not be overrated. It is the patrol craft, armed with various antisubmarine devices, on

which we must rely actually to kill the submarines. It is on the mine field that we rely to give us intensity of patrol. Until we have proved the efficiency of the American mine field, we must look upon it as a bluff. We must not attempt to put the bluff too high by notifying an area up to the 3-mile limit of Norway. The navigation of the Pentland Firth by submerged submarines is considered impracticable. As it is on the patrol craft we rely to destroy the submarines, it is not considered that leaving the approach to the Pentland Firth uncovered is of vital importance. It is clearly recognized, however, that once the barrage has one or more systems completed right across, our subsequent mine laying must be adjusted to meet any new enemy tactics.

C. N. S. wrote a minute:

Arrangements are to be made for continuing the eastern Area C up to the surface with British mines after two systems of Areas B and C have been completed.

Also, to make the surface barrage in Area C more complete, the American Navy should be asked to provide mines and long moorings for two lines of mines in that area.

The possibility of having to lay mines in Areas B and C at greater depths than 200 feet should also be prepared for.

Question of date of proclamation will be raised again on 14th February.

(P. D. C. I. 65–22.) 21. On 7–1–18 D. P. requested, on P. D. 1005, and D. C. N. S. approved, that a conference should be held to consider details in connection with the patrol of the Northern Barrage.

(P. D. C. I. 65–23.) 22. On 7–1–18 D. P. requested, on P. D. 034, information from D. T. M. concerning maximum length of mooring rope required for mining Area C with surface mines in case the necessity arose.

(M. 0890.) 23. Proposed program for laying Area B. On 9–1–18 R. A. (M) informed Admiralty (letter No. 0014–3) that 4,000 H. 2 mines would be available for laying in period 30th January–28th February, and asked for mine layers to be sent, etc.

Admiralty informed C-in-C that date for commencement of operations on Northern Barrage should be considered as 30–1–18.

(P. D. C. I. 65–25.) 24. On 12–1–18 Plans Division produced "P. D. 037. Requirements of the Northern Barrage Patrol Craft." This paper put forward the results of the conference asked for by P. D. 1005 on 7–1–18. The points dealt with mainly concerned bases, depots, depot ships, administrative personnel, and system of communication.

(P. D. C. I. 65–27.) 25. On 18–1–18 United States force commander produced a paper reviewing the proposals regarding the Northern Barrage. To this paper was attached the criticism of the British proposals by the United States Plans Division.

(M. 01457.) 26. On 23–1–18 United States force commander wrote to Admiralty:

It is not expected that United States mine layers will arrive by March 15, but that they will arrive soon enough thereafter as to keep to program for beginning and completing one system of Area A.

(M. 01529.) 27. On 25–1–18 United States force commander wrote to Admiralty:

* * * too late to modify characteristics for Area A without causing delay and confusion.

Also mentions British acceptance of principle of extension of surface fields through Areas B and C owing to patrols proving ineffective. Asks for maximum current in Area B.

Reply: Not over 1 knot.

(M. 0890.) 28. On 31–1–18 R. A. (M) informed Admiralty by wire:

Owing to delay in testing type II deep switches anticipate operations can not be commenced before 7 or 8 February or possibly later.

Admiralty replied on 2–2–18:

In view of test pots sent on 29–1–18, operations should proceed as arranged.

(P. D. C. I. 248.) 29. On 11–2–18 Plans Division produced "P. D. 049. The Antisubmarine Campaign in 1918." This paper discussed the general situation. Decisions on 7 points were asked for. These points were as follows:

1. Is the 1918 antisubmarine campaign to be directed mainly toward obtaining a control of the North Sea exits?

2. If so, is a base in Norwegian waters necessary for the support of the patrols in Area C of the barrage?

3. If it is not necessary, how are the patrols to be supported?

4. If it is decided that a base is necessary, what is to be the size and nature of the detachment and where is it to be based?

5. What are to be the functions of the Grand Fleet in the 1918 antisubmarine campaign?

6. If its correct functions are those suggested in this paper, is the control of the southern area to be strengthened by a modern battle squadron in the Swin, etc.?

7. If it is decided to seize an anchorage in Norwegian waters, when is it to be done, what procedure is to be followed, and what excuses are to be made?

This paper was not commented on.

(M. 02251.) 30. On 13–2–18 United States force commander to admiralty:

On account of delay in conversion of mine layers, they will probably arrive May 1st.

(M. 02324.) 31. On 15–2–18 United States force commander to Admiralty:

First full shipment 2 steamers 2,000 mines each 6th March.

32. From 2–3–18 to 22–3–18 the laying of deep mines in Area B took place. On 22–3–18 *Gaillardia* was blown up and further work in Area B was stopped pending investigation.

On 31–3–18 C-in-C wired:

* * * The chief point to settle is, are these mines safe within 45 feet of surface? Unless this can be guaranteed, the policy of laying mines in vicinity of principal fleet base is wrong.

(P. D. C. I. 65–29.) 33. On 17–4–18 Plans Division produced "British Reasons for Only Proclaiming an Area to the Eastward of 2° E." This paper proposed that the efficiency of the eastern mine fields should first be established before mining to the westward and before laying further deep mines in Area B.

(No indication as to whether this paper was sent in or not.)

(M. 04047.) 34. On 19–4–18 Plans Division produced a paper entitled "P. D. 1128. Decisions Regarding the Northern Barrage." This paper stated limits of notified area, with a proposal that it should come into operation at the same time as an effective patrol can be established in the neighborhood of the Fair Island Channel—i. e., May 15.

Also proposals as to mining of Areas A, B, and C. These latter included: (*a*) The Americans to lay two lines of surface mines in Area C as soon as possible after the arrival of their minelayers. (*b*) The question of laying deep mines with fixed mooring in Area B to be reconsidered.

Notification of area approved. Notice to Mariners, dated 26th April. Notice issued to neutral representatives on 27th April. Notice issued to the press 1st May, 1918.

(M. 04047.) 35. On 24–4–18 Admiralty informed C-in-C and R. A. (M) as to decisions reached substantially in accordance with P. D. 1128, including the fact that the Americans would first lay surface mines in Area C. Also as follows:

Area B is shown in the position originally approved, though it is not at present proposed to lay any more mines in that area.

(M. 04474.) 36. On 7–5–18 United States force commander wrote Admiralty: With reference to the statement that—

it is not at present proposed to lay any more mines in Area B, inasmuch as the deep mining of Area B is an essential portion of the whole project, without which the value of the remainder of the mining would be questionable, information is desired as to the Admiralty's intentions regarding the mining of the Area in question.

This letter also stated that owing to the sequence of shipment of mining material it will be necessary to commence on Area A and to mine Area C subsequently.

On 10–2–18 Admiralty replied to United States as follows: It was hoped that the deep and surface fields in Areas A and C would force submarines to use the Fair Island Channel, which is in close proximity to the bases from which the hunting craft work. The deep mine field in Area B can have no effect in restricting the areas through which the submarines can pass, and should not therefore be considered an essential part of the scheme. The Admiralty are, however, fully aware of the desirability of laying deep mines in Area B to assist the patrol craft to destroy submarines, but defects in depth taking of British mines preclude laying at the present time, and the first necessity is to render Areas A and C so dangerous that the enemy will avoid them.

(M. 04796.) 37. On 16–5–18 the Norwegian Government called the attention of our Foreign Office to the fact that the northeast corner of the notified area (position 6) fell slightly within the 3-mile limit. This was confirmed by hydrographer, and Norwegian Government were informed that the mistake had arisen through inadvertence. A new Notice to Mariners (651–1916) was issued on 27th May, amending position (6) accordingly.

(P. D. C. I. 65–31.) 38. On 8–6–18 the American carried out their first excursion in Area A. About 3 per cent exploded shortly after laying.

(P. D. C. I. 65–30.) 39. On 11–6–18 the United States Plans Division produced "Memorandum No. 35. Northern Mine Barrage—Area A." This paper mentions the probability that submarines would pass through Area A on the surface because no patrol vessels would be sighted. Proposed that there should be two complete systems and a third surface system of three parallel rows of mines with 45-foot antennæ.

(No record of any comment or action on this paper.)

(P. D. C. I. 65–34.) 40. On 11–7–18 C-in-C wired:

695. After consultation with First Sea Lord, it has been decided that mines in Area A, Northern Barrage, are not to be laid west of meridian of Greenwich for the present. This will allow a clear passage some 25 miles wide for supporting forces to Scandinavian convoy.

(M. 021742.) 41. On 13–7–18 C-in-C wired to Admiralty (726) to the effect that he considered American mines laid at 80 feet to be quite useless as a surface mine field, and considered excursion planned for morrow, to lay others at 65 feet, should be postponed or depth should be adjusted.

Admiralty replied that they considered mines should be laid as arranged and that the laying of mines at less depth in future was under consideration.

(M. 021742; P. D. C. I. 65–33.) 42. On 15–7–18 C-in-C wrote (1935 H. F. 0044) in amplification of his telegram (726 of 13–7–18) that the depth of the mines prevents any successful results—other than moral effect—from being attained. Paragraph 3 read as follows:

I am strongly of opinion that these factors should have been given full consideration prior to the commencement of laying the United States system of mines—no details of which have been furnished to me—and it is disconcerting to learn that only now, after completion of three operations of considerable magnitude, is it under consideration to lay the mines at a less depth in future. As a result of this lack of forethought, destruction of enemy submarines passing on the surface is not being achieved and, on the other hand, we have curtailed the sea room available to, and the consequent free movement of, our own surface vessels.

He added that—

The only remedy is to lay further mine fields in Area A at such a depth as will render the destruction of enemy submarines passing on the surface highly probable.

On 25–7–18 Admiralty replied that data, which were not available when American mine field was planned, show that a mine can only be considered as destructive if exploded within 15 feet of the hull. To make barrage completely effective would require double the quantity of mines and double the time to complete. It is proposed to shorten the antennæ to 35 feet in future mines for surface use, and lengthen those for deeper mines to bridge the gap. It is remarked that submarines are avoiding the proclaimed area and therefore that the latter has been effective heretofore. Should evidence be forthcoming that submarines pass through Area A, two or more lines of British mines at 10 feet will be laid. This will take a month, and the life of the mines will be short.

To this docket (M. 021742) on 28–7–18 D. C. N. S. attached a minute for D. P. as follows:

No further action is required at present on these papers, but they should be brought up again when we make and communicate the decision as to mining Area B. Present decision is to sweep Area B; complete mining of Area A to 1° W.; consider thorough mining of Area B to Orkneys, deep and shallow; press Norwegian Government to maintain their decree.

(P. D. C. I. 65–32.) 43. On 20–7–18 Plans Division produced a paper entitled "P, D. 095. Northern Barrage—Area C." This paper suggested extension of notified area and mine field to southeastward up to the 3-mile limit off Syre Naes, Karmo. A further paper was mentioned as being in course of preparation.

MEMORANDUM No. 44.

ENEMY RAIDERS.

6 August, 1918.

The increasing importance of American military effort in Europe makes it imperative that every effort be made to guard the trans-Atlantic communication of our armies. This duty is now more acutely felt than at any previous stage of the war, because of the large number of American troops constantly at sea.

It is very necessary not only that proper steps be taken but that responsibility for procrastination or failure to take proper steps shall be definitely fixed as between nations by suitable record. The spoken word may be forgotten or denied. The Northern Barrage has been under discussion with the British Admiralty for some time as a barrage against submarines. With the lengthening nights its value as an antiraider measure will be very great.

We recommend that a letter in the sense of the following be addressed to the British Admiralty:

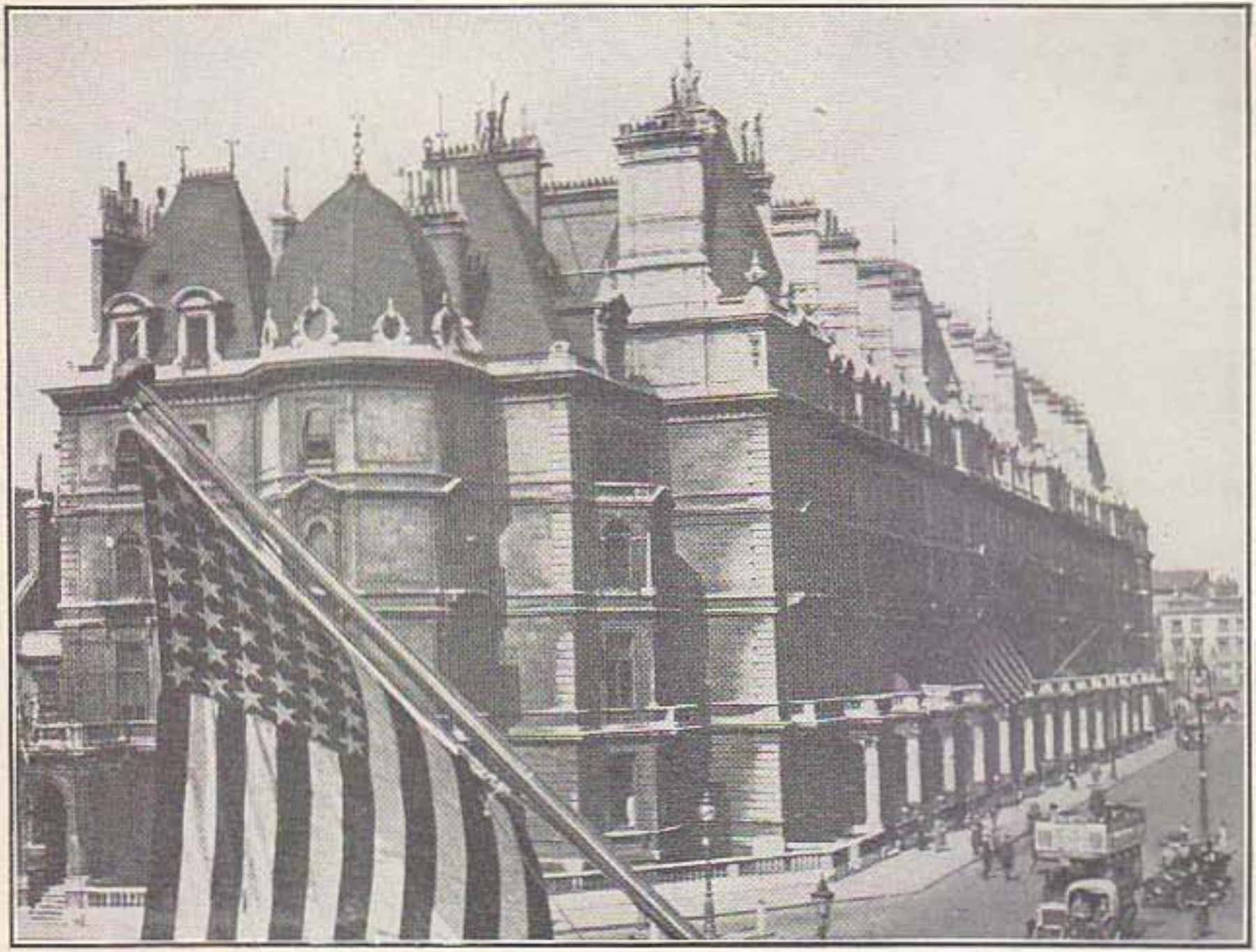
The Navy Department is apprehensive of the escape of an enemy raiding force into the Atlantic to prey on convoys. It desires to station battleship escorts for troop convoys and important cargo convoys in readiness to assist in bringing them safely to port. It proposes to station some battleships in European waters for escort duty. The efficiency of the arrangement depends largely on timely information. If the first news of a raider is the news of her attack on a convoy, the measures in reply can not be so effective as they would have been had the raider been detected while still in the North Sea.

In support of the intention of the Navy Department, I propose that the Northern Barrage be completed from coast to coast immediately and to the surface, with the double object of—

1. Barring raiders and submarines.
2. Compelling enemy sweeping operations in front of raiders, so that they will be delayed, and consequently more exposed to discovery if they attempt to escape.

I urge the importance of completing the barrage as proposed now, before bad weather sets in.

I urge an early reply stating the Admiralty's intentions, so that I may communicate the same to my Government.



U. S. NAVAL HEADQUARTERS, 30 GROSVENOR GARDENS, LONDON, ENGLAND.

MEMORANDUM No. 45.

ORGANIZATION OF A PLANS DIVISION FOR NAVY DEPARTMENT.

10 August, 1918.

PROBLEM.

Submit reply to the following cablegram:

8760. In view of the experience of your Planning Department in war zone, submit outline of organization they would recommend, together with a list of general subjects to be handled, keeping in mind both the present and future.

The above-quoted cablegram has been interpreted to mean:

In view of the experiences of your Planning Section in the war zone, submit an outline of an organization of a Plans Division for the Navy Department, together with a list of problems which you consider it important that they should take up in order to cover the present war-time conditions and postwar conditions.

METHODS OF PLANNING SECTION, UNITED STATES NAVAL FORCES OPERATING IN EUROPEAN WATERS.

The experiences of the Planning Section in the war zone have not furnished any special basis for recommendations concerning the organization of a Plans Division in the Navy Department. The recommendations that follow are based on general knowledge and experience, rather than on specific experiences in the war zone.

The Planning Section of the commander United States naval forces in European waters has consisted, since its organization in January, 1918, of three captains, United States Navy, and, more recently, of one lieutenant colonel, United States Marine Corps. The chief of staff has been exofficio head of the Planning Section, but has necessarily confined his participation in the operations of the Planning Section to a review of its completed work, supplemented by frequent discussions of important subjects with individual members, with the section as a whole, and with the vice admiral commanding.

When the Planning Section was organized but one rule was laid down for its guidance, viz: "Neither the Planning Section nor any member thereof is to engage in any administrative work whatever."

This rule has been of the greatest value in permitting the section to concentrate its energies on its special mission.

There has been no internal organization of the Planning Section. The several members have each participated in the formulation of problems. Once a problem is decided upon, each member of the section prepares an independent solution, but free discussion proceeds coincidently with the progress of individual solutions. As each solution is completed, it is turned in to the senior member. When all solutions are completed, all members study all solutions. Points of difference are thrashed out in discussion until there is unanimity of opinion. One member is then detailed to prepare a joint solution that shall embody in acceptable manner the best thought of all solutions presented.

The joint solution of each problem is presented as a tentative solution to the chief of staff, who reviews it, discusses it as necessary, and finally presents it to the vice admiral for his approval, subject to such modification as he may deem appropriate. Material modification of solutions is rare.

In the course of solutions or in the preparation for solution of problems the Intelligence Section assembles whatever data are necessary and presents them in the desired form. The assistance of the Intelligence Section is given heartily and fully and is, of course, essential to a proper treatment of the problem.

During the progress of problem solving, members of the Planning Section avail themselves of opportunities to consult with officers of special experience in the matters being considered.

Copies of accepted solutions of problems are sent to the Navy Department and are given to the Plans Division of the Admiralty. A new departure is to send copies of solutions to flag officers in the war zone and to the commander in chief.

British Admiralty Plans Division.

This problem as presented by the Navy Department was submitted to the British Admiralty Plans Division for an expression of their opinion, having in view their own experience to date. The following is their reply:

OUTLINE FOR AN ORGANIZATION FOR A PLANS DIVISION.

1. Experience in all branches of public affairs and private business has demonstrated clearly the need for separation between the functions of defining and establishing a general policy, which relates to the end, and the conduct of affairs, which relates to the means of attaining the end. Persons immersed in the current business of any

office are unable to look ahead sufficiently to form a comprehensive view in which the end is clearly seen, and to frame a broad policy. The result of this, in war, is that strategy tends to become localized and to take a defensive form.

2. In consequence of this tendency, a Plans Division, free from routine and current work, is a necessity in any organization dealing with war, and should embrace two sides of naval thought:

(i) That of policy, which includes the preparation of plans.

(ii) That of matériel, which provides for the development and utilization of matériel in accordance with the policy.

3. In both of these functions the Plans Division should constitute, in practice, the special staff of the Chief of the Naval Staff. Its head should be in the closest relation with him, and fully acquainted with the political, naval, and military situation, as well as with the intentions of the ministry concerning future events. This can only be obtained if the head of Plans enjoys the full confidence of the C. N. S., and works directly under him.

4. Similarly, the head of a Plans Division must be in intimate touch with the divisions conducting intelligence and current operations, and with the departments of supply. If close cooperation is not insured, plans may be prepared which take insufficient account of forces available and of existing conditions, and the forces required may be otherwise employed at the critical moment; or a full use may not be made of improvements in matériel, or matériel itself may not be developed in the direction required for war. In this connection it will be found profitable for the Plans Division to promulgate a weekly report to the Intelligence and Operations Divisions, stating the work they have completed or still have in hand.

5. The preparation of adequate plans involves the cooperation of expert officers of more than one branch, but this preparation should not in most cases be carried beyond a certain point; all experience of war has shown that the details must be worked out by those officers who are to have charge of the execution.

6. The policy side of the Plans Division deals inter alia with the following subjects:

(*a*) General naval policy.
(*b*) Mining policy.
(*c*) Peace policy.
(*d*) Strategy and tactics—in which is included distribution of force, operation in all waters, attack and defense of trade, combined operations, and invasion.
(*e*) Antisubmarine operations.
(*f*) Antisubmarine mining.

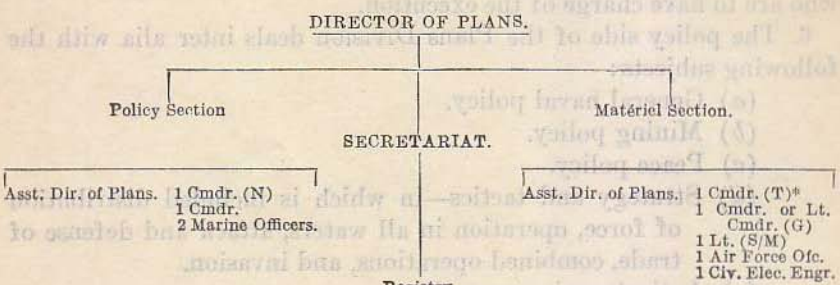
(*g*) Air.
(*h*) Neutrals.
(*i*) Law.

7. The matériel side of the Plans Division deals inter alia with the following subjects:

(*a*) Design of all new vessels, so far as seeing that their armament, speed, etc., are such that they are the best for the purpose for which they are to be used, according to the approved policy.
(*b*) Proposals for numbers and types of new or repeat vessels.
(*c*) Proposals for scrapping old and useless vessels.
(*d*) Proposals for new uses of existing vessels, to increase the fighting efficiency of the fleet.
(*e*) Examination of proposals for types of aircraft, in order to judge of their suitability for proposed operations.
(*f*) Examination of types of mines, sumbarine sweeps, etc., in order to judge of their suitability for proposed operations.
(*g*) Urgency of production, e. g., to watch the rate of production of vessels for use in approved plans.
(*h*) Torpedoes, allocation and new designs.
(*i*) Consideration of proposals for use of new weapons, and advice on what lines they should be developed.
(*j*) General requirements of matériel for combined operations.
(*k*) Review of annual program.

8. An integral part of the Plans Division should be the secretariat, a body organized to do the work of a secretary. Its work will include summarizing and keeping a historical record of past operations, filing of intelligence from an operational standpoint, and promulgation of information throughout the Plans Division.

ORGANIZATION OF A PLANS DIVISION.



*With mining, torpedo, and electrical experience.

[Admiralty Plans Division, 8 August, 1918.]

PROPOSED ORGANIZATION OF NAVY DEPARTMENT PLANNING SECTION.

[By American Planning Section.]

PLACE IN ORGANIZATION OF NAVY DEPARTMENT.

The Planning Section should be a section of the Office of Operations, Navy Department, coordinate with and intimately related to the Operations and Material Sections.

The head of the Planning Section should be directly responsible to the Chief of Naval Operations as Aid for Plans.

PERSONNEL.

The personnel of the Planning Section should be made up of experienced officers who are, as far as practicable, graduates of the War College. In order to provide such officers they should be selected in advance for the War College course. It is important that the members of the Planning Section shall, by reason of their experience, reputation, and rank, command the confidence of the department and of the naval service.

INTERIOR ORGANIZATION.

The Planning Section will have to deal with a wide variety of subjects; for this reason it will be necessary to split the Planning Section up into committees. The Aid for Plans can judge best how this should be done when he knows the number and qualifications of the officers available. Assuming that 15 officers are available for duty in the Planning Section, the following committees are suggested:

1. POLICY ..... Three officers.

General subjects.

1. Policies of foreign nations.
2. Own national policies.
3. Resultant naval policies.

NOTE.—This committee must work with committees of State and War Departments.

2. STRATEGY ..... Three officers.

General subjects.

1. Strategy of foreign powers.
   - (*a*) Peace-time strategy.
   - (*b*) War-time strategy.
   - (*c*) Building programs.
2. Own grand strategy. This comprises—
   - (*a*) Naval strategy in peace and in war.
   - (*b*) Military strategy in peace and war.
   - (*c*) Building programs.

NOTE.—This committee must work with War Department committee either in actual cooperation or in liaison at all times.

3. TACTICS ..... Three officers.

General subjects.

1. Naval tactics of foreign navies.
2. Own naval tactics of—
   (*a*) Fleet as a whole.
   (*b*) All elements of naval power.
   (*c*) Building program—tactical requirements.

NOTE.—This committee should have liason with coast artillery and expeditionary forces of Army.

4. LOGISTICS ..... Three officers.

General subjects.

1. Bases.
2. Reserve supplies.
3. Personnel.
4. Mobilization.
5. Train.
6. Matériel.

5. EDUCATION.

General subjects.

1. Doctrine.
2. Tactical instructions.
3. Leadership; cooperation.
4. Manuals.

The Aid for Plans should not be a member of any committee.

GENERAL RULES.

The Planning Section should have—

1. No administrative duties.

2. Opportunity for constant education of its members through observation and study of all forms of naval and military activity.

3. Constant touch with progress in the execution of plans.

4. Constant liaison with all Bureaus and offices of the Navy Department; with the fleet; the War Department and the State Department, through liaison officers of the several departments, bureaus, and offices detailed to work with the Planning Section.

NOTE.—It should be the aim of the Planning Section to keep in close personal touch with individuals controlling the activities that might influence the work of the Planning Section.

5. Authority to consult directly with officers of the service, and to ask that such officers be ordered to visit the Planning Section.

6. Authority to call on O. N. I. for information collated and arranged in the desired manner.

7. A separate and carefully organized filing system, with the necessary confidential stenographers and clerks.

PROCEDURE.

8. The Aid for Plans, in consultation with the senior members of committees, will propose the problems and assign them to committees for solution.

9. Each committee will be responsible for the completeness and soundness of the solutions of problems assigned to it, and will present finished solutions to the Aid for Plans.

10. The Aid for Plans will organize from available personnel special committees for special problems whenever this course appears expedient.

11. Every solution of a problem that may be submitted shall be examined by all committees. The committee responsible for the solution shall, if necessary, be responsible also for demonstration to the Planning Section as a whole the soundness of its conclusions.

12. The completed solution shall be submitted to the Chief of Naval Operations for his action.

13. The Aid for Plans shall continue in close touch in an advisory way with the execution of plans.

14. Suggestions from the service or elsewhere concerning matters dealt with by the Planning Section shall be considered by appropriate committees.

PROBLEMS.

Every problem should be considered as a part solution of a general plan rather than as something that stands alone, detached, and solitary. For this reason the most general problems should be solved first, and subsequent problems should arise from the decisions of the more general problems. National policy, naval policy, national strategy, naval strategy, logistics, naval tactics, form a descending series from the general to the concrete, which may be used as a partial guide in determining chronological sequence of effort in problem solving. The outline "Plan of a War Portfolio" will suggest more in detail the ideas contained in this paragraph.

The following general problems are suggested:

1. National foreign policy in the Atlantic. Special reference to German African colonies, Portuguese Islands, Spanish Islands.

2. Naval policy in the Atlantic and Caribbean. Special reference to strength of fleet, types of ships, distribution of bases.

3. Same as above for Pacific. Special reference to Philippines, ex-German islands.

4. National policy regarding merchant marine. Special reference to naval needs.

5. Naval aspects of peace negotiations.

6. Maritime international law after the war.

7. Naval doctrine—general doctrine. Application of general doctrine to special forces and to specific campaigns. Doctrine of cooperation.

8. Basic teachings of the War College.

9. Mobilization plans.

10. Theory and practice of cooperation between Army and Navy.

The following special problems are suggested:

1. Organization of Office of Naval Operations. A complete organziation and rules of procedure.

2. Fleet organization.

3. Mobile base organization.

4. Fixed base organization.

5. Transport service organization.

6. Naval aviation organization.

7. Mining policy—types—probable demands.

8. Aviation policy—at home; abroad.

9. Demobilization.

10. Current operations.

11. Postwar training and maneuvers.

12. Organization of reserve personnel.

13. Foresee developments in matériel to meet demands of the future. Special reference to directing genius of inventors.

14. Peace-time distribution of naval vessels.

15. Antisubmarine tactics of all classes of vessels.

16. Organization and tactics of convoys and escorts.

17. Antisubmarine weapons.

18. System of service schools for officers.

19. Organization of Planning Section.

MEMORANDUM No. 46.

EXECUTION OF NAVY DEPARTMENT'S PLAN FOR BATTLE-CRUISER RAID.

10 August, 1918.

(See Maps Nos. 4 and 5.)

GENERAL SITUATION.

The Navy Department's plan for protecting convoys against raiders from the North Sea or Mediterranean is as follows:

PLAN.

Forces to be employed as follows:

Battleship Division 6.—Utah, *Nevada*, and *Oklahoma*. To be based at Brest or vicinity of Queenstown, preferably the latter (Berehaven).

Battleship Division 8.—Arizona, *Mississippi*, *New Mexico*, and *Pennsylvania;* also a Division of 4 Japanese battle cruisers. These to be based apparently on Hampton Roads or some port on our Atlantic coast.

Battleship Division 2, 3, 4, and 5, plus *Delaware* and *North Dakota*, to escort troop convoys. This makes a force of 18 battleships, and together with the two divisions above mentioned includes all battleships except the *Kentucky* and *Illinois* classes. The use of the Japanese battle cruisers depends upon getting Japan to send them to our Atlantic coast and securing her consent to using them as proposed.

Cruiser force to be used to escort cargo convoys.

GENERAL PLAN.

Atlantic Ocean divided into three sections, viz:

Western Atlantic: From United States coast to longitude 45.

Middle Atlantic: From longitude 45 to longitude 20.

Eastern Atlantic: From longitude 20 to destination.

PLAN FOR EASTBOUND CONVOY.

First. All convoys between United States coast and longitude 45 return to nearest port to await escorts. Furnish two old battleships as escorts for each convoy carrying troops. Give same escort to cargo convoys if practicable, otherwise give two armored cruisers.

Second. Convoys between longitude 45 and longitude 30 to be diverted immediately to the Azores.

Third. Convoys between longitude 30 and 20 proceed to Azores or to destination, or to nearest port, according to circumstances.

Fourth. Convoys east of longitude 20 proceed to destination at top speed.

WESTBOUND SHIPPING.

First. Ships between European ports and longitude 15 return to port for escort, or proceed to Azores, dependable upon submarine situation.

Second. Ships between longitude 15 and longitude 45 proceed to Azores or to nearest United States or Canadian port, depending upon their proximity to these points.

Third. Ships west of longitude 45 proceed to destination or nearest port.

PLANS FOR PROTECTION.

First. Battleship Division 6, accompanied by two divisions of destroyers of the European forces, proceed at top speed to San Miguel, Azores, presumably to furnish escort to the convoys and other shipping assembled there.

Second. Battleship Division 8, with one destroyer division, to be held "Instantly ready to proceed." Purpose not definitely stated in department's dispatch, but probably to furnish escort to convoys returning to United States or Canadian ports in the western Atlantic zone.

Third. Japanese battle cruisers to be used for direct pursuit of enemy raiders.

MISCELLANEOUS.

First. Plan to be applicable to United States troop convoys, cargo convoys to French Bay ports, and other convoys carrying United States troops. Other convoys to utilize the plan if considered advisable by Admiralty.

Second. It is assumed that definite information of the escape of enemy will be given to all forces before enemy has crossed the line Scotland-Iceland.

Third. Plan to become effective immediately upon agreement and to be put into operation upon receipt of broadcast radio and cable regarding enemy's escape from North Sea.

Fourth. Department to maintain fuel supply in European waters and Azores for Battleship Division 6.

MEDITERRANEAN.

In case of a battle cruiser coming out of the Adriatic or Dardanelles, the department assumes that the forces will be notified before the vessel has gotten clear of the Aegean Sea.

Same plan is to be followed, except that ships east and west bound between longitude 20 and longitude 45, and north of latitude 45, will proceed to destination or the nearest port at top speed.

It is contemplated in case it should appear desirable this plan may be combined with a plan of evasion by warnings either before or after the premeditative plan is operative, and as a final resort, to leave it to the discretion of the escort commander to scatter his convoy.

Special Situation.

Assume the Navy Department plan has been adopted and is in force.

Required.—Detailed plans to cover the following cases:

1. Exit of raiding force known when it crosses the Scotland-Iceland line, or before it reaches that line.

2. First knowledge of escape of raiding force obtained through news of an attack on a convoy to the westward of Ireland.

In solving these two cases, assume four subordinate cases:

(*a*) Forces distributed as at present.

(*b*) *Oklahoma* en route to Berehaven—other vessels as at present.

(*c*) *Oklahoma* at Berehaven—other vessels as at present.

(*d*) Three battleships at Berehaven.

As to communications, assume—

(*a*) Cable communication to the United States as at present.

(*b*) Cable communication interrupted. All communications by radio.

OPERATIONS PLAN.

The convoys normally in the Atlantic are shown in the following plan:

Name of convoy.	Speed of convoy.	Period between sailings.	Length of passage.	Ocean escort.
H. S.	8 knots	8 days	14 days	1 auxiliary cruiser.
H. C.	11½ knots	8 days	12 days	1 cruiser.
H. X.	13 knots	8 days	12 days	1 armored cruiser; 1 auxiliary cruiser.
U. S.	12 knots	8 days	12 days	1 armored cruiser.
H. B.	9 knots	8 days	15 days	1 cruiser.
H. N.	9½ knots	8 days	15 days	1 cruiser.
H. H. [1]	8 knots	8 days	18 days	1 auxiliary cruiser.
H. G.	6-7 knots	4 days	10 days	1 gunboat.
H. D.	8 knots	8 days	13 days	1 gunboat.
H. L. [2]	8 knots	8 days	15 days	1 gunboat.

[1] Westward-bound convoys corresponding to the above disperse.

[2] There are outward bound convoys of about the same number corresponding to H. G., H. D., and H. L.

NOTE.—Eleven convoys arrive every eight days. About 20 European-bound convoys are at sea at one time.

The following applies to U. S. and H. B. convoys and, if Admiralty consents, to H. X. and H. C. convoys.

The plans proposed are to apply to all cases where the raider makes an exit from the North Sea.

The following governs the action of the United States Naval Forces, Europe, to clear the sea of convoys when escorts are too weak to hold off a battle cruiser.

1. Warnings and information will be sent according to communication plan.

2. Specific instructions will be given by London to each convoy east of longitude 45° W.

3. Specific instructions will be given by London to battleships of Division 6, whether they are at sea or in port.

4. Battleships of Division 6, whether in port or at sea, will proceed at best speed toward Azores until instructions are received.

5. Chief of staff, Queenstown, when raider warning is given, will send two divisions of United States destroyers to join Battleship Division 6, or if ships of that division are at sea, to Azores.

6. All other United States destroyers not engaged in escort work will scout to give both positive and negative information of raider to all convoys at sea. This information will be used as far as possible to bring convoys to destination.

7. Convoys west of longitude 45° W. will be handled by instructions from Washington.

8. Convoys arriving at Azores will be combined and dispatched under battleship and destroyer escort to destination as soon as possible.

9. At least one battleship will remain at Azores until all convoys bound for Azores have arrived.

10. To permit intelligent and prompt action by Battleship Division 6, the commander of that division will at all times be kept informed of routings, sailings, and rendezvous of U. S. and H. B. convoys, and of H. X. and N. C. convoys in case department's plan is accepted by the Admiralty.

RESUMPTION OF CONVOYS.

1. Convoys in ports off the French coast will sail under escort of battleships of Division 6 as soon as those vessels are available. Every effort will be made to evacuate all ports of westbound ships.

2. If raider threat continues, the following modified convoy system is suggested, each convoy to have battleship escort when eastbound and when westbound:

Name of convoy.	Speed of convoy.	Period between sailings.	Length of passage.	Ocean escort.
H. S. and H. H	8	8	14	2 battleships; 1 cruiser.
H. G	11½	8	12	2 battleships; 1 cruiser.
H. N. and H. B	8	8	15	2 battleships; 1 cruiser.
U. S. and H. X	12	8	12	2 battleships; 1 cruiser.

The following arrangements must be made:

1. For refueling destroyers at Azores.
2. For refueling battleships on French coast.
3. Refueling vessels of convoys that may be short of fuel at other than terminal ports.

HALIFAX ESCORTS.

Battleships escorts should be stationed in readiness at Halifax.

COMMUNICATION PLAN.

First notice of escape of enemy raiders may be—

(*a*) Through secret service.

NOTE.—Special arrangements are necessary to insure that message is identifiable, and that it will be handled without any delay whatever.

(*b*) Through a sighting at sea.

NOTE.—Special arrangements are necessary to give immediate right of way to message from sea that carries information of raiding force, and then arrangements as under (*a*) above.

If (*a*), then information will come to Admiralty and then to 30 Grosvenor Gardens, or vice versa.

Information from secret service or from sea must give following concerning raiding force:

(1) Greenwich meridian time of sighting.
(2) Position—latitude and longitude.
(3) Composition of force—battle cruisers, auxiliary cruisers, light cruisers, etc.
(4) Course.
(5) Speed.

Admiralty and Vice Admiral Sims decide if report is reliable and to be broadcasted. If broadcasted, information will be given as reliable or doubtful.

FIRST STEP.

Broadcast from—

Poldhu—B. A.
Valencia—B. A.
Carnarvon—B. A.
Nantes—U. S.

British Admiralty accepts responsibility for immediate broadcasting from Poldhu, Valencia, Carnarvon; United States accepts responsibility for immediate broadcasting from Nantes.

Message to Nantes via direct wire to Paris, thence Nantes. Captain Jackson to follow up message by telephone to insure prompt service. Priority arrangements to be made now.

SECOND STEP.

(*a*) Inform Brest by direct wire—U. S.
(*b*) Brest inform all convoys in port—U. S.

THIRD STEP.

(*a*) Inform Navy Department, via cable. Arrange for priority of message now. At the time insure priority by telephone to general manager of W. U. Message to be identifiable at New York, and priority thence to Washington to be arranged.

(*b*) Arrange for priority in decoding at Washington and for immediate action on message.

(*c*) Inform Navy Department via radio from—
(1) Eiffel Tower.
(2) Lyon.

Message to go to Eiffel Tower by direct wire to Paris, and to be followed up by Paris office.

Message to go to Lyon by direct wire to Brest, then direct wire Brest to Lyon, and be followed up by inquiry from Brest; message to be easily identifiable, and to have priority arranged for now.

NOTE.—Carnarvon should be provided with a suitable arc set to make a third trans-Atlantic radio route available.

FOURTH STEP.

Navy Department broadcasts at discretion.

The above four steps are to be taken regardless of the source of information, whether from secret service or by an actual sighting at sea.

In the case of a sighting at sea, the vessels sighting the raiding force will invariably broadcast position, course, speed, character of raiding force, and Greenwich meridian time of sighting.

All other vessels at sea within 1,000 miles of reported position of raiding force will maintain complete radio silence.

The above communication plan should be rehearsed frequently by test messages over all routes, and times taken along the route to locate and overcome causes of delay.

SUBSEQUENT STEPS.

After the first warning, each new piece of information concerning the raiding force will be handled in the same manner as the first warning.

Estimates based on all available information will be broadcasted at 0600, 1200, 1800, 0000 daily.

The personnel of all offices through which communications may pass to be instructed in their share of the above communication plan.

INSTRUCTIONS FOR THE GUIDANCE OF CONVOYS IN THE EVENT OF AN ENEMY BATTLE CRUISER MAKING A RAID ON THE ATLANTIC.

1. On the receipt of a warning that an enemy battle cruiser has entered the Atlantic, senior officers of convoys shall be guided by the instructions given below, subject to which they are given full discretion as to the action to be taken to avoid destruction.

2. Information of a raid may be broadcasted from a vessel sighting the raider, or may be broadcasted from shore radio stations. The following information may be expected and each vessel or convoy sighting a raider will immediately broadcast similar information.

(1) Greenwich meridian time of sighting.
(2) Position of sighting—latitude and longitude.
(3) Composition of force—whether battle cruisers, auxiliary cruisers, light cruisers, etc.
(4) Course of raider.
(5) Speed.

The Admiralty and the Navy Department will subsequently broadcast each new piece of information when received, in the same manner as the first warning. They will also broadcast estimates, based on available information, at 0600, 1200, 1800, 0000 daily.

The following protective measures may be expected:

1. Instructions for individual convoys will be broadcasted from shore radio stations—Poldhu, Valencia, Carnarvon, Nantes.

2. Battleship, destroyer, and submarine support will be found at Ponta Delgada, Azores, four days from the hour of the first warning.

3. Convoys proceeding toward Ponta Delgada may expect to proceed toward destination, properly escorted, within three days of their arrival at the Azores.

4. Complete radio silence shall be maintained by all vessels within a thousand miles of the raider unless the vessel is in sight of the raider, in which case it will broadcast as complete information as possible. An exception to the rule of maintaining complete radio silence may be made by escort commanders under circumstances, when, in their judgment, the messages from the reporting vessel

may not have been received by a shore station. In such cases the escort commander will repeat the messages of the reporting vessel.

5. Ponta Delgada, Azores, will broadcast information as to when supporting forces may be expected there.

ACTION OF ADMIRALTY AND OF NAVY DEPARTMENT.

1. All convoys in port will be held there until the danger is past or until suitable escort is provided.

2. Each convoy at sea will be given specific instructions, based on conditions as they are known to exist at the time. Unforeseen conditions may, however, prevent receipt of instructions.

3. Battleship destroyer escorts will be sent to Ponta Delgada, and may be sent to convoys at sea in special danger.

The following principles of action will govern dispositions of convoys and supporting forces in the absence of specific instructions:

1. Vessels and convoys at sea must in the first instance rely on their own efforts to escape raiding forces.

2. As a final resort, convoy commanders are authorized to scatter their convoys.

3. Wherever possible, convoys should seek to escape in the direction of their destination. Some risks may be accepted in order to reach destination, but the security of the convoy is the primary consideration.

PLAN.

In the absence of specific instructions convoys will proceed as follows, if such action accords with known conditions and the principles already laid down:

EASTBOUND CONVOYS.

1. Convoys west of longitude 45° west return to nearest available port to await escort.

2. Convoys between longitude 45° west and 30° west proceed to Ponta Delgada, Azores.

3. Convoys between longitude 30° west and 20° west proceed to destination or to Azores, according to circumstances.

4. Convoys east of longitude 20° west proceed to destination at best speed.

WESTBOUND SHIPPING.

1. Ships between longitude 15° west and European ports return to port.

2. Ships between longitude 15° west and 45° west proceed to Azores, or to nearest United States or Canadian port, depending upon their proximity to those points.

3. Ships west of longitude 45° west proceed to destination or to nearest port.

In reaching decisions as to action in the absence of instructions, consider the following points:

1. Last reported position of raiding force.

2. Most threatening position in which raiding force could be at time warning is received.

3. Improbability of our forces interfering with the cruise of the raiding forces, except when it attacks convoys.

4. Probability that raiding force will cooperate with own submarines, using some of the latter as scouts.

5. Some risks may be accepted in order to proceed to destination.

The table below gives the fuel capacity of German battle cruisers:

Ship.	Fuel, coal.	Stowage oil.	Total.
	Tons.	*Tons.*	*Tons.*
Hindenburg	4,625	984	5,609
Derfflinger	5,543	197	3,700
Seydlitz	3,050	197	3,247
Moltke	2,760	197	2,975
Von der Tann			

In the earlier battle cruisers oil is used only for spraying the fires; in the *Derfflinger* and probably the *Hindenburg*, details of which are lacking, a proportion of the boilers can burn oil alone. These vessels could therefore extend their endurance considerably by capturing an oiler. The endurance of the earlier three ships being much less than that of the *Derfflinger*, the following investigation has been confined to her.

The daily consumption of the *Derfflinger* is estimated as follows:

(*a*) Steam for full speed at 20 minutes' notice.

(*b*) Steam for full speed at 1 hour's notice.

The consumption at (*a*) is taken for the passage through the North Sea; that at (*b*) while she is operating in the Atlantic.

Speed.	Consumption (a).	Tons per day (b).
10 knots	205	183
15 knots	336	320
20 knots	546	535
25 knots	996	996

Coaling in the open Atlantic would necessitate exceptionally fine weather. Oiling is a more practicable proposition, and the capture of an oiler is a possibility which must be taken into account. Fueling at sea is too uncertain to be an essential feature of the German

plan and is therefore more likely to extend the duration than the field of the raider's operations.

The raider may, however, proceed to a prearranged rendezvous immediately after leaving the North Sea and refuel there before commencing operations. It is unlikely that a battle cruiser will be exposed to the risk of not being able to return through failing to meet her fuel ships, which are more likely to be captured than the raider herself.

Possible places for the rendezvous are as follows:

Greenland.—An open harbor is usually to be found either on the west coast (October to July) or on the east coast (July to September), but the ice varies greatly from year to year; unless reports of its condition have been obtained, the operation would not be a promising one.

West Indies.—This locality is open to the objection that if the battle cruiser failed to meet or to capture a fuel ship she could not get back to Germany.

MEMORANDUM No. 47.

NOTES ON VISIT TO GRAND FLEET AND MINE BASES.

(By Capt. H. E. YARNELL, United States Navy.)

3 September, 1918.

Reached Rosyth August 7. On board *New York*, August 7–10.

August 8–10, Sixth Battle Squadron and Fifth Battle Squadron, with attendant cruisers and destroyers, were at sea covering British mine-laying operations in Area C.

Battleships steamed in column of squadrons, distance between squadrons 3 miles, Fifth Battle Squadron leading on line of bearing, Sixth Battle Squadron in column, both squadrons zigzagging. Speed was maintained at 18½ knots for the period, the vessels maintaining this with comparative ease.

Two points were emphasized by Admiral Rodman as being most desirable in his opinion:

First. Replacing the 12-inch gun ships with 14-inch gun ships.

Second. The addition of another battleship, bringing up the total strength to 6, in order that one may be sent home for leave and repairs.

Kite balloons were in use on the *Texas* and *New York* during the trip. These undoubtedly add to the visibility, but have the disadvantage of disclosing the presence of vessels long before the vessels themselves are in sight.

Arriving at Inverness August 10, went out on *San Francisco* August 12–14 during the experimental mine-laying trip. The results of this trip were most encouraging, and the laying of the barrage is to be resumed. All hands recognize the necessity of completing the barrage before the end of September; weather and visibility conditions can not be relied upon after that time.

The problem of finding the end of a completed section of the barrage, in order to begin laying another section, is a delicate thing in any but clear weather. The procedure is to run a taut wire from one of the buoys marking the limits of the declared area to the end of the section which was last laid. In order to maneuver the 10 ships into position for laying, the end of the old section must be closely known. If time should not permit of laying the completed

barrage to the Orkneys, at least the surface rows should be completed before the winter.

During the five days at sea with the Battle Squadron and *San Francisco*, the weather was such that submarine chasers could have operated with ease. In conversation with officers who have served in the Grand Fleet, and with officers of the Mine Force who have been in this region since June, they state that it is entirely practicable for vessels of the chaser class to operate in this region during the summer months. It is believed that during the summer of 1919 as many of our chasers and hunting vessels as practicable should be assigned to this area and the bases should be ready to permit their operations beginning immediately when the weather permits.

APPENDIX.

Supplementary notes by Commander W. R. FURLONG, United States Navy.

Relative to the last paragraph in Captain Yarnell's notes, I was at sea in one ship or another of the Grand Fleet two or three times each week in these waters during the months of June and July. Having heard so much about the bad weather conditions in these waters, I was greatly surprised at the smoothness of the water during these summer months, and at the good visibility. Practically all of the firing began at 22,000 yards. I mention this to corroborate the statements about the ability of chasers, or, what would be better, Eagle boats, to operate along this submarine exit from the North Sea.

In Captain Belknap's report, 20 August, 1918, relative to the sixth mining operation, he states that—

> While returning in the North Channel off the Orkneys, radio notice was intercepted of a submarine passing west-southwest 15 miles distant from Fair Island, steering southeast at 4 knots submerged. She was about 25 miles astern of us. It seemed possible that the *Patuxent* and *Patapsco*, following several hours astern, might cross her course quite near.

Fair Island is midway between the Orkneys and Shetland Island, and just 25 miles north of Area B. If this area is to remain open, then it is of great importance that we get vessels for hunting submarines in this gap in the Northern Barrier.

Since writing the above, there has just come across this desk from Admiral Strauss notice of a rumor that the British intend to ask us to surface mine Area B. This does not remove the necessity for chasers or Eagle boats both north of and south of the barrier, as instances of submarines having to return to their bases on the surface after having encountered the barrage shows there is still work to be done by surface craft, where the mines have not entirely destroyed submarines.

COL. R. H. DUNLAP, U. S. M. C., MEMBER OF PLANNING SECTION.

MEMORANDUM No. 48.

MILITARY AND NAVAL RAID ON THE EAST COAST OF ENGLAND.

22 August, 1918.

(See Map No. 1, "The North Sea.")

GENERAL CONSIDERATIONS.

In Planning Section Memorandum No. 40, of 10 July, 1918, possible activities in which the High Seas Fleet might engage are discussed; and the conditions under which the High Seas Fleet might seek an engagement with the Grand Fleet are indicated.

In Memorandum No. 40 it was shown that the High Seas Fleet, should it seek action with the Grand Fleet, would seek it in a predetermined area, in order that it might make use of all its auxiliary weapons of offense, such as torpedo boats, submarines, trap mine fields, and aircraft.

It was recognized that for one fleet to bring another to action in a predetermined area was a difficult matter. The paper which follows, dealing with a military raid on the east coast of England, might be considered as one of the surest and most efficacious methods of bringing about a naval engagement in a predetermined area under conditions somewhat under the control of the enemy, since the raid might be designed to give the fleet its opportunity as well as to exert a pronounced military influence on shore. For instance, if the enemy should decide on a military expedition to the coast between the Wash and the Humber, knowing at the time that the Grand Fleet was in the Firth of Forth or at Scapa, he might be able so to dispose his special forces north of the Humber as to cover the landing and compel the Grand Fleet to accept action in an area previously prepared to give the enemy the maximum tactical advantage.

While it appears improbable that a raid on so large a scale as indicated in the following paper will occur, it is nevertheless interesting to note the possible consequences of success, and the steps which might follow such a raid, if successful. Assume the landing, and assume a successful fleet engagement which compels the Grand Fleet to retire even temporarily, special forces previously prepared by the enemy might raid and block temporarily the Channel ports

in such a manner as to interfere very seriously with the reinforcements of military forces in England. If the cross-channel lines of communication were thus sufficiently interfered with, and if the naval engagement resulted in a command of the narrow seas for even a brief period, the first landing of military forces might be reinforced by a second landing of equal numbers, which would create a serious condition in England.

Strategy of this kind on the part of the enemy would appear unlikely during a time when he is already hard pressed on his own land front, but might be considered when the initiative was in his hands as a means to compel the acceptance of peace negotiations.

German Side.

Mission: To raid English east coast.

ENEMY NAVAL FORCES—STRENGTH AND DISPOSITION.

Firth of Forth: The enemy main Grand Fleet—superior to our High Seas Fleet—is at present based at Firth of Forth. Due to the necessities of convoys, and protection of English east coast, the hunting of submarines and mine sweeping or laying operations, there are not present with the Grand Fleet a superiority of destroyers or submarines.

Methil: 6 destroyers and 10 torpedo boats.

Humber River—Humber Tyne—Methil: For convoy work between the above ports are 27 destroyers and 8 submarines.

Lowestoft: 2 monitors and 2 destroyers.

Harwich: 29 destroyers, 31 submarines, and 10 light cruisers.

The Nore: 7 battleships, 6 destroyers, torpedo boats.

Dover: 17 monitors, 41 destroyers, many P-boats, 1 submarine.

The enemy mine barrage extending across the North Sea—exact extent unknown—has to date crippled two of our submarines and will possibly, if completed and effective, prevent not only the exit of submarines, but necessitate extensive mine-sweeping operations before our raiding forces can operate in its vicinity. Its restricting effect upon maneuver in any operations south of the Firth of Forth is not great.

Mine field: Along east coast of England from 52 north to Dover Straits.

ENEMY LAND FORCES—STRENGTH AND DISPOSITION.

Scotland—

Firth of Forth: 12 battalions (12,000 men); fixed gun defense.
Toy: 2 battalions (2,000 men); fixed gun defense.
Gormatz: 1 battalion (1,000 men).
Aberdeen: 1 battalion (1,000 men).

Tyne—

Blythe to Durham: 16 battalions with 4 in reserve (20,000 men); fixed gun defense.

Tees—

North Hartlepool to Saltburn: 5 battalions (5,000 men); fixed gun defense.

East coast defenses—

Saltburn to Great Driffield: 12 battalions (12,000 men).

Humber and Lincolnshire coast defenses—

Driffield to Wash: 16 battalions (16,000 men); fixed gun defense.

East Anglia—

Wash to Thames: 5 mixed brigades (20 battalions, 20,000 men).
3 divisions (36 battalions, 36,000 men).

Harwich: 10 battalions (10,000 men); fixed gun defense.

There is one division of 12 battalions (12,000 men) in reserve in the Northern Command between the Wash and Berwick. Strength of battalions not known. Organization provides 1 battalion=1,001 all ranks.

ENEMY AIR FORCE—STRENGTH AND DISPOSITION.

Firth of Forth—

Crail: 1 military aerodrome.
Turnhouse: 1 military aerodrome.
West Fenton: 1 military aerodrome; 1 airship station; 1 naval aerodrome.
Rosyth: 2 seaplane stations.

Tyne—

Cramlington: 1 military aerodrome.
South Shields: 1 seaplane station.

Tees—

Redcar: 1 seaplane station; 1 naval aerodrome.

Flamborough Head—

Hernsea: 1 seaplane station.
Beverley: 1 military aerodrome.

Humber—

Killingholme: 1 seaplane station.

The Wash—

Sedgeford: 2 military aerodromes.

Yarmouth—

Pulham: 1 seaplane station; 1 airship station.
Felixstowe: 1 seaplane station.

Following is a study of the various seacoast areas of the English coast, considered with respect to possible landings, the railroad and road communications leading to them, the commercial centers affected by landing operations, and the strength of and time required for British sea and land forces to assemble to oppose such operations.

Concentration of villages where raids would accomplish greatest damage:

1. Between the Tyne and Whitby. Principal coast towns are: Tynemouth, South Shields, Hartlepool, Saltburn, and Whitby. Principal interior towns and centers for railroad communications to shore

are: Newcastle, Durham, Middlesborough, and Stockton, within 10 miles of the coast.

2. Wash to the Thames. Principal coast towns: Hunstanton, Wells, Cromer, Yarmouth, Lowestoft, Saxmundham, and Harwich. Principal interior towns and centers for railroad: Kings Lynn, Fakenham, Norwich, and Haughley.

3. Between Bridlington and the Humber. Principal coast towns: Bridlington, Hornsea, and Withernsea. Principal interior towns and centers for railroad: Driffield and Hull.

4. Between the Humber and the Wash. Principal coast towns: Mablethorpe, Sutton-on-sea, and Skegness. Principal interior towns and centers for railroad: Louth and Lincoln, with Grimsby and Boston on either flank.

CONSIDERATION OF THE COAST LINE.

EAST COAST OF ENGLAND.

For purpose of determining possible landing places for raiding force. The only landings considered suitable are here noted. Mention is made of part of the coast line not considered practicable for landing.

The coast—Dangers.—The navigation of the east coast of England may be divided into two sections:

(*a*) North of the River Humber.

From Berwick to North Sunderland, latitude 56° 46′ N. to 55° 33′ N., dangers including the Farn Islands extended about 5 miles from the coast, but from the latter port southward to the Humber the dangers do not extend more than 2 miles from the coast, except in Bridlington Bay.

(*b*) South of the River Humber.

The navigation here is rendered difficult by numerous sand banks, forming a series of ridges parallel to the coast, with comparatively deep channels between, and extending in some cases to a distance of about 45 miles from the shore. Navigation amongst these ridges in the deep-draft vessels of the present day would be impracticable were the channels not marked artificially; but buoying and lighting of all dangers by the Trinity House renders the navigation of this coast comparatively easy in fairly clear weather.

During thick or foggy weather, or in strong winds or gales with snow, too much precaution can not be exercised; and, when at all doubtful as to the vessel's position, it is far safer to anchor and wait until the fog or mist clears sufficiently to allow objects at a distance of 2 or 3 miles to be seen, rather than, by proceeding, to risk running on any of the banks or a collision with another vessel. The tide, also in the great majority of cases, sets across the banks, so that if a vessel gets aground with the flood she is set more on to the

bank the higher the tide rises, and the stream (at springs especially) is much stronger over the ridges than in the channels between.

Depths.—The depths between these banks are sufficient to allow a vessel to anchor almost anywhere in moderate weather, and with offshore gales anchorage is safe, the water being nearly always fairly smooth, especially close inshore or under the lee of the banks. With on-shore gales, the dangerous banks are all marked by heavy breakers, more especially with the tide against the wind, so that it is possible, with due precaution and a strict attention to the soundings, by keeping along the lee side of the breakers, at a safe distance, to obtain some shelter, the position of the vessel being ascertained wherever possible by seamarks in the vicinity.

Harbors.—Between the Humber and the Forth, a distance of 200 miles, there is no harbor that can be entered under all circumstances of wind, weather, and tide, consequently nothing is to be gained by keeping near the coast in on-shore winds.

The only safe harbor between the Humber and the Thames is Harwich, but as there is only 19 feet at low water in the channel, it can not be entered by large vessels at that time.

Winds and weather.—Although the mean annual direction of the wind is from the west, easterly winds are by no means uncommon. In fact, the wind and weather may be divided into two types, the westerly and the easterly, one of which is generally prevailing over Great Britain. With the westerly type of wind the atmospheric pressure is lowest over Iceland and highest to the southward of the British Isles, whilst with the easterly type the pressure is highest in the north and lowest in the south. The westerly type is most common during the months of December, January, February, July, August, and September, whilst the easterly type is most common in March, April, May, and November; June and October may be regarded as intermediate months. The characteristic of the westerly type is that the wind, commencing at some point of south, with a comparatively high temperature, a dull sky, and rain, veers to some point of west, with a cooler air and brighter sky, and after a day or so of fine weather backs again to the south, with bad weather, sometimes rising to the intensity of a gale, and so on for weeks together. The characteristic of the easterly type is that the wind fluctuates between southeast and northeast, the southeast winds bringing foul weather and the northeast fine weather, veering and backing with many variations for a considerable period. The change from the easterly to the westerly type is often preceded by a movement in the upper clouds. If, with the easterly type prevailing, cirrus and stratus clouds be seen moving from west to east, a change is nearly certain to follow.

Fogs and mists.—Fogs and mists occur at all seasons of the year in the vicinity of the English coast. Thick weather, approaching to

a fog, is very common. Part of this is doubtless due to the westerly winds blowing the smoke of the great manufacturing districts into the North Sea, for the weather is seldom clear with westerly winds between Flamborough Head and the Forth, nor off the estuary of the Thames. The northeasterly winds of spring bring, as a rule, the clearest weather.

The foggiest period is from April to July, the latter being the foggiest month in the year. The clearest period is from October to December, but it is to be observed that the data for December are very meager. The foggiest portions of the sea are usually within 100 miles of the shore on either side, excepting in July, when they extend to about 150 miles—the southern portion and particularly the English coast being the worst.

During the summer of 1910 H. M. S. *Hearty* made systematic observations at an average distance from the Norfolk coast of 50 miles for the purposes of the North Sea survey, lasting from April to September, inclusive. The summarized results were, viz: That the limit of visibility of a large vessel on an average was 4,000 yards on 7½ days in the month; 8,000 yards on 7½ days in the month; over 8,000 yards on 15 days in the month.

The effect of the abnormally hot summer and the absence of strong winds was, it is considered, to increase the usual amount of hazy weather in the North Sea, and therefore statistics must be judged accordingly until further continuous observations are available.

The northernmost portion of the east coast of England, from Berwick (lat. 55° 46′ N., long. 1° 59′ W.), at the mouth of the Tweed, to North Sunderland Point, or the Snook, 16½ miles southeastward of it, is the most dangerous section north of the Humber. At 5 miles southeastward of Holy Island, Farn Islands and adjacent shoals extend 4½ miles at right angles to the coast. Fronting this piece of coast are numerous dangers, all of which are, however (with two exceptions), within the 10-fathom contour line.

From Cheswick southward there is, fronting a rocky coast line, a sandy strand (possibly covered at high water) which gradually widens to abreast Beal Point, where it connects Holy Island with the mainland at low water, and forms extensive tracts of sand, the southernmost of which is known as Fenham Flats. Total, 6 miles of beach.

Warnham Flats, dry for an extent of 1 square mile at low water, practically occupy the whole of Budle Bay, but they are intersected by Ross Low and Warren Water, two streamlets which afterwards join and thence run to Warnham Bar; 2½ miles of beach. Landing practicable on these beaches. Depths from 9 to 12 fathoms at 1 mile, gradually decreasing to shore. N. E. Ry. runs close to the shore line. A parallel railway runs within 15 miles, joining

the N. E. Ry. at Berwick to the north and Bilton to the south. Three good roads parallel to the shore within a radius of 10 miles. Many small villages on or within 2 miles of shore, largest Berwick and Belford.

North Sunderland to River Tyne (lat. 55° 35′ N. to 55° 2′ N., long. 1° 39′ W. to 1° 32′ W.).

Alnmouth Bay, extending from Seaton Point to Coquet Island, is 4½ miles long and 1½ miles to its head, with depths in it of from 20 to 50 feet; 4½ miles of beach.

Coquet Island—The coast: From Seaton Point the coast is sandy, and runs 1½ miles in a southwesterly direction to Alnmouth. Waw Burn is 3½ cables from Seaton Point, and Marden or Alnmouth Rocks, which uncover at half tide, extends 3½ cables from a point under Marden farmhouse. From Waw Burn the coast is backed by a grassy ridge, terminating in Alnmouth Hough. On the former are Foxton Hall and Marden farmhouse. Beacon Hill, or Alnmouth Hough, is the site of a very ancient camp.

From Aln River to Coquet River is composed of sandhills, the only interruption being Birling Cars Point, a rocky cliff, 64 feet high, and a ledge extending from this point is the only foul ground upon the western shore of Alnmouth Bay.

Coquet Road lies between Coquet Island and its ledges and the mainland, with the ledges and sands extending from it. The roadstead thus formed is secure from winds which blow from the eastward, through south, to northwestward; with the wind from any other quarter it is exposed, and should not be used except under extreme circumstances; the depth in it is from 18 to 22 feet, sand. Two branches of the N. E. Ry. terminate at this point; one line runs south along the coast and the other southwest for a distance of 4½ miles, where it joins the N. E. Ry.

Druidge Bay, extending from Bindicar to Snab Point, is 5 miles long and recedes 1 mile; the shore is low and sandy, and the background moderately high. Shaftham Peak (1,003 feet), with a steep northern face, is the principal peak inland. Landing practicable. Beach 4 miles.

Newbiggin Bay lies between Newbiggin Point and Spital Point, 8 cables south-southwestward of it. There is a good shelter in the bay with northerly winds; bottom, sand over clay; and the shore continues sandy, with sloping grass banks, to Spital Burn, where rock begins. A branch of the N. E. Ry. terminates at this point. It joins the N. E. Ry. 2 miles to the westward. Landing practicable. Beach 1,000 yards.

Cambois Bay extends from Spital Point to Blyth Snook, 3 miles to the southward. The shore, nearly as far as Wansbeck River, is rocky, and from thence it is low and sandy, with several windmills and

colliery chimneys visible behind it. Landing practicable. Beach 1½ miles.

The coast from Blyth (lat. 55° 8′ N., long. 1° 30′ W.) to Seaton Sluice, nearly 1¾ miles south of it, is low and sandy and numerous colliery chimneys show within it. A branch of the N. E. Ry. terminates at this point, joining the main line 1½ miles to the southwest. The main line of the N. E. Ry. skirts the shore 1,000 yards to 2 miles, with the additional branches as noted above. Landing practicable. Beach 2 miles.

There are many small villages within 2 miles of the coast, the principal ones being St. Johns, Widdrington, Crosswell, Ulgham, Woodhorn, Newbiggin, Blyth, Bedlington, Morpeth, and Tynemouth.

River Tyne to Flamborough Head (lat. 55° 1′ N. to lat. 54° 7′ N., long. 1° 25′ W. to long. 0° 5′ W.).

South Side: The southern side of the entrance is sandy coast, from the eastern point of which the south pier projects. From the foot of the pierhead sand extends 3½ cables in a northwesterly direction to the point under the Lawe, the southern point of the entrance to Shields Harbor. Approximately three-fourths mile of beach.

There is a small stretch of sand immediately northward of Black Hall Rocks, and from 6 cables southward of Black Hall Rocks to the Hartlepool Hough it is sandy; otherwise the coast is rocky. The 3-fathom contour, within which are isolated rocks and ledges, extends about 5 cables from the coast. Approximately 3 miles of beach.

Tees Bay: This is a large open bay 6 miles across, having Hartlepool at its northern point and Redcar on its southern point, with the River Tees discharging itself about midway between; the general depths in it are from 5 to 10 fathoms, but shoals and rocks extend from its shores in some cases to a distance of 1 mile. The bay is exposed to all winds from an easterly direction. Suitable for landing. Six miles of beach.

In the section from Hartlepool to Redcar there are two branches of the N. E. Ry., one joining the main line running to Middlesborough, about 2 miles northwest of that town, and the other from Middlesborough parallel to the south bank of the River Tees until it reaches the coast, where it branches and runs north and south along the coast. There is no important connection leading from the north to the south of the River Tees east of Middlesborough. From Redcar 4 miles south the beach is possibly suitable for landing in good weather. Landing may be made in Whitby Road, Scarborough Bay, and Filey Bay. Four miles of beach.

Flamborough Head to and including the Humber (lat. 54° 7′ N. to lat. 53° 28′ N., long. 0° 5′ W. to long. 0° 17′ W.).

This coast is unsuited for landings of any magnitude. A few breaks in the cliffs not suited for anything but small force landing. The entrance to the River Humber and the shore line immediately to the south thereof are assumed to be impossible on account of the protection afforded by land defenses, mines, and naval craft in the immediate vicinity.

The Humber to Cromer (lat. 53° 28′ N. to lat. 52° 55′ N., long. 0° 10′ E. to long. 1° 18′ E.).

General remarks: The deep bight between the Humber and Cromer, the upper part of which is indifferently termed Lynn Deep and the Wash, is for the most part occupied by numerous and dangerous sands, some skirting the mainland, whilst others lie out a considerable distance in the offing; through these sands the several rivers which have their outlets in the Wash find their way at low water. The rapidity of the tides in this deep bight, the low character of its shores, and the mists which almost constantly prevail render this the most difficult portion of the navigation on the eastern coast, and consequently a more than common degree of vigilance is necessary when navigating in the locality.

The coast: From Donna Nook, at the entrance of the Humber, to Skegness, 22 miles to the south-southeastward, at the entrance to the Wash, the coast is composed of sand hills. From Donna Nook to Boygrift Drain, south of Sutton-le-Marsh, may be considered impracticable for landings due to the numerous shoals offshore which would require transports to lie offshore for rapid landing. From this point to Skegness is suitable for landing. Nine miles of beach. The Great Northern Railway runs parallel to the shore at a distance of about 5 miles. A branch of this railway from the main line touches the coast at Sutton-le-Marsh, continues north along coast, finally bending to the west and rejoining the main line at Louth. The entrance to the Wash, together with the adjacent shores to the east of the entrance, are considered unpracticable to landing, due to mines, gun defense, and the numerous shoals which are offshore in this section.

Cromer to Orfordness (lat. 52° 55′ N. to lat 52° 5′ N., long. 1° 18′ E. to long. 1° 55′ E.).

The coast from Cromer (lat. 52° 56′ N., long. 1° 18′ E.) runs almost in a straight line to the southeastward for 20 miles, to Wintertonness, where it curves to the southward. To the southeastward it continues high for 1 mile, with indications of extensive landslips; in fact, the whole of the mud cliffs (as they are termed) from Cromer to Happisburgh, at 10½ miles south of it, being formed of diluvial matter, principally clay, with masses of chalk embedded in it, are subject to incessant inroads of the sea. No suitable landings in this section.

No landings in the Thames considered practicable.

Distances and time in hours required for British naval forces to reach threatened areas.

[Speeds: A=Battleships, 20 knots; B=Destroyers, 30 knots; C=Submarines, 15 knots; D=Battle cruisers and light cruisers, 25 knots.

Miles (sea).							Firth of Forth (hours).				Dover (hours).				Thames (hours).				Harwich (hours).				Lowestoft (hours).				Humber (hours).			
							A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
224	327	372	411	418	0	Firth of Forth	0	0	0	0	21	14	28	17	21	14	28	16	19	13	26	15	16	11	22	13	11	8	16	9
176	279	324	363	371	48	Holy Island	2	2	3	2	19	12	24	15	18	12	24	14	16	11	22	13	14	9	18	11	9	6	12	7
150	253	298	340	348	71	Alnmouth Bay	4	2	5	3	17	12	23	14	17	11	22	14	15	10	20	12	12	8	16	10	7	5	10	6
145	248	293	335	343	76	Druidge Bay	4	3	5	3	17	12	23	14	17	11	22	13	15	10	20	12	12	8	16	10	7	5	10	6
137	240	285	327	335	84	Newbiggin Bay	4	3	5	3	17	11	22	14	16	11	22	13	14	9	18	11	12	8	16	10	7	5	10	6
136	239	284	326	334	85	Cambois Bay	4	3	6	3	17	11	22	14	16	11	22	13	14	9	18	11	11	8	16	9	6	5	10	5
134	237	282	324	332	87	Blyth	4	3	6	3	17	11	22	13	16	11	22	13	14	9	18	11	11	8	16	9	6	5	10	5
115	218	263	305	323	96	The Tyne	5	3	6	4	16	11	22	13	15	10	20	12	13	9	18	11	11	7	14	9	6	4	8	5
95	198	243	285	303	116	Tess Bay (Hartlepool)	6	4	8	5	15	10	20	12	14	9	18	11	12	8	16	10	10	7	14	8	5	4	8	4
40	143	188	230	248	171	Flamborough Head	9	6	11	7	13	8	16	10	11	7	14	9	10	6	12	7	7	5	10	6	2	2	4	2
0	103	148	190	208	211	The Humber	11	7	14	9	10	7	14	8	9	6	13	8	7	5	10	6	5	3	6	4	0	0	0	0
18	85	130	172	190	229	Sutton-le-Marsh	12	8	15	9	10	6	13	8	9	6	12	7	7	4	8	5	4	3	6	3	....	....	....	....
33	70	115	157	175	244	The Wash (offshore)	12	8	16	10	9	6	12	7	8	5	10	6	6	4	8	5	4	2	4	3	....	....	....	....
....	0	45	87	105	314	Lowestoft	16	11	21	13	5	4	7	4	4	3	6	3	2	2	3	2	0	0	0	0	....	....	....	....
....	45	0	42	60	359	Harwich	18	12	24	14	3	2	4	2	2	1	3	2	0	0	0	0	2	2	3	2	....	....	....	....
....	.....	42	0	.....	401	Thames (Sheerness)	....	....	....	....	....	....	....	....	0	0	0	0	2	1	3	2	....	....	....	....	....	....	....	....
....	.....	.....	55	0	456	Dover	....	....	....	....	0	0	0	0	3	2	4	3	....	....	....	....	....	....	....	....	....	....	....	....

	Distance.	Time, rail.	Time, motor.	Time, marching.
	Miles.	*Hr. min.*	*Hr. min.*	*Hr. min.*
Edinburgh (Firth of Forth) to Cheswick	47	1 54	7 00	.....
Edinburgh (Firth of Forth) to Alnmouth Bay	69	2 46	9 00	.....
Blyth to River Tyne	10	0 30	1 00	4 00
Blyth to Druidge Bay	12	0 30	1 30	5 00
Blyth to Alnmouth Bay	16	0 42	2 00	6 24
Durham to Sunderland	25	1 00	3 20	.....
Durham to South Shields	27	1 10	4 00	.....
Durham to Hartlepool (Redcar)	40	1 40	6 00	.....
North Hartlepool to Tees River	8	0 20	1 00	3 12
Saltburn to Redcar	5	0 12	0 30	2 00
Saltburn to Whitby	25	1 00	3 20	.....
Driffield to Bridlington	12	0 30	1 30	5 00
Hull to Hornsea	12	0 30	1 30	5 00
Hull to Withernsea	20	0 50	3 00	.....
Louth to Sutton-on-Sea	14	0 40	2 00	5 36
Louth to Grimsby	15	0 45	2 00	6 00
Louth to Skegness	25	1 00	3 20	.....
Boston to Skegness	22	0 50	3 00	.....
Norwich to Lowestoft	20	0 40	3 00	.....
Norwich to Cromer	22	0 50	3 00	.....
Harwich to Aldeburgh	35	1 20	5 00	.....
London to Burnham on Crouch	40	1 35	6 00	.....

Trains assumed to be: 30 covered cars, 17 flat cars, 1 coach, 2 R. R. service cars. One box car holds 40 men, 8 horses or mules. Required for Div., less Artillery, 32 trains; for Divisional Artillery, 26 trains. Good time for loading trains, 3 hours; Infantry alone, 1 hour.

Trucks 3 to 5½ tons; speed, 7 miles per hour for 10 hours, or 70 miles; 1 large truck holds 40 men if necessary, Rate of marching, 2½ miles per hour.

Assuming raid on indicated section.—Table showing time required for British land and naval forces to reach locality.

Location of raid.	Naval force from—	Time to reach point of raid.	Land force from—	Approximate strength, men.	Time to reach point of raid.	
					Railroad.	Motor.
		Hours.			*H. m.*	*H. m.*
Alnmouth Bay region	Firth of Forth:					
	Battleships	2	Edinburgh	12,000	5 00	8 00
	Destroyers	2				
	Submarines	3	Blyth	10,000	3 00	3 00
	Cruisers	2				
Redcar (Hartlepool region.	Firth of Forth:					
	Battleships	6	N. Hartlepool	2,500	.....	1 00
	Destroyers	4				
	Submarines	8	Saltburn	2,500	.....	0 30
	Cruisers	5				
Bridlington-Hornsea region.	Firth of Forth:					
	Battleships	9	Driffield	5,000	1 30	2 00
	Destroyers	6				
	Submarines	11	Hull	5,000	1 30	2 00
	Cruisers	7				
	The Humber:					
	Destroyers	2				
	Lowestoft:					
	Destroyers	3				
Sutton-on-Sea region.	Harwich:					
	Destroyers	4	Louth	5,000	1 40	2 00
	Submarines	8				
	Cruisers	5	Grimsby	5,000	2 30	3 00
	Lowestoft:					
	Destroyers	3				
	Humber:					
	Destroyers	0.30	Skegness	5,000	2 00	2 30
	Submarines	1	Boston	5,000	2 20	3 20
Region, Wash to Thames.	Lowestoft	.....	Norwich	56,000	.....	.....
	Harwich	.....	Hrwich			
	Thames	.....	London			
	Dover	.....				

OWN FORCES—STRENGTH, DISPOSITION, AND POSSIBLE AGTIONS.

Our High Seas Fleet is inferior to the Grand Fleet, except in destroyers, of which we have a greater concentration, due to the large number of enemy destroyers on convoy work and submarine hunting, which is made necessary by the activity of our submarines. We have also a superiority in submarines, which, however, have not enough speed to accompany a raiding force, and which, if they were concentrated in the vicinity of the raid at an earlier date, would result in an enemy concentration of antisubmarine vessels which might jeopardize the raid by active measures or by giving early information.

There would be required for a raiding force 100,000 men and 20 transports, minimum speed 20 knots, and from 8 to 10 thousand gross tons each, allowing 2½ gross tons per man. These forces can be mobilized unknown to the enemy in the vicinity of Cuxhaven.

Table of distances.

	Miles.
Helgoland to Firth of Forth	360
Helgoland to Holy Island	330
Helgoland to Hartlepool	300
Helgoland to Tees	300
Helgoland to Flamborough Head	260
Helgoland to Humber	250
Helgoland to Wash	250
Helgoland to Lowestoft	240

Considering the tables showing disposition of the British military and naval forces, the study of suitable landings and the localities on the English east coast wherein the greatest damage could be done, together with the table of distances from Helgoland to the English coast, the following conclusions are arrived at, viz:

1. *From Tyne to Whitby.*—This district has the greatest concentration of villages; can muster 5,000 troops for its defense within and hour, and can assemble the main naval forces from the Firth of Forth in the following periods of time: Destroyers in 3 hours, cruisers in 4 hours, battleships in 5 hours, and submarines in 6 hours. It has 13 miles of beach suitable for landing in good weather. It is 360 miles from Helgoland.

2. *Wash to the Thames.*—This district has the second greatest concentration of towns; can muster 56,000 men for its defense. It has already 10,000 men in one of the few towns in which landing is practicable. It has no beaches suitable for landing. There are naval forces in the near vicinity at Lowestoft and Harwich. The Thames naval force can reach it with destroyers in 4 hours, battleships in 5 hours, cruisers in 4 hours, and submarines in 7 hours.

There is a mine field defense, extending from approximately 52 N. south to the Dover Straits. It is 240 miles from Helgoland.

3. *From Flamborough Head to the Humber.*—This district has the third greatest concentration of villages; can master 10,000 men in from 1½ to 2 hours for its defense. It has no beaches suitable for landing. It requires 9, 6, 11, 7 hours for battleships, destroyers, submarines, and cruisers, respectively, to reach it from the Firth of Forth. The naval forces based in the Humber for convoy duty require but 2 hours to reach this district. This force is not large, and might be absent on convoy work. The Lowestoft force requires 5, 10, 6 hours for destroyers, submarines, and cruisers, respectively, to reach it. It is 260 miles from Helgoland.

4. *Between the Humber and the Wash.*—This has the fourth greatest concentration of towns. It can muster 20,000 men in 3 hours for its defense. It has approximately 9 miles of good landing beaches. The naval force at Lowestoft requires 3 hours to assemble, while the main naval force at Firth of Forth requires from 8 to 15 hours and forces at Harwich 5 to 7 hours to reach it. It is 260 miles from Helgoland.

Flamborough Head to the Humber.—No landings practicable.

From the Tyne to Whitby.—This district is too close to the Firth of Forth, where the Grand Fleet is based. The landings practicable could be reached by troops at a time when delay for our forces landing could not be considered.

The district from the Wash to the Thames is too completely protected.

While the district between the Humber and the Wash (having the fourth greatest concentration) can muster 20,000 men for its defense, yet there are several good landing beaches which are so situated that it requires the greatest length of time for naval forces of any strength to reach its vicinity. It has 9 miles of beach suitable for landing. It is 260 miles from Helgoland, being one of the nearest points on the English coast.

A raid on the English coast to be successful must be so conducted that—

1. The first evidence that the raid is contemplated is the arrival of the transports off the points of landing.

2. The High Seas Fleet is so placed at this time that it can intercept the Grand Fleet and accept action with it. This action should be a delaying action for the purpose of gaining the greatest length of time to the transports. Assuming that 24 hours would be required to complete the landing, and withdrawal of all merchant stores to a distance of 5 miles from the beach, and that the Grand Fleet could be brought to action at least 3 hours from the point of landing, it

would require an action of at least 12 hours' duration. This action on the part of the High Seas Fleet could only be admissible when conditions on the western front and elsewhere make it apparent that the war is lost to Germany unless this diversion is successful.

Decision.

To raid the English coast between the Humber and the Wash.

[Extract from Memorandum No. 71, "History of Planning Section."]

Undertaken by the Planning Section with a view to determining the likelihood of a German raid and its influence upon the naval situation.

In forwarding the memorandum on 7 September the Force Commander made the following comment:

"2. This subject is one that does not closely concern us, as none of our forces would be likely to be involved in any defensive action that might be taken against such a raid. The study was suggested, however, by the frequent receipt of intelligence information to the effect that preparations were being made in the German arsenals and dockyards for some naval movement on a large scale, the activities including the rearming of vessels which had been disarmed for some time and the apparent preparation for commissioning nearly everything in German harbors that would float. While this information was always of very doubtful reliability, it seemed worth while to make a study as to the possibilities of a raid on the English coast.

"3. The Planning Section in collecting information upon which to base this study found that the British military authorities have made very comprehensive and complete preparation to meet a possible attempt on the part of Germany to land a force on the English coast. The Admiralty has not made any such preparations but has of course considered the possibility of such a raid in deciding on the distribution of the British naval forces and it may be said that the British Admiralty and Navy would welcome such an attempt on the part of Germany as giving them the long sought opportunity for a major action against the German Fleet."

MEMORANDUM No. 49.

THE SUBMARINE SITUATION IN GENERAL, ANTISUBMARINE MEASURES, AND THE UTILITY OF AMERICAN SHIPYARDS.

30 August, 1918.

The following memoranda were prepared by representatives of American and British Planning Sections during the night of August 27, in preparation for a conference to be held the following morning between the First Sea Lord and the American Assistant Secretary of the Navy.

The subject of the memoranda was not clearly defined in advance, but was supposed to be along the general lines of a discussion held between Admiral Sims and the First Sea Lord, at which Captain Fuller (British Director of Plans) was present. It was understood that the sense of this discussion included the present submarine situation in general and antisubmarine measures which should be taken. But it had particular reference to the question of the manner in which American shipyards could assist British construction of antisubmarine vessels, in order that British yards could proceed with the construction of merchant vessels more rapidly, and thus meet present public and political criticism with respect to the small output of merchant tonnage. Apparently the result of the discussion was a tentative conclusion that a large number of small vessels suitable for escort work, extended well to seaward, was probably necessary in the near future, owing to the extension of submarine activity farther from shore.

The original intention was that a joint paper should be prepared by representatives of the two Planning Sections.

Preliminary discussion between the Planning Section representatives developed a divergence of view as to the form which the paper should take, particularly with reference to the inclusion of matter relating to the Northern Barrage and its support by hunting units, which the American representative believed should receive considerable emphasis.

Work was begun simultaneously on separate papers. The American memorandum was completed first, and the British representative

then undertook to reconcile the two with a view to producing a joint paper satisfactory to both.

In the original draft of the British paper insufficient emphasis was laid upon the Northern Barrage and its support to satisfy the American representative, and since time forbade further discussion the two memoranda were then submitted separately.

Subsequently, the British memorandum was altered to emphasize more strongly the importance of completing and supporting the Northern Barrage.

MEMORANDUM BY UNITED STATES PLANNING SECTION.

1. The close interrelation between the various forms of antisubmarine measures renders it impossible to reach sound conclusions by the consideration of one of these measures alone.

2. Our principal and most successful reply to the submarine has been the convoy system. By means of it we have been enabled to keep losses within bounds and to continue the war.

One of the enemy's anticonvoy measures has been to extend submarining farther into the Atlantic and, to a small extent, to the North American coast.

4. It is physically impossible for us to counter this move by extending the convoy system throughout the Atlantic route. About 1,200 escorting vessels of seagoing antisubmarine type would be required for such a convoy system. The most complete defensive reply which we are able to make is to duplicate approximately on the North American coast the convoy escort system now in effect in Europe.

5. But it should be specially noted that such measures alone will not reduce materially the mercantile losses below present figures. We have reached approximately the limit of protection which a practicable convoy escort system is able to afford.

6. We adopted the convoy system originally because at that time there was no other alternative. The enemy had the initiative and has maintained it. At no time have we felt sufficiently secure to assign forces, at the expense of the convoy system, to operations more offensive in character.

7. Our losses will not be reduced much below the present figures until we succeed in developing an offensive support to the convoy system. The inevitable effect of success in this form will be a reduction in escort requirements.

8. The most important antisubmarine measure which can be effected at present is the speedy completion of the North Sea and Adriatic mine barrages; complete in length from coast to coast, and in depth from the surface to about 300 feet.

9. The support of the barrages by surface craft and aircraft will render them more effective. In fact the barrages will furnish a nucleus of effort about which we may gradually assemble with safety our main antisubmarine effort, and ultimately conform to the principle of concentration; which the enemy's advantage of the initiative has heretofore denied us.

10. Another important offensive measure which should be further developed is submarine hunting. It should be most useful when used to support the mine barrages.

11. Our experience to date with hunting by sound has been disappointing—undoubtedly to some extent due to inexperienced personnel and to the necessity for operating with material which was still in the development stage. The lack of success has been due also to the lack of development of hunting tactics.

12. Large groups hunting by sight during long nights is worthy of trial; and a combination of sight and sound hunting should prove effective with vessels of proper type and personnel trained in the special tactics required. While no untried effort should be put into effect on a large scale, still we are justified at this time in allotting a sufficient number of vessels to demonstate whether an offensive method of such apparently promising value is in reality worth further effort.

13. With barrages properly completed and properly supported by hunting groups and other craft it is very probable that convoy requirements will be reduced materially. But we can not afford to rely wholly upon such an assumption; and it is possible that a greater number of antisubmarine vessels, suitable for high seas work, than are now projected will be required.

14. In view of the supreme importance of the time factor, the speeding up of construction now projected is of greater consequence than undertaking new programs. The new American destroyers should have their torpedo armament entirely omitted if by so doing their completion may be expedited. The importance of time also requires that newly projected types have their characteristics altered if in this manner their delivery may be expedited without affecting their usefulness in the intended service.

15. The following are the minimum requirements of an antisubmarine vessel suitable for escort and hunting services:

(*a*) One thousand tons displacement.
(*b*) Twenty-four knots speed.
(*c*) Radius of latest American destroyers.
(*d*) Four 4-inch guns.
(*e*) Forty depth charges.
(*f*) Latest listening devices.

102315°—23——23

(*g*) Special arrangements for stopping all noise during an interval of five minutes.

(*h*) Seaworthiness equal to the latest destroyers.

16. In view of the magnitude of our present destroyer program, as well as of the great extension of all forms of antisubmarine measures, it is not believed necessary to lay down more vessels of that general type at this time. If more are laid down, the number should not exceed 100.

17. An important antisubmarine measure is the construction of merchant vessels. It is believed that surplus labor and material, above that required to complete present program for vessels of destroyer type, should be utilized in the construction of merchant tonnage, rather than in large additions to the program for vessels of destroyer type.

Measures Required to Meet the Submarine Situation in the Future.

1. The fact that the percentage of sinkings beyond 50 miles from the coast has risen during the last few months does not, so far as the ordinary U-boat is concerned, indicate any radical change in the enemy's submarine policy now or in the future. There does not appear to be any ground for the assumption that as our antisubmarine measures improve, the submarines will work much farther out. Outside narrow areas, such as the North Sea, Irish Sea, and English Channel, the space involved is so large that counter measures must be more or less limited to the immediate vicinity of the convoys, and these are much the same whether the convoy is 30 or 300 miles from the coast.

2. It is fundamental that the farther the submarine operates from the focal and terminal areas, the greater will be its difficulty in locating targets. This is accentuated by the convoy system, which concentrates the shipping in a comparatively small space.

3. The only new factor in this respect is the advent of the cruiser-submarine, which has a surface speed of 18 knots and will probably remain at sea for six months and be able to visit any part of the world. Twelve are believed to be on order, and six should be in commission before the end of the year.

4. These will, of course, go farther afield than the ordinary U-boat, but they will tend to work in the vicinity of the focal and terminal areas, such as off the North American coast, River Plate, Dakar, etc. It will not pay them to work right out in the ocean spaces.

5. These vessels were probably designed with the primary rôle of attacking trade on the surface by gunfire. The reply is the extension of the ocean-escort system to the South Atlantic and to the outward

trade in the North Atlantic. If certain British cruisers are withdrawn from patrol duties on distant stations, and, together with United States predreadnoughts, battleships, and armed cruisers, are used for ocean escorts, it is considered there should be sufficient ships for the purpose.

6. The United States are arranging for a percentage of their merchant ships to be equipped with a special armament which will enable them to strengthen the ocean escorts, and the application of this system to the British mercantile marine is under consideration.

7. The ocean-escort system is also a protection from the submarine-cruiser's torpedo attack, for, by concentrating the shipping in a small space, it is more difficult to find. The only other possible counter measure on the North American Atlantic coast is the provision of antisubmarine escorts on similar lines to those in the British submarine zone, but the number of vessels required would be out of all proportion to the very limited enemy submarine force in that area. It is considered that such vessels would be better employed in preventing enemy submarines proceeding into the Atlantic.

8. The figures given in the Director of Statistics' table are not a percentage of the total number of sailings of each class of vessel, but a percentage of the total attacks or sinkings.

9. The increase in the size of the vessels sunk does not indicate any new factor in the submarine situation. It is probably largely a question of chance, and next quarter the percentage is just as likely to fall. Of course, if the conditions are favorable, the enemy will always aim at the largest ships, and the larger the ship the greater the probability of hitting.

10. With regard to the present stationary position of monthly losses of tonnage, this is due to the fact that we are not destroying sufficient submarines to reduce it, and that, neglecting the losses amongst vessels not in convoy, the present rate of sinking is a measure of the limitations of the convoy system's defensive power.

11. In order to meet the present situation and reduce the loss of merchant tonnage the rate of destroying the submarine must be accelerated, and that is the factor which dominates every other aspect of the situation. Up to the present the vast majority of the fast antisubmarine forces have been employed on escort duty, and this is more particularly true of destroyers, which are the only vessels with sufficient speed for hunting purposes.

12. The enemy has maintained the initiative in the submarine campaign from the beginning, and we have never felt sufficiently safe to withdraw destroyers from escort work for purely hunting operations. Also the fact that he has a free passage through the North Sea, and passes backward and forward without interruption, makes

us scatter our forces over a wide field, and, under these circumstances, the destruction of submarines becomes largely a matter of chance.

13. It is much more important to consider the destruction of the submarine in the narrow waters of the North Sea than the extension of antisubmarine escorts across the Atlantic. The latter measure is not only impracticable but would be opposed to every sound principle of concentration. The minimum number of small craft likely to be required for the purpose would be about 1,000, and a small proportion of these operating in the North Sea should be able to destroy enemy submarines.

14. It is considered that the progress made with submarine listening devices makes it almost certain that hunting by a combination of sound and sight will eventually prove effective if suitable vessels, such as destroyers, are used in sufficient numbers, together with personnel well trained in the tactics required and the listening devices employed. The geographical position of the east coast, right on the flank of the inward and outward submarine tracks, is a factor of which full advantage has not yet been taken.

15. If a sufficient number of suitable craft are continuously and systematically employed in offensive antisubmarine operations in the North Sea, they will, in conjunction with the Northern Barrage and other obstacles, destroy and damage a percentage of the submarines en route between their bases and their operating areas, and this percentage will increase as the personnel and instruments improve, so that eventually it should only be possible for a small proportion of submarines to succeed in reaching the Atlantic.

16. For the execution of an offensive antisubmarine policy the "destroyer" type of vessels is most suitable, whereas trawlers and other comparatively slow craft are of little use. It is also important that antisubmarine escorts should be interchangeable with the hunting craft and vice versa.

17. The only modification required in the modern destroyer to make it an ideal antisubmarine and escort vessel are to increase its fuel supply and to substitute a depth-charge armament for torpedoes. This might be done at the expense of the boiler power, which is unnecessarily large.

18. The construction of destroyers is now so standardized that it would be a great advantage to retain their dimensions, which give good seagoing qualities for a vessel of their displacement. It is considered that the following are the minimum requirements of an antisubmarine vessel for escort and hunting duties:

(*a*) About 1,000 tons displacement.
(*b*) About 24 knots speed.
(*c*) About 4,000 miles endurance.
(*d*) Three or four 4-inch guns.

(*e*) About 40 depth charges.

(*f*) Special arragements for stopping all noise during listening intervals.

19. The measures suggested to meet the submarine situation are:

(*a*) The completion of the Northern Barrage from the Norwegian coast to the Orkneys.

(*b*) The provision of strong hunting forces in the North Sea composed of destroyers or similar vessels with listening apparatus and personnel to work it. It is considered that at least 50 are required to have any effect on the submarines.

(c) Augmentation to a suitable establishment of antisubmarine craft for ocean escort duties up to 500 miles from British and French Atlantic ports, these craft to be suitable for working with hunting forces if required.

NOTE.—With regard to the above, the requirements for (*b*) should be met before those for (*c*).

In forwarding the paper the Force Commander made the following comment:

"2. The circumstances attending the preparation of this memorandum are fully set forth in the memorandum prefixed to it. The Force Commander did not participate in any conferences between the First Lord of the Admiralty and Assistant Secretary Roosevelt, but was present at a conference of Admiralty officials presided over by the First Lord.

"3. The statements made in the Planning Section memorandum are believed to be correct and, in general, accurate, and it is thought it will be useful for the Department to have these statements in its possession in view of the prospective visit to the United States of the First Lord of the Admiralty with other Admiralty officials.

"4. With respect to paragraph 5 of the memorandum: It is to be remembered that as the number of vessels in the ocean trade increases, either more or larger convoys must be run. In the first case probability of a submarine finding a convoy is increased, while in the second case the protection of the convoy offered by the escort is decreased, unless the number of escorting vessels is largely increased. It is true, therefore, that there is a limit of protection which a practicable convoy escort system is able to afford. It is perhaps too much to say that we have now reached even approximately that limit of protection.

"5. Attention is invited to the fact that the last six pages of this memorandum are devoted to the memorandum prepared by the Plans Division of the Admiralty."

MEMORANDUM No. 50.

BATTLE CRUISER RAID.

September, 1918.

(See Maps Nos. 4 and 5.)

The Navy Department's plan for protecting convoys against raiders from the North Sea or Mediterranean is given in the following cablegrams:

Origin: Opnav, Washington, 31 July, 1918.

Simsadus.

Simben 8. Reference Planning Section Memorandum 26—battle cruiser raids. The department is of opinion that raid by a battle cruiser against the supply lines to European ports, particularly against troop convoys, is a possibility, and that even if the chances be remote it should be guarded against. The department further notes that the decision arrived at as modified by the action actually contemplated by the Admiralty, while safeguarding ships leaving port after notice of the escape of an enemy battle cruiser has been promulgated, is in the nature of a negative decision and affords only partial relief to ships then in transit between United States and European ports. The department further proposes the following definite plan for consideration and action. General plan to be applicable to United States troop convoys, cargo convoys to French bay ports, and convoys carrying United States troops; other convoys to utilize plan if considered advisable by Admiralty. Plan drawn on line of battle cruiser escaping by way of North Sea around north end Scotland, though with slight modification it is applicable also to enemy battle cruiser escaping from Black Sea. Definite information of escape of enemy should be given to all forces before enemy has crossed Scotland to Iceland lines or has gotten clear of Aegean Sea. Plan applicable to both eastbound and westbound ships. Specific details: The Navy Department has asked the State Department to request of Japan that she detail four battle cruisers to ——— with the Atlantic Fleet at Hampton Roads. The North Atlantic to be divided into three areas—first, West Atlantic, longitude 45° west to United States coast; Mid-Atlantic, longitude 20° west to longitude 45° west; East Atlantic, longitude 20° west to East Atlantic destination. The United States to station Division 6, consisting of U. S. S. *Utah*, U. S. S. *Nevada*, U. S. S. *Oklahoma*, at Queenstown or Brest, preferably the former port or vicinity, to act as raider guard against battle cruisers in the Mid-Atlantic and east section. To hold the Eighth Division, consisting of U. S. S. *Arizona*, U. S. S. *Mississippi*, U. S. S. *New Mexico*, U. S. S. *Pennsylvania*, to cover the West Atlantic section or to proceed where necessary. To use the Japanese battle cruisers, if they are detailed to work with our forces, for the purpose of direct pursuit. Eastbound convoys: All convoys between longitude 45° and United States return to nearest United States or Canadian port, there to await adequate escort. Furnish two old battleships as escorts for each convoy carrying troops. If practicable, extend the same escort

to cargo convoys, and, where this is not practicable, use two armored cruisers for escort to cargo convoys; all convoys east of meridian longitude 20° proceed to destination at top speed; convoys between longitude 45° west and longitude 30° west diverting immediately to Azores Islands and make for an anchorage or lee under island San Miguel; convoys between longitude 30° and longitude 20° diverting to San Miguel or proceed to destination or nearest port as circumstances demand, depending upon estimated position of enemy cruisers relative to position and speed of convoys. Westbound shipping: Ships between longitude 15° west and European ports return to port to await adequate escort or divert to San Miguel, Azores Islands, depending upon submarine situation; ships between longitude 15° west and longitude 45° west divert to Azores Islands or to nearest United States or Canadian port, depending upon their proximity to those points. Ships westerly of longitude 45° west route to desination or to nearest port. Utilize U. S. S. *Delaware* and U. S. S. *North Dakota* with Division 2, Division 3, Division 4, Division 5, battleship force, to escort troop convoys; utilize cruiser force to escort cargo convoys; hold Battleship Division 8 with one destroyer division instantly ready to proceed; dispatch Division 6 with two destroyer divisions in European waters to proceed at top speed to Azores Islands, San Miguel. Use Japanese battle cruisers as pursuit division, if they are detailed to cooperate with United States forces and if such plan is agreeable to them. Above plan to become effective immediately upon agreement and to be put into operation upon receipt of broadcast radio and cable stating that enemy battle cruiser had escaped from North Sea. The department to maintain adequate supply of coal and oil in European waters and Azores Islands, to meet the logistic needs of Battleship Division 6. This above plan is suggested as a possible counter to any enemy battle cruiser or small force of enemy ships escaping from North Sea and attempting to raid our lanes of communication before internment in some neutral port or escape to other seas.

Modification suggested for raiding force escaping from Adriatic Sea or Dardanelles: Ships east or westbound between meridian longitude 20° and longitude 45° and north of latitude 45 proceed to destination or the nearest port at top speed. 10030.

BENSON.

Origin: Opnav, Washington, 31 August, 1918.

724. Plan outlined our Simben 8 and 11 for protection against battle cruiser raids and instructions one of commander force, European waters, will become effective upon receipt of this cable, so far as plan for diversion of routes is concerned. Beginning with September 9, battleship escort will be given to the HX, HC, and United States troop convoys in the order of importance named. Until system of battleship escort is thoroughly in hand it is probable that some convoys will sail without additional battleship escort. You will be informed when this happens. To put the entire plan into active operation, if it is so desired, when information is gained of the escape of a raider, the following radio or cable will be sent by Sims and by Opnav: "Battle cruiser raid plan operative." 14030. 724.

BENSON.

Origin: Opnav, Washington, 4 September, 1918.

Simsadus.

857. Your 3959, 3947, and 3937. The disinclination of the Admiralty to divert HX and HC convoys in accordance with our plan naturally weakens it. Since protection must be afforded HX and HC convoys, as they carry our

troops, your plans to use Division 6 for the protection of HX and HC convoys, as indicated in 3947, approved, but the United States troop convoys diverted to Azores Islands according to our plans must receive the protection of at least one of our dreadnoughts from Division 6. Therefore, until joint agreement is reached we will expect the United States troop convoys and the HB to be diverted and the HX and HC to proceed. If department finds according to this arrangement, which scatters our force, we will be unable to adequately protect all the troop convoys, it may be necessary to urge upon the War Department the advisability of discontinuing sending troops in the HC convoy. As no joint agreement has been reached, convoys at sea are not familiar with our plan, and United States convoys must be given diverting instructions, but on receipt of this, issue instructions to all transports, United States men-of-war, and escort ships in European waters; make themselves familiar with necessary details. Also furnish all American merchant vessels with sealed orders, to be broken in case of receipt of operating signal as prescribed, whereby westbound ships may avail themselves of protection if desired. The operating signals will be sent in a United States code to American ships only. Beginning with September 9 it is department's plan to furnish predreadnought escort to the HX and HC convoys, whose captain will be familiar with our plan, but will not use it unless Admiralty so desires. Commander cruiser force will issue similar instructions to ships on this coast. Finally, this plan is only a temporary expedient and does not solve the problem of continued activity of an enemy battle cruiser in the North Atlantic. Escort by battleships will protect troop convoys against the ordinary raiders, but the cargo convoys will still be lightly protected. Our dreadnoughts are too slow for an efficient pursuit division, and no answer has been received from Japanese on our request that they send four battle cruisers to base with our fleet. Department desires to know what will be the Admiralty policy as to the use of their battle cruisers for pursuit in case of the escape of an enemy battle cruiser. 19503. 857.

BENSON.

In order to comply with the Navy Department's No. 857, we recommend that the following statement of the Navy Department's plan be issued to "All transports, United States men-of-war, and escort ships in European waters":

NAVY DEPARTMENT'S PLAN NO. 1 FOR PROTECTING UNITED STATES SHIPPING AGAINST RAIDERS.

EMPLOYMENT OF FORCES.

Battleship Division 6.—Utah, Nevada, Oklahoma. Are based at Berehaven, Ireland.

Battleship Division 8.—Arizona, Mississippi, New Mexico, Pennsylvania. Are based on United States Atlantic coast.

Battleship Divisions 2, 3, 4, and 5, plus *Delaware* and *North Dakota*, are now used to escort troop convoys.

Cruiser force is used to escort cargo convoys.

MISCELLANEOUS.

First. Plan is applicable to United States troop and cargo convoys and single ships bound to and from French ports.

Second. Plan is now effective and all vessels to which it applies will put it into operation upon receipt of the following message in a United States code by radio or cable:

"Battle cruiser raid plan operative."

Third. Department will maintain a small fuel supply at Azores.

Fourth. Senior officers of convoys and masters of vessels acting singly may receive instructions by radio ordering some action different from that herein prescribed. In any case such officers shall use their best endeavor to safeguard their commands.

Fifth. As the raider may emerge from either the North Sea or the Mediterranean and may be first heard of in any latitude, commanders of convoys and ships in safe latitudes may proceed to destination notwithstanding that this plan would require them, owing to their position in longitude, to turn back or to proceed to the Azores.

APPLICABILITY OF PLAN.

Sixth. Paragraphs seventh to thirteenth, which follow, apply to all United States troops and cargo ships, whether in convoy or proceeding singly, bound to or from French ports and not escorted in adequate force to meet the raider threat.

Eastbound shipping.

Seventh. If between United States coast and longitude 45, return to nearest port to wait escort.

Eighth. If between longitude 45 and longitude 30, proceed immediately to the Azores.

Ninth. If between longitude 30 and 20, proceed to Azores or to destination, or to nearest port, according to circumstances.

Tenth. If east of longitude 20, proceed to destination at top speed.

Westbound shipping.

Eleventh. If between European ports and longitude 15, return to port for escort, or proceed to Azores, depending upon submarine situation and other circumstances.

Twelfth. If between longitude 15 and longitude 45, proceed to Azores or to nearest United States or Canadian port, depending upon proximity to those points and upon other circumstances.

Thirteenth. If west of longitude 45, proceed to destination or to nearest port.

PROTECTION.

Fourteenth. Battleship Division 6, accompanied by two divisions of destroyers of the European forces, will proceed to San Miguel, Azores.

Fifteenth. Battleship Division 8, with one destroyer division, is to be held ready to proceed to sea instantly.

September 10, 1918.

We recommend further that the following sealed instructions be furnished all American merchant vessels:

INSTRUCTIONS FOR WESTBOUND UNITED STATES MERCHANT VESSELS IN CASE AN ENEMY RAIDER OPERATES IN THE ATLANTIC.

1. The following instructions prescribed by the United States Navy Department are to be carried out by westbound merchant ships in case of a raid by a battle cruiser or other powerful enemy vessel:

2. Purpose of the instructions is the safety of the ship.

3. When the position of the raider is known, ships so placed as to be able to continue their voyage with reasonable safety shall continue their voyage. When the raider is so close as to place the ship in imminent danger, the master must use his judgment as to the best manner of evading the raider regardless of the instructions which follow. In all other cases the following courses of action are prescribed:

(*a*) When between longitude 15° W. and European ports: Proceed to nearest allied port.

(*b*) When between longitude 15° W. and 45° W.: Proceed to Azores or to nearest North American port, giving preference to North American port if conditions permit.

(c) When west of longitude 45° W.: Proceed to destination or to nearest port.

On the outside of the envelope containing the above instructions we recommend that the following be written:

INSTRUCTIONS IN CASE OF RAID BY ENEMY BATTLE CRUISER OR OTHER POWERFUL SHIP.

NOT TO BE OPENED UNTIL WARNING HAS BEEN RECEIVED.

Information of a raid may be broadcasted from a vessel sighting the raider or may be broadcasted from shore radio stations. The following information may be expected by each vessel sailing singly and the senior officer of each convoy sighting a raider will immediately broadcast similar information:

(1) Greenwich meridian time of sighting.

(2) Position of sighting, latitude and longitude.

(3) Composition of force—whether battle cruisers, auxiliary cruisers, light cruisers, etc.

MEMORANDUM No. 51.

PROPOSALS FOR DEALING WITH CONVOYS DURING A BATTLE-CRUISER RAID.

26 September, 1918.

[Prepared by British and United States Planning Divisions and the Director of Mercantile Movements.]

PART I.

GENERAL PROPOSALS FOR DEALING WITH CONVOYS DURING A BATTLE-CRUISER RAID IN THE NORTH ATLANTIC.

GENERAL REMARKS.

1. The United States Navy Department's proposals only deal with troop convoys, and although these should undoubtedly receive the first call on battleship escorts, other convoys should also be considered. In order to make the best use of the forces available, it is essential to view the protection of all allied convoys in the North Atlantic as a single problem, and to issue similar instructions from the British Admiralty and United States Navy Department.

2. Hard and fast instructions should be avoided as far as possible for the exact circumstances of a battle-cruiser raid can not be foreseen. Much will depend on intelligence and the position of the various convoys at the time, but as a general rule, every effort must be made as soon as possible to provide with adequate escorts all convoys likely to pass through dangerous areas.

3. It is proposed that this should mainly be done by meeting or overtaking unprotected convoys with battleships from Berehaven and Halifax, and by utilizing battleships returning to America and those accompanying eastward-bound troop convoys that have reached a position of safety. In some cases it may be possible to afford more immediate protection by combining two convoys at sea under the same escort, but troop convoys should not be delayed in order that their escorts may provide protection for slower cargo convoys.

4. Action will as a rule have to be regulated by W–T, but in order

to provide for the movements of convoys before specific orders can be given them or in default of signals reaching them, general instructions should be issued to all convoys and fast troop transports sailing independently. It is of the utmost importance that the convoys themselves should preserve the strictest wireless silence, except in special cases which will be referred to in the instructions. The admiral commanding United States battleships at Berehaven should be kept informed of routes and positions of convoys and of the submarine situation in the Atlantic; and commodores of convoys and escort commanders should as far as possible know the routes and speeds of all other convoys.

5. A raider warning shall not be sent out without mutual consent of Admiralty and Navy Department, unless the evidence of a raider being out is conclusive. During a raid all convoys and battleship escorts to the westward of 40° W. will be under the control of the United States Navy Department in cooperation with the commander in chief, North America and West Indies, and those to the eastward, under the British Admiralty, in cooperation with the United States force commander. The two headquarters will be responsible for communicating intelligence and instructions within their own particular spheres, and should keep each other fully informed. The ordinary procedure for routing shall continue in operation except that orders to convoys and escorts shall be sent direct from the Admiralty and Navy Department to save time, base commanders concerned being informed of orders issued.

6. The number of battleships required in readiness at Berehaven and Halifax to meet convoys at sea depends on the number of these convoys that have already adequate escorts. For numbers required see paragraph 14. Halifax is proposed as the American base in preference to a United States port, because it is much farther to the eastward and convoys can be overtaken from that port which would otherwise have to turn back. In the summer season it may be found more convenient to use St. Mary's Bay, Newfoundland, as a coaling base for battleship escorts.

EASTBOUND CONVOYS.

7. On the warning being issued, convoys escorted by battleships should continue their journey; the Berehaven battleships should proceed to the westward to meet unescorted convoys along special routes, given to the latter in their instructions. Any other battleships that may be available should be directed according to circumstances.

8. Halifax escorts should be dispatched as necessary to overtake

convoys which have recently sailed. All convoys which sail after the warning should be provided with battleship escorts as arranged by Washington, convoys of similar speed being sent in company if necessary.

9. It is proposed that convoys in the eastern area of the Atlantic, unescorted by battleships, should either join up other convoys or shape course for the special battleship routes referred to in paragraph 7, and follow them to the eastward until they meet their escorts, the Admiralty informing the convoys concerned by W–T. If they are to the eastward of the supposed or probable position of the raider they should proceed direct to their destination.

10. The special routes referred to in paragraph 7 will be fixed by two rendezvous in longitude 22° and 30° W., respectively, issued with the instructions to convoys, which should be varied from time to time, and which can be altered by signal if the position of the raider renders this necessary. Different routes will be given for the convoys making the north of Ireland, English Channel, and French Bay ports.

WESTBOUND CONVOYS.

11. Westbound convoys that are to the eastward of the supposed or probable position of the raider should be recalled to the nearest port, unless it is fairly certain that they are clear of danger. The remainder should proceed to their destinations, remaining in company or dispersing at the discretion of the senior officer. If the enemy should operate in the western Atlantic, it may be necessary to meet westbound convoys (if and when adopted) with battleships which may be alone at sea or be dispatched from United States ports or Halifax.

BATTLESHIPS AT BEREHAVEN, ETC.

12. The general working of the foregoing plan is not affected by the actual number of battleships at Berehaven and Halifax or at sea with convoys, but the more that are available the fewer will be the convoys which will have to turn back or proceed through the danger zone without escort.

13. The number required can be estimated by an examination of the average position of eastbound convoys in the North Atlantic. The approximate distribution of eastbound convoys during a complete cycle of eight days is shown below. (See also the diagrams attached to this paper.)

This table does not include the United States 16–18 knot convoy (three ships) or the British fast transports sailing independently, as these do not follow a regular program.

Day.	Zone A.—Destroyer R. V. to 20° W.		Zone B.—20°–40° W.		Zone C.—40°–50° W.		Zone D.—W. of 50° W.		Total.	
	Troop.	Cargo.	Troop.	Cargo.	Troop.	Cargo.	Troop.	Cargo.	Troop.	Cargo.
First	0	0	2	3	1	1	1	3	4	7
Second	1	0	1	4	1	1	1	3	4	8
Third	0	3	2	1	1	2	1	3	4	9
Fourth	1	3	1	1	1	3	1	2	4	9
Fifth	1	0	1	1	1	3	2	2	5	6
Sixth	0	1	2	1	0	2	2	3	4	7
Seventh	1	1	1	3	1	1	1	2	4	7
Eighth	0	0	1	3	1	1	1	2	3	6

14. Convoys already accompanied by adequate battleship escort will continue their route as ordered. Generally speaking, it will be unnecessary to provide unprotected convoys in Zone A with battleship escorts, unless the enemy is suspected to be in the neighborhood. Unescorted convoys in Zone B will be met from Berehaven, or will be ordered to join other convoys. Similarly unescorted convoys in Zone C, but in some cases they may be ordered to turn back or to await escort from Halifax. Those in Zone D may be ordered to join other convoys or to await escort from Halifax. The action to be taken in each case will be seen more clearly from the diagrams.

15. If the H. X., H. C., and United States convoys carrying troops are already provided with adequate escorts, three dreadnoughts at Berehaven and from one to three at Halifax will provide for all requirements.

If the troop convoys are not already provided with adequate escorts the number of dreadnoughts at Berehaven should be increased to six, that at Halifax to five.

16. It is therefore proposed that if no convoys are being escorted regularly by one dreadnought or two predreadnought battleships, 3 additional United States dreadnoughts should be stationed at Berehaven, making a total of six, and that five should be stationed at Halifax. If regular battleship escorts are being provided for troop convoys these numbers may be reduced to three at Berehaven and three at Halifax. Destroyer escorts should be provided from Queenstown for battleships proceeding alone in the Eastern Atlantic submarine zone. Except when the position of the raider requires the convoy to be protected, further battleship escorts should only accompany convoys to approximately 18° W., and may drop them farther west if necessary to enable battleships to return without refueling. In order to save coal on the eastward voyage, they should fuel at Halifax, Sydney, or St. Marys Bay, Newfoundland, and thereafter operate from Canadian ports.

CONVOYS TO AND FROM GIBRALTAR AND THE SOUTH.

17. With regard to the Gibraltar, Dakar, Sierra Leone, and South Atlantic convoys, it is proposed that convoys which are in danger of being intercepted should be directed by the Admiralty to proceed to the nearest friendly protected harbor.

18. If the enemy is known to be operating to the westward of approximately longitude 30° W., it will be sufficient to divert all convoys as far to the eastward as submarine activity permits. Convoys which have taken refuge in harbor, or are in port when the warning is issued, should remain there pending orders from the Admiralty.

CONVOY CIPHER.

19. The convoy cipher should be used for all signals made under this plan. This cipher should be issued to all United States battleships and to fast troop transports which sail independently.

PART II.

INSTRUCTIONS TO NORTH ATLANTIC CONVOYS IN THE EVENT OF A BATTLE-CRUISER RAID.

GENERAL INSTRUCTIONS.

1. On receipt of a warning that an enemy battle cruiser has entered the Atlantic, senior officers of convoys, captains of fast British transports sailing independently, and others concerned are to be guided by the instructions given below, subject to which they are given full discretion as to the action taken to avoid destruction.

2. Complete W-T silence is to be maintained by escort vessels in company with convoys and by all merchant ships sailing independently or in company, subject to the following reservations:

(*a*) The position and movements of the raiding force are to be reported by vessels sighting it; and in order to insure such signals reaching shore stations, other vessels are, if necessary, to repeat them.

(*b*) On approaching the destroyer rendezvous, convoys may make the usual signal reporting time of arrival at the rendezvous, and, under certain circumstances, communication with approaching battleship escorts may be permitted. These signals are not to be made, however, if information of the enemy's position indicates that the safety of the convoy is likely to be endangered thereby. A raider can obtain accurate bearings of transmitting vessels within the range of the latter's wireless, and can fix their position in conjunction with another raider or submarine.

3. Reports of enemy's position, classified as "Reliable" or "Doubtful," will be issued as information is received by W-T in convoy cipher.

4. During a raid all convoys and battleship escorts to the westward of 40° W. will be under the control of the United States Navy Department in cooperation with the British commander in chief, North America and West Indies, and those to the eastward under the British Admiralty, in cooperation with the United States force commander. The ordinary procedure for routing will continue in operation except that orders to convoys and escorts shall be sent direct from the Admiralty and Navy Department to save time, base commanders concerned being informed of orders issued.

5. From the intelligence thus issued and from a consideration of the enemy's fuel endurance some estimate can be made of the raider's movements. This subject is examined in detail in Appendix I. In deciding on the course of action, and in the absence of other than these instructions, the following points should be borne in mind:

(*a*) There is little chance of hunting down an enemy battle cruiser in the Atlantic; and the safety of convoys will depend on evasion or the protection of battleship escorts.

(*b*) The North Atlantic is a very large space, and the chances of a battle cruiser locating a convoy unaided are not very great; but cooperation with submarines and aircraft is to be expected.

(*c*) As a final resort, senior officers of convoys must be prepared to scatter their vessels.

(*d*) Delay in arrivals dislocates the arrangements for destroyer escorts and exposes convoys to greater submarine dangers.

6. If in avoiding the enemy it is necessary to make so large a diversion to the southward that convoys or individual ships run short of coal, they should refuel at St. Michaels, Azores; but this should be avoided, if possible, as safe accommodation is limited.

7. If it is necessary to seek refuge in a European harbor, convoys should proceed to the Azores, Lisbon, or a French port. Defensively armed ships not carrying troops may be sent into Spanish ports; but escorts and ships carrying troops are not to enter neutral ports if it can be avoided.

EASTBOUND CONVOYS.

8. Subject to any necessary alterations of course to avoid immediate danger, convoys escorted by battleships will continue their route while convoys unescorted by battleships will, in the absence of specific instructions, shape course so as to get on to the special routes given in Appendix IV, and will follow them to the eastward until they meet an escort or are out of danger.

9. United States battleships will be dispatched from Berehaven along the above-mentioned routes, and any others that are available will be directed to meet adjacent convoys. As a general rule, the Admiralty will signal to the selected convoys the names of the battleships meeting them. Convoys for which no escorts are available may be directed to join other convoys or to proceed unescorted. In the latter case, the senior officer will act as circumstances dictate, subject to the principles indicated in paragraph 4.

10. Convoys to the eastward of 20° W. will continue their routes, subject to such deflection as may be necessary to avoid immediate danger. They will not be met by battleships unless specific instructions are issued to individual convoys.

11. Unescorted convoys west of longitude 40° W. will continue their route unless specific instructions are received by them to return to Halifax or Sydney. They will probably be directed to meet a westbound battleship or one from Halifax, or to join another convoy. In the event of the raider operating in the Western Atlantic, eastbound battleships in the Eastern Atlantic may be ordered to drop their convoys and reinforce the escorts in the west.

WESTBOUND CONVOYS.

12. Failing specific wireless instructions, westbound convoys are to continue their journey, subject to such deflection as may be considered necessary to avoid immediate danger. Convoys that are to the eastward of the reported or probable position of the raider, and those which have recently sailed, may be ordered to return to the nearest port. If convoys are being maintained right across the Atlantic and the raider is operating in the Western Atlantic, battleships will, if possible, be dispatched from United States ports or Halifax to meet them, the necessary instructions being issued by W-T.

SOUTHERN CONVOYS.

13. Battle cruiser raids on Gibraltar, Dakar, Sierra Leone, and South Atlantic convoys are improbable, and it is unlikely that battleships will be sent to meet them. As a general rule they should proceed with their voyage, making such alterations, of course, as may be desirable, but bearing in mind the chances of meeting other convoys. If considered necessary, they may be ordered to seek refuge in a friendly or neutral port and await instructions from the Admiralty.

102315°—23——24

APPENDIX I.

PROBABLE LIMITS OF ACTIVITY OF A RAIDING BATTLE CRUISER IN THE ATLANTIC.

The table below gives the fuel capacity of German battle cruisers:

	Fuel coal.	Stowage oil.	Total.
	Tons.	*Tons.*	*Tons.*
Hindenburg	4,625	984	5,609
Derfflinger	3,543	197	3,700
Seydlitz	3,050	197	3,247
Molkte	2,760	197	2,957
Von der Tann			

2. In the earlier battle cruisers oil is used only for spraying the fires; in the *Derfflinger* and probably the *Hindenburg*, details of which are lacking, a proportion of the boilers can burn oil alone. These vessels could therefore extend their endurance considerably by capturing an oiler. The endurance of the earlier three ships being much less than that of the *Derfflinger*, the following investigation has been confined to her.

3. The daily consumption of the *Derfflinger* is estimated as follows:

(*a*) Steam for full speed at 20 minutes' notice.

(*b*) Steam for full speed at 1 hour's notice.

Speed.	Consumption (tons per day).	
	(*a*)	(*b*)
10 knots	205	183
15 knots	336	320
20 knots	546	535
25 knots	996	996

4. The extreme limit which the *Derfflinger* could reach on the fuel she carries, assuming that she consumes 320 tons a day while cruising and retains a reserve of 1,000 tons of fuel to meet the demands of chasing and being chased, may be taken as the line Belle Isle Straits-Azores-Gibraltar. If she reached this limit she could not remain on it, but would have to return immediately. It is therefore unlikely that she will proceed so far to southward or westward. She could operate for four days on the line Ushant-C. Farewell-Greenland.

5. *Possibility of the raider refueling in the Atlantic.*—On the assumption given in paragraph 4, about nine days would elapse be-

tween the raider crossing the meridian of the Shetlands on her outward and inward journeys. If she remains out longer than this it must be presumed that she has succeeded in refueling.

6. Coaling in the open Atlantic would necessitate exceptionally fine weather. Oiling is a more practicable proposition, and the capture of an oiler is a possibility which must be taken into account. Fueling at sea is too uncertain to be an essential feature of the German plan and is therefore more likely to extend the duration than the field of the raider's operations.

7. The raider may, however, proceed to a prearranged rendezvous immediately after leaving the North Sea and refuel there before commencing operations. It is unlikely that a battle cruiser will be exposed to the risk of not being able to return through failing to meet her fuel ships, which are more likely to be captured than the raider herself.

Possible places for the rendezvous are as follows:

Greenland: An open harbor is usually to be found either on the west coast (October to July) or on the east coast (July to September), but the ice varies greatly from year to year, and unless reports of its condition have been obtained the operation would not be a promising one.

West Indies: This locality is open to the objection that if the battle cruiser failed to meet or to capture a fuel ship she could not get back to Germany.

8. The extreme limit which the *Derfflinger* could reach, on the assumption given in paragraph 4, if she proceeds to Greenland and refuels before operating, and retains sufficient fuel to get back to Germany, may be taken as the parallel of 30° north from 10° to 40° west, thence to latitude 35° north, longitude 60° west.

Appendix II.

W-T INSTRUCTIONS.

1. The greatest care and the most competent operators available should be used for reading all long-distance W-T messages to men-of-war (see "W-T Instructions for Ocean and Destroyer Escorts and for Commodores of Convoy") and war warnings to merchant ships (see Appendix to W-T Instructions for Merchant Vessels).

2. Since the duty of reading these messages, until the arrival of the destroyer escort, devolves upon the ocean escort, the commodore of the convoy should be warned when news is first received of the presence of the enemy, in order that the W-T operator of the commodore's ship may be cautioned to keep a sharp lookout for a "Raider distress" message.

3. It is desirable that the man-of-war or commissioned escort vessel should listen out on 400 meters (spark), if able to do so while keeping up her other communications, in order to intercept enemy W-T, with a view to getting warnings of his approach. After contact with the destroyer escort has been made, a destroyer may be detailed for this duty. Such information must, however, be accepted with considerable reserve, since very little reliance can be placed on estimation of the distance or character of the vessel signaling. The enemy would probably use the 400-meter wave for communicating with his submarines.

Appendix III.

List of special rendezvous.

Number.	Position.		Number.	Position.	
	Lat. N.	Long. W.		Lat. N.	Long. W.
100	35°	22	150	35°	30°
101	36		151	36	
102	37		152	37	
103	38		153	38	
104	39		154	39	
105	40		155	40	
106	41		156	41	
107	42		157	42	
108	43		158	43	
109	44		159	44	
110	45		160	45	
111	46		161	46	
112	47		162	47	
113	48		163	48	
114	49		164	49	
115	50		165	50	
116	51		166	51	
117	52		167	52	
118	53		168	53	
119	54		169	54	
120	55		170	55	
121	56		171	56	
122	57		172	57	
123	58		173	58	
124	59		174	59	
125	60		175	60	
126	61		176	61	
127	62		177	62	
128	63		178	63	

Appendix IV.

SPECIAL ROUTES FOR EMERGENCY ESCORTS.

Route I.—For convoys bound for French west coast ports.

Route II.—For convoys bound for English and Irish Channels.

Route III.—For convoys bound for North Channel.

2. The routes will be varied from time to time.

3. If circumstances necessitate it, the routes will be altered by broadcast signal.

4. The routes pass from Berehaven through the following rendezvous and terminate in longitude 30° W.

	Rendezvous passed through.
Route I	110 and 159
Route II	115 and 163
Route III	120 and 167

APPENDIX V.

The following is copy of a letter which explains the preceding plan and should be used in conjunction with it:

SEPTEMBER 25, 1918.

From: Force commander.
To: Secretary of the Admiralty.
Subject: Battle-cruiser raid plan.

1. The force commander acknowledges receipt of your M-00321 of 20 September, 1918, transmitting copy of the approved plan for dealing with convoys during a battle-cruiser raid in the Atlantic.

2. Attention is invited to the fact that the plan which has been approved by the Navy Department is contained in the cablegrams which follow. The plan "in extenso" as transmitted by you has not yet been submitted to the Navy Department. The cablegrams are a brief digest of the plan. Wherever the cablegrams appear in any way to differ from the plan as transmitted, the cablegram should be followed. The force commander therefore requests that copies of this letter be attached to all copies of the approved plan, in order that there may be no possible misunderstanding as to what the plan really is.

The following is copy of the cablegram presenting the plan to the Navy Department:

Your 857. Instructions to United States merchant vessels and to United States naval forces have been issued as directed. Admiralty propose to use their battle cruisers to bar the return of enemy raiders, and do not propose to use them for pursuit of raiders in the Atlantic.

I recommend the adoption of the following joint plan which has been prepared jointly by my Staff and Admiralty Plans Division, and has the approval of the Admiralty:

(Quote:) The following plan shall govern all vessels and convoys at sea after they have received warning of a raid:

PLAN.

1. Raider warnings shall not be sent out without mutual consent of Navy Department and Admiralty, unless evidence is conclusive "that raider is out."

2. As a rule convoys and supporting forces will be handled by radio from the Navy Department or the Admiralty.

3. The aim will be to continue all voyages and to provide all convoys that are in danger with battleship escort by sending battleships from Halifax and Berehaven to overtake or to meet convoys not already escorted by battleships, and by combining convoys of approximately equal speed.

4. Battleship escorts will leave eastbound convoys and join westbound convoys as indicated by the situation, getting all their fuel in American ports.

5. During a raid all operations west of longitude 40 shall be controlled by the Navy Department, in consultation with British commander in chief, North Atlantic and West Indies, and all operations east of longitude 40 shall be controlled by the Admiralty in consultation with the commander United States

naval forces, Europe, with complete interchange of information received and orders issued.

6. The ordinary machinery for routing shall continue in operation except that orders to convoys and escorts at sea to avoid raiders shall be sent direct from the Navy Department and the Admiralty to save time. Base commanders concerned shall be informed of orders issued.

7. Special rendezvous routes to be used in the case of a raid in the absence of radio instructions will be given each convoy unescorted by battleships before sailing, and battleships will be sent out from Berehaven to join the convoys.

8. Commanders of battleships at Halifax and at Berehaven, and all commodores of convoys and commanders of escorts, shall be given the routes of convoys sailed or about to sail, together with the latest information on the submarine and raider situation.

9. Destroyer escorts will accompany Berehaven battleships when practicable.

CONVOY INSTRUCTIONS.

1. Raider warnings and all subsequent communications will be made in convoy cipher. Reports of enemy position will be broadcasted by shore stations.

2. Convoys shall listen in for radio instructions but in their absence on receipt of warning the following shall govern:

(*a*) Notwithstanding these general instructions special vessels and convoys are given full discretion as to action taken to evade the enemy when danger is imminent.

(*b*) When practicable, convoys should seek to escape in the general direction of their destination.

(*c*) As a final resort convoy commanders, when insufficiently protected, may disperse their convoys.

(*d*) Maintain radio silence except that senior officer's ship shall—

1. Report position and movements of raiding force if sighted.
2. Relay to shore stations such reports if deemed necessary.
3. Communicate rendezvous signals unless safety of convoy is thereby endangered.

Eastbound convoys.

(*e*) Convoys escorted by battleships will continue their route.

(*f*) Convoys unescorted by battleships in the absence of radio instructions will get on rendezvous routes and follow them.

(*g*) Battleships will be dispatched from Berehaven to join convoys unescorted by battleships.

(*h*) Convoys for which no battleship escorts are available may be ordered by radio to join escorted convoys.

(*i*) A separate rendezvous route will be assigned for convoys bound to—

(1) French ports.
(2) English and St. Georges Channels.
(3) North Channel.

Westbound convoys.

(*j*) Convoys will, if practicable, continue their voyage.

(*k*) Westbound battleships will give such protection as practicable.

Southern convoys.

(*l*) Should proceed on their voyage unless ordered to port. (Unquote.)

The Navy Department in reply to the above cablegram sent the following cablegram:

"Before coming to a final decision regarding the proposed general plan for a battle cruiser raid, the department desires information on the following points:

"As to paragraph 3. Does this mean that troop and cargo convoys will be combined?

"As to paragraph 7. Is it the intention to lay out a plan of diversion routes for each unescorted convoy, which plan shall remain in force for a period of time and then be changed; or is it the plan to furnish several diversion routes on sailing to each unescorted convoy? Will these routes be furnished by the Admiralty to us for eastbound sailings and vice versa for westbound sailings? Will more than one diversion route be furnished to each convoy? Should not escorted convoys be furnished with diversion routes also?

"As to paragraph (*e*). This paragraph appears to preclude diversion of escorted convoys even when encountering superior forces.

"As to paragraph (*f*). The details to carry this into effect are not stated.

"As to paragraph (*h*). Is it the intention that troop convoys may under circumstances be delayed to join a cargo convoy?

"As to paragraph (*i*). Is it the intention that more than one diversion route shall be prescribed for each convoy?"

The force commander's reply to the above cablegram was the following:

"As to paragraph 3. Troop and cargo convoys may be combined when their speeds are equal, but only in case shortage of escorts make combination necessary.

"As to paragraph 7. The plan provides three rendezvous routes only, which will be changed periodically. All convoys bound for French ports during any given period will be given the same rendezvous route. Convoys bound for the English Channel will be given but one route, and those bound for the north of Ireland the third rendezvous route. These rendezvous routes are not diversion routes, but are given solely to facilitate the junction of convoys and battleship escorts in case radio instructions do not get through. No diversion routes whatever are under the plan to be given except by radio after the warning of the raid. No rendezvous routes are contemplated for the Western Atlantic, since there will be no westbound convoys there. Such routes may be designated if the department desires. Eastbound rendezvous routes will be furnished by the Admiralty to the Navy Department.

"As to paragraph (*e*). Paragraph (*a*), (*b*), and (*c*) modify all succeeding paragraphs and give the senior officer of the convoy all necessary discretion.

"As to paragraph (*f*). Details are intentionally omitted. The appropriate rendezvous route will be known to the convoy. The senior officer of the convoy will exercise his discretion as to when and how to get on the route. The expectation is that instructions by radio will give details of procedure to fit circumstances, and that the rendezvous route may not be used at all in some cases.

"As to paragraph (*h*). Troop convoys will not be delayed to join cargo convoys.

"The rendezvous routes mentioned in paragraphs (*f*) and (*i*) are the same rendezvous routes."

The following is copy of the cablegram by which the Navy Department approved the plan:

"The joint plan for meeting the raider menace in the Atlantic is approved, and will be substituted in place of the plan under which United States forces are now operating. For the present our Division 8, with duty corresponding to Division 6, will base at Hampton Roads, although at a later date some ships of the division may base at Halifax. The department directs that the necessary instructions be issued to United States forces to put this plan into effect and that the department be furnished with rendezvous routes. The Navy Department will give direction to the commander in chief and to the commander of the cruiser force to issue instructions from this end, putting the plan into effect immediately after the receipt of rendezvous routes. Although the plan does not embrace westbound shipping proceeding independently, the department infers that the provision of paragraph (3) of the plan will hold and that if necessary westbound shipping will be guided by warnings received, and by any subsequent instructions broadcasted."

The department was informed that its understanding, as set forth in the last sentence of the above quoted cablegram, is correct.

MEMORANDUM No. 51A.

TESTING OF NORTHERN BARRAGE.

18 September, 1918.

On July 30, Planning Section recommended—

That the surface mine barrage already laid be tested as soon as possible by running a skimming sweep set for a depth of 10 feet across the barrage and normal to it, in several places, so as to determine the effectiveness of the mines nearest the surface that have already been laid. Unless this is done we shall have no conclusive assurance of the effectiveness of our mining effort.

The report contained in the information Bulletin from the Admiralty this morning indicates that submarines are crossing Area A with impunity.

The Planning Section consider it highly important that the test, as recommended on 30 July, 1918, be carried out at the earliest possible date. So far no steps appears to have been taken to carry out the recommendation above quoted.

MEMORANDUM No. 52.

APPRECIATION BY BRITISH PLANS DIVISION—OFFENSIVE AND DEFENSIVE ALLIANCE WITH BULGARIA.

15 September, 1918.

FOREWORD.

Solution to the following problem was undertaken jointly by the British and American Planning Sections.

General situation: Reports indicate an increasing spirit of hostility on the part of Turkey and Bulgaria toward Germany, and serious jealousy between Bulgaria and Turkey. It is possible that in the near future it may be practicable for the Allies to conclude a separate peace with either Turkey or Bulgaria.

Required: An estimate of the situation as to which country it would be most desirable to conclude peace with, and the basis on which such a peace might be negotiated.

Assumption: That a peace made simultaneously with both nations is impracticable.

The American Planning Section believes that the conclusions reached in the following solution are the best from the point of view of the allied cause as a whole for the defeat of Germany. But since the United States is not actually allied with any nation, and since the solution advocates attack upon and the exploitation of a nation (Turkey) with which the United States is not at war, the United States Planning Section, notwithstanding that it participated in the solution, decided not to join Admiralty Plans Division in submitting this paper formally.

AN OFFENSIVE AND DEFENSIVE ALLIANCE WITH BULGARIA.

FOREWORD.

(i) Every 12 months of war is costing the Allies about 500,000 lives and over £5,000,000,000. Any reasonable step that can be taken to hasten the decisive defeat of Germany merits serious consideration.

(ii) A division in the enemy coalition on the lines suggested herein would have important stragetic results, as well as a profound moral

effect; it might well prove a decisive factor in the war, hastening a decision against Germany.

(iii) The most promising quarter in which we might expect to be able to create such a division is between Bulgaria and Turkey. By eliminating other possibilities, such as a peace with Bulgaria or a peace or an alliance with Turkey (vide Appendix I) as being less advantageous, the conclusion has been arrived at that, provided Bulgaria's greed, hatred of Turkey, and desire to be on the winning side are sufficiently potent to overcome her war weariness, an offensive and defensive alliance with Bulgaria[1] offers the most far-reaching naval, military, political, and economic advantages, and would hasten considerably the decisive defeat of Germany. In this respect the influence of the German retirement in France on the duration of the war may easily be exaggerated; the Allies have been fighting for four years mainly in their own territory, and it is by no means certain that Germany will not fight on for years in her territory.

Military Considerations.

1. The first effect of concluding an alliance with Bulgaria would be the withdrawal of the Bulgarian Army from the ranks of the enemy, and this is shown by the D. D. M. O. (vide Appendix II) to be a factor of the utmost strategic importance, because it would compel the enemy "to act everywhere on the defensive, and an extensive retreat on the western front would form a necessary part of such defensive policy."

2. The Bulgarian Army, however, would not only be withdrawn from the enemy coalition, but added to the allied man power; and Bulgarian troops, supported by the half million allied troops now at Salonica (vide Appendix III) could advance on Constantinople. This addition of about one million troops to Turkey's opponents, coupled with her practical isolation from Germany by the automatic cutting of communications via the Danube and the Berlin-Constantinople railway, would lead to a lessening of the Turkish resistance in Egypt and Mesopotamia, and British forces in those theaters could reinforce the allied effort before Constantinople. In these circumstances, it may be confidently asserted that Turkey would be compelled to an early and unconditional surrender.

3. As a result of Turkey's surrender, 250,000 white and 500,000 black British troops, 250,000 animals, and 10,500 mechanical transport vehicles now in Egypt and Mesopotamia (vide Appendix IV), together with 500,000 allied troops from Salonica and the Bulgarian

[1] Far from being prejudicial to the interests of Greece and our Balkan Allies, such an alliance could be arranged that would materially contribute to an equitable and satisfactory settlement of the Balkan question (vide Appendix VII).

Army, would be released; a proportion of these could be employed on the western front, the remainder could be diverted to assist the Czecho-Slovaks, Rumanians, and Serbians, or demobilized. We should thus benefit to some extent by the release of ocean tonnage (vide Appendix V). In addition, the Inland Water Transport in Egypt and Mesopotamia handles nearly two and a half million tons per annum, and this service would be released for use in France and elsewhere.

4. But the above-mentioned release of man power for more direct use against Germany is only a fraction of that which could be ultimately expected. Serbian prisoners would be released by Bulgaria, the Rumanians could be put on their feet again and their army reconstituted, and, above all, allied intervention via the Black Sea instead of across Siberia should make it easier for us to rehabilitate Russia. The military potentialities are vast.

Naval Considerations.

The opening of the Dardanelles would deprive the enemy of one of his two main submarine bases in the Mediterranean, and would thus simplify our antisubmarine campaign in that sea. More important still, our fleet would be able to enter the Black Sea and clear it of enemy vessels. Direct communication with Russia would be established, and some 350,000 tons of merchant tonnage obtained (vide Appendix VI). Enemy warships could be destroyed or forced to surrender, and the ships and personnel in the British Agean Squadron would be freed for more direct service against Germany.

Economic Considerations.

6. Control of the Black Sea being in allied hands, and communication via the Danube and the Berlin-Constantinople railway cut, the supplies of metals, fuel, and grain in the Caucasus and Ukraine could be diverted to the service of the Allies (vide Appendix VI) and all German hopes of supplies from Russia, Rumania, Bulgaria, and Turkey would have to be definitely abandoned.

Political Considerations.

7. All these naval, military, and economic advantages would follow an alliance with Bulgaria. Not the least important factor, however, is that the reward it is suggested to give Bulgaria promises to open a way—almost the only way—for the settlement of the conflicting aspirations of our Balkan Allies and Bulgaria. In short, it is suggested to allow Bulgaria to extend eastward, absorbing European Turkey up to the line Midia (on the Black Sea), Rodosto (on the Sea of Marmora) (vide Appendix VII), if necessary adding Con-

stantinople as an additional inducement, with the reservation that the Bosphorus and Dardanelles are to be internationalized, while the Gallipoli Peninsula is to be occupied by an allied force as a guaranty of Bulgaria's good faith.

8. It is urged that we should not ignore the possibility of forming an offensive and defensive alliance with Bulgaria on account of the complexities of the Balkan situation, since, whatever the outcome of the war, conflicting aspirations in the Balkans will have to be dealt with. The above proposals would go far toward solving this very difficult problem, and, if acted upon, would enable satisfactory arrangements to be made with a decisively defeated Turkey in regard to Mesopotamia and the future of Palestine and Armenia.

APPENDIX I.

Peace with Bulgaria or Turkey or an alliance with the latter would not offer such advantages as an alliance with Bulgaria, but the general effect of each one is considered below.

PEACE WITH BULGARIA.

1. The principal advantage of a peace with Bulgaria would be the elimination of the Bulgarian Army from the ranks of the enemy. This matter has been considered by the D. D. M. O.'s department of the British War Office, vide Appendix II, which may be summarized as follows:

(*a*) It would compel the enemy to act everywhere on the defensive, and an extensive retreat on the western front would form a necessary part of such a defensive policy.

(*b*) The bulk of the Turkish forces would be required to watch Bulgaria, since the latter's demobilization would be slow.

(*c*) With Bulgaria a doubtful neutral, and Rumania only waiting for an opportunity to rise, a large proportion of the total possible remaining enemy forces in the eastern theater would be immobilized watching these two States.

2. An advance along the Adriatic coast as far as Scutari should be a feasible operation, embracing the fall and occupation of Durazzo, which would be a factor of considerable naval importance.

3. From the naval and military points of view, therefore, peace with Bulgaria would have such a detrimental effect on Germany's war situation that it is highly probable that she would attempt to deter Bulgaria from making peace by the threat of incurring her active hostility. Such a threat would prevent Bulgaria making peace without first protecting herself by an offensive and defensive alliance with the Allies. A further obstacle to peace would be the difficulty of

arriving at a settlement of the Bulgarian frontiers, unless Bulgaria were willing to forego nearly everything she came into the war to gain.

PEACE WITH TURKEY.

4. Peace with Turkey would release in Egypt and Mesopotamia over three-quarters of a million British troops and would deprive the enemy of the use of the Dardanelles as a submarine base. Also, if we could rely on Turkey's will and ability to prevent the egress of belligerent warships from the Black Sea, we should no longer require to maintain the Aegean Squadron, and its ships and personnel would become available for service against Germany.

5. On the other hand, since the Dardanelles would become open to merchant traffic and the Black Sea to neutral shipping, additional neutral bottoms would become available for enemy transport of Black Sea produce, to the serious detriment of our blockade measures and our hopes of regenerating Russia. Turkey would be able to devote all her energies to exploiting her mineral and agricultural resources, and would naturally endeavor to improve her economic position by selling as much of her produce as possible to the Central Powers. Germany's dream of supplies from the East would therefore very probably materialize if the Allies made a separate peace with Turkey. The only counter would be Turkey's acquiescence to the passage of our fleet through the Dardanelles, so that we could obtain command of the Black Sea, but it is inconceivable that Germany would tolerate it, or would hesitate to threaten war in the last resource. Such a threat would drive Turkey into an alliance with the Allies as a measure of self-protection.

6. A further difficulty in the way of making an advantageous peace with Turkey is the settlement of allied requirements in Palestine, Syria, Armenia, and Mesopotamia.

AN OFFENSIVE AND DEFENSIVE ALLIANCE WITH TURKEY.

7. The principal additional advantage of an alliance over a peace with Turkey is that the Dardanelles would become available for the passage of allied war vessels into the Black Sea, unless Bulgaria, having declared war on Turkey, seized the Dardanelles with Germany's assistance.

8. Both Turkey and Bulgaria are war weary. Nevertheless, both wish to come out on the winning side, and the strong feeling of hostility and jealousy between the two countries is an important factor; indeed, in the case of Bulgaria, it might stimulate her to attack Turkey, if the latter allied herself with the Entente. Ger-

many and Bulgaria would then very probably be able to seize the Dardanelles before we could effectively come to Turkey's assistance, because Turkish railways are so much in the hands of the Germans. If this occurred, we should be deprived of the fruits of our alliance, viz: Allied control of the Black Sea, which carries with it (*a*) enhanced ability of the Allies to rehabilitate Russia—a factor of very great moral and material value; (*b*) the ability to divert to the service of the Allies supplies of metals, fuel, and grain from the Caucasus and Ukraine, together with the means of transport, which would otherwise become available for Germany.

9. On the other hand, Germany might discourage Bulgaria from entering into hostilities against Turkey, because if allied assistance were given promptly, Turkey would be a hard nut for Bulgaria to crack, and such hostilities would eventually lead to a further drain on Germany's resources, would put an end to all her hopes of obtaining supplies from the East, and would imperil the security of the large loans made by Germany to Turkey.

10. It is possible, therefore, that if we entered into an offensive and defensive alliance with Turkey, Bulgaria would hesitate to attack Turkey, and, furthermore, Turkey's example might strengthen Bulgaria's desire for peace and induce her also to come to terms with the Entente. In neither case, however, does it seem that terms could be settled without very considerable concessions on our side, which would be quite irreconcilable with the aspirations of our Balkan Allies, allied desires in Armenia, and British requirements in Mesopotamia and Egypt.

Appendix II.

Possible allied operations in the Balkans in the event of the elimination of Bulgaria from the war.

1. The following appreciation was prepared by the Military Operations Division, War Office, in reply to the questions—

If Bulgaria ceased to be hostile, would it be possible for the allied forces at Saloniki, either (1) to advance up the Adriatic coast as far as the Sabbioncello Peninsula; or (2) to cut the Danube waterway at any point?

2. The following hypotheses are assumed:

(*a*) The allied forces in Macedonia would remain at their present strength, no divisions being transferred either to or from other theaters.

(*b*) Bulgaria would either become a strict neutral, who would refuse passage to allied troops across her territory; or she would become an ally, who would place her army and resources at the Allies' disposal.

The immediate hypothesis that she would become a benevolent neutral is rejected on the ground that benevolent neutrality would cause Germany and Austria to declare war against her and so throw her into the arms of the Allies.

3. The feasibility of the operations in question may be considered from two points of view:

(1) Relative strength of forces on either side.

(2) Topography and communications.

4. As regards (1): The allied force is already defined by hypothesis (*a*) in 2 above as being the present allied army in Macedonia, viz:

British	4	divisions.
French	8	divisions.
Serbians	6	divisions.
Italians	1½	divisions.
Greeks	8	divisions (rising to 10).
Total	27½	divisions (rising to 29).

The enemy's available force is very difficult to determine. We may assume that without undertaking a considerable withdrawal he would be unable to remove divisions from France, but in the event of Bulgaria's elimination from the war he would be compelled to act everywhere on the defensive, and an extensive retreat on the western front would form a necessary part of such a defensive policy.

We may further assume that he could not bring up divisions from Turkey or the Turkish theaters of war, since the Bulgarians would hardly tolerate the passage of Turkish troops across their territory; and even if Bulgaria were neutral, the bulk of the Turkish forces would be required to watch her.

There remain the Italian and eastern theaters:

(*a*) Italian theater: The Austrians now have the equivalent of about 60 divisions (including dismounted cavalry divisions) on the Italian front, as against 57 allied. It is reasonable to assume that, under urgent necessity, Austria might risk the removal of, say, 15 divisions from the Italian theater, particularly if reinforced from the western front.

(*b*) Eastern theater: The enemy forces in the eastern theater amount to 35 German infantry divisions; 15½ Austrian infantry divisions; 4½ Austrian dismounted cavalry divisions. Of these the following could perhaps be used for active operations: 29 German infantry divisions; 9 Austrian infantry divisions; 4½ Austrian dismounted cavalry divisions—say the equivalent of 41 infantry divisions in all.

But it is obvious that with Bulgaria a doubtful neutral and Rumania only waiting for an opportunity to rise, a large proportion of this force would be immobilized in watching these two States.

Assuming, however, that 25 per cent of the 41 divisions might be transferred to the Balkans, we may reckon on the possible transfer of 10 infantry divisions from the eastern theater. Adding 15 divisions from the Italian theater, the maximum possible enemy reinforcement would thus be 25 divisions.

5. *Feasibility of proposed operations.—*

(*i*) Cutting of the Danube waterway: It appears that the principal use made of the Danube by the enemy is between the Black Sea and Turnu Severin, just below the Iron Gates. It is not known to what extent he uses water transport above Turnu Severin, but it is known that vessels drawing 10 feet or more can not go above that point, and also, as a railway runs from Turnu Severin to Budapest, the use of the river is less essential.

The Danube waterway can therefore only be cut effectively below Turnu Severin, and this implies that Bulgaria is an active ally.

With regard to the possibility of cutting the Danube waterway less effectively, above Turnu Severin, if Bulgaria were neutral, this could only be done if peace were made with Bulgaria on the understanding that she allowed passage to allied troops up the Salonika-Nish railway, even if the terms included her retaining Serbian Macedonia and occupying it during the war.

Further, even if the Salonika-Nish railway were available for the Allies, they could only supply 15 divisions along it. The enemy, with an excellent system of communications leading down to Belgrade, could probably maintain a greater number south of the river and could also probably spare them from other fronts (say 10 from the eastern and 15 from the Italian front).

On the other hand, it is doubtful whether the enemy would waste troops in holding an advanced position south of the Danube. It is more probable that he would seek to economize men by holding the line of the river, rather than crossing it, and so create a strategic reserve to meet emergencies generally in the Balkans, in view of the possible active hostility of Bulgaria and Rumania.

(*ii*) Advance up the Adriatic coast to the Sabbioncello Peninsula: This represents an advance of over 200 miles, with inferior communications. It appears probable that, in the event of Bulgaria being eliminated from the war, the enemy would at once evacuate the Albanian coast up to and including San Giovanni di Medua. The Albanian mountains are better supplied with tracks than are the mountains of Montenegro, and the risk of a turning movement from Uskub could not be neglected by the enemy. But should the enemy decide to attempt to hold the Albanian coast, Valona would be the initial base for allied operations, and the Valona Decauville would have to be linked up with the Austrian railhead at Fieri, whence the

Austrian Decauville runs to Scutari, above which point there is a break in the railway communications.

It would presumably be possible, though this is a naval question, to establish sea bases in the rear of an advancing force at Durazzo and San Giovanni di Medua. This would materially assist supply, and an advance as far as Scutari should be a feasible operation. The stage beyond Scutari would probably prove far more difficult, since here the Austrian permanent coast defenses are reached and the defending force has better communications behind it. Moreover, the narrow strip of mountainous country between Lake Scutari and the sea should give the defense every chance.

APPENDIX III.

Troops employed on Balkan front.

Troops:	
British—	
Officers	5,075
Other ranks	115,170
Indian—	
Officers	18
Other ranks	2,767
Native—Other ranks	26,893
Total	149,923
French, all ranks	227,500
Greek, all ranks	113,000
Grand total	490,423
Guns:	
British	360
French	600
Greek	150
Total	1,110

NOTE.—Traffic handled at Saloniki averages 14,000 tons weekly.

APPENDIX IV.

British forces employed in Egypt (including Palestine), Mesopotamia, and Aden.

	Troops.					Animals.				Mechanical transport vehicles.
	British and Dominion.		Indian and native officers.	Indian, other ranks.	Native, other ranks.	Horses.	Mules.	Camels.	Donkeys.	
	Officers.	Other ranks.								
Egypt	10,783	164,526	1,947	90,301	134,027	60,137	44,827	41,213	11,525	5,000
Mesopotamia	5,891	75,842	2,150	253,022	27,712	37,513	44,735	4,716	2,298	5,500
Aden	166	1,591	111	7,713	867	963	1,436	1,378	.....	.....
	16,840	241,959	4,208	351,036	162,606	98,613	90,998	47,307	13,823	10,500
Total	775,649					250,741				10,500

APPENDIX V.

Tonnage employed in maintenance of British forces in Saloniki, Egypt, and Mesopotamia.

Service.	No. of ships.	Gross tonnage.	Service.	No. of ships.	Gross tonnage.
Saloniki.			*Egypt (including Palestine)*—Con.		
Troops and horses	9	60,749	Stores, Red Sea	7	11,000
Hospital ships	2	15,538	Stores, general, from India and Rangoon	15	54,086
Stores from United Kingdom	4	11,200	Grain from India	6	21,835
Grain, etc., from India	8	16,000	Frozen meat, etc., from Australia	7	65,100
Forage, Mediterranean	10	66,926	Coal for military purposes	2	7,000
Frozen meat, ships, local	7	28,000			
Frozen meat, ships, Australia	6	21,000	Total	88	397,950
Coal for military purposes	3	27,900			
	1	3,500	*Mesopotamia.*		
Total	59	250,813			
Egypt (including Palestine).			Troops and horses	12	46,946
			Hospital ships and ambulance transports	8	42,411
Troops and horses	19	121,499	Stores from United Kingdom	6	30,000
Hospital ships	7	52,230	Stores from India	63	166,119
Stores from United Kingdom	8	26,400			
Stores, United States—Egypt	2	10,000	Total	89	285,476
Stores, ferry and local	15	28,800			

Total for Egypt and Mesopotamia.....177 ships; 683,426 gross tons

NOTES.—(i) Above figures do not include naval ships of any category. (ii) Tonnage saved by the stoppage of the campaign in all or any of the theaters mentioned depends on what is done with the armies concerned. If they are left there, they will still have to be maintained: if they are moved elsewhere, tonnage will be required for their removal dependent on the pace at which their removal had to be effected, and maintenance would be required for the men remaining until the move is over.

APPENDIX VII.

THE ALLIES' POLICY IN THE BALKANS.

The following—from Mr. Wickham Steed, of the British and American War Mission—is a brief outline of the policy upon which the activities of the Department for Propaganda in Enemy Countries are based in so far as they concern Bulgaria. Mr. Wickham Steed and Mr. Seton Watson, who works with him, are two recognized authorities on Balkan political questions.

This policy, which has received the general approval of His Majesty's Government, has two main aspects—

(1) As regards the actual prosecution of war; and

(2) As regards the future settlement in the Balkans.

As to (1): It is eminently desirable to remove Bulgaria from the number of our enemies. Had we to choose between removing Turkey and removing Bulgaria, the latter alternative would probably be the more advantageous. At the same time it is imperative that there should be no dealings with Bulgaria of a nature to estrange Serbia and Greece. Apart from the moral consideration that we can not be false to our friends in order to placate a stubborn and treacherous enemy, we should risk losing the bone in an attempt to snatch at the shadow. Therefore any overtures from the Bulgarians should be met with a declaration that it is for Bulgaria to prove her sincerity toward the Allies by making a clean sweep of the men responsible for allying

her with our enemies; and by breaking with Germany, Austria-Hungary, and Turkey.

Without making any definite reference to the future frontiers of Bulgaria, she might be told that while the Allies are determined that the future Balkan settlement shall follow ethnographical lines as nearly as possible, they would have no objection to an extension of Bulgarian territory eastward, at least as far as the line from Midia, on the Black Sea, to Rodosto, on the Sea of Marmora; or the eventual retention by Bulgaria of the purely or overwhelmingly Bulgarian districts in the Southern Dobrudja.

As to (2): The possibility of reaching a satisfactory Balkan settlement necessarily depends upon the treatment of Austria-Hungary by the Allies. Before Serbia can be asked to assent to an arrangement that would bring Bulgaria even up to the east bank of the Vardar, it would, in my opinion, be necessary to establish the principle of the independence of the Southern Slav Provinces of Austria-Hungary in union with Serbia, not as "compensation," but in virtue of the principle of nationality. Similarly, before finally sanctioning any Bulgarian claim to the Southern Dobrudja, the Allies should definitely recognize the principle of Rumanian national unity.

Neither the Southern Slav, Rumanian, nor indeed Czecho-Slovak national unity can be assured without the substitution for the present Austro-Hungarian Monarchy of united and independent national States linked together in some form of federal alliance.

In regard to Macedonia, the Allies should, I think, make no definite pronouncement. It is a mongrel region that may have to be reserved for special treatment. My own views are similar to those expressed to me at Constantinople in September, 1913, by the great Bulgarian Exarch, the late Mgr. Joseph, who alluding to the treaty of Bukarest which his fellow countrymen were denouncing as vindictive and unjust, said "Bulgaria needs clear frontiers. The frontiers drawn by the treaty are harsh, but they are clear. If they remain, a generation hence the Bulgars to the west and to the south of them will have been Serbified or Hellenized. The non-Bulgar populations to the east and north of them will have been Bulgarized. Then it will be possible to make a Balkan Federation."

In other words, I think the Allies should look well ahead and not sacrifice the higher aim of establishing a solid Balkan Confederation in future to any immediate attempt to reconcile claims that are irreconcilable.

[Extract from Memorandum No. 71, "History of Planning Section."]

Informal intercourse with the British Plans Division developed the fact (about 1 August) that they were again impressed with the desirability and practicability of concluding a separate peace with Turkey, and that they proposed making a fresh study of the subject.

It was expected that the question would soon come up for discussion by the British War Cabinet, and the Plans Division desired to have ready an appreciation of the question, from the naval point of view, for possible consideration by the War Cabinet.

We suggested the wisdom of broadening the problem to include Bulgaria as well as Turkey. The British suggested that the estimate would carry greater weight if it be submitted as a joint paper, and a solution was therefore undertaken jointly. Owing to their superior facilities for obtaining information, British officers collected practically all of the data contained in the Appendixes.

After the problem had been solved and the conclusions reached, we deemed it advisable for the reasons stated in the "Foreword" not to participate in formally submitting the paper. But in order to accomplish the objects sought in originally deciding upon a joint paper, the "Foreword" was prefixed.

Through a misunderstanding the British Plans Division omitted the "Foreword" in submitting the appreciation formally to the Admiralty.

The paper was timely, and was the only study prepared on the subject in advance of the Balkan crisis, which occurred a few weeks after its completion.

It is understood, however, that owing to a mistake in routing in the Admiralty, the paper was not brought to the attention of higher officials in time to be of use to them during the Balkan crisis.

MEMORANDUM No. 53.

MINE BASE IN MEDITERRANEAN.

23 September, 1918.

(See Map No. 6, "The Mediterranean Sea.")

The plans so far approved by the department and by the Allied Naval Council contemplate the establishment of two mine barrages in the Mediterranean, one in the Otranto Straits and the other in the Aegean from Euboea to Cape Kanapitza.

The Navy Department has authorized the establishment of a mine base from which operations will be conducted in the Mediterranean. All mine material and much of the material for the base will have to be brought from the United States or from the present mine bases in Scotland.

The following places appear to be available for basing mine operations:

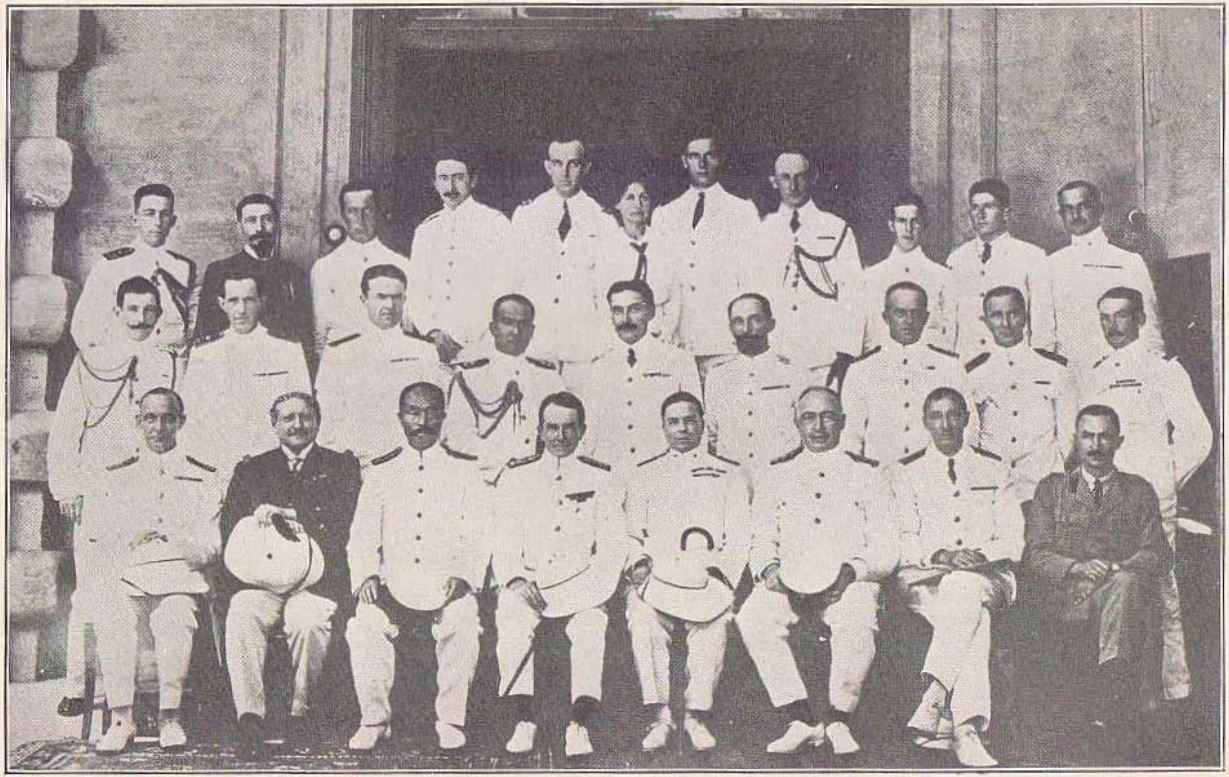
Corfu.
Argostoli.
Bizerta.
Vicinity of Athens.

It will be necessary to have the mine layers based in some place where they can get minor repairs.

It will be necessary to provide an escort of destroyers for the mine layers on each one of their expeditions.

It is extremely desirable that the destroyer escort be an American destroyer escort, in order that there may be no difficulty concerning the readiness of the escort to serve the mine force. At present, destroyers and all similar escort forces in the Mediterranean are worked to their capacity either in support of the Otranto barrage, in defense of the east coast of Italy, or in escort work. It is notorious that convoys in the Mediterranean receive very scant protection. It is very undesirable that the requirements of the mine force should detract from the actual local protection of convoys.

It is therefore recommended that 12 destroyers be assigned the mine force from among those destroyers that are expected to arrive between now and January 1.



ALLIED CONFERENCE ON MEDITERRANEAN MINE LAYING, HELD AT MALTA, 6 AUGUST, 1918.

(Rear Admiral Joseph Strauss, U. S. N., head of American delegation, front row, third from right.)

The destroyers attached to the mine force will also need a fueling base and a base where minor repairs can be made.

The following is the mission of the mine base in the Mediterranean:

To promote the laying of the mine barrages in the positions determined upon at the earliest possible date.

It is fundamental that no mine base should be located within the radius of aircraft or within the prospective radius of aircraft during the coming year. This consideration eliminates Corfu and Argostoli, and leaves for consideration a Greek port, a port in Sicily, or Bizerta.

A study of the available information has led to the conclusion that Bizerta offers the best solution. The following are the advantages of Bizerta:

1. Dry dock and repair facilities available.
2. Safe from aircraft attack.
3. Refueling facilities, but fuel would have to be transported to Bizerta.
4. Harbor absolutely safe from torpedo attack.
5. Convoys from Gibraltar frequently pass Bizerta.

NOTE.—All of our mine carriers would thus be interfered with in their voyage as little as possible, since they would join the Gibraltar-Bizerta convoys both coming and going.

6. Bizerta already has wharves and a certain amount of facilities available; so that we estimate that the base can be established at Bizerta in two months less time, counting from the present, than it could be established in any other available place.
7. It is a suitable base for destroyers.
8. Destroyers assigned to the mine force would be in an excellent locality for hunting and escorting operations during those periods when the mine force might not need them.
9. Shorter haul for mine carriers and consequent less exposure for them to submarine attack. They will require no fueling except at Gibraltar.

DISADVANTAGES OF BIZERTA.

1. Five hundred and eighty miles from Otranto barrage; 780 miles from Aegean barrage. This means that the mine layers in laying the Otranto barrage will be about 15 days longer at sea than they would be if based on Corfu. We do not consider this a valid objection to Bizerta if the mine carriers have a suitable American destroyer escort.

2. The services of escort vessels will be required for a longer period than they would be were the mine base nearer to the mine

barrage. This is not wholly a loss, since if these vessels were not used in protecting the mine layers they would have to be used to protect mine carriers if the entire enterprise were to receive as great a degree of security.

If any other port than Bizerta is chosen for the mine base, it will be necessary to construct wharves, to bring lighters from a distance, to build all of the facilities necessary for carrying out mining operations. In view of the scarcity of material of every kind in the Mediterranean necessary in the construction of a mine base, it is believed that the estimate of two months' time saved in selecting Bizerta as a base is conservative; in addition, selection of this point as a base will undoubtedly result in a considerable saving in transportation and cost of material for placing the base in operation.

Planning Section have asked that this matter be taken up by Captain Jackson with the French Admiralty, in order to ascertain the willingness of the French Admiralty for us to use Bizerta, and the extent to which they can place facilities at our disposal.

INDORSEMENT BY FORCE COMMANDER.

Bizerta approved as Mediterranean mining base, subject to consent of French Government. Captain Murfin will be dispatched as soon as possible to consult with French Ministry of Marine and, having received their consent, to establish base at Bizerta.

SIMS,
Vice Admiral, U. S. Navy, Commanding.

London, England, September 28, 1918.

[Extract from Memorandum No. 71, "History of Planning Section."]

Initiated by the Planning Section after it had become known that the commander, mine force, had tentatively decided upon Corfu, or some other tactically suitable place nearer than Bizerta to the proposed barrages. He was ultimately convinced of the superiority of Bizerta, when considered from all aspects. The incident illustrates the importance of coordinating strategic and tactical examination of such matters, and of the value of a Planning Section.

MEMORANDUM No. 54.

INCREASING THE PROBABILITY OF TORPEDO HITS.

23 September, 1918.

Memorandum for Chief of Bureau of Ordnance, dated 16 July, 1918, signed G. B. Wright, has been referred to Planning Section for Comment. The following is quoted from it:

If the electric torpedo (assumed by Planning Section to mean a magnetically fired torpedo) is a moderate success, I believe that it will answer every requirement of a mobile depth charge, that it can be used for that purpose, and that there can be adapted to this torpedo, means for making it circle at a fixed range with constantly increasing depth, or to run on a straight course and then dive to a fixed depth and explode, which would give the necessary tamping.

Planning Section Memorandum No. 41, dated 31 July, 1918, contains the following:

Torpedoes fired from submarines have been very effective against enemy submarines, but many opportunities for success have been lost through the difficulty of hitting so small a target as a submarine. With the enemy submarine showing its periscope only and probably in the act of diving, the torpedo set for 25 feet is apt to miss. Experienced officers believe that the depth setting should be changed to permit of a 60-foot setting. Independent, however, of depth of submergence, the submarine is a very difficult torpedo target. The problem of increasing the probability of torpedo hits is of extreme importance. There are two ways of increasing the probability of hits:

(1) *Firing more torpedoes.*

Comment.—It has been suggested that a small torpedo be developed that can be fired in groups simultaneously from the same torpedo tube, so directed as to scatter shotgun fashion.

It is of course assumed that every care is taken to keep each torpedo in efficient condition, and that on each occasion of a profitable opportunity to fire at any enemy submarine, every torpedo that can be fired effectively will be fired.

(2) *Increasing the danger space of torpedoes.*

Comment.—Each torpedo carries an explosive charge which, if detonated within 70 feet of a submarine, will sink or disable the submarine. Many torpedoes fail to hit the submarine, but still pass within 70 feet of it. It is probable that the number of successful shots would be increased not less than 50 per cent if each torpedo passing within 70 feet of a submarine detonated. No other torpedo problem in design is of such immediate importance as the following:

To attach to all torpedoes now used by submarines a device that will detonate the torpedo should it, while making a war run, pass within 70 feet of any vessel.

If a magnetic device can be successfully developed to fire a torpedo passing within 70 feet of its target, the length of the torpedo target will be automatically increased by 140 feet.

Of still greater importance will be the gain in the vertical target. The danger space offered to the present torpedo by a submarine on the surface is very small, owing to the fact that the minimum depth at which the torpedo will run accurately is only a few feet (about 5) less than the draft of the submarine.

Should the magnetic firing device function at 70 feet, the torpedo will be effective against a submarine operating at any depth between the surface and 70 feet plus the torpedo depth setting plus the vertical height of the submarine.

It is suggested that in conjunction with the development of the magnetic firing device, efforts be made to increase the depth at which the torpedo may be run, so as to render torpedo fire more effective against a submerged submarine. Assuming the over-all height of a submarine to be 30 feet, a torpedo running at 100 feet depth would be effective against a submerged submarine operating at all depths down to 200 feet.

If in addition a device can be perfected which will make the torpedo circle after running a predetermined distance, the lateral danger space will be increased greatly. A straight shot against a submarine end on will have a lateral danger space of about 170 feet. Should the torpedo then circle with an 85 feet radius, the lateral danger space will be increased to 340 feet. Against a submarine presenting its beam to the firing ship these lateral danger spaces will be correspondingly increased.

It should be noted, however, that the circling device introduces the necessity of making an estimate of range, together with a range setting. Owing to the difficulties of estimating range from torpedo craft, and to the tendency of underestimation, it is believed that the present valuable feature of torpedo fire (that is, accuracy independent of range, within the limit of the maximum run) should be preserved; at least until near the end of the torpedo run.

The suggested feature of increasing depth during circling, and that of diving and exploding at the end of a run, do not appear necessary for torpedoes which can be run at 100 feet depth. For those having a shallower depth limit such devices might be useful, but the probability of their utility does not appear to warrant any increased mechanical complications—at least until more important features are developed.

We therefore recommend that future development proceed along the following general lines:

(*a*) A magnetic firing device that will detonate the torpedo should it, while making a war run, pass within 70 feet of any vessel.

(*b*) Depth mechanism and structural strength which will permit the torpedo to be run at depths down to 100 feet maximum.

(*c*) A device of permanent adjustment which will cause the torpedo to circle after having nearly reached its maximum range.

INDORSEMENT BY FORCE COMMANDER.

Foregoing recommendations are approved.

SIMS,
Vice Admiral, U. S. Navy, Commanding.

London, England, September 30, 1918.

MEMORANDUM No. 55.

KITE BALLOONS IN ESCORTS.

23 September, 1918.

[Undertaken by the Planning Section after the Commander, United States Naval Forces in France, had orally requested an opinion from a member of the Section on the subject.]

PROBLEM.

Kite balloons being available for use with escort vessels the following questions arise:

1. Should kite balloons be used by vessels escorting convoys?

2. If escort vessels use kite balloons, what are the principles governing their use?

In considering these questions all available publications and reports have been carefully studied and freely used in the notes that follow.

The following information is pertinent:

(1) In July, 1917, experiments were carried out with a kite balloon by a destroyer. It was found that a kite balloon could trace the submarine after her movement could no longer be seen from the bridge, but it is doubtful if a kite balloon observer can follow a submarine that seeks to escape by diving, more than a minute longer than the same submarine could be followed from the bridge. When the submarine is leaking oil, the kite balloon is more useful in the chase than at any other time.

(2) In July, 1917, the Grand Fleet destroyers made an experimental hunt for submarines. The submarine was discovered on the surface 8 miles away. Later two periscopes were discovered, distance not stated.

(3) Later two other submarines were discovered in the same hunt by the kite balloon, distance not stated. No result of the contact except that submarine remained submerged during daylight.

(4) On 12 July, 1917, H. M. S. *Patriot* sighted a submarine on the surface at a distance of 28 miles. The submarine submerged when kite balloon was distanced 6 miles. Submarine came up when kite balloon was 4 miles away and immediately submerged. *Patriot* was directed to the spot by the kite balloon and an attack was made; submarine was probably destroyed.

(5) On May 27, 1918, a convoy was attacked while escorted by a kite balloon. The attack was delivered five minutes after the balloon

was hauled down to change observers. This was the first instance on record of an attack on the convoy while being escorted by a kite balloon. A second convoy was attacked on September 3, 1918, when escorted by a kite balloon; one vessel was sunk.

The British believe that enemy submarines feel that they incur no great danger while being sighted from kite balloons at a distance. British publications give the visibility of kite balloons in clear weather at about 20 miles. Visibility is influenced greatly by several variable factors—light, background, color of balloon, relative positions of balloon, and observing vessel.

(6) It is known, of course, that even when convoys are not accompanied by kite balloons that submarines as a rule sight convoys before they themselves are sighted.

(7) At twilight in clear weather a kite balloon becomes increasingly visible from all bearings and remains so until it is quite dark. Under these conditions it is probable that a submarine can come to the surface at some distance from the kite balloon and follow it without fear of detection.

(8) Observation from kite balloons is much less efficient when wind is blowing.

(9) When there are whitecaps on the water the chances of seeing a periscope from a balloon are small.

(10) Recent records covering British operations indicate that a kite balloon has to cruise over 30,000 miles to sight a submarine. The conclusion is, of course, that as a rule—

1. The submarine sees the kite balloon first.
2. The submarine submerges very soon after the kite balloon is sighted.

Considering the questions to be decided, viz:

1. Should kite balloons be used by vessels escorting convoys?
2. If escort vessels use kite balloons, what are the principles governing their use?

it is evident that the answer to question 1 depends in part upon the answer to question 2, so we shall investigate the principles governing the use of kite balloons first.

The kite balloon has but one direct use, and that is to get information; it has but one drawback that need be considered here, and that is that it gives information to the enemy. The real problem for the kite balloon, therefore, is to get as much useful information as possible, and to give as little useful information as possible to enemy vessels.

The indirect use of a kite balloon is measured by its effect on enemy submarines. They nearly always submerge in time to avoid

being seen from the balloon while they are still on the surface, and thereby limit voluntarily their maneuvering power.

There are two ways of using kite balloons:

(1) In close escort positions. Here the kite balloon vessel zigzags close to the convoy.

(2) In extended patrol positions. Here the kite balloons are at visibility distance from the convoy in thick weather and at about 20 miles from the convoy in clear weather.

The functions of the kite balloon in close escort positions, where it usually zigzags across the front of the convey, are—

(1) To sight any submarine which, through a bad lookout or through taking chances, stays on the surface with the kite balloon in sight.

(2) To sight submarines that attempt to attack in time to give warning and to direct a counterattack.

(3) To warn convoy of browning shots.

(4) To limit the submarine's maneuvering area on the surface, so that if the submarine be in the rear of the convoy it will have to make a very wide detour to get ahead of the convoy in position for attack undiscovered.

(5) to prevent trailing of convey by dropping astern of convoy just before dark.

(6) To keep submarine submerged after an attack.

The close escort position is the one that gives the maximum information to the enemy submarine. It makes a conspicuous marker of the convoy's position and thereby enables the submarine to communicate the convoy's position and movements to submarines better placed for attack. It is also quite possible for the sighting submarine itself to gain a position for attack by a wide detour.

The principal advantages of the close escort position are:

(1) *Readiness for counterattack.*

Comment.—Unless the submarine is leaking oil the kite balloon will probably not guide the attacking vessel more efficiently than it could be guided from the bridge for more than one additional minute once the attack is delivered.

(2) *Protection against browning shots through warnings.*

Comment.—Taking into consideration—

(*a*) That the kite balloon has not over two observers;

(*b*) That the browning shot torpedo will not be in flight more than three minutes, and more often two minutes;

(*c*) That an appreciable interval is required to give the warning;

(*d*) That the warning can not tell each vessel the relative bearing of the torpedo,

we conclude that the extra protection given by kite balloons against browning shots is about one minute's earlier notice of danger to the convoy.

(3) *Bluffing the submarine.*

Comment.—Recent evidence indicates that this element may soon be negligible.

From the above, in conjunction with the operating experiences of kite balloons in the presence of submarines, we conclude—

That it is not profitable to use kite balloons in close escort positions except in waters where convoy routes are well known and during weather when visibility is very limited.

The extended patrol for escort of convoys is discussed in various publications. Attention is invited particularly to O. N. I. No. 29, of February, 1918.

The functions of the kite balloon in extended patrol positions are similar to those in close escort positions.

Every convoy carries with it an area within which a submarine may maneuver submerged into position for attack on the convoy. The width of the area is twice the visibility of the convoy from the submarine's periscope—about 14 miles in clear weather plus the length of the convoy in front. The area extends an indefinite distance ahead of the convoy.

The after side of the area is bounded by an irregular line, dependent on the formation and speed of the convoy, the speed and radius of the submarine when submerged, and the range of the submarine torpedoes.

This area is called the "Diving danger area."

A similar area, known as the "Surface danger area," includes and extends beyond the "Diving danger area" on the flanks and rear by an amount equal to the difference in visibility of the convoy from a submarine submerged and from a submarine on the surface. In clear weather the "Surface danger area" may be taken to be 22 miles in width.

The flank boundaries of both the "Diving danger area" and the "Surface danger area" are determined by visibility from the submarine, because the presumption is that the submarine can not maneuver for attack when it can not see. The development of listening apparatus may in the near future extend the "Diving danger area" by the flanks to twice the listening radius rather than to twice the visibility, provided the submerged radius of the submarine keeps pace with the listening radius.

Extended patrol vessels or vessels stationed at visibility distance from a convoy with the object—

(*a*) Of limiting the submarine's freedom of action on the surface and of preventing the submarine from sighting the convoy.

(*b*) Of sighting any submarine that does not dive immediately upon sighting the patrol vessel.

If the patrol vessel carries a kite balloon the principles of extended patrol are not thereby altered.

If the patrol vessels are stationed inside the "Diving danger area" they may sight a submarine, but the submarine may still be able to maneuver submerged so as to attack. If, however, the extended patrol vessels are stationed outside the "Diving danger area" and in such position as to sight any submarine in or near that part of the "Surface danger area" not common to the "Diving danger area," any submarine there sighted will have to dive, and by diving will lose all chance of successful attack on the convoy, since it will have dived without sighting the convoy and without knowledge of its whereabouts.

When the convoy is escorted by antisubmarine vessels it is reasonably safe to assume, for all except the slowest convoys, that no submarine will be able to maneuver submerged successfully for attack if it first sights the convoy when the convoy already has the submarine abaft the beam.

In stationing extended escort vessels care should be taken that the range of vision astern is such that no submarine can reach the "Diving danger area" on the surface without being observed either by the extended patrol or the close escort.

The following table gives the bearing in points from right ahead on which the extended escorts should be from the convoy guide:

Speed of convoy.	Visibility.			
	4 miles.	6 miles.	8 miles.	10 or more miles.
7 knots	7	6	5	4½
9 knots	5	5	4½	4
11 knots	4	4	3½	3½
13 knots	4	3½	3½	3

The extended patrol vessel with kite balloon must keep convoy in sight—closing in for this purpose as weather thickens. In clear weather kite balloon may be about 12 miles from convoy.

POSITION OF KITE BALLOON VESSELS.

(1) *In very clear weather—*

(*a*) *With two kite balloons.*—One on each bow, in extended escort positions given above, to make wide zigzags outward from extended escort positions.

(*b*) *With but one kite balloon.*—On one bow, in extended escort position, crossing occasionally to the other bow and never lingering ahead of the convoy.

(2) *With moderate and with low visibility*—that is, when kite balloon will not be seen farther than convoy is seen—

(*a*) *With two kite balloons.*—One in each of the close escort positions, zigzagging so as to cover the front of the convoy and the wing columns.

(*b*) *With but one kite balloon.*—At close escort distance, ahead of convoy and covering the whole front with zigzags.

With regard to the above-designated positions, when there is but one kite balloon it should as a rule be stationed—

(*a*) To windward of the convoy.

(*b*) On the sunnny side of the convoy.

(*c*) On the side nearest the moon.

(*d*) On the opposite side to the rising sun at dawn, moving around to other side at sunrise.

(*a*), (*b*), and (*c*) to be at such distance from the convoy that the submarine must dive before sighting the convoy and be unable to come to the surface between the balloon and the convoy without being seen.

At twilight kite balloons should drop back by the flanks as the light fails to positions on the quarters of the convoy, keeping as far away as possible without losing touch and not closing up until quite dark. If convoy alters course after dark, kite balloons should stand off a different course and not rejoin until quite dark, then take close escort positions.

If in sight of land, or if the area ahead of the convoy is being patrolled, kite balloons should be stationed in the close escort position in all visibilities.

Extended patrol should not be used until the minimum requirements of close escort have been met.

Considering now the use of the kite balloon in extended escort positions we find—

(1) That it does not betray the presence of a convoy and therefore gives practically no useful information to the enemy.

Comment.—A submarine seeing a kite balloon can make one positive deduction and several tentative deductions.

Positive deduction.—That a surface vessel is towing a kite balloon in a certain general direction which the submarine can determine.

Tentative deductions.—

(*a*) That a convoy may be near the kite balloon and that it is more apt to be astern of the kite balloon than ahead of it.

(*b*) That the kite balloon is near antisubmarine vessels—whether a convoy is near by or not—since kite balloons are used in hunting as well as in escort operations.

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(*c*) That the surest way to approach the convoy if there is one near by is to approach the kite balloon—if possible getting ahead of the kite balloon.

The submarine can make these same deductions if it sights a single vessel of war; so that practically the only information which the kite balloon gives to the submarine is earlier information of the presence of a vessel in a given direction, and correspondingly early information of the general course of that vessel. This earlier information is measured by the relation of the two circles of visibility—(1) of the vessel, (2) of the kite balloon. The atmospheric conditions modify very greatly the relation of these circles of visibility. In clear weather the kite balloon would probably be sighted twice as far as the vessel. In thick weather the vessel itself might be sighted first.

(2) That the submarine sighting the balloon will very likely be attracted by it even to the extent of voluntarily leaving the "Diving danger area."

(3) That all submarines outside the "Diving danger area" will be prevented from entering that area except by chance.

(4) That the trailing of convoys will be prevented.

(5) Any submarine sighted can be kept submerged until convoy has passed or until dark.

We conclude—

That it is profitable to use kite balloons in extended escort positions in accordance with the principles already explained.

The practicability of using kite balloons in bad weather or on long voyages has not been considered. We assume that decision in each instance as to whether or not to take balloons in tow will be based upon operating experience to date and a forecast of conditions likely to be encountered.

SUMMARY.

As to question (1), it is not profitable to use kite balloons in close escort positions except—

(1) In waters where convoy routes are well known.

(2) During weather when visibility is very limited.

It is profitable to use kite balloons in extended escort positions in accordance with the principles already explained, viz:

(*a*) On the bearings given in the table at the bottom of page 394.

(*b*) At visibility distance from the convoy, except that in clear weather this distance shall not exceed 12 miles.

(*c*) *In very clear weather*—

(*a*) *With two kite balloons.*—One on each bow in extended escort position, crossing occasionally to the other bow ward from extended escort positions.

(*b*) *With but one kite balloon.*—On one bow in extended escort position, crossing occasionally to the other bow and never lingering ahead of the convoy.

(*d*) With moderate and with low visibility—that is, when kite balloon will not be seen further than convoy is seen—

(*a*) *With two kite balloons.*—One in each of the close escort positions, zigzagging so as to cover the front of the convoy and the wing columns.

(*b*) *With but one kite balloon.*—At the close escort distance, ahead of convoy and covering the whole front with zigzags.

(*e*) When there is but one kite balloon with a convoy, it should as a rule be stationed:

(1) To windward of the convoy.

(2) On the sunny side of the convoy.

(3) On the side nearest the moon.

(4) On the opposite side to the rising sun at dawn, moving around to other side at sunrise.

(1), (2), and (3) to be at such distance from the convoy that the submarine must dive before sighting the convoy and be unable to come to the surface between the balloon and the convoy without being seen.

(*f*) At twilight kite balloons should drop back by the flanks as the light fails to positions on the quarters of the convoy, keeping as far away as possible from the convoy without losing sight of it and not closing up until quite dark. If during this time convoy alters course after dark kite balloons should stand off on a different course and not rejoin until quite dark, then take close escort positions.

(*g*) If in sight of land, or if the area ahead of the convoy is being patrolled to the limit of visibility of the kite balloon, kite balloon should be stationed in the close escort position in all visibilities.

(*h*) Extended patrol should not be used until the minimum requirements of close escort have been met.

INDORSEMENT BY FORCE COMMANDER.

Approved as a preliminary study of the subject of the use of kite balloons in escorts, paper to be mimeographed, and to be given wide distribution to forces for information and inviting comment, in order that a definite doctrine and plan covering the subject may be developed.

(Sd.) W. S. SIMS,
Vice Admiral, U. S. Navy, Commanding.

London, England, September 30, 1918.

MEMORANDUM No. 56.

BRITISH PLANS DIVISION PAPER ON ALLIES' TRADE WITH SCANDINAVIA.

26 September, 1918.

(See Maps Nos. 1 and 2.)

The attached paper is a copy of a memorandum prepared by the Admiralty Plans Division. The American Planning Section did not participate in this paper, but was furnished with a copy of it for its information.

As the paper is of general interest, and especially as it was thought that certain parts of it might be of interest to the War Trade Board, the usual copies have been prepared.

Attention is particularly invited to Appendix I, "The Case for Mining Norwegian Territorial Waters." Some of the principles therein laid down do not appear to be entirely sound.

1. The possibility of the enemy replying to the mining of the Norwegian coastal route by attacking the Allies' trade in Norwegian and Swedish territorial waters is examined in the inclosed paper, the conclusions being summarized in paragraph 23.

2. The nature and distribution of this trade is dealt with in Appendixes II, III, and IV, with special reference to its war value.

3. With reference to paragraph 21 and the possibility of Skudesnaes becoming useful to the Allies, it would be desirable, other things being equal, to lay mines in Norwegian territorial waters, Bommelo Island and the barrage, so as to leave an exit from Skudesnaes to the northward.

4. Decisions are required on paragraph 23 and as to using Appendix I for propaganda purposes.

THE NATURE AND DISTRIBUTION OF THE ALLIES' TRADE WITH SCANDINAVIA, WITH SPECIAL REFERENCE TO THE MINING OF NORWEGIAN TERRITORIAL WATERS AND THE POSSIBILITY OF ENEMY RETALIATION.

1. *Importance of mining Norwegian waters.*—It is fundamental that the submarine can never be defeated merely by a dispersed system of trade protection. The closure of the North Sea exits, which is an essential factor in a concentrated antisubmarine policy, is therefore of such vital importance that it can not be weighed against a possible reduction in the Scandinavian trade.

2. The possibility of the enemy retaliating on the Allies' trade in Scandinavian waters seems rather remote, but the question is considered in the following paper and the nature of the trade examined.

3. *Deterrents to German retaliation.*—The systematic destruction of allied and neutral shipping in territorial waters would inevitably tend to bring Norway and Sweden into the war on the side of the Allies, because they are to a large extent dependent on this trade for food and coal. (Vide Appendix II, Table A.)

4. The possibility of hostilities with Norway or Sweden would act as a strong deterrent to Germany, for the consequent cessation of trade would be a serious matter (vide Appendix II) (Table B), and the use of their harbors would modify the naval strategical position in the Allies' favor by facilitating the control of the North Sea exits and threatening the enemy's North Sea-Kattegat-Baltic communications.

5. It is probable, therefore, that Germany will not attempt any systematic violation of Norwegian and Swedish waters; but our economic hold on Scandinavian countries should be used to stiffen their resistance to enemy aggression. It is important that the Allies' case should be clearly presented to the Norwegian and Swedish people; some remarks on this subject are included in Appendix I, and it is suggested they be used for propaganda purposes.

6. *Protection of allied trade.*—If the enemy commences a systematic attack in territorial waters, shipping will be easier to defend in some localities than others; and from this point of view it is convenient to divide the coast line into the following sections (vide Chart, Appendix II):

Section A. The Norwegian coast line from Skudesnaes to the northward.

Section B. The coast line between Skudesnaes and Goteborg, which includes the whole of southern Norway and Sweden outside the Kattegat and Baltic.

Section C. The Swedish coast from Goteborg to the Sound.

Section D. The Swedish coast inside the Baltic.

Section E. The Danish coast.

7. In Section A there would be no additional risk from submarines, for trade could be carried on through the Inner Leads, and the few places where ships have to come into the open could be easily guarded by trawlers. So far as surface raiders are concerned, the risk in this section would be practically unaltered.

8. In Section B the risk from submarines can be reduced by sheltering in the numerous harbors and by making use of the inner channels. The 90-mile stretch between the Naze and Skudesnaes is exposed, however, and if the enemy systematically attacked in that

quarter trade might become very difficult. But the enemy could not maintain surface craft in this locality, and the risk from submarines would be decreased during dark nights.

9. It appears that single ship sailings could be continued in the greater part of Section B, unless the enemy actually attacked shipping in the fiords and inner channels, and this is not considered likely. With regard to the Naze-Skudesnaes section, shipping could, if necessary, be collected at Skudesnaes and Kristiansund and passed through under destroyer escort, supported by a strong covering force to the southward. This operation, however, could only be carried out at irregular and infrequent periods.

10. In the northern part of Section C (Swedish coast in the Kattegat) trade could probably be continued through inner channels with a fair degree of safety; but in the southern part the enemy would be able to maintain a more or less continuous blockade with surface vessels.

11. In Section D (Swedish coast in the Baltic) all trade could be stopped by blockading the southern entrance to the Sound.

12. In Section E (the Danish coast) the enemy would be in a position to stop most of the trade by blockading the northern entrance to the Sound and Belts.

13. *Nature and distribution of Scandinavian trade, etc.*—The nature and distribution of the Scandinavian trade will now be examined, so that the effect of holding up any particular section of the coastal route may be realized.

14. Agreements are in force between Britain and the United States and Norway and Sweden by which the latter two countries provide the Allies with a certain amount of tonnage and goods in return for coal and a specific quantity of foodstuffs, etc. Denmark also provides tonnage in return for coal. For further details of these agreements and the nature of the goods, vide Appendix II, Tables A and C.

15. It is difficult to get complete statistics of the distribution of the Allies' trade with Norway and Sweden, but in Appendix III will be found a detailed analysis of the cargoes of British, Norwegian, Swedish, and Danish ships on the different sections mentioned above for the months of July and August, 1918, together with a chart showing the various goods imported from different parts of Norway and Sweden. Appendix IV gives further information in regard to the more essential supplies.

16. An examination of Appendixes III and IV shows that, of the various materials received from Norway and Sweden, iron ore, timber, ammonium nitrate (for France), pig and bar iron, special steels, ball bearings, and carbide are the most important, and that the remainder could be obtained elsewhere without difficulty.

17. Iron ore, carbide, and some timber come from Section A; and their supply would be subjected to no additional risk if Germany violated neutral waters.

18. Ammonium nitrate (for France, vide Appendix IV, p. 407) comes from Section B. The total quantity only amounts to about 100,000 tons per annum, and special protection could be organized if it were transported in a few trips by large cargo vessels.

19. Timber, ball bearings, pig and bar iron, and special steels mainly come from Section C. Of these, timber presents considerable difficulty on account of its bulk (vide Appendix IV, pp. 406, 407); but there should be no great difficulty in organizing the transport of the remainder overland to Norwegian ports in Section A. The timber trade with Section B could probably be continued on a reduced scale by occasionally providing special protection between Kristiansund and Skudesnaes.

20. In return for these goods and a certain amount of shipping, we have agreed to supply Norway and Sweden with 2.7 and 1.8 million tons of coal respectively per annum, much the greater part of which goes to Section B (vide Appendix III). The maintenance of coal exports on this scale would be difficult, but they could probably be kept going at a reduced rate by the measures suggested in paragraph 8. In this case Norway and Sweden would be the only sufferers, and the onus for the resultant distress would fall on Germany.

21. If enemy action in Scandinavian waters definitely inclined these countries to the side of the Allies, we should be prepared to base an advanced detachment of the Grand Fleet—consisting of battle cruisers, submarines, and destroyers—on Skudesnaes. This force would be in a position to exercise control over the trade passing between Sections A, B, and C; and in order to dispute that control the enemy would have to risk a superior force, which could only remain in that area for a very limited period. Kristiansund is considered to be in too advanced a position to form a suitable base for a detached force.

22. The following is a summary of the above considerations and the appendices:

(*a*) Completion of the Northern Barrage to the Norwegian coast is of paramount importance; and trade considerations should not be allowed to stand in its way.

(*b*) If the Allies have to carry out that operation, retaliation by the enemy in territorial waters is possible but improbable.

(*c*) The Allies naval, diplomatic, and economic forces, nevertheless, should be coordinated so as to strengthen Scandinavian resistance to any enemy action of this kind.

(*d*) If the enemy does decide to attack in neutral waters, the trade in Section A could be carried on as before, whilst the re-

mainder could probably be continued in reduced volume. The increase in tonnage required to bring material from more distant countries would be compensated by the decreased sinkings which might be expected from the greater efficiency of the Northern Barrage.

(*e*) In this case special measures would have to be occasionally taken by the Grand Fleet to protect accumulations of trade passing between Sections A and B.

(*f*) An organized effort should be directed toward making the Allies as independent as possible of supplies from Sections B, C, and D, partly by developing and increasing other sources of supply and partly by accumulating larger reserves. For example, if our consumption of Swedish pig iron, bar iron, and special steels had been cut down to the present scale and the Treasury had not reduced the supplies, we should now have sufficient reserves to last for a long time (vide Appendix IV). Independently of the particular question under consideration, the mere fact that the enemy is in a position to cut off Swedish supplies to the Allies is quite sufficient reason to make every effort to be independent of them should that emergency arise.

(*g*) In the event of enemy action bringing the Scandinavian powers in on the side of the Allies, arrangements should be made to base a strong detachment from the Grand Fleet on Skudesnaes.

23. If the foregoing is approved in principle, it is suggested that tht War Cabinet be communicated with as regards paragraph 22 (*f*) and Appendix IV—i. e., the necessity of the Allies' making themselves as far as possible independent of Swedish supplies—and that action be taken with regard to issuing Appendix I in suitable propaganda form.

Appendix I.

CASE FOR MINING NORWEGIAN TERRITORIAL WATERS.

1. Norwegian territorial waters have been used by the enemy to outflank the Allies' naval power, and their efforts to close the North Sea exits to enemy submarines are thus rendered abortive. Proof of the passage of enemy submarines should be given, and the necessity of mining explained.

2. A belligerent can not be allowed, under the plea of international law, a privileged passage to and from the open sea in order to sink belligerent and neutral shipping in defiance of all the accepted customs of maritime war.

3. The whole basis of relationship between a belligerent and neutral rests on the assumption that the neutral does not shield the other

belligerent from the pressure of his opponent's hostility. Hence, if the immunity of Norwegian waters is used by the enemy to shield him from the action of the Allies' sea power, that immunity ceases.

4. This doctrine coincides with that held by the Norwegian Government, for in the royal decree of 13th October, 1916, belligerent submarines were forbidden to navigate or sojourn in territorial waters, and the Norwegian Government have now to enforce that decree.

5. It must also be pointed out that Sweden adopted a much stronger attitude on the same question. The Swedish royal decree of July 19, 1916, was only aimed at submarines, but the decree of July 14 notified the closing by mines of the Kogrund Channel, the only passage through territorial waters by which the Allies' trade could pass in and out of the Baltic without being attacked by German warships. This decree resulted in a very large number of British merchant ships being shut up in the Baltic.

6. It should be explained that the intention is to prevent belligerent war vessels passing through territorial waters, and that a clear channel can be left through the Inner Leads for neutral and bona fide belligerent merchant ships, so that neutral trade, whether with belligerents or neutrals, can continue undisturbed.

7. The policy of the Allies might be defined as follows:

The territorial waters of a neutral power can not be respected where such waters are used systematically by enemy war vessels for the purpose of passage to and from the area of operations. Should a neutral power fail to take adequate measures for the prevention of such traffic, the enemy war vessels will be liable to attack, save and except only in the waters of harbors or where the lives and property of neutrals might be endangered by such attack. In the case of submarines, the Allies' preventive action may include a mined zone in territorial waters which will be declared in the usual manner.

Appendix II.

Table A.—*Summary of rations allowed by the Allies to Norway and Sweden under agreements of 30th April and 29th May, 1918.*

Commodity.	Yearly ration (metric tons).	
	Norway.	Sweden.
Foodstuffs	597,522	609,870
Oils and fats, etc	109,696	155,540
Rubber, etc	[1] 17,000	[1] 1,050
	14,100	.....
Textiles	18,310	37,350
Miscellaneous	61,042	24,835
Metals, minerals, etc	258,080	158,426
Coal	[2] 2,760,000	1,800,000

[1] Pieces.
[2] Allowed under coal and ship agreements of 22-8-17 and 30-11-17, in return for which Norwegian Government allows us the use of such of their merchant ships as they do not themselves require.

TABLE B.

Exports from Norway and Sweden to Germany of the undermentioned articles are restricted by agreements of 30th April and 29th May, 1918, in any single year, to the quantities mentioned below:

[Figures are in metric tons per annum.]

Commodity.	Sweden.	Norway.	Total.
Ferrosilicon	7,000	2,000	9,000
Calcium carbide	6,000	10,000	16,000
Iron ore	3,500,000	40,000	3,540,000
Iron and steel	200,000	.....	200,000
Fish and fish products	.....	48,000	48,000
Calcium nitrate	.....	8,000	8,000
Zinc	.....	1,000	1,000
Aluminium	.....	40	40
Pulp, paper, and products thereof	236,000	.....	236,000

TABLE C.

Under the Swedish[1] and Norwegian agreements of 30th April and 29th May, 1918, these countries will export to the allied powers and America the following commodities:

[Figures in metric tons per annum.]

Commodity.	Norway.	Commodity.	Norway.
Nitrates	112,000	Iron-ore concentrates	200,000
Cyanamide	10,000	Pyrites	130,000
Calcium carbide	30,000	Molybdenite, etc	300
Silicum carbide	3,000	Timber, wood, and wood products	1,005,000
Aluminum	12,000	Iron ore	.....
Zinc	20,000	Pig iron	.....
Sodium	500	Special steels	.....
Ferrosilicon	20,000	Ball bearings	.....
Ferrochrome	5,000	Fish and fish products	48,000
Special nails	3,000		

NOTES.

1. We expect 45,000 tons of timber per month from Sweden. France requires 15,000 tons of timber per month; United States requires 30,000 tons of timber per month.
2. We are empowered to employ 400,000 tons of Swedish shipping, half within and half without the German so-called "war zone."
3. We have the right to purchase from 2,000,000 to 2,500,000 tons of iron ore during the year ending 1st July, 1919.
4. The trade agreement between the Allies and Denmark is now under revision. At the present time we obtain a certain amount of shipping and practically no goods from Denmark. In return we allow her about 100,000 tons of coal per month.

[1] The Swedish Government will facilitate exports from Sweden to the Associated Countries.

APPENDIX III.

Scandinavian trade—Period, July–August, 1918.

SECTION A.—THE NORWEGIAN COAST LINE FROM SKUDESNAES TO THE NORTHWARD.

Imports.	Ships.				Exports.	Ships.			
	British.	Norwegian.	Swedish.	Total.		British.	Norwegian.	Swedish.	Total.
Cargoes:					Cargoes:				
Coal	56	3	1	60	Carbide	5	.....	.....	5
General	4	1	1	6	Pyrites	3	.....	.....	3
					Copper ore	1	.....	.....	1
					Wood and products	11	4	.....	15
					General	.....	7	.....	7
					Iron ore	35	1	4	40
					Iron briquets	2	.....	.....	2
Total	60	4	2	66	Total	57	12	4	73

SECTION B.—THE COAST LINE BETWEEN SKUDESNAES AND GOTEBORG.

Cargoes:					Cargoes:				
Coal	45	25	82	152	Carbide	1	.....	.....	1
Aluminium	.....	1	.....	1	Pyrites	7	3	.....	10
General	1	5	1	7	Copper ore	1	.....	.....	1
					Wood and products	40	21	60	121
					General	4	12	44	60
					Chemicals	1	.....	.....	1
Total	46	31	83	160	Total	54	36	104	194

SECTION C.—THE SWEDISH COAST FROM GOTEBORG TO THE SOUND.

Imports.	Ships, Swedish.	Exports.	Ships, Swedish.
Cargoes: Coal	8	Cargoes: Wood and products	17

SECTION D.—THE SWEDISH COAST INSIDE THE BALTIC.

Cargoes: Coal	6	Cargoes: Wood and products	3

SECTION E.—THE DANISH COAST.

Imports.	Ships, Danish.	Exports.	Ships, Danish.
Cargoes:		Cargoes:	
Coal	109	Ballast	99
General	7	Produce	4
Total	116	Total	103

The whole of this trade is with ports in the Belts and Sound, except 25 coal cargoes to east coast of Jutland and 2 to Esbjerg.

APPENDIX IV.

SUPPLIES FROM SWEDEN.

NOTE.—Various experts have been consulted in the compilation of these notes, but it is not claimed that the investigation is exhaustive. To achieve such a result the matter would have to be dealt with by a competent committee. It may be observed, however, that the various departments showed a strong tendency to exaggerate the importance of Scandinavian imports and that a considerable amount of cross-questioning was required to discover that substitutes and alternative sources of supply existed. Where large questions of policy are involved, the opinion of a supply department or a manufacturer who is absorbed in his own particular business should not be accepted without careful examination.

Our most important imports from Sweden are iron ore, pig iron, bar iron, special steels, ball bearings, and timber.

Iron ore.—The supply of iron ore would be uninterrupted, as it is transported by rail to Narvik, which is situated in the northern part of Area A.

Bar iron, pig iron, and special steels.—For certain high-class steel manufactures Swedish bar iron and special steels are said to be superior to the home product, and, if supplies of the former were cut off, the efficiency of such articles as tank chains, gun springs, band saws, etc., would be reduced. For example, instead of supplying a tank with two spare chains it might require three or four. Thus the employment of Swedish bar iron and special steels means economy of labor. It must be pointed out, however, that there are two schools of thought on this subject, and some experts consider that the superiority of the Swedish articles is exaggerated. With regard to Swedish pig iron, it is generally admitted to be of better quality than the home product and is used to dilute and reduce the percentage of impurities in British pig iron. In any case the quantities[1] of bar iron, special steels, and pig iron imported from Sweden are not very large, and there should be no great difficulty in getting them transported by rail to northern Norwegian ports. Apart from the question of quality, deprivation of Swedish bar and pig iron would necessitate a slight increase in British production. It is of interest to note that, owing to the unfavorable rate of exchange between the United Kingdom and Scandinavia, the Treasury not long ago instructed the Ministry of Munitions to cease buying from Scandinavia and for some time the munitions industry had to live on reserve stocks. Eventually the departments were allowed to put in requisitions for cer-

[1] 9,000 tons bar iron and 8,000 tons pig iron during the first six months of 1918, which is a considerable reduction on previous years.

tain Swedish supplies based on the minimum quantities they could manage with, and this was allowed by the Treasury, subject to a 50 per cent reduction. Thus the Treasury drastically cut down supplies of essential goods, whereas naval policy would dictate the necessity of accumulating reserve stocks of material which the enemy is in a position to cut off at a moment's notice. There would appear to be urgent necessity for closer cooperation between Government departments concerned in such matters.

Ball bearings, being of small bulk, could easily be transported by rail across Norway, but nevertheless every effort should be made to increase home production, so that we no longer depend on imported supplies.

Timber.—From November on we expect to take 45,000 tons and France 15,000 tons of timber per month from Sweden, the whole of which will probably come from the Goteborg district. If Goteborg were cut off, efforts might have to be made next summer to get large supplies from Archangel. It is doubtful whether Kola could supply during the winter.

NOTE.—A difficulty has arisen owing to an urgent request from the Americans for 30,000 tons of timber per month for their army in France.

Other supplies.—All the remaining imports from Sweden could be obtained elsewhere without difficulty.

SUPPLIES FROM NORWAY.

Our most important requirements are ammonium nitrate, carbide, and timber.

Ammonium nitrate.—Used for making amatol and ammonal. It is a substitute which was introduced owing to the shortage of toluol, from which T. N. T. and trotyl are made. This shortage is not likely to be overcome, as toluol is derived from coal.

If, therefore, France's Scandinavian supplies of ammonium nitrate were cut off or appreciably reduced, the difference would probably have to be made up partly by increased production in and export from the United Kingdom and partly by a more extensive use of picric acid in France. The disadvantage of the latter is that its use entails the transport of rather large quantities of materials, while increased production of ammonium nitrate in the United Kingdom would entail increased imports of Chilean nitrate of soda. (The Norwegians produce all their nitrate from the air.) It is considered that the difficulty, at the present juncture, of erecting works in France precludes the manufacture in that country of ammonium nitrate from Chilean nitrate.

In the event of Germany attacking Scandinavian trade, the supply from Norway could be maintained by faster ships and powerful escorts.

Carbide.—The carbide comes from the Alby works at Odda, north of Stavanger, in Section A, and the transport would present no additional difficulty.

Timber.—From November on we expect 15,000 tons per month from Norway. Some of this come from Christiania, a little from Narvik, and the bulk from Trondhjem. It is possible that the Trondhjem district will be able to supply the whole amount.

Fish.—The fish comes from various ports in Section A and its import would present no difficulty.

Other supplies.—Aluminum, ferrochrome, ferrosilicon, zinc, etc., are also imported from Norway, but can easily be obtained elsewhere. Pyrites are imported from Norway, mainly to prevent their export to Germany.

Comment on 3 October by the Force Commander follows:

"1. There is forwarded herewith inclosed for the information of the Department one copy of Planning Section Memorandun No. 56, which is a copy of a paper prepared by the Plans Division of the British Admiralty on the subject of Scandinavian trade in its relation to the allied interests and probable effect on those interests of Germany retaliating on the Scandinavian trade for the mining of Norwegian territorial waters.

"2. The Department is aware that within the past few days Norway has made public announcement of mining certain territorial waters against the passage of belligerent submarines. Since Norway has taken this action of her own volition it does not seem probable that Germany will attempt to retaliate by declaring unlimited submarine warfare or cruiser warfare against neutral vessels in Scandinavian waters."

MEMORANDUM No. 57.

HUNTING ENEMY SUBMARINES IN THE BAY OF BISCAY AREA.

[Submitted jointly by American and British Planning Sections.]

October, 1918.

NOTE.—The following memorandum was prepared without knowledge of the recent decision to send British submarines to work in the Biscay area. It is not considered advisable to work United States destroyers in the same area as British submarines; but the original proposal is still put forward because it is considered that the United States destroyers will have a much better chance of driving off or destroying the enemy submarines. It is therefore suggested that the submarines (Ambrose's flotilla) either work alternately with the United States destroyers, say a week at a time, or that they be sent elsewhere. The enemy submarine route to the westward of Ireland would appear to be a very suitable operating area for the Ambrose's flotilla. They would be safe from the attack of our own vessels and the enemy submarines are almost certain to be proceeding on the surface in this area.

1. In the rendezvous area west of Brest there have been operating each day during the last month, within a radius of 75 miles from the center of the area, from two to six enemy submarines. This area lies on the direct line of approach from America to the French ports and to the English Channel, and from Gibraltar to Milford Haven and the Irish Sea ports.

2. During the same period only one attempt has been made to hunt the submarines out of this area, and that attempt was made with vessels not sufficiently seaworthy. It is urgent that submarines designedly operating on such an important area should be interfered with as much as possible by hunting vessels, for if they are unmolested in an area where traffic is so dense the rate of sinking will be high and eventually a troop convoy may be found and attacked.

3. Destroyers are really the only vessels suitable for hunting operations in this area in winter, and for the hunting to be effective it should be carried out systematically.

4. The following suggestions, therefore, are put forward:

(*a*) That the 8 American destroyers now based at Queenstown, that have been, or will be in the near future, fitted with the latest form of Mason device, be based upon Plymouth to form the necessary

hunting force, and that 8 British destroyers relieve them at Queenstown. The only stations from which these 8 reliefs could be temporarily provided without considerable dislocation, and having in view the removal of the enemy naval force in Flanders, would seem to be Dover, which now has 8 flotilla leaders and 26 F. M. and S class and 2 ex-Turkish destroyers, or Harwich, which has 4 flotilla leaders and 24 R class destroyers.

(*b*) That special arrangements be made for the rapid transmission of information to operating vessels of the positions of submarines in this area.

(*c*) That instead of defining the area in which hunting groups are to operate that they be advised of the areas where submarines are operating, and that the hunting groups shift their operating areas so as to follow the enemy submarines wherever they may go, the principle being to take away from the submarines their present sense of security against attack when they themselves are not attacking.

5. The matter of providing forces for attacking this concentration of submarines in the Bay of Biscay area is one of extreme urgency, and it is considered that every possible effort should be made to provide them.

INDORSEMENT BY FORCE COMMANDER.

The recommendations contained herein are approved in principle, their execution to be deferred until such time as it may become apparent that the enemy has renewed his efforts at concentration in the area in question. During the month of October up to the 15th, only one vessel has been sunk in this area and it seems probable, judging by the experiences of last year, that there will be no strong effort made in this area until next April.

WM. S. SIMS,
Vice Admiral, U. S. Navy, Commanding.

U. S. Naval Headquarters, London, England, October 19, 1918.

[Extract from Memorandum No. 71, "History of Planning Section."]

The Planning Section had noted the enemy concentration of submarines west of Brest, and acting upon its recommendation the Force Commander dispatched a force of American destroyers and chasers from Plymouth on 30 and 31 August to operate against the enemy. This independent action led to such vigorous protest by the British admiral commanding the naval district in which Plymouth is located as to induce the Force Commander to agree not to repeat similar independent operations. The incident demonstrated the unsuitability of chasers for operations so far at sea at that season of the year. However, it served to emphasize the importance of offensive action against the enemy con-

COL. LOUIS McCARTY LITTLE, U. S. M. C., MEMBER OF PLANNING SECTION.

centration, and apparently to induce the British decision to send submarines on that mission.

The incident illustrates the importance of a Planning Section keeping in close touch with current events during war.

In forwarding the memorandum the Force Commander on 19 October commented as follows:

"1. There is forwarded herewith for the Department's information one copy of Planning Section Memorandum No. 57, which is a joint memorandum by the Plans Division of the Admiralty and the Planning Section of my staff, concerning a plan for hunting enemy submarines in the so-called concentration area west of Brest, France.

"2. Should the concentration of submarines in that area again become marked, steps will be taken to carry out the plan proposed in this paper."

102315°—23——27

MEMORANDUM No. 58.

NAVAL USE OF LONG-RANGE GUNS.

19 October, 1918.

Planning Section has been asked its opinion as to the value of a long-range gun capable of firing at a range of about 65 miles.

The following are approximate data concerning the long-range gun which fired at Paris:

Range	about 68 miles.
Frequency of firing	3 to 4 times per hour.
Angle of fall	about 60°.
Angle of departure	about 50°.
Initial velocity	5,700 f. s.
Time of flight	about 3 minutes.
Remaining velocity	about 2,350 f. s.
Angle of dispersion in Paris	about $2\frac{1}{2}$° of arc.
Pattern in range	several miles, some shots falling both well over and well short of Paris.
Caliber	about 9 inches.

The effect on Paris was annoying, but had no material influence on the conduct of the war.

The gun proposed may be used either—

(*a*) On board ship.

(*b*) On shore.

We will examine each of these possibilities in relation to the present war only.

The naval objectives for such a gun are practically the same as aircraft objectives, namely naval bases in the Helgoland Bight, on the Belgian coast, and in the Adriatic. The naval bases in the Bight can be attacked by long-range fire from ships only.

The nearest land positions to the bases in Flanders at Ostende, Bruges Canal, and even Ghent are within easy range for the proposed gun from positions well back of our line. The base at Bruges offers a target of less than 1 square mile; that at Ostende about the same. These are Belgian cities, and in spite of the great desirability of destroying vessels and workshops there which are used to support the war for the enemy, the authorized objectives even

for aircraft are extremely circumscribed. In the Bruges Canal destroyers lie in the vicinity of protected buildings with entire impunity, the only authorized objectives being the dockyard and docks. It is well known that aircraft can drop bombs on the Flanders objectives with more accuracy than a gun of such long range can drop projectiles. The effect of a bomb is far greater than that of a projectile from the proposed gun.

We therefore conclude that, so far as the Flanders bases are concerned, the long-range gun has no mission in that area.

In the Adriatic the enemy bases to be considered are—

Trieste.
Pola.
Cattaro.
Durazzo.

Pola is the main base in the Adriatic, and the one which it is most desirable to attack by artillery. There is but one small exposed section of the coast of Italy, at the mouth of the River Po, which is within 65 sea miles of Pola.

Trieste is within reach of the long-range gun if it is placed close behind the present lines.

All other Adriatic ports are out of range from land positions.

The target of the harbor and dockyards at Pola is approximately 2 square miles; that at Trieste about 1 square mile. The major axis of the Pola target is about 2 miles long in the approximate direction from which the gun would fire.

In view of the foregoing, and furthermore in view of the relatively small target and minor importance of Trieste as a naval base, it would appear that Pola is the only base in which we would now be warranted in building long-range guns to bombard from shore positions.

On account of the comparatively small bursting charge a large number of shots would be necessary in order to produce any decisive effect at long range. Moreover, if the size of the target at Paris represents the maximum of accuracy of which the gun is capable, it would seem that no naval target is available for the use of these guns from shore, and their construction for naval purposes would consequently not be recommended.

As to use on board ship, the problem is even more difficult. The only positions from which we need consider the use of these guns from ship board are—

(1) In the Helgoland Bight.
(2) In the Adriatic.

Wherever these guns are fired from ships, the ship must be stationary and in very smooth water. The British Plans Division, which is investigating the subject of firing from ships, concluded as follows:

When firing at great ranges, the exact geographical position of the gun must be known if material results are to be forthcoming.

The advantage of mounting the long-range guns in vessels instead of ashore is a gain in mobility leading to a wider choice of targets.

In order to use these guns from ships means must be available for accurately fixing the position of the firing vessel at sea. Positions at sea can be obtained by the following methods:

(*a*) Fixes (bearings or angles) from land objects by day or shore lights by night. (NOTE.—The extreme distance from the land at which such a fix could be obtained may be considered as about 30 miles in the case of bearings of searchlight beams shown from prearranged positions at night.)

(*b*) Astronomical observations. (NOTE.—This method can not be relied upon owing to the vagaries of the weather. Even under good conditions the margin of error is likely to reach 2 miles.)

(*c*) By the use of navigational marks whose position has been previously ascertained. (NOTE.—The absence of navigational marks in the North Sea renders this method impracticable throughout those waters unless special buoys are laid out and "fixed" previously for the purpose.)

(*d*) By ranging and direction finding by sound.

It will be seen from the above quotation that the difficulties of fixing the position of the ship with sufficient accuracy to justify long-range fire are almost insurmountable. In addition to these difficulties, there is the question of obtaining accurately the bearing of the target at which firing must be directed, the error of which is in the direction. This error, resulting either from an error in the compass itself or from other causes, will cause a diversion of about 2,300 yards from the point of aim, or a total arc of dispersion at the extreme range of over 4,500 yards. To this error must be added those incident to air conditions, which can not be ascertained with anything like the same degree of accuracy as they can be from land stations, there being no facilitities for sounding the air at great altitudes from the sea position of the ship.

As the rate of firing is necessarily slow, it would be possible for the enemy by sound-ranging methods to determine quickly the bearing or position of the bombarding ship and to take countermeasures. These countermeasures might involve a large supporting force of destroyers or even capital ships.

So far as the bombardment of German bases in or near the Helgoland Bight is concerned, no effective work could be done, even if the ship was not interfered with, unless there were arrangements made for spotting the fall of shots. This could be done from aircraft only. It is well known that it is not possible to put aircraft into the Helgoland Bight in numbers sufficient to do spotting by day with the facilities available or likely to be available in the near future. The effort required to keep even a single plane in the air

or hovering over a given objective would be greater than to deliver a bombing attack on that same objective, with the probable effectiveness of the latter greatly in excess of the effectiveness of bombardment by a long-range gun.

The same comments are true in a somewhat less degree as regards the bases in the Adriatic.

CONCLUSION.

So far as the present war is concerned, we see no justification for the mounting of the proposed long-range gun on any vessel of the Navy.

We see no need for the proposed long-range gun for the bombardment of any bases from land positions except Pola and Trieste, and then only in case gun has sufficient accuracy at required range.

We recommend, should it be determined to attempt the bombardment of either of these bases by a long-range gun, that Pola be selected for bombardment first.

In view of the fact that 65 miles is the minimum range required for the successful bombardment of Pola, we recommend that efforts be made to increase this range by at least 15 miles, in order to give greater choice of range in the location of the guns during the bombardment.

No recommendations are made concerning the use of these guns on purely military as opposed to naval objectives.

INDORSEMENT BY FORCE COMMANDER.

As a study of the probable value of a 65-mile gun in the present war, this Planning Section memorandum is approved.

It is thought that no material results of importance commensurate with the expenditure of money and the interference with other ordnance construction would be attained by the use of such guns in the present war.

Certain moral results might be attained, but judging by the little effect which the long-range bombardment of Paris had, the importance of such results may be easily overestimated.

As to the use of such a gun in future wars, the following is quoted from my cable No. 2768 of August 13, 1918:

> It is difficult to anticipate the requirements far in advance and it is probable that the necessity for such a gun will be greater in the future than at the present. It is recommended that the Bureau of Ordnance proceed with the development of such a gun with the utmost dispatch.

WM. S. SIMS,
Vice Admiral, U. S. Navy, Commanding.

U. S. Naval Headquarters, London, England, October 19, 1918.

MEMORANDUM No. 59.

ARMISTICE TERMS.

24 October, 1918.

Certain proposals for armistice terms have been made by a Paris conference, by the British Admiralty, and by the Force Commander to the Navy Department. The following paper compares all of these proposals and submits revised proposals, giving the reasons therefor.

The object of an armistice now is to secure a cessation of fighting during the period necessary for the Allies to formulate their peace terms, communicate them to Germany, and receive her formal acceptance. The motive underlying the armistice is the prevention of unnecessary loss of life and property. The assumption is that Germany is defeated.

If it were perfectly certain that the peace terms proposed by the Allies would be accepted and that hostilities would not be resumed, a simple cessation of hostilities would be sufficient.

The dangers of an armistice are—

(*a*) Legitimate advantage to enemy due to breathing spell.

(*b*) Possibility of enemy deriving illegitimate advantage through bad faith.

(*c*) Resumption of hostilities with Allies in a materially less advantageous position than they enjoy at present.

The Allies are now in such a position that they can demand that an armistice, if any is to be granted, shall insure the conclusion of a peace on their own terms. The terms of the armistice must be such, therefore, that their acceptance and observance by the enemy would be practically equivalent to an unconditional surrender and would preclude a resumption of the war.

The decision of the war must be made on land; the function of the sea forces is to make it possible for the armies to win. The principal terms of the armistice must therefore be determined by the military authorities, while the naval terms must be determined so as to support the military terms and, in addition, meet all naval requirements.

The military and naval representatives of England, France, Italy, and the United States met at Versailles on October 8, 1918, to consider armistice terms, and laid down the principle that—

"One essential of an armistice is the disarmament of the enemy under control of the Allies"; and agreed on certain definite requirements, which will be stated later. All of these requirements may be sumarized as follows:

(*a*) Active hostilites to cease.

(*b*) Evacuation by enemy of allied, neutral, and disputed territory without further damage.

(*c*) Withdrawal of enemy fighting forces—land, sea, and air—to specified areas or bases.

(*d*) Certain submarines to be interned in allied ports for the period the war.

(*e*) Pledges to be taken in the form of immediate occupation of certain fortified places in enemy possession.

(*f*) Return without reciprocity of prisoners of war.

These six items may now be examined to see if they cover all that is necessary to an armistice and what detailed provisions should be made for making them effective.

(A) RESUMPTION OF ACTIVE HOSTILITIES.

If by active hostilities is meant no more than fighting with the enemy, the application of this requirement to both sides is implied and is necessary. The special character of the armistice which we demand, however, requires that the definition be modified so as to permit the Allies to carry on mine laying, escort work, submarine hunting, and patrolling, while denying all such activities to the enemy.

We may therefore lay down the following conditions:

(1) Enemy submarines to cease hostilities immediately upon the signing of the armistice.

Paris proposal: Submarine warfare to cease immediately upon the signature of armistice.

British proposal: Submarine warfare to cease immediately upon the signature of armistice.

Proposal to department: Submarine warfare to cease immediately upon signature of armistice. Unrestricted submarine warfare to be abandoned for the duration of the war.

Comment: Proposal No. 1 above preserves to our submarines the right to operate outside of territorial waters, whereas the other proposal limits the activities of our submarines as much as it limits the activities of German submarines.

(2) Enemy to lay no mines outside his own territorial waters during the armistice. Allies to have the right to continue laying mines outside of enemy territorial waters.

Comment: Not covered by other proposals. This provision is in line with the mission of making it impossible for the enemy to resume the war.

(3) Enemy to do no mine sweeping outside his own territorial waters. Allies to be free to sweep up mines anywhere except in enemy territorial waters. Enemy to disclose the location of all mine fields laid by him outside his own territorial waters.

Paris proposal: Enemy to reveal the position of his mines outside territorial waters. Allies to have the right to sweep such at convenience.

British proposal: Allies to have the right to sweep up enemy mines outside his territorial waters at their own convenience.

Proposal to department: Enemy to reveal the position of his mines outside territorial waters. Allies to have the right to sweep such at convenience.

(4) Allied blockade and restrictions on sea-borne commerce to continue as at present.

Paris proposal: The present blockade conditions to remain unchanged, and all enemy merchant vessels found at sea to remain liable to capture.

British proposal: The present blockade conditions to remain unchanged, and all enemy merchant vessels found at sea to remain liable to capture.

Proposal to department: The present blockade conditions to remain unchanged, and all enemy merchant vessels found at sea to remain liable to capture.

Comment: Proposal No. 4 above is broader in meaning than the other proposals, since blockade conditions are not the only sea conditions now limiting commerce with the enemy countries.

(5) Allied naval vessels to be employed outside enemy territorial waters in any desired manner not involving actual attack on enemy territory, vessels, or property.

Comment: This is a new proposal, consistent with the character of the armistice, and is included to prevent any recrimination on the part of Germany.

(6) The same restrictions and privileges to apply to our own aircraft as to naval vessels.

Comment: This is a new proposal, consistent with the character of the armistice, and is included to prevent any recrimination on the part of Germany.

(B) EVACUATION BY THE ENEMY.

It is obvious that whenever an armistice might be concluded, the evacuation by enemy naval forces of all occupied allied and neutral ports would be the corollary to evacuation of similar territory by armies. Similarly, the evacuation of ports in disputed territory may be demanded.

We, therefore, lay down the following additional conditions:

(7) Enemy naval forces to evacuate—

(*a*) All ports and coasts of neutral, occupied, or allied countries; (*b*) all ports and coasts of disputed territory which, by the terms of the armistice, military forces are to evacuate, including (*c*) the coast and ports formerly included in the Empire of Russia.

Coasts and ports of countries in categories (*b*) and (*c*) not to be occupied by the Allies during the armistice.

Paris proposal: Enemy to evacuate Belgian and Italian coasts immediately. Austro-Hungarian Navy to evacuate all ports in Adriatic Sea occupied by them outside national territory. Black Sea ports to be immediately evacuated.

British proposal: Enemy to evacuate Belgian and Italian coasts immediately. Austro-Hungarian Navy to evacuate Istrian ports and all ports in the Adriatic occupied by them outside national territory. Black Sea ports to be immediately evacuated.

Proposal to department: Enemy to evacuate Belgian and Italian coasts immediately. Austro-Hungarian Navy to evacuate all ports in Adriatic Sea occupied by them outside national territory. Black Sea ports to be immediately evacuated.

Comment: Concurrence in the British proposal that Istrian ports be evacuated is withheld, as this introduces the idea of the occupation of enemy territory and involves a needless friction during the progress of peace negotiations.

(8) No damage of any kind to be done by the enemy to any of the evacuated coasts or ports before evacuation, and no military stores, munitions, or provisions to be destroyed or to be removed before evacuation.

Paris proposal: No military destruction to be permitted before evacuation. To leave behind all naval war stores and equipment.

British proposal: No destruction of abandoned material to be permitted before evacuation. To leave behind all naval war stores and equipment.

Proposal to department: No military destruction to be permitted before evacuation. To leave behind all naval war stores and equipment.

Comment: Proposal No. 8 above is designed to be more specific and comprehensive than either of the substitute proposals.

(C) AND (D) DISPOSAL OF ENEMY NAVAL FORCES.

It is obvious that the enemy naval forces can not be left in a position, or allowed to gain a position during the armistice, from which they could initiate operations advantageously should hostilities be resumed.

If we demanded the surrender to the Allies of all or a considerable part of the enemy fleet, we should be demanding more than even a treaty of peace might require and something that we probably should not have accomplished by force in a continuation of the war. Moreover, we should be providing the causes for possible serious disagreement amongst the Allies. As Germany has possession of certain Russian ships, these must be surrendered.

In the matter of submarines, however, the great difficulty of insuring that they will remain in any specified place if not under allied control makes it necessary that they be delivered to the Allies.

In spite of these deliveries to the Allies, the representatives of the United States should have in mind that it is contrary to the principles of disarmament that these vessels thus obtained from the enemy be distributed to the enemies of Germany. In principle the Russian vessels should be returned to Russia when a stable Government has been established there.

We therefore lay down the following additional conditions:

(9) All enemy naval surface craft of all classes shall withdraw for the duration of the armistice to enemy waters or bases, as follows:

(*a*) Enemy vessels now in the North Sea, Baltic, or German home ports to the German Baltic ports.

(*b*) Enemy vessels in the Mediterranean, Adriatic, Aegean and adjacent waters, except the Black Sea and its tributaries, to Austrian Adriatic ports.

(*c*) Enemy vessels in the Black Sea and its tributaries to remain in that sea.

(*d*) Vessels formerly belonging to Russia and now in the possession of the enemy to be surrendered to the Allies at such place or places and under such conditions as may be prescribed by the allied commanders in chief in the North Sea and Mediterranean. No damage of any kind to be done to these vessels by the enemy before surrender. Final disposition of these vessels to be determined by the treaty of peace.

Paris proposal (*a*): All enemy surface shipping, including monitors, river craft, etc., to withdraw to naval bases specified by the Allies and remain there during the armistice.

Paris proposal (*b*): Austro-Hungarian Navy to evacuate all ports in the Adriatic Sea occupied by them outside national territory.

Paris proposal (*c*): Ships and material seized in Black Sea ports by the enemy to be delivered to the Allies.

Paris proposal (*d*): None.

British proposal (*a*): All enemy surface ships to withdraw to naval bases specified by the Allies, and to remain there during the armistice, and the following-named ships to be surrendered at once in allied bases:

Battleships:
- *Baden*, fleet flagship.
- 3d battle squadron—
  - *Konig.*
  - *Bayern.*
  - *Grosser Kurfurst.*
  - *Kronprinz Wilhelm.*
  - *Markgraf.*
- 4th battle squadron—
  - *Friedrich der Grosse.*
  - *Konig Albert.*
  - *Kaiserin.*
  - *Prinzregent Luitpold.*
  - *Kaiser.*

Battle cruisers:
- *Hindenburg.*
- *Derfflinger.*

Battle cruisers—Continued.
- *Seydlitz.*
- *Moltke.*
- *Von der Tann.*
- *Mackensen.*

Light cruisers:
- *Brummer*, mine layer.
- *Bremse*, mine layer.
- *Koln.*
- *Dresden.*
- *Emden.*
- *Frankfurt.*
- *Nurnberg.*
- *Wiesbaden.*

Destroyers:
- Fifty of the most modern destroyers.

British proposal (*b*): Austro-Hungarian Navy to evacuate Istrian ports and all ports in the Adriatic occupied by them outside national territory.

British proposal (*c*): Ships and material seized in the Black Sea ports by the enemy to be delivered to the Allies.

British proposal (*d*): None.

Proposal to department (*a*): All enemy surface ships, including monitors, river craft, etc., to withdraw to naval bases specified by the Allies and remain there during the war.

Proposal to department (*b*): Austro-Hungarian Navy to evacuate all ports in the Adriatic Sea occupied by them outside national territory.

Proposal to department (*c*): Ships and material seized in Black Sea ports by the enemy to be delivered to the Allies.

Proposal to department (*d*): None.

Comment: The proviso contained in our suggestion to the department that vessels shall remain at designated bases until the end of the war is impracticable of realization. The provision also that enemy surface forces shall withdraw to bases specified by the Allies is too vague, and has consequently been defined. The British proposal that certain ships of the enemy shall be surrendered in allied bases should not be included in the armistice terms. The surrender

is not necessary to the armistice. If we demand the surrender to the Allies of a considerable part of the enemy fleet, we should be providing the causes for a possible serious disagreement amongst the Allies.

(10) All enemy submarines, excepting only such of those under construction as are not yet launched, to be interned in allied ports for the duration of the war. Final disposition of these to be determined by the treaty of peace.

Paris proposal: Sixty submarines of type to be specified shall proceed immediately to specified allied ports and remain there during the armistice. Submarines operating in the North Sea and Atlantic Ocean shall not enter the Mediterranean Sea.

British proposal: All enemy submarines to be surrendered at once in allied ports.

Proposal to department: Sixty submarines of type to be specified shall proceed immediately to specified allied ports and remain there during the war. Submarines operating in the North Sea and Atlantic Ocean shall not enter the Mediterranean Sea. No enemy naval forces away from home bases at time of signing armistice to be permitted to return to such bases, but to proceed to allied ports for internment. In addition to the 60 submarines which are to proceed to specified allied ports, 15 additional submarines are to proceed to such ports for internment during each month of the continuation of the armistice, excepting the first month or fraction of a month.

Comment: Proposal No. 10 above is more specific, more comprehensive, and more in accord with the nature of the proposed armistice than any of the other proposals. It is open to the objection that friction in the peace conference may result from surrender, but the difficulty of insuring that submarines will remain in any specified place if not under allied control makes this provision necessary.

(11) All enemy naval aircraft to be concentrated at enemy bases specified by the allies and to remain there during the armistice.

Paris proposal: Enemy naval air forces to be concentrated in bases specified by the Allies and to remain there for duration of the armistice.

British proposal: All enemy air forces to be concentrated in enemy bases specified by the allies and to remain there for duration of the armistice.

Proposal to department: Enemy naval air forces to be concentrated in bases specified by allies and to remain there for duration of the war.

Comment: It is manifestly impracticable to insure that aircraft shall remain in specified enemy bases for duration of the war. The requirement should apply to aircraft only, not to air forces.

(E) PLEDGES.

Paris proposal: Surrender of Helgoland to allied and naval commander in chief.

British proposal: As a guarantee that these naval conditions will be observed, Helgoland to be surrendered within 48 hours to the allied commander in chief in the North Sea.

Proposal to department: None.

Comment: So far as naval warfare is concerned, the fact that all submarines, except such as may be built during the armistice, are delivered to the Allies, taken in conjunction with the other naval conditions of the armistice, is a sufficient guarantee that the enemy can do no naval harm by breaking the armistice. We consider that the disadvantages of the question raised by the surrender of Helgoland will outweigh the advantages of the additional guarantee it might give temporarily.

(F) PRISONERS.

(12) All naval and mercantile marine prisoners in enemy hands to be returned in the shortest possible time without reciprocity, and authorization to be given by the enemy for the immediate release of naval and mercantile marine prisoners of the Allies and of the United States interned in neutral countries.

Paris proposal: Prisoners in enemy hands to be returned to allied forces without reciprocity as soon as possible. Prisoners taken from the Central Powers to be employed for reparation of willful damage done in occupied areas by enemy and for reparation of areas so damaged.

British proposal: All naval and mercantile marine prisoners in enemy hands to be returned in the shortest possible time without reciprocity and authorization to be given for the immediate release of similar allied prisoners interned in neutral countries. Enemy naval prisoners in allied hands to be treated on similar lines to their military prisoners.

Proposal to department: None.

Comment: The Paris proposal to use prisoners for the reparation of willful damage is not consistent with the aims of peace or likely to promote the continuance of peace.

MISCELLANEOUS.

(13) The merchant ships of all nations at war with Germany now in enemy control to be handed over to the Allies without reciprocity in ports or bases to be specified by the Allies.

Paris proposal: None.

British proposal: The merchant ships of all nations at war with Germany now in enemy control to be handed over to the Allies without reciprocity in ports or bases to be specified by the Allies.

Proposal to department: None.

Comment: None.

(14) *British proposal:* Enemy to agree to the release of any merchant ships under control of neutral powers and have access to and egress from the port of Antwerp, and shall be as free during the armistice as in the time of peace.

Paris proposal: None.

Proposal to department: None.

Comment: Free access to the port of Antwerp involves the question of the sovereignty of Holland. On August 4, 1914, Holland proclaimed her sole sovereignty over the mouth of the Scheldt and closed it to war navigation, thus preventing allied fleets going to the assistance of Antwerp during the siege. The Allies have never admitted this right, which is in no way granted to Holland by the treaty of 1839. The Entente in 1914 allowed the Dutch action to stand. The question therefore of free navigation from the high seas to Antwerp is proper for inclusion in the terms of the armistice only if it be essential to Holland to gain the consent of Germany to such navigation in order to avoid counter measures by Germany against Holland. We make no recommendation on this proposal.

(15) All the above measures to be executed in the shortest possible time.

Paris proposal: All the above measures to be executed in the shortest possible time, which should not exceed three to four weeks.

British proposal: All the above measures to be executed in the shortest possible time.

Proposal to department: None.

(16) In the above proposals, whenever the word "Allies" or its derivatives is used, it should be interpreted to include all those Powers now actively associated in the war against the Central Powers.

N. C. TWINING,
Captain, U. S. Navy.
FRANK H. SCHOFIELD,
Captain, U. S. Navy.
L. MCNAMEE,
Captain, U. S. Navy.
D. W. KNOX,
Captain, U. S. Navy.

Approved.

SIMS,
Vice Admiral, U. S. Navy, Commanding.

U. S. Naval Headquarters, London, England, October 24, 1918.

[Extract from Memorandum No. 71, "History of Planning Section."]

Initiated by the Planning Section, Chief of Staff participating, with a view to assisting the Force Commander at a meeting of the Inter-Allied Naval Council, then about to be held, to consider the naval terms of the proposed armistice.

The Force Commander forwarded this memorandum to the Navy Department on 25 October with the following comment:

"1. There is inclosed herewith for the information of the Department a memorandum prepared by the Planning Section of my staff on the subject of naval terms which should be included among the terms of any armistice which may be concluded with the Central Powers.

"2. My cable 6573 retransmitted to the Department two cable messages received from Capt. R. H. Jackson, Paris, setting forth the fact that there had been a meeting of prime ministers and naval and military representatives of some of the allied countries at Versailles on October 8 and stating the naval terms which had been agreed upon by the naval representatives present but which had not been concurred in by the United States Navy representative, owing to lack of authority.

"3. My cable No. 6574 commented on the proposed armistice terms and made certain suggestions for adding to or modifying those terms.

"4. The Department's cable No. 2836 stated that the President did not wish to issue any instructions to the naval representatives in Paris with regard to concurring in the proposed terms of the armistice.

"5. It is probable that a complete statement of the terms proposed by the military and naval representatives is in the possession of the Department, as it was cabled to Washington by General Bliss.

"6. The Department's cable No. 3154 directed me to submit recommendations as to terms preliminary to peace discussion, terms of peace, and our attitude and action subsequent to the conclusion of peace, in order to secure a reasonably long peace. To this I replied in cable No. 7186, stating that the terms of an armistice already forwarded, with certain additions and modifications, were recommended as being the desirable terms to an armistice preliminary to a peace discussion.

"7. My cablegram No. 7955 set forth 15 proposals for an armistice, which represented the final conclusions after considering all of the terms proposed by—

"(*a*) The Paris conference.

"(*b*) The British Admiralty in two letters addressed to me under date of October 17 and October 19.

"(*c*) My cable No. 6574.

"(*d*) My cable No. 7186.

"8. The inclosed memorandum of the Planning Section contains an analysis and discussion of all of these proposals and the 16 numbered paragraphs contain the 15 proposals embodied in my cable No. 7955. It will be noted that No. 14 of the memorandum contains no final proposal by me, so that No. 14 of the cablegram is No. 15 of the memorandum.

"9. A copy of this memorandum and my cable No. 7955 has been mailed to Admiral Benson in Paris."

MEMORANDUM No. 60.

GERMAN AND AUSTRIAN SUBMARINE CAMPAIGN.

12 October, 1918.

General situation: As on September 25, 1918.

Required: Estimate of the situation from the German side as to the submarine campaign, and measures that should be taken to increase its effectiveness, the estimate to cover the following:

1. Operating areas.
2. Objectives within operating areas.
3. Tactical methods and possible replies.
4. Access to operating areas.
5. Relative importance of mines and torpedoes.

NOTE.—*This problem is solved from the German side.*

GENERAL CONSIDERATIONS.

The basic mission of German naval forces is—

"To give the maximum support to land forces in obtaining a successful decision on land."

The overwhelming preponderance of allied surface craft has constrained us since the Battle of Jutland to limit the mission of German surface forces "To further the submarine campaign to the maximum degree"; which mission includes as its major object the maintenance of a free access to the high seas for submarines. We have utilized in this manner our surface strength against allied sea communications.

The failure of the submarine campaign to be as decisive as we had hoped, together with the present unsatisfactory military situation in France (brought about principally through the actual and projected arrival from America of vast numbers of men and quantities of material) create the necessity to make our naval effort at this critical juncture more effective.

Command of the sea's surface would serve German ends so admirably that we would be impelled to attempt to gain it if the unwisdom of such an effort was not obvious.

It might be possible to defeat the Grand Fleet by a concentration of German surface, submarine, and air forces, provided the Germans

were able to choose the scene of action. But the annihilation of the Grand Fleet could hardly be accomplished, and the Allies possess strong reserves of all classes of ships. A victory over the Grand Fleet, however, could not be attained without serious German losses, against which there are no reserves. It therefore appears practically impossible for Germany to obtain command of the sea's surface.

Furthermore, any serious attempt to gain surface command must involve a strong possibility of defeat for the High Seas Fleet. This would jeopardize seriously the command of the subsurface of the sea and restrict the submarine campaign which is now giving material support to the German land campaign.

Owing to destruction of shipping by means of the submarine campaign, combined with increased requirements, the allied prospective shortage of essential products during the next 12 months is about 6,000,000 tons of goods.

We therefore conclude to adhere to our previously adopted mission for the High Seas Fleet—"To further the submarine campaign to the maximum degree"—as well as to the present mission for the submarine forces—"The maximum possible sustained attack on the sea communications of the Allies."

We have then to consider the possibility of increasing the effectiveness of the submarine campaign.

I. Operating Areas.

In deciding upon any area for operations we have to consider—

(*a*) The density of traffic in that area.

(*b*) The importance of the traffic.

(*c*) Antisubmarine measures likely to be encountered.

(*d*) The weather.

(*e*) The distance of the area from the base of the submarines operating there.

The only areas that need to be considered are, in the order of importance—

1. The Irish Sea.
2. The English Channel.
3. Approaches to the Channel, including the Bay of Biscay.
4. The North Sea.
5. The Mediterranean.
6. The Atlantic Ocean.

The Irish Sea traffic amounts to about 25 per cent of the total in and out of Great Britain. Large quantities of military stores, including fuel oil for the Grand Fleet, and numerous American troops, are transported through this area. In winter the sheltered waters here offer more favorable conditions to submarine operations than

the open sea. The distance from German bases (assuming Dover Strait closed) is less than to any other area except the North Sea.

For submarines to enter the Irish Sea from the north requires the passage of two mine barrages. The barrage across the North Channel is a deep one and its patrol by British forces will be difficult in winter. The Irish Sea has been the scene of considerable hunting effort. The restricted and sheltered waters are favorable to hunting. Unless frequented by submarines these hunters will be available for service elsewhere.

We decide to operate in the Irish Sea during winter.

The *English Channel* is crossed by the main line of supply of the British Army. Many supplies for the French Army and supplies and troops for the American Army cross these waters. This traffic is heavily convoyed, the efficiency of which is reduced in bad weather.

The efficiency of the Dover barrage practically restricts German approach to these lines of supply to the long outside route.

We decide to limit submarine attacks against Channel traffic to bad weather periods when operations off the Channel entrance are difficult.

In the approaches to the Channel (including the Bay of Biscay) converges a very high percentage of the total shipping which supports the allied war effort. It includes most of the American reinforcements, whose continuous arrival constitutes the greatest menace to German success on land. This area is conveniently near German bases.

We have to choose between operations well offshore or close to shore.

The factors in favor of the offshore operations are—

(*a*) Absence of antisubmarine vessels except in the neighborhood of convoys.

(*b*) Consequent safety at night while charging batteries on the surface.

(*c*) Absence of aircraft.

(*d*) Less probability of pursuit in reply to "allos" of vessels attacked.

(*e*) Less strain on personnel.

(*f*) Difficulty of getting damaged merchant ships into port.

The disadvantages of the offshore position are—

(*a*) Lack of lee in bad weather.

(*b*) Lack of bottoming depths.

(*c*) Greater facility with which vessels may be routed clear of the area.

(*d*) Greater difficulty in sighting convoys, owing to less density of traffic.

The advantages of the areas closer to terminal ports are suggested by the above considerations. It should be noted that if an area is selected just outside the reach of aircraft patrol, submarines enjoy practically the same immunity from attack that they would with one more distant from land; while at the same time the probability that they will sight convoys bound for the port off which they are lying is very greatly increased. When within 100 miles of a port the submarine can so shape its movements that the most expert routing of vessels issuing from that port will give no guarantee that the vessels will pass outside the operating area of the submarine, and this with no undue expenditure of fuel on the part of the submarine.

If the operating area of the submarine is twice as far from port, fuel expenditure necessary to nullify precautions will be twice as great, while the probability of success will be one-half as great.

It is well known that convoys break up and ships proceed singly in certain areas. In these areas the dangers of attack on vessels are very much lessened, since single ships are as a rule either not escorted at all or but poorly escorted. The principal drawback in operating against single ships in narrow waters is the counterattack of patrol forces in the vicinity and the danger from deep mine fields.

We decide to concentrate our principal submarine effort in the approaches to the English Channel, including the Bay of Biscay; operating in good weather about 100 miles from shore and in bad weather close to shore where a lee is available.

The North Sea.—About 25 per cent of all shipping in and out of Great Britain passes along the English east coast between Newcastle and Harwich. The diversion of this traffic to other areas would cripple seriously Great Britain's war effort. Attacks on shipping in this area can be made conveniently, due to proximity to German bases and to the elimination of the barrage menace; although it will involve difficulties due to trap-mine fields and large antisubmarine forces. In winter this area offers better shelter from heavy weather than any other except the Irish Sea.

We decide that all U. B's and U. C's in northern waters should concentrate operations on the English east coast.

Owing to probable extensive bombing and bombardment effort against Flanders bases, and to the efficiency of the Dover barrage, we decide to prepare at once to base the Flanders Flotilla on German North Sea ports.

The Mediterranean.—The importance and density of the traffic in the eastern Mediterranean is now great, but is likely to diminish as the result of changes in the political and military situation in Turkey and the Balkans.

The necessity for the support of the large American Army in France, and the prospects of its further very great increase, coupled with the inadequacy of the ports on the west coast of France, indicate that the passage through the Mediterranean Sea to ports in the south of France will become of greatly increased importance—in fact, one of the main arteries of supply to troops on the western front.

It may be that a considerable percentage of American troops will be diverted to the Italian front, in which case the Mediterranean lines of communication from America would become of greater relative importance.

We are warranted in continuing the present submarine effort in the Mediterranean on a large scale. Owing to the possibility of the defeat of Turkey, we must be prepared to shift submarines based there to the Adriatic.

The Atlantic Ocean.—The weather to be anticipated through the next six months, joined to the distance of the Western Atlantic ports, the lack of suitable ports of refuge, the difficulties of communication, probable exhaustion of the crew in severe weather, and consequent less likelihood of their sustaining well long cruises away from the base, make the Western Atlantic unsuitable for any extensive operations by submarines.

Occasional visits of one or more submarines to these waters will serve to keep on the American coast a portion of their antisubmarine vessels, and thus will relieve to a considerable degree the counter measures against German submarine operations in the Eastern Atlantic.

Westbound trans-Atlantic traffic proceeds independently when west of about longitude 25. Submarines operating west of that longitude will tend to force westbound shipping into convoys and thus reduce the efficiency of the allied ocean transportation system.

We decide to employ cruiser-submarines against the trans-Atlantic trade routes, and to make occasional visits to the American coast.

The area Gibraltar-Azores-Canaries is one through which important traffic passes, and where good winter weather prevails. The maintenance of at least one submarine there will result in slowing up shipping by forcing it into convoys, and we decide to do so. The difficulties of access to German bases decides us to base submarines operating in the southeastern North Atlantic upon the Adriatic.

CONCLUSIONS AS TO OPERATING AREAS.

1. The principal submarine effort should be made in the approaches to the English Channel, including the Bay of Biscay, about 100 miles from shore.

2. Submarines should operate in the Irish Sea during winter.

3. Operations against Channel traffic should be limited to periods of bad weather when submarines can not operate efficiently in the open sea.

4. U. B's and U. C's should operate against traffic on the English east coast. Preparations for moving the bases of the Flanders Flotilla to Germany should be undertaken at once.

5. The Mediterranean submarine campaign should be continued as at present, preparations being made to shift submarines based on Turkey to the Adriatic.

6. Submarines should make occasional visits during winter to the North American coast. Cruiser-submarines should operate west of about longitude 25 W. against trans-Atlantic traffic. At least one submarine should be maintained in the area Gibraltar-Azores-Canaries during winter, basing on the Adriatic.

II. Objectives Within Operating Areas.

There are four classes of objectives in any operating area that need be considered:

(*a*) Naval vessels carrying neither stores nor troops.

(*b*) Merchant vessels sailing singly.

(*c*) Fast convoys.

(*d*) Slow convoys.

In considering which of these objectives it is most profitable to attack, and in drawing conclusions from these considerations, it should not be understood that any one of these objectives will be ignored if a suitable opportunity for an attack presents itself. The examination of objectives is for the sole purpose of determining which is the most profitable from an operational standpoint.

In the eight months ending August 31, 52 per cent of all attacks on single ships resulted in sinking the vessel; 60 per cent of all attacks on convoys resulted in sinking a vessel; 53.6 per cent of all attacks on vessels, whether in convoy or whether sailing singly, were successful. Of the submarines which were lost or seriously damaged during an attack, 11 were sunk and 6 were seriously damaged as a result of attacking convoys, and one was sunk and one damaged as a result of attacks on ships sailing singly. During the same period 49 submarines were sunk through enemy action not incident to counter-attacks.

While attacks on convoys have resulted in a somewhat higher percentage of sinkings, yet the fact that it has proved about 15 times more dangerous to attack convoys might lead us to conclude that the single ship is a better paying target.

On the other hand, we have to consider that—

(*a*) The most valuable ships and cargoes are convoyed practically continuously.

(*b*) About 90 per cent of overseas merchant traffic in northern waters is already under convoy or escort.

(*c*) This percentage will probably become higher as the number of escort vessels increases.

It is apparent that if German attack on allied sea communications is to materially assist the land campaign, the principal attack must be directed against convoys.

If the choice could be made between attacking vessels capable of carrying troops (whether outward or homeward bound) and attacking vessels carrying stores (on the basis that both attacks would be equally effective in sinkings, and that the danger in both cases to the attacking vessels would be the same), the choice would inevitably be to attack troop ships. Troops make war. Stores and munitions are of importance only in so far as they support the troops and the population behind the lines.

In addition to this principal consideration, there is the secondary consideration that the moral effect of sinking transports carrying large numbers of troops would be much greater than the sinking of storeships. The first sinking of a troop transport would probably have the opposite to the desired effect on American morale and would stimulate to increased efforts; but if the efficiency of German arrangements were such that transports were sunk with as much frequency as storeships are now, the result would inevitably be a great decrease in the number of troops transports at sea. It is not true, however, that storeships and transports are equally available as objectives. The following factors influence the relative availability of these objectives:

(*a*) Transports are much faster than storeships. The average speed of storeships may be assumed to be 8 knots and of transports 13 knots.

(*b*) Transports are better protected than storeships when in convoy. As a rule there is at least one destroyer for every transport in convoy, while there is not over one-third of a destroyer for each storeship in convoy. In some cases escort vessels are not destroyers, but auxiliary craft.

As to the disadvantages of speed of convoy from the standpoint of the attacking vessel, if we assume that the submarine can see a convoy at a distance of 10.5 miles, and if we assume that the submarine can maneuver safely for an hour submerged at 7 knots, still retaining a sufficient reserve battery power, the probability that it can get in position for attack on a convoy that has been sighted

is in the proportion of 7 for an 8-knot convoy, to 5.5 for a 12-knot convoy, to 4.75 for a 14-knot convoy. In other words, the submarine has 68 per cent as much chance of maneuvering at 7 knots submerged into a position for attack against a 14-knot convoy as it has of maneuvering from the same position against an 8-knot convoy.

Another factor that greatly influences the probability that a submarine may attain position for successful attack against a convoy is the relative speeds of the convoy and submarine on the surface. If the convoy is an 8-knot convoy, for instance, and is sighted by a submarine capable of making 12 knots on the surface, the submarine can gain 10 miles on the convoy and possibly attain attacking position in 2½ hours. If the convoy sighted happens to be a 10-knot convoy, it will take the same submarine twice as long to gain the same attacking position; whereas if the convoy is a 12-knot convoy, the submarine can never attain attacking position. In other words, it will be found as a rule that submarines can not maneuver on the surface into position for attack on convoys faster than 11 knoots if in the first instance convoy is sighted from a position abaft the beam of the convoy. This fact alone greatly reduces the probability of successful contact with fast convoys.

Even assuming that the submarine finally gets within attacking range of fast convoy, speed of convoy still acts as a real obstacle to success, because—

1. The time available for pointing the submarine is most limited.

2. A fast vessel is more apt to be able to maneuver clear if the torpedo is seen, especially if it be a Browning shot.

3. The zigzagging of the convoy produces a greater effect for each unit of time because of the speed.

4. The position between columns of a convoy is much more dangerous and liability of the submarine to ramming is greater.

5. Fast convoys are apt to be manned by more skilled officers and crews than slow convoys.

6. Some slow convoys do not zigzag at all, so that the approach to firing position presents the single difficulty of evading the escorts.

As to the superiority of protection of troop convoys, it is probable that the danger to the attacking vessel is at least in the proportion of the relative densities of escort. Attacks which have been made successfully against convoys have been made through gaps in the screen, from position inside the screen, and frequently from positions between the columns of the convoy. The position between the columns is a difficult one, but it is much less difficult in the case of storeships, which are more liable to straggle and keep their positions badly, than it is between the columns of the compact and well-ordered formation of troop convoy.

CONCLUSIONS AS TO OBJECTIVES.

1. The principal objective must be convoys.

2. As between slow convoys and fast convoys, slow convoys will give the greater return in tonnage for a given expenditure of effort.

3. The danger to the submarine is far less in attacking slow convoys.

III. Tactical Methods.

The present military situation in France requires that the rate of sinking of shipping be increased if possible. This can be accomplished to some extent by submarine captains exercising more boldness in attack. Heretofore they have been given orders requiring great caution in risking their vessels, because of the greater value of a submarine when its operations are extended over a long period of time. Now that there is an acute crisis it will pay to be bolder in attack, accepting the probable increase in losses of submarines for the sake of increasing the destruction of merchant tonnage.

The increasing tendency to place all vessels in convoy, where they are more immune against submarine attack than when proceeding singly, requires us to develop more efficient means for employing submarines against convoys.

The tactical methods of attacking a convoy with one submarine are developed as well as is practicable.

The difficulties incident to coordinating the attack simultaneously of more than one submarine on a convoy will scarcely warrant the effort to do so. The favorable conditions presented, however, after a convoy has been attacked, owing to the resulting confusion and disorganization among the convoy and escort, renders it desirable that we be prepared to deliver successive attacks. Furthermore, we should endeavor to put our submarines in touch with convoys more frequently, so as to increase the sinkings per submarine within a given time.

These considerations suggest the following tactical methods:

(*a*) A deployment of submarines dispersed in longitude and latitude across the principal traffic routes.

(*b*) That each submarine sighting a convoy will attack if practicable and will broadcast information of position, course, and speed of convoy.

(*c*) A convoy sighted so far distant as to render attack impracticable should nevertheless be followed long enough to obtain the information necessary to be broadcasted.

IV. Access to Operating Areas.

The menace against submarine exits to the high seas offered by existing and projected barrages requires careful consideration. If the submarine campaign is to continue to be an important factor in the war, reasonably safe access to and from their bases must be assured.

Already the Dover barrage has made it advisable to proceed north-about. As the northern barrage approaches completion we must prepare for antibarrage operations.

The most useful breach in a barrage will be one made without the knowledge of allied forces. This form of breach is not practicable at Dover, where thick patrols are maintained. In the north it is more likely to be successful, particularly if attempted during darkness or fog. The distance from our ports makes it difficult to sweep a breach secretly with surface craft unless they be very fast. A 30-knot vessel could reach the barrage, sweep a passage through, and return to port in about 24 hours. During the winter such a trip could be arranged during darkness except for 3 hours each way at the journey's end. Support during the daylight could be easily given. Specially insulated vessels will be required.

We decide to experiment with the fitting of high-speed destroyers for sweeping the American mine.

In so far as secrecy is concerned, submarines fitted as mine sweepers would be preferable for the passage to and from the barrage, particularly in the Adriatic. They also would require special insulation. They should be able to sweep effectively while operating on the surface. In the North Sea they may remain on station submerged during the day and sweep each night.

We decide to specially equip a force of submarines for sweeping the American mine.

Apparently no steps are being taken to mine the Pentland Firth. The current is so strong as to render effective patrol by small craft and the mining of this passage extremely difficult, if not impossible. The same condition renders submerged navigation precarious, but this danger may be considerably less than that presented by the barrage when no swept channels through it are known to be clear. It is therefore important that we investigate the feasibility of submerged navigation through the Pentland Firth at various stages of the tide and at various depths. We should be prepared to run the Firth on the surface under low visibility conditions.

If it is practicable to fit our operating submarines so as to be even partially immune against the American mine, the menace of the Northern Barrage and those projected in the Mediterranean will

be reduced greatly. We decide to employ the best technical talent on the solution of this problem.

The increased efficiency of barrages will render it desirable that German submarines be required to cross them as seldom as is possible consistent with the prosecution of the war on shipping to the maximum degree.

Through neutral or German bottoms possibly we may arrange to furnish submarines with fuel, torpedoes, supplies, and relief crews at remote rendezvous, such as are to be found in the Faroes, Iceland, the northern Norwegian coast, Spanish waters, Northern Africa, and Asia Minor.

We decide to take preliminary steps now toward establishing such a system of supplying submarines when the efficiency of the barrages renders it desirable.

If the North Sea barrage becomes and thereafter remains effective, our submarines will be confined to the North Sea in their operations. It might in that case be desirable to transfer a portion of them to the Mediterranean until such time as the Adriatic is barred to us. A transfer of any considerable number of submarines would justify support to sweeping operations through the North Barrage with a view to passing submarines out.

V. Relative Importance of Mines and Torpedoes.

The use of the mine, even in small quantities, requires the Allies to employ a very large force in mine sweeping and thus lessens the other antisubmarine effort.

The mine sweeping of the Allied Powers is now developed to such an extent that mining is not otherwise a profitable employment of submarines, except in areas where mine sweeping is not efficient, like certain United States, Mexican, and South American ports.

Unless our mining is restricted to the vicinity of ports and other comparatively small areas, we shall hamper our own ability to prosecute the submarine campaign either with mines or torpedoes.

The principal submarine effort should still be directed toward a torpedo and gun attack on vessels or convoys.

Decisions.

as to operating areas.

1. To make the principal submarine effort in the approaches to the English Channel, including the Bay of Biscay, about 100 miles of shore.

2. Other submarine effort should include—
The Irish Sea during winter.
The English Channel in bad weather.
The English east coast for all U. B's and U. C's.
The Mediterranean; conducted as at present.
Occasional visits to the North American coast.
Cruiser-submarines west of longtiude 25.
At least one submarine in the area of Gibraltar-Azores-Canaries.

3. To prepare to base the Flanders submarine on Germany and the Constantinople submarines on the Adriatic.

AS TO OBJECTIVES.

1. To make convoys the principal objective.

2. To take advantage of favorable opportunities for attacking other objectives.

AS TO TACTICAL METHODS.

1. To exercise henceforth greater boldness in attack by submarines.

2. To bring submarines into contact with convoys more frequently, and to deliver successive attacks by several submarines on the same convoy by the following methods:

(*a*) A deployment dispersed in latitude and longitude across the principal traffic routes.

(*b*) A submarine sighting a convoy should attack if practicable, and, in any event, should broadcast information of the convoy's position, course, and speed.

AS TO ACCESS TO OPERATING AREAS.

1. To prepare for breaching the Northern Barrage by sweeping with specially insulated destroyers and submarines.

2. To investigate the feasibility of submarines running the Pentland Firth at various depths, stages of tide, and visibility conditions.

3. To employ the best technical talent on the problem of making our submarines immune against the American mine.

4. To arrange for furnishing supplies and relief crews to submarines by supply ships at isolated rendezvous beyond the actual and probable barrages.

AS TO MINES COMPARED WITH TORPEDOES.

1. To continue to direct the principal submarine effort toward a torpedo and gun attack.

Allied Replies to Probable New Measures of the Enemy.

1. The completion, patrol, and support of present and projected mine barrages, including the denial of exit to submarines via the Pentland Firth, are the most important counter measures open to the Allies. When these barrages are made even moderately effective the necessity for further measures will diminish greatly.

2. A concentration of hostile submarines in the approaches to the English Channel or elsewhere for the purpose of making coordinated attacks can be met best by the employment of destroyer hunting groups, in addition to the present escort arrangements.

3. To thicken barrages with more positive action mines will be the best counter measures should the enemy succeed in making his submarines immune against the American mine.

4. Constant and systematic vigilance by surface craft and special agents to nullify any effort the enemy may make to supply submarines at isolated rendezvous.

[Extract from Memorandum No. 71, "History of Planning Section."]

Prepared by direction of the Force Commander, who forwarded it with the following comment on 8 November:

"1. There is inclosed herewith for the information of the Department a memorandum prepared by the Planning Section of my staff on the subject of the German and Austrian submarine campaign. This is an estimate of the situation from the German point of view as to the submarine campaign, and was made early in October before the defection of Austria and before it became evident that Germany was nearing the end of her power."

MEMORANDUM No. 61.

DEMOBILIZATION PLAN.

4 November, 1918.

The following plan considers demobilization of United States naval forces operating in European waters only. There are two cases:

(1) Austria accepts armistice terms while Germany does not.

(2) Austria and Germany both accept armistice terms.

In both cases certain principles of demobilization to govern, as follows.

(*a*) No force to be demobilized so long as there is possibility of a renewal of hostilities in which its services might be needed.

(*b*) No force to be maintained in Europe longer than necessary.

(*c*) Personnel to take precedence over material in shipments home, sufficient personnel being left behind in every case to prepare material for shipment, to care for it, and to close finally and legally all obligations.

(*d*) Cargo vessels used in demobilization to carry cargoes both ways when practicable.

NOTE.—It is assumed that demobilization on the United States Atlantic coast will be coordinated with demobilization of United States naval forces in Europe.

(*e*) Commanding officers of forces, bases, and stations, with suitable staff, to remain to superintend and expedite demobilization.

(*f*) All port officers, with their organizations, to remain until amount of American military and naval traffic at their ports is inconsiderable.

(*g*) Naval demobilization to be done with naval vessels. Mine layers and mine carriers and colliers to be used for this purpose in repeated trips across the Atlantic for demobilization of material.

(*h*) Each station to submit cargo capacity—weight and space—required for demobilization and estimated dates when shipments will be ready.

DEMOBILIZATION—CASE (1).

When Austria accepts the terms of armistice—

(1) Stop all preparations for mining in the Mediterranean and Aegean, including cancellation of all manufacturing orders in the United States.

COMMENT.—If mines have still to be used against Germans they can best be used in North Sea.

(2) Demobilize completely the United States naval air stations in Italy and stop all preparations for Adriatic bombing squadrons, including the production of material for these squadrons in the United States.

(3) Stop all shipments of naval material for United States forces to Italy and to Corfu, except that necessary for demobilization.

When Austria turns over naval vessels as per armistice terms—

(1) Demobilize submarine chaser base, Corfu. Vessels and equipment proceed to Gibraltar.

COMMENT.—Even if Germany continues fighting she will not be likely to send submarines into the Adriatic or even beyond the line Sicily-Cape Bon, so that our chasers are more likely to be of service if based on Gibraltar than elsewhere in the Mediterranean. Gibraltar is also desirable because of the base organization already in existence there.

(2) Transfer northern bombing squadrons to United States Army.

COMMENT.—All naval objectives for northern bombing squadrons will have disappeared with the surrender of Austria and the evacuation of Belgian ports. Further bombing operations would be against strictly military objectives and should therefore be under Army control. In turning over these squadrons to the Army we may turn over personnel and material both until such time as the Army personnel is available to relieve the Navy personnel.

DEMOBILIZATION—CASE (2).

When Austria and Germany both accept armistice terms—

(1) Carry out steps indicated under Case (1) above, except as to northern bombing squadrons, which demobilize.

(2) Stop all naval aviation shipments from United States.

(3) Stop all mine shipments from United States.

When Austrian and German vessels are delivered in accordance with armistice terms—

(1) Demobilize United States naval base, Gibraltar, except as to repair facilities and flagship.

COMMENT.—Considerable Army demobilization may take place through French Mediterranean ports, so that the repair facilities of Gibraltar may assist American vessels running to those ports.

(*a*) All naval vessels proceed to United States. They should convoy the Corfu submarine chasers to the United States.

(*b*) Army storeships carrying stores to French Mediterranean ports may take surplus naval stores from Gibraltar.

(2) Demobilize Azores except tugs and repair facilities.

NOTE.—In both (1) and (2) above, get recommendations of base commanders before acting.

(3) Demobilize all naval air stations, sending home personnel as fast as practicable. Mine carriers and colliers can be used to assist in this work.

(4) Demobilize mine bases, sending home all vessels, mines, and material belonging to United States. Retain facilities for operation of United States mine sweepers in case United States is to participate in sweeping up United States mines in North Sea.

(5) Send all battleships and their accessories home.

(6) Send home all vessels, personnel, and material based on Queenstown and Plymouth with the possible exception of tugs, which may be needed on French coast and repair ships which may be needed elsewhere. Use destroyers to escort or tow submarine chasers as necessary. Completely demobilize both bases.

(7) Cardiff and Liverpool organizations to remain in full commission for the present. Suggest at least one repair ship for the Cardiff organization. Cross-channel steamers and their shore organization to remain in full commission so long as Army may require them.

(8) Send home from French coast all naval vessels, naval material, and naval personnel not needed in connection with the demobilization of the United States Army. The force commander should be allowed considerable latitude in determining the sequence and extent of demobilization. He should be guided by the following:

(*a*) Immediate demobilization of all combatant activities and transfer of vessels, personnel, and material to United States.

(*b*) Retention in France of all naval vessels, material, and personnel that will serve to expedite transfer of United States Army to United States.

(*c*) Retention of United States mine sweepers until French coast is clear of mines.

(*d*) Immediate suspension of all construction work not necessary for demobilization purposes.

NOTE.—It may be desirable for the force commander in France to retain a division of destroyers for emergency duty.

SUGGESTION.

Give port officers additional duty in charge of the loading and shipment of naval demobilization, personnel and material, at their respective ports.

* * * * * * *

The preceding demobilization plan was prepared by the Planning Section for Admiral Benson. Upon its receipt in London a con-

ference was held and a modified plan of the demobilization was prepared by Admiral Sims's staff.

The modified plan follows:

DEMOBILIZATION PLAN.

The following plan considered demobilization of United States naval forces operating in European waters only. There are two cases:

(1) Austria accepts armistice terms while Germany does not.

(2) Austria and Germany both accept armistice terms.

In both cases certain principles of demobilization to govern, as follows:

(*a*) No force to be demobilized so long as there is possibility of a renewal of hostilities in which its services might be needed.

(*b*) No force to be maintained in Europe longer than necessary.

(*c*) Personnel to take precedence over material in shipments home, sufficient personnel being left behind in every case to prepare material for shipment, to care for it, and to close finally and legally all obligations.

(*d*) Cargo vessels used in demobilization to carry cargoes both ways when practicable.

NOTE.—It is assumed that demobilization on the United States Atlantic coast will be coordinated with demobilization of United States naval forces in Europe.

(*e*) Commanding officers of forces, bases, and stations, with suitable staff, to remain to superintend and expedite demobilizations.

(*f*) All port officers, with their organizations, to remain until amount of American military and naval traffic at their ports is inconsiderable.

(*g*) Naval demobilization to be done with naval vessels, so far as may be practicable.

(*h*) Each station to submit cargo capacity—weight and space—required for demobilization and estimated dates when shipments will be ready.

DEMOBILIZATION—CASE (1).

When Austria accepts the terms of armistice—

(1) Stop all preparations for mining in the Mediterranean and Aegean, including cancellation of all manufacturing orders in the United States.

COMMENT.—If mines have still to be used against Germans they can best be used in North Sea.

(2) Stop all shipments of naval material for United States forces to Italy and to Corfu, except that necessary for demobilization.

When Austria turns over naval vessels as per armistice terms—

(1) Demobilize completely the United States naval air stations in Italy and stop all preparations for Adriatic bombing squadrons, including the production of material for these squadrons in the United States.

(2) Demobilize submarine chaser base, Corfu, vessels and equipment proceed to Gibraltar.

COMMENT.—Even if Germany continues fighting she will not be likely to send submarines into the Adriatic or even beyond the line Sicily-Cape Bon, so that our chasers are more likely to be of service if based on Gibraltar than elsewhere in the Mediterranean. Gibraltar is also desirable because of the base organization already in existence there.

(3) Northern bombing squadrons will continue as at present with a possibility of these being used as a support for the naval unit at Zeebrugee.

DEMOBILIZATION—CASE (2).

When Austria and Germany both accept armistice terms—

(1) Carry out steps indicated under case (1), part (1), above.

(2) Stop all naval aviation shipment from United States.

(3) Stop all mine shipments from United States.

When Austrian and German vessels are delivered in accordance with armistice terms—

(1) Demobilize northern bombing squadrons.

(2) Demobilize United States naval base, Gibraltar, except as to repair facilities, salvage units, tugs, and flagship.

COMMENT.—Considerable Army demobilization may take place through French Mediterranean ports, so that the repair facilities of Gibraltar may assist American vessels running to those ports.

(*a*) Naval vessels proceed to United States when practicable. They should convoy the Corfu submarine chasers to the United States if season permits.

NOTE.—Ask department concerning policy regarding disposition of subchasers. Take up question of selling them in Europe.

(*b*) Army storeships carrying stores to French Mediterranean ports may take surplus naval stores from Gibraltar.

(3) Demobilize Azores except tugs, salvage units, and repair facilities.

NOTE.—In both (1), (2), and (3), above, get recommendations of base commanders before acting.

(4) Demobilize all naval air stations, sending home personnel as fast as practicable. Mine carriers and colliers can be used to assist in this work.

(5) Demobilize mine bases, sending home all vessels, mines, and material belonging to United States. Retain facilities for operation of United States mine sweepers in case United States is to participate in sweeping up United States mines in North Sea.

(6) Send all battleships and their accessories home.

(7) Send home all vessels, personnel, and material based on Queenstown and Plymouth, with the exception of tugs, repair ships, and salvage units, which will be needed. Completely demobilize both bases.

(8) Cardiff and Liverpool organizations to remain in full commission for the present. Suggest at least one repair ship for the Cardiff organization. Cross-channel steamers and their shore organization to remain in full commission so long as their services are required.

(9) With exceptions hereafter noted, send home from French coast all naval vessels, naval material, and naval personnel:

Exceptions: (*a*) Vessels, material, and personnel needed in connection with demobilization of the Army. (*b*) Retain United States mine sweepers as long as their services are required. (*c*) Retain destroyers as necessary in Europe for emergency duty. This provision also applies to other bases.

(10) Suspend immediately all construction work not necessary for demobilization purposes.

(11) *Naval railway batteries:* Commander of battery take charge of disassembling and returning to United States guns and useful ordnance equipment. That part of battery which can be used commercially, such as engines, sleeping cars, etc., to be turned over to the Army.

(12) *Hospitals:* These will be retained with full complement or reduced as may be necessary, corresponding to demobilization of naval units which are dependent upon them. It may be that the hospital at Queenstown will have to be kept up after the base at Queenstown is entirely demobilized for the purpose of taking care of the sick at the Cardiff base.

(13) *Murmansk, Russia:* Inasmuch as the naval forces in northern Russia serve diplomatic purposes rather than naval or military, its continuance will necessarily depend upon diplomatic conditions which at present can not be foreseen.

[Extract from Memorandum No. 71, "History of Planning Section."]

Prepared by direction of Admiral W. S. Benson, at Paris, where the Planning Section had gone to assist the Force Commander at the meeting of the Inter-Allied Naval Council.

Forwarded by the Force Commander with the following comment:

"2. It will be noted in the statement following page 5 that the original paper was prepared by the Planning Section in Paris for Admiral Benson. The paper was then forwarded to London, where a conference of the Force Commander's staff was held, and certain modifications were suggested. These modifications were later approved by Admiral Benson, so that the second portion of this memorandum is the basis of the demobilization plan which is now being executed."

MEMORANDUM No. 62.

STEPS TO BE TAKEN TO EXECUTE ARMISTICE TERMS WITH AUSTRIA-HUNGARY.

Paris, France, 4 November, 1918.

NAVAL CONDITIONS.

GENERAL.

Appoint a naval commission consisting of one representative from each of the allied and one from the United States naval forces to decide upon and carry into execution the details of the armistice.

All questions arising to be decided by unanimous vote, subject, in case of division, to the decision of the Allied Naval Council, which will refer questions not unanimously decided to the respective Governments represented.

United States detail Rear Admiral Bullard as representative.

As to Paragraph I of armistice terms—

Notify Allied and United States naval forces of the cessation of hostilities.

United States: Notify Vice Admiral Sims to issue necessary instructions to Rear Admiral Niblack, Rear Admiral Bullard, and Captain Nelson.

As to Paragraph II of armistice terms—

Place guards on board the 15 submarines surrendered and escort with light craft to a suitable port of the Allies and turn over to representative of naval commission, submarines to be then dismantled and placed in charge of ship keepers; crews to be repatriated.

United States representative to direct subchasers at Corfu to participate in turning over submarines and to detail an officer as United States representative on each group of submarines taken over.

As to Paragraph III of armistice terms—

Place guards on all naval surface craft to be surrendered and reduce their crews to number necessary for safe navigation; escort with Allied and United States naval forces to Corfu and turn over to representatives of the Naval Commission. Crews to be repatriated.

United States representative to participate in taking over vessels,

and to detail an officer as his representative on each battleship or cruiser taken over and for each group of torpedo craft.

Detail an officer, as his representative, to have supervision over ships and naval material in each enemy port.

As to Paragraph IV of armistice terms—

Allies remove obstructions and mines from the Danube.

United States: No action required by.

As to Paragraph V of armistice terms—

As a general principle the Austria-Hungarian merchant marine should be placed in commission as soon as possible and permitted to carry on trade under the supervision of the Allies and United States.

United States: No special action.

As to Paragraph VI of armistice terms—

Designation of bases for aircraft to be left to the Commission.

United States: No special action.

As to Paragraph VII of armistice terms—

All floating craft, naval material, and equipment outside of Italian territory to be taken over by United States and Allies.

United States representative to detail an officer to participate in supervision of such material in each port.

As to Paragraph VIII of armistice terms—

Allies to occupy the land and sea fortifications and islands which form the defenses, and of the dockyards and arsenal at Pola.

United States representative to detail an officer to represent the United States at Pola during the period of the armistice.

As to Paragraph IX of armistice terms—

Allies and United States to resume possession of merchant ships formerly belonging to them.

United States to take over United States merchant ships, if any, and take steps to put into operation as soon as practicable.

As to Paragraph X of armistice terms—

No action necessary.

As to Paragraph XI of armistice terms—

Receive prisoners.

United States to receive and care for any United States prisoners and those of other associated powers if requested.

Naval Conditions of an Armistice with (A) Germany and (B) Austria-Hungary.

The Allied Naval Council puts forward the following terms of armistice for Germany and Austro-Hungary in the belief and understanding—

1. That the military authorities are in a position to continue to press the enemy and to prosecute vigorously the war on land;

2. That the enemy's moral and material collapse and his general position is such that he must in fact submit to terms which would only be accepted by a beaten foe; and

3. That the Associated Governments desire only terms of this nature, and not such an armistice as could be expected from an enemy still capable of powerful and effective resistance.

Should these assumptions be wrong, the Allied Naval Council would require to consider the question further. It should be borne in mind that if the war is prolonged through refusal of the armistice terms by the enemy a severe and active submarine offensive is materializing, and that on the sea—as apart from on land—the enemy may be able to cause material losses of men and property to the Associated Countries.

(A) NAVAL CONDITIONS OF AN ARMISTICE WITH GERMANY.

PREAMBLE.

It is understood that any armistice which may result as a consequence of the exchange of notes between President Wilson and the German Government will, on signature, carry with it the immediate cessation of all hostilities at sea, and that in the event of the German Government being unable to convey immediate orders to that effect to any submarine, raiders, or other ships or vessels which may be operating on the seas, they will immediately communicate to the Allies and the Governments associated with them in the war against Germany the latest information in their possession as to the location and movements of all such vessels.

Further, all neutral countries shall be informed of the assent of the German Government to the free navigation of all territorial waters by the naval and mercantile marines of the Allies and the Associated Governments, and that Germany waives all questions of neutrality which may arise from any arrangements made with neutral powers by the Allies and the Associated Powers in regard to such usage of their territorial waters.

I. German submarines to the number of 160 (including all submarine cruisers and mine-laying submarines), with their complete armament and equipment, are to be surrendered to the Allied and the United States of America Governments, in ports which will be specified by them. All other submarines are to be paid off and completely disarmed.

II. All German surface warships (including monitors and river craft) are to return to German naval bases to be specified by the Allied and United States of America Governments, and, with the exception of vessels which are to be surrendered, they are to remain there during the armistice.

The following ships and vessels of the German Fleet, with their complete armament and equipment, are to be surrended to the Allies and United States of America Governments, in ports which will be specified by them, namely:

Battleships:
- 3d battle squadron—
  - *Konig.*
  - *Bayern.*
  - *Grosser Kurfurst.*
  - *Kronprinz Wilhelm.*
  - *Markgraf.*
- 4th battle squadron—
  - *Friedrich der Grosse.*
  - *Konig Albert.*
  - *Kaiserin.*
  - *Prinzregent Luitpold.*
  - *Kaiser.*

Battle cruisers:
- *Hindenburg.*
- *Derfflinger.*
- *Seydlitz.*
- *Moltke.*
- *Von der Tann.*
- *Mackensen.*

Light cruisers:
- *Brummer*, mine-laying cruiser.
- *Bremse*, mine-laying cruiser.
- *Köln.*
- *Dresden.*
- *Emden.*
- *Frankfurt.*
- *Nurnberg.*
- *Wiesbaden.*

Destroyers:
- Fifty of the most modern destroyers.

All other battleships, cruisers, and destroyers are to be paid off immediately, and are only to retain on board nucleus crews, the number of which will be fixed by the Allied and United States of America Governments.

All vessels of the auxiliary fleet (trawlers, motor vessels, etc.) are to be disarmed.

III. The crews of the ships and vessels surrendered under Paragraphs I and II will be repatriated to Germany after surrender, if the surrender obligations have been faithfully carried out.

IV. The allied and United States of America fleets and ships and vessels are to be given free access to and from the Baltic, and to secure this the Allied and United States of America Governments shall be empowered to occupy all German forts, fortifications, batteries, torpedo batteries, and other defenses of all kinds at all the entrances from the Cattegat into the Baltic, and further for that purpose the Associated Governments shall be empowered to sweep up all mines and obstructions of all kinds laid by Germany between the Danish and German coasts on the one side and the Norwegian and Swedish coasts on the other side, and also any mines or obstructions laid within the Baltic outside German territorial waters, and the position of all such mines and obstructions are to be notified to the Associated Governments by Germany and appropriate plans of the positions are to be furnished.

V. The existing blockade conditions set up by the Associated Governments are to remain unchanged, and all German merchant ships found at sea are to remain liable to capture.

VI. Otherwise than is provided in Paragraph IV the position of all mine fields or obstructions of any kind laid by Germany are to be indicated, with the exception of those laid in German territorial waters, and the Associated Governments shall have the right at their own convenience to sweep up any German mines or obstructions outside German territorial waters during the continuance of the armistice.

Germany shall also agree to waive all questions of neutrality in connection with any mine sweeping or other war-like operations in the Baltic or elsewhere which the Associated Governments may arrange with neutral Governments to carry out themselves or jointly with such neutrals in neutral territorial waters, and Germany shall so inform all neutral Governments.

VII. All German aircraft are to be concentrated in German bases to be specified by the Allied and United States of America Governments and are to remain there immobilized and stationary during the armistice.

VIII. All Black Sea ports are to be evacuated by Germany, and all merchant ships belonging to the Associated Governments in these ports seized or taken over by Germany are to be handed back to the Associated Governments at such ports as may be designated by them, and all neutral merchant ships seized are to be released. All war-like and other materials of all kinds seized in these ports, together with all German materials as specified in Paragraph IX in connection with Belgium, are to be handed over to the Allied and United States of America Governments.

IX. Germany shall, in evacuating the whole of the Belgian coast, leave behind all merchant ships, tugs, lighters, cranes, and all other harbor material, all material for inland navigation, all aircraft and air materials and stores, all arms and armaments, and all stores and apparatus of all kinds, all of which are to be abandoned by her.

X. All merchant ships in German control belonging to the Associated Governments are to be restored, in ports to be specified by them, without reciprocity on the part of the Associated Governments.

XI. No destruction of the ships and materials specified in the preceding paragraphs is to be permitted before evacuation, surrender, or restoration.

XII. All the above measures shall be executed by Germany in the shortest possible time, within the periods for each item which will be laid down before the armistice is signed.

XIII. German naval prisoners shall be dealth with on similar lines to those laid down for military prisoners, but in no case will prisoners who have formed part of the crews of German submarines be released.

NOTE.—All vessels and property belonging to the enemy, which under the terms of armistice are to be surrendered or handed over are to be held in trust for final disposal at a conference of the Allied and United States of America representatives on the conclusion of the armistice.

NOTE BY THE NAVAL REPRESENTATIVE OF THE UNITED STATES OF AMERICA.—The naval representative of the United States of America wished to reserve for further instructions from his Government the question of the disposition of surrendered vessels.

CONCLUSIONS IN REGARD TO AN ARMISTICE WITH AUSTRIA.

The Supreme War Council decide—

(*a*) To approve the attached terms of an armistice with Austria-Hungary.

(*b*) That General Diaz, on behalf of the Associated Governments, shall, on the arrival of accredited representatives of the Austrian supreme command, communicate to them the approved terms of an armistice.

(*c*) That the Italian Government, on behalf of the Supreme War Council, shall be responsible for communicating this decision to General Diaz.

(*d*) To invite Colonel House, on behalf of the Supreme War Council, to communicate this decision to President Wilson.

(*e*) That an admiral shall be associated with General Diaz in these negotiations.

ARMISTICE WITH AUSTRIA-HUNGARY.

NAVAL CONDITIONS.

I. Immediate cessation of all hostilities at sea, any definite information to be given as to the location and movements of all Austro-Hungarian ships.

Notifications to be made to neutrals that freedom of navigation in all territorial waters is given to the naval and mercantile marines of the Allied and Associated Powers, all questions of neutrality being waived.

II. Surrender to the Allies and United States of America of 15 Austro-Hungarian submarines, completed between the years 1910 and 1918, and of all German submarines which are in or may hereafter enter Austro-Hungarian territorial waters. All other Austro-Hungarian submarines to be paid off and completely disarmed, and to remain under the supervision of the Allies and United States of America.

III. Surrender to the Allies and United States of America, with their complete armament and equipment of 3 battleships, 3 light

cruisers, 9 destroyers, 12 torpedo boats, 1 mine layer, 6 Danube monitors, to be designated by the Allies and the United States of America. All other surface warships (including river craft) are to be concentrated in Austro-Hungarian Naval bases to be designated by the Allies and the United States of America, and are to be paid off and completely disarmed and placed under the supervision of the Allies and United States of America.

IV. Freedom of navigation to all warships and merchant ships of the Allied and Associated Powers to be given in the Adriatic and up the River Danube and its tributaries in the territorial waters and territory of Austria-Hungary.

The Allied and Associated Powers shall have the right to sweep up all mine fields and obstructions, and the positions of these are to be indicated.

In order to insure the freedom of navigation on the Danube the Allies and the United States of America shall be empowered to occupy or to dismantle all fortifications or defense works.

V. The existing blockade conditions set up by the Allied and Associated Powers are to remain unchanged and all Austro-Hungarian merchant ships found at sea are to remain liable to capture, save exceptions which may be made by a commission nominated by the Allies and United States of America.

VI. All naval aircraft are to be concentrated and immobilized in Austro-Hungarian bases to be designated by the Allies and United States of America.

VII. Evacuation of all the Italian coasts and of all ports occupied by Austria-Hungary outside their national territory, and the abandonment of all floating craft, naval materials, equipment, and materials for inland navigation of all kinds.

VIII. Occupation by the Allies and the United States of America of the land and sea fortifications and the islands which form the defenses and of the dockyards and arsenals at Pola.

IX. All merchant vessels held by Austria-Hungary belonging to the Allies and Associated Powers to be returned.

X. No destruction of ships or of materials to be permitted before evacuation, surrender, or restoration.

XI. All naval and mercantile marine prisoners of war of the Allied and Associated Powers in Austro-Hungarian hands to be returned without reciprocity.

[Extract from Memorandum No. 71, "History of Planning Section."]

MEMORANDA NOS. 62 (4 NOVEMBER), 63 (3 NOVEMBER), 64 (30 OCTOBER), 65 (4 NOVEMBER), AND 66 (5 NOVEMBER, 1918).

Subject: "*Steps in Connection with Armistice.*"

After the adjournment of the Inter-Allied Naval Council, the Planning Section remained in Paris to assist Admiral Benson, under whose direction these

memoranda were prepared, copies being sent to the Force Commander, whose forwarding comment follows:

"MEMORANDUM NO. 62.

"1. There is forwarded herewith inclosed for the Department's information a copy of Planning Section Memorandum No. 62, which contains a statement of the naval conditions for an armistice with Germany and Austria-Hungary as originally prepared by the Allied Naval Council, together with the action of the Supreme War Council at Versailles with respect to the conditions of the armistice with Austria-Hungary and a statement of those conditions, as finally presented.

"2. The memorandum also sets forth in some detail the steps to be taken by the United States in carrying out the naval conditions of the armistice.

"3. Rear Admiral W. H. G. Bullard, U. S. Navy, has been appointed the United States representative for this purpose and is now in the Adriatic flying his flag on board the U. S. S. *Birmingham*.

"MEMORANDUM NO. 63.

"2. Since this memorandum was prepared the situation contemplated has arisen in some degree since the former Austro-Hungarian monarchy seems to be split up into four separate and independent States, viz, German Austria, Czecho-Slavia (Bohemia), Hungary, Jugo-Slavia. There are at present, however, no certain indications that these several States are to prove unstable and it is quite possible that few if any difficulties will be encountered in dealing with the Jugo-Slavs, who are the principal maritime power of the four.

"3. Rear Admiral Bullard, who is the United States naval representative in the Adriatic, has been furnished with a copy of this memorandum for his information. It is understood that the United States is already preparing to send a commission to Jugo-Slavia, as is suggested on the last page of this paper.

"MEMORANDUM NO. 66.

"1. There is forwarded herewith for the information of the Department one copy of Planning Section Memorandum No. 66, concerning the steps to be taken by the Allies and the United States in the execution of the naval conditions of the armistice with Germany.

"2. Rear Admiral S. S. Robison, U. S. Navy, has been appointed the United States naval representative on a commission which will probably be headed by Vice Admiral Browning, of the British Navy, to supervise the execution of the naval conditions of the armistice with the exception of those included in Items IX and X of the abbreviated naval conditions as set forth in this memorandum.

"3. Rear Admiral Robison will be given the U. S. S. *Chester* as a flagship and such yachts and destroyers as he may require in the execution of his duties.

"4. Rear Admiral M. L. Bristol, U. S. Navy, has been detailed as the United States naval representative on a commission to be headed by Vice Admiral Sir Roger Keyes, of the British Navy, to supervise the execution of Item IX of the armistice terms as set forth in the inclosed memorandum.

"5. Should any United States naval participation be required in the execution of the terms of Item X, Rear Admiral Bullard will be directed to detail an officer from his command."

MEMORANDUM No. 63.

PROPOSED DECISIONS IN THE EVENT OF A REVOLUTION IN AUSTRIA-HUNGARY.

Paris, France, November 3, 1918.

Required: A study and estimate of the situation, with proposed decisions, all from a naval viewpoint, that it would be advisable—

(1) For Allies to take,

(2) For United States naval forces to take,

in any allied operations in the event of a revolution in Austria-Hungary which completely upsets the present Government.

Please note these points:

1. The only United States naval forces to be drawn upon are those in the Mediterranean and at Gibraltar.

2. Also bear in mind present situation in Germany and the probable armistice that will be submitted probably to-day.

The general situation is assumed to be as follows:

The defeat of the Austro-Hungarian Army, together with unstable political conditions in that Empire, render it incapable of further military or naval effort at present.

The United States has recognized the belligerency of, and the Allies the independence of, the Czecho-Slav State of Bohemia. An independent political State is now in process of formation there, after having been recognized by the Austrian Government as having the right to do so. The Austrian Government has recognized the right of Jugo-Slavia to form a separate State, which political movement has already begun.

A separate Government is being set up in Hungary which is not in sympathy with Germany or Austria. Austria proper is assumed to be still sympathetic with Germany and to some extent under German dominance.

Mr. Wilson's diplomacy has resulted in a hesitating movement in Germany toward democratizing that Government.

The military situation on the western front, together with the collapse of all her allies, has convinced the German Government that the war is irretrievably lost, and has made it anxious for an early peace, in order to save the dynasty and the Government if

possible. There is danger of anarchy setting in in the former Austro-Hungarian Empire, and possibly in Germany.

There is danger of famine in what was formerly Austria-Hungary and the Balkans.

Terms of armistice, demanding virtual surrender, are about to be submitted to Germany.

Since the naval point of view above is to be considered, Bohemia and Hungary may be excluded from the problem.

Our mission is—

(1) To take advantage of the Austro-Hungarian situation in order to favor the conclusion of satisfactory terms with Germany.

(2) To further the early establishment of stable government in Jugo-Slavia friendly to ourselves.

The present tendency in Germany toward democratizing the Government and toward coming to terms favorable to us will be jeopardized if—

(1) The new Government in Jugo-Slavia does not receive justice and generosity from the Allies and the United States.

(2) The new Government fails to become stable at an early date and anarchy sets in.

The greatest danger against justice being done to Jugo-Slavia lies in the ambitions of Italy in the Adriatic and her jealousy of any interference on the part of allied countries in that theater. It appears essential that an understanding be reached immediately with Italy by the United States, England, and France, in order to avoid friction among the Allies as well as to insure justice being done to the new Adriatic State. Jugo-Slavia should include all territories in which the Slav population preponderates, including adjacent islands so populated.

Essential justice with respect to the disposition of the former Austrian Fleet, while at the same time avoiding friction, is difficult to attain. The apparent action of the Austrians in turning over the fleet to Slavia may be an enemy move to embarrass us. Italy will desire this fleet. So will Slavia. It is essential to our interests that at least all submarines be taken into custody by the Allies. In order to avoid hostilities against us, should the former Austrian surface forces be gotten possession of by a counter revolutionary party, the fleet should be taken possession of by allied forces, at least until a stable government favorable to us is established.

Allied claims to permanent possession of the fleet should be determined by the Peace Conference.

In order to avoid the possibility of Slavian bases getting into the hands of counter-revolutionists, it is important that they be occupied by the allied forces (preferably United States) until a stable government friendly to us is established.

The accomplishment of these aims will depend upon mutual trust between Slavia and the Allies. At present Slavia trusts the United States most, and suspects Italy.

The measure next in importance will be the immediate establishment of relations with the Jugo-Slavonians by American observers, who should be sent into the country immediately to inform the United States Government of conditions there. The party should include military and naval officers. An American admiral should be sent immediately with a suitable flagship, and should cooperate with the observers. Two of our destroyers, together with the Corfu chasers, will comprise a suitable additional force.

In view of the threatened famine, the late Austro-Hungarian merchant marine should be placed in commission at once. If necessary, we should take the ships over and man them, with the distinct understanding that they are to be returned to the new countries when they are able to man them. Food should be shipped into these countries by these vessels as soon as we can be assured that it will not reach our enemies.

Decisions.

ALLIES.

1. Take over control of surface craft and submarines.
2. Take over control of all fortified ports where a stable government friendly to us does not exist.
3. Place former Austrian merchant marine in service for shipping food into Jugo-Slavia as soon as we are certain that the enemy will not be aided thereby.

UNITED STATES.

4. Send a flag officer to the Adriatic in a suitable flagship, with two destroyers.
5. Instruct flag officer to cooperate with the allied forces.

SUGGESTIONS.

1. That the American observers be sent into Jugo-Slavia as soon as possible to inform United States Government of conditions, military and naval officers to be in party.
2. That the attitude of the Allies, particularly Italy, on all these matters is important, and their specific assent should be gained to each proposition.

MEMORANDUM No. 64.

PRINCIPLE GOVERNING DISPOSITION OF GERMAN VESSELS THAT ARE SURRENDERED.

Paris, France, 30 October, 1918.

The following memorandum was submitted to Admiral Benson in Paris by the Planning Section about October 30, 1918:

MEMORANDUM FOR ADMIRAL BENSON.

1. We deem it highly important that the following principle be accepted now by all concerned:

"No vessel surrendered by Germany shall ever be used to increase the naval armaments of any power whatever."

COMMENT.

The distribution of vessels surrendered by Germany will serve to increase the armaments of the Powers participating in the distribution. It is highly improbable that the United States will participate in such a distribution; in fact, we consider it undesirable that she should so participate. In consequence, we shall find ourselves at the end of this war, if distribution does take place, in a position of great naval inferiority not consistent with our interests at sea and overseas.

With Germany disarmed, there is no occasion for Great Britain to possess a fleet greater than her present fleet, unless the power of that fleet is designed to restrain us.

MEMORANDUM No. 65.

UNITED STATES NAVAL INTERESTS IN THE ARMISTICE TERMS.

Paris, France, 4 November, 1918.

I. All of the Great Powers now considering armistice terms and peace terms with the Central Powers have constantly in view post-war conditions and possibilities. It is perfectly legitimate, according to precedent, for each of those Powers to seek by the terms of armistice and by the terms of peace to strengthen to the maximum their position in the world. That they are following this policy astutely and consistently admits of no doubt.

II. There now appears to be an agreement between the representatives of Great Britain, France, and Italy by which Great Britain and France dictated the German armistice terms and Great Britain and Italy dictated the Austrian terms, Italy being accorded practically everything she asked for.

III. In view of the readiness with which France and Italy agreed to the taking over of German and Austrian vessels there can be little doubt that an understanding exists between France, Italy, and Great Britain as to the distribution of these vessels. In other words, there have been councils on this subject of vital importance to us from which we have been excluded.

IV. Table I gives the present strength of those Powers in dreadnoughts, battle cruisers, destroyers, and submarines:

TABLE I.—*Present built.*

	Dreadnoughts.	Battle cruisers.	Destroyers.	Submarines.
Great Britain	33	10	425	136
France	7	0	43	64
Italy	5	0	33	41
Japan	6	7	67	17
United States	17	0	172	55
Germany	21	6	218	177

V. Table II, which follows, gives a probable distribution of the German and Austrian vessels required by the armistice terms to be surrendered to the Allies, on the assumption that Great Britain gets

two vessels for each one that is apportioned to France, Italy, and Japan, the United States not participating in the distribution. It is believed to be the correct policy for the United States not to participate in this distribution.

TABLE II.—*Assumed distribution.*

	Dreadnoughts.	Battle cruisers.	Destroyers.	Submarines.
Great Britain	2	6	24	70
France	4	0	12	35
Italy	4	0	12	35
Japan	3	0	11	35
United States	0	0	0	0

VI. By combining Tables I and II we get the probable postwar strength of the six greatest naval powers, as follows:

TABLE III.—*Probable postwar strength.*

	Dreadnoughts.	Battle cruisers.	Destroyers.	Submarines.
Great Britain	35	16	449	206
United States	17	0	172	55
France	11	0	55	90
Japan	9	7	78	52
Italy	9	0	45	76
Germany	11	0	168	17

VII. Table IV gives a comparison of strength of the principal naval Powers before and after the possible distribution of those German and Austrian vessels that are required by the armistice terms to be surrendered to the Allies and the United States:

TABLE IV.—*Total capital ships before and after distribution.*

	Before.	After.		Before.	After.
Great Britain	43	51	Japan	13	16
United States	17	17	Italy	5	9
France	7	11	Germany	27	11

VIII. Assuming the distribution made as indicated, the United States with 17 modern capital ships would be faced at once with an alliance between Great Britain and Japan controlling a total of 67 capital ships. Even with Japan left out Great Britain would face us with three times the number of capital ships that we have. This in itself is an intolerable situation, but if we join to the mere recital of figures political considerations which we know has gov-

erned in the past, we shall see more clearly that our national interest demands that this distribution of vessels shall not take place.

IX. Four great Powers have arisen in the world to compete with Great Britain for commercial supremacy on the seas—Spain, Holland, France, Germany. Each one of those Powers in succession have been defeated by Great Britain and her fugitive Allies. A fifth commercial Power, the greatest one yet, is now arising to compete for at least commercial equality with Great Britain. Already the signs of jealousy are visible. Historical precedent warns us to watch closely the moves we make or permit to be made.

X. If the German and Austrian Fleets be reduced by those vessels designated in the armistice terms for surrender or internment, and if those vessels be destroyed—

(*a*) Other European nations will require no increase in their fleets, since French and Italian interests do not conflict and neither nation can compete with Great Britain at sea. Germany will be out of the running for many years because of the burdens of an imposed peace.

(*b*) The relative naval strengths of Great Britain, France, Italy, and Japan will remain unchanged, but the naval position of the United States will be greatly weakened, since there will remain in Europe no real balancing influence on the activities of the British Fleet.

(*c*) Japan will require no augumentation of her fleet unless her intentions are hostile to the interests of the United States.

(*d*) The alliance between Great Britain and Japan will still be strong in relation to the United States in the proportion of 56 capital ships to 17—a more than three to one preponderance.

XI. With these facts in view, we may be sure that if Great Britain demands, either directly or, as is more likely, indirectly through France or Italy, a distribution of surrendered and interned vessels that she has solely in view her future relations with the United States. A prominent British subject recently said to an American in Sweden: "If you want freedom of the seas you jolly well will have to fight for it."

XII. The distribution of German and Austrian submarines would be a special menace to all the merchant ships of the world, no matter into whose hands those submarines fell. Prominent officers in the British Admiralty have justified on military grounds the German use of submarines in unrestricted warfare.

XIII. Unless we leave in Europe some restraining influence on British naval power Great Britain will be able to exert throughout the world an influence unknown to her in time of peace in the recent past. It may be right and proper that she shall have a greater navy

than any other European Power, since she must by the nature of her insular position assure to herself the opportunity to live by the importation of food. It is not, however, in the interest of humanity that she shall occupy so commanding a naval position that she may regulate the high seas through the world in accordance with her will.

CONCLUSIONS.

1. All German and Austrian submarines should be destroyed.
2. No German or Austrian naval vessel should be used to increase the naval armament of any power whatsoever.

MEMORANDUM No. 66.

STEPS TO BE TAKEN TO EXECUTE ARMISTICE TERMS WITH GERMANY.

Paris, France, 6 November, 1918.

NAVAL CONDITIONS.

The following steps are suggested for carrying out the armistice terms with Germany:

GENERAL.

Appoint a naval commission consisting of one representative from each of the Allied and one from the United States naval forces to decide upon and carry into execution the details of the armistice.

All questions arising to be decided by unanimous vote, subject, in case of division, to the decision of the Allied Naval Council, which will refer questions not unanimously decided to the respective Governments represented.

United States: Detail Vice Admiral Wm. S. Sims, U. S. N., as representative, to be assisted by such other representatives as he may appoint from his command.

As to Paragraph I of armistice terms—

Notify Allied and United States naval forces of the cessation of hostilities.

United States: Notify all United States naval forces.

As to Paragraph II of armistice terms—

Receive prisoners.

United States to receive and care for any United States prisoners and those of other Associated Powers not present, if requested.

As to Paragraph III of armistice terms—

Place guards on board the 160 submarines surrendered and escort with light craft to suitable ports of the Allies and turn over to representatives of naval commission. Submarines to be then dismantled and placed in charge of ship keepers; crews to be repatriated.

United States representative to direct antisubmarine vessels of his command to participate in the turnover of submarines and to detail

an officer as United States representative in connection with each group of submarines taken over.

As to Paragraph IV of armistice terms—

Interned vessels: Allied and United States representatives to recommend neutral ports for use as internment ports. Diplomatic arrangements to follow. Allied and United States representatives to decide on character of disarmament. Representatives to inspect disarmed ships. Allied and United States vessels to escort disarmed vessels to ports of internment. Surveillance of interned vessels to be limited to the presence of naval vessels of the Allies and of the United States in each internment port, with the privilege of inspection.

Vessels disarmed in German ports: Designate German naval bases for concentration of all German surface warships not interned in neutral ports. Representatives of Allies and United States to determine upon and inspect disarmament. Subsequent supervision to be limited to the present at the base of naval vessels of the Allies and of the United States to observe and report upon fulfillment of armistice terms. Any attempt to keep personnel on board each vessel would result in needless friction.

United States representative detail officer and vessels as required; principle of action to be full participation in all armistice arrangements.

As to Paragraph V of armistice terms—

The execution of this paragraph concerns the British Admiralty more intimately than anyone else.

United States representative cooperate with Allied representatives; governing principles:

(*a*) Our own mine sweepers must clear French coast before being employed elsewhere.

(*b*) We will accept responsibility for sweeping Area A of the Northern Barrage if the Allies so desire, it being understood that sweepers of a special type will be required, possibly involving construction of vessels.

As to Paragraph VI of armistice terms—

Allies and United States make arrangements through diplomatic channels with neutral concerned.

United States representative to cooperate with Allied representatives and specially to detail a United States naval vessel to accompany any Allied naval force that may enter the Baltic; United States forces not to participate in the occupation of any shore positions.

As to Paragraph VII of armistice terms—

No special action required.

Principle of action: The earliest possible relief of friendly populations consistent with a possible resumption of hostilities.

As to Paragraph VIII of armistice terms—
Designation of bases to be left to commission.
United States: No special action.
As to Paragraph IX of armistice terms—
United States: No special action.
As to Paragraph X of armistice terms—
United States representative take over any American vessels or assist Associated Powers, if requested, to take over vessels belonging to them or to their citizens.
As to Paragraph XI of armistice terms—
United States representative take over any American vessels or assist Associated Powers, if requested, to take over vessels belonging to them or to their citizens.
As to Paragraph XII of armistice terms—
No special action required.
As to Paragraph XIII of armistice terms—
No special action required.
As to Paragraph XIV of armistice terms—
No special action required.

Armistice with Germany.

Abbreviated naval conditions.

I. Immediate cessation of all hostilities at sea, and definite information to be given as to the location and movements of all German ships.

Notification to be given to neutrals that freedom of navigation in all territorial waters is given to the naval and mercantile marines of the Allied and Associated Powers, all questions of neutrality being waived.

II. All naval and mercantile marine prisoners of war of the Allied and Associated Powers in German hands to be returned, without reciprocity.

III. Surrender to the Allies and the United States of America of 160 submarines (including all submarine-cruisers and mine-laying submarines), with their complete armament and equipment, in ports which will be specified by the Allies and the United States of America. All other submarines to be paid off and completely disarmed and placed under the supervision of the Allies and the United States of America.

IV. The following German surface warships, which shall be designated by the Allies and the United States of America, shall forthwith be disarmed and thereafter interned in neutral ports to be designated by the Allies and the United States of America, and

placed under the surveillance of the Allies and the United States of America, only caretakers being left on board, namely: 6 battle cruisers; 10 battleships; 8 light cruisers, including 2 mine layers; 50 destroyers of the most modern types.

All other surface warships (including river craft) are to be concentrated in German naval bases to be designated by the Allies and the United States of America, and are to be paid off and completely disarmed and placed under the supervision of the Allies and the United States of America. All vessels of the Auxiliary Fleet (trawlers, motor vessels, etc.) are to be disarmed.

V. The Allies and the United States of America shall have the right to sweep up all mine fields and obstructions laid by Germany outside German territorial waters, and the positions of these are to be indicated.

VI. Freedom of access to and from the Baltic to be given to the naval and mercantile marines of the Allied and Associated Powers. To secure this the Allies and the United States of America shall be empowered to occupy all German forts, fortifications, batteries, and defense works of all kinds in all the entrances from the Cattegat into the Baltic, and to sweep up all mines and obstructions within or without German territorial waters without any questions of neutrality being raised, and the positions of all such mines and obstructions are to be indicated.

VII. The existing blockade conditions set up by the Allied and Associated Powers are to remain unchanged, and all German merchant ships found at sea are to remain liable to capture.

VIII. All naval aircraft are to be concentrated and immobilized in German bases to be specified by the Allies and the United States of America.

IX. In evacuating the Belgian coasts and ports, Germany shall abandon all merchant ships, tugs, lighters, cranes, and all other harbor materials, all materials for inland navigation, all aircraft and air materials and stores, all arms and armaments, and all stores and apparatus of all kinds.

X. All Black Sea ports are to be evacuated by Germany; all merchant ships in the Black Sea belonging to the Allied and Associated Powers held by Germany are to be handed back; all neutral merchant ships seized are to be released; all warlike and other materials of all kinds seized in those ports are to be returned, and German materials as specified in Paragraph IX are to be abandoned.

XI. All merchant ships in German hands belonging to the Allied and Associated Powers are to be restored, in ports to be specified by the Allies and the United States of America, without reciprocity.

XII. No destructions of ships or of materials to be permitted before evacuation, surrender, or restoration.

XIII. The German Government shall formally notify the neutral Governments of the world, and particularly the Governments of Norway, Sweden, Denmark, and Holland, that all restrictions placed on the trading of their vessels with the Allied and Associated Countries, whether by the German Government or by private German interests, and whether in return for specific concessions such as the export of shipbuilding materials or not, are immediately canceled.

XIV. No transfers of German merchant shipping of any description to any neutral flag are to take place after signature of the armistice.

MEMORANDUM No. 67.

(Omitted from publication at this time.)

MEMORANDUM No. 68.

FUTURE SUBMARINE WARFARE.

(Undated.)

General situation: International naval situation as at present.

Required: Estimate of the situation as to future submarine warfare with relation to—

(*a*) National interests.

(*b*) World interests.

SOLUTION.

As a result of the manner in which the Central Empires have conducted submarine operations, there exists throughout the world a public sentiment favorable to the abolition of submarine warfare and the destruction of all existing vessels of this type.

It is our purpose to examine the question of a future policy in regard to submarines, both from the point of view of world interest and national interest, and to determine the attitude which the United States should adopt toward the abolition of submarine warfare.

Theoretically the submarine is a valuable weapon of war with a large field of legitimate activity. There appears no cause for its condemnation on the ground that it has been the most powerful weapon of our adversaries, or that it has been used in violation of existing international law. The same reasons might be adduced for discarding the use of guns because they have been used to project poison-gas shells and other projectiles that cause unnecessary suffering.

It is necessary then to examine the actual methods employed by the Central Empires in submarine warfare to discover how far the successful use of submarines is dependent inherently on their employment in a manner inconsistent with the conduct of civilized warfare. If it appears that their efficiency is largely dependent on their illegitimate use in disregard of the laws of humanity, in violation of neutral rights, or in derogation of a sound policy for the world at large, it is safe to assume that in any war the temptation to employ submarines in their most efficient manner may prove too strong for a belligerent threatened with defeat, and that therefore the moral and material interests of humanity would be improved by the elimination altogether of the subsurface vessel.

CONDITIONS GOVERNING SUBMARINE ATTACK.

The weapons of the submarine are the torpedo and the gun. In order to maintain the water-tight integrity of its hull, it is essential that the submarine be protected as far as possible from gunfire. There is thus imposed upon the vessel the necessity of submerged attack against all craft possessing guns of equal or superior range. To make a successful submerged attack it is considered essential to get within ranges of 1,000 yards—preferably 300 yards. To approach within such ranges demands the utmost secrecy. Furthermore, the safety of the submarine precludes the possibility of demanding surrender at anything but a distance that would permit the most valuable prizes to escape by utilizing their superior speed. Owing to the impossibility of always determining the hostile or neutral character of a vessel by its flag or general appearance, there will frequently exist a doubt in the mind of the submarine commander, with a strong tendency to resolve the doubt in favor of aggression. Having torpedoed a vessel, there remains no means under the average conditions of providing for the surrender of the crew or its removal to a place of safety. The security of the submarine at such close quarters requires its continued submergence until the menace to its safety is removed by the sinking of the attacked vessel. Such has been the practical operation of submarine warfare.

LEGITIMATE USE OF SUBMARINES.

The legitimate use of submarines may be considered to be confined to the following:

(1) Independent attack on unsupported combatant vessels of the enemy.

Comment: The submarine has an undoubted right to attack without warning an enemy man-of-war or any vessel engaged in military operations and not entitled to immunity as a hospital ship, cartel ship, etc.

It is repugnant to the standards of civilized humanity to deliberately plan warfare with the intention of giving no quarter in battle. Hence if such an attack is made and the enemy vessel surrendered, provision should be made for the safety of the lives of the prisoners either on their own vessel or in the ship's boats if in safe waters.

A torpedo attack usually results in the sinking of a vessel. If we imagine this vessel to be a transport loaded with troops, it would be obviously impossible for the submarine to take them on board or to insure any degree of safety to those who might be successfully embarked on the high seas in the ship's boats.

It may be argued that a similar result might follow an action between surface ships, but it is desired to point out that the rescue of the surrendered or drowning should be the normal procedure and not the exception, as would be the case in unrestricted submarine warfare.

While submarines might be built of sufficient size and equipped in a manner that would permit their operations to conform to the rules adopted for surface craft, it is certain that such vessels would be seriously handicapped by such requirements, and it is not reasonable to suppose that they would be adopted.

(2) Independent attack on combatant enemy vessels capable of rendering mutual support.

Comment: In this case attack without warning would be justifiable. Destructions might be continued until the enemy surrendered, when humanity would require that a vessel be spared to care for the surviving crews. Unless we imagine a submarine large enough to carry prize crews to take possession of surrendered vessels, it is not reasonable to suppose that any combatant vessel would be spared.

(3) Attack, in support of surface vessels, on enemy combatant forces.

Comment: This is a purely legitimate use of the submarine which, however, has had no exemplification in the present war. Great Britain has fast submarines designed to operate with the fleet, but there is no reason to suppose that they might not be diverted to other uses not so legitimate.

(4) Capture or destruction of enemy merchant vessels.

Comment: It must be expected that the merchant vessels of belligerents will arm for defense. This is an ancient right, founded on that of self-preservation and as sound in principle as the right of a citizen to keep and bear arms. Such vessels are nevertheless noncombatants and must be regarded as such, since they are denied the right of taking the offensive.

Since, however, it would be too late for a vessel to defend herself after being torpedoed by a submarine, it is necessary for her to forestall attack as soon as the intention of the submarine can be determined. Under such conditions (which must obtain in unrestricted submarine warfare) a submarine appearing in any quarter from which an attack was possible must expect resistance from the threatened vessel.

In order to make certain that a prize shall not escape attack, the submarine, if inferior in speed and gun power, must make a submerged attack with torpedoes. He is thereby precluded from—

(*a*) Visit and search to determine identity as well as origin and ownership of cargo.

(*b*) Summoning the vessel to surrender.

(*c*) Taking possession of the vessel.

(*d*) Providing for the safety of passengers or crew.

The inhuman character of this form of warfare has led to forms of reprisals on submarines, such as the use of mystery ships, that react to make the crews of submarines still more brutal, so that no attempt is made to save life, but the submarine continues its submerged attack until the merchant vessel is sunk. Instances of submarines firing on boats filled with passengers are cited and of crews deliberately drowned after being placed on the deck of the submarine.

(5) Capture or destruction of neutral merchant vessels.

Comment: Capture of neutral merchant vessels under conditions and restrictions imposed by international law is justifiable. Destruction after capture is contrary to international law and can not be justified in any circumstances.

The right of neutral vessels to arm for self-defense dates from the days of piracy, and it can not be denied that the same right still exists to take measures for self-preservation against a belligerent who chooses to operate in defiance of international law against friend and foe alike.

If we admit the right of neutral merchant ships to arm for self-defense, the same set of conditions arise that makes it impossible for the submarine to efficiently wage war on commerce within the bounds of international law. Nor is it apparent that any change in international law could be made that would satisfy the just claims of neutrals to the free use of the high seas for their persons or their goods that would not at the same time seriously hamper the success of the submarine. The difficulty lies in the necessity of secrecy and suddenness of attack to prevent the escape of fast merchant vessels. This is obviously inconsistent with any attempt at visit and search, which in all cases would be necessary if only to establish identity.

(6) All operations of war permitted to surface vessels.

Comment: The necessity of preserving hull integrity and the limited number of guns that can be carried by a submarine restrict sharply its employment in surface operations. Such operations, while legitimate, offer but a small field of activity.

ILLEGITIMATE USE OF SUBMARINES.

The illegitimate employment of submarines by the Central Empires in the present war consisted of—

(1) Attack without warning on enemy merchant vessels.

(2) Attack without warning on neutral merchant vessels.

(3) Attack without warning on enemy hospital ships.

(4) Sinking of enemy merchant ships without visit or search.

(5) Sinking of neutral merchant vessels without visit or search.

(6) The abandonment, without regard to safety, of passengers and crews of vessels sunk.

(7) The planting of unproclaimed mine fields outside of enemy territorial waters.

Submarine operations in the present war may be considered as typical of what may be expected in future wars, when success is dependent on the result of a war on commerce.

There is high authority for the statement that prominent naval officials of at least one of the Allies are of the opinion that the unrestricted submarine warfare conducted by Germany was justifiable, and that with the exception of its more barbarous features its adoption by this ally might be expected under similar circumstances.

It is of interest to note the several phases of submarine operations in the present war as illustrating the tendency to develop maximum efficiency regardless of legal restrictions.

The first phase consisted of submarine attacks on combatant vessels. With the abandonment of the Declaration of London and the inauguration of a general blockade, there entered a second phase, a measure of retaliation, which was distinguished by the destruction without warning of enemy merchant vessels. The protests of neutrals and the fear of drawing the United States into the war induced for a time the exception of enemy passenger vessels; but, on the other hand, destruction without warning was gradually extended to apply to enemy and neutral cargo vessels alike.

It became apparent at last that the only hope of ending the war was by a food blockade of Great Britain. In this situation the Central Empires declared for unrestricted warfare and established prescribed zones that pretended to exclude all vessels from the high seas within certain areas contiguous to the territory of the Allied Powers. Any vessel whatever entering these areas was liable to destruction without warning.

NATIONAL INTEREST AS AFFECTED BY SUBMARINES.

Considering submarine warfare from the standpoint of national interest, let us examine the advantages and disadvantages to be derived from its use by each of the Great Powers.

Great Britain is the greatest naval power as well as the greatest mercantile power in the world. Her existence depends on control of her sea communications. In a naval war conducted by surface craft alone she can by maintaining a large margin of strength above her probable adversaries hope to maintain her position indefinitely. In

a naval war involving subsurface craft no amount of naval superiority in any class of vessel can prevent the destruction of her shipping, or, as in the present war, relieve her from the menace of starvation by blockade.

The submarines of Germany almost accomplished their purpose, although the German surface fleet was but a fraction of the united strength of the United States and the Allies, and this in the face of over 4,000 special craft, as well as mines, aircraft, and every device known to science, employed against them.

In spite of the fact that Great Britain has a large flotilla of submarines and has developed a special type for use in fleet action, her naval strength would be greatly increased by the abolition of submarine warfare, and it can be confidently expected that she would favor such a policy.

France is a continental nation ranking fourth in naval strength and merchant marine. She is directly dependent on neither for existence. Except in a world war she might expect to be supplied through her neighbors. In a war with Great Britain, submarine warfare would seem to be to her advantage. She would have little to lose and much to gain. The present war has shown, however, that submarines have little success against combatant vessels, so that, as considered heretofore, important results could be gained only by unrestricted operations against merchant shipping. Aside from any question of legality or morality involved, there is in the destruction of merchant shipping an economic loss to the world that affects all nations, whether belligerent or neutral. This phase of the subject will be discussed later. In a naval war against powers other than Great Britain, there is little that France could accomplish with submarines that could not be done with surface craft.

Italy, while not an insular nation, is dependent largely on sea-borne commerce. Her Navy and merchant marine occupy fifth place among the Great Powers. Her commerce would be largely at the mercy of any enemy in the Mediterranean. During the present war her commerce was driven from the Adriatic, and in spite of the assistance of the Allies she had great difficulty in maintaining herself. With naval operations confined to surface craft she would have been much better off. In addition to the objections to submarine warfare it should be remembered that it is a highly organized and specialized form of warfare requiring technical labor for construction, and for operation expert training, great skill, and considerable endurance to insure success. These requirements are to be found in but few countries. The Germans have set a standard of efficiency for the submarine weapon that we can expect to see but rarely attained. Italy's strength would not be relatively improved by the continuation of submarine warfare.

Germany and Austria can not expect to be in a financial condition that will permit for at least a generation to come any attempt to revive their naval strength. Considering the fate of their existing submarines, it is safe to exclude the Central Empires from present consideration. They would probably gladly agree to abolish any form of warfare in the future. Should they eventually regain their military strength there is every reason why they should never again be trusted with the submarine weapon.

Japan is an insular nation that occupies in the Pacific a position similar to that of Great Britain in the Atlantic. She stands third in naval and mercantile strength. She has a growing fleet and a rapidly increasing merchant marine. Her only potential enemy is the United States, from whom she can expect no aggression. If, unfortunately, war should come, her position would be very favorable for submarine operations against our communications with the Philippines.

On the other hand, our submarines based on the Philippines and Guam would be within striking distance of her coasts and would be a grave threat to the commerce on which her existence depends. With submarine abolished, her surface craft could probably accomplish lawfully all and more than could submarines.

Japan has but few submarines, and these of but little efficiency, which would seem to indicate that she is in agreement with this view.

Like other nations with ambitions to be powerful commercially on the sea, she has much to lose and little to gain by submarine warfare.

Small nations, with relatively large merchant fleets, such as Holland, Norway, and Sweden, have neither the military strength to withstand the invasion of a great power, nor the means to conduct an aggressive war against a small power. In either case they could expect heavy uncompensated loss from submarines.

Small nations with little or no merchant shipping of their own might selfishly benefit by submarines in a war against a maritime power. If their submarine warfare was confined to legitimate operations against combatant vessels they would be of value in repelling invasion, but it can not be expected that they would bring about victory against a powerful nation, and in addition to the danger of their submarines being used illegally there could be no equitable means provided of granting their use to one nation and not to another.

The *United States* is the second naval and mercantile power in the world. Our continental coasts lie across the ocean from any formidable enemy. No foreign invasion of our continental territory is possible, nor do we contemplate aggression against any power. Nevertheless the large merchant marine that we are building may be exposed to submarine attack in any part of the world. Such an aggres-

sion by any small or irresponsible power might cause us losses both in property and national prestige out of all proportion to the size of the offending power.

In a war with Great Britain submarines would serve a purpose in preventing the blockade and bombardment of our coasts, but the same results could be accomplished by surface craft and mobile coast-defense guns.

The chief reason why the United States should not build submarines is that public opinion would never permit their use in the same manner as that of our adversaries. Their chief use would be in the destruction of enemy merchant shipping. This the national conscience would not permit, certainly not after the German manner, while our probable adversaries would likely not be controlled by any such restrictions.

With a surface fleet second to none, the United States is in a position to vindicate its policies in every part of the world. With submarines in existence no strength in surface craft can ever insure a like security.

EFFECT OF ABOLITION OF SUBMARINES ON NAVAL STRENGTH.

If we reckon naval strength in terms of dreadnoughts and battle cruisers, and exclude Russia and the Central Powers, we observe that the naval strength of the Great Powers follows closely the strength of their merchant marine and is not dependent on submarines.

Naval strength.	Capital ships.	Merchant tonnage (approximate).	Submarines.
1. Great Britain	43	15,000,000	168
2. United States	17	5,000,000	108
3. Japan	9	1,700,000	19
4. France	7	1,500,000	55
5. Italy	5	1,000,000	6

Small powers with negligible navies are—

	Merchant tonnage.
Norway	1,300,000
Holland	800,000
Sweden	700,000

We conclude that the abolition of submarines would not practically alter the standing in relative remaining naval strength of any of the Great Powers.

DESTRUCTION OF MERCHANT SHIPPING AN ECONOMIC LOSS TO THE WORLD.

It is to the interest of the world at large that the evils of war be confined to the nations participating in it.

The economic interdependence of every part of the modern world makes it impossible for one country to suffer loss without in a measure

affecting all. But the vital indispensable necessity to the welfare of the world is merchant shipping, the common carrier of the world, that provides the sole means of interchange of products on which civilized existence has come to depend.

International law for the present has not progressed sufficiently far to forbid the destruction of belligerent merchant vessels under certain prescribed circumstances. It does forbid the sinking of neutrals.

We believe that the destruction of any merchant ships employed as common carriers is contrary to a sound world policy and should be forbidden.

As a result of the present war the world at large has been subjected to a loss of 13,000,000 tons of merchant shipping; 2,000,000 tons of this was the property of neutrals.

The loss of cargoes has impoverished the world and subjected many of the neutrals to hardships greater than those endured by some of the belligerents.

The tonnage sunk represents a direct economic loss falling upon the people of the world, whether belligerent or neutral.

EFFECT OF ABOLITION OF SUBMARINES ON REDUCTION OF ARMAMENTS.

The abolition of submarine warfare would be a great step in the reduction of armaments. In addition such a reduction would carry with it the elimination of all special types of craft that are necessary only in antisubmarine warfare.

If all distinctly antisubmarine craft were dispensed with and torpedo vessels reduced to a proportion of six destroyers for each dreadnought or battle cruiser, the following reduction could be accomplished in vessels already built:

Great Britain:	
Submarines	168
Destroyers	167
Torpedo boats	96
Patrol boats	63
Sloops	12
Patrol gunboats	26
Armed whalers	19
Motor launches	540
Submarine depot ships	13
United States:	
Submarines	108
Destroyers	70
Torpedo boats	17
Submarine depot ships	3
Converted yachts (?)	53
Submarine chasers	300
Japan:	
Submarines	19
Destroyers	13
Torpedo boats	24
Submarine depot ships	4
France:	
Submarines	62
Destroyers	50
Torpedo boats	121
Special gunboats (?)	10
Sloops	9
Dispatch vessels	10
Submarine chasers	50
Italy:	
Submarines	56
Destroyers	22
Torpedo boats	65
Submarine depot ships	1
Motor launches	147

In addition to the foregoing there could be a reduction in mine-sweeping vessels, aircraft, repairs, and supply vessels, as well as elimination of special nets, mines, and devices used against submarines.

CONCLUSIONS.

We recommend—

1. That an international agreement be concluded to abolish submarine warfare.

2. That to insure against violations of this agreement all subsurface vessels of every class whatsoever now built or building be destroyed, and that none hereafter be constructed.

3. That no merchant vessel shall hereafter be destroyed by belligerent action.

4. That merchant vessels which under present rules would be subject to destruction may be sent into a neutral port and interned in the same manner as combatant vessels.

[Extract from Memorandum No. 71, "History of Planning Section."]

MEMORANDA NOS. 68 AND 70 (7 NOVEMBER, 1918).

Subject: "*Future Submarine Warfare, Freedom of the Seas.*"

Initiated by the Planning Section with a view to determining the attitude which the United States representatives at the Peace Conference should take upon these subjects.

In forwarding this paper to the Department the Force Commander made the following comment:

"1. There is forwarded herewith for the information of the Department one copy of Planning Section Memorandum No. 68, entitled, 'Submarine warfare.' A copy of this memorandum has also been furnished direct to the Chief of Naval Operations in Paris.

"2. The Force Commander does not consider that the arguments put forward by the Planning Section in this paper are logical, nor that they support the conclusions reached. The paper is therefore forwarded without approval for consideration by the Department."

102315°—23——31

MEMORANDUM No. 69.

STEPS TO BE TAKEN BY THE NAVY FOR DEMOBILIZATION OF THE UNITED STATES ARMY IN EUROPE.

14 November, 1918.

The Planning Section has considered the steps necessary to be taken by the Navy for the demobilization of the United States Army in Europe and recommends as follows:

1. The immediate organization of a combined Army and Navy Demobilization Planning Section in Paris, to consist of staff representatives of the force commander, of the commander United States Naval Forces in France, and of the Commander in Chief of American Expeditionary Forces.

2. The organization of a fuel supply and repair service for each port on the French coast to be used in demobilization.

3. The establishment and extension as necessary of Naval Port Officer organizations in all ports used in demobilization.

4. The adoption of the principle of demobilization of all United States troops through French ports.

5. The prohibition of all immigration through Atlantic ports of the United States, and the drastic restriction of all travel across the Atlantic by civilians, until the United States Army is demobilized.

6. The retention of all ex-German ships in the naval service until the Army is demobilized.

7. The placing under naval control of all vessels engaged in the demobilization of the United States Army.

8. The organization of all United States debarkation ports to expedite turn around of all vessels engaged in demobilization.

9. The establishment of competition in turn around, with monthly publication of complete records of performances of ships and ports, giving names of officers concerned. Suggest the Army establish competition in loading and unloading.

10. The immediate demobilization of all United States naval forces in Europe not needed in the domobilization of the Army.

11. The fitting of all United States general cargo vessels now building or in service with knockdown arrangements for carrying troops, so that these vessels may be used to carry cargo when eastbound and

troops when westbound. Vessels so fitted to include United States colliers and mine layers, if and when practicable.

12. The employment of all German and Austrian ships now available in German and Austrian ports in carrying troops when westbound and cargo for their own countries when eastbound.

13. The employment of neutral shipping, so far as possible, in demobilization of the Army, giving such shipping as is used priority for cargo in the United States.

14. The employment of predreadnoughts and armored cruisers in the transportation of the Army, their crews being reduced to the minimum possible in order to increase their carrying capacity.

15. The retention, if practicable, of the services of the Dutch ships.

16. The use of all passenger space on trans-Atlantic liners to the limit. These liners to call at a French port to get troops.

SUGGESTIONS.

1. The use in wintertime of southern routes for westbound cargo vessels carrying troops.

2. The use of triangular voyages by vessels of the Argentine wheat and beef trade, carrying troops to the United States, general cargo to South America, and food to Europe.

3. The bunkering for the round trip of all vessels in the United States, so far as possible.

Forwarding comment by the Force Commander follows:

"2. The following comment is submitted on the recommendations and suggestions contained in this paper:

"RECOMMENDATIONS.

"1. All arrangements for evacuating the United States Army through French ports have been submitted to Vice Admiral Wilson, Commander, United States Naval Forces in France, who has been given full authority to deal with the Commander in Chief, American Expeditionary Forces, and his subordinates and make all arrangements that are necessary and possible within the limits imposed by the forces at his disposal.

"2 and 3. The Commander, United States Naval Forces in France, has full authority to carry out these recommendations and will do so to any necessary extent.

"4. It is thought that this should not be adopted as a principle, as it would unnecessarily restrict the speed of the evacuation of the Army. It is probable that most of the troops will be embarked for the United States at French ports, but the use of certain English ports should not be definitely rejected.

"5, 6, and 7. These recommendations are recommended for approval.

"8 and 9. In so far as these concern the Navy they should apply principally to the cruiser and transport force.

"10. Demobilization of United States naval forces is proceeding as rapidly as circumstances permit.

"11, 12, and 13. Recommended for the favorable consideration of the Navy Department.

"14. It is thought that this matter has already been decided by the Navy Department.

"15 and 16. Recommended for the favorable consideration of the Navy Department.

"SUGGESTIONS.

"1. This is a matter for the commander of the cruiser and transport force to decide, under such instructions as the Department may choose to issue.

"2. Recommended for the consideration of the Navy Department and other departments concerned.

"3. Recommended for adoption in so far as capacity of ships permit. The difficulties of obtaining coal in France have been so often set forth that it is needless to emphasize them at this time."

MEMORANDUM No. 70.

FREEDOM OF THE SEAS.

Paris, France, 7 November, 1918.

The idea that the high seas belong equally to all civilized and law-abiding nations and that each of those nations and their citizens may use the high seas freely and unhindered in their lawful occupations is universally accepted without qualification as the basis of peace-time procedure. But when the world is divided into two camps, those who are at war and those who are still at peace, freedom of the seas is qualified and restricted by certain extranational powers which have heretofore been accorded to nations at war. These qualifications and restrictions interfere with the commerce of those nations not at war, sometimes mildly and sometimes to such a degree as to influence greatly their national life. There is wrapped up in the idea of the extranational rights of belligerents the idea of a certain loss of sovereignty on the part of neutrals that is distasteful to them and is a constant source of friction and possible danger. For these reasons there has been a constant demand for some international arrangement by which the peaceful use of the high seas by neutrals shall be assured to them no matter how powerful relatively the belligerents may be.

The President's statement of Point II of his fourteen points appears to be founded on the idea of a League of Nations in which the Great Powers participate. He plans freedom of the seas through prewar agreement of the Great Powers in the expectation that when war comes there will be the League on one side and the unruly Power or Powers on the other, and that the League will be able to enforce either morally or by the actual application of military power the new rights of commerce in time of war.

Point II reads as follows:

> Absolute freedom of navigation upon the seas outside territorial waters alike in peace and in war, except as the seas may be closed in whole or in part by international action for the enforcement of international covenants.

The following definitions, taken from current opinion, are useful in gaining a more comprehensive understanding of what freedom of the seas means to men's minds:

(*a*) Unimperiled imports at all times. (Dernberg.)

(*b*) The German Government is prepared to do its utmost to confine the operations of war for the rest of its duration to the fighting forces of the belligerents, thereby also insuring the freedom of the seas, a principle which

the German Government believes now, as before, to be in agreement with the Government of the United States. (German reply to Sussex note.) In the same note the German Government speaks of restoring the principle of "the freedom of the seas" by a renewed observance of international law.

(*c*) Free and unfettered access in time of peace to all oceans by all who wish to cross them upon their lawful occasions. In war we mean that this privilege must be fought for by belligerent navies, causing as little inconvenience as possible to neutrals, but the right of searching neutral merchant ships must be maintained, in order to verify their nationality, and to prevent their aiding an enemy. (George Ashton; British.)

(*d*) Freedom of the seas is the abolition of belligerent rights afloat. (Corbett: British.)

From the above we see that there are no less than three distinct conceptions of a proper freedom of the seas in time of war. They are:

(*a*) The League of Nations conception.
(*b*) The American conception.
(*c*) The British conception.

The League of Nations conception of freedom of the seas is based on the idea that the power which does not abide by the peaceful methods of the League for settling international disputes is entitled to no special rights at sea as a belligerent, but may even be deprived entirely of the rights ordinarily granted to it in time of peace. Economic and military pressure may be brought to bear on the recalcitrant Power by all members of the League. If the action of the League is unanimous, all of its merchant vessels may trade throughout the world with a peace-time freedom that is modified solely by enemy action and self-imposed restrictions as to trading with enemy or entry into prohibited areas. If the League be not unanimous, or if there be maritime Powers without the League, the effort will still be toward assuring to merchant vessels of those Powers freedom to trade unhindered among themselves and with those Powers that remain loyal to the League.

If war should occur between nations outside the League, the League's conception of freedom of the seas would cause the denial of all belligerent rights to that nation refusing peaceful settlement, the principle being that the rights of the law-abiding and peaceful take precedence over the rights of those who wish to decide disputes by force.

The American conception of freedom of the seas in the past has been that merchant vessels of all friendly and neutral nationalities shall be permitted to use the high seas freely and unhindered on their lawful occasions and that the following employments are unlawful:

(*a*) Carriage of contraband.
(*b*) Blockade running.
(*c*) Unneutral service.

And that the following acts are unlawful:

(*a*) Attempts to avoid visit and search by flight.
(*b*) Resistance by force.
(*c*) Presentation of fraudulent papers.
(*d*) Acceptance of billigerent convoy.

In the application of the above the governing principle is that the neutral shall suffer the minimum possible dislocation of his normal maritime activities. The American Government has from time to time contended for the immunity of private property, even though it be enemy property, from capture on the high seas unless it be contraband of war. This contention has never received international assent.

The British conception of freedom of the seas is not freedom of the seas at all, but freedom of the belligerent to adjust his maritime action to the necessities of the military and naval situations. As sea power is necessarily the basis of all British activities on land, the British contend for the greatest possible freedom of action of belligerents on the high seas. Their contention in this respect is emphasized and enlarged by the fact of their great naval supremacy and the consequent military advantage that will accrue to them from increased freedom of action at sea, even though the rights of neutrals may thereby be infringed upon. The actual rules of maritime warfare which are accepted by the British Government coincide in most respects with the American practice, but the liberality of interpretation of those rules which a great navy permits to Great Britain operates to the greater restriction of freedom of commerce.

Great Britain may be more willing to accord by international agreement increased rights to belligerents because of a belief that should she be neutral the power of her navy will enable her to require an interpretation of those rules favorable to the neutral. In other words, the influence of her naval power will sway the interpretation of rules for maritime warfare to her advantage whether she be the belligerent or neutral.

A fourth conception of freedom of the seas is the right of all merchant vessels, belligerent and neutral, freely to navigate the high seas outside territorial waters without molestation by the naval vessels of the belligerents. This conception is the negation of any special rights on the high seas that a nation may acquire by virtue of her belligerency. The belligerent rights that a nation now acquires by common consent are:

(*a*) To capture or destroy the combatant vessels of an enemy.
(*b*) To capture other vessels of an enemy.
(*c*) To destroy enemy merchant vessels under special circumstances.
(*d*) To visit and search any merchant vessel on the high seas.

(*e*) To capture and send into port for adjudication any merchant vessel—

(1) Carrying contraband.

(2) Violating or attempting to violate a blockade.

(3) Rendering unneutral service.

(*f*) To establish and proclaim blockades of enemy coasts and ports.

(*g*) To confiscate property of neutrals by judicial procedure as penalty for violation of belligerent rights.

In addition to the above undisputed rights of belligerents there is a right not yet firmly established by consent but actually exercised by force of establishing zones or areas where shipping is forbidden to enter. These areas have been designated "strategic areas." They may be fixed areas, as in the vicinity of naval bases, or moving areas surrounding naval forces in passage at sea.

If this fourth conception of freedom of the seas were adopted by common consent, the need of navies would disappear, except as a means for covering a landing, preventing a landing, bombarding enemy shore positions. Navies exist now for the protection of sea communications of their armies and peoples or for the attack of the enemy's sea communications. If sea communications are protected by complete freedom of the seas universally agreed upon, force is no longer required for that purpose. It would be of no advantage for one navy to fight and defeat another if back of the victory there were not some real meaning, a real influence exerted on events on land. If after the victory of one navy over another sea communications remain no less nor no more free than before, the victory will be fruitless and the effort both of the fight and of the preparation for the fight vain, except as events inside territorial waters may be modified by that victory.

Complete freedom of the seas shifts warlike operations from the sea and makes war on land practically the sole form of war. It facilitates invasion of countries that are now safe by reason of the sea barrier. It is an end distinctly in the special interest of nations whose armies are strong and distinctly against the special interest of nations whose navies form their chief means of defense. It seems impracticable to readjust by agreement the life of nations to such a revolution in their relations, no matter whether there be a League of Nations or not.

But if the complete realization of freedom of the seas is at present impracticable, we can not conclude that navigation of the seas in time of war may not be made more free to neutrals. A brief examination of each one of the belligerent rights at sea as enumerated above will be made in order to indicate the direction that changes favorable to neutral commerce may take.

(*a*) *To capture or destroy the combatant vessels of an enemy.*

Comment: Denial of the right to attack an enemy fleet on the high seas would not only deprive insular nations of their most effective defense against invasion but would render sea power impotent in a war against a nation having a powerful army. The right to capture or destroy the fleet of an enemy should not be questioned.

(*b*) *To capture other vessels of an enemy.*

Comment: The belligerent right to capture the merchant vessels of an enemy is parallel with the right of an army to interrupt the land communications of an enemy. Railway lines are not spared, even if they connect the belligerent with a neutral State. The right is complicated by the fact that not only enemy but neutral vessels may assist in supplying armies from overseas, but as the presumption is that the neutral vessel is innocent and the enemy vessel is guilty the immunity from capture of enemy vessels on the high seas can never be so complete as the immunity of neutral vessels. Modern war conditions have forced belligerent merchant vessels into a military or semimilitary status. The needs of States at war, especially if they must support operations overseas or from overseas, compel the employment of a large part of their merchant marine in strictly military duties. It would be an absurdity not to make vessels so employed liable to capture. If they were not so liable, the following acts might be done with impunity.

(1) Oversea transportation of troops.
(2) Oversea transportation of munitions.
(3) Scouting.

(*c*) *To destroy enemy merchant vessels under special circumstances.*

Comment: Every merchant vessel built to meet a commercial need is a distinct acquisition to civilization. Every merchant vessel destroyed is a distinct economic loss to the world. Injury to the enemy does not require the destruction of his property but the sequestration of it. The world is too vitally concerned in the preservation of sea-borne commerce to permit the sinking of merchant ships as an act of war. The belligerent right to arrest the enemy ship, to appropriate it and its services, constitutes no permanent loss to the world. The present belligerent right to sink enemy merchant vessels should be abrogated. The belligerent may be granted in return the privilege of interning merchant ship prizes in neutral ports under conditions which would now permit him to sink the prize.

(*d*) *To visit and search any merchant vessel on the high seas.*

(*e*) *To capture and send into port for adjudication any merchant vessel:*

(1) Carrying contraband.
(2) Violating or attempting to violate a blockade.
(3) Rendering unneutral service.

Comment: The two belligerent rights stated above are interlocking. Guilt can not be fixed on a vessel ordinarily except by visit and search. Visit and search is exercised to discover—

(*a*) Identity of vessel.

NOTE.—An enemy vessel might fly a neutral flag as a means of escaping capture. She might change her name, her appearance, or adopt any one of several subterfuges that would succeed if visit to determine identity were not allowed.

(*b*) Contraband.

NOTE.—The principal annoyances to maritime trade in time of war grew out of the right to visit and search to determine if contraband forms a part of the vessel's cargo. According to present international law, Governments are not responsible for the trade in contraband of their citizens and this notwithstanding the fact that acts of individuals engaged in contraband trade influence gravely the foreign relations of their Governments. As we are seeking for arrangements that will give greater freedom to merchant vessels on the seas, we suggest that the question of contraband be made a national responsibility of neutrals by the following method:

(1) The adoption and proclamation in time of peace of a specific contraband list.

(2) The prevention by each neutral Government in time of war of the exportation by land or sea to a belligerent of any article in the contraband list.

(3) The failure of any Government, either willingly or through negligence, to prevent the exportation to belligerents of contraband to constitute an unneutral act for which it shall be responsible to the injured belligerent and to the Governments party to the agreement.

(4) The freedom to trade even in articles of the contraband list with neutral countries to be absolute, responsibility for contraband residing with the Government within whose sovereignty the contraband is last embarked for shipment either by land or sea to the belligerent.

(5) The abolition of the right of search for contraband.

(6) The making of trade in contraband a capital offense for all those who knowingly engage in it.

(*c*) Violation of blockade.

NOTE.—If we deny the right of blockade except within enemy territorial waters, we make blockade impossible unless we at the same time extend territorial waters so as to include waters much farther from shore than 3 sea miles. If we grant unqualifiedly the right of blockade, the belligerent may give to it so elastic a meaning as to inclose large and commercially vital areas within the blockade lines. At present the definition of blockade is so vague that the belligerent may claim a blockade line hundreds of miles from shore, thereby appropriating to himself at the expense of the neutral vast areas of the sea in which there can be no free navigation. The direction of effort should be toward defining more precisely the limits of belligerent action in establishing a blockade. The annoyances to innocent shipping through visit and search might further be reduced by reducing the period during which and the area within which liability for breach of blockade exists.

(*d*) Unneutral service.

NOTE.—If a merchant vessel be guilty of unneutral service, such guilt can be best established by visit and search. To deny visit and search for this

purpose would not be in the interest of justice. The search required is easily and quickly made at sea and in this respect differs materially from the search for contraband.

(*f*) *To establish and proclaim blockade of enemy coasts and ports.*

Comment: Discussed above.

(*g*) *To confiscate property—ships and cargoes—of neutrals by judicial procedure as penalty for violation of belligerent rights.*

No comment.

The question of strategic areas is one needing the most careful scrutiny. In general the discretion of the belligerent should be limited as much as possible while still granting him a reasonable freedom in naval operations.

The above covers the principal belligerent rights and suggest tendencies favorable to neutrals and toward greater freedom of the seas.

The present war has brought into use methods of denying the freedom of the seas to neutrals which are not included in acknowledged belligerent rights. Neutral merchant shipping has been required to operate on certain specified trade routes prescribed by the belligerents under pain of being denied fuel and necessary supplies. Vessels refusing to trade under these conditions have been requisitioned; pressure has been brought to bear on neutrals to compel them to desist from trading with the enemy. This pressure has been made effective through the shortage of food and the consequent dependence of neutral populations on rations allotted by the belligerent having control of the sea.

Nations that control the fuel facilities of the world by the possession of fuel deposits and by widespread systems of fueling stations may exert a powerful influence over trade both in peace and in war. This influence may be so used as to restrict freedom of navigation to an even greater extent than the exercise of the ordinary belligerent rights. This control through fuel is one specially difficult to handle, since the nation exercising the control is exercising a right of sovereignty in which the sovereignty of other nations is not at issue. There might be agreements among all nations to permit no discrimination in the fueling of ships and no pressure in the way of military repair facilities, stevedores services, clearances, etc., but war would invariably furnish conditions justifying or possibly necessitating departure from such agreements, the principle of self-defense operating to dislocate the full operation of peace-time agreements. A surer method is the expansion of separately controlled systems of fueling stations under sovereignties least likely to require to requisition these facilities or to divert them to war uses.

The underlying principle of belligerent and neutral rights and duties on the high seas should be—

A neutral shall not aid a belligerent, nor shall a belligerent interfere with a neutral except in accordance with precise rules determined during peace, unalterable during war.

The changes in international practice suggested in this paper can not be put forward except for adoption in principle. International law has been of slow growth through a long period of years. Each right and each duty is related to other rights and duties, so that no one of these may be changed except after the closest scrutiny by the most learned and constructive of international jurists of the nations concerned.

SUMMARY OF CONCLUSIONS.

From the above consideration we conclude—

1. That absolute freedom of the seas is at present impracticable.
2. That the belligerent's right to capture or to destroy combatant ships of the enemy on the high seas can not be questioned.
3. That the right to capture enemy merchant ships should not be denied.
4. That liability for the exportation and carriage of contraband should become a national liability instead of a private liability.
5. That the nature of contraband should be determined during peace by universal agreement and that these agreements should be unalterable during war.
6. That no merchant ship, either belligerent or neutral, should be destroyed in war.
7. That the right of visit and search should be granted for the sole purpose of identification and to determine guilt for unneutral service and breach of blockade.
8. That the permissible limits of blockade areas should be determined precisely during peace and the corresponding freedom of belligerents to determine the extent of blockade areas restricted.
9. That strategic areas should be limited in extent as much as possible and that the discretion of the belligerent in declaring such areas should be defined during peace.
10. That the underlying principle of belligerent and neutral rights on the high seas should be that a neutral shall not aid a belligerent nor shall a belligerent interfere with a neutral except in accordance with precise rules determined during peace and unalterable during war.
11. That the changes or modifications in international law suggested above should not be put forward for adoption except in principle until they have received the closest scrutiny by the international jurists of the nations concerned.

MEMORANDUM No. 71.

HISTORY OF PLANNING SECTION.

From 26 December, 1917, to Conclusion of Armistice, 12 Novermber, 1918.

London, 30 December, 1918.

The work of the Planning Section has been presented in numbered memoranda from 1 to 71, inclusive.

A complete file of Planning Section Memoranda has been sent to the United States Naval War College.

A copy of each memorandum was forwarded to the Navy Department (Operations) upon its approval by the Force Commander.

Additional copies of each memorandum have been placed in the files of the force commander.

Copies of selected memoranda were forwarded to the commander in chief Atlantic Fleet and to various detachment commanders.

In many cases copies of memoranda were furnished the British Admiralty.

ORIGIN AND ORGANIZATION.

The Section was originated in accordance with telegraphic instructions, dated 19 November, 1917, sent by the Chief of Naval Operations to Washington while he was temporarily in London. This message is quoted below:

From: Admiral Benson.
To: Navy Department.

From my observation and after careful consideration, I believe that plans satisfactory to both countries can not be developed until we virtually establish a strict planning section for joint operations here (in London), in order that the personnel therein may be in a position to obtain latest British and allied information and to urge as joint plans such plans as our estimates and policy may indicate. This action appears to all the more necessary considering the fact that any offensive operations which we may undertake must be in conjunction with British forces and must be from bases established or occupied within British territorial waters. The officers detailed for this duty should come here fully imbued with our national and naval policy and ideas. Then, with intimate knowledge which they can obtain here from data available, actual disposition of allied forces, the reason therefor, they will be in a position to urge upon British any plans that promise satisfactory results.

(Signed) BENSON.

The Section was formed in London on 26 December, 1917, at the Headquarters of the Force Commander, United States Naval Forces Operating in European Waters, as a part of his staff.

The personnel of the Section comprised—

Capt. N. C. Twining, U. S. N., chief of staff to the Force Commander and ex officio head of the Planning Section. Participated in no solutions except Memorandum No. 59 on "Armistice terms."

(*a*) Participating in Memoranda Nos. 1 to 17, inclusive, Capts. F. H. Schofield, U. S. N.; D. W. Knox, U. S. N.; H. E. Yarnell, U. S. N.

(*b*) Participating in Memoranda Nos. 18 to 47, inclusive, Capts. F. H. Schofield, U. S. N.; D. W. Knox, U. S. N.; H. E. Yarnell, U. S. N.; Col. R. H. Dunlap, U. S. M. C.

(*c*) Participating in Memoranda Nos. 48 to 56, inclusive, Capts. F. H. Schofield, U. S. N.; D. W. Knox, U. S. N.; Col. R. H. Dunlap, U. S. M. C.

(*d*) Participating in Memoranda Nos. 57 and 58, Capts. F. H. Schofield, U. S. N.; D. W. Knox, U. S. N.

(*e*) Participating in Memoranda Nos. 59 to 71, inclusive, Capts. F. H. Schofield, U. S. N.; L. McNamee, U. S. N.; D. W. Knox, U. S. N.

On 1 January, 1918, the First Sea Lord of the British Admiralty tentatively suggested orally that one member be attached to the staff of Rear Admiral Keyes, R. N., commanding at Dover, another member to the Material Section of the British Admiralty, and the other member to the Operations Section of the British Admiralty.

On 2 January, 1918, in its Memorandum No. 2, the Planning Section recommended—

(*a*) That it work as a unit, all members considering the same subject simultaneously.

(*b*) That its duties be more general than proposed by the First Sea Lord.

(*c*) That it be free to consider questions that seem most urgent to the Force Commander and to members of the Section.

(*d*) That it be accorded the privileges of the Admiralty, with complete freedom of action so far as the Admiralty is concerned.

These recommendations were approved.

In addition to their duties in formulating plans, one or more members of the Section attended the Force Commander at meetings of the Inter-Allied Naval Council. Capt. H. E. Yarnell was attached to the secretariat of the Council until after the fourth meeting, held June 11 and 12, when he was relieved by Capt. D. W. Knox.

The connection with the Council was of great value in keeping the Section informed of the general trend of broad events and thus assisting in the formulation and solution of problems.

Cooperation with British Plans Division.

The formation of the American Planning Section followed very soon after the appointment of Admiral Wemyss as First Sea Lord of the British Admiralty and the reorganization of the Admiralty by the new administration.

One feature of this reorganization was the enhanced importance attached to the British Plans Division, which had previously had a very precarious existence. The Plans Division was given permanent and spacious offices and a rear admiral (Keyes) made Director of Plans. Almost immediately, however, Rear Admiral Keyes was detached and succeeded by Capt. R. T. M. Fuller, R. N.

In addition to its office at the Headquarters of the Force Commander, the American Planning Section was assigned office space at the Admiralty within the British Plans Division.

Complete cordiality and freedom of informal discussion existed at all times between the two Sections. Under appropriate circumstances they submitted joint solutions to problems. Where problems were solved by one Section only, a copy of the solution was generally furnished to the other Section. Each Section kept the other generally informed of its work in hand.

Under the reorganization instituted by Admiral Wemyss the British Plans Division was supposed to fulfill its theoretical function of a General Staff "Thinking Department," and to initiate strategical conceptions to be carried into effect by the operating branches of the staff.

This change of routine in practice proved difficult to establish in the Admiralty. The Deputy Chief of Naval Staff and Assistant Chief of Naval Staff having acquired the habit of performing Plans functions themselves, or having them done by the Operations Division, were inclined to continue in the old way. Several striking examples occurred of important plans being completed without Plans Division having been consulted or even acquainted with the fact. Plans submitted by the Plans Division frequently received apparently scant notice by the Deputy Chief of Naval Staff, Assistant Chief of Naval Staff, and other high officials, being merely indorsed by them casually (and at times sarcastically) and sent to file. This attitude appeared to be partly caused by the fact of the Director of Plans having insufficient rank.

Under these circumstances the British Plans Division frankly sought the formal concurrence of the American Planning Section in many of their plans, for the sake of the greater attention given the papers on that account.

The influence which our Planning Section exerted upon British strategy is difficult to estimate. The attitude of the British higher

officials toward us was apparently similar to that manifested toward the British Plans Division. Rarely were our proposals frankly accepted. From the beginning we urged constantly, both orally and in memoranda—

1. The fact that the principal naval mission was antisubmarine.
2. The great importance of completing the Northern Barrage.
3. The pressing need for developing and adopting offensive antisubmarine operations; if necessary at some detriment to the convoy system and to the instant readiness of the Grand Fleet to attack the High Seas Fleet.

There appeared constantly to be a strong and almost unanimous reluctance on the part of the British command to accept these doctrines. In the British Plans Division, however, they were favorably indorsed; and it is believed that they gradually gained favor in other quarters and materially influenced the conduct of the campaign.

Comment on Memoranda.

MEMORANDA NOS. 1 (31 DECEMBER, 1917), 3 (5 JANUARY, 1918), 17 (12 MARCH), 35 (11 JUNE), 42 (30 JULY), 43 (21 AUGUST), 51A (18 SEPTEMBER).

Subject: "*Northern Mine Barrage.*"

From its organization the Planning Section was thoroughly convinced of the desirability of completing the barrage at an early date according to a design which would render the passage of submarines northabout as hazardous as practicable.

Believing that the speedy completion of an effective barrage required agreement in advance upon a plan by the two navies which had jointly undertaken the project, frequent discussions and conferences were held with British officials. These developed important differences of opinion as to the general characteristics of the barrage. Repeated efforts were made to reconcile these differences and to reduce to writing a concrete plan which would be acceptable to both navies.

These efforts met with failure in so far as formal agreement upon a written plan was concerned, the British apparently desiring to reserve the privilege of altering the plan when expediency so dictated. They were probably influenced to adopt this attitude by the intentions (not then disclosed) to undertake extensive mining operations in "the Bight," and at Dover, which might interfere with any agreements they made with respect to the Northern Barrage. Possibly some skepticism also existed as to the ability of the Americans to execute satisfactorily their part of the project. Doubt as to the practicability of the barrage, as well as to its strategic importance, was frequently manifested by many high British officials, notably the

Commander in Chief Grand Fleet, under whose general direction the laying operations and their protection were placed. This attitude was reflected in the Deputy Chief of Naval Staff, whose department in the Admiralty handled fleet affairs. It was upon the recommendation of the Commander in Chief that the position of the barrage was moved about 50 miles northward, placing the American Section in depths of water somewhat deeper than the original position. This incident alone put back American preparations about three weeks. It became known in about September, 1918, that the hostility of the Commander in Chief to the barrage was caused in large measure by the interference that the barrage would cause to the weekly Norwegian convoy, for the protection of which the Commander in Chief was held responsible.

The British Assistant Chief of Naval Staff was hostile to the barrage, apparently because of the probable influence which it would have to reduce the number of vessels available for convoys, for which duty he was primarily responsible.

For similar reasons, affecting their own job, practically every influential British official afloat and ashore was opposed to the barrage, except the British Plans Division.

This situation caused the American Planning Section constantly to urge orally expedition in the completion of the barrage, and to emphasize its great importance in the above memoranda, as well as in other papers upon more general subjects.

It is believed that the influence of this Section, exerted so constantly, considerably advanced the completion of the barrage. But for the lack of a proper agreement in the early stages of the project, and for the opposition of British officials, it is probable that the barrage might have become effective in the early summer of 1918.

Forwarding comment by the Force Commander follows:

MEMORANDUM NO. 17 (FORWARDED 18 APRIL).

2. The Department is of course aware that there has been in the past very extensive mining in the Helgoland Bight, both by the British Admiralty and by the enemy. Mining in that locality is still carried on whenever circumstances appear to render it desirable, but it is not regarded as important as it was early in the war. There is a very large number of mines in this area and very few enemy submarines come out from Germany by this route.

3. The Admiralty has also directed certain mining operations in the Kattegat with a fair degree of success. This work was begun about the end of March and has been carried on continuously when weather permitted.

4. Mining has also been undertaken in the North Channel leading to the Irish Sea. It is upon this mining project that the U. S. S. *Baltimore* has been employed since her arrival in these waters.

5. Laying mines in Area B of the Northern Barrage was begun by the British about three weeks ago, but owing to unexpected and unexplained difficulties

with the mines themselves the operations were suspended temporarily before one complete line had been run. Numerous mines failed to take the correct depth, a considerable number floated, and there were a number of premature explosions. H. M. S. *Gaillardia*, while accompanying a mine layer, was sunk by striking a mine.

6. Since the British mine was supposed to be entirely safe if laid at a depth materially different from that intended, this behavior of the mines was very puzzling and disconcerting. A 35-foot sweep was made along the mines already laid, and a number of mines were picked up, although they were supposed to have been laid at a depth of 65 feet. Most of the mines that were picked up by the sweep exploded.

7. The Commander in Chief of the Grand Fleet was naturally very much disturbed by these unsatisfactory results of the first mine laying, and the Admiralty have felt that they could not continue laying the barrage in Area B until the faults in the mines had been discovered and removed. I am not aware that they have as yet discovered what the difficulty is.

8. With respect to Area B: I have from the first consistently urged that this area be made as narrow as was practicable, considering the requirements of the Grand Fleet and of commerce, and I have also held that the deep mining should be carried close up to the islands of the Orkney group.

9. With respect to Area C: I have equally held from the first that this could be made effective only by supplementing the deep mine field with a surface mine field of American mines, and that the mining should be carried up to Norwegian territorial waters, but not into them.

10. My views with respect to Areas B and C have previously been accepted in principle by the Admiralty, and the department has been advised to be prepared to furnish surface mines for both of these areas.

11. Owing to an apparent uncertainty in the Admiralty as to the further execution of the plans for the Northern Barrage, I caused the matter to be brought up at the staff meeting this morning, at which I proposed the following:

(*a*) We to lay two single lines of surface mines over the southern portion of Area C, 40 to the mile.

(*b*) British to lay one "system" of deep mines over the northern portion of Area C.

NOTE: A "system" of English mines comprises five parallel lines of different depths.

(*c*) We to run the two above-mentioned single lines in Area C and a single "system" entirely across Area A as early as practicable.

NOTE: A "system" of American mines consists of mines at 80′, 160′, and 240′ depths, respectively.

(*d*) Whether "C" or "A" is mined first is not very material, but if the mines and sinkers for Area C can be sent over without delay, it would be better to mine that area first.

(*e*) In view of the great difficulty of efficiently patrolling so wide an area as the present designed Area B, it seems necessary to surface mine a portion of it in the same manner as is proposed for Area C, leaving a portion without surface mines as an exit of the Grand Fleet, this exit to be as narrow as it can safely be made.

(*f*) Area B to be deep mined as already planned, except that the mines are to be carried close up to the coast (islands) without leaving the 7-mile channel now shown on the chart.

12. Rear Admiral Strauss, commander of the mine force, was present at the meeting, and he and I were at entire concurrence at all points. The Admiralty

Staff did not reach a decision, owing, I believe, to their desire to consult the Commander in Chief, Grand Fleet, before reaching final decision. I have every reason to believe, however, that they will accede to all of the above proposals with the possible exception of (e).

13. A proclamation notifying the mining of Areas A and C will be issued at an early date by the British Government.

14. As soon as the proposal to lay a double row of surface mines across Area C is acceded to, I shall cable to the Department requesting that the necessary material be shipped.

MEMORANDUM NO. 35 (FORWARDED 17 JUNE).

2. The proposed change has been made the subject of cable communications between the Force Commander and the Department, and at the time of writing a decision has not been reached as to the practicability of making the change at the present time.

3. Calculation shows that assuming three systems of mines as originally contemplated, the probability of contact by a submarine passing through the area, either on the surface or submerged, when mines are laid 150 feet apart, is 33.6 per cent; with the proposed change the probability of contact by a submarine passing through the area on the surface becomes 50.4 per cent, while the probability in case of passing through below the surface is 24.4 per cent. Assuming that of every three submarines that attempt to pass the barrage two make the attempt on the surface and one submerged, the average probability of contact under the proposed plan would be about 42 per cent.

MEMORANDUM NO. 4 (31 JANUARY, 1918).

Subject: "*Notes on Submarine Detection by Sound.*"
No comment.

MEMORANDUM NO. 5 (10 JANUARY, 1918).

Subject: "*Employment of Auxiliary Cruisers.*"
No comment.

MEMORANDUM NO. 6 (11 JANUARY, 1918).

Subject: "*Kattegat Problem.*"

This was the first strategic problem solved by the Planning Section.

Its solution was undertaken at the request of the Admiralty Deputy Chief of Naval Staff. We were informed that the British Plans Division had already solved a similar problem, and were requested to refrain from consulting the previous solution.

Consequently, and in view of certain improbable hypotheses made in the problem, we felt that it was in the nature of a test of our abilities and that our solution could be of no direct utility in connection with the war. These beliefs determined us to set our own problems in the future, at least until certain aspects of the war which we deemed of great importance should be examined.

MEMORANDUM NO. 7 (14 JANUARY, 1918).

Subject: "*Assignment of Destroyers to the Grand Fleet.*"

Prepared in response to a recommendation by the commander, Division Nine (American battleships serving with the Grand Fleet), that American destroyers be assigned to duty with the Grand Fleet, in order that valuable experience might be gained.

MEMORANDUM NO. 8 (JANUARY, 1918).

Subject: "*Estimate of the General Naval Situation in Relation to the War as a Whole.*"

This was the first strategic problem set itself by the Planning Section. It was selected partly with a view to self-education, but also with a desire to contribute something useful toward the prosecution of the war.

Following favorable comment from the Force Commander and the Admiralty, it was thought that the solution might prove of greater value if it received wider circulation and if the conclusions reached should be approved in principle by the Inter-Allied Council.

It was accordingly submitted as a part of the agenda for the Inter-Allied Council and subsequently received the approval of that body. It was the subject of favorable informal comment by French and Italian officers.

The influence which the paper exerted upon the conduct of the war is difficult to estimate. Some of the conclusions reached were already in process of design or execution by the Allies; others were renderd impracticable by subsequently changed conditions. Nevertheless it was apparently the first comprehensive examination of the naval aspects of the war made by any of the allied staffs, and as such it served to clarify thought and to unify conceptions and effort among the Allies.

Forwarding comment by the Force Commander on 31 May follows:

1. Inclosed herewith are corrected pages 17 and 18 for Planning Section Memorandum No. 8, a copy of which was forwarded to the Department on February 22.

2. The changes from the pages 17 and 18 previously forwarded are such as to eliminate from the memorandum all references to the seizure of a base in Norway.

3. All copies of this memorandum which were furnished to the Allied Naval Council and to the British Admiralty were altered in accordance with the inclosed corrected sheets.

MEMORANDA NOS. 9 (30 JANUARY, 1918), 16 (7 MARCH), 31 (27 MAY), 37 (17 JUNE), 53 (23 SEPTEMBER).

Subject: "*Situation in the Mediterranean.*"

Memorandum No. 9 was initiated by the Planning Section as being the most important special problem at that time requiring solution

after examination had been made of the general naval situation as a whole.

After reaching a solution on 30 January, 1918, the Planning Section was so much impressed with the importance of undertaking without delay the tentative decisions reached that it obtained permission of the Force Commander to endeavor to get the paper before the Inter-Allied Council at its next meeting, to be held soon after in Rome.

Under the rules of the Council, however, the subject was presented too late for consideration at that session and consequently discussion of it by the Inter-Allied Council was postponed until the session which met in London on March 12. A decision was then reached approving the paper, but inasmuch as execution of the plan required military assistance, reference to the military representatives of the Versailles Council was necessary before allocation of the required troops could be obtained.

By that time the military situation in France had become so grave that the Versailles Council decided no troops could be spared then. However, a subcommittee of the Council, including among its members Capt. H. E. Yarnell and Col. R. H. Dunlap, both of the United States Planning Section, met in Rome on 15 May and prepared detailed plans.

Meantime a mobile floating barrage across the Otranto Straits had been instituted and the laying of a net mine barrage continued slowly. These measures were moderately successful, but did not appear to be, nor likely to become, a satisfactory solution of the submarine situation in the Mediterranean.

By May, 1918, it appeared unlikely that any troops could be spared for a considerable time for the Sabbioncello operation; so the Planning Section again undertook a solution of the submarine situation in the Mediterranean on a purely naval basis. During the preliminary consideration of the subject, cablegram was received from Operations suggesting the Cape Bon-Sicily mine barrage.

On 17 June formal solution (P. S. Memo. 37) was submitted to the Force Commander, who brought the subject to the attention of the Admiralty.

On 23 July an emergency meeting of the Inter-Allied Council was held in London to consider mining operations in the Mediterranean. Capts. N. C. Twining and F. H. Schofield, both of the Planning Section, represented the United States at this meeting.

On 23 July, previous to the Council meeting, the Planning Section prepared a digest of its solution to the Mediterranean problem (P. S. Memo. 37). This was submitted to the Inter-Allied Council (see Council files No. 168), where it received consideration at the emergency meeting.

The Council approved the principles affecting mine barrages in general, and decided to request a commission at Malta then studying various matters in connection with Mediterranean mining operations to examine in detail the definite proposals made by the United States for Mediterranean barrages.

Rear Admiral Joseph Strauss, U. S. N., commanding the United States Mine Force in European Waters, was appointed as United States representative to attend the conference at Malta, and took with him a complete copy of Planning Section Memorandum No. 37 to present to the Malta conference.

After Admiral Strauss's departure from London a cablegram was received from the United States Navy Department directing him to support the Cape Bon-Sicily project.

The Malta conference adopted the general features of the United States proposal contained in Planning Section Memorandum No. 37, so far as they related to mining (see report of conference—Inter-Allied file No. 188).

On 15 September, at the next meeting of the Inter-Allied Naval Council, the report of the Malta conference was approved in general. Our proposal to continue plans for the Sabbioncello barrage was rejected.

The history of Mediterranean mining plans illustrates several important points.

I. *The inherent difficulty of allied operations.*—Definite conclusions were reached on 30 January, 1918, as to important active operations which should have been undertaken promptly in the Mediterranean against the enemy submarine campaign.

Authoritative and concrete decision to undertake them was not reached finally until 15 September.

In the early stages of the conference the Italians were not prepared to accept the United States proposals, and there was an undercurrent of Italian opposition throughout, apparently due to political jealousy. Some delay was caused, also, by the inability of the military command to provide necessary military support when asked for, though an earlier request might have received favorable action. But the principal cause for delay was the cumbersome method adopted for coordinating the naval effort of the Allies. A permanent council, similar to the Versailles Military Council, probably would have been able to insure prompter decisions and more timely coordinate action.

II. *The need for close cooperation between Navy and Army planning.*—Had the Navy planners been sufficiently informed continuously of the military situation in this case to know the probabilities of obtaining military assistance in the Adriatic, they would have been able to have adopted its naval plans accordingly. Similarly,

the Army would have been able to plan with greater facility with respect to new lines of supply in the Mediterranean, about which inquiries were made during the period under discussion. It appears important that Army and Navy planners should be located near enough together to permit ready conferences.

III. *The great importance of the planning function within a naval organization.*—As far as known, the American solutions of the Mediterranean problems, together with others, including their estimate of the general naval situation, are the only comprehensive estimates made by any allied naval staff. This is remarkable, particularly in view of the lateness of the entry of America into the war. The allied naval strategy was formulated almost invariably by men burdened with war administration, who concerned themselves chiefly with questions most pressing from an administrative point of view. Even after the British Admiralty instituted a Plans Division, the former method was continued and the Plans Division had little influence upon the broad aspects of the war.

In consequence, allied naval strategy in the main was the child of expediency. It lacked comprehensiveness, continuity, and oftentimes even soundness.

Forwarding comment by the Force Commander follows:

MEMORANDUM NO. 16.

2. In this connection please refer to my letter No. CS–13279, of April 5, 1918, with which was forwarded Allied Naval Council Paper No. 81 on this subject. Attention is also invited to my cablegram No. 6077, of April 5, which gives the latest information concerning this matter.

MEMORANDUM NO. 37.

1. There is inclosed herewith for the Department's information two copies of Planning Section Memorandum No. 37, which is an estimate of the general situation in the Mediterranean and having particular reference to certain possible and proposed mining operations in the eastern Mediterranean.

2. I concur in general in the conclusions reached and in the recommendations made. The matter will be brought up before the Allied Naval Council at its next meetings, about the 24th instant, but not in such a way as to commit the United States to the project unless it is approved by the Navy Department.

3. In case the Council accepts in principle the proposal to lay additional barrages in the eastern Mediterranean, a tentative decision will be reached as to the time and manner of laying the barrage, and as to the distribution of the various portions of the tasks among the several navies concerned, the final complete proposal will then be submitted to the Department for its action.

4. Particular attention is invited to the portions of the paper, pages 13 and following, which have been numbered in pencil. Of these items it seems that Nos. 1, 4, and 6 might best be left to some of the allied navies, while

the selection of the base and the actual operation of laying the mines might be undertaken by the United States.

5. It is requested that one copy of the inclosed memorandum be forwarded to the Bureau of Ordnance. It is to be noted that the matter of the Sicily-Cape Bon barrage, suggested in the Department's cable No. 6489, has been considered, but for various reasons is not considered the most desirable of those examined.

MEMORANDUM NO. 10 (30 JANUARY, 1918).

Subject: "*Cruiser-submarines.*"

No comment.

MEMORANDUM NO. 11 (13 FEBRUARY, 1918).

Subject: *Morale—Allied and Enemy.*"

This problem was set itself by the Planning Section at a time when the morale of the European allied civil populations appeared to be on the verge of some impairment.

The solution was circulated by the Force Commander among a large number of prominent British persons, including Lord Northcliffe. It was received very favorably and is believed to have been of utility in Great Britain.

It is understood that the paper proved of considerable value to the United States Bureau of Public Information, at Washington, D. C.

MEMORANDUM NO. 12 (15 FEBRUARY, 1918).

Subject: "*United States Naval Air Effort in European Waters.*"

This paper was initiated by the Planning Section.

In view of the comparative ignorance of the Planning Section of the technical side of aviation and its complete lack of aviation experience, this solution was intended only as a preliminary study of the subject and the decisions only as tentative.

Notwithstanding the objections made by the Commander United States Naval Aviation Forces in Europe to some of the decisions, the action of the Planning Section submitting the solution met with his enthusiastic approval. It resulted in his consulting the Planning Section frequently, when opportunity offered, and in the initiation of conferences between allied naval aviation representatives to determine the policies and principles which should govern their future joint action.

When demobilized the Planning Section was about to solve a problem to determine the policy that should govern the peace-time development of the Air Service for the Navy.

On 15 March the Force Commander forwarded this memorandum with the following comment:

1. I forward herewith copy of the comments of the Commander United States Naval Aviation Forces, Foreign Service, on the Memorandum No. 12 of the Planning Section of my staff regarding aircraft, together with notes (in brackets) made by the Planning Section on the comments of the Commander United States Naval Aviation Forces, Foreign Service.

2. The comments of the Commander United States Naval Aviation Forces, Foreign Service, are based upon a thorough study by his organization of all the questions raised by the Planning Section. Attention is invited to the close agreement of the Planning Section and the Commander United States Naval Aviation Forces, Foreign Service, on all the essential points of the air program.

MEMORANDUM NO. 13 (23 FEBRUARY, 1918).

Subject: "*K. Tubes.*"

Prepared at the suggestion of and in collaboration with Capt. R. H. Leigh, U. S. N., following a raid by the enemy against the Dover barrage patrol.

MEMORANDUM NO. 14 (25 FEBRUARY, 1918).

Subject: "*Denial of English Channel to Enemy Submarines.*"

Initiated by the Planning Section in accordance with Decision 8 of the estimate of the general naval situation.

MEMORANDUM NOS. 15 (4 MARCH, 1918) AND 28 (17 MAY, 1918).

Subject: "*Peace with Turkey.*"

Initiated by the Planning Section.

This paper received the warm concurrence of the British Plans Division.

Memorandum No. 15 was submitted to the Inter-Allied Naval Council (see papers No. 69, 88, and 129, Council files), which disagreed with the general conclusions of the Planning Section. Memorandum No. 28 was prepared for the Force Commander when the Council was considering recommending a declaration of war against Turkey and Bulgaria by the United States.

MEMORANDUM NO. 17 (12 MARCH, 1918).

Subject: "*Review of Mining Policy.*"

Initiated by the American Planning Section.

At the suggestion of the Force Commander, in order that he might better support our recommendations at the daily staff meeting at the Admiralty, it was proposed to the British Plans Division that this problem and future important problems be solved jointly by the two Sections.

The practice adopted was for each Section to reach a tentative solution independently and then to reconcile differences before preparation of a joint solution.

The principal recommendation in this paper—i. e., to concentrate mining effort upon the Northern and Dover barrages, excluding any other mining that would interfere with these projects—was not accepted. The very extensive mining operations in the Bight then in progress were continued, and considerable mining in the Kattegat was undertaken subsequently. The American Planning Section always believed these efforts to be unsound, and so stated repeatedly and emphatically. It was apparent that closing either the Bight or the Kattegat was of little value unless both could be closed, and it was impossible to close the Kattegat without violating the neutrality of two Scandinavian nations. Furthermore, the proximity of these mine fields to enemy bases rendered impossible the prevention of enemy sweeping operations.

Undoubtedly some inconvenience was caused the enemy by this auxiliary mining. He sustained some losses in both fields. There were periods when weather prevented sweeping and when the danger of the passage through the Bight led the enemy to use only the longer Kattegat route. Nevertheless, the auxiliary effort necessarily restricted the effort on the task of laying the Northern Barrage, which promised much greater results than could be obtained by mining in the Bight and Kattegat.

The British mining activities during the war emphasize the importance of—

(*a*) Formulating sound strategic policies and plans before undertaking operations.

(*b*) Concentration of effort.

Forwarding comment of the Force Commander on this paper has been quoted previously under the subject "Northern Mine Barrage."

MEMORANDUM NO. 18 (28 MARCH, 1918).

Subject: "*Antisubmarine Policy.*"

Initiated by the American Planning Section; solution submitted jointly by American and British Sections.

The principal points of difference between the preliminary independent solutions of the two sections were:

(*a*) British solution included proposed tactical plans in some detail for hunting with a large group of about 20 destroyers (suggested originally by American Planning Section), and for an elaborate patrol of trawlers, P-boats, etc., in the approaches to the Fair Island passage. We believed these proposals somewhat academic in form and concurred only in the general recommendation that opera-

tions of that nature be undertaken. The appendixes on these subjects were therefore omitted from the joint solution, though submitted to the Admiralty independently by British Plans Division. The patrol was subsequently instituted off Fair Isle, and, after several months' trial without any greater success than occasional contacts with enemy submarines, was abandoned.

(*b*) The British desired to divert at once large forces from convoying to hunting. The Americans desired to divert at first sufficient forces only to demonstrate the value of hunting, and if results warranted, then to increase hunting forces gradually at the expense of convoying. In reconciling differences this point was conceded to the British.

This paper caused much comment among British officials—principally unfavorable, on account of the recommendation that convoy escort forces be reduced.

The Force Commander took the view that any extensive reduction of convoy escorts was unwarranted and highly dangerous, and that hunting which depended principally on sight was futile.

Admiral Sir Lewis Bayly, Commander in Chief, Coast of Ireland, is reported to have said that to reduce the convoy escorts would be to " tamper with the safety of the Empire."

It is understood that the Commander in Chief, Grand Fleet, was in accord with the idea of giving him command of the antisubmarine measures at the northern exit to the North Sea, but was not willing to undertake such a task without an increase in the antisubmarine forces, particularly destroyers, assigned to him.

The written comment of the Deputy Chief of Naval Staff follows:

The analyses in Appendixes I and III are most instructive. Three points can be deduced from them, and in any discussion of submarine measures they should be taken into account:

(1) The effectiveness of the Dover patrol has increased enormously; this coombined with the intensive mining of the Bight has had the result of deterring submarines from attempting the Dover passage. More submarines proceed northabout, and urgency of offensive operations in the north is enhanced.

(2) The convoy system has had the effect of causing the vast majority of successful attacks to be made comparatively close to the coast.

(3) The above fact has rendered possible more concentration of antisubmarine force, and in areas more favorable for its operation. Consequently losses have diminished.

With the general policy advocated in this paper I am in agreement. The trend of the remarks on the function of the Grand Fleet appears to be somewhat academic. The state of preparation of the Grand Fleet must be in every respect the same if it is to engage the High Seas Fleet, whether it is to do so " at any time or anywhere in the North Sea," or only " if it threatens the barrage," since there is no more reason to expect warning if the High Seas Fleet comes out to operate in the south than if it comes out to operate in the north.

I do not agree with any reduction of convoy escorts, indeed, if it were possible, which it is not, without detriment to other service. I would increase them, in order that a margin of force might be available to attack a submarine which has attacked a convoy.

I do not agree with the statement in paragraph 5 that the primary function of the Harwich force is to support the Dover barrage. It is rather to interfere with any operations in the southern area of the North Sea which the enemy may attempt with light forces and to observe any movements of his heavy forces in the southern area.

Propose that the paper be taken to the Commander in Chief, for VA northern patrol, for his perusal.

S. R. F.

The written comment of the Assistant Chief of Naval Staff is quoted below:

I would suggest that Plans should supplement this interesting study with a thorough investigation of the antisubmarine policy at the moment. A study of the measures in force and in preparation, with the actual employment of the forces available and the reasons underlying their employment, would show that many of the proposals have been anticipated and either are in operation or in process of being put in operation when the necessary resources, provision for which we made many months ago, materialize.

The paper would have been more valuable had it been written in connection with the departments who from day to day study the varying aspects of the submarine situation and the most effective methods of dealing with it.

The forwarding comment of the Force Commander on 29 May follows:

2. This paper is forwarded as a matter of interest to the Department, although it does not meet with my entire approval. Few of the recommendations have been put into effect.

3. Viewing the paper broadly, it proposes three radical changes from the present practice, viz:

(*a*) A change in the mission and functions of the British Grand Fleet.

(*b*) A reduction of danger zone escorts by 30 per cent.

(*c*) A reduction in coastal patrol by 50 per cent.

4. It would, perhaps, be nearer the mark to state instead of (*a*), above, that the proposal is to effect a change in the Commander in Chief's conception of his own mission and to cause him to feel the same responsibility for closing to submarines the northern exits from the North Sea as is felt by the vice admiral at Dover to close the Dover Straits.

5. It is, of course, not proposed that the capital ships of the Grand Fleet shall engage in antisubmarine warfare. The destroyers and other vessels of similar types now attached to the Grand Fleet and needed for screening purposes would, of course, be very useful in assisting to close the northern exits from the North Sea and in an antisubmarine offensive. Their allocation to this sort of employment would necessitate putting the battleships into one or two harbors on about 20 hours' notice for sea instead of 4 hours as at present. The result of such action might conceivably be a very serious raid on the east coast of England by the enemy's High Seas Fleet, of which the political if not the military results would be most harmful to the allied cause.

6. It is difficult to say just what the size of an escort should be for a convoy of a given size, and it may be that it is the presence of escorting vessels rather

than their number that deters the submarine from attacking. We have no assurance of this, however, and must assume the contrary. It is, therefore, not wise at present to reduce the strength of escorts.

7. The coastal patrols might perhaps be reduced without loss of efficiency if a vigorous offensive were directed against submarines in other areas, but unfortunately vessels of the class engaged in this patrol work are the least efficient for offensive operations, having low speed and offensive power.

8. The laying of the mine barrage across the North Sea will begin very soon, but, owing to defective functioning of the British mines, the deep mining of the section of the barrage nearest the Scottish coast can not be undertaken at once, so that the only means for preventing the passage of submarines across that area will be the establishment of a patrol. Whether or not this can bring the decisive results contemplated by Paragraph II of the inclosed paper is questionable. Certainly no extensive reduction in the protection now given to shipping could be considered, unless we could be assured that both the Dover Strait and the northern exit from the North Sea were closed with a reasonable degree of tightness against the passage of submarines.

9. With respect to the suggestions in Paragraph 23: I am quite in agreement that the present division of command about the British Isles is not a satisfactory one, nor one that is conducive to the highest efficiency, but this is, of course, a matter so intensely domestic in its nature that the Admiralty could not be approached on the subject in any official way. I believe the Admiralty itself is not satisfied with the division of command in the Channel, and it is probable that some change will be made in the near future.

10. A considerable amount of effort has recently been devoted to an attempt to prevent the passage of submarines through the Fair Island Passage, or to operate offensively against any that may use that passage. There have been some encounters with submarines in that locality without definite results, and it is supposed that recently the German submarines have been acting under orders to avoid that passage by going north of the Shetland Islands.

(Sgd.) WM. S. SIMS.

MEMORANDUM NO. 19 (26 MARCH, 1918).

Subject: "*Reorganization United States Naval Forces in European Waters.*"

This problem was assigned the Planning Section by the American Chief of Staff in view of the expected large increase in the United States forces in European waters.

MEMORANDA NOS. 20 (3 APRIL, 1918) AND 20A (15 APRIL).

Subject: "*Doctrine of antisubmarine attack.*"

Initiated by the American Planning Section with a view to emphasizing principles brought out in previous papers as well as indoctrinating the antisubmarine forces. The need for further special treatment of this subject would not have been apparent to the Planning Section but for the routine practice of scrutinizing operational reports. The incident points to the necessity of a Planning Section

keeping in close touch with operations. The forwarding comment of the Force Commander on 29 May follows:

2. Memorandum No. 20 was prepared by the Planning Section of my staff after having read a report by an escorting vessel in which it was made plain that the escorting vessel considered that it was unnecessary to insure that it could not attack the convoy. Memorandum No. 20a is a joint memorandum by the Planning Section of my staff and the Plans Division of the Admiralty on the same subject.

3. The broad idea expressed in both memoranda is that on every occasion of contact with an enemy submarine it should be pursued to destruction if possible, since the enemy's submarine campaign can not be defeated by merely defending shipping.

4. The problems and situations presented by the naval warfare that is now being carried on are new to naval experinece, but a doctrine is being gradually evolved, and it is important that the basis of this doctrine should be the offense rather than the defense.

5. The "guilding principles and general instructions," as appearing on pages 3 and 4 of Memorandum No. 20a, are, in general, approval, and will doubtless appear in the final doctrine evolved from current experience. With particular reference to Item VI it may be said that the protection of the convoy may often be best accomplished by a vigorous attack on the threatening enemy. With this fact in mind it is apparent that the initiation of an attack on the submarine is not in fact a subordination of the protective mission to the offensive mission. It is furthermore the fact that certain limited areas, such as the North Channel leading to the Irish Sea, submarines do not operate in pairs or groups, but practically always singly, so that there is little danger of the convoy being attacked by any submarine other than the one that is being hunted.

MEMORANDUM NO. 21 (MAY, 1918).

(Not printed herein.)

MEMORANDA NOS. 22 (10 APRIL), 30 (24 MAY), 39 (27 JUNE), 42A (5 AUGUST), AND 47 (3 SEPTEMBER, 1918).

Subject: "*Visits made by Members of the Planning Section to Various Forces.*"

These visits were planned in order to keep the section in touch with the practical aspects of operations and thus to prevent its viewpoint from becoming academic. The visits were very valuable in this respect, and served also to stimulate the imaginations and refresh the minds of the members of the Section.

Several visits, including one to Queenstown, were made which were not reported on by memoranda.

The forwarding comment of the Force Commander follows:

MEMORANDUM NO. 22.

1. There is forwarded herewith inclosed a copy of Planning Section Memorandum No. 22 concerning a visit to Dover made by the officers of the Planning Section of my staff in April, 1918.

2. The matter of a design of a mine which shall rise and fall with the tide, maintaining a fixed position relative to the surface of the water, has been taken up by Lieutenant Commander Thomson, of my staff, for reference to the Bureau of Ordnance. A copy of this memorandum is also being furnished to the Bureau of Ordnance.

3. The visit to Dover was made before the brilliant operation against Zeebrugge and Ostend, which was executed under the direct supervision of Vice Admiral Keyes, and for which he has been knighted.

4. I concur in the opinion expressed by the Planning Section that Vice Admiral Keyes is a man of high attainments and character and will probably rise to high command in the British Navy.

MEMORANDUM NO. 30.

1. With reference to the third paragraph on page 2 of the inclosed report: It is expected that when the necessity for extreme secrecy no longer exists copies of these battle orders may be procured. At present the Force Commander dems it inadvisable to ask for copies of them.

2. The cordial relations between our officers and men and those of the British Fleet, as referred to on page 3, have been reported to the Force Commander from numerous sources, and it is a source of great gratification that such good relations exist. The Force Commander has heard nothing but praise of our battleships and their officers and crews.

3. With respect to the bases at Inverness and Invergordon, referred to on page 5: The Force Commander has personally inspected these bases and finds them exceedingly well organized and operating with a high degree of efficiency. The credit for organizing them on so excellent a basis is due to Capt. C. G. Murfin, U. S. Navy, who had charge of their construction and arrangements.

MEMORANDUM NO. 47.

2. With respect to the points emphasized by Rear Admiral Rodman: The 12-inch gun ships of Battleship Division Nine could not be replaced by 14-inch gun ships without adding to the number of oil burning vessels in the Grand Fleet, which has hitherto been considered undesirable and is still so considered. Admiral Rodman's second recommendation has already been forwarded to the Department with my approval.

3. The laying of the mine barrage is now proceeding satisfactorily and it is thought that the cause of the large number of premature explosions of mines has been ascertained and eliminated. At present the intention is to conduct the next mine-laying operation in Area B, laying six rows of surface mines at 43′ depth entirely across the area, the British at the same time laying a single row of mines at 6′ depth. More details regarding these mine-laying operations are contained in other correspondence.

4. It is probably entirely practicable, as stated by Captain Yarnell, for vessels of the chaser class to operate in the region of the barrage during the summer months, so far as weather and sea conditions are concerned, but the fact that the distance across the area to the coast of Norway is about 300 miles, reduces the availability of these vessels of comparatively short radius, since they must always return to the base and can not take shelter or replenish supplies on the eastern side of the area.

5. It is requested that one copy of the inclosed memorandum be forwarded to the Bureau of Ordnance.

102315°—23——33

MEMORANDUM NO. 23 (23 APRIL, 1918).

Subject: "*Military Uniforms.*"

No comment.

MEMORANDUM NO. 24 (2 MAY, 1918).

Subject: "*Tenders.*"

The Force Commander's forwarding comment on 1 June follows:

1. The reasons given on page 3 of the inclosed memorandum are sound, and I believe the conclusion to be also sound, although it is not certain that a tender could take care of only 24 of the Ford destroyers.

2. With respect to reason (*c*): I may add that the English laboring man not only strikes at pleasure but takes all of the usual holidays, and is not infrequently incapacitated for work on the day following the holiday, so that it is extremely difficult to secure the performance of emergency work.

3. The *Dixie* and *Melville*, now at Queenstown, are fully occupied in caring for the destroyers and submarines based on that port. The number of destroyers based on Queenstown may not increase materially, but it is probable that some of the chasers will be based there and it may be found necesssary to station an additional tender at that port. In case this necessity arises the *Buffalo* will probably be sent there. The *Panther*, now at Brest, is very much needed at the Azores, and it is my intention to send her there as soon as the *Bridgeport* arrives to relieve her at Brest.

4. The *Prometheus* and the *Bridgeport* together should be able to take care of all repair work at Brest for the remainder of the current year. When the number of destroyers operating on the French coast is considerably augmented, an additional repair ship will probably be found necessary.

5. There is already need for additional repair facilities at Gibraltar, but it is hoped the Department will provide these on shore, making the detail of a repair ship unnecessary.

6. The *Leonidas* and *Hannibal* will serve as parent and repair ships for some submarine chasers, the *Leonidas* taking care of 36 at Corfu and the *Hannibal* taking care of 36 in British waters. Shore facilities will be provided at Plymouth for another group of 36. No decision has been reached yet regarding the last group of 36 to arrive.

7. It is recommended that provision be made for the additional destroyer tenders, 12 in number, in accordance with the memorandum inclosed.

MEMORANDUM NO. 25 (8 MAY, 1918).

Subject: "*Convoy Orders.*"

The necessity for this memorandum became apparent after discussing the subject with several commanding officers of ocean escort vessels and examining the form of orders then in use.

In forwarding this memorandum to the Department on 10 June, the Force Commander made the following comment:

1. There is forwarded herewith for the information of the Department one copy of Planning Section Memorandum No. 25 on the subject of "Convoy orders."

2. It will be noted that the proposed form for convoy orders is based on the standard campaign order form recommended for adoption by the Department.

3. It is proposed to adopt this form for issuing convoy orders whenever such orders are issued by United States naval authorities in Europe.

4. The proposed form of order has been brought to the attention of the Admiralty.

MEMORANDA NOS. 26 (17 MAY), 26A (UNDATED), 44 (6 AUGUST), 46 (10 AUGUST), 50 (SEPTEMBER, 1918), 51 (26 SEPTEMBER, 1918).

Subject: "*Battle Cruiser Raid.*"

Problem 13 (Memorandum 26) was initiated by the Planning Section after decision was reached to accelerate greatly the transport of American troops to Europe. It was submitted 17 May, 1918. We knew that consideration had been given sometime previously by the British to this question, but we were not satisfied that their plans, which contemplated no effort to search for or to attack the raider except during her exit to or return from the open Atlantic, were the best that would be devised.

During the preparation of Memorandum 26 the Operations Section of the Force Commander's Staff was freely consulted and it concurred in decisions reached.

The essential difference between the British and American views become apparent when Memorandum 26 and the Admiralty Plans Division remarks upon it, together with British Plans Division Paper P. D. 080 (appended to Memorandum 26), are compared. We believed the British aversion to scouting for the battle cruiser to be due partly to their lack of familiarity with and practice in scentific methods of scouting. A copy of Commander Pye's confidential book on Information and Security had been presented previously to the British Admiralty and comment by British officers indicated possibly that these subjects had not been well developed in their service.

Memorandum 46 was prepared immediately upon receipt of Navy Department telegram Simben of 31 July, 1918 (quoted in Memorandum No. 50).

The Department plan was deemed unsatisfactory by the Planning Section and the Force Commander, as set forth in dispatch of 3 August, as follows:

Urgent. Simben 21. Your Simben 8. I believe it extremely dangerous to base on assumption that information of enemy's escape will be obtained otherwise than through news of an attack. There is certainly a small chance that this information will be available, and in long nights of winter chances will be very much against this early information. I believe safety requires plan should be based on assumption that one or more battle cruisers will be at large in Atlantic with ample fuel supply and in a position to attack convoys before we have any knowledge of their exit from home ports. Only

possible protection against this danger is battleship escort of convoys inaugurated before the danger arises. This would subject the battleships to a relatively small risk of being torpedoed as compared with the great risk of one or more convoys of many thousand troops being destroyed before measures could be taken to protect them. I have consistently advocated this plan and am convinced that no other can offer the same certainty of protection to troop and other convoys. The following comments are submitted on the Department's plan, as set forth in its cablegram: Assembly of large numbers of merchant ships at Azores dangerous, because of possible submarine attack and extraordinary marine risks due to assembly so many vessels. Think general principle of action should be to keep all convoys moving toward destination. To turn back shipping or to deflect it toward other than terminal ports would make antisubmarine escort impossible in many cases and would introduce refueling difficulties that would tie up many vessels until fuel could be sent to them.

Battleships based on Irish port as proposed would be available to escort to safe positions such troop convoys as might be in danger area when alarm was given, and this is deemed a safer plan than to have such convoys proceed to destination unescorted or to have them proceed to Azores. If Department should decide to adhere to its plan of having battleships go to the Azores to furnish escort to shipping assembled there, it is suggested that the Tagus River would be a better base than an Irish port, being 300 miles nearer the Azores. When Department has decided on general principle of plan, I will take up whole question with British Admiralty. The final plan must be a joint plan, taking cognizance of all allied shipping..

To this the Department replied:

Simben II. Your 21. Our 8. The details of the plan drawn by the Department were laid down to accord in general with the decision of your Planning Section as revised by the Admiralty Planning Department. As to your first point, viz, that safety requires plan should be based on assumption that one or more battle cruisers will be at large in Atlantic with ample fuel supply and in position to attack convoy before we have any knowledge of their exit from home port, this statement seems to be in contradiction to statement in P. D. 080, paragraph 5, and opposed to the actual information which you have from time to time furnished us. It is, however, so important a point that a direct statement should be had ——— the Admiralty as to their ability to provide the necessary information. You will notice in our plan that it is Department's intention to furnish old battleship escort to number of two for each important convoy when necessity arises, but there have been many reasons why we did not wish to do this in advance of the necessity, one being that we did not desire to give advance information to the enemy as to one of the most important elements in the plan and thus give him the opportunity to plan an answer. In this matter also you should get a direct statement from the Admiralty as to the advisability of our using our predreadnoughts for escort and when the operation in their opinion should go into effect. With regard to the rest of our plan and your comment on same: Even when battleship escort is provided, this, in itself, on account of its fixed character, is still only a partial answer and can be countered by the enemy by an increase in power of his raiding force. It therefore becomes necessary to provide for further contingencies, and this the plan submitted attempts to do. It differs only from the decision of your Planning Section in introducing the scheme of premeditated diversion. In general, on account of the few dreadnoughts available, their slower speed than that of battle cruisers,

the number of convoys to be protected, and the great area over ——— these convoys operated, it seemed first necessary to divert according to a plan which might at same time get our dreadnoughts in touch with battle cruisers and afford greatest protection with minimum number of convoy ships. Second, nothing in the above prevents Department from immediately proceeding on the plan of evasion by warnings, either before or after the premeditated plan is operative, and, lastly, as a final resort it is always in the province of the escort commander to scatter his convoy. Therefore, the Department still adheres to its predetermined plan, introducing the element of evasion by warnings, and, lastly, proposes that the movement to scatter be left in escort commander's hands as last resort. The Department prefers to base Division 6 at Berehaven and does not consider the Tagus a good position from many points of view. U. S. S. *Oklahoma* and U. S. S. *Nevada* will sail in a few days. The plan above outlined will apply to our troop convoys to France and to the direct cargo convoys to French bay ports. It is desired that this plan be taken up immediately with Admiralty to get their concurrence as to HX and HC convoys carrying our troops, or for such modification of the plan as they suggest. 18006. Simben II.

BENSON.

N. B.—Two words evidently omitted in coding, as blank spaces indicate.

Meantime, since the receipt of the first departmental telegram (Simben 8), the two Planning Sections had been at work upon a joint solution of the problem, upon the basis of maintaining a force of United States battleships in Irish waters, which before had been deemed unacceptable to the United States Navy Department. It was the intention to produce a paper at once acceptable to both Planning Sections, to the Admiralty, and the Navy Department. The British Director of Mercantile Marine and the Operations Section of the Force Commander's Staff collaborated in the solution.

After a tentative solution had been practically completed, a false report was received of the sighting at night in the North Sea of one or more large vessels proceeding at high speed outward. This information was transmitted to the Navy Department, which then sent its telegram No. 724 of 31 August announcing that a system of battleship escort would be inaugurated on 9 September. The joint plan was then modified on the basis of continuous battleship escort for important convoys—a system previously assumed unacceptable to the Navy Department.

A telegraphic summary of the joint plan was forwarded to the Navy Department and its telegraphic approval was received by the Force Commander on 21 September, 1918, Memorandum 26 having been submitted 17 May, 1918.

The history of this incident illustrates the difficulties of cooperation during war between Allies—more especially when far apart.

The following forwarding comment was made by the Force Commander:

MEMORANDA NOS. 26 AND 26A.

1. The inclosed Memorandum No. 26, from the Planning Section of my staff, has as an Appendix comment by the Plans Division of the British Admiralty, and also a statement of the measures proposed by the Admiralty Plans Division to be taken if enemy battle cruisers enter the Atlantic. These proposed measures have not been approved by the Admiralty, as it is not their custom to reject or adopt the recommendations of the Plans Division in advance of any necessity for action.

2. I regard the estimate of the situation made by the Planning Section of my staff, and the decisions reached, as sound, and believe that battle cruisers should be made available for the purpose of searching for enemy battle cruisers in case they enter the Atlantic. I am informed that Great Britain has made the strongest possible effort to induce Japan to send her battle cruisers to the war zone, but without success. It is possible that the United States Government might be more successful, and it is suggested that an effort be made to persuade Japan to this end.

3. It would be extremely undesirable, in my opinion, to adopt the passive waiting attitude expressed in paragraph 1 of the "Proposed measures," etc.

4. The Department's attention is particularly invited to paragraphs 5 and 6 of the "Proposed measures," etc. It is recommended that plans be prepared for providing battleship escorts, in case of necessity, and that a certain number of merchant vessels now building in the United States be equipped with high-power radio.

MEMORANDUM NO. 44.

1. There is forwarded herewith inclosed for the information of the Navy Department copy of Memorandum No. 44, prepared by the Planning Section of my staff on the subject of enemy raiders.

2. I propose to address a letter, in the sense outlined in this memorandum, to the British Admiralty, and to include therein the additions mentioned in paragraph 2 of my indorsement, approving this memorandum.

3. Upon receipt of a reply from the Admiralty, the contents thereof will be communicated immediately to the Navy Department.

4. An extra copy is inclosed for transmission to the Bureau of Ordnance.

MEMORANDA NOS. 46, 50, 51.

2. Memorandum No. 46 was prepared as a study of the means for immediately putting into execution the plan outlined in Department's cablegram Simben No. 8 of July 30, 1918. As no occasion ever arose to act on this plan the memorandum is forwarded merely as a matter of interest to the Department.

3. Memorandum No. 50 is also based on cablegram Simben No. 8 and also on cablegrams Nos. 724 and 857 and sets forth the instructions which were prepared and issued to transports, United States men-of-war, and escorts ships and to American merchant vessels. Since the adoption of the joint plan set forth in Memorandum No. 51, steps have been taken to cancel the instructions contained in Memorandum No. 50.

4. Memorandum No. 51 is a joint paper by the Admiralty Plans Division and the Planning Section of my staff, covering a plan for dealing with convoys during a battle cruiser raid in the Atlantic. This is the plan of which the substance was cabled to the Department in cablegram No. 4523 and which was finally approved in Department's cablegram No. 1869.

MEMORANDUM NO. 27 (16 MAY, 1918).

Subject: "*Redistribution of Naval Forces in the Mediterranean.*

This memorandum was submitted with reference to a suggestion that American battleships be sent to the Mediterranean in order to assist in meeting the situation brought about by Germany taking ex-Russian battleships in the Black Sea.

MEMORANDA NOS. 29 (25 MAY), 32 (30 MAY), AND 34 (7 JUNE, 1918).

Subject: "*Submarine Chasers.*"

These memoranda were prepared in anticipation of the arrival of large reinforcements of chasers to European waters.

The Planning Section felt that the chasers offered the most promising means for tactical offensive operations against enemy submarines, and that if this means could be favorably developed that a solution to the submarine menace would be approached.

We combated constantly the British desire to split up the United States chasers into small detachments for use under British command in a manner similar to the employment of their small motor craft in patrol work within small coastal districts.

We believed that the proper evolution and success of the chaser effort required the organization of these craft into large units, to operate offensively only, and under American command, with freedom to proceed within the limits of their radius to the reported positions of submarines, irrespective of the small geographical division which fixed the limits of the numerous British coastal commands.

Forwarding comment by the Force Commander follows:

MEMORANDUM NO. 29.

1. Thus far decision has been reached to base 36 chasers at Corfu, Greece, Base 25, and 36 at Plymouth, England, Base 27. It is probable that the third group of 36 chasers will be based at Queenstown, Ireland, leaving the question of basing the fourth group of 36 open for decision.

2. The area at the north of Ireland, including the North Channel, is one in which there are at nearly all times one or two submarines operating, and it is quite possible that it may be found that our fourth group of submarine chasers operate in that area instead of operating from Brest. The approaches to Brest and to the English Channel will be fairly well covered by the 72 boats based on Plymouth and Queenstown, but it may be found desirable to cover the Bay of Biscay with the fourth group instead of sending it to the north of Ireland. The Bay of Biscay is not a favorite place for submarines to operate, so that for the present it does not seem advisable to decide to assign 36 chasers to that locality.

MEMORANDUM NO. 32.

1. There is forwarded herewith for information Planning Section Memorandum No. 32, containing certain recommendations regarding the submarine chaser base at Plymouth.

2. The recommendations have been approved and are being placed in effect.

MEMORANDUM NO. 34.

1. The inclosed memorandum by the Planning Section was prepared by direction of the Force Commander as a reply to certain proposals made by the British Admiralty as to the allocation of submarine chasers and their arrival in these waters. The Admiralty suggestions were contained in Allied Naval Council Paper No. 146a, and the essential portions of this memorandum were embodied in Allied Naval Council Paper No. 150. Copies of both of these papers have already been furnished to the department.

MEMORANDUM NO. 33 (3 JUNE, 1918).

Subject: "*Defense of Air Stations.*"

No comment.

MEMORANDUM NO. 36 (12 JUNE, 1918).

Subject: "*Depth-Charge Equipment of Chasers.*"

The forwarding comment of the Force Commander on 17 June follows:

2. The recommendations of the Planning Section, as summarized on the second page, have been approved, and will be placed in effect as rapidly as possible for the submarine chasers now in service in European waters.

3. It is recommended that similar action be taken respecting those submarine chasers not yet dispatched to European waters and those intended for service in home waters.

MEMORANDUM NO. 38 (13 JUNE, 1918).

Subject: "*Occasional Use of Grand Fleet Destroyers on the Northern Patrol.*"

This memorandum was initiated by the British Plans Division. We were in such accord with the proposals made therein as to be very glad of the opportunity to join in them.

Forwarding comment by Force Commander on 13 July follows:

2. No action has been taken by me on this paper, as it seems to be a matter affecting the British Admiralty principally. I am quite in accord with the opinions expressed in the paper to the effect that there may, and doubtless will be, occasions when it will be safe to reduce very considerably the number of light craft serving with the Grand Fleet, and that vessels thus relieved might advantageously be used in antisubmarine work.

3. The preservation without serious reduction in strength of the British Grand Fleet is so important to the allied cause, and the necessity for protecting troop and store ships, and in fact all cargo-carrying vessels, is so great that much as it may be desired to undertake offensive operations, this can not be done on a large and permanent scale until many additional vessels are available for service.

MEMORANDUM NO. 40 (10 JULY, 1918).

Subject: "*High Sea Fleet Activity.*"

Initiated by the Planning Section with the object of deducing the naval measures likely to be taken by the enemy in support of his land operations and civilian morale.

The forwarding comment of the Force Commander on 23 July follows:

1. There is forwarded herewith for the information of the Department one copy of Planning Section Memorandum No. 40, which is a solution of Problem No. 14, and is an estimate of the situation from the German point of view.

2. This memorandum contains a study of considerable interest and is forwarded to the Department for that reason and not with any expectation that the Department will take any action.

3. A copy has been transmitted unofficially to the Chief of the Naval Staff of the British Admiralty.

MEMORANDUM NO. 41 (13 JULY, 1918).

Subject: "*Antisubmarine Tactics.*"

This problem was undertaken by the Planning Section because we felt that antisubmarine methods and means then employed were not sufficiently effective to meet the menace against allied sea communications. The recent enemy successes on land appeared to render important a consideration of the subject. Believing that the best solution of the submarine problem was tactical, we endeavored to deduce the best tactical methods for combating submarines.

This memorandum was mimeographed and distributed to United States vessels in the war zone.

MEMORANDUM NO. 45 (10 AUGUST, 1918).

Subject: "*Organization of a Plans Division for the Navy Department.*"

No comment.

The Force Commander indorsed this paper as follows:

Approved. The organization proposed by the Plans Division of the British Admiralty, while possibly well suited to the organization of the Admiralty, is not thought to be as suitable for a Planning Section in the Navy Department as is the plan proposed by the Planning Section of this staff.

MEMORANDUM NO. 48 (22 AUGUST, 1918).

Subject: "*Military and Naval Raid on the East Coast of England.*"

Undertaken by the Planning Section with a view to determining the likelihood of a German raid and its influence upon the naval situation.

In forwarding the memorandum on 7 September the Force Commander made the following comment:

2. This subject is one that does not closely concern us, as none of our forces would be likely to be involved in any defensive action that might be taken against such a raid. The study was suggested, however, by the frequent receipt of intelligence information to the effect that preparations were being made in the German arsenals and dockyards for some naval movement on a large scale, the activities including the rearming of vessels which had been disarmed for some time and the apparent preparation for commissioning nearly everything in German harbors that would float. While this information was always of very doubtful reliability, it seemed worth while to make a study as to the possibilities of a raid on the English coast.

3. The Planning Section, in collecting information upon which to base this study, found that the British military authorities have made very comprehensive and complete preparation to meet a possible attempt on the part of Germany to land a force on the English coast. The Admiralty has not made any such preparations, but has, of course, considered the possibility of such a raid in deciding on the distribution of the British naval forces, and it may be said that the British Admiralty and Navy would welcome such an attempt on the part of Germany as giving them the long sought opportunity for a major action against the German Fleet.

MEMORANDUM NO. 49 (30 AUGUST, 1918).

Subject: "*Submarine Situation in General, Antisubmarine measures, and the Manner in Which American Shipyards Could Assist British Construction of Antisubmarine Vessels.*"

In forwarding the paper the Force Commander made the following comment:

2. The circumstances attending the preparation of this memorandum are fully set forth in the memorandum prefixed to it. The Force Commander did not participate in any conferences between the First Lord of the Admiralty and Assistant Secretary Roosevelt, but was present at a conference of Admiralty officials presided over by the First Lord.

3. The statements made in the Planning Section memorandum are believed to be correct and, in general, accurate, and it is thought it will be useful for the Department to have these statements in its possession in view of the prospective visit to the United States of the First Lord of the Admiralty with other Admiralty officials.

4. With respect to paragraph 5 of the memorandum: It is to be remembered that as the number of vessels in the ocean trade increases, either more or larger convoys must be run. In the first case probability of a submarine finding a convoy is increased, while in the second case the protection of the convoy offered by the escort is decreased, unless the number of escorting vessels is largely increased. It is true, therefore, that there is a limit of protection which a practicable covoy escort system is able to afford. It is perhaps too much to say that we have now reached even approximately that limit of protection.

5. Attention is invited to the fact that the last six pages of this memorandum are devoted to the memorandum prepared by the Plans Division of the Admiralty.

MEMORANDUM NO. 52 (15 SEPTEMBER, 1918).

Subject: "*Offensive and Defensive Alliance with Bulgaria.*"

Informal intercourse with the British Plans Division developed the fact (about 1 August) that they were again impressed with the desirability and practicability of concluding a separate peace with Turkey, and that they proposed making a fresh study of the subject.

It was expected that the question would soon come up for discussion by the British War Cabinet, and the Plans Division desired to have ready an appreciation of the question, from the naval point of view, for possible consideration by the War Cabinet.

We suggested the wisdom of broadening the problem to include Bulgaria as well as Turkey. The British suggested that the estimate would carry greater weight if it be submitted as a joint paper, and a solution was therefore undertaken jointly. Owing to their superior facilities for obtaining information, British officers collected practically all of the data contained in the Appendixes.

After the problem had been solved and the conclusions reached, we deemed it advisable for the reasons stated in the "Foreword" not to participate in formally submitting the paper. But in order to accomplish the objects sought in originally deciding upon a joint paper, the "Foreword" was prefixed.

Through a misunderstanding the British Plans Division omitted the "Foreword" in submitting the appreciation formally to the Admiralty.

The paper was timely, and was the only study prepared on the subject in advance of the Balkan crisis, which occurred a few weeks after its completion.

It is understood, however, that owing to a mistake in routing in the Admiralty, the paper was not brought to the attention of higher officials in time to be of use to them during the Balkan crisis.

MEMORANDUM NO. 53 (23 SEPTEMBER, 1918).

Subject: "*Mine Base for Operations in Mediterranean.*"

Initiated by the Planning Section after it had become known that the commander, mine force, had tentatively decided upon Corfu or some other tactically suitable place nearer than Bizerta to the proposed barrages. He was ultimately convinced of the superiority of Bizerta, when considered from all aspects. The incident illustrates the importance of coordinating strategic and tactical examination of such matters, and of the value of a Planning Section.

MEMORANDUM NO. 54 (23 SEPTEMBER, 1918).

Subject: "*Increasing the Probability of Torpedo Hits.*"

No comment.

MEMORANDUM NO. 55 (23 SEPTEMBER, 1918).

Subject: "*Kite Balloons in Escort.*"

Undertaken by the Planning Section after the Commander, United States Naval Forces in France, had orally requested an opinion from a member of the Section on the subject.

MEMORANDUM NO. 56 (26 SEPTEMBER, 1918).

Subject: "*British Admiralty Plans Division Paper on Scandinavian Trade.*"

Comment on 3 October by the Force Commander follows:

1. There is forwarded herewith inclosed for the information of the Department one copy of Planning Section Memorandum No. 56, which is a copy of a paper prepared by the Plans Division of the British Admiralty on the subject of Scandinavian trade in its relation to the allied interests and probable effect on those interests of Germany retaliating on the Scandinavian trade for the mining of Norwegian territorial waters.

2. The Department is aware that within the past few days Norway has made public announcement of mining certain territorial waters against the passage of belligerent submarines. Since Norway has taken this action of her own volition, it does not seem probable that Germany will attempt to retaliate by declaring unlimited submarine warfare or cruiser warfare against neutral vessels in Scandinavian waters.

MEMORANDUM NO. 57 (19 OCTORER, 1918).

Subject: "*Antisubmarine Hunting in Bay of Biscay.*"

The Planning Section had noted the enemy concentration of submarines west of Brest, and, acting upon its recommendation, the Force Commander dispatched a force of American destroyers and chasers from Plymouth on 30 and 31 August to operate against the enemy. This independent action led to such vigorous protest by the British admiral commanding the naval district in which Plymouth is located as to induce the Force Commander to agree not to repeat similar independent operations. The incident demonstrated the unsuitability of chasers for operations so far at sea at that season of the year. However, it served to emphasize the importance of offensive action against the enemy concentration, and apparently to induce the British decision to send submarines on that mission.

The incident illustrates the importance of a Planning Section keeping in close touch with current events during war.

In forwarding the memorandum the Force Commander on 19 October commented as follows:

1. There is forwarded herewith for the Department's information one copy of Planning Section Memorandum No. 57, which is a joint memorandum by the Plans Division of the Admiralty and the Planning Section of my staff, con-

cerning a plan for hunting enemy submarines in the so-called concentration area west of Brest, France.

2. Should the concentration of submarines in that area again become marked, steps will be taken to carry out the plan proposed in this paper.

MEMORANDUM NO. 58 (19 OCTOBER, 1918).

Subject: "*Naval Use of Long-Range Guns.*"

No comment.

MEMORANDUM NO. 59 (24 OCTOBER, 1918).

Subject: "*Armistice Terms.*"

Initiated by the Planning Section, Chief of Staff participating, with a view to assisting the Force Commander at a meeting of the Inter-Allied Naval Council, then about to be held, to consider the naval terms of the proposed armistice.

The Force Commander forwarded this memorandum to the Navy Department on 25 October with the following comment:

1. There is inclosed herewith for the information of the Department a memorandum prepared by the Planning Section of my staff on the subject of naval terms which should be included among the terms of any armistice which may be concluded with the Central Powers.

2. My cable 6573 retransmitted to the Department two cable messages received from Capt. R. H. Jackson, Paris, setting forth the fact that there had been a meeting of prime ministers and naval and military representatives of some of the allied countries at Versailles on October 8 and stating the naval terms which had been agreed upon by the naval representatives present but which had not been concurred in by the United States Navy representative, owing to lack of authority.

3. My cable No. 6574 commented on the proposed armistice terms and made certain suggestions for adding to or modifying those terms.

4. The Department's cable No. 2836 stated that the President did not wish to issue any instructions to the naval representatives in Paris with regard to concurring in the proposed terms of the armistice.

5. It is probable that a complete statement of the terms proposed by the military and naval representatives is in the possession of the Department, as it was cabled to Washington by General Bliss.

6. The Department's cable No. 3154 directed me to submit recommendations as to terms preliminary to peace discussion, terms of peace, and our attitude and action subsequent to the conclusion of peace, in order to secure a reasonably long peace. To this I replied in cable No. 7186, stating that the terms of an armistice already forwarded, with certain additions and modifications, were recommended as being the desirable terms to an armistice preliminary to a peace discussion.

7. My cablegram No. 7955 set forth 15 proposals for an armistice, which represented the final conclusions after considering all of the terms proposed by—

(*a*) The Paris conference.
(*b*) The British Admiralty in two letters addressed to me under date of October 17 and October 19.
(*c*) My cable No. 6574.
(*d*) My cable No. 7186.

8. The inclosed memorandum of the Planning Section contains an analysis and discussion of all of these proposals, and the 16 numbered paragraphs contain the 15 proposals embodied in my cable No. 7955. It will be noted that No. 14 of the memorandum contains no final proposal by me, so that No. 14 of the cablegram is No. 15 of the memorandum.

9. A copy of this memorandum and my cable No. 7955 has been mailed to Admiral Benson in Paris.

UNNUMBERED MEMORANDUM (OCTOBER, 1918).

Subject: "*Surrender of German Fleet as an Article of the Armistice Terms.*"

No comment.

MEMORANDUM NO. 60 (12 OCTOBER, 1918).

Subject: "*German and Austrian Submarine Campaign.*"

Prepared by direction of the Force Commander, who forwarded it with the following comment on 8 November:

1. There is inclosed herewith for the information of the Department a memorandum prepared by the Planning Section of my staff on the subject of the German and Austrian submarine campaign. This is an estimate of the situation from the German point of view as to the submarine campaign, and was made early in October before the defection of Austria and before it became evident that Germany was nearing the end of her power.

MEMORANDUM NO. 61 (4 NOVEMBER, 1918).

Subject: "*Demobilization Plan.*"

Prepared by direction of Admiral W. S. Benson, at Paris, where the Planning Section had gone to assist the Force Commander at the meeting of the Inter-Allied Naval Council.

Forwarded by the Force Commander with the following comment:

2. It will be noted in the statement following page 5 that the original paper was prepared by the Planning Section in Paris for Admiral Benson. The paper was then forwarded to London, where a conference of the Force Commander's staff was held and certain modifications were suggested. These modifications were later approved by Admiral Benson, so that the second portion of this memorandum is the basis of the demobilization plan which is now being executed.

MEMORANDA NOS. 62 (4 NOVEMBER), 63 (3 NOVEMBER), 64 (30 OCTOBER), 65 (4 NOVEMBER), AND 66 (5 NOVEMBER, 1918).

Subject: "*Steps in Connection with Armistice.*"

After the adjournment of the Inter-Allied Naval Council, the Planning Section remained in Paris to assist Admiral Benson, un-

der whose direction these memoranda were prepared, copies being sent to the Force Commander, whose forwarding comment follows:

MEMORANDUM NO. 62.

1. There is forwarded herewith inclosed for the Department's information a copy of Planning Section Memorandum No. 62, which contains a statement of the naval conditions for an armistice with Germany and Austria-Hungary as originally prepared by the Allied Naval Council, together with the action of the Supreme War Council at Versailles with respect to the conditions of the armistice with Austria-Hungary and a statement of those conditions as finally presented.

2. The memorandum also sets forth in some detail the steps to be taken by the United States in carrying out the naval conditions of the armistice.

3. Rear Admiral W. H. G. Bullard, U. S. Navy, has been appointed the United States representative for this purpose and is now in the Adriatic, flying his flag on board the U. S. S. *Birmingham*.

MEMORANDUM NO. 63.

2. Since this memorandum was prepared the situation contemplated has arisen in some degree, since the former Austro-Hungarian monarchy seems to be split up into four separate and independent States, viz, German Austria, Czecho-Slavia (Bohemia), Hungary, Jugo-Slavia. There are at present, however, no certain indications that these several States are to prove unstable, and it is quite possible that few if any difficulties will be encountered in dealing with the Jugo-Slavs, who are the principal maritime power of the four.

3. Rear Admiral Bullard, who is the United States naval representative in the Adriatic, has been furnished with a copy of this memorandum for his information. It is understood that the United States is already preparing to send a commission to Jugo-Slavia, as is suggested on the last page of this paper.

MEMORANDUM NO. 66.

1. There is forwarded herewith for the information of the Department one copy of Planning Section Memorandum No. 66, concerning the steps to be taken by the Allies and the United States in the execution of the naval conditions of the armistice with Germany.

2. Rear Admiral S. S. Robison, U. S. Navy, has been appointed the United States naval representative on a commission which will probably be headed by Vice Admiral Browning, of the British Navy, to supervise the execution of the naval conditions of the armistice, with the exception of those included in Items IX and X of the abbreviated naval conditions as set forth in this memorandum.

3. Rear Admiral Robison will be given the U. S. S. *Chester* as a flagship and such yachts and destroyers as he may require in the execution of his duties.

4. Rear Admiral M. L. Bristol, U. S. Navy, has been detailed as the United States naval representative on a commission to be headed by Vice Admiral Sir Roger Keyes, of the British Navy, to supervise the execution of Item IX of the armistice terms as set forth in the inclosed memorandum.

5. Should any United States naval participation be required in the execution of the terms of Item X, Rear Admiral Bullard will be directed to detail an officer from his command.

MEMORANDUM NO. 67 (21 NOVEMBER, 1918).

[Not printed herein.]

Subject: "*United States Building Program.*"

Prepared in London.

MEMORANDA NOS. 68 AND 70 (7 NOVEMBER, 1918).

Subject: "*Future Submarine Warfare, Freedom of the Seas.*"

Initiated by the Planning Section with a view to determining the attitude which the United States representatives at the Peace Conference should take upon these subjects.

In forwarding this paper to the Department the Force Commander made the following comment:

1. There is forwarded herewith for the information of the Department one copy of Planning Section Memorandum No. 68, entitled "Submarine warfare." A copy of this memorandum has also been furnished direct to the Chief of Naval Operations in Paris.

2. The Force Commander does not consider that the arguments put forward by the Planning Section in this paper are logical, nor that they support the conclusions reached. The paper is therefore forwarded without approval for consideration by the Department.

MEMORANDUM NO. 69 (7 NOVEMBER, 1918).

Subject: "*Steps to be Taken by the United States Navy for the Demobilization of the United States Army in Europe.*"

Forwarding comment by the Force Commander follows:

2. The following comment is submitted on the recommendations and suggestions contained in this paper:

RECOMMENDATIONS.

1. All arrangements for evacuating the United States Army through French ports have been submitted to Vice Admiral Wilson, Commander, United States Naval Forces in France, who has been given full authority to deal with the Commander in Chief, American Expeditionary Forces, and his subordinates, and make all arrangements that are necessary and possible within the limits imposed by the forces at his disposal.

2 and 3. The Commander, United States Naval Forces in France, has full authority to carry out these recommendations and will do so to any necessary extent.

4. It is thought that this should not be adopted as a principle, as it would unnecessarily restrict the speed of the evacuation of the Army. It is probable that most of the troops will be embarked for the United States at French ports, but the use of certain English ports should not be definitely rejected.

5, 6, and 7. These recommendations are recommended for approval.

8 and 9. In so far as these concern the Navy they should apply principally to the cruiser and transport force.

10. Demobilization of United States naval forces is proceeding as rapidly as circumstances permit.

11, 12, and 13. Recommended for the favorable consideration of the Navy Department.

14. It is thought that this matter has already been decided by the Navy Department.

15 and 16. Recommended for the favorable consideration of the Navy Department.

SUGGESTIONS.

1. This is a matter for the commander of the cruiser and transport force to decide, under such instructions as the Department may choose to issue.

2. Recommended for the consideration of the Navy Department and other departments concerned.

3. Recommended for adoption in so far as capacity of ships permit. The difficulties of obtaining coal in France have been so often set forth that it is needless to emphasize them at this time.

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