

**LANDING OPERATIONS
DOCTRINE**

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**OFFICE OF NAVAL OPERATIONS
DIVISION OF FLEET TRAINING**



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**CHANGE No. 2 to
FTP-167**

**NAVY DEPARTMENT,
HEADQUARTERS, COMMANDER IN CHIEF,
U. S. FLEET, AND CHIEF OF NAVAL OPERATIONS.
WASHINGTON, D. C., August 1, 1942.**

Change No. 2 to Landing Operations Doctrine, U. S. Navy, 1938 (FTP-167) is approved.
Change No. 2 has been incorporated in the following numbered pages which are transmitted
herewith:

Pages:

vii	51	95	181
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These pages will be inserted immediately on receipt, and superseded pages will be destroyed
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/S/ R. E. EDWARDS,
for and in the absence of
E. J. KING,
Admiral, U. S. Navy,
Commander in Chief, U. S. Fleet and
Chief of Naval Operations.

Change No. 1 to
FTP-167

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NAVY DEPARTMENT,
OFFICE OF CHIEF OF NAVAL OPERATIONS,
Washington, D. C., May 2, 1941.

Landing Operations Doctrine, U. S. Navy, 1938 (FTP-167) was approved on August 5, 1938, for the use and guidance of the naval service, and was made effective on receipt. This publication supersedes "Tentative Landing Operations Manual" of 1935, all copies of which were ordered destroyed by burning.

FTP-167 is intended as a guide for forces of the Navy and Marine Corps conducting a landing against opposition. It considers, primarily, the tactics and technique of the landing operation and the necessary supporting measures therefor. Purely naval or military operations are dealt with only to the extent to which these operations are influenced by the special nature of amphibious warfare.

Change No. 1 to FTP-167 is a complete revision of FTP-167 except for the title page. All pages of FTP-167 (except the title page) bearing Registered Nos. 1-1500 are to be removed and destroyed by burning. Change No. 1 shall be inserted in FTP-167 bearing Registered Nos. 1-1500.

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It is forbidden to make extracts from or additional copies of this publication without specific authority from the Chief of Naval Operations, except as provided for in the current edition of the Registered Publication Manual.

H. R. STARK,
Admiral, U. S. Navy,
Chief of Naval Operations.

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CHANGE No. 3 to
FTP 167

NAVY DEPARTMENT,
HEADQUARTERS OF THE COMMANDER IN CHIEF,
UNITED STATES FLEET,
WASHINGTON, D. C., 1 August 1943.

From: Commander in Chief, United States Fleet, and Chief of Naval Operations.

To: All Holders of F. T. P. 167.

Subject: Change No. 3 to F. T. P. 167.

Enclosure: (A) New pages nos. IVa, IVb, VII, VIII, IX, X, 111 to 150 (inclusive), 239 to 244 (inclusive).

1. Change No. 3 to F. T. P. 167, Landing Operations Doctrine, U. S. Navy, 1938, is promulgated herewith and is effective upon receipt. It is confidential and nonregistered and shall be stowed, transported and handled in accordance with the current edition of the Registered Publications Manual.

2. This change shall be entered as follows:

a. Pen changes:

Par. 223c, p. 38—change HYPO to HOW; change PREP to PETER.

Fig. 2, p. 41—change OPTION to OBOE; change HYPO to HOW.

Par. 230, p. 42—change "Section VI" to "Section IV."

Par. 322, p. 54—insert "(FTP 207)" at end of paragraph.

Fig. 16, p. 91—change "Affirm" to "Able."

Fig. 17, p. 93—change CAST to CHARLIE in two places.

Fig. 23b, p. 107—change "Affirm" to "Able."

Fig. 23c, p. 108—change "Unit" to "Uncle" in three places; change "Hypo" to "How."

Par. 615b, p. 154—change "par. 553" to "par. 522."

Par. 624c, p. 157—change "par. 543" to "section IV, Chapter V."

Par. 637a, p. 159—at end of first sentence, strike out "as described in section III, Chapter V."

Par. 811a, p. 178—change "see pars. 542, 552c, and 731" to "see section IV, Chapter V."

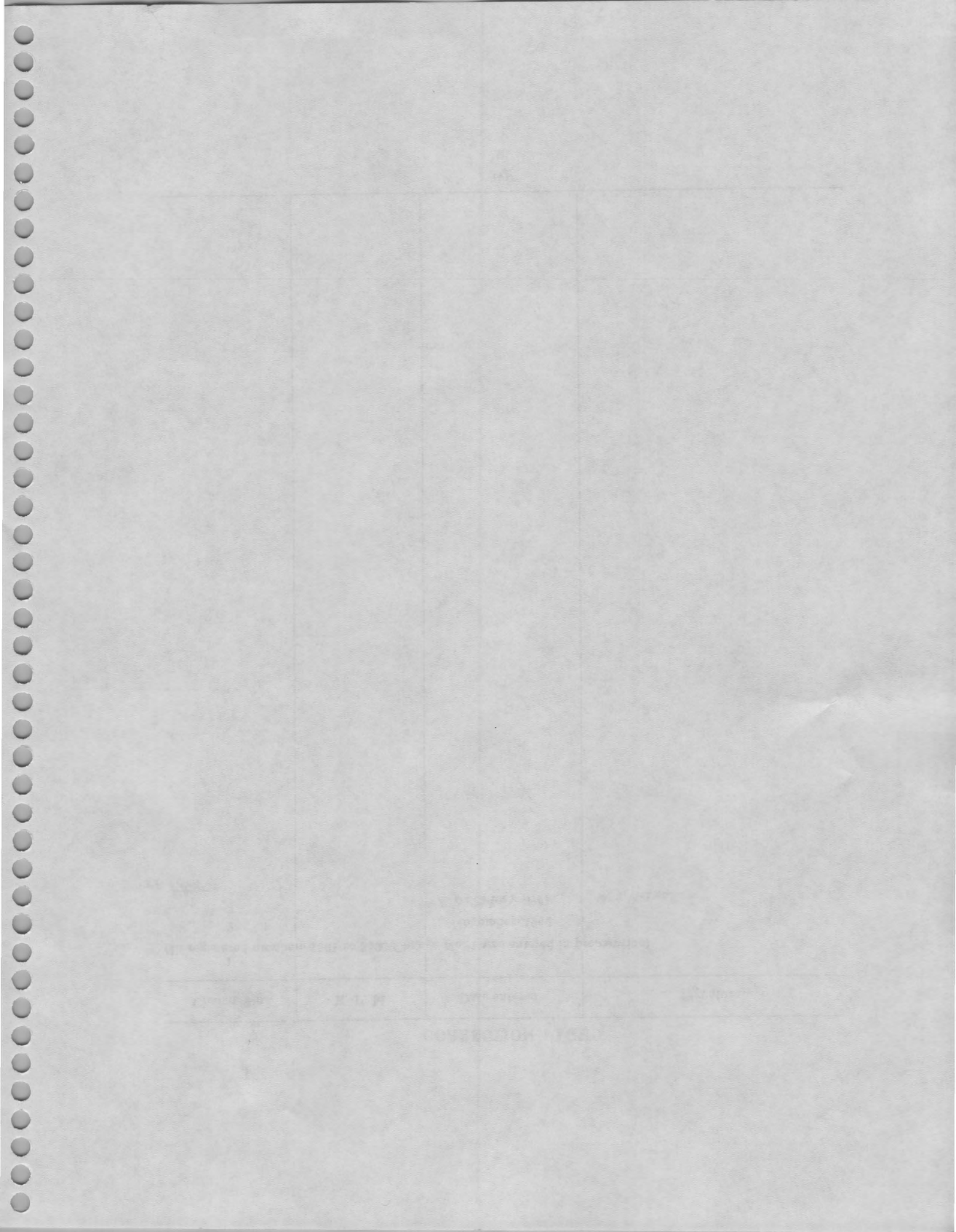
Par. 833b, p. 188—change "par. 543" to "section IV."

b. Insert the numbered pages transmitted herewith as Enclosure (A). Superseded pages will be destroyed by burning, no report of destruction being required.

s/ R. S. EDWARDS,
Chief of Staff.

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CHAPTER I

LANDING OPERATIONS—GENERAL

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SECTION I

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101. General objectives.—*a.* Landing operations may be conducted by naval forces for the following general purposes:

For securing bases for our fleet or components thereof.

For denying bases or facilities to the enemy.

For bringing on a fleet engagement at a remote distance from an enemy main base by causing the enemy fleet to operate in protection of the threatened area.

To cause a dispersion of the enemy fleet by threatening areas vital to his plan of campaign.

For protection of life and property in connection with small wars.

For sabotage.

For the conduct of such other land operations as may be required in the prosecution of the naval campaign.

b. The purpose for which a landing operation is conducted in any given area will influence the nature of the operation, its specific objectives, and the forces to be employed.

102. Types of bases.—*a.* Classification and definitions of the various types of naval bases will be found in the War Instructions, U. S. Navy.

b. An advanced base is one established in an advanced location by the operating forces for wartime use. An advanced base established for temporary use in support of landing operations is called a supporting base.

103. Selection of a base.—*a.* In the selection of a base consideration must be given to the following factors:

Suitability of the area for the type of base it is proposed to establish.

Geographical location in relation to the theater of operations of the fleet.

Defensive strength and natural resources available.

The operations afloat and ashore required to seize and hold the base.

b. Supporting bases should be within flying range of the proposed landings, and should provide space for the construction of landing fields and sheltered water for the operation of sea planes. Shelter for surface craft and submarines is extremely desirable.

104. Securing a base.—In addition to the purely naval phases of the operation, the securing of a base for our fleet involves the control of all land areas from which the enemy can operate

effectively against the base with infantry or artillery. Ultimately, if the enemy air force cannot be denied by our aircraft and antiaircraft, it will be necessary to conduct additional landings for the purpose of neutralizing enemy air operations against the base.

105. Denying a base.—The denial of a base includes those measures necessary to prevent the enemy from using it. Insofar as landing operations are directly involved, this requires the securing of only such land areas as will enable our forces to operate effectively against the base with infantry, artillery, or aircraft. In this case the enemy force defending the base is an objective of the attacker only to the extent that it interferes with the attacker in occupying such areas and operating therefrom.

106. Illustrative diagram—securing and denying a base.—*a.* The difference between securing and denying a base may be considered under two general situations (see fig. 1):

First situation: A BLUE expeditionary force has the task of securing a base for use of the BLUE fleet at A on an island occupied by RED. This task requires BLUE, in the first place, to drive RED from all such areas as B, C, D, E from which RED can operate against the base or its approaches with infantry or artillery and, eventually, from such areas as X or Y from which he can operate effectively against the base with aircraft. At least BLUE must successfully neutralize enemy weapons and aircraft operating against the base from such areas.

Second situation: BLUE has the task of denying the base A to RED. In this case BLUE would have to secure and hold only one area, such as B or E, from which he could operate effectively against the base or approaches thereto with infantry or artillery, or X or Y from which he could operate effectively against the base with aircraft.

b. In planning a landing operation in an area occupied by an enemy force it should be remembered that the task of the enemy will materially affect the probable strength and disposition of his forces. If his task is to deny the base, his force may be relatively weak and largely concentrated in, or prepared to move into, an area which is easy to defend. If his task is to secure the base for his own use, his forces will probably be of greater strength and more widely dispersed.

107. Landing raids.—Landing raids are generally made for the purpose of destroying enemy facilities and establishments, such as batteries, bridges, docks, supplies, aircraft, etc., or for harassing defense forces, diverting attention from operations in other localities, and effecting division of enemy forces. Such operations depend largely for success upon rapidity of movement and surprise, and normally involve relatively small forces, a limited advance inland, and a quick withdrawal. They may be conducted in connection with other landings or as a separate operation.

108. Land in the tactical control of sea areas.—*a.* The ability of naval forces to maintain themselves in a given area may be dependent, from a tactical as well as from a logistical point of view, upon the occupation or control of the land areas lying within or adjacent to the theater of operations. Under modern conditions, certain types of bases have been moved from the realm of logistics to the realm of tactics; that is, from the line of communications to the line of battle.

b. Due to the importance of aircraft in fleet engagements, the relatively small number and vulnerability of carriers, and the possibility of shore-based aircraft operating with and augmenting the strength of our own or the enemy fleet, territory which otherwise might have no strategical or tactical value assumes an important role as possible air bases.

c. To a lesser extent submarine bases may be considered in the same category as air bases.

d. When the successful prosecution of the naval campaign requires the fleet, or portions thereof, to operate in a theater within effective flying range of enemy territory, the preliminary naval operations may revolve around a contest for the available land within or adjacent to the area. The entrance into and the securing of the initial foothold in such a theater of operations is hazardous and involves landing operations of a difficult nature. Under such conditions, the naval operations during the preliminary phases may be in the nature of a naval reconnaissance involving landings made with the view of securing information and seizing unoccupied or lightly held territory which later may be occupied in force and, ultimately, used as a base for further operations. (See par. 119, Supporting Bases.)

109. Small wars.—The extended and skillful use of automatic weapons by unorganized and irregular forces, even though relatively weak, may result in heavy casualties during a landing at localities occupied by such forces, unless the landing is conducted in accordance with sound tactical principles. While the doctrines herein enunciated are intended primarily as a guide in major operations, they apply equally to small war situations, with due allowance made for the character of the forces engaged and the necessity of safeguarding life and property insofar as possible.

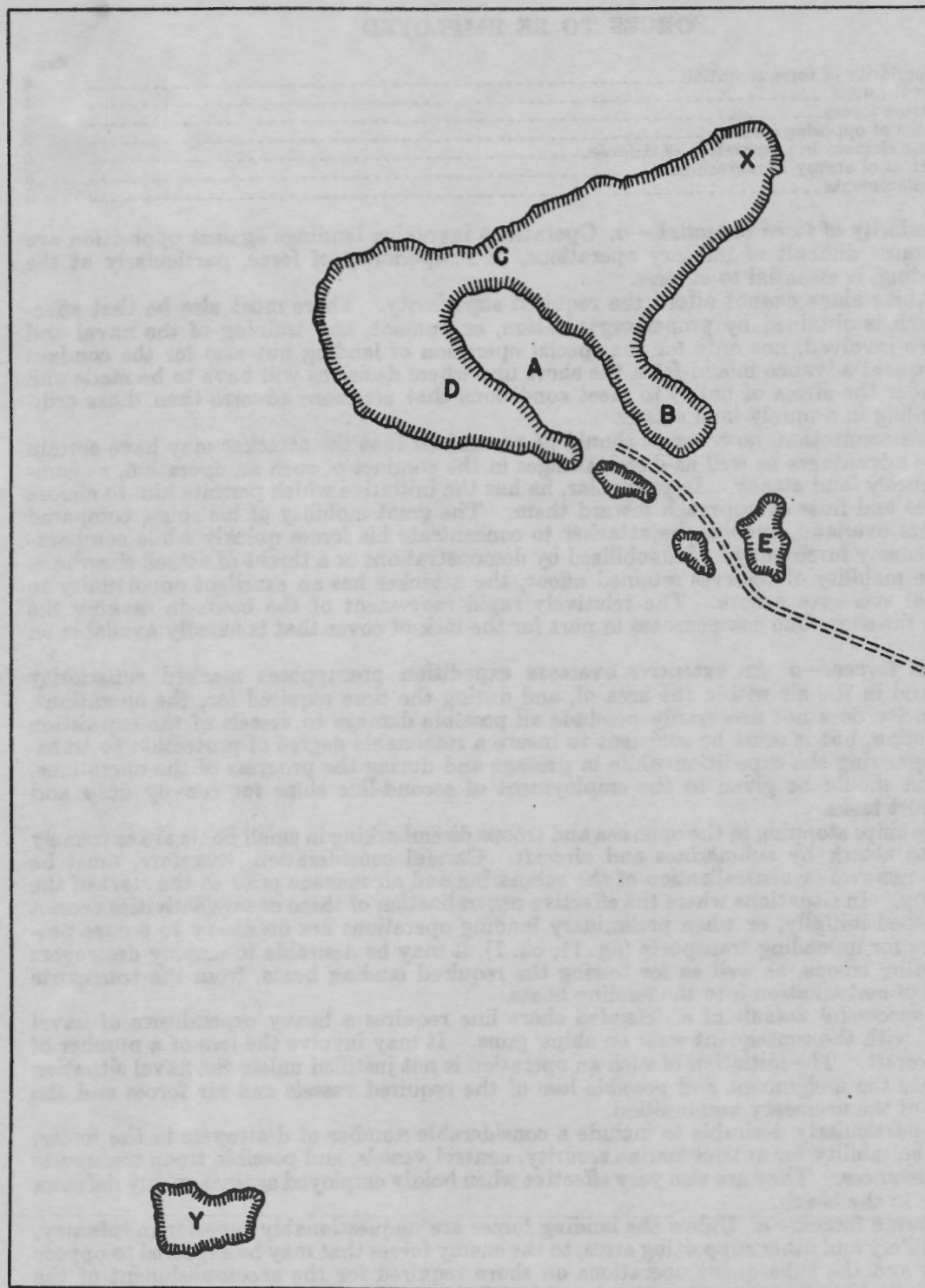


FIGURE 1.—Securing and denying a base.

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110. Superiority of force essential.—*a.* Operations involving landings against opposition are among the most difficult of military operations, and superiority of force, particularly at the point of landing, is essential to success.

b. Numbers alone cannot afford the required superiority. There must also be that effectiveness which is obtained by proper organization, equipment, and training of the naval and marine forces involved, not only for the special operation of landing but also for the conduct of the subsequent advance inland from the shore line where decisions will have to be made and executed under the stress of battle to meet conditions that are more adverse than those ordinarily prevailing in a purely land attack.

c. In this connection, however, it should be recognized that the attacker may have certain very definite advantages as well as disadvantages in the conduct of such an operation, as compared to a purely land attack. In particular, he has the initiative which permits him to choose his objectives and lines of approach toward them. The great mobility of his ships, compared to movements overland, enables the attacker to concentrate his forces quickly while comparatively large enemy forces may be immobilized by demonstrations or a threat of attack elsewhere. Through the mobility of reserves retained afloat, the attacker has an excellent opportunity to exploit initial successes ashore. The relatively rapid movement of the boats in making the approach to the shore line compensates in part for the lack of cover that is usually available on land.

111. Naval forces.—*a.* An extensive overseas expedition presupposes marked superiority on the sea and in the air within the area of, and during the time required for, the operations. Such superiority does not necessarily preclude all possible damage to vessels of the expedition by enemy action, but it must be sufficient to insure a reasonable degree of protection to transports accompanying the expedition while in passage and during the progress of the operations. Consideration should be given to the employment of second-line ships for convoy duty and gunfire support tasks.

b. Large ships stopping in the open sea and troops disembarking in small boats are extremely vulnerable to attack by submarines and aircraft. Careful consideration, therefore, must be given to the removal or neutralization of the submarine and air menace prior to the start of the actual landing. In situations where the effective neutralization of these enemy activities cannot be accomplished initially, or when preliminary landing operations are necessary to secure protected waters for unloading transports (fig. 11, ch. I), it may be desirable to employ destroyers for transporting troops, as well as for towing the required landing boats, from the transports to the point of embarkation into the landing boats.

c. The successful assault of a defended shore line requires a heavy expenditure of naval ammunition, with the consequent wear on ships' guns. It may involve the loss of a number of ships and aircraft. The initiation of such an operation is not justified unless the naval situation fully warrants the assignment and possible loss of the required vessels and air forces and the expenditure of the necessary ammunition.

d. It is particularly desirable to include a considerable number of destroyers in the forces, due to their suitability for antisubmarine security, control vessels, and possible troop transports for limited distances. They are also very effective when boldly employed against enemy defenses located close to the beach.

112. Marine forces.—*a.* Unless the landing forces are unquestionably superior in infantry, as well as artillery and other supporting arms, to the enemy forces that may be expected to oppose the landings and the subsequent operations on shore required for the accomplishment of the mission, the initiation of such an operation is not justified.

b. The operations ashore as well as the landing must be adequately supported by marine aircraft or, in their absence, by naval aircraft.

113. Tasks of opposing forces.—If, by reason of the task of the defender, the coast line or amount of territory to be defended is great in proportion to the strength of the defender, he will have to disperse his forces or leave certain portions of the coast undefended. The attacker may thus be able to concentrate, by reason of the superior mobility of his ships, an overwhelming superiority at the point of landing. Under such conditions, particularly if the task of the attacker permits him to assume the defensive after landing, the operation may be undertaken without as great superiority as would be necessary where the territory is restricted, the landing beaches are limited, and the task of the landing force requires offensive operations after landing.

114. Time element in preparation of defense.—Time is an important element in preparing an effective defense. A comparatively short delay, which would give the enemy time to organize and coordinate his infantry and artillery fires and prepare defensive works, would necessitate the employment of a much larger attacking force against the same defending force. It is important, therefore, that properly trained naval and marine forces be available and prepared to initiate at an early date after the outbreak of hostilities any landing operation that may be decided upon.

115. Arrival of enemy reinforcements.—The possibility of enemy reinforcements, particularly air forces, arriving during the course of the operation requires careful consideration in the estimate of the relative strength, and influences the selection of the time of arrival of the attacking force in the landing area.

116. Replacements.—Provisions should be made for adequate replacements, so that experienced units may be maintained at full strength. Since casualties in a landing operation are likely to be high in the initial phases, estimates of replacements to accompany the force should be liberal.

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ADVANCE FORCES

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117. Preliminary operations.—Prior to initiating an operation involving a landing against serious opposition, the desirability of organizing advance or reconnaissance forces for the conduct of certain preliminary operations should be given consideration. The following preliminary operations in connection with proposed landings may be desirable:

Reconnaissance.

Seizure of a supporting base.

Operations against defending aircraft.

Operations against naval defense forces.

118. Reconnaissance.—*a. Information to be obtained.*—(1) Information regarding a theater of operations may be considered under two general heads, namely, Naval and Military.

(2) Naval information is obtained for the purpose of determining the enemy naval dispositions in the theater of operations; verifying and supplementing existing hydrographic and meteorologic data; determining, from a navigational standpoint, the suitability of beaches and sea areas required for the conduct of a landing; locating mined areas, underwater obstacles, and other obstructions; selecting suitable approaches to landing areas; preparing sailing directions; and establishing necessary aids to navigation.

(3) Military information deals with the nature of the terrain in the proposed zone of operations and the enemy dispositions ashore, including defensive works, strong points, machine gun and artillery positions, location and intensity of defensive barrages, landing fields, gassed areas, location of reserves and their routes of advance, supply and ammunition facilities.

b. Necessity for reconnaissance.—(1) It is a sound principle in the conduct of landing operations to avoid landing against strongly organized positions unless such action is the only means of carrying out the assigned task within the time available. In general, such organized positions can be located only by adequate and thorough reconnaissance.

(2) There is a notable lack of information on charts and in existing sailing directions in regard to landing conditions for small boats. There is a further possibility that the enemy will place underwater obstacles and other obstructions on or near available landing beaches and

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approaches thereto. Information in regard to beaches, therefore, will have to be secured largely through active reconnaissance.

(3) On an inadequately charted coast line, with ordinary navigational aids destroyed by the enemy, the safe navigation of the attacker's ships requires careful and detailed reconnaissance. Under some conditions, a limited hydrographic survey of the coast and the establishment of necessary aids to navigation may be required.

(4) The necessity for conserving and making the best use of the limited supply of naval ammunition renders it desirable that beaches be reconnoitered before being shelled by ships' guns in order to determine whether or not they are being held by the enemy. It is also desirable to locate strong points in the enemy position, and to chart landmarks which will enable firing ships to identify their target areas.

(5) Before landing relatively large bodies of troops, particularly on small islands or in other restricted areas, it is important to determine by reconnaissance if beaches have been, or are likely to be, gassed.

c. Means employed.—(1) To gain the desired information, surface craft, submarines, aerial observation and photography, and landing parties are employed.

(2) Aerial photographs and direct observation from the air and sea will give fairly complete information in regard to certain types of fieldworks on shore but will give very little information as to whether or not they are occupied. Particularly dangerous emplacements, such as machine-gun positions, may be so well camouflaged as to be completely invisible. As a rule, the number and location of defensive weapons can only be determined, and then with difficulty, by causing them to open fire, which normally they will do only when a landing seems imminent. Against an alert enemy, therefore, the attacker will have to depend upon landing parties or demonstrations to gain information regarding the enemy's strength and dispositions on shore. The landing parties may consist of agents, patrols, or reconnaissance in force. (See ch. IV, sec. VI, Reconnaissance Patrols.)

d. The intelligence plan.—After making a study of existing data on the proposed theater of operations, an intelligence plan should be prepared in which is listed the additional information, naval and military, required for the conduct of the operation. This intelligence plan forms the basis for determining the size, composition, and tasks of the reconnaissance force dispatched to the theater of operations for the purpose of collecting the necessary information.

e. The principle of surprise.—In the execution of the intelligence plan for a specific landing operation, care must be taken not to divulge the intentions of the attacker, and certain landing areas and beaches, which are not to be used, should be reconnoitered as thoroughly and with the same means as those at which landings are planned.

f. Detailed reconnaissance of a landing area.—In connection with the detailed reconnaissance of a particular landing area, see paragraphs 209 and 210.

119. Supporting bases.—*a.* In many theaters of operations, it will be extremely difficult for the defender to occupy all of the available land areas in force. Certain areas will be strongly fortified and others will be more lightly held or even unoccupied. If it is necessary to seize a fortified position in such an area, it will generally be advisable, if not mandatory, to operate step by step, seizing first the weakly defended areas for use as supporting bases in the subsequent landings against the fortified positions.

b. If suitable areas are available for the purpose, the establishment of one or more supporting bases may furnish the following advantages in the execution of the main attack:

Permits naval aircraft to operate from landing fields and reduces the risk incident to carrier operations.

Permits the employment of seaplanes.

Permits employment of the aviation of the landing force.

Denies landing fields and other facilities to the enemy.

Affords shelter for vessels before and during the course of the subsequent operations.

Affords a rendezvous and a point of departure for subsequent landings.

Facilitates the storage and distribution of supplies.

c. A supporting base will usually be within bombing range of an enemy base or possible base. Under such conditions, the seizure and occupation of the supporting base, and the installation of the necessary landing fields and facilities, is a delicate problem and the operation may require a considerable period of time. The initial operation may be a landing in force, or a foothold may be secured by advance or reconnaissance forces. In the latter case, the garrison and base facilities may be gradually built up by the subsequent landing of troops and material

in relatively small increments. It will be safer to fly planes in from carriers after adequate landing fields and air and antiaircraft protection have been provided, rather than to attempt landing crated planes and setting them up under hostile bombing attacks. The enemy may be expected to bring the full strength of his air units against the establishment of a supporting air base.

120. Operations against defending aircraft.—*a.* Operations against enemy aircraft, preliminary to a landing, may include aerial combat, bombing and strafing planes on the ground, and gassing, bombing, and shelling landing fields and their installations.

b. The enemy will, if possible, utilize a large number of landing fields; camouflage will be employed to the fullest extent to protect his establishments; dummy planes will be displayed; real planes will be widely separated and camouflaged. Such protective measures on the part of the enemy require careful reconnaissance before successful attacks can be launched. The restriction of hostile air activities by rendering a considerable portion of his landing fields unusable through bombing attacks will require extensive operations and a heavy if not prohibitive expenditure of bombs. Therefore, such bombing operations should be limited to landing fields definitely known to be occupied.

c. Carrier-based planes are at a distinct disadvantage in conducting this type of operation compared to land-based planes. For this reason, if a supporting base is not available to the attacker, it may be advisable to restrict preliminary air operations of carrier-based planes to necessary reconnaissance, in order to insure superiority at the critical time of landing.

121. Operations against naval defense forces.—*a.* The naval defense forces of a base, having the mission of furnishing information of the attacker's movements and inflicting damage to his ships and small boats transporting troops to the beach, must be cleared from the sea areas required for the conduct of the operation, or effectively neutralized during the course of the landing.

b. In addition to screening and patrolling the station and maneuver areas of the attacking force during the landing, advance forces may be given the task of operating against the naval defense force prior to the landing with the view of clearing the required area of surface patrol craft and reducing the number and effectiveness of enemy submarines.

c. At night, patrol vessels constitute one of the defender's principal means of securing information as to the movements of the attacker's ships. To secure this information, they have to approach closely and attempt to identify every vessel maneuvering on the coast. For this reason, destroyers of the attacker operating at night against naval defense forces have an excellent opportunity of making contacts with enemy vessels and locating their patrol areas. Operations in such areas for several nights prior to the landing should result in material losses to the naval defense force and reduction in its effectiveness by compelling the enemy vessels to adopt a less aggressive attitude.

122. Organization of advance forces.—*a.* The composition of advance forces will depend upon the tasks assigned and the probable enemy forces in the theater of operations. Advance forces should be dispatched at such time as will permit the main operation to be executed without unnecessary delay.

b. Specially trained marine personnel and suitable boats for reconnaissance tasks should accompany the force for the conduct of necessary shore reconnaissances. When the advance force is given the task of securing a supporting base, a suitable landing force should be made a part of the advance force, or available to it, for use when the occasion arises.

SECTION IV

MAIN AND SUBSIDIARY LANDINGS

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123. Types of operations.—The seizure of an area defended by hostile forces may involve the following coordinated operations:

- The main landing;
- One or more secondary landings; and
- One or more demonstrations or feints.

124. The main landing.—The main landing is that upon which the ultimate success of the tactical plan depends. In the assignment of troops, ships, and aircraft, it has first consideration and must be provided with the forces necessary for success. The detachment of any forces from the main landing for the conduct of a subsidiary operation is only justified when the results to be reasonably expected from the latter are greater than if these forces were used in the main landing. In some situations, consideration should be given to making two or more landings in force, with the view to exploiting the landing which is most successful.

125. Secondary landings.—*a.* Secondary landings are those made outside the immediate area of the main landing which directly or indirectly support the main landing. They may be made prior to, simultaneously with, or subsequent to, the main landing.

b. Secondary landings are usually made for the purpose of seizing and holding areas which are desirable for operations in connection with the main landing, or which may be used by the enemy in opposing the main landing. Secondary landings may also be made for the purpose of diverting enemy reserves, artillery fire, or aircraft support from the area of the main landing. Such landings may also cause delay in starting the movement of the general reserves, or local defense forces from other sectors, to oppose the main landing.

c. The early entry into action of land-based artillery and aircraft may be necessary in order to provide adequate support for the main landing or the operations on shore. Where suitable areas for landing fields or artillery positions exist outside of the area of the main landing, consideration should be given to the early seizure of such areas by secondary landings.

d. Secondary landings made for the purpose of causing the movement of hostile reserves from the main landing area require, as a rule, a greater proportional force than those seeking to hold enemy forces in place or retard their movement. In the former case, sufficient force must be employed to overcome the local defense forces and gain a success which threatens a point important to the defender; otherwise, he probably will not move his reserves.

e. The term "secondary landings" should not be used in plans and orders, as these landings constitute an important part of the operation as a whole. The forces assigned these tasks must carry them out with the same determination that characterizes the main landing.

f. In some situations, the development of the subsequent operations may make it advisable to exploit a secondary landing rather than the main landing, consequently this should be considered when selecting areas for secondary landings.

126. Demonstrations.—*a.* A demonstration, or feint, is an exhibition of force, or movement, indicating an attack. Demonstrations are made for the purpose of diverting enemy reserves, artillery fire, surface craft, submarines, or aircraft support from the area of the main landing, or the retarding of the movement of enemy forces thereto.

b. In order further to deceive the enemy as to the location of the main landing, demonstrations may be conducted and coordinated with secondary landings. A demonstration alone, however, may often be more effective than a weak secondary landing, particularly in delaying the movement of enemy forces toward the area of the main effort. The effectiveness of a weak landing is largely lost as soon as its weakness is discovered, while a show of force constitutes a continuing threat and may hold in place comparatively large enemy forces for considerable periods of time. In order to produce the greatest effect, the mobility of ships should be utilized in such operations to threaten a number of points and thus immobilize enemy forces over a large area.

c. Demonstrations have no territorial objective but they should threaten areas of importance to the enemy. They should be coordinated as to time, and directed at points so distant from the main landing that they will contain the enemy forces stationed at or drawn to such points, and prevent them from opposing the main landing. This coordination as to time and distance is particularly important where it is desired to prevent the participation of the enemy aircraft, surface vessels, and submarines in the operations involved in the main landing.

d. Demonstrations conducted in conjunction with and in the vicinity of an actual landing are effective in causing a dispersion of enemy artillery fire. Shore batteries generally have a "normal zone" covering one or more beaches and a "contingent zone" covering other beaches or areas. The defensive artillery plan will generally provide for a concentration of all batteries within range of a designated point. A few boats approaching a beach, particularly when accompanied by smoke and some gunfire, should make all enemy batteries, within whose normal zone the beach lies, open fire on that particular beach or boats, rather than joining in a general concentration on the actual landing. Such demonstrations are particularly desirable when the main landing is conducted on a comparatively narrow front.

e. Demonstrations may be conducted in connection with reconnaissance prior to a landing in order to cause the consumption of the enemy ammunition and chemical supplies, the dis-

closure of his strength and dispositions, artillery positions, barrages, gassed areas, and landing fields, and further the wearing down of his air forces.

f. From the foregoing, it may be seen that demonstrations or feints may be made to contribute greatly toward the gaining of tactical surprise.

127. **Surprise landings.**—Rubber landing craft, track landing vehicles, and other special types of boats, as well as parachute troops, and troops transported during the night from a distant base by patrol planes or large commercial clipper planes, should be utilized to the fullest extent to execute surprise landings at points where, due to the nature of the beaches or terrain, landings would not ordinarily be expected. These landings may be in connection with or part of the main or secondary landings and should be made in accordance with the same principles and for the same purposes as previously set forth in this section.

SECTION V

BEACHHEADS

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128. **The beachhead.**—a. The first consideration in the conduct of operations on shore after the landing has been effected is the seizure of a beachhead of sufficient extent to insure the continuous landing of troops and matériel, and to provide the terrain features and maneuver space requisite for the projected operations on shore.

b. The establishment of a beachhead enables a commander to maintain control of his forces until the situation ashore has developed and he has sufficient information on which to base his plans and orders for further operations.

c. As a matter of security, it will be necessary to clear the beachhead of enemy resistance. It should be kept in mind, however, that the establishment of a beachhead is not a purely defensive measure. It has the equally important object of insuring further advance inland if required to accomplish the mission of the force. Consideration should be given, therefore, to the early seizure of terrain features which will facilitate this advance by including them in the beachhead or making them the objective of a special operation. Consideration should also be given to depriving the enemy of terrain features which are most advantageous in the defense.

129. **The force beachhead line.**—This is an objective prescribed for the purpose of fixing the limits of the beachhead. It is not necessarily a defensive position to be occupied and organized as such. It is, however, a tentative main line of resistance in case of counterattack prior to the advance from the beachhead, and it is occupied and organized to the extent demanded by the situation. (See fig. 2.)

130. **The exploitation line.**—a. This is a line beyond the beachhead line to which reconnaissance and security detachments will be pushed by units occupying the beachhead line. It provides a zone in which active reconnoitering will be conducted on the initiative of such unit commanders and, at the same time, prevents a greater dispersion of the force as a whole than is desired by the force commander. (See fig. 2.)

b. Reconnaissances beyond the exploitation line will partake of the nature of reconnaissances in force launched by specific orders against designated points or in designated directions.

c. In the event of the occupation of the beachhead line as a defensive position, the exploitation line constitutes the limit of the outpost positions.

131. **Extent and form of the beachhead.**—a. The beachhead should be of sufficient depth and frontage to secure the landing from *ground-observed* artillery fire. Usually this will be possible only with comparatively large forces. A landing force manifestly cannot overextend its units or subject its flanks, beach establishments, and land communications to attack until the enemy situation has been developed. The depth and frontage of the beachhead will be dependent, therefore, upon the mission, the size of the force engaged, the nature of the terrain particularly as regards natural obstacles, and the probable enemy reaction.

b. Figure 2 shows diagrammatically how terrain features may modify the form of the beachhead, and the extent to which the beachhead line may have to be occupied under various

conditions in order to insure the desired security of the shore establishments. In figure 2-a, the terrain is assumed to be suitable for maneuver throughout its whole extent. In figures 2-b and 2-c, the effect is shown of certain impassable obstacles, which may be encountered in a variety of forms and combinations. Figure 2-d shows a beachhead where it is necessary to land in a town. This latter situation might arise in the seizure of a town as part of a major operation or in connection with a small war where a beachhead, in addition to its normal functions, would afford an immediate security zone for civilians. In most situations of this kind it would be advisable to land outside the town even though only very weak resistance is anticipated.

132. Successive objectives.—Successive objectives may be designated to coordinate the advance from the beach to the beachhead line. Such objectives have the advantages of permitting reorganization of attacking troops, passage of lines, coordination of field artillery and ships' gunfire with the advance, and facilitating the execution of an appreciable change in direction of the attack. Objectives entail a certain delay and should not be prescribed unless actually needed for a definite purpose.

133. The artillery control line.—*a.* This is a line short of which the field artillery does not fire except on request of infantry commanders, and beyond which the advance is supported by the bulk of the field artillery. Its introduction is often desirable in order to permit artillery to open fire immediately upon landing without danger to friendly troops.

b. The position of the artillery control line is fixed after consideration of the probable position of the infantry at the time the artillery is ashore and in position to open fire. If suitable terrain features exist, the artillery control line should be located a safe distance beyond an infantry objective, which can easily be defined and readily identified on the ground by both infantry and artillery. If no such natural features exist, the artillery control line should be located at such distance from the beach that the advanced infantry elements will not, in all probability, have reached the target area at the time it is estimated that the artillery will open fire.

c. Main reliance must be placed in ships' gunfire for support of the attack up to the artillery control line, as field artillery will not be in position to fire short of this line unless the attack is stopped or materially slowed down before the artillery control line is reached.

134. Intermediate beachhead lines.—*a.* Subordinate commanders may find it desirable, particularly where beaches are not contiguous, to designate intermediate beachhead lines in addition to the successive objectives prescribed by higher authority, with the view of protecting the beaches from aimed small-arms fire. The depth of such intermediate beachheads will be largely dependent upon the formation of the terrain adjacent to the beach. If there is a bluff or ridge close to the shore line, a comparatively shallow intermediate beachhead may suffice; if the terrain inland from the beach is an open, fairly uniform slope, an intermediate beachhead of from 1,000 to 1,500 yards may be necessary to accomplish the desired purpose.

b. When intermediate beachheads are prescribed, they are designated "Battalion beachhead," "Regimental beachhead," etc., according to the organization for which prescribed.

135. Establishing the beachhead.—*a.* In a landing operation, troops must clear the beach rapidly; there must be no delay at the water's edge. This requires, in the first place, that landing units be landed in assault formation as fully deployed as the available boats permit. Once landed, every individual must thoroughly understand that he must first clear the beach and then move rapidly inland or in the designated direction.

b. Assault units push the attack to their designated objectives without waiting for the advance of units on their flanks. Reserves are utilized to cover the flanks of advanced units rather than holding up the attack for a uniform advance on the whole front. If a unit is landed on the wrong beach, its commander will initiate such action as will best further the general scheme of maneuver.

136. Advance from the beachhead.—*a.* The desirability of establishing a security zone around his shore base should not lead a commander to adopt a passive attitude. Unless the mission is accomplished by the securing and holding of the beachhead, active, aggressive action provides the surest means of carrying out the mission and will often afford the best protection to the beach establishments.

b. The advance from the beachhead line, however, may entail the breaking of one or both flanks from physical contact with the shore, the establishment of shore lines of communication, and entering into a phase of war of maneuver. Under such conditions, the securing of a beachhead may be followed by a period of stabilization during which the necessary regrouping of forces may be effected and information of the hostile dispositions secured. Reconnaissances by air forces and ground troops should be pushed vigorously so that the delay on the beachhead line may be reduced to the absolute minimum.

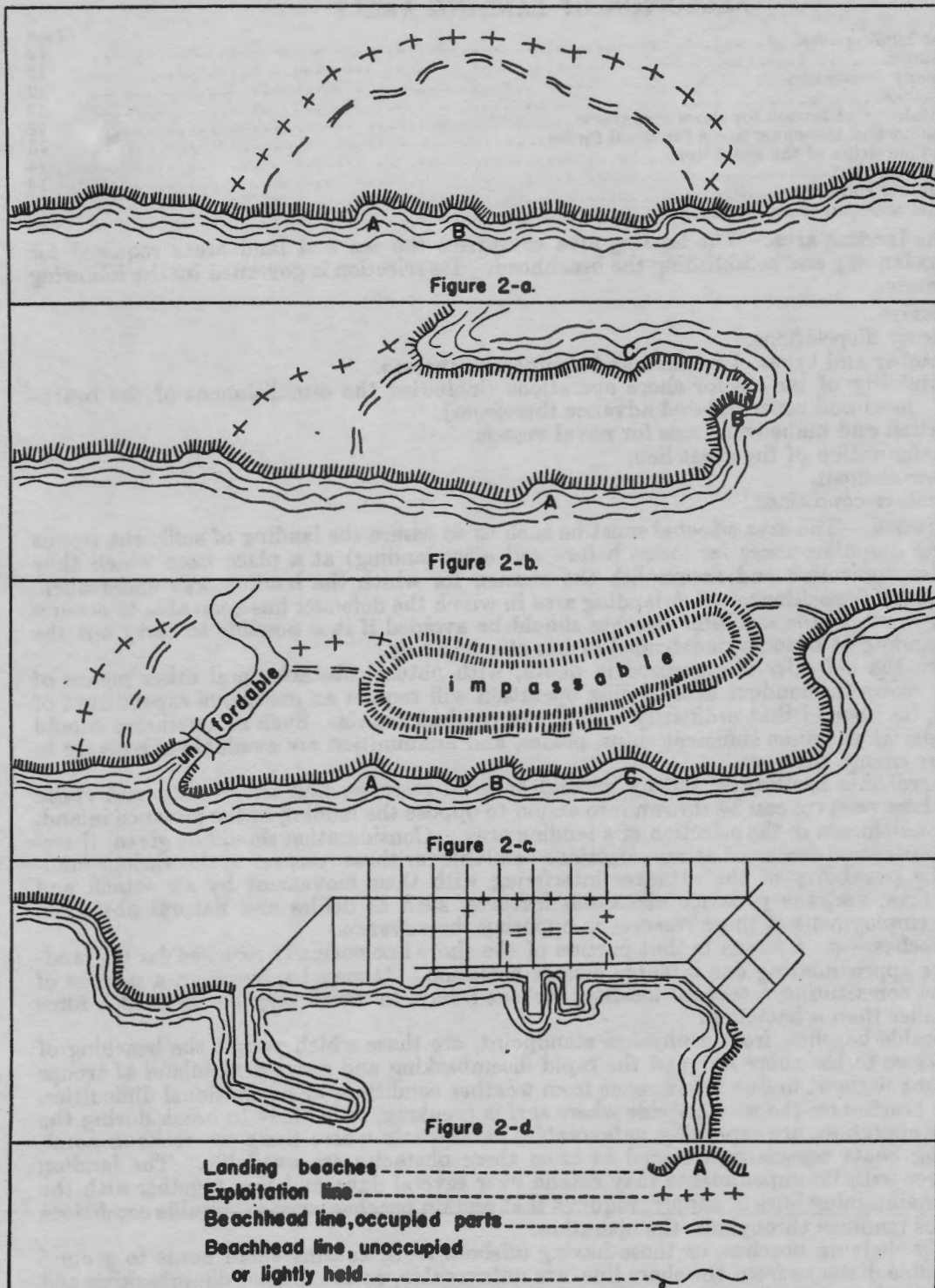


FIGURE 2.—Beachheads.

LANDING OPERATIONS DOCTRINE

SECTION VI

SELECTION OF LANDING AREAS

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137. The landing area.—The landing area comprises the sea and land areas required for executing the landing and establishing the beachhead. Its selection is governed by the following principal factors:

Mission.

Enemy dispositions.

Number and types of beaches and approaches thereto.

Suitability of terrain for shore operations (including the establishment of the beachhead and contemplated advance therefrom).

Station and maneuver areas for naval vessels.

Configuration of the coast line.

Time element.

Weather conditions.

138. Mission.—The area selected must be such as to assure the landing of sufficient troops (after making due allowances for losses before and after landing) at a place from which they can reach their objective and accomplish the mission for which the landing was undertaken.

139. Enemy dispositions.—*a.* A landing area in which the defender has been able to occupy and strongly organize the available beaches should be avoided if it is possible to carry out the mission by landing at beaches undefended or less strongly held.

b. Where the defender is organized in depth, with natural obstacles and other means of defense, the successful conduct of a landing operation will require an enormous expenditure of ammunition, far beyond that ordinarily supplied to combat vessels. Such an operation should never be undertaken unless sufficient ships, planes, and ammunition are available effectively to neutralize the enemy weapons.

c. The probable location of enemy general or local reserves, and the facility and speed with which these reserves can be thrown into action to oppose the landing or the advance inland, are important elements in the selection of a landing area. Consideration should be given, therefore, to the routes and means of communications available for these reserves to the various landing areas, the possibility of the attacker interfering with their movement by air attack and interdiction fires, and the presence of terrain features, such as defiles and natural obstacles, favorable to employment of these reserves in opposing the advance.

140. Beaches.—*a.* A beach is that portion of the shore line normally required for the landing of a force approximating one infantry assault battalion. It may be, however, a portion of the shore line constituting a tactical locality, such as a bay, to which may be assigned a force larger or smaller than a battalion.

b. Favorable beaches, from a physical standpoint, are those which permit the beaching of small boats close to the shore line and the rapid disembarking and movement inland of troops and equipment without undue interference from weather conditions or navigational difficulties.

c. Open beaches on the weather side where surf is breaking, or is likely to break during the course of the operation, are especially unfavorable, particularly where there are rocks or coral, unless landing boats especially designed to cross these obstacles are available. The landing of a large force with its impedimenta may extend over several days, and this, together with the necessity of maintaining lines of supply, requires that certain beaches provide suitable conditions for continuous landings throughout the operation.

d. Gently shelving beaches, or those having offshore reefs, causing small boats to ground at a considerable distance from the shore line, are unfavorable, as the time of disembarking and deploying is lengthened, with consequent increase in the effect of hostile fire. The use of shallow draft lifeboats or rubber boats will be found advantageous when, because of tactical considerations or hydrographic conditions elsewhere, a landing on this type of beach is desired.

e. Approaches to the beach should be free, under all conditions of tide, from natural or artificial obstructions to navigation, and it is particularly desirable that there be sufficient room to seaward to permit the boats to deploy into their attack formations before coming under effective artillery or small-arms fire. Narrow entrances between islands and channels in reefs prevent this early deployment and greatly increase the effectiveness of the defender's fire.

f. Some of the beaches must provide suitable landing conditions and routes inland for wheeled vehicles and tractors. Such beaches may be captured initially or in subsequent operations. Other beaches may be suitable for landing infantry and pack artillery only. In this connection, it should be recognized that determined foot troops can negotiate precipitous slopes and that such slopes will often offer dead spaces from enemy fires. Landing conditions at the foot of rocky cliffs, however, are often bad and landings may be possible only in calm seas.

g. The area around a beach in which the defender can place weapons for direct aimed fire on the beach will be limited by the configuration of the ground. When such areas have a depth of several hundred yards, the immediate landing is more difficult because of the large zone which has to be neutralized. Shallow areas are advantageous in reducing the size of this zone and permitting the attacker to deprive the defender of observation on the beach after a relatively short advance. Woods which the defender has not had time to clear, or a bluff close to the beach, have certain definite advantages in executing the actual landing, provided the advance of necessary combat equipment is not seriously impeded. Such features may, however, render more difficult the support by naval gunfire of the subsequent advance inland.

h. The number of beaches required for an operation is dependent upon the size of the attacking force, the scheme of maneuver, and the amount of resistance expected. A landing area with a large number of suitable beaches is particularly desirable, even for a comparatively small force, as it causes a dispersion of the defender's efforts and permits the attacker to land on as broad a front as is commensurate with his strength. Such an area also favors tactical surprise, as it offers the attacker a choice in the selection of beaches, and the defender is unable to determine the exact point of landing until the boats have approached close to the shore.

i. The shore line need not be suitable for landing throughout its entire extent, provided the various beaches permit the units landing thereon to be mutually supporting and a portion of the beaches permit the timely landing of the required equipment.

j. Beaches not otherwise suitable may be utilized for landing troops in rubber boats, amphibian tractors, or other special type boats. Such special equipment should be utilized to the fullest extent practicable for the execution of surprise landings, and to assist main landings by pressure at points which, because of the nature of the coast line, are lightly held by the enemy.

141. Suitability of terrain for shore operations.—a. The influence of the terrain on the shore operations is the same as in ordinary land warfare. The proposed zone of advance should be critically examined as to its suitability for the contemplated operation, paying particular attention to the road net, natural obstacles or defiles which have to be forced, observation for both defender and attacker, maneuver room for the force engaged, and landing fields which permit the early entry into action of our land-based aircraft.

b. In connection with the location of the landing area in relation to the final objective of the shore operations, consideration should be given to the advantages inherent in a movement along the coast line. The sea affords protection to at least one flank, and such a movement greatly facilitates the supply problem in that the shore base may be shifted as the action progresses, resulting in shorter and more easily protected lines of supply. This type of operation also compels the defender to fight on lines perpendicular to the beach and permits reinforcement of field artillery by ships' guns firing under the most advantageous conditions. Too much reliance, however, should not be placed on this support except in areas adjacent to the beach and visible from seaward.

142. Station and maneuver areas for naval forces.—a. The naval forces should have station and maneuver areas free from mines and obstructions, and with suitable approaches thereto, in which troops may be safely disembarked and from which the type of fire demanded by the situation may be delivered. The areas must be conveniently located with respect to the available beaches.

b. Water deep enough for maneuvering vessels close inshore is desirable, as it enables ships accompanying the boats to stand well in and deliver their fire at short range. This permits the most effective support during the approach of the small boats and the initial landing.

c. Flanking fire in support of a landing is generally more effective than that delivered from the front, as it tends to enfilade the defender's position and permits small boats carrying troops

to approach closer to the area being shelled. Sea areas from which this type of fire can be delivered are, therefore, extremely desirable.

d. A sheltered transport area will materially decrease the time required for unloading troops and equipment and will lessen the danger of the operation being interrupted by bad weather.

e. Water with a depth and bottom suitable for anchoring marking ships or buoys is a desirable feature. It may be advantageous in some cases to anchor transports or even firing ships. Water of less than 10 fathoms furnishes considerable protection against large submarines, provided the shallow depth extends far enough to keep enemy submarines outside of maximum torpedo range. This depth of water, however, does not furnish complete protection from small submarines, and is favorable for enemy mining operations.

f. If a convenient supporting base is not available for anchorage and protection of the naval forces during the period elapsing between the initial landing and the securing of a suitable new base, it is highly desirable that the landing and operations ashore be planned with a view to securing a sheltered anchorage as quickly as possible.

143. Configuration of the coast line.—a. Favorable landing conditions are usually found in harbors, bays, and indentations in the coast line. Such formations, however, favor the concentration of enemy artillery fire in the entrances and, furthermore, permit the defender to bring flanking fire upon the boats from automatic weapons and antiboat guns from the shores flanking the entrance. Enemy weapons so located must be neutralized by either naval gunfire or the leading element of the landing force before the boats making the main landing come within effective range of such flanking fire.

b. Land projections are favorable to the attacker in that they facilitate the delivery of flanking fire by ships' guns and permit the attacking units to protect both flanks by resting them on the water's edge. At the same time, the base of a peninsula may afford the enemy a strong defensive position which will block progress inland. The seizure of such projections as a supporting measure for other operations may be advisable.

c. A chain of small islands offers certain advantages as a landing area. The delivery of naval gunfire, particularly counterbattery, is facilitated, and the operation may be conducted step by step, each island as it is seized becoming a base for further operations. The islands may be mutually supporting by small-arms or artillery fire, but the employment of general reserves by the defender for opposing the landings on the various islands may be difficult or entirely impossible.

144. Time element.—Certainty of getting ashore is of first consideration, but a successful landing avails nothing if the landing force, by reason of distance or difficulties of the terrain, is unable to reach its objective in time to carry out its mission. The time element, therefore, is important in the selection of the landing area. If time is limited it may be necessary to land close to the objective regardless of enemy dispositions. With more time available, the landing may be made in an area where the beaches are less heavily defended, but requiring more extensive shore operations for the carrying out of the mission.

145. Weather conditions.—Careful study must be made of the weather conditions in the contemplated theater of operations. Operations that may be feasible at one season of the year may be impracticable at another due to weather conditions, such as prevalent high winds which may render landings impossible, the likelihood of storms interrupting ship to shore communications, or rains rendering land operations difficult. Surf and reefs may be negotiable at only one stage of the tide and conditions may vary within the same general area.

146. Final selection of landing area.—a. Landing areas having the best beaches and the most favorable approaches inland will probably be those most heavily defended by the enemy. Conversely, landing areas with unfavorable beaches and easily defended avenues of approach inland will be less heavily defended.

b. The final selection of the landing area will generally be a question of deciding between these conflicting conditions. A correct decision demands a careful estimate of the situation, involving not only a study of the physical features of the beaches but a thorough knowledge of the capabilities and limitations of the opposing forces and a careful computation of time and space.

c. As a rule sufficient information on which to base a decision will not be available until after a thorough reconnaissance has been completed.

SECTION VII

SCHEME OF MANEUVER

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147. **Frontage of attack.**—*a.* An important consideration in formulating a scheme of maneuver is the frontage to be covered by the landings and the subsequent advance inland. Necessarily, the frontage of the landing is dependent, to a large extent, upon the number, type, and relative position of the beaches available in the landing area. An almost equally important consideration, however, is the strength and equipment of the attacking force. During the initial stages of the landing, ships' guns constitute the artillery of the attacking force. This force must be considered therefore, as comprising two elements of major importance, namely—

The landing force.

Naval gunfire.

b. The landing force.—(1) It is desirable to attack on a wide front in order to increase the speed of landing and to cause a dispersion of the defender's efforts, but the attacking force must not itself overextend. It must observe the principle of concentration of effort and assign sufficient forces to the various tasks to insure their success.

(2) Units comprising initial assault echelons are particularly apt to become disorganized during and immediately after the landing, and they cannot be expected to make deep penetrations against strong opposition. It is often desirable, therefore, to have leading assault units secure a limited objective or intermediate beach head and cover the landing of fresh troops with which to carry on the attack.

(3) In many cases landings will not be made on the entire front of the beach head. This will result in the zone of attack increasing in width as the advance inland progresses. The scheme of maneuver, therefore, must provide for the introduction of additional units in the assault from time to time in order to take care of this increased front.

(4) Sufficient reserves must be kept in hand to insure the exploitation of successes and to continue the attack to the final objective. The success of the initial effort is of first consideration and the forces necessary to its success must be assigned thereto before thought can be given to reserves for future contingencies. But an operation which apparently requires all of the attacker's forces for securing the initial foothold on the beach is rarely justified.

(5) The foregoing factors require organization in depth, and units should be assigned frontages which permit a depth of formation commensurate with the effort expected of them; that is, according to the depth of advance, the nature of the hostile opposition, and the assistance to be expected from or given to neighboring units. Consideration must be given not only to the frontage of the landing but to the frontage to be eventually covered by the unit.

(6) For frontages applicable to various subordinate units, see chapter IV, section III.

c. Naval gunfire.—(1) Probably the most difficult decision in formulating the scheme of maneuver is that pertaining to the frontage which can be effectively covered by the fire of the available ships, and it is here that the judgment and responsibility of the commander is put to the severest test. In deciding this question, consideration must be given to: First, *the devastating effect of the fire of relatively few machine guns when firing under advantageous conditions*; second, *that an attack against such weapons has little chance of success unless adequately supported by artillery*; third, *that a landing operation cannot be stopped and resumed at will, and, as a rule, only one chance for success is offered.*

(2) In order to provide this essential artillery support, the scheme of maneuver must observe the principle of concentration of effort for the naval gunfire as well as for the landing force, by limiting the landings to frontages commensurate with the amount of supporting gunfire available. Where the number of ships is relatively small, two alternate maneuvers are offered for accomplishing the desired results, namely—

Landing at few beaches.

Landing at several beaches in echelon, so that all available ships can concentrate successively on each beach.

148. Boats.—*a.* The speed with which troops can be put ashore is directly dependent upon the number and type of boats available and the distance of the transports from the various beaches. The scheme of maneuver, therefore, must take these factors into consideration, particularly where there are not enough boats to embark all of the landing force at one time. The timely support of assault echelons and the prompt exploitation of success require reserves in boats immediately available. This limits the number of boats, and consequently the troops and frontages, which can be assigned the initial assault echelons.

b. The frontage of the initial attack will also be limited by the availability of small, fast boats suitable for assault troops. Such boats should be provided for the leading platoons of battalions which are to be landed in assault. (For detailed discussion of landing boats, see ch. III.)

149. Hostile dispositions.—*a.* Beaches strongly organized for defense should be avoided, if possible, in the initial landings. Advantage should be taken of undefended or lightly defended portions of the shore line, even though presenting less favorable landing conditions, in order to outmaneuver the hostile resistance or to gain a position from which flanking artillery or small-arms fire may be brought to assist the landing at more favorable beaches.

b. This type of maneuver may necessitate awaiting favorable weather conditions in order to effect landings at the desired beaches. It should be recognized that such plans embody additional hazards due to probable delays in execution, and the consequent increased danger of interruption of operations by bad weather or submarine attack.

150. Types of landings.—*a.* A simultaneous landing may be made on all selected landing beaches, or the landing may be made by echelon.

b. In attacking by echelon, it is generally desirable to land last at the beach, or beaches, where it is planned to make the main effort. This enables the ships which support that landing to continue, without interruption, in support of the advance of the main effort. Plans must be flexible, however, and constant consideration should be given to the advisability of exploiting a landing already successfully executed rather than attempting a new landing against opposition.

c. The time interval between landings, in an attack by echelon, may vary between wide limits. Where there are sufficient boats to carry all of the landing force in one trip and the supporting ships can cover the various landings from the same general locality, this interval may be only a few minutes. The amount of ships' gunfire to be placed on the various beaches, together with the scheme of maneuver on shore, will determine this time interval. Where two or more boat trips and considerable movement of the supporting ships are required, or where it is desired to cause a movement of hostile reserves toward the first landing, several hours may elapse between landings. The danger of being defeated in detail must be guarded against.

d. Landings by echelon should be attempted only when the beaches, or groups of beaches, are separated by such distances that troops landed on one beach will not be endangered by naval gunfire on another beach.

e. A landing by echelon, as in a landing on a single beach, facilitates the concentration of the hostile artillery fires. In connection with such landings, demonstrations should be made to cause a dispersion of the hostile fire. In addition heavy counterbattery fire should be employed to neutralize the enemy batteries.

151. Illustrative diagrams—Scheme of maneuver.—*a.* The following figures illustrate diagrammatically the application of the foregoing principles in the formulation of a scheme of maneuver for a landing operation under varying conditions as to number of beaches and form of coast line.

b. The diagrams are intended merely to illustrate general principles under certain conditions. In actual practice, these conditions may be encountered in a variety of forms and in an infinite number of combinations.

c. The broken lines in the diagrams are not necessarily objectives, but indicate simply how the maneuver may develop on shore. The actual location of objectives is dependent upon the contemplated maneuver on shore, the nature of the terrain, speed of landing, and the probable rate of advance.

d. The arrows in the diagrams indicate the direction of the main effort, that is, the direction in which the commander plans to exert the maximum effort in the accomplishment of the particular task in view. This is a general direction only; diverging local maneuvers are often necessary by subordinate commanders, and all local successes should be vigorously exploited.

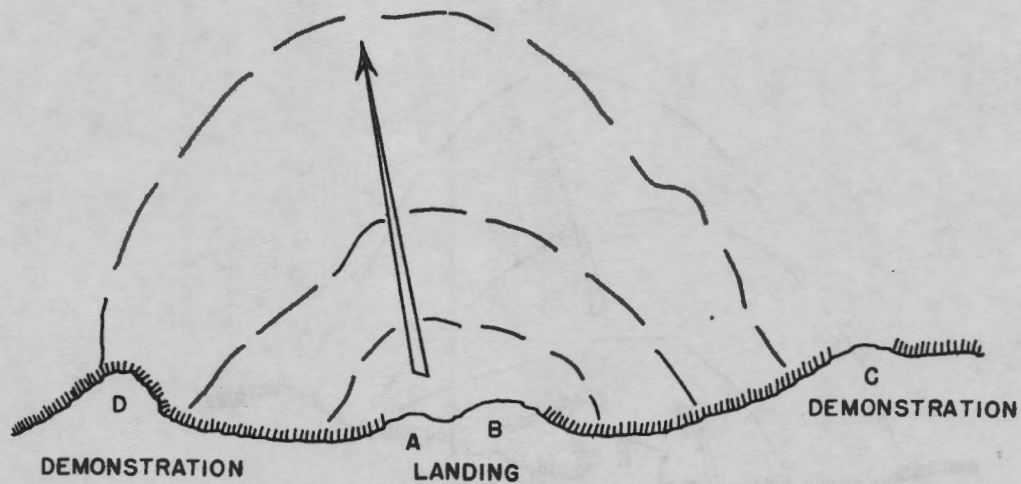


FIGURE 3.

Figure 3 illustrates a landing and demonstrations, with a possible maneuver on shore, when the terrain, amount of naval gunfire, or hostile dispositions make it desirable to limit the landings to one beach, or to a few adjacent beaches.

This maneuver has the advantage of simplicity in the execution of the movement from ship to shore and permits the concentration of ships in support of the one landing.

This type of landing, however, enables the enemy to concentrate his artillery on the landing, facilitates the employment of hostile reserves, and entails the maximum extension of front after the landing is effected. Heavy counterbattery and interdiction fires should be employed in connection with such landings.

The demonstrations at C and D may be employed with any of the illustrations which follow. Demonstrations, made on the flanks of a landing, are desirable in order to disperse the enemy artillery fire and to confuse the enemy as to the actual point of landing. Reconnaissance of adjacent beaches may be conducted in connection with such demonstrations.

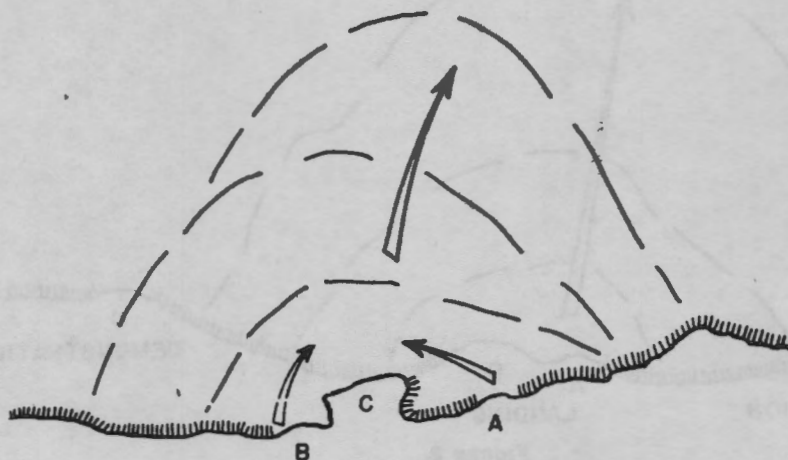


FIGURE 4.

This maneuver is a modification of that shown in figure 3. It illustrates the capture by flanking action of a beach which is strongly defended or difficult of approach from seaward. Initial landings are made at A and B, which have better approaches, are more difficult to defend, or, on account of unfavorable landing conditions, are less strongly held than C. After the capture of C, landings may be continued at that beach, the troops landed at C being used to push the attack in the desired direction.

The landings at A and B may be made simultaneously or by echelon. In the latter case, ships' gunfire is used first to support the landing at A and then at B, or vice versa.

This maneuver may be used in connection with any of the illustrations which follow.

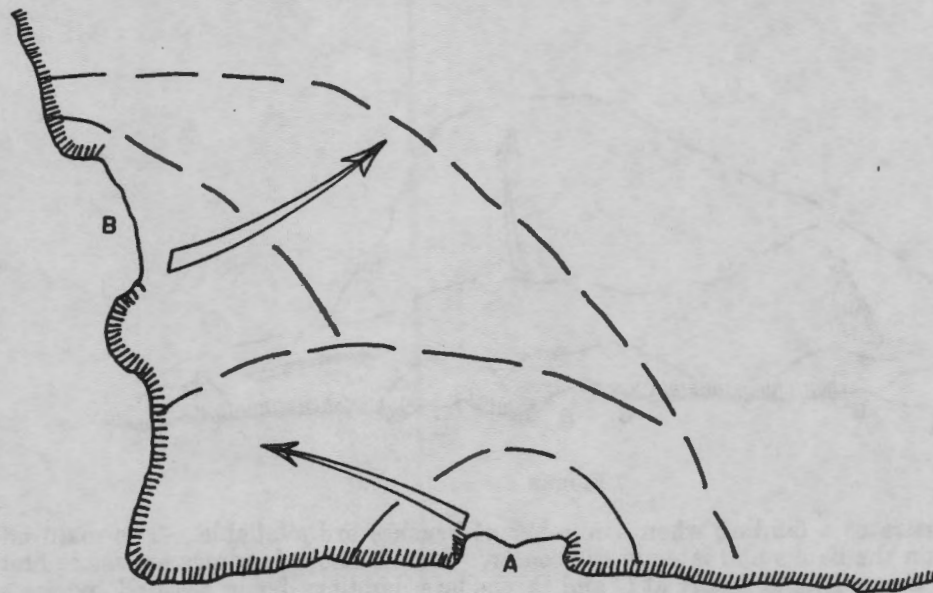


FIGURE 5.

This diagram illustrates a landing on two beaches (A and B) separated to such an extent that the troops will be initially out of supporting distance. The landings at A and B, as in figure 4, may be made simultaneously or by echelon. In the latter case, the first landing is made at A and the second at B in order to facilitate the later support of the main effort. In the event of a success at A, however, consideration should be given to continuing the landing of troops at that point rather than making a new effort at B.

If sufficient boats are not available for embarking the entire landing force at one time, the first trip may be used for the landing at A and the second trip for the landing at B. In this type of maneuver, where a considerable period of time elapses between the various landings, hostile reserves may be deflected toward the first landing and away from the main effort.

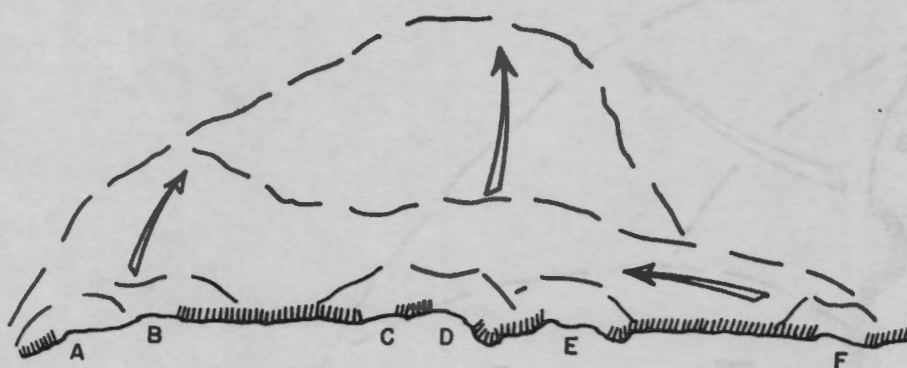


FIGURE 6.

Figure 6 illustrates a landing when a number of beaches are available. The main effort may be initially on the flanks and later in the center. Simultaneous landings are made first at A and F, then at B and E, and finally at C and D, the later landings being assisted by fire and movement from troops previously landed.

Modification of this maneuver may be made by starting at one flank and working toward the other, or by making a simultaneous landing at all beaches. In the latter case, a large number of supporting ships would be necessary.

When sufficient boats are available to transport the bulk of the landing force in one trip, permitting short time intervals between the various landings, this general type of maneuver enables a large number of troops to be put ashore in a short period of time. This is particularly advantageous when the defender has large central reserves, necessitating great speed in the execution of the landings and in the development of the operation on shore.

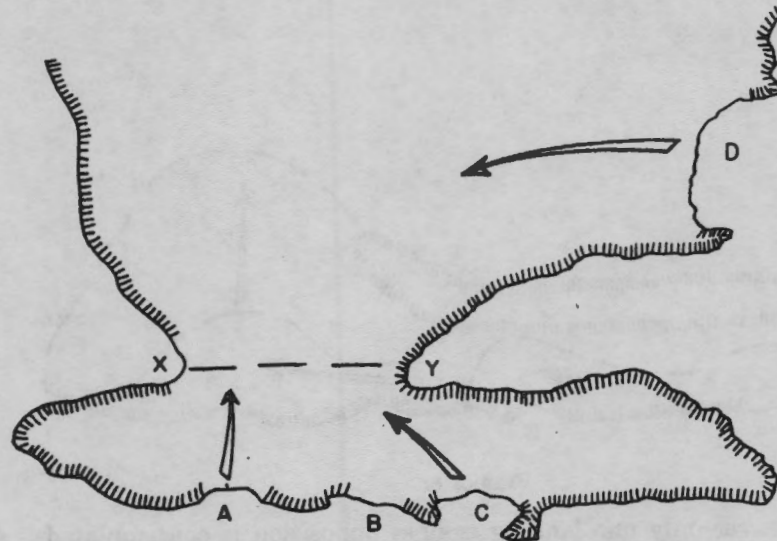


FIGURE 7.

This maneuver illustrates the seizure of terrain in the vicinity of beaches A, B, and C, which later may be used in connection with the main effort at D.

The landings at A, B, and C may be made in accordance with the maneuvers illustrated in the preceding figures. The landing at D may be delayed until enemy forces have been drawn toward A, B, and C, and the advance inland from D may be used to outflank a defensive position such as X-Y.

In some cases, the plan may visualize landing at D only in case the advance from A, B, and C is stopped. This type of maneuver is particularly applicable where there is a naturally strong defensive position, such as X-Y, barring the advance inland from certain beaches which, in consequence, appear to be lightly held. This maneuver presupposes a marked superiority on the part of the attacker.

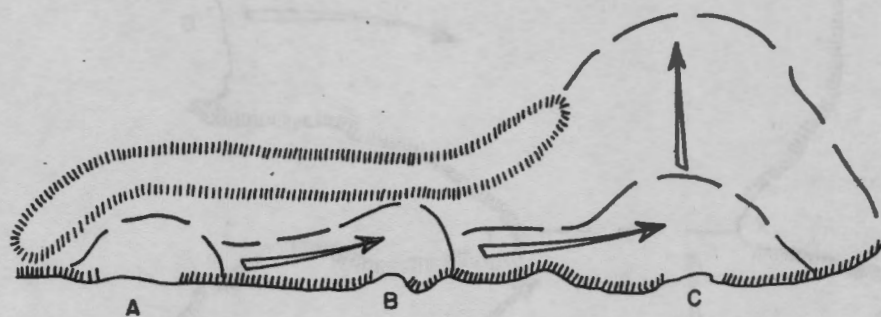


FIGURE 8.

In the above maneuver only one landing against opposition is contemplated. A limited beach head is first secured at A. The troops then push on, capture B, and establish the necessary beach head to permit an unopposed landing there. Troops landed at B then capture C by a similar maneuver.

This type of maneuver is less fatiguing on the landing force than other types of landings at a single beach, in that the troops landing at B and C do not have to march from A. They are, however, landed in close proximity to the front lines. The execution of the landing in this maneuver is relatively slow, and it is generally suitable only when two or more boat trips are required, and where some natural obstacle protects the exposed flank, facilitating a rapid advance from beach to beach.

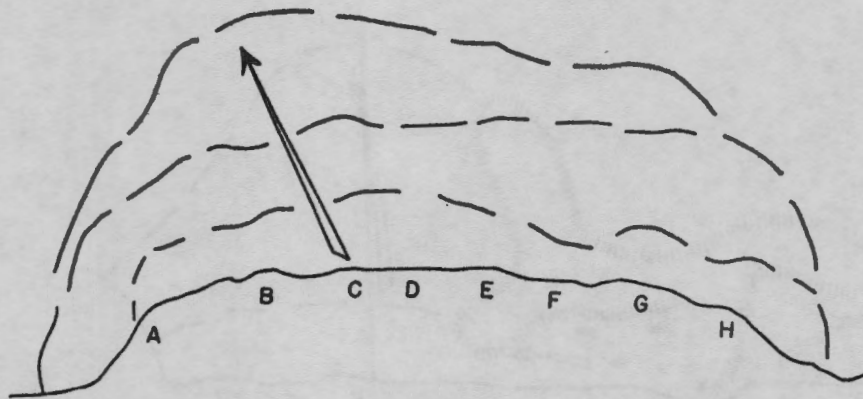


FIGURE 9.

This figure illustrates a simultaneous landing on a long shore line having favorable landing conditions throughout its entire extent.

This is the simplest type of maneuver to execute on land, as all units are mutually supporting and complicated movements are avoided. A large number of supporting ships is required, however, and the movement from ship to shore, involving the simultaneous landing of a large number of boats under naval gunfire, is extremely difficult to execute.

Where the necessary number of ships is not available to support this type of landing, compartments of the terrain may usually be found which will permit a landing by echelon, as illustrated in the next figure.

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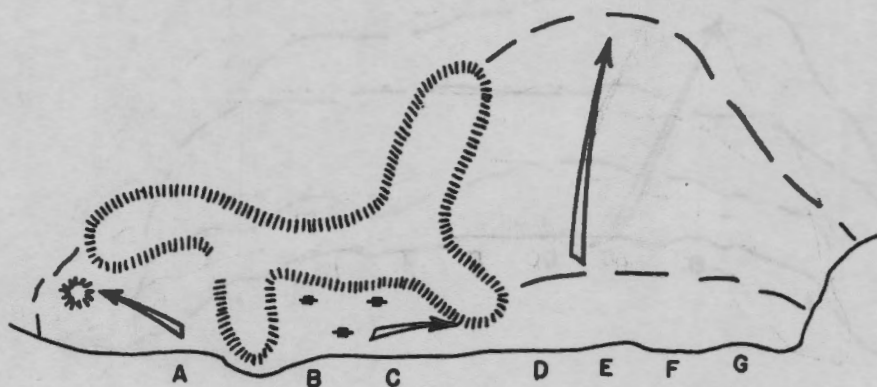


FIGURE 10.

In this diagram, the shore line is suitable for landings at practically all points. Inland terrain features form three natural compartments of terrain, as indicated.

The initial landing is made at A. The troops, after landing, push to the left in order to secure the debouchment from the cul-de-sac in that direction and to confuse the enemy as to the direction of the main blow. Landings are then made at B and C, where field artillery is installed. The main effort is later made at D, E, F, and G, assisted by artillery fire from batteries at B and C, and pressure in the direction of the defile between C and D.

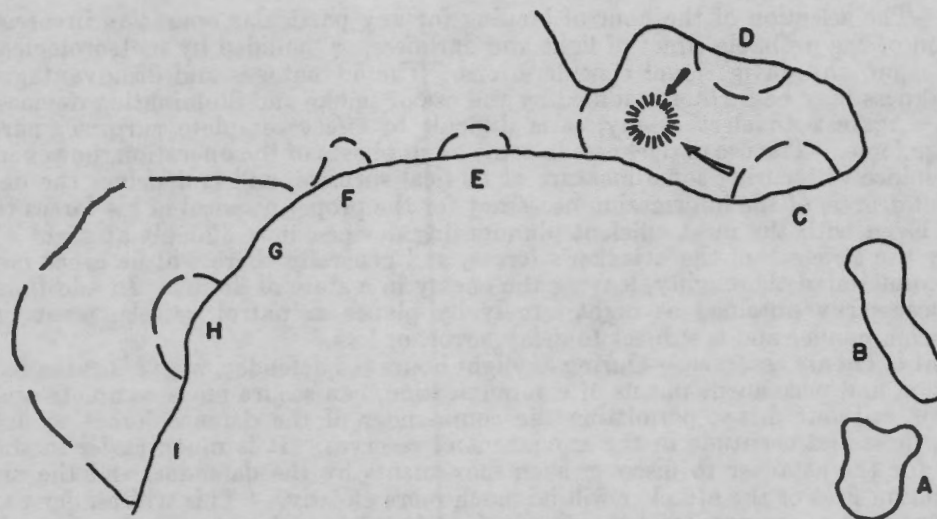


FIGURE 11.

Figure 11 illustrates the capture of islands and a peninsula to permit the passage of boats or transports into a large bay or harbor where the main landing is to be conducted.

In the maneuver illustrated, the islands are taken successively and the peninsula is captured by two converging attacks which may be initiated simultaneously or by echelon. If ranges are suitable, field artillery may be installed on the islands to assist subsequent landings.

When preliminary reconnaissances within the harbor are prevented by situations such as shown above, and the enemy is known to be overextended, it may be advantageous to employ reconnaissances in force in connection with the main landing. These reconnaissances in force are landed as a part of the main landing at several points (as E, F, and H) with a view to discovering the enemy's weak points. These weak points are then quickly exploited by large central reserves held offshore in boats for the purpose.

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SECTION VIII

COMPARATIVE TIMES OF LANDING

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152. General.—The selection of the hour of landing for any particular operation involves careful consideration of the probable effect of light and darkness, as modified by meteorological conditions, air situation, and navigational considerations. The advantages and disadvantages of daylight and darkness may be further modified by the use of smoke and illuminating devices.

153. Surprise.—Against an alert enemy, it is difficult to effect complete surprise, particularly with a large force. The use of darkness in some or all phases of the operation, however, does increase the chance of securing some measure of tactical surprise, and it deprives the defender, to a material degree, of the information necessary for the proper disposal of his forces to meet the attack. Even with the most efficient illuminating devices, it is difficult at night to estimate accurately the strength of the attacker's forces, and generally there will be areas not illuminated and reconnoitered thoroughly, leaving the enemy in a state of doubt. In addition, the information, necessarily obtained at night largely by planes or patrol vessels, must be transmitted to the commander and is subject to delay, error, or loss.

154. Movement of enemy reserves.—During daylight hours the defender, with his extended system of observation and permanent means of communication, can secure more complete and accurate information without delay, permitting the commander of the defense forces to act with greater promptness and certitude in the movement of reserves. It is much easier in the daytime, however, for the attacker to discover such movements by the defender, and the air attacks and interdiction fires of the attacker will be much more effective. This will render the use of roads for movement of reserves, and the occupation of positions close to the shore, much more hazardous than at night.

155. Air operations.—*a.* Granted that the attacker will always have superiority in the air, night attacks are favorable to the defender because it is only in daylight that full advantage can be taken of superiority in the air. This applies particularly to the protection of transports and combat ships. Bombing under cover of darkness is practically impossible to stop, regardless of the numerical superiority of the attacker in the air. A night operation, therefore, involving the anchoring or laying to of transports for several hours, should rarely be attempted in the face of an active enemy air force. Such an operation may be practicable when destroyers or small craft, not so vulnerable to air attack, are used for transporting troops for the initial assault echelons. Transports carrying the main forces may come in after daybreak under protection of the attacker's air force.

b. The possibility of avoiding discovery of the attack force and attacks thereon by enemy aircraft during the approach to the objective should be carefully considered. If arrival at the objective is planned at daybreak, advantage may be taken of the hours of darkness to avoid discovery prior to the landing. This procedure also extends the area that must be searched to seaward by enemy patrols to include the daylight hours preceding the night run of the attack force. Such operations are within the capacity of modern aircraft, however, and must be expected.

c. Consideration should be given to a surprise landing by parachute troops, or troops with portable landing boat equipment transported by patrol planes during the night from a distant base.

d. Effective air support of the landing is seriously handicapped by darkness or poor visibility due to the difficulty of operating aircraft from ships at night and of locating well-concealed targets in the beach defense area.

156. Operations of naval defense forces.—Even though the attacker has control of the sea in the area of operations, such control does not preclude the defender launching night destroyer

attacks, day and night submarine attacks, and mining operations. The presence of one or all of these threats, and the means available to counter them, are factors that must be considered in selecting the hour of landing. These countermeasures are more effective during daylight.

157. Effectiveness of defender's fire.—*a.* Darkness materially reduces the effectiveness of the defender's rifle and automatic rifle fire. Machine guns are affected to a less degree, particularly when firing on their final protective lines. Smoke, if properly laid, can produce the same effect as darkness in reducing the effectiveness of the enemy's small-arms fire.

b. Indirect artillery fire is much more effective when observed, particularly in firing at moving targets such as boats, as the fires can be displaced to follow the targets and the rate of fire can be stepped up when the target approaches the area being shelled. The effective delivery of aimed fire from antiboat guns on the beach necessarily requires that the targets be seen from the guns. Insofar as enemy artillery fire is concerned, therefore, night operations favor the attacker. Smoke is not nearly as effective as darkness in preventing terrestrial and aerial observation.

158. Effectiveness of fire from boats.—The effectiveness of the fire from boat guns will be materially reduced by darkness or smoke. If the attacker plans to have a large number of properly armed boats in his leading waves capable of producing a heavy volume of fire, it is probable that darkness or smoke would be more favorable to the defender in the fire fight which will occur just prior to the landing.

159. Effectiveness of ship's gunfire.—Ship's gunfire on the beaches, as well as interdiction and counterbattery, will be much less accurate at night or in smoke and constitutes a greater hazard to friendly troops. Inshore supporting ships accompanying the boats depend, for their greatest effectiveness, upon direct laying on observed targets. Darkness or smoke would prevent the necessary observation for the conduct of such fire and would thus greatly reduce the effectiveness of, or even preclude, one of the most valuable forms of support. If an adequate number of vessels is available to stand close in and support the attack at short ranges, and the depth of water and configuration of the coast line permits, a day landing is almost obligatory.

160. Navigational considerations.—The navigation of ships and the handling of small boats will be greatly facilitated by a daylight operation. On an unfamiliar coast, without thorough reconnaissance and the establishment of navigational aids, there is no assurance that a landing could be made at night on the designated beaches. The establishment of such navigational aids tends to deprive the attacker of the surprise sought in a night operation but they should not be dispensed with where it is important to land at specific points. Where navigational hazards are great, a day landing may be obligatory.

161. Conduct of operations on shore.—*a.* Night attacks are extremely difficult to execute and are rarely attempted in land warfare except under special conditions. Even if a night landing is contemplated, the bulk of the force should be landed shortly before or at daybreak so that the troops will have the benefit of light in conducting the operations on shore.

b. If the decision is to make a day landing, the hour fixed should be early enough to allow sufficient daylight for the operations contemplated for the first day.

162. Meteorological conditions.—The following meteorological conditions may influence the the hour of landing:

- Prevailing winds.
- Surf conditions.
- Prevalence of fogs or mists.
- Direction of the sun.
- Phase of the moon.
- Tides.

163. Final selection of hour of landing.—It may be seen from the foregoing that the selection of the hour of landing involves consideration of a number of conflicting factors. The weight to be given each of these factors will vary between wide limits according to the type of operation and the conditions existing in the contemplated theater of operations. In general, it may be said that where the enemy has considerable force in the area of operations but where the choice of landing places is so wide that he cannot defend them all a night landing will probably offer the best chance of success. Conversely, should the choice of landing places be so restricted that the enemy, though deficient in total strength in the area, has been able to establish defenses at each, the best way of overcoming those defenses will be an accurately coordinated day landing, carried out with the support of intense naval gunfire and vigorous air operations against ground targets.

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SECTION IX

PLANS AND ORDERS

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164. Flexibility in planning.—In addition to a preferred plan for the contemplated operation, one or more alternate plans should be prepared prior to embarkation. The organization, equipment, training, and embarkation of the Fleet Marine Force and certain other naval task groups should permit the execution of any one of the prepared plans, a modification thereof, or the preparation and execution of an entirely new plan. Weather conditions, additional information, enemy action, or other changes in the situation which may occur between departure and arrival at destination may require extensive modification of plans, or a complete change of plans, in order to accomplish the mission of the expedition.

165. Basic orders and instructions.—A large part of the orders, instructions, and other matter which must be published prior to embarkation are applicable to any plan which might be adopted in the proposed theater of operations. This includes such orders as those relative to embarkation and movement overseas, basic task organization, intelligence data, basic communication instructions, basic supply and administrative provisions, general instructions to beach and shore parties, armament and equipment of boats, and general instructions relative to indoctrination and methods of landing. Such basic orders and instructions should be published separately, rather than as a part of any one plan, since they remain effective, unless specifically modified, for any plan which may be adopted. Any particular operation plan can thus be limited to those details which are peculiar to that operation, permitting orders and annexes for each plan to be prepared in more concise form. This procedure will be of particular advantage when it becomes necessary to make extensive modification of plans, or to prepare and execute a new plan.

166. Maps and overlays.—A liberal use of maps, overlays, and sketches as part of plans and orders is desirable where such plans and orders can thereby be prepared in more clear and concise form.

167. Dissemination of orders en route.—As far as practicable, all plans and orders are distributed prior to sailing from the last port of call. Necessity will probably arise for the distribution of data secured or prepared after departure, such as airplane photographs, intelligence data, or more detailed instructions. Such data as well as extensive modification of plans or change of plans must be distributed to ships concerned by airplane drop, dispatch vessel, or by rendezvous of some or all of the fleet units concerned. Minor modification of plans may be disseminated by signal communication.

168. Centralization in planning.—The wide dispersion of troops on transports, the difficulties in the transmission of papers after departure, and the time needed for the preparation of orders by intermediate commanders may justify centralization of planning and variation from the normal form and procedure in the issuance of operation orders. For example, in a force consisting of several brigades, force orders may be formulated in sufficient detail to be issued direct to regiments or battalions, thereby obviating the necessity for, or limiting the scope of, brigade and regimental orders for the landing and initial operations ashore. Similarly, certain annexes, such as the Landing Schedule, Naval Gunfire Support Annex, etc., may be published in a form suitable for issue to battalions, either direct or attached to the orders of intermediate commanders.

169. Detailed plans.—Details relative to the preparation of the various operation orders and annexes are covered in succeeding chapters.

CHAPTER II

TASK ORGANIZATION

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SECTION I

ORGANIZATION AND COMMAND

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201. The attack force.—a. The attack force is a task organization of the fleet especially constituted for the conduct of landing operations. It consists of—

The naval task groups.
The landing force.

b. If separate operations are contemplated in localities at such distances from each other that direct command and coordination by one commander would be difficult or impracticable, two or more attack forces may be organized.

c. Each attack force is designated by a suitable name, such as "Dewey Attack Force." For reasons of secrecy and to prevent confusion in case the attack force operates in more than one area, it is inadvisable to designate an attack force by the name of its objective or the locality in which it is to operate.

d. The commander and the units of each attack force should be designated at the earliest practicable date. The attack force commander will usually be the senior naval commander of the units of the fleet comprising the attack force. It may be impracticable, however, to determine the complete organization of the attack force until the situation in the proposed theater of operations has been ascertained. Under such conditions, in order to provide continuity of planning and execution, it will be desirable to designate as attack force commander an officer, not necessarily commanding a fleet unit, especially selected for the conduct of the operation, and provided with an adequate staff and a suitable flagship. He should be senior to commanders of fleet units which may be assigned to the attack force. Provision must be made in advance for continuity of command within the landing area during the course of the operation.

e. In order that the attack force commander may better control the operation of all task groups, it is desirable that his flagship operate independently of these groups. If the fire of the flagship is required it is desirable that it be utilized in general support of the operation as a whole rather than to support a specific organization of the landing force.

f. When an advance force (ch. I, sec. III) has been operating in the theater of operations prior to the arrival of the attack force, it is desirable that vessels of the advance force be assigned to the attack force upon its arrival in the theater, so that the operations of the two forces may be closely coordinated.

202. Tasks of naval task groups and landing force.—The normal tasks of the naval task groups and the landing forces are:

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a. Naval task groups.—

- To provide adequate reconnaissance.
- To provide protection against enemy naval forces during the landing operation.
- To provide, man, equip, and operate the small craft required for the operation, and to land personnel and matériel of the landing force in accordance with the approved plan for the landing.
- To support the operation by gunfire, aircraft, and screening operations, fire from boat guns, mine sweeping, and removing underwater obstacles.
- To provide signal communication between ships and shore.

b. The landing force.—

- To provide troops for reconnaissance of the beach.
- To deliver fire from its own weapons while embarked in boats for landing and to assist in manning designated boat guns.
- To conduct operations on shore necessary for the accomplishment of the mission.

203. Organization of the naval task groups.—*a.* The vessels assigned the attack force are organized into task groups appropriate for the various operations involved and the scheme of maneuver decided upon. These task groups will include some or all of the following:

(1) The reconnaissance group, or groups, consisting of vessels assigned the task of reconnoitering the landing area selected for the operation, and such other areas as may be considered desirable in order to confuse the enemy as to the point of landing. The reconnaissance group is generally composed of suitable vessels from the other task groups listed below.

(2) The fire support group, or groups, consisting of vessels assigned gunfire missions in support of the landing and subsequent operations.

(3) The air group, consisting of aircraft assigned to support the operations. Aircraft of the landing force may be attached to the air group during such periods as may be desirable.

(4) The transport group, or groups, consisting of the transports and supply vessels used in carrying troops, equipment, and supplies.

(5) The control group, consisting of vessels designated to guide and assist the movement from ship to shore, provide communication facilities with the boats and troops while en route to the beach, and to assist in controlling the supporting naval gunfire. Certain vessels of this group may be utilized at convenient times to lay smoke screens, assist in furnishing fire support, etc.

(6) The antisubmarine group, consisting of the vessels designated to protect the units of the attack force from enemy submarines. This group may be given the task of laying destroyer smoke screens to protect vessels and boats from observation. As a rule, this is not a separate task group. Suitable vessels for antisubmarine screen are usually assigned the principal task groups of the attack force.

(7) The mine group, consisting of the vessels assigned the task of conducting sweeping and mine-laying operations. This group may be given the task of removing underwater obstacles.

(8) The screening group, consisting of that part of the force assigned the task of providing security from enemy forces afloat.

(9) The salvage group, consisting of such light craft as may be available for rescuing personnel of distressed boats, hauling off grounded boats, and the recovery of sunken equipment. (See ch. IV, sec. VIII.)

(10) The demonstration group, or groups, consisting of the vessels assigned the task of making demonstrations outside of the designated landing area.

b. It may be necessary to organize a special task group to protect small boats from enemy light surface craft. If a separate group is not organized, this task should be assigned other groups operating in the vicinity of the beaches and routes of approach thereto.

c. Supply vessels carrying boats, crated or knocked-down aircraft, or other equipment essential for the conduct of the landing and hospital ships, may be assigned to the transport group or they may be organized into separate task groups of the attack force. Vessels carrying troops, equipment, or supplies not needed immediately may be organized into a separate task group and kept out of the landing area until required.

d. It may be desirable to assign the tasks specified for two or more of the groups listed in this paragraph to a single task organization. As the operations progress, the composition of the task groups may be changed, certain vessels being transferred from one group to another.

204. The attack group.—*a.* When the attack force is to conduct operations on a broad front under conditions which would make direct control by one commander difficult or when the

operation naturally divides itself into distinct tasks, it may be advisable to organize the attack force into two or more attack groups.

b. The attack group consists of a detachment of the landing force and some or all of the naval task groups listed in paragraph 203. Certain of the task groups, such as the air group, reconnaissance group, and the screening group, may be retained under the direct control of the attack force commander and support the operations of all attack groups.

c. Each attack group is given an appropriate name such as "Right Flank Attack Group, Dupont Attack Force."

205. The landing force.—*a.* (1) The provisions of this publication contemplate that the major part of the landing force will be composed of units of the Fleet Marine Force

(2) The Fleet Marine Force is composed of three main elements, namely:

Lightly equipped units suitable for offensive landing operations.

Base defense artillery.

Aircraft.

(3) In order to reduce the number of transports in the initial movement it may be advisable to organize a separate transport group for base defense artillery, or certain portions thereof not required until the base is taken. More economical loading of transports will result, however if base defense artillery is distributed among the vessels transporting the entire force.

(4) The employment of the aircraft of the landing force will depend upon the availability of landing fields in the vicinity of the contemplated landing area, and the number and type of vessels available for its transportation to the theater of operations. (See ch. VI, Aviation.)

b. Organization of the landing force.—(1) For operations on shore, the task organizations of the landing force are its regularly organized tactical units such as battalions, regiments, and brigades. Special task organizations are required for—

The embarkation.

The movement from ship to shore.

(2) For embarkation the landing force is subdivided into "embarkation groups," each group usually composed of a proportional part of all arms and capable of independent action. Each embarkation group should be embarked in a transport division of the transport group. (See par. 920.)

(3) For the movement from ship to shore the landing force is subdivided into "landing groups," each composed of a reinforced infantry battalion, or other unit of approximately the same size. The boats which transport the landing group to the beach are organized into a "boat group." (See pars. 403 to 405.)

c. Embarkation of commanders.—(1) During the preparation of all plans the commander of the landing force, or at least appropriate members of his staff, should be available to the commander of the attack force.

(2) For the voyage overseas the commander of the landing force shall, if practicable, be embarked on the flagship of the attack force commander. Provision must be made for the landing of the commander of the landing force and his staff at the proper time.

(3) When operating as part of a larger force, commanders of lesser units such as regiments, brigades, or divisions should be embarked on the flagship of the transport division or squadron transporting the units of their commands. During the movement from ship to shore it may be desirable for regimental, brigade, or division commanders or such members of their respective staffs as they may designate, to transfer temporarily to vessels of the control group.

206. The transport group.—*a.* The transport group commander is responsible for—

Preparation and assembly of transports, boats, and special equipment for the landing, and the assembly and training of the necessary naval personnel for the operation of these vessels, boats, and equipment.

Assignment of boats to transports, and if necessary, the organization of boats into boat groups.

Embarkation of troops and matériel in accordance with approved plans.

Conduct of the transport group in the movement overseas.

Debarcation of troops and matériel in accordance with the approved plans for the operation.

Designation of boat rendezvous area, or areas.

b. In an operation involving a large number of transports, effective control of the embarkation, movement overseas, and the landing requires that the transport group be organized into

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appropriate transport divisions, each embarking a self-sustaining unit of the landing force known as the "embarkation group."

c. The transport group commander operates through his transport division commanders and they, in turn, operate through the transport commanders. The landing force has a corresponding chain of command, namely: (1) The commander of the landing force, (2) a commanding officer of each embarkation group embarked on a transport division, and (3) the commanding officer of troops on each transport. This parallel chain of command decentralizes and simplifies the planning and execution of the various operation involved. It also permits the closest liaison between corresponding troop and transport commanders.

d. The transport group, the transport division, and the transport commanders should be designated at the earliest possible date and should be free to supervise the preparation of their vessels, training of personnel, assembly of the necessary boats and matériel, and preparation of detailed plans for the various operations. The transport group commander, in particular, should be provided with an adequate staff. Frequent conferences between transport commanders and appropriate commanding officers of units to be embarked are essential during the period of preparations.

e. The detailed organization of transport divisions and corresponding embarkation groups of the landing force is covered in paragraph 920.

f. The transport group commander keeps the commander attack force informed of the progress of the debarkation and advises him when the landing waves are embarked in boats. (See par. 405e, for control of debarkations by transport commanders.)

g. The detailed planning of the movement from ship to shore, see chapter IV.

207. **Organization of boats.**—In order to control effectively the movement from ship to shore the landing boats are organized into boat divisions, groups, and, if necessary, flotillas, and appropriate commanders designated. (See par. 405.)

208. **The control group.**—a. **Tasks.**—The following are the normal tasks of the control group:

Mark control points necessary for regulating the movement from ship to shore, and other points designated by the attack force commander. (See ch. II, sec. III, Station and Maneuver Areas.)

Control the movement of all boats between the rendezvous areas and the beach. (See pars. 427 and 431.)

Keep attack force commander, and such other commanders as may be designated, informed of the progress of the movement from ship to shore, the landing of various waves, and the subsequent operations on shore visible from seaward.

Assist in control of naval gunfire supporting the landing.

Relay messages from and to the landing beaches.

b. **Composition.**—(1) If available, the control group should consist of sufficient vessels or small craft to permit one vessel to be assigned to each landing boat group. It may be practicable to utilize as control vessels the fire support ships accompanying the boats, and vessels of the mine group. If sufficient vessels are not available to permit the assignment of one control vessel to each landing boat group, motorboats may be utilized.

(2) As the control group must be familiar with the landing area it is desirable that vessels and personnel taking part in the preliminary reconnaissances be assigned to it.

c. **Communication.**—(1) Each control vessel should be prepared to communicate direct with the landing boats, as well as the flagship of the attack force, fire support groups, control group, and other designated vessels. This will usually require additional communication facilities on each control vessel. (See pars. 711 and 712, Communications.)

(2) It is particularly important that control vessels communicate to higher commanders and fire support groups when landing waves pass control points and the line of departure.

(3) Visual and messenger boat communication should be established with the beach party as soon as it has landed. Special observers should be detailed to watch for pyrotechnic signals from the boats, aircraft, and landing force.

d. **Control of movement from ship to shore.**—(1) After marking or identifying the line of departure and control points (see pars. 221 and 222) the designated vessels of the control group rendezvous with the boat groups at the designated time and place, guide them in to the line of departure, and regulate the speed of the movement so that the successive waves will cross the line at the scheduled times. This will permit orders modifying the plan to be transmitted to the boat groups through the proper control vessels. These scheduled times may be previously prescribed by the attack force commander; if not, an approach schedule computed by

the commander of the transport which carried the troops to be guided should be delivered to the control vessel in the boat rendezvous area. As it is extremely important that the boats move on the prescribed approach schedule, it is desirable that control vessels be equipped with long-base range finders with which they can take frequent ranges on the line of departure and beach.

(2) If vessels of the control group have the additional task of furnishing gunfire support, they proceed to their prescribed firing stations as soon as the necessity of controlling the boat movement ceases.

(3) It is desirable, whenever practicable, that the approach from the boat rendezvous areas to the line of departure be planned as a simultaneous guided movement of all control vessels, each acting as guide to a boat group. (See pars. 431 and 432.)

(4) After leading boat groups have landed, certain designated control vessels may be utilized as a rendezvous for boats transporting field artillery and reserves. This will permit final orders as to time and place of landing of artillery and reserves to be transmitted through a control vessel.

(5) If the transport group is compelled to put to sea for any reason, control vessels may be designated as mother ships for the boat groups until the boats and transports are reassembled.

e. Control of naval gunfire.—(1) The vessels of the control group signal the fire support groups when the leading boats are in the positions prescribed by the attack force commander for opening, lifting, or ceasing fire. (See par. 228f.)

(2) In order to assist in the control of fire, spotters from the firing ships may be put aboard control vessels.

f. When two or more boat groups land simultaneously on contiguous beaches, one of the control vessels should be designated to signal all of the necessary information to the attack force commander and appropriate fire support vessels.

209. The reconnaissance group.—*a.* In the operation of the reconnaissance group particular attention should be paid to the following:

Identifying "fixes" on the beach and establishing such other aids to navigation as may be necessary. Photographs and panoramic sketches executed by surface craft or submarines, and oblique aerial photographs from seaward will be of great assistance to boat group commanders in locating their beaches, to troop commanders in planning their operations on shore, and to fire support groups in planning and executing the supporting fires.

Ascertaining enemy naval dispositions within and in the vicinity of the landing area. Determining the suitability of beaches and sea areas required for the conduct of the operation.

Locating underwater obstacles and other obstructions such as booms and nets installed by the enemy, particularly in the vicinity of the selected landing beaches, or approaches thereto.

Ascertaining if beaches have been gassed. This is particularly important on small islands or in other restricted areas.

Locating mined areas.

Ascertaining enemy dispositions on shore and selecting suitable targets, landmarks, and aiming points for fire support ships.

Securing information regarding the enemy air force.

b. For conducting reconnaissance patrols, see chapter IV, section VI.

210. The mine group.—*a.* Sweeping operations may be conducted in connection with the preliminary reconnaissance of the landing area, and part or all of the mine group may be assigned the reconnaissance group for this purpose.

b. In the conduct of mine-sweeping operations particular attention should be paid to the transport and fire-support areas, and approaches thereto.

c. Booms, nets, and other obstructions installed by the enemy may be removed by dragging the obstacles into deeper water, wire-cutting parties, explosives, or utilizing boats or small craft to cut breaches.

211. The fire support group.—For detailed tasks and organization of the fire support groups, see chapter V, Naval Gunfire.

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SECTION II

SHORE PARTY

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212. Shore Party.—a. The shore party is a special task organization formed for the purpose of facilitating the landing and movement off the beach of troops and material. It comprises elements of both the naval forces and the landing force, and is commanded by an officer of the landing force known as the shore party commander. Each shore party commander is responsible to the senior troop commander operating in the zone which his shore party serves. He exercises control of all activities in the immediate beach area delimited by the senior troop commander in that zone. The beachmaster is the naval officer in charge of the naval section of the shore party. He will act as assistant to the shore party commander and will be his advisor on naval matters.

The tasks of the shore party are as follows:

1. Mark hazards to navigation in the vicinity of the beach and determine most suitable landing points.
2. Effect emergency boat repairs.
3. Evacuate casualties to ships in accordance with Naval Attack Force and Landing Force Medical Plans.
4. Control boat traffic in the vicinity of the beach.
5. Direct landing, retraction, and salvage of boats.
6. Mark landing beach limits.
7. Establish and mark unloading points on landing beaches.
8. Unload the material of the Landing Force from small craft.
9. Remove underwater and beach obstructions.
10. Evacuate prisoners of war to ships in accordance with Landing Force Instructions.
11. Construct landing facilities when required.
12. Maintain liaison with senior troop commander within the zone served by that particular shore party; and in the case of the Senior Shore Party Commander, with the senior command of the Landing Force ashore.
13. Maintain order and direct traffic on and in the vicinity of the beach.
14. Provide bivouac, parking, and storage areas on and in the vicinity of the beach for various elements using that beach.
15. Insure rapid movement of equipment and supplies landed on the beach, in accordance with requirements of the units which the Shore Party is serving.
16. Maintain a record showing organizations, matériel, and supplies, by appropriate categories, which have been landed on the beach.
17. Construct and maintain beach exit routes.
18. Provide for decontamination of gassed areas on the beach.
19. Maintain a situation map for information of landing units.
20. Operate emergency motor maintenance service to assist vehicles damaged in landing.
21. Provide local security for beach area.
22. Perform such other functions as are assigned.
23. Establish communication with adjacent shore parties.
24. Maintain communications with naval vessels and forces ashore as necessary.

The execution of tasks (1) through (5) are functions of the naval component of the shore party for which the beachmaster is directly responsible to the senior naval officer afloat and will deal directly with him in regard to these tasks. Tasks (6) through (22) will be performed by the military component of the shore party. Tasks (23) and (24) will be performed jointly by the military and naval sections.

b. Composition.—The size and composition of the shore party will of necessity vary with the tactical situation. It should embody personnel qualified for discharge of the following functions:

1. Communications.
2. Military Police.
3. Labor.
4. Mess.
5. Liaison.
6. Salvage.
7. Engineer.
8. Medical.
9. Boat repair.
10. Local defense.

213. Landing the Shore Party.—It is essential that the several shore party commanders, along with shore party, hydrographic reconnaissance, and beach marking personnel, land in the leading boat group, and that the remainder of the shore party be transported ashore as soon thereafter as practicable in order that the full utility of the organization may be developed early in the operation.

214. Medical Service.—*a.* Medical units of the landing force are responsible for the treatment, care and evacuation of casualties ashore and for designation of casualties to be evacuated to hospital ships or transports. Landing force medical units are also responsible for movement of evacuable casualties to the beach.

b. The shore party is responsible for placing evacuable casualties in ambulance boats and for regulating the flow of casualties to transports and hospital ships. Ambulance boats along with attendant medical personnel will be furnished by hospital ships or transports as directed in the Naval Attack Force Medical Plan. Upon reporting to the shore party commander initially, these boats are under his control until dispatched with casualties.

c. Details of the medical service afloat and ashore are covered in Chapter IX, Section VIII.

215. Personnel for Shore Parties.—*a.* Shore parties should be organized operating units in the same sense as are tactical units of the landing force. They should be composed to fit the specific tactical situation in hand, and should be exercised prior to active operations.

b. The military components of the shore party should be of such composition as to permit the effective discharge of their tasks as listed in 212*a* above.

c. The naval section of the shore party should be provided from vessels of the transport division in which the military elements of that shore party are embarked. It should include personnel and equipment for discharge of tasks in accordance with paragraph 212*a* above.

d. The number of shore parties required and their precise composition will vary with the size of the landing force, and the character and number of beaches utilized. As a general principle, one shore party should be organized for each reinforced regiment and this shore party should be susceptible to division into three parts, each for the support of a reinforced battalion.

216. Reconstruction and Relief of Shore Parties.—*a.* Following the initial assault phases of an operation, it will frequently be found that only certain beaches are maintained for continued use. In those cases, individual shore parties so released may be used for reinforcement of details on active beaches.

b. Upon completion of the initial transport unloading task and seizure or construction of landing facilities, shore parties should be supplanted by base logistical agencies as the situation dictates.

217. Deleted.

218. Deleted.

LANDING OPERATIONS DOCTRINE

SECTION III

STATION AND MANEUVER AREAS

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219. Assignment of areas.—The various naval task groups must be assigned appropriate station and maneuver areas within the landing area to permit them to carry out their assigned tasks. These will include the following:

One or more transport areas in which transports or other vessels disembark troops and matériel.

One or more fire support areas in which the fire support groups will operate.

Such other stations, or cruising directions, as may be necessary to coordinate the naval operations within the landing area.

220. Transport and gunfire support areas.—*a. Movement of boats.*—The transport areas and gunfire support areas must be so located in relation to each other that boats transporting troops and matériel from ship to shore will not be interfered with by the movement of the firing ships, and vice versa.

b. Fire support areas.—There may be several fire support areas, according to the number of supporting ships, the fire missions, and the hydrography and topography of the landing area.

The location of fire support areas, as regards the most effective delivery of the various classes of fire, is covered in detail in chapter V, Naval Gunfire.

c. Transport areas.—(1) The transport areas should be conveniently located in respect to the landing beaches, and as close inshore as enemy artillery fire and depth of water will permit.

(2) The areas selected should, insofar as the hydrography of the landing area permits, afford smooth water for debarkation of troops and matériel, and protection against attack by enemy surface craft and submarines.

(3) Where beaches are separated by considerable distances it may be desirable to designate two or more transport areas.

(4) The location of the transport areas and the initial movement of boats should not disclose to the enemy early information as to the exact point of landing.

(5) Ships within transport areas should not be crowded, as space must be provided for the assembly and movement of boats. In the assignment of berths to transports the intermingling or crossing of boat units should be avoided.

(6) Provision should be made for maneuvering the transport group after the debarkation of troops is completed. This will reduce the effectiveness of enemy submarines and aircraft attacks.

(7) As soon as the situation permits, transports should move as close to the landing beaches as possible, in order to speed up the landing of equipment and supplies. Smooth water is extremely desirable.

d. Mines.—In locating transport and fire support areas consideration should be given to the probable location of enemy mine fields. Where selected areas are found to be mined they should be swept, or other areas designated.

221. Line of departure.—*a.* The line of departure is a coordinating line suitably marked to assist the various waves to land on designated beaches at the proper time, and to coordinate naval gunfire and aircraft operations with the movement of the boats.

b. During daylight, unless prevented by reefs or other navigational hazards inshore of the line of departure, boats deploy into their attack formations on or before crossing the line of departure. In order to insure that this deployment will take place prior to the boats coming under effective small arms or light artillery fire, the line of departure should be from 2,500 to 5,000 yards from the beach. The line should be so oriented in relation to the landing beach that boats will, if possible, have a straight run for the beach and the waves will be on proper line of bearing.

c. In order that boats may land on schedule it is essential that the line of departure be accurately located at the prescribed distance from the beach.

d. A separate line of departure should be designated for each beach except where beaches are continuous, then one line of departure may suffice for two or more beaches.

222. Reference and control points.—*a. Reference points.*—For reasons of secrecy and to simplify the preparation of plans and orders, it will be found convenient to designate reference points for prescribing the limits of transport areas, fire support areas, lines of departure, etc. Each reference point is designated by a letter and is fixed by giving its bearing and distance from a known point, grid coordinates, or the latitude and longitude.

b. Control points.—(1) Control points are those reference points which are marked by buoys, boats, or small craft for use as aids to navigation for the vessels and boats of the attack force. Control points should be established as follows:

To indicate lines of departure.

To indicate where boats change direction, pass through lanes between fire support groups, and at other points which will aid the control group in regulating the movement of the boats. It is desirable that a control point be located in the vicinity of the point where landing boats should be when the final bombardment of the immediate beach defenses starts.

To aid the various supporting groups to move into the landing area, take accurate station therein, and conduct the necessary operations in the area on the prescribed time schedule.

(2) A control point may be established as the initial point for regulating and coordinating the movement of the various naval task groups into the landing area. As an aid to navigation, and to insure effective control, it may be desirable to establish the initial point at a considerable distance to sea.

(3) Marking vessels must take accurate station on the designated control points. If the depth of the water permits, it will be advisable, as a preliminary measure, to anchor at certain

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control points buoys which are not visible from shore. Small craft, or boats with mast stepped, may be stationed at the buoys at the proper time to insure their being picked up by boats or vessels not familiar with the landing area. This procedure is particularly important in the case of the line of departure, in order that the enemy will not be forewarned as to the exact point of landing. Where the line of departure is close inshore it may be undesirable to put down buoys. In this case, the control vessel may signal the leading boat group when the line of departure is reached.

(4) Marking vessels should fly identifying flags by day and show a light to seaward by night. Provision should be made for marking vessels at the initial point and at certain control points within the landing area to dispatch radio signals which may be readily identified when picked up by homing loops.

c. *Table of reference and control points.*—A table of reference and control points is usually issued as an annex to operation plans and orders. The table may be typed on a diagram showing the various station and maneuver areas, as indicated in figure 1.

223. *Illustrative diagram.*—a. Figure 1 shows how transport and fire support areas might be located for landings by echelon on beaches C, B, and A. The initial landing is made at beaches C and B, and then at A. The boats from transport area No. 2 proceed toward beach D and turn near control point EASY for a straight run for beaches C and B. In order to still further confuse the enemy the leading boats may constitute a demonstration and continue on toward beach D. As the landing is by echelon the transports in transport area No. 1 arrive later than those in area No. 2 and the boats from transport area No. 1 have a straight run for beach A.

b. Ships in fire support area No. 3 support the landing at beach C. Ships in fire support area No. 2 support the landing at beach B, and later at A. Fire support groups 4 and 1 are assigned counterbattery, interdiction, and fires on targets of opportunity north and south, respectively, of the line SS', but may reinforce the fires on the beaches with guns not engaged in their primary tasks. *HOW* *PETER*

c. Control points ~~EASY~~, JIG, ~~MIKE~~, and QUEEN mark the lines of departure. Control points EASY and MIKE provide additional coordinating points for the movement of the boats and, at the same time, are so located as to aid the transport and fire support groups to take accurate station. Control point TARE is the initial point for regulating the movement into the landing area.

SECTION IV

COORDINATION OF OPERATIONS

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224. *H-hour and D-day.*—a. When plans or orders are prepared for an operation that is to take place at an hour and on a date as yet undetermined, or concerning which secrecy is essential, the expressions H-hour and D-day are used to indicate that the hour and date of the operations are to be announced in subsequent orders.

b. There is but one H-hour and D-day for all units participating in a given operation. It is usually the time of the initial landing in the main operation. The time of all other landings, movements, debarkation schedules, fire schedules, etc., are indicated as occurring a definite number of hours, minutes, or days before or after H-hour D-day, as explained in detail below.

c. An attack force may plan two or more consecutive operations when the situation is so uncertain as to make it impracticable to base all operations on the same H-hour and D-day. Under these conditions, each operation, or the force conducting it, should be so designated that there will be no chance of a misunderstanding when H-hour and D-day are designated for a particular operation.

d. Hours prior to and after H-hour are indicated thus: "H minus 15 minutes," indicating 15 minutes before H-hour; "H plus 2 hours and 10 minutes," indicating 2 hours and 10 minutes after H-hour.

e. Dates prior to and after D-day are indicated thus: "D minus 1 day," indicating the calendar day prior to D-day; "D plus 3 days," indicating the third calendar day after D-day. Each day comprises the 24 hours from midnight to midnight.

f. Nights are indicated thus: "The night D minus 2 days—D minus 1 day," indicating, if D-day were 14 September, the night 12–13 September.

TASK ORGANIZATION

Confidential

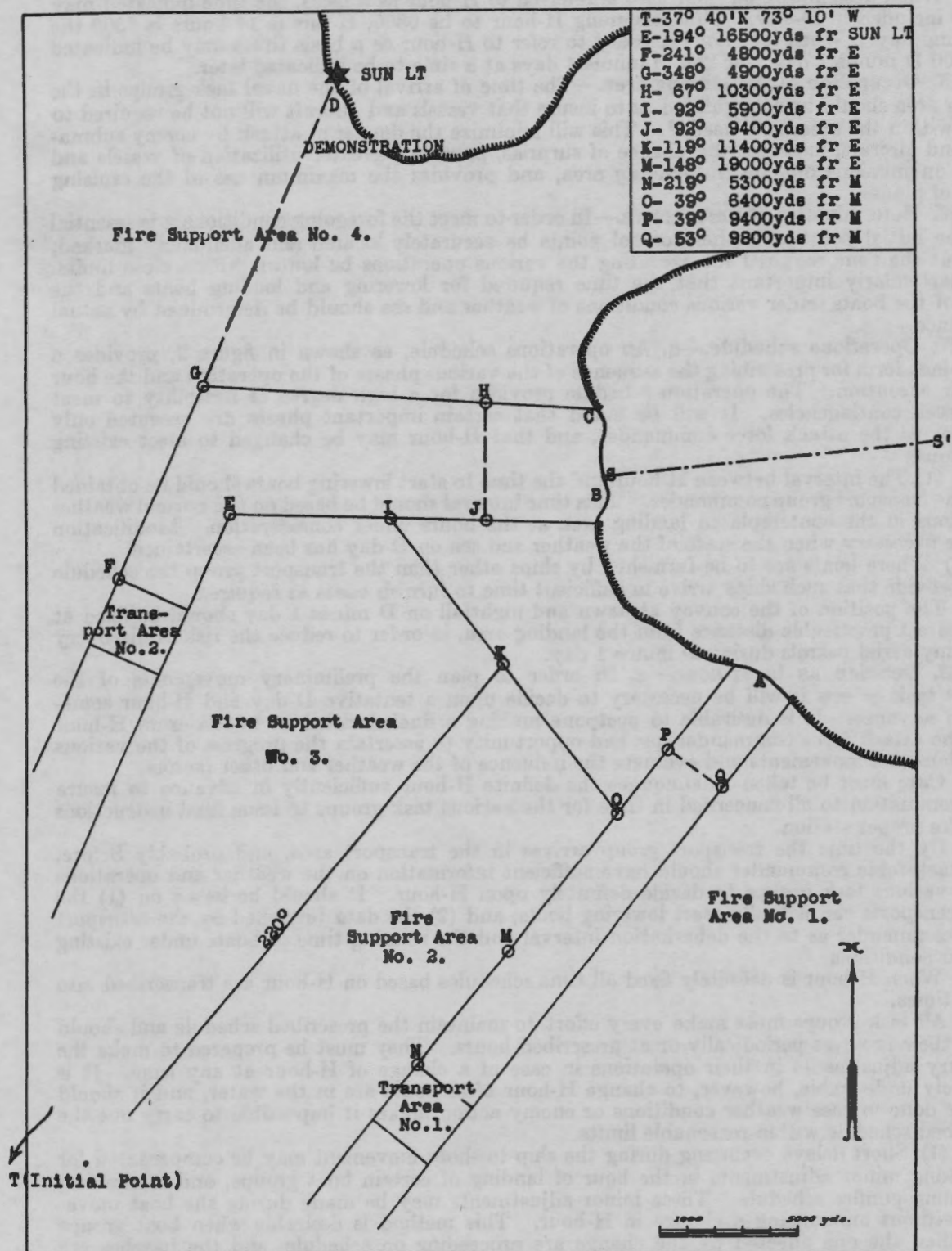


FIGURE 1.—Station and maneuver areas.

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g. When designating an hour that is referred to H-hour as a basis, the time indicated may not be included in D-day. Thus assuming H-hour to be 0800, H minus 14 hours is 1800 the preceding day. When it is not necessary to refer to H-hour as a basis times may be indicated as "0600 D minus 1 day," or "on D minus 4 days at a time to be indicated later."

225. Occupation of the landing area.—The time of arrival of the naval task groups in the landing area should be so regulated as to insure that vessels and aircraft will not be required to arrive within the area until needed. This will minimize the danger of attack by enemy submarines and aircraft, increases the chance of surprise, permits a greater utilization of vessels and planes on missions outside the landing area, and provides the maximum use of the cruising radius of planes.

226. Determination of time factors.—In order to meet the foregoing conditions it is essential that the initial point and other control points be accurately located and adequately marked, and that the time required for executing the various operations be known within close limits. It is particularly important that the time required for lowering and loading boats and the speed of the boats under various conditions of weather and sea should be determined by actual experience.

227. Operations schedule.—a. An operations schedule, as shown in figure 2, provides a convenient form for prescribing the sequence of the various phases of the operation and the hour of their execution. The operation schedule provides for a high degree of flexibility to meet unforeseen contingencies. It will be noted that certain important phases are executed only on order to the attack force commander, and that H-hour may be changed to meet existing conditions.

b. (1) The interval between H-hour and the time to start lowering boats should be obtained from the transport group commander. This time interval should be based on the normal weather conditions in the contemplated landing area at the hours under consideration. Modification may be necessary when the state of the weather and sea on D-day has been ascertained.

(2) Where boats are to be furnished by ships other than the transport group the schedule must provide that such ships arrive in sufficient time to furnish boats as required.

c. The position of the convoy at dawn and nightfall on D minus 1 day should be fixed at the greatest practicable distance from the landing area, in order to reduce the risk of discovery by enemy aerial patrols during D minus 1 day.

228. Decision as to H-hour.—a. In order to plan the preliminary movements of the various task groups it will be necessary to decide upon a tentative D-day and H-hour sometime in advance. It is desirable to postpone making a final decision as to the exact H-hour until the attack force commander has had opportunity to ascertain the progress of the various operations and movements and evaluate the influence of the weather and other factors.

b. Care must be taken to announce the definite H-hour sufficiently in advance to insure its dissemination to all concerned in time for the various task groups to issue final instructions and take proper station.

c. By the time the transport group arrives in the transport area, and probably before, the attack force commander should have sufficient information on the weather and operations of the various task groups to decide definitely upon H-hour. It should be based on (1) the hour transports can actually start lowering boats, and (2) the data furnished by the transport group commander as to the debarkation interval and the running time of boats under existing weather conditions.

d. When H-hour is definitely fixed all time schedules based on H-hour are transcribed into actual times.

e. All task groups must make every effort to maintain the prescribed schedule and should report their progress periodically or at prescribed hours. They must be prepared to make the necessary adjustments in their operations in case of a change of H-hour at any time. It is extremely undesirable, however, to change H-hour after boats are in the water, and it should only be done in case weather conditions or enemy action makes it impossible to carry out the prescribed schedule within reasonable limits.

f. (1) Short delays occurring during the ship-to-shore movement may be compensated for by making minor adjustments in the hour of landing of certain boat groups, and in the corresponding gunfire schedule. These minor adjustments may be made during the boat movement without announcing a change in H-hour. This method is desirable when boat groups other than the one affected by the change are proceeding on schedule, and the beaches are sufficiently separated to obviate the danger of delayed bombardment on certain beaches falling on friendly troops which have already landed at other beaches.

OPERATIONS SCHEDULE

D minus 1 day (3 September)

Execute (or continue) Air Operations Plan.

0600 Convoy in lat., long.

0600 Reconnaissance group establish control point TARE (initial point). Execute Reconnaissance Plan.

1800 Reconnaissance group mark control points EASY and MIKE.

1800 Mine group pass control point TARE, execute Sweeping Plan. 0600

1900 Convoy in lat., long. Take formation **OPTION**.

D day (4 September)

H minus 7 hours 30 minutes.—Control group pass control point TARE.

H minus 6 hours 15 minutes.—Fire support group FOUR pass control point TARE and proceed to assigned fire support area.

H minus 6 hours.—Convoy pass control point TARE.

H minus 4 hours.—Air group take station vicinity reference point, prepared launch aircraft on order Commander Attack Force to protect convoy and escort.

H minus 3 hours 50 minutes.—Vessels of reconnaissance group join designated task groups.

H minus 3 hours 40 minutes.—Fire support groups ONE and THREE, take station in assigned fire support areas.

H minus 3 hours 25 minutes.—Transport group No. 2 take station in assigned transport area. Lower boats and debark in accordance with "Debarkation and Approach Schedules."

H minus 3 hours.—Fire support group TWO take station in assigned fire support area.

H minus 2 hours 30 minutes.—Fire support groups prepared to open fire on orders Commander Attack Force for ranging shots. (See Fire Support Annex.)

H minus 1 hour 43 minutes.—Control vessels and first waves be prepared to leave boat rendezvous areas (near transport area No. 2) in accordance with appropriate approach schedules furnished by transports concerned (or as directed by Commander Attack Force or control group).

H minus 58 minutes.—Control vessels and first waves pass control point EASY (when control group is to act as a unit while guiding boat groups). 4000

H minus 12 minutes.—First waves pass line of departure (HYPO-JIG) (when control groups is to act as a unit while guiding boat groups).

H minus 2 minutes.—Aircraft bomb and strafe landing beaches.

0900 Tentative H-hour. H-hour will be definitely announced by time transports take station in transport area No. 2.

NOTE.—Operations of transport group No. 1, opposite beach A, to be coordinated with those of transport group No. 2, according to the plan of landing.

FIGURE 2.—Sample operations schedule.

(2) The following example will illustrate how this adjustment may be effected: Assuming a heavy bombardment is to be placed on a beach from H minus 25 minutes to H minus 3 minutes. Running time from line of departure to beach, 10 minutes. H-hour is set for 0800. On passing a control point at 0730 the control vessel estimates the leading wave will land at 0820, 20 minutes late, and immediately transmits this information to the attack force commander and fire support vessels. The control vessel would then regulate the movement so that the leading wave would cross the line of departure at 0810 and land at 0820. The fire support group should be directed to open fire at 0755 and should plan to lift the fire 7 minutes after the control vessel signals the line of departure is actually crossed. The time of lifting the fire should be further checked by direct observation from the control vessel and fire support group.

g. Timepieces throughout the attack force must be synchronized.

229. Coordination by event.—*a.* The inability of boats, aircraft or of troops on shore to maintain an exact time schedule will be the usual case, and deviation from estimated times must be regarded as normal. It is often desirable that troops push forward as rapidly as possible and not be restrained by previous calculations. Coordination by time is more likely to fail than to succeed. Wherever practicable, coordination should be effected by event which may be done by indicating the arrival of units at a certain point by pyrotechnic or other signal. The signal may be given by the supported unit or by an observer who is in a position to view the movement.

b. The following is an example of such coordination. A landing team approached a beach while gunfire from ships bombarded the beach defenses. When the boats reached the proper distance from the beach, the embarked troop commander fired a red pyrotechnic signal to indicate that ships' gunfire should cease. This signal was repeated by the flagship of the firing group in acknowledgement and also as a *signal of execution* for planes to drop smoke bombs on the beach. This actual operation succeeded.

230. For coordination of naval gunfire, aviation, and movement of boats see chapter V, section VI, and chapter VI, paragraph 624.

IV

CHAPTER III

LANDING BOATS

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SECTION I

GENERAL

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301. Boat requirements.—*a.* A primary consideration in a successful landing against opposition is the provision of landing boats in adequate numbers, and with suitable characteristics to land the personnel and matériel of the landing force in accordance with the tactical and administrative plans. Allowance should be made for probable boat losses.

b. Number of boats required.—(1) It is highly desirable that sufficient boats be available to land all combat troops, without the need for any of these troops having to wait for a second trip. The number provided should at least permit the landing in the first trip of the boats of sufficient assault battalions, with essential combat equipment, to cover the required frontage in the proposed operations, together with the necessary artillery and local reserves to hold the ground gained until reinforcements are landed in later trips.

(2) Lighters and barges, in addition to the boats used to land troops, must also be provided to land the necessary equipment and supplies of the landing force within the time limit and under the conditions likely to be encountered.

c. Scheme of maneuver.—The number of boats available must be considered in determining the scheme of maneuver to be adopted. A shortage of boats will probably require a reduction in the frontage on which the landing is to be made, and may slow down the advance inland of the leading elements due to the delay in landing reserve echelons. Under these conditions, more time will be available for the enemy to concentrate against troops which have landed. Where there is little danger of enemy concentration against troops ashore, as on a series of small islands, the landings can be made successively by using the same boats in each landing.

d. Data on boat requirements.—Data on boat requirements for landing personnel and matériel of all units of the Fleet Marine Force can be obtained from Marine Corps Organization and Tonnage Tables, and from "Logistic Data, U. S. Marine Corps."

302. Transportation of boats.—*a.* The transportation of the required number of boats to the theater of operations is a serious problem. The stowage requirements for boats and other deck cargo may be so large that unusual methods of boat stowage may be imperative. Such conditions may require stowage in holds or 'tween deck compartments, or construction of platforms or stages designed to increase the available deck stowage space. Some situations may permit the larger boats and lighters to be towed to the landing area. Specially converted ships to act as boat carriers may be necessary in large operations.

b. Insofar as possible the boats and lighters needed in the landing should be carried on the transports. Each transport on which combat units are embarked should carry, as a minimum, sufficient boats to land one reinforced infantry battalion.

c. The capacity of ships' booms under all conditions of weather likely to be encountered will normally fix the maximum weight of boats which may be carried. Specially designed sectional boats and lighters of large capacity may be carried broken down for assembly after arrival at destination. Where time is available, and on ships with low freeboard, arrangements may be made for carrying lighters, beyond the capacity of the booms, to be launched over the side.

d. When it is impossible to accommodate sufficient boats on the troop transports, it may be desirable to provide one or more specially designed ships to act as boat carriers.

303. Boats for landing assault battalions.—a. It is extremely important that the assault battalions be landed in suitable boats. Desirable characteristics of such boats are:

(1) *Armament.*—Should mount suitable weapons capable of producing a heavy volume of fire.

(2) *Speed.*—Should be fast. Boats for leading waves should have a speed of not less than 12 knots, a greater speed being desirable.

(3) *Shallow draft.*—Should be able to run well up on any type of beach, override underwater obstacles, and ground on a fairly even keel.

(4) *Good surfboat.*—Should be seaworthy and easily handled in surf.

(5) *Armor.*—Should have armor protection against small-arms fire. This is particularly necessary for coxswain, gunners, engine, and gasoline tank.

(6) *Rugged.*—Not easily damaged by pounding in the surf.

(7) *Nesting.*—It is desirable that the boats be suitable for nesting or stowing in tiers aboard ship.

b. Special type boats such as rubber boats and amphibian tractors should be provided in sufficient numbers for any special missions requiring this type of equipment.

304. Size of boats.—a. The use of relatively small boats in landing the leading echelons has many advantages. A heavy volume of fire can be developed upon approaching the shore, small boats can be beached closer in, troops are quickly disembarked and deployed for attack on shore, and a number of small boats presents a less concentrated target for enemy fire. Small boats can be nested in large boats aboard ship or stowed in spaces not suitable for larger types, and can be carried on vessels not equipped with large capacity booms.

b. Figure 1 illustrates diagrammatically the advantages of small boats over large boats in landing leading waves.

Company A, on the right, lands its leading wave in eight small shallow-draft boats. The beach is covered by the fire of boat guns from the eight boats. Boats run well in to the beach and troops are on shore with minimum delay. Troops deploy ashore with slight lateral movement. The enemy fire is dispersed over eight targets, and a relatively small number of men are exposed to a single shell, mine, or the beaten zone of a machine gun.

Company B lands its leading wave in one large boat. This boat beaches relatively far out, has little fire power, enemy fire can be concentrated, disembarkation and movement are slow, and troops must move laterally to get into attack formation. For example, the flank squads of Company B would have to debark and move 200 yards directly by the flank under enemy fire before gaining their proper places in the attack formation of the company.

c. Large boats, however, have certain advantages, particularly for rear waves. To land a given number of troops requires fewer boats, less stowage space aboard ship, and fewer boat crews. Large boats simplify and speed the execution of the ship to shore movement, particularly where the beach or approach thereto is restricted. They can be used to best advantage where, due to surprise or under protection of troops already landed, the boats and troops disembarking will not be subjected to aimed fire of small arms or antiboat guns.

d. It will be seen from the foregoing that from tactical considerations, as well as from the standpoint of procurement and transportation overseas, it is desirable that boats of several sizes be made available. The following sizes are the most suitable:

(1) Boats with a capacity of from 12 to 20 fully equipped men, in addition to the crew, for landing the leading waves. Sufficient boats of this size should be provided to land from 10 to 15 percent of the infantry of the landing force. Where destroyers are to be utilized for transporting troops and landing boats, it may be desirable to supply boats having a capacity of even less than 12 fully equipped men.

(2) Boats with a capacity of 20 to 40 men for landing support echelons, that is, the second waves. Sufficient boats of this size should be provided to land from 10 to 15 percent of the infantry of the landing force.

(3) Boats with a capacity of 40 or more men for landing reserve echelons, that is, third and succeeding waves. Sufficient boats of this size should be provided to land from 20 to 25 percent of the infantry of the landing force.

(4) When boats are provided in accordance with the above provisions, about one-half of the total number of infantry battalions of the landing force will be equipped with suitable boats to land in assault formations.

305. Speed of boats.—The time that boats are in the water between the transport area and the beach is an important consideration. Fast boats are less vulnerable to enemy fire and reduce the time available to the enemy to concentrate his troops and otherwise perfect his defensive measures. Fast boats in the leading waves decrease the interval between the lifting of the naval supporting fire and the arrival of the boats at the beach. When this naval gunfire lifts, the enemy

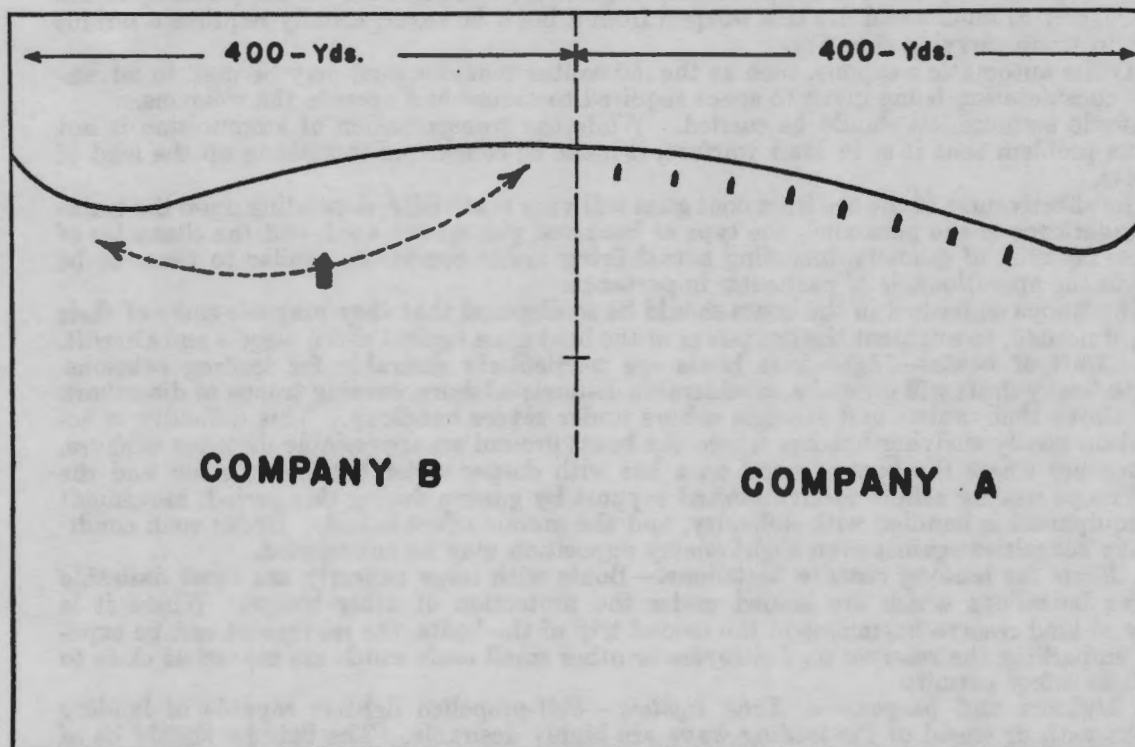


FIGURE 1.—Comparison of small and large boats in landing leading wave.

may be expected to man his defenses near the beach. Any decrease in this interval will materially improve the chances of success of the landing.

306. Boat armament.—*a.* In order to compensate for the probable limitations of naval gunfire and the necessity of lifting this gunfire when the leading boats are still well off the beach, each boat of the leading waves should be heavily armed with machine guns, a mortar, or other suitable weapon.

b. (1) Boats in the leading waves should be prepared to place a heavy fire on the enemy defenses near the beach. While the accuracy of this fire may not always be depended upon for destruction of point targets, its volume makes it effective for covering the beach area immediately dangerous to the landing of troops. Fire from boats can be compared with assault fire of troops attacking on land; that is, fire delivered while actually moving forward in the assault, which, while it cannot be considered accurate, has been found efficacious in keeping the enemy down. The fire from boat guns is assault fire delivered under extremely advantageous conditions and is of particular value during the period between the lifting of naval gunfire and the time troops are deployed on shore. After the boat grounds opportunity may develop for well-directed fire on visible targets at short range.

(2) Boats in succeeding waves should be prepared to open fire on enemy aircraft and on the beach when an opportunity is presented and such fire does not endanger preceding waves.

c. (1) All guns should be suitably mounted for firing at targets on the beach; machine guns should also be capable of delivering effective all-round antiaircraft fire. Mounts should provide for rapid and accurate laying from a moving platform.

(2) It is preferable that boat guns and mounts be part of the fixed installation of landing boats. In this case antiaircraft and other fire is possible when boats are returning from the beach or carrying troops not armed with suitable boat weapons. In the event that boat guns are not otherwise available, the armament of the troops being landed can be so used.

d. (1) The .30-caliber machine gun, due to its rapid fire, and its adaptability for mounting and firing from small boats is an extremely effective weapon. A large percentage of the boats should be so equipped.

(2) Mortars are effective because of the large explosive charge of the projectile, and the relatively small dispersion in range of such high-angle weapons due to the pitching of the boat. Properly to mount and fire this weapon from a boat, however, usually requires a serious reduction in troop carrying capacity.

(3) Other automatic weapons, such as the .50-caliber machine gun, may be used to advantage, due consideration being given to space required to mount and operate the weapons.

e. Ample ammunition should be carried. While the transportation of ammunition is not the serious problem that it is in land warfare, it must be considered in making up the load of small boats.

f. The effectiveness of the fire from boat guns will vary materially, depending upon the training and experience of the personnel, the type of boat and gun mount used, and the character of the seas. Training of gunners, including actual firing under conditions similar to those to be expected in the operations, is of particular importance.

g. The troops embarked in the boats should be so disposed that they may use some of their weapons, if needed, to augment the fire power of the boat guns against shore targets and aircraft.

307. Draft of boats.—Light-draft boats are particularly desirable for leading echelons. Boats with heavy draft will ground a considerable distance offshore, causing troops to disembark in water above their waists and struggle ashore under severe handicap. This difficulty is accentuated on gently shelving beaches where the boats ground an appreciable distance offshore, and on beaches where the boats ground on a bar with deeper water between the bar and the shore. Troops wading ashore receive limited support by gunfire during this period, movement is slow, equipment is handled with difficulty, and the morale effect is bad. Under such conditions heavy casualties against even slight enemy opposition may be anticipated.

308. Boats for landing reserve battalions.—Boats with large capacity are most desirable for reserve battalions which are landed under the protection of other troops. Where it is necessary to land reserve battalions in the second trip of the boats, the movement can be expedited by embarking the reserves on destroyers or other small craft which are moved as close to the beach as safety permits.

309. Lighters and barges.—*a. Tank lighters.*—Self-propelled lighters capable of landing light tanks with or ahead of the leading wave are highly desirable. The lighters should be of shallow draft and should provide for the tanks being run ashore without delay under their own power. The lighter should be heavily armed to provide a point of support on the beach and cover the landing of the tank. These lighters can also be used for the landing of artillery, other vehicles and heavy matériel.

b. Small lighters.—Small lighters with shallow draft and other suitable characteristics may be used to augment the artillery and tank lighters in the landing of matériel.

c. Special barges.—Special barges may be required for the delivery of water, gasoline, and fuel oil in bulk to the beach during the later phase of the landing.

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SECTION II

STANDARD NAVY BOATS

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310. Table of characteristics.—*a.* The use of standard ships' boats is not contemplated for expeditionary forces. They may, however, be used for ships' landing forces.

b. Characteristics of standard Navy boats are shown in figure 2. The explanation given in the paragraphs which follow should be considered when using the data given in the table.

311. Capacity in boat spaces.—*a.* A "boat space" is the space and weight required for one marine with his individual combat equipment. A marine so equipped is assumed to weigh 224 pounds (one-tenth of a long ton) and to occupy 13.5 cubic feet of space.

b. The number of boat spaces available for troops (or matériel) is computed as 60 percent of the rated maximum personnel capacity of the boat, less number of men in the crew.

c. Boats should not be loaded to capacity as shown in column 2 except for simple ferrying operations under ideal sea conditions. It should be further realized that the rated capacities as shown in column 2 will be modified by any of the following exigencies:

(1) If the sizes of the boat crews exceed the minimum as shown in column 6, the rated capacities as shown in column 2 must be decreased accordingly.

(2) If boats are to come under fire, there should be sufficient room to allow troops to get down low in the boats.

(3) If weapons are to be fired from the boats, sufficient boat spaces should be allowed for their operation.

d. It should be noted that the space and weight of any protective armor, boat guns and ammunition, extra anchors, etc., will correspondingly reduce the capacity of a boat.

e. The capacity of a boat in tons is one-tenth of its rated capacity in boat spaces.

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1	2	3	4		5	6	7	8
Type	Boat spaces (in addition to minimum crew) ¹	Speed ²	Time to load in minutes ³		Designating letter ⁴	Minimum crew ⁵	Mean draft loaded (approximate)	Weight (approximate) ⁶
			Day	Night				
		<i>Knots</i>					<i>Ft. In.</i>	
50-foot motor launch.....	110	7	15	20	A	4	3 1	21,400
40-foot motor launch.....	50	6	8	10	B	4	2 5	14,500
36-foot motor launch.....	38	6	6	8	C	4	2 2	11,100
33-foot motor launch.....	27	4	5	7	D	3	2 2	8,400
30-foot motor launch.....	21	5	4	6	E	3	2 2	8,400
24-foot motor launch.....	10	5	3	4	F	2	1 11	5,600
50-foot motorboat.....	25	10	5	7	I	4	3 1	19,500
40-foot motorboat.....	18	9	4	6	K	4	2 8	15,000
35-foot motorboat.....	12	8	3	4	L	4	2 9	13,600
26-foot motorboat.....	8	6	3	4	M	3	2 1	6,200
26-foot motor whaleboat ⁷ ..	11	5½	3	4	N	3	2 1	5,300
30-foot whaleboat.....	22	(⁸)	4	6	O	2	1 9	3,300
28-foot whaleboat.....	17	(⁸)	4	6	P	2	1 8	2,900
24-foot whaleboat.....	12	(⁸)	3	4	Q	2	1 7	2,300

¹ See par. 312.
² See par. 313.
³ See par. 314.
⁴ See par. 315.
⁵ See par. 316.
⁶ Includes hull, Diesel engine, standard equipment, and fuel.
⁷ Unsuitable for landings in heavy or even moderate seas.
⁸ Pulling boat, must be towed.

FIGURE 2.—Characteristics of standard Navy boats.

312. Speed in knots.—The speeds indicated in column 3 of the table represent average speeds with loaded boats, engines in good order, and fairly smooth water. Speeds will vary and should be determined by actual tests under various conditions of weather, sea, and load. The speed of a boat used in towing is cut approximately 50 percent when the combined load of the boats in tow equals the rated capacity of the towing boat.

313. Time to load.—The loading times in the table are based upon debarking under average conditions and using cargo nets over the side of the transports in place of ladders and gangways. An allowance of about 50 percent has been made for delays which may be expected under war conditions and time for coming alongside. The time of loading a boat will vary according to the relative amount of personnel and matériel comprising the load, the facilities of the transport for discharging, the training of the personnel, and the condition of the sea. The loading time for each boat should, therefore, be determined by tests conducted under various conditions, using the actual load to be transported by the boat.

314. Designating letters.—In boat diagrams and orders relative to debarkation it is convenient to designate each type of boat by a letter, using the designating letters listed in column 5 of the table. For example, the designation "A-1" should be used instead of "50-foot motor launch No. 1." These designating letters should be placed on the boat. (See par. 421c (9, 10, 11).)

315. Crew.—*a.* The figures shown in column 6 of the table indicate the minimum number of men required to handle the boat. The figures do not include boat officers, gunners, additional personnel for handling lines, signalmen, or Hospital Corps men for ambulance boats. Marines to be landed may be used as gunners. (See par. 411.) Members of the beach party can be detailed to duty as boat officers, linesmen, etc. The number of additional officers and men must be determined for any particular situation and the number of boat spaces shown in column 2 of the table reduced accordingly.

b. The exact strength of the crew and other Navy personnel that will embark in each boat must be determined early, and this information made known to the landing force before the Boat Assignment Tables are initiated. (See par. 421.)

316. Boat spaces required for matériel.—a. For general cargo, such as ammunition, rations, camp equipment, etc., the number of boat spaces required can be computed with sufficient accuracy by multiplying the weight of the cargo in long tons by 10.

b. For vehicles, consideration must be given to the weight and dimensions of each article, and the center of gravity of the boat load. The dimensions of vehicles are given in "Logistic Data, U. S. Marine Corps."

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SECTION III

SPECIAL EQUIPMENT FOR STANDARD NAVY BOATS

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317. Armament.—Boats should be armed as indicated in paragraph 306a of this chapter.

318. Armor.—It is desirable that boats to be utilized for landing assault echelons against opposition afford some armor protection against enemy small-arms fire. For this purpose protective plating can be rigged from waterline to gunwale in space occupied by troops, with additional protection for gunner and coxswain. The weight of the plating will decrease the speed and capacity of the boat, and possibly its seaworthiness. These factors must be considered in determining the practicability of installing plating.

319. Equipment for handling motor launches in surf.—*a.* (1) Two stern anchors of appropriate type and weight, and sufficient length of line (about 3½ inches in circumference) to span the breakers should be in the boat for use in preventing it being broached while in the surf and to assist in its retraction from the beach. A luff tackle rigged to the towing post may be used to aid in hauling in the anchor line during retraction. The anchor and line should be carried properly faked in the stern ready for letting go.

(2) Heavy seas, strong currents or hard bottom will require the holding power of two anchors for each motor launch. In such cases it is preferable that the two anchors be bent in tandem on a single anchor line, with about 10 fathoms of line between anchors. One anchor is usually sufficient for the 26-foot motor whaleboat.

b. Bowline.—A bowline should be coiled down in bow ready to run to the beach.

c. Quarter lines.—Quarter lines are not necessary except in the case of boats which must remain beached in a moderate to heavy surf for an appreciable period; that is, for a longer time than that normally required to unload infantry with light combat equipment.

d. Canvas screens.—Canvas screens lashed tightly to stern railings and supports and secured to stern beading will reduce the amount of water shipped over the stern in case of following seas. Flaps should be fitted in screens to permit working of stern anchor lines and tiller.

e. Engine cover.—If necessary a canvas cover should be rigged over the engine housing to keep the engine dry, care being taken to allow for the intake of air.

f. Oars.—Oars with grommets and thole pins should be provided.

320. Procedure for handling motor launches in surf.—*a.* A surf landing is one of the hardest duties a boat crew is called upon to perform. Special training is necessary for success and each beach must be studied during the approach. The coxswain should give his orders by whistle or voice if the latter can be heard above the surf. The engineer must be alert at all times to give the anchor men as much assistance as possible with the engine. The most dangerous place in the surf is from the crest of the breaking waves to some distance shoreward. The distance of this area from the beach varies with the slope of the beach. On a flat beach waves will break well out from shore and once through this area a boat is in comparatively safe water. On such a beach the stern may strike first when a wave recedes, in which case the propeller has to be stopped to avoid damage. On a steep beach when the stern and propeller are clear, the engine should be used to help maintain the boat squarely on the beach.

b. Upon approaching the beach the first anchor should be dropped about 5 or 6 boat lengths from the line of breakers, and the second as soon as the line between anchors has run out. The boat should be timed to follow directly behind a breaking wave if possible, and the anchor line should be paid out with a slight strain until the boat actually strikes the beach. Anchor men should then hold and secure the anchor line and the bowman should go over with the bow line and hold the bow to the beach. Anchor lines must be kept well taut at this point to insure against broaching. If swells are not parallel to the beach, landings should be made normal to the swell. When landing in a strong cross tide or wind the boat will fall off as it goes in and as a result its anchors will be to windward or against the tide. This is where they should be.

c. The greatest help in making a successful landing is to have well set anchors and a taut anchor line. The boat should be timed to follow directly behind a breaking wave, but once in the surf it should not hesitate but keep going. Anchor line should be paid out, keeping a slight

tension until the moment of striking the beach, then it should be kept well taut to prevent broaching. If the anchor line is properly handled the boat will not broach to.

d. In getting off the beach the bowman should be recalled as soon as the last troops clear the boat. On a flat beach the waves must be watched very closely and when the stern is lifted the anchor men should haul and the engine be backed hard. This is repeated for successive waves. Luff tackle should be used here if necessary. The anchor line must be taut before the next wave hits the stern. On a steep beach the danger is from waves breaking over the stern and swamping the boat. This can be avoided only by getting out fast. Care must be taken not to back over and foul the anchor line. Once through the breakers the anchor line should be taken in by hand.

e. When 26-foot motor whaleboats are headed into choppy seas, as many of the troops as possible should be moved well aft to lighten the bow. A steering rowlock should be installed and a steering oar provided for use in case of a disabled tiller. The same rowlock serves as an excellent fair lead for paying out the anchor line.

f. The procedure herein outlined is intended as general doctrine applicable to handling of powerboats in surf. The normal boat equipment required for the several types of standard Navy boats and detailed instructions to boat crews for landing through various conditions of surf with the least danger to personnel and material have been promulgated in other publications and instructions.

321. Miscellaneous provisions.—*a. Thwarts and bottom boards.*—Movable thwarts should be removed. Bottom boards should be removable to permit bailing.

b. Wire cutters.—Wire or bolt cutters, with long handles, and hacksaws should be provided for cutting barbed wire or heavier wire entanglements at beaches and approaches thereto.

c. Cargo nets and assisting lines.—A cargo net on each bow stopped along rail, or lines looped along rail from bow to amidships will be of material assistance in disembarking troops and equipment from large boats.

d. Boat compasses.—The errors of all boat compasses should be accurately determined prior to the landing.

e. Life buoys.—Boats should carry a limited number of life buoys, and life jackets for troops embarked.

f. Signal equipment.—Signal equipment to be carried in boats should be prescribed in appropriate orders. (See ch. VII, Communications.)

g. Protection from chemicals.—Boats should be equipped with protective covering and decontaminating agents for protection against chemical attack. (See par. 831.)

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SECTION IV

SPECIAL NAVY LANDING CRAFT

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322. Special Navy landing craft.—See confidential pamphlet "Characteristics of British and United States Landing Craft, Landing Ships, Landing Vehicles." (FTP Des)

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CHAPTER IV

SHIP TO SHORE MOVEMENT

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SECTION I

GENERAL

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401. Scope.—a. The scope of this chapter includes those considerations directly connected with the planning and execution of the movement of troops from the beginning of their debarkation from transports until they are landed on the beach. It deals primarily with the infantry battalion and smaller units, and the corresponding boat organizations. Naval gunfire and the landing of field artillery, tanks, and other arms and services are treated in separate chapters.

b. Although the same principles apply, special adaptations of the methods prescribed herein will be necessary in the event the situation favors towing or ferrying by larger vessels, or landing directly from larger vessels at piers or beaches.

c. In the formations illustrated in this chapter use of the following types of boats is contemplated:

Special Navy landing craft. Standard Navy boats (for ships' landing forces).

d. (1) The formations illustrated in this chapter are, in general, also applicable for rubber landing craft and landing vehicles in the special operations where employment of those types is desirable. Necessary modifications entailed by the differences in capacities and other characteristics of the above types should be made.

(2) Rubber craft should be available for use in the following situations:

- (a)** Crossing water too shoal for larger boats.
- (b)** Negotiating underwater obstacles.
- (c)** Landing in rocky and difficult places.
- (d)** Surprise landings.
- (e)** Landing from ships unable to accommodate a sufficient number of larger boats.
- (f)** Landing raiding parties and reconnaissance patrols.
- (g)** Landing from water-borne aircraft—see paragraph 155c and chapter VI.
- (h)** For river crossings after the initial landing.
- (i)** Landing of intelligence agents.

(3) Landing vehicles, track, will be useful and should be available for the following employment:

- (a)** Crossing water too shoal for regular landing boats.
- (b)** Crossing coral reefs.
- (c)** Negotiating obstacles both under water and on land.
- (d)** Crossing swampy or marshy areas.

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- (e) Movement of personnel, equipment, and supplies from transports to locations inland without unloading at the beach.
- (f) In lieu of tractors and trailers in the early phases of an operation before motor transport has been landed.

e. The formations discussed hereafter are not based on any specific tables of organization because of the changes to which such tables are subjected. The illustrations are of a general nature, adapted to three rifle platoons in each company, three rifle companies in each battalion, and three battalions in each regiment, with certain heavier weapons as an integral part of the above echelons. The frontages assigned units on shore are based on an average of one man to each 4 to 8 yards of the firing line, with adequate supports and reserves to assure proper distribution in depth. Unusual conditions, such as night attacks or rough and wooded terrain, may justify deviation from the limits given.

402. Ship to shore movement vital part of attack.—a. The ship to shore movement of the small boats carrying troops embraces an important phase of the attack itself. The movement is more than a simple ferrying operation and involves much of the tactics of fire and movement. This may be readily realized from a brief review of the basic elements of an infantry attack on land prior to the hand-to-hand conflict.

b. An attack on land opens with preparatory gunfire laid on the defending enemy positions for both destruction and shock. This fire is increased in severity until masked by the assaulting infantry. For ease of control, the infantry begins its distant approach in comparatively large columns, but, as the approach continues and the danger from enemy weapons increases, the infantry, for its own safety and ease of prospective deployment, breaks into smaller units. Finally, in order to reduce losses further and to use effectively its own weapons, it is forced to deploy. Then, when it is judged that the combined fires of the artillery and infantry have produced sufficient effect, or at a time previously ordered, the gunfire lifts and the deployed infantrymen, still maintaining their fire, rush the enemy positions with the bayonet.

c. In the attack on the immediate beach defenses in a landing operation, all of the above phases up to the last rush take place while the attackers are on the water. This indicates that the leading troops must necessarily be broken into small groups as soon as danger from shore weapons becomes acute or the necessity arises for the use of their own weapons. A deployment of small boats is necessary to accomplish this. All lateral maneuvers essential to placing the troops in the proper attack formations and opposite the desired landing place must also take place at or before this time. Finally, the leading troops must be quickly delivered in formation on the beach, deployed as skirmishers, or as near thereto as the small boats will permit. Supports and reserves must be maneuvered on the water so as to exploit successes, and artillery must follow at the proper time and place to enable it to support the attack beyond the initial assault.

d. Landing operations definitely place the burden of an important phase of the initial attack upon coordinated movements of various types of naval craft in accordance with land tactical plans. Thus, the movement from ship to shore should not be regarded as merely a preliminary movement, but as an integral and vital part of the attack itself, demanding of the boat commanders a high order of tactical knowledge and skill and a complete control of the boat formations involved.

SECTION II

TASK ORGANIZATION

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403. Major groupings.—a. The organization for any ship to shore movement of troops is naturally divided into two main categories: (1) The task organizations of the landing force; and (2) those of the small boats in which they are to move and initiate the fight.

b. The task organizations of the landing force consist of various combinations of its regularly organized units (squads, platoons, companies, etc.). These combinations are not only organized

to accomplish limited tasks during the initial landing but also to enable the attack to be continued inland without delay. The task organizations of the small boats should, as far as the number and types of boats permit, conform to those of the landing force, so as to facilitate the landing of troops in the formations which will permit them to carry out their shore missions.

c. The basic task organizations are as follows:

Landing force: The landing groups.

Small boats: The boat groups.

404. The landing group.—a. The landing group is the basic task organization of the landing force for the movement from ship to shore.

b. In large operations it normally consists of an infantry battalion, plus such artillery, tank, antitank, antiaircraft, medical, and engineer units as may be attached. It also includes all other units attached for landing with it for purposes of organization of activities at the beach for command, and for communications. These latter units usually include shore and beach parties, forward echelons of higher commands, and liaison agencies. (See fig. 1 for one example of the composition of a landing group.)

c. In order to permit the best use of available boats, provide for combined training, and simplify the issuance of orders, all troops to be landed in formation should be organized into landing groups.

d. Each landing group is identified by a number, followed by the name of the principal organization. The senior troop commander in each group is usually designated as its commander.

e. (1) The organization of landing groups is published in the form of a table, as shown in figure 1. It is preferable to issue a consolidated force table showing all landing groups organized in the force. The table should be issued as early as practicable after the composition of the landing force is known, preferably before embarkation of troops, and independent of any tactical orders for a landing. This table may then be used as a basis for assignment of boats, organization of embarkation groups, transport loading, etc.

(2) The table should show the number of boat spaces required for each organization and the total for each landing group. Motor vehicles and heavy equipment requiring special boats or landing gear should be listed separately. Infantry battalions which it is planned to use in assault should be so designated, so that suitable boats may be assigned.

(3) In the later issuance of tactical orders for a specific operation, the composition of the landing groups may be modified as found necessary to meet the requirements of that particular operation. The assignment of attached units to separate boat divisions, as indicated in figure 1, is therefore desirable.

405. Organization and command of boats.—a. (1) Due to the fact that the landing groups must be landed in tactical formations, the boats which are to transport them to the beach may, when deployed, be spread over large areas. From figure 2, it will be seen that the boats transporting an assault battalion may occupy an area of some 1,000 by 5,000 yards. In order to control and maneuver boats over such a large area, careful organization, adequate communications, and a proper chain of command are essential. This is provided by the following task organizations:

The boat group.

The boat divisions of the boat group.

The boat flotilla.

(2) *The boat group.*—The boat group is the basic task organization of the boats to be used for transporting troops from ship to shore. One boat group is organized for each landing group to be landed in the first trip of the boats. The boat group is designated by a number, as "Boat Group No. 1," and is commanded by a naval officer known as the "boat group commander."

(3) *The boat division.*—The boat division is a task organization of two or more small boats within the boat group. It transports a platoon, company, or other tactical subdivision of the landing group. (See fig. 2.) During the ship-to-shore movement, the boat division operates as a unit and is maneuvered by the boat division commander. The organization into boat divisions facilitates the control of the boat group as a whole by permitting the boat group commander to exercise command through his boat division commanders rather than dealing directly with individual boats. In order to decentralize and facilitate detailed tactical planning of the operation of small assault units, and to permit a wider choice of formations of the company

LANDING OPERATIONS DOCTRINE

Organizations	Boat Spaces		
	Per- son- nel	Ma- ter- ial	To- tal
LANDING GROUP NO. 1 (1st Bn, 5th Mar, Reinforced) ¹			
1st Bn, 5th Mar-----			
Btry, A, 11th Mar (75MMPH) 1 tractor & 2 trailers ² ---			
Rec Det, 1st Bn, 11th Mar-----			
1st Plat, 1st Tk Co ² -----			
1st AA & AT Plat, Regtl Wpns Co, 5th Mar ² -----			
1st Plat, Co A, 1st Eng Bn-----			
1st Plat, Co A, 1st Amphibian Bn-----			
Shore Party No. 1-----			
Beach Party No. 1-----			
Total-----			
LANDING GROUP No. 2 (2d Bn, 5th Mar, Reinforced) ¹			
2nd Bn, 5th Mar-----			
Btry B, 11th Mar (75 MMPH) 1 tractor & 2 trailers ² ---			
Rec Det, 1st Bn, 11th Mar-----			
2d Plat, 1st Tk Co ² -----			
2d AA & AT Plat, Regtl Wpns Co, 5th Mar ² -----			
2d Plat, Co A, 1st Eng Bn-----			
2d Plat, Co A, 1st Amphibian Bn-----			
Shore Party No. 2-----			
Beach Party No. 2-----			
Total-----			
LANDING GROUP No. 3 (3d Bn, 5th Mar, Reinforced)			
3d Bn, 5th Mar-----			
1st Bn, 11th Mar (less Dets) 2 tractors & 4 trailers ² ---			
Regtl Wpns Co, 5th Mar (less 2 Plats) ² -----			
Co A, 1st Engr Bn (less 2 Plats)-----			
Fwd ech, Hq Co, 5th Mar-----			
Coll Sec, Co A, 1st Med Bn-----			
Det 1st Sig Co-----			
Co A, 1st Amphibian Bn (less 2 Plats)-----			
Total-----			
LANDING GROUP No. 4 (1st Bn, 7th Mar, Reinforced) ¹			
1st Bn, 7th Mar-----			
Etc-----			
Etc., etc. (landing groups numbered serially throughout force)-----			

¹To be organized and equipped for employment as an assault unit.²To be embarked in a separate boat division.

FIGURE 1.—Sample form for organization of landing groups.

and battalion, every effort should be made to organize a separate boat division for each of the assault platoons of the landing group. Each boat division is designated by a number, as "Boat Division 1, Boat Group No. 1."

(4) *The boat flotilla.*—The boat flotilla is a task organization of two or more boat groups. The boat flotilla is organized as such under the following circumstances:

(a) To coordinate planning and training when a common commander of two or more boat groups is necessary to advise on the procurement and proper assignment of boats and naval personnel, and to assume charge of indoctrinating and training the boat groups.

(b) To facilitate execution when the operation of two or more boat groups in a restricted area demands the actual presence of a common commander.

In either *a* or *b*, a flotilla commander is appointed by either the transport group commander or the transport division commander, as appropriate. During operations he is embarked in a fast boat and proceeds so as best to exercise command during the movement from ship to shore.

b. Waves.—(1) A wave consists of the boats within a boat group which carry the troops that are to land approximately simultaneously. It may consist of a single boat division or two or more boat divisions (landing abreast).

(2) Boat groups land in successive waves corresponding as nearly as possible to the tactical formation desired for the troops during and after landing. The landing formation of the boat group to meet these troop requirements is controlled by the assignment of boat divisions to waves. The number of waves in a boat group and the composition of each wave may thus vary for different beaches, depending upon the nature and extent of the beach, the approaches thereto, the terrain inland, and the scheme of maneuver of the troops.

(3) Waves are designated successively from front to rear as "first wave," "second wave," etc. Owing to the distance which may exist between waves, each wave should have a commander. He will be one of the boat division commanders, except in large waves which should be commanded by a separate officer embarked in a separate boat.

c. Figure 3 is designed to show the chain of command within a typical formation of a boat group. The pennants and streamers shown in the figure are for identification of the various commanders and are not meant to be actually flown from the boats. The wave guide flags, however, will usually be flown. It will be noted that in waves consisting of only one or two boat divisions, one officer may act as commander of both the wave and a boat division.

d. Personnel requirements of the boat group.—(1) The naval personnel required to command and operate a boat group landing a reinforced infantry battalion in assault may be summarized as follows:

A boat group commander.

Two assistant boat group commanders, if needed, to be employed as wave commanders, or otherwise assist in control of the movement.

One boat division commander for each boat division (usually 6 to 8).

A boat officer or competent petty officer to command each boat not carrying one of the above officers.

Boat crews, with necessary signalmen.

(2) This number of officers and men is necessary only for leading boat groups, as troops and material of succeeding landing groups are usually transported by boats of larger capacity. Officer personnel available may also compel modification for leading boat groups. However, a boat group commander with an officer assistant in each wave is considered the minimum requirement. Senior petty officers should then be employed as commanders of boat divisions to which officers have not been assigned.

(3) The exact size of the boat crews assigned to man each type of boat to be used should be made known to the landing force before assignments of troops to boats are made.

(4) Sufficient specialists in engineering and ordnance should be provided for the necessary maintenance of boats and armament.

e. Transport commanders.—(1) When all boats of a boat group and the corresponding troops are embarked on a single transport, the boat group operates under the orders of that transport commander until it reaches the rendezvous areas when it operates under the direction of the control group commander. In order to insure accurate timing of the movement of the boat group from the rendezvous area to the beach, the approach schedule prepared by the transport commander should be furnished the appropriate control vessel as soon as it arrives in the rendezvous area. (Sec par. 428f.)

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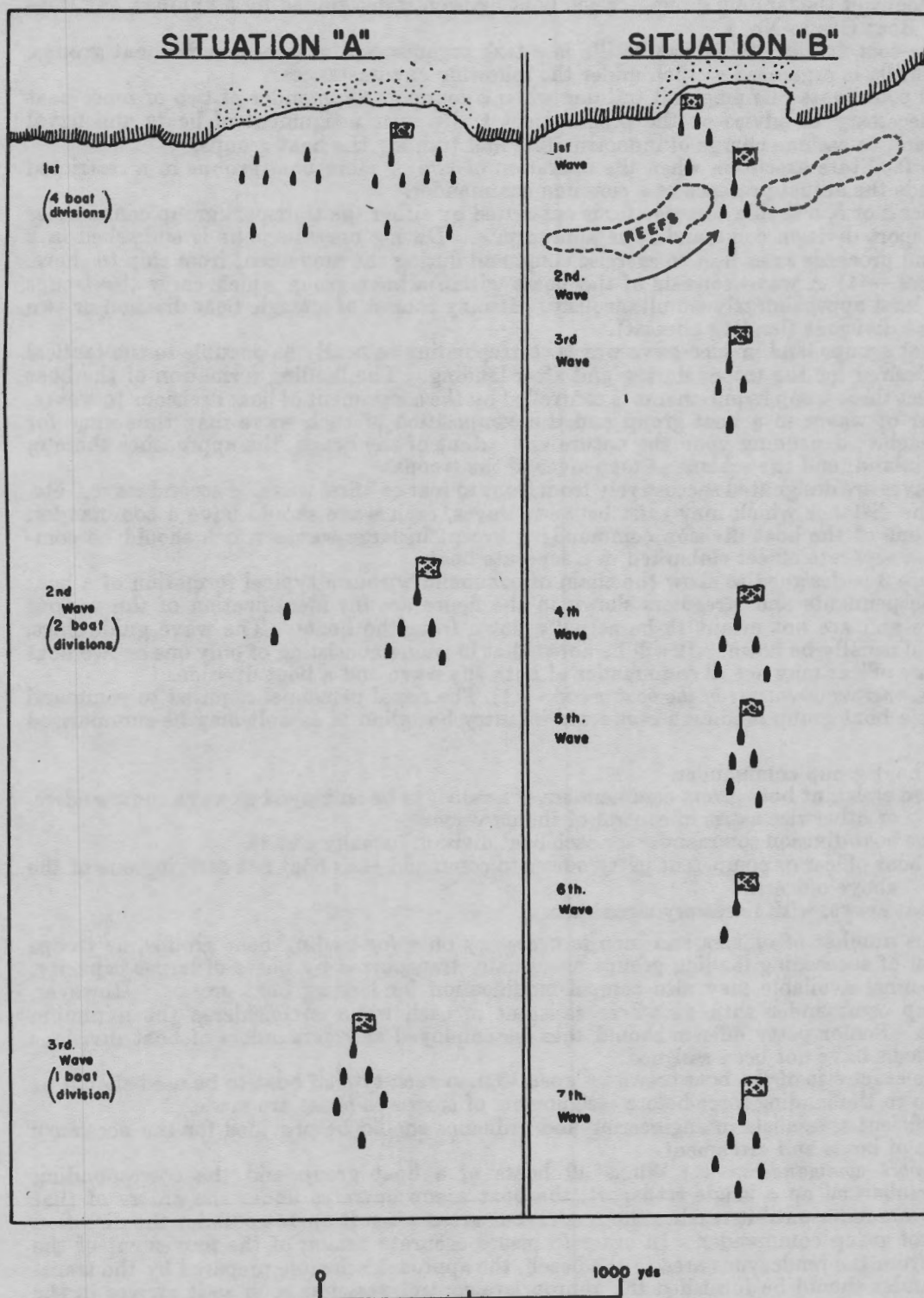


FIGURE 2.—The boat group, boat division, and wave.

(2) When boats of a boat group and troops of the corresponding landing group are embarked on several ships, each troop unit debarks under the commander of the ship on which transported. The loaded boats then assemble at the designated rendezvous areas where they are guided by vessels of the control group to the line of departure.

406. Assignment of boats to boat groups.—*a.* The table showing the organization of landing groups (fig. 1) is the basis for the assignment of boats to boat groups. This assignment should be made as early as practicable prior to embarkation.

b. Boat groups which are to carry assault battalions should be assigned sufficient boats to transport them intact in one trip, and should include the smallest and fastest boats available. Boat groups organized to carry units which are to land later may consist of larger motor launches, lighters, etc.

c. Where available, special antiaircraft and close support boats should be assigned to boat groups transporting assault battalions.

d. In determining the number of boats required, the capacity of amphibian tractors included in the landing group should be taken into consideration.

e. The assignment of boats to boat groups may be conveniently issued in the form of a table showing the boats assigned to each group and, if known, the naval officer designated as its commander. The source, type, capacity, and identification numerals of each boat should be given.

407. Boat pools.—*a.* These consist of additional boats assigned to transports to aid or replace boats which become inoperative prior to and during the landing. Boat pools should include all types used in the boat groups they support, and crews should be familiar with the plan of landing and the formations involved. Certain of these boats may be used to accompany leading boat groups and, in this case, should operate under the orders of the boat group commander.

b. Boats of leading boat groups carrying troops or materiel will not be permitted to leave formation between the line of departure and the beach to assist damaged boats. Boats transporting succeeding landing groups will be guided by the requirements of the situation.

408. Flexibility.—*a.* Prearranged plans cannot be expected to cover every situation that may arise after the force is embarked. It may be necessary to modify the original plans, or to select an entirely new landing area. Hence, the boat groups and the landing groups should be organized, trained, and embarked so as to be able to execute a landing wherever desired in accordance with orders issued at sea. This is possible only when—

The landing groups are organized into well-balanced tactical teams.

Boats for the boat groups have been designated, and the boat groups properly organized. The personnel is properly trained in suitable boat formations (usually not more than three).

The officers of the boat groups are embarked upon the same transport as the landing groups.

b. If the above conditions are fulfilled, a change of formation for any particular beach becomes relatively simple, involving only a change in the position of complete boat divisions. Minor adjustments may be made, such as changing a boat with its complete load from one boat group or boat division to another, but no change in the basic organization of the boat groups or reassignment of troops to boats should be necessary.

409. Embarkation of officers of the boat group.—*a.* All officers of a boat group, including boat officers, should be embarked as a unit on the same transport which carries the officers of the corresponding landing group. This is desirable even if some of the boats of the boat group and their crews are carried in other ships.

b. This doctrine permits the closest personal cooperation between officers of the boat groups and those of the landing groups with whom they must operate under fire. This consideration becomes even more important when the individual boat officers consist of those chosen mainly because of their proficiency in handling small boats rather than experience and training aboard ships of the Navy, as would often be the case in time of war.

c. Furthermore, in case of change of plan while at sea, the embarkation of boat and troop officers on the same ship greatly facilitates the preparation of a new plan for the movement from ship to shore, and the dissemination of the necessary orders and instructions to all concerned.

410. Beach and fire-control party personnel.—*a.* Due to the fact that the regular duties of individuals of the naval beach parties do not begin until after they have been landed by the boat groups, they may be used to assist boat crews during the initial movement to the beach, and should be assigned to boats accordingly.

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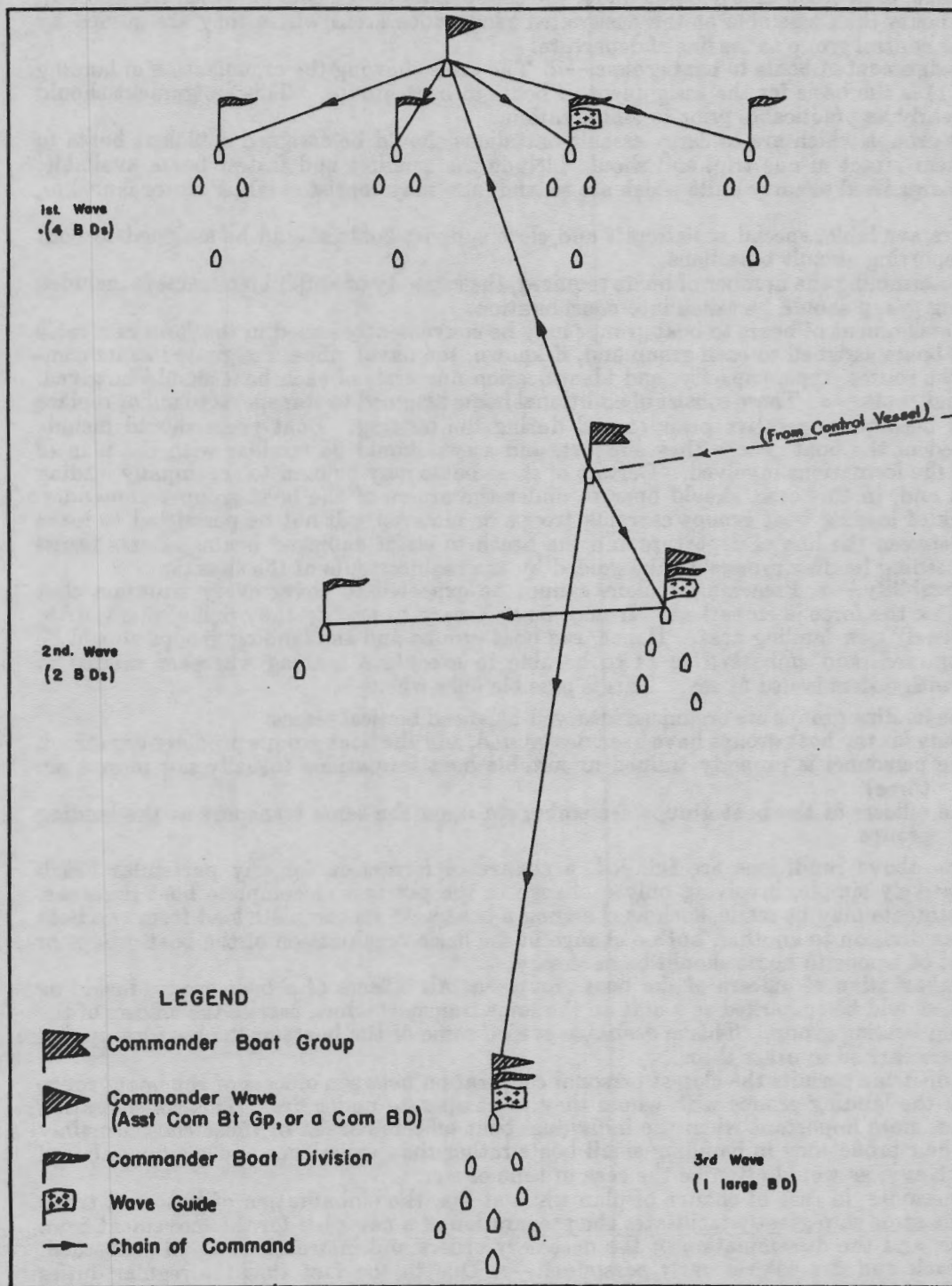


FIGURE 3.—Showing chain of command within a boat group as arranged for a particular formation. System varied to suit other formations. Diagram not to scale.

b. Fire-control party personnel for the control from the beach of ships' gunfire may use a boat, or boats, from the firing ship, or may be assigned to boats transporting troop units. If embarked in separate boats, the boat group commander assigns an appropriate position in the boat formation.

411. Marine personnel as crews of boat guns.—a. Personnel of machine gun and howitzer companies may be utilized as crews of boat guns. Shore-party personnel may be used as gunners, ammunition passers, or to assist the boat crews in any other way during the trip to the beach. The personnel of assault rifle companies should not be assigned such duty, as they should be free to disembark and engage in the fight as soon as the boats ground.

b. If marine personnel is used in manning boat guns, members of the regular boat crews should also be trained to operate these weapons for their own protection during subsequent trips.

SECTION III

FORMATIONS, FRONTAGES, AND DISTANCES

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412. Distance and interval.—a. When speaking of formations of troops on land, the term "distance" means the space between elements from front to rear; "interval" means the space between elements of the same line. When speaking of naval craft, the term "distance" means the space between individual ships or boats, measured in any direction; "interval" means the space in any direction between groups of ships or boats, measured between the corresponding ship or boat in each group.

b. The naval designations are used in this publication in connection with boat formations. The interval between waves is expressed in time (minutes), as the linear distance is dependent upon the speed of the boats.

413. Factors involved.—Formations frontages, and distances employed within boat groups are governed largely by the following considerations:

Types of boats available.

Extent of beach, form of coast line, and presence of obstacles.

The necessity of maintaining the integrity of troop organizations and landing these organizations in the desired tactical formation.

The necessity for effective use of boat weapons against enemy aircraft and beach defenses.

Vulnerability of the formation to fire of enemy beach weapons and aircraft.

Time intervals between waves which permit timely support by following units, and, at the same time, are sufficient to prevent congestion of boats and intermingling of units on the beach.

414. The boat division lands the assault platoon.—a. According to the situation and the terrain, the rifle platoon may land in one or in two echelons. Although the former quickly develops the full fire power of the platoon, it leaves the platoon leader with no force available for reinforcement, flank protection, or maneuver. It may, therefore, be more desirable to land a part of the platoon as a second echelon or support group.

b. (1) Figure 4 illustrates a boat division landing an assault platoon in four boats. This is considered the ideal from a tactical standpoint but the number and size of boats available may compel a more economical loading. In such a case the assault platoon may be embarked in three or even in two boats. A boat division of three boats usually employs a Vee formation as illustrated. A division of two boats usually proceeds in line of bearing (echeloned) to avoid enfilade. The assignment of less than three boats to an assault platoon is avoided whenever practicable as it will delay the deployment of the platoon and increase its casualties.

(2) It will be noted that the leading boats are deployed in a Vee, similar to that used by aircraft. This formation possesses the advantage of effective leadership and control by the command and guide boat, permits the three leading boats to fire their weapons at the beach, and is less vulnerable to aerial attack than a line or column formation. Whenever advisable, the Vee may be opened to a line-abreast by appropriate signals from the leading boat. (See sec. VII for

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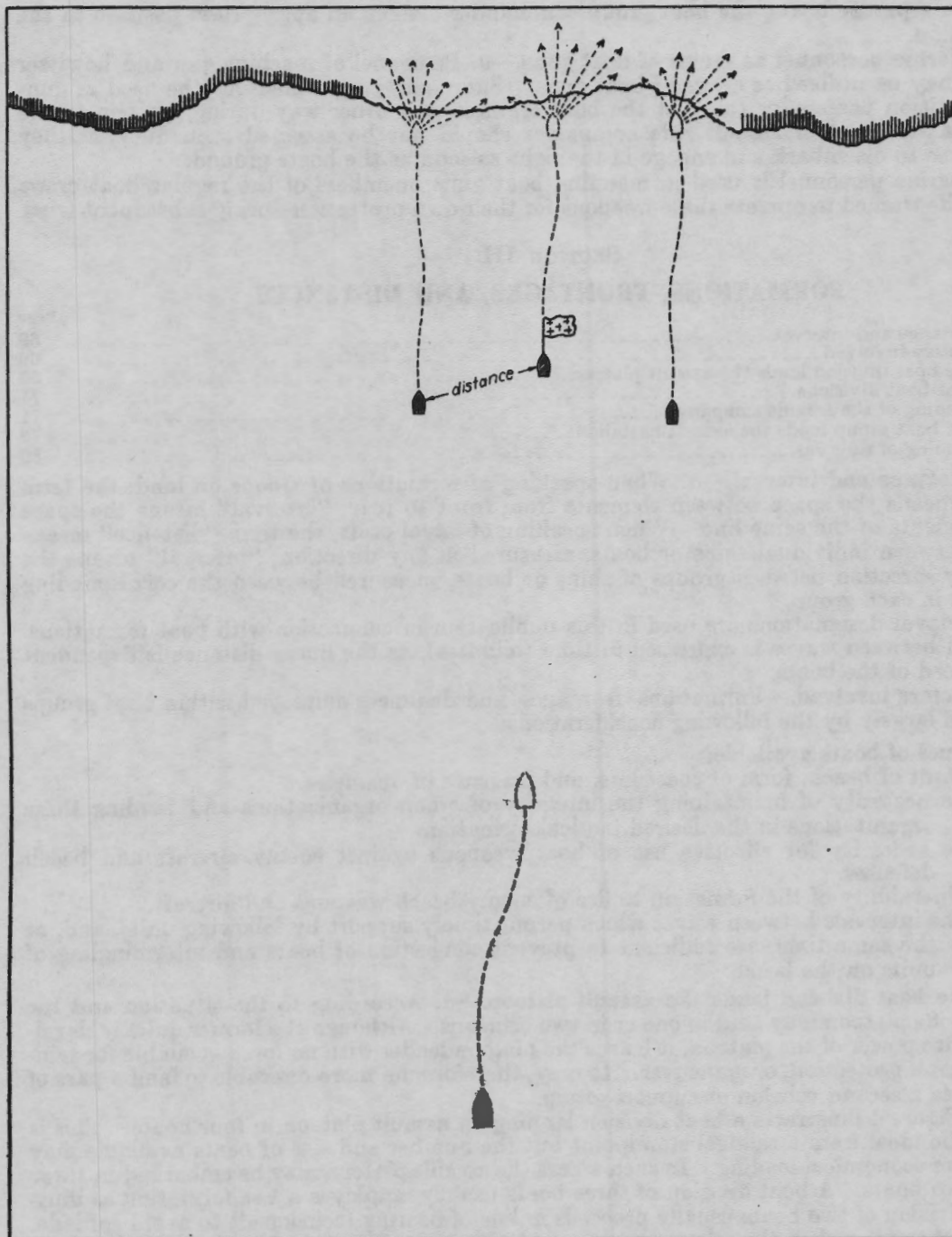


FIGURE 4.—Boat division lands assault platoon.

boat formation signals.) In order further to avoid the effects of hostile fire, boat officers should be trained to run zigzag courses while maintaining approximately their relative positions in the prescribed formation.

(3) One group of the platoon may be designated as a support group and should follow sufficiently close to the leading boats to maintain contact. As the leading boats approach the beach, the support group should be in the rear from half a minute to 2 minutes traveling time. This allows the support group, while enroute, to choose the most advantageous point, within the platoon's zone of action, to land and support the attack. Care must be exercised to avoid fouling the anchor lines of preceding boats. In the case of a quartering sea, extension of the time interval between waves may be necessary to allow the leading wave to recover anchors before the succeeding wave beaches.

(4) Ordinarily, the support group lands behind leading squads which have been able to make a successful landing and advance inland. If, however, unopposed enemy weapons open fire from positions on the flank of the platoon which would obviously endanger the leading squads, the support group should not hesitate to change course so as to engage such weapons with boat guns at point-blank range and land the troops so that they may deliver a direct assault upon the position. Such flanking fire from the beach is particularly dangerous when landing in bays or other indentations. The maneuvering of the support group as described above would, of course, be greatly handicapped in the presence of fog, smoke, or darkness.

(5) A rifle platoon, after landing, is held responsible for a frontage of from 100 to 200 yards. In order to cover the entire front with fire and insure all enemy weapons on the beach being engaged immediately upon landing, the leading boats are uniformly distributed over the assigned front, making the distance between boats from 40 to 70 yards. This distance between boats will usually prevent more than one boat being damaged by a single shell or aerial bomb. At night, or when landing on a beach of less than 100 yards, the distance may be reduced.

c. When the leading elements of assault platoons are to be landed in boats carrying more than a squad there should be sufficient distance between boats to allow for the full deployment of the troops from each boat without overlapping on the beach.

d. (1) Figure 5 illustrates the application of the Vee formation of the boat division when landing an assault platoon on one side of a peninsula. This maneuver is particularly applicable where the platoon has the task of covering the flank of other units. The formation permits the platoon to engage simultaneously the probable enemy position on the point and their supporting weapons in the reentrant. The support group in a separate boat, without reducing speed, maneuvers toward the exposed left flank of the platoon ready either to go in and engage any weapons which open fire along the platoon front, or to land behind the most successful squad.

(2) When it is desirable to have an assault platoon attack both sides of a peninsula, the three leading boats split from the Vee formation when nearing the beach and land at the point and two sides of the peninsula, respectively. The support group may then land behind the most successful squad, land on one of the flanks, or be used for reinforcement.

e. (1) Figure 6 illustrates the closed Vee formation used by an assault boat division while proceeding from the transport to the vicinity of the line of departure; the dotted lines show how the boats deploy as they cross that line. Boats are about 40 yards apart in order not to give a concentrated target to enemy aircraft and artillery. The closed Vee facilitates control and deployment into open Vee or line-abreast. In rain, fog, smoke, or darkness, it will usually be advisable to cruise in column formation, with or without boats in tow.

(2) In daylight, the deployment into open Vee or line-abreast is normally made on or before crossing the line of departure. When a narrow channel exists, deployment may be delayed until the channel is negotiated. During darkness, deployment may be made closer to the beach. Deployment is made gradually, without material reduction in speed of formation.

415. Rear boat divisions.—Boat divisions in the second and succeeding waves may employ formations similar to the foregoing. Boats should be not less than 40 yards apart and arranged in staggered lines.

416. Landing of the assault company.—a. The assault company is usually landed by three boat divisions. If the company includes three rifle platoons and a weapons platoon, units of the latter may be attached to the rifle platoons until the landing is effected. A fourth boat division may be organized if practicable and if circumstances warrant such action. When platoons are small, or when only large boats are available, the number of boat divisions may be reduced accordingly.

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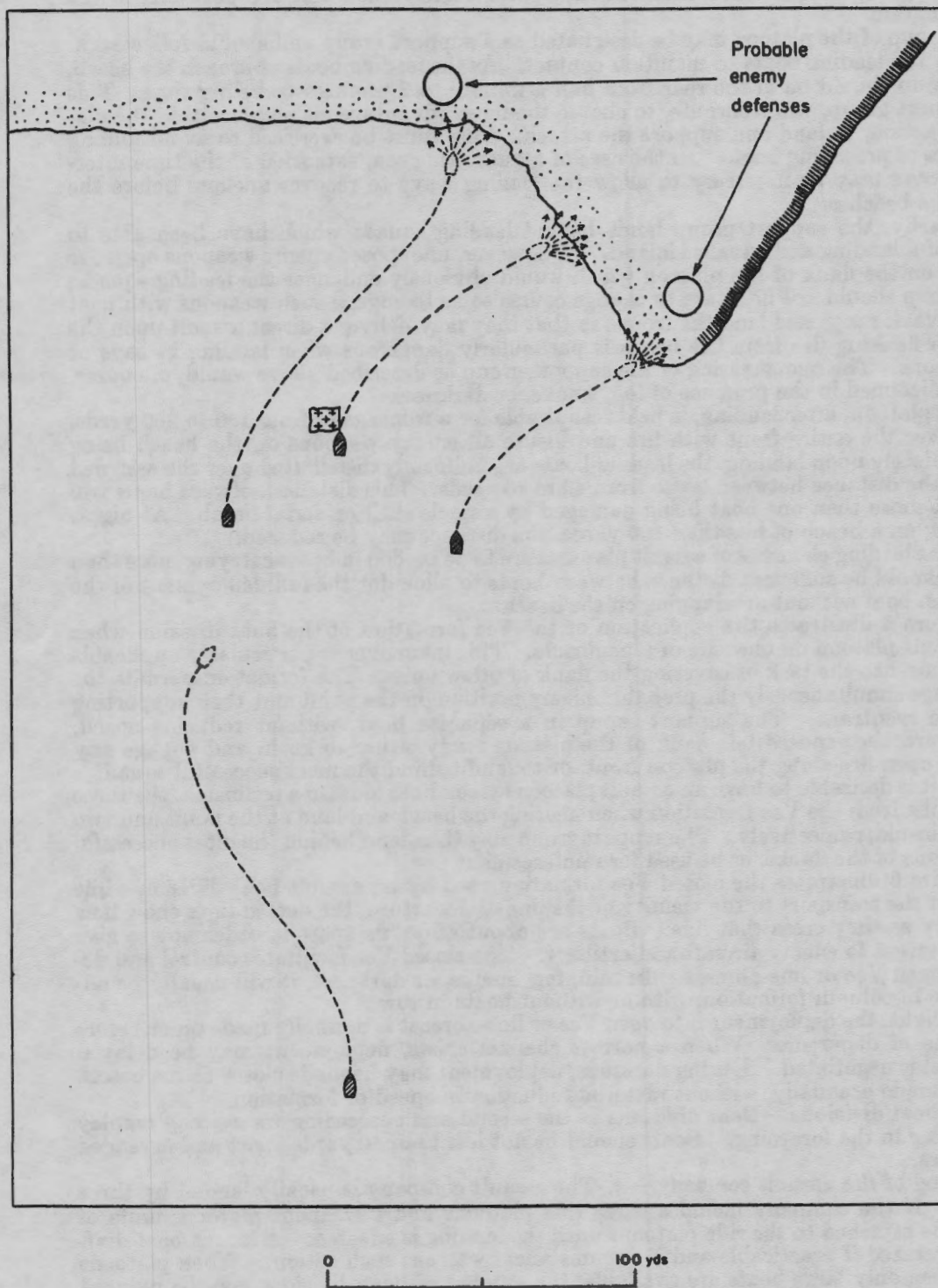


FIGURE 5.—Boat division lands assault platoon.

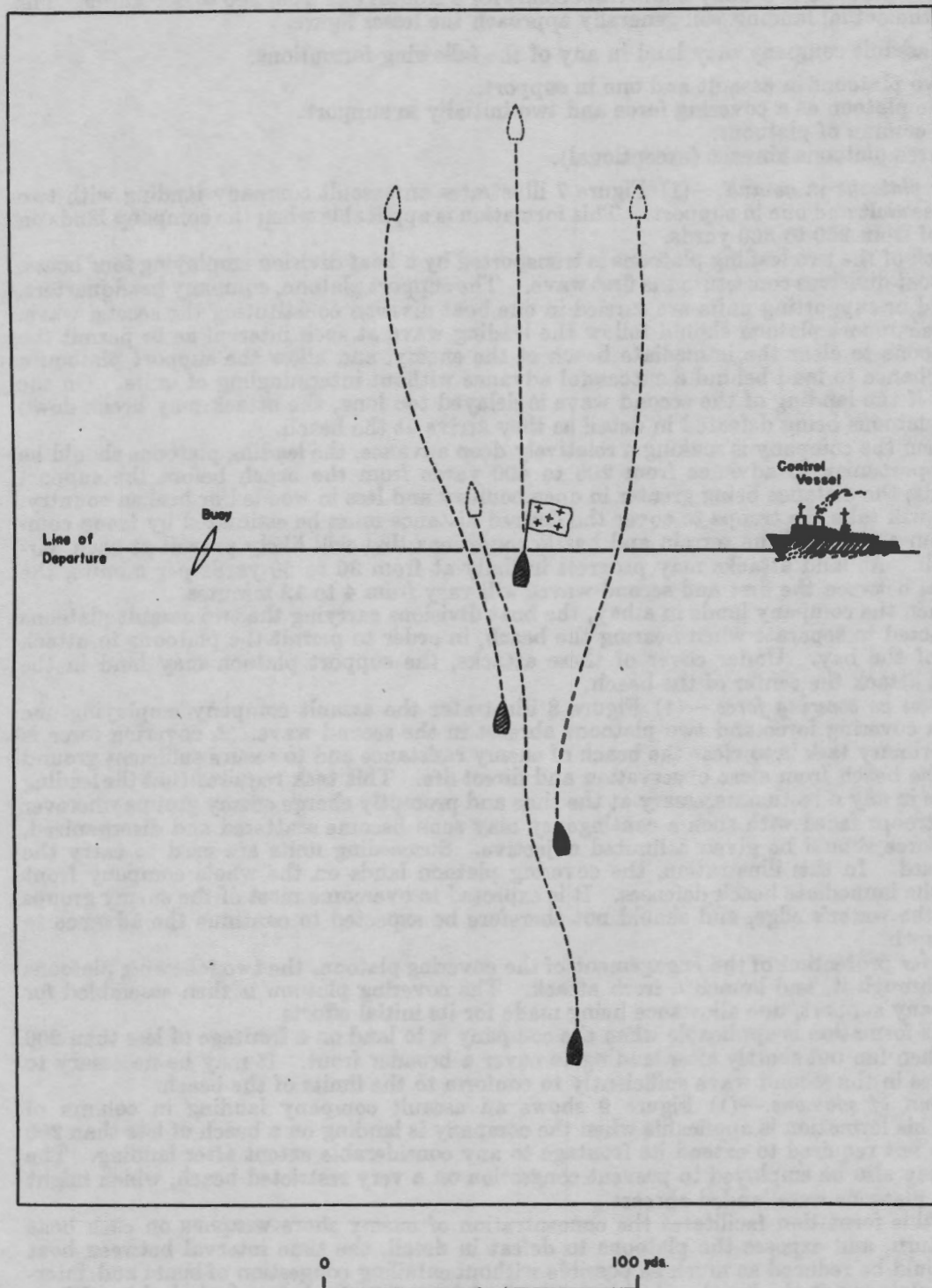


FIGURE 6.—Boat division deploys while crossing line of departure.

b. In the advance inland, an assault company of three rifle platoons or of three rifle platoons and a weapons platoon, is usually made responsible for a frontage of from 200 to 500 yards. The frontage of the actual landing will generally approach the lesser figure.

c. The assault company may land in any of the following formations:

Two platoons in assault and one in support.

One platoon as a covering force and two initially in support.

In column of platoons.

Three platoons abreast (exceptional).

d. *Two platoons in assault.*—(1) Figure 7 illustrates an assault company landing with two platoons in assault and one in support. This formation is applicable when the company lands on a frontage of from 250 to 500 yards.

(2) Each of the two leading platoons is transported by a boat division employing four boats. These two boat divisions constitute the first wave. The support platoon, company headquarters, and attached or supporting units are carried in one boat division constituting the second wave.

(3) The support platoon should follow the leading wave at such interval as to permit the assault platoons to clear the immediate beach of the enemy, and allow the support platoon a reasonable chance to land behind a successful advance without intermingling of units. On the other hand, if the landing of the second wave is delayed too long, the attack may break down because of platoons being defeated in detail as they arrive at the beach.

(4) When the company is making a relatively deep advance, the leading platoons should be given an opportunity to advance from 200 to 400 yards from the beach before the support platoon lands; the distance being greater in open country and less in wooded or broken country. The time it will take the troops to cover the desired distance must be estimated by troop commanders from a study of the terrain and battle conditions that will likely prevail at each particular beach. As land attacks may progress initially at from 30 to 50 yards per minute, the time interval between the first and second waves will vary from 4 to 12 minutes.

(5) When the company lands in a bay, the boat divisions carrying the two assault platoons may be directed to separate when nearing the beach, in order to permit the platoons to attack both sides of the bay. Under cover of these attacks, the support platoon may land in the interval and attack the center of the beach.

e. *Platoon as covering force.*—(1) Figure 8 illustrates the assault company employing one platoon as a covering force and two platoons abreast in the second wave. A covering force is one whose primary task is to clear the beach of enemy resistance and to secure sufficient ground to protect the beach from close observation and direct fire. This task requires that the leading squads move in any direction necessary at the time and promptly charge enemy groups wherever found. As troops faced with such a contingency may soon become scattered and disorganized, a covering force should be given a limited objective. Succeeding units are used to carry the attack forward. In this illustration, the covering platoon lands on the whole company front and rushes the immediate beach defenses. It is expected to overcome most of the enemy groups found near the water's edge, and should not therefore be expected to continue the advance to any great depth.

(2) Under protection of the engagement of the covering platoon, the two following platoons land, pass through it, and launch a fresh attack. The covering platoon is then assembled for use as company support, due allowance being made for its initial efforts.

(3) This formation is applicable when the company is to land on a frontage of less than 200 yards and then fan out shortly after landing to cover a broader front. It may be necessary to close the Vees in the second wave sufficiently to conform to the limits of the beach.

f. *Column of platoons.*—(1) Figure 9 shows an assault company landing in column of platoons. This formation is applicable when the company is landing on a beach of less than 200 yards and is not required to extend its frontage to any considerable extent after landing. The formation may also be employed to prevent congestion on a very restricted beach, which might occur if two platoons were landed abreast.

(2) As this formation facilitates the concentration of enemy shore weapons on each boat division in turn, and exposes the platoons to defeat in detail, the time interval between boat divisions should be reduced as much as possible without entailing congestion of boats and intermingling of platoons at the beach. A time interval of from 2 to 6 minutes is desirable. When the company is being employed as a covering force for the battalion, the intermingling of platoons after landing ceases to be a governing factor, and the time interval for landing of boat divisions should approach the minimum figure.

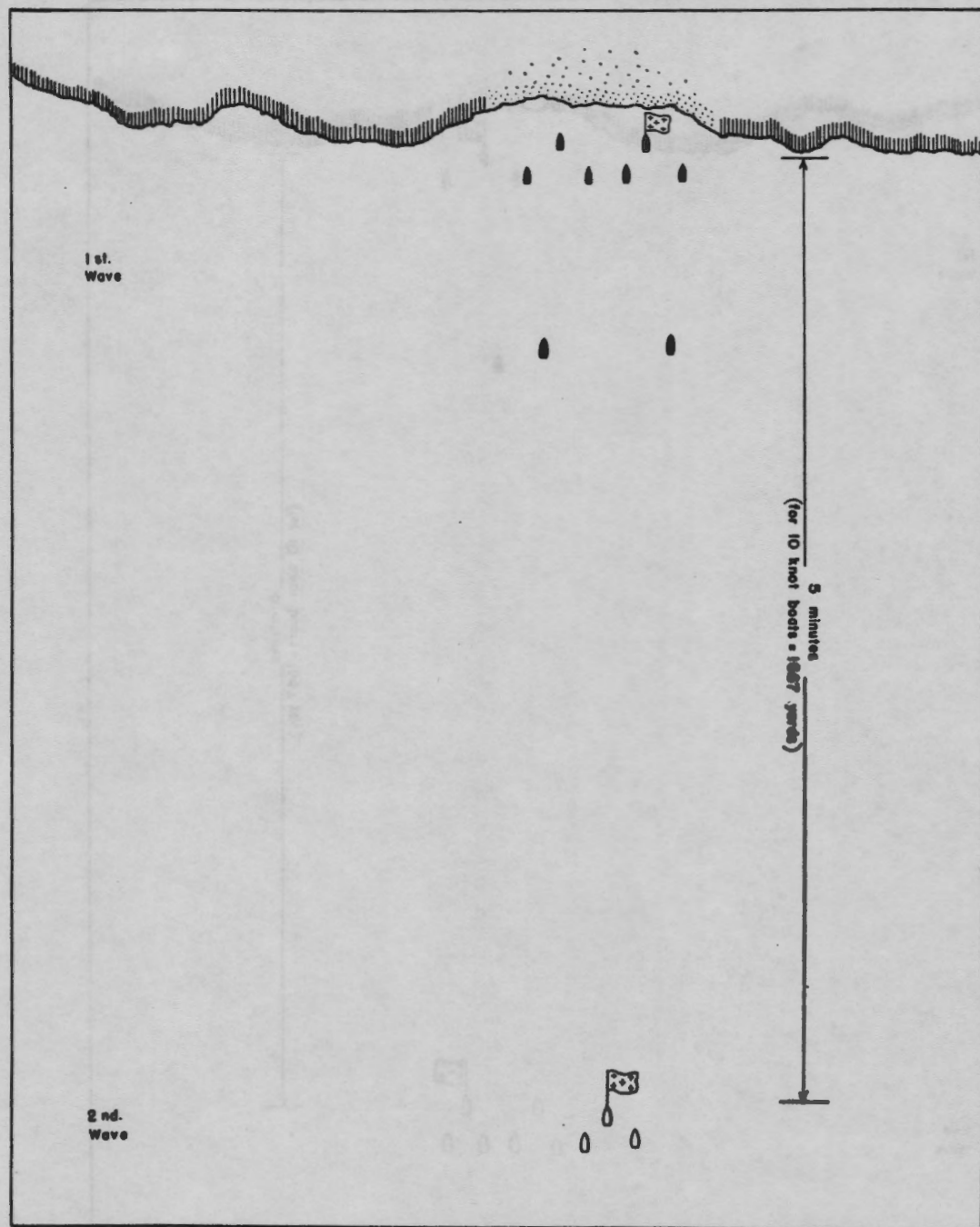


FIGURE 7.—Rifle company landing with two platoons in assault and one in support. Three boat divisions.

LANDING OPERATIONS DOCTRINE

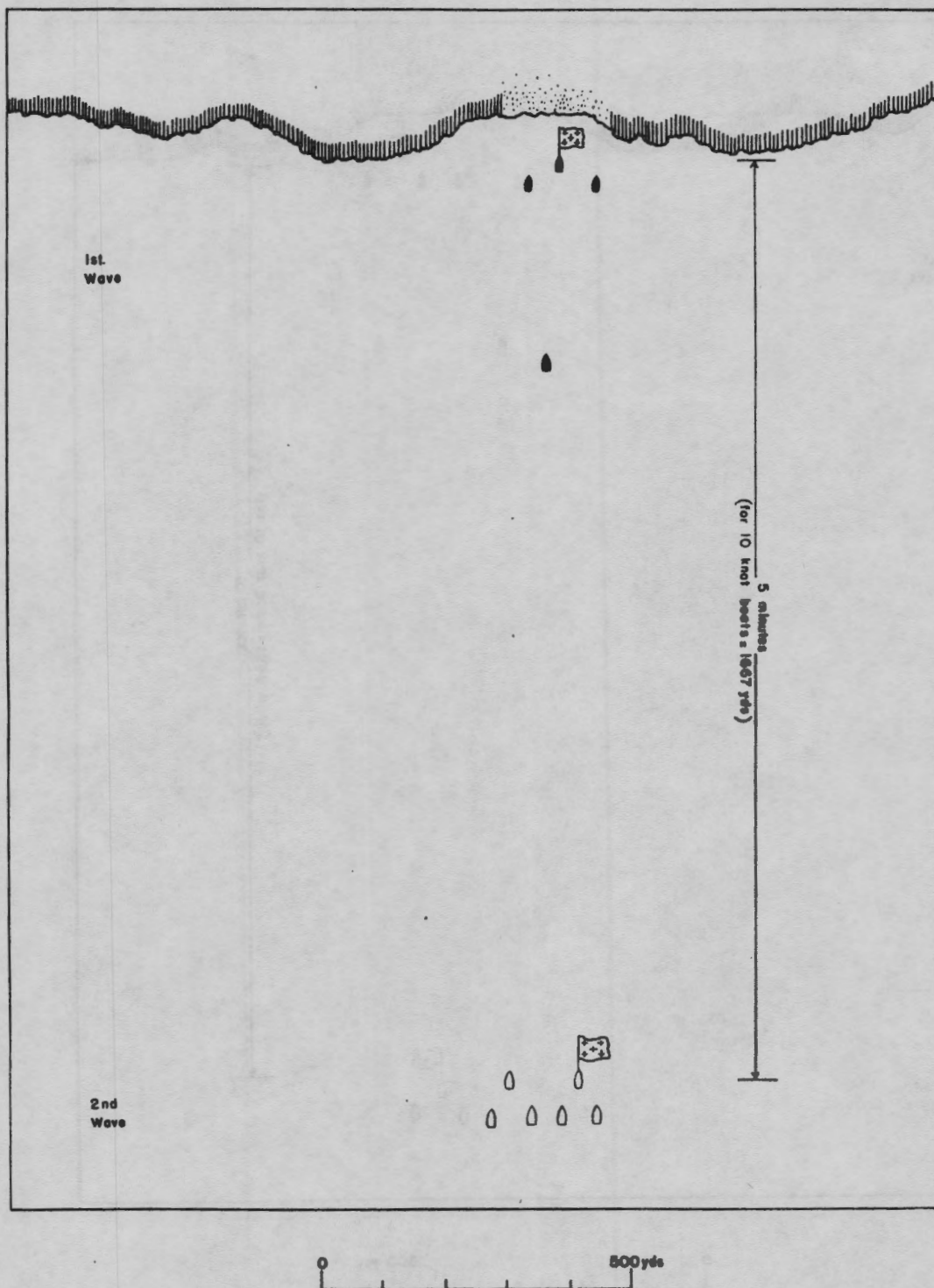


FIGURE 8.—Rifle company landing with a covering platoon.

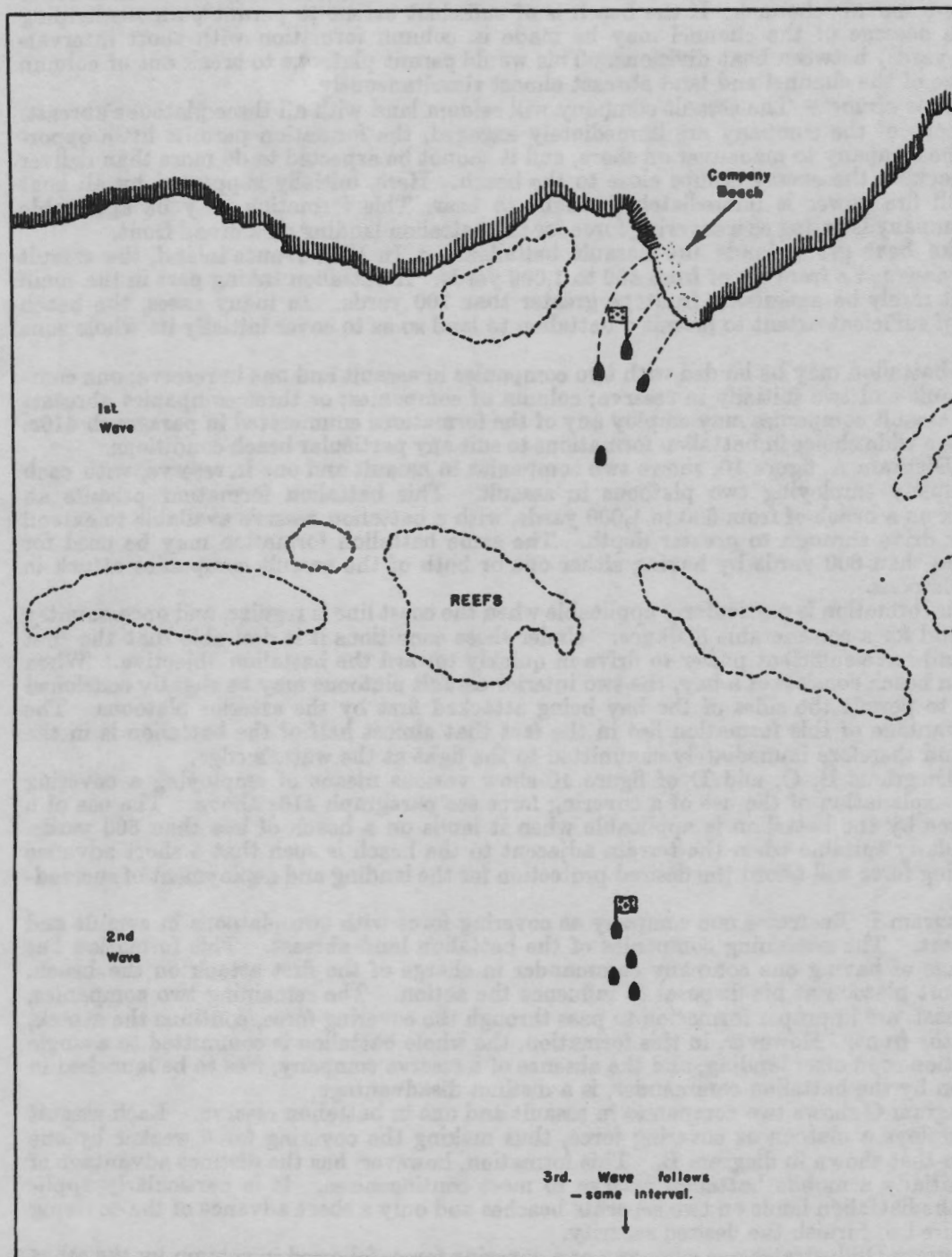


FIGURE 9.—Company in column of platoons.

(3) It may be necessary to employ the column formation in approaching the beach in order to negotiate a narrow channel. If the beach is of sufficient extent to permit platoons landing abreast, the passage of the channel may be made in column formation with short intervals (200 to 300 yards) between boat divisions. This would permit platoons to break out of column upon passage of the channel and land abreast almost simultaneously.

g. Platoons abreast.—The assault company will seldom land with all three platoons abreast. As all platoons of the company are immediately engaged, the formation permits little opportunity for the company to maneuver on shore, and it cannot be expected to do more than deliver a severe attack on the enemy groups close to the beach. Here, initially supported by all boat guns, its full fire power is immediately brought to bear. This formation may be applicable when the company is acting as a covering force for the battalion landing on a broad front.

417. The boat group lands the assault battalion.—*a.* In the advance inland, the assault battalion is assigned a frontage of from 500 to 1,000 yards. A battalion taking part in the main effort should rarely be assigned a frontage greater than 700 yards. In many cases, the beach will not be of sufficient extent to permit a battalion to land so as to cover initially its whole zone of advance.

b. The battalion may be landed with two companies in assault and one in reserve; one company in assault and two initially in reserve; column of companies; or three companies abreast.

c. The assault companies may employ any of the formations enumerated in paragraph 416c. This permits a wide choice in battalion formations to suit any particular beach conditions.

d. (1) Diagram A, figure 10, shows two companies in assault and one in reserve, with each leading company employing two platoons in assault. This battalion formation permits an initial attack on a beach of from 600 to 1,000 yards, with a battalion reserve available to extend the front or drive through to greater depth. The same battalion formation may be used for frontages less than 600 yards by having either one or both of the assault companies attack in column of platoons.

(2) This formation is particularly applicable when the coast line is regular, and open country extends inland for a considerable distance. Under these conditions it is desirable that the first troops to land have sufficient power to drive in quickly toward the battalion objective. When the battalion beach consists of a bay, the two interior assault platoons may be slightly echeloned to the rear to permit the sides of the bay being attacked first by the exterior platoons. The main disadvantage of this formation lies in the fact that almost half of the battalion is in the first wave and therefore immediately committed to the fight at the water's edge.

e. (1) Diagrams B, C, and D of figure 10 show various means of employing a covering force. For explanation of the use of a covering force see paragraph 416e above. The use of a covering force by the battalion is applicable when it lands on a beach of less than 500 yards. It is particularly suitable when the terrain adjacent to the beach is such that a short advance of the covering force will afford the desired protection for the landing and deployment of succeeding units.

(2) Diagram B illustrates one company as covering force with two platoons in assault and one in support. The remaining companies of the battalion land abreast. This formation has the advantage of having one company commander in charge of the first attack on the beach, with a support platoon at his disposal to influence the action. The remaining two companies, landing abreast, are in proper formation to pass through the covering force, continue the attack, and extend the front. However, in this formation, the whole battalion is committed to a single course of action soon after landing, and the absence of a reserve company, free to be launched in any direction by the battalion commander, is a distinct disadvantage.

(3) Diagram C shows two companies in assault and one in battalion reserve. Each assault company employs a platoon as covering force, thus making the covering force weaker by one platoon than that shown in diagram B. This formation, however, has the distinct advantage of providing initially a mobile battalion reserve to meet contingencies. It is particularly applicable when the battalion lands on two separate beaches and only a short advance of the covering force is required to furnish the desired security.

(4) Diagram D illustrates one company as a covering force, followed in column by the other two companies of the battalion (column of companies). This formation tends to divide the landing into a succession of three efforts of equal magnitude. This feature may tend to increase the danger of defeat in detail and slow up the process of extending the front. The formation has the advantage inherent in a disposition in depth and may be desirable when the battalion lands in darkness, when it attacks inland on a narrow front, or to prevent congestion on a very restricted beach.

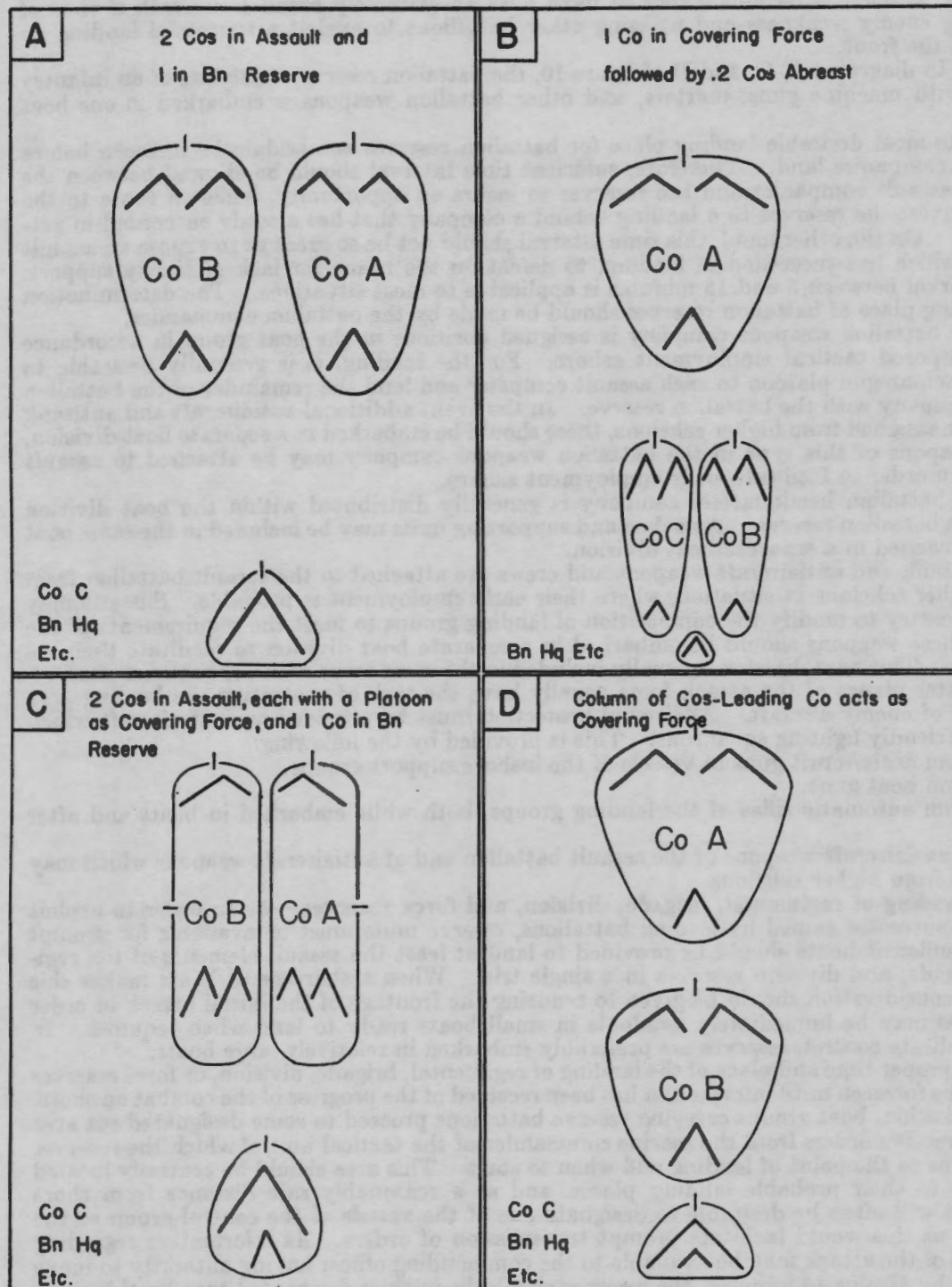


FIGURE 10.—Boat group lands assault battalion. Diagrams not to scale.

LANDING OPERATIONS DOCTRINE

f. The battalion will seldom land with all companies abreast. The formation may be applicable when a demonstration is desired to create the impression of a much larger force, or when it is necessary to make a reconnaissance in force over an extremely broad front with a view of determining enemy weakness and utilizing other battalions to exploit a successful landing on any part of the front.

g. (1) In diagrams A, C, and D of figure 10, the battalion reserve, consisting of an infantry company with machine guns, mortars, and other battalion weapons is embarked in one boat division.

(2) The most desirable landing place for battalion reserves can seldom be foreseen before the assault companies land. Therefore, sufficient time interval should be allowed between the landing of assault companies and the reserves to insure an opportunity, while en route to the beach to divert the reserves to a landing behind a company that has already succeeded in getting ashore. On the other hand, this time interval should not be so great as to expose an assault company, which has succeeded in landing, to defeat on the beach for lack of timely support. A time interval between 5 and 15 minutes is applicable to most situations. The determination of the landing place of battalion reserves should be made by the battalion commander.

h. The battalion weapons company is assigned positions in the boat group in accordance with its proposed tactical employment ashore. For the landing, it is generally desirable to attach a machine gun platoon to each assault company and land the remainder of the battalion weapons company with the battalion reserve. In the event additional antiaircraft and antitank weapons are assigned from higher echelons, these should be embarked in a separate boat division, and the weapons of this type in the battalion weapons company may be attached to assault companies in order to facilitate early employment ashore.

i. The battalion headquarters company is generally distributed within the boat division carrying the battalion reserve. Attached and supporting units may be included in the same boat division or carried in a separate boat division.

j. Antitank and antiaircraft weapons and crews are attached to the assault battalion from units of higher echelons in situations where their early employment is probable. Since it may become necessary to modify the composition of landing groups to meet the requirements of the situation, these weapons should be embarked in a separate boat division to facilitate their redistribution. This boat division is usually included in the same wave with the battalion reserve.

k. Fighter planes of the attack force usually have the task of protecting the landing area from action of enemy aircraft. Additional protection must be provided against aircraft which may evade friendly fighting squadrons. This is provided by the following:

Fire from antiaircraft guns of vessels of the inshore support groups.

Fire from boat guns.

Fire from automatic rifles of the landing groups, both while embarked in boats and after landing.

Fire of antiaircraft weapons of the assault battalion and of antiaircraft weapons which may be attached from higher echelons.

418. Landing of regimental, brigade, division, and force reserves.—a. In order to exploit quickly the successes gained by leading battalions, reserve units must be available for prompt landing. Sufficient boats should be provided to land at least the assault elements of the regimental, brigade, and division reserves in a single trip. When a shortage of boats makes this impossible, consideration should be given to reducing the frontage of the initial attack in order that reserves may be immediately available in small boats ready to land when required. In order to facilitate control, reserves are preferably embarked in relatively large boats.

b. The proper time and place of the landing of regimental, brigade, division, or force reserves can seldom be foreseen until information has been received of the progress of the combat on shore. Upon debarkation, boat groups carrying reserve battalions proceed to some designated sea area where they receive orders from the marine commander of the tactical unit of which the reserves form a part as to the point of landing and when to start. This area should be centrally located in reference to their probable landing places, and at a reasonably safe distance from shore artillery. It will often be desirable to designate one of the vessels of the control group as the rendezvous, as this would facilitate prompt transmission of orders. As information regarding the progress of the attack may be available to the commanding officer having authority to move the reserves by H plus 15 minutes, the reserves should be in their designated area by this time.

c. (1) Where the beaches on which the reserve units may be landed are separated by long distances, it may be desirable to hold the units aboard the transports, even though boats are available for their immediate debarkation. When a decision is reached regarding the employ-

ment of these reserves, the transports proceed opposite the selected point of landing for debarkation, thus speeding up the movement.

(2) When it is necessary to land reserves in the second trip of the boats, the transports or other vessels (such as destroyers) to which the reserves may have been transferred, should proceed as close to the beach as enemy fire and depth of water permit. Under such conditions, provision must be made for the rendezvous of boats with the transports or other vessels at the selected point.

(3) When conditions permit, reserves may be landed directly from transports and smaller craft onto a dock or sea wall. The landing of reserves directly from beached transports, however, generally involves the use of small boats or rafts to ferry the troops to the beach. Under these conditions, time will usually be gained by having the transports or other vessels anchor or heave to in sufficient water to keep them afloat, even when it involves a slightly greater ferrying distance to the shore.

SECTION IV

PLANNING

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419. Landing schedule.—*a.* A landing schedule is prepared for each operation and issued as an annex to force operations orders. It shows the place, hour, and priorities of landing of all units, and coordinates the movements from the transports, in order to provide for the execution of the desired scheme of maneuver.

b. In a division, or for smaller detached operations, the landing schedule will usually be issued by the division or the unit conducting such detached operation. Priorities of landing in the second and succeeding trips of the boats should be prescribed by the highest echelon of command.

c. The time of landing of units landed in the first trip of the boats is usually expressed in terms of H-hour. The hour of landing is not prescribed for units transported in the second and succeeding trips of boats running individually. Such units are listed in order of priority of landing from each transport.

d. A suggested form for a landing schedule is shown in figure 11.

e. It will be noted from the following paragraphs that prior to the issuance of a landing schedule for a specific operation, most of the detailed plans can be prepared, and training conducted, for the debarkation and movement from ship to shore from each transport.

420. Detailed plans.—*a.* (1) Detailed plans for the debarkation of all troops from each transport and the movement from ship to shore of all leading boat groups should be accomplished jointly by the commanders of the landing groups and boat groups concerned, under the direction of the transport commander, and in accordance with the landing schedule and other orders from higher authority.

(2) As the time and place of landing regimental, brigade, division, and force reserves depends mainly upon the progress of the troops previously landed, the decision as to where these reserves should land and when they should start should rest with the marine commander of the tactical unit of which the reserves form a part. (For manner of landing such reserves, see par. 418 above.)

b. The use of diagrams in preparing and issuing plans and instructions will be found useful. Diagrams should be simple and clear, and, to facilitate reproduction, should be accomplished by use of the typewriter, as shown in the figures in this section.

c. The organization of the landing groups, and the assignment of boats to the corresponding boat groups having been completed, the following diagrams, tables, and schedules will be found useful in planning and issuing orders for the movement from ship to shore:

(1) *Boat assignment table* showing the organization of boats into boat divisions, boat division formations, and the personnel carried in each boat.

(2) *Landing diagrams* showing graphically the various landing formations of the boat group.

LANDING OPERATIONS DOCTRINE

(3) *Deployment diagrams*, used when necessary to show graphically how the boat group deploys into the various landing formations.

(4) *Boat diagrams* showing the place of individual men and equipment in each boat.

(5) *Boat assembly and rendezvous diagrams* showing the assembly areas of empty boats preparatory to debarkation, routes to gangways, and rendezvous areas of loaded boats.

(6) *Debarkation and approach schedule* containing the instructions necessary to insure troops being debarked from transports and landed in accordance with the prescribed plan.

LANDING SCHEDULE

Landing Group No.	Beach	Boat Group No.	Troop unit	From transport—	Time of landing
1	A	1	1st Bn., 1st Marines, reinforced.....	XAP 14	H-hour.
2	B	2	2d Bn., 1st Marines, reinforced, less 1 tractor and 2 trailers.	XAP 13 XAP 15	H-hour.
4	C	4	1st Bn., 2d Marines, reinforced.....	XAP 10	H plus 30 min.
3	A or B	3	3d Bn., 1st Marines, reinforced.....	XAP 14	H plus 40 min.
5	C	5	2d Bn., 2d Marines, reinforced plus Bty. F, and Hq. Bty., 2d Bn., 10th Marines.	XAP 11	H plus 70 min.
			Etc., etc.....		

Priorities of landing of units in second trip of boats:		
	Beach	Boat groups
From transport XAP 14: Hq. Bty., 10th Marines (Arty.)..... 1st Engineer Company (less detachments).....	As directed..... A.....	} 1 and 3 (boats running individually).
From transport XAP 13: Etc.....		
Etc., etc.....		

FIGURE 11.—Suggested form for landing schedule.

421. Boat assignment table.—*a. Explanation of table.*—(1) The information shown by the boat assignment table for a boat group landing an assault battalion is illustrated in part in figure 12. This table should be accomplished as soon as the composition of the landing group and the number, types, and speeds of boats assigned to the boat group are known.

(2) It will be noted from the figure that in each boat division the order of boats in column is determined from, and facilitates deployment into, the Vee formation. (See fig. 6 for further illustration.)

(3) Each boat division commander and the commanding officer of the troops to be carried are placed in the leading boat of the boat division.

(4) Boats of each boat division, together with the troops they carry, are listed in the table in the order they appear in their column formation. This will be the order in which the boats of each boat division come alongside the transport for debarkation of troops.

(5) Matériel which requires extra boat spaces, such as mortars, guns, bulky ammunition, etc., should also be shown in the table wherever necessary.

b. General organization and assignment doctrine.—In the organization of boat divisions, the determination of their formations, and the assignment of troops to boats, the following points should be kept in mind:

(1) A separate boat should be assigned for use of the boat group commander and his necessary communication detail. If sufficient boats are available, it is also desirable to assign a separate boat to each of the assistant boat group commanders. The landing group (battalion) commander, with a part of his staff, should land in one of the above-mentioned boats, preferably

that of the boat group commander. These boats are not placed in any boat division, but cruise independently as directed by the officer concerned.

(2) The smallest and fastest boats should be assigned to assault platoons in such a manner as to permit the battalion to assume the maximum number of formations, the next larger types to support platoons, and the largest boats to the reserve echelon. Boats in each boat division should have approximately the same speed. Boat divisions which will probably land abreast should also have the same speed.

(3) It is desirable that at least four platoons per battalion be assigned boats suitable for assault echelons. This would not only permit the battalion to land on a broad front (as shown in diagram A, fig. 10) but also to land in either of at least two additional formations.

(4) The integrity of troop units should be maintained as far as possible, and units should be landed in their proper tactical formations. For example: A rifle squad should be kept together in one boat; each platoon in a reserve rifle company should be kept intact in one boat (or boat division); etc.

(5) The risk of heavy loss of any one arm or service is reduced by distributing each among two or more boats. For example, it would be inadvisable to embark all of a weapons company, communications platoon, or similar organization, in one boat.

c. Suggested procedure.—In the preparation of the boat assignment table it may be convenient to proceed in the following sequence:

(1) Assign a separate boat for the boat group commander and his communication detail, and, if sufficient boats are available, one for each of his assistants.

(2) Assign to a boat the landing group (battalion) commander and such members of his staff as should accompany him.

(3) Assign such members of the weapons company, and beach party and shore party personnel, as are needed as gunners or to assist the boat crews in the initial movement.

(4) Assign boats to rifle units—first, assault platoons, then support and reserve echelons. This is the basis of the organization of the boat divisions.

(5) Assign the remainder of the weapons company, headquarters units, and any attached or supporting troops. Such units are assigned to boats carrying rifle units or to separate boats. Such separate boats are assigned to or organized into boat divisions as necessary. A separate boat division may be organized for large self-contained units such as headquarters companies or artillery.

(6) Designate ambulance boats and assign the necessary medical personnel and equipment in accordance with the attack force medical plan.

LANDING OPERATIONS DOCTRINE

BOAT ASSIGNMENT TABLE

Boat No.	Personnel and Material	Boat Spaces	Formations
0	Comdr Bt GP, Comm Detail (3), & Crew (3) Comdr 1st Bn, Staff (2), & Runners (4) Machine Gunners 1st Plat Co D Total	7 7 2 16	
1	<u>BOAT DIVISION No. 1</u> (1st Plat Co A 1st Bn) Comdr Bt Div & Crew Machine Gunners 1st Plat Co D Comdr 1st Plat Co A, & Runners 1st Sqd 1st Plat Co A Total	4 2 3 9 18	<u>Vee</u> 0 1 0 0 3 2 0
2	Bt O, Crew (3), Med (2) Machine Gunners 1st Plat Co D Plat Guide & 2d Sqd 1st Plat Co A Total	6 2 10 18	4 0 <u>Column</u>
3	Bt O, Crew (3), & Med (2) Machine Gunners 1st Plat Co D 3d Sqd 1st Plat Co A Total	6 2 9 17	0 1 0 2
4	Bt O & Crew Machine Gunners 1st Plat Co D Plat Sgt & Runner 1st Plat Co A Auto Rifle Sqd 1st Plat Co A Total	4 2 2 8 16	0 3 0 4
5	<u>BOAT DIVISION No. 2</u> (2d Plat Co A 1st Bn) Comdr Bt Div & Crew Machine Gunners 1st Plat Co D Comdr 2d Plat Co A & Runners 1st Sqd 2d Plat Co A Total	4 2 3 9 18	<u>Vee</u> 0 5 0 0 7 6 0
6	Bt O & Crew Machine Gunners 1st Plat Co D Plat Guide & 2d Sqd 2d Plat Co A Total	4 2 10 16	8 <u>Column</u>
7	Bt O, Crew (3), Med (2) Machine Gunners 1st Plat Co D 3d Sqd 2d Plat Co A Total	6 2 9 17	0 5 0
8	Bt O, Crew (3), & Med (2) Machine Gunners 1st Plat Co D Plat Sgt & Runner Auto Rifle Sqd 2d Plat Co A Total	6 2 2 8 18	6 0 7 0 8
	(CONTINUED UNTIL BOAT GROUP IS COMPLETED)		

FIGURE 12.—Sample boat assignment table.

- (7) Fill up boats with the remainder of the beach and shore parties.
- (8) It is advisable to employ a complete check-off list, in order that each unit, or fractional part thereof, can be accurately accounted for. As a final check, the total of the boat spaces used should be added and compared with the total shown on the check-off list.
- (9) Beginning with "Boat Division No. 1," assign each boat of the boat group its serial number. Each type of boat is given a designating letter. Boats of each type are numbered serially in the order they should load and proceed from the transport; for example LCP(R)-1, LCP(R)-2, LCP(R)-3, LCV-1. These designating letters and numbers are for tactical purposes only, and indicate the proper position of the boats while in formation. For administrative purposes when not operating in formation, boats will be known by their permanent designations as "TENN 2," "ARG 4"; except that when boats have no permanent designations, their tactical type letters and numbers may be used.
- (10) In order to prevent duplication, blocks of designating letters and numbers may be assigned each boat group. For example, Boat Group No. 1 may be assigned LCP(R)1-14, inclusive; Boat Group No. 2, LCP(R)15-29, inclusive; etc.
- (11) The designating letter and number are placed on boards which can be suitably displayed in the boats. Such boards should be provided by the transport in which the troops are embarked and should be carried into the boats with the troops. This will insure, in any contingency, the proper identification of each boat according to the troop units actually embarked.

422. Landing diagrams.—a. A landing diagram shows the landing formation of the boat group and the guide and alternate guide of each wave. A separate diagram is made to show each formation the boat group may be required to employ, generally from two to four, depending on the types of boats available. For later reference, each formation should be given an identification number. Figure 13 shows a sample landing diagram for a boat group with four boat divisions in the first wave. Additional information, such as the designating letter and number of each boat, may be included on the original diagram if space permits. Such additional information, together with the intervals and distances between elements, should always be added if for any reason the diagram alone is to be used for a particular operation in lieu of written orders issued in advance.

b. Landing diagrams should generally be prepared and promulgated at the same time as the boat assignment table.

c. The intervals and distances between the various elements of the boat group will vary for different beaches and should, therefore, be prescribed in the orders (or placed on the diagram) for each rehearsal, and for the actual landing. For example, instructions for a particular rehearsal or actual landing, employing the formation shown in figure 13, would include information similar to the following:

The boat group will employ landing formation No. 1:

Distance between boats within BD's—50 yards. Support groups in first wave—As directed by boat division commanders.

First wave: Lt. P Cmdg. in LCP(R)-15 (not in formation): Interval between BD's 5 and 4—200 yards; BD's 4 and 1—150 yards; BD's 1 and 2—200 yards.

Second wave: Lt. Q Cmdg. in LCP(L)-3: Lands 8 minutes after first wave. Interval between BD's in second wave—350 yards.

Third wave: Lt. R Cmdg. in LCV-15: Lands 12 minutes after second wave. Interval between BD's 7 and 8—300 yards.

d. When there has been no opportunity for combined training in the various formations, however, and the boats are to assemble *by type* at the transport for the debarkation, all necessary information as to boat numbers, distances, and intervals should be entered on the landing diagram issued at the gangway to each boat officer.

423. Selection of landing formation.—a. A landing formation should be selected and intervals and distances prescribed which will best carry out the scheme of maneuver applicable to the configuration of the particular beach under consideration.

b. It is extremely important that the whole front of the beach be covered by troops, and particularly that enemy positions on the flanks be assaulted promptly. This may require under certain conditions that the landing be made over coral or other natural or artificial obstacles. Where such conditions exist, special boats available should be employed to effect the landing.

c. Where a beach constitutes a pronounced reentrant, it may be necessary to land on the points first.

LANDING OPERATIONS DOCTRINE

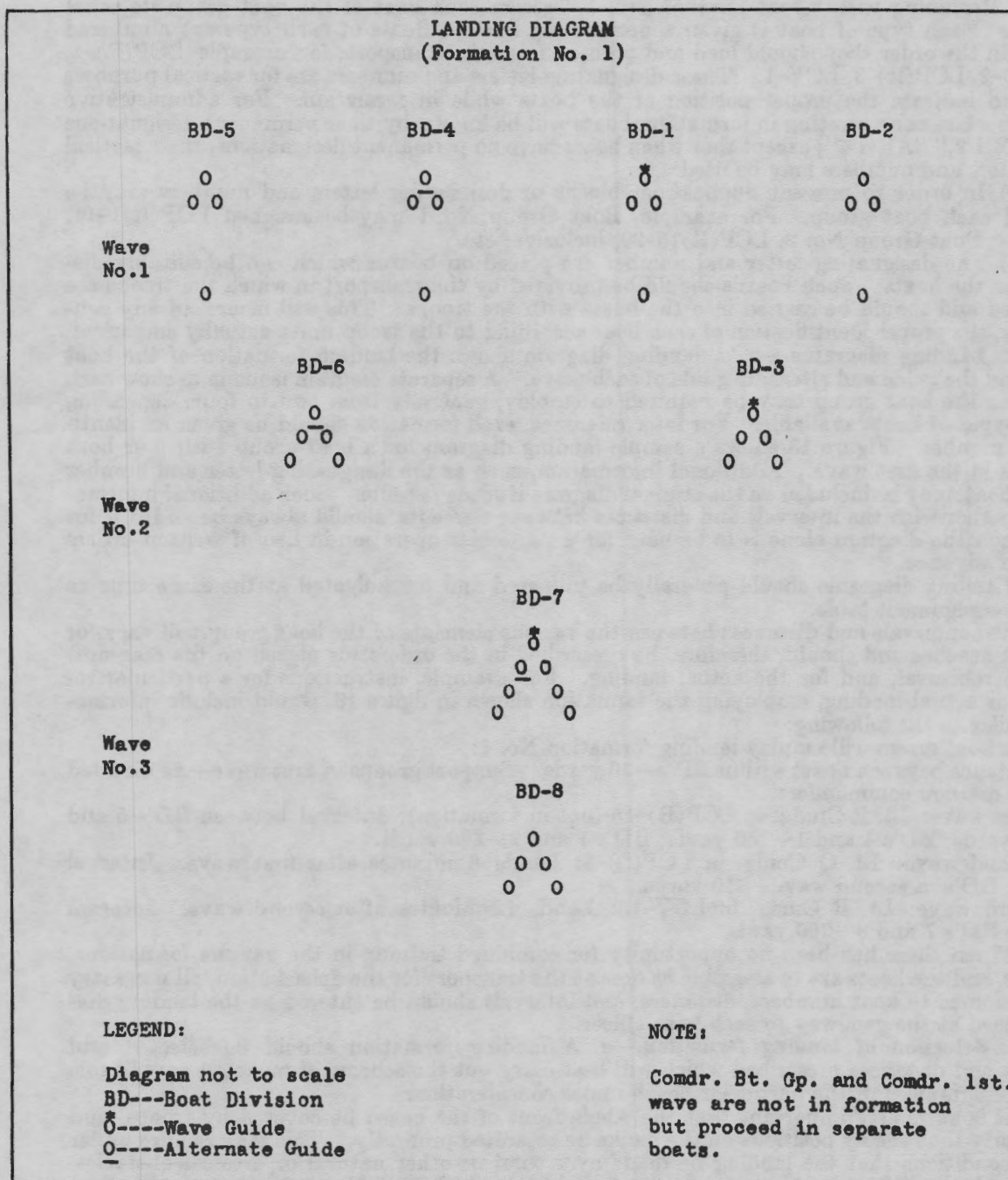


FIGURE 13.—Sample landing diagram.

424. Deployment diagrams.—*a.* A deployment diagram shows the formation in which the boat group proceeds from the rendezvous areas to the line of departure and the method of deployment into the landing formation.

b. Figure 14 shows a deployment diagram applicable to the landing formation shown in figure 13, when deployment is made straight to the front. In this figure, the boat group is proceeding with reduced intervals between waves. This formation is particularly applicable during darkness, when transport areas are congested, or when the route to the line of departure contains several changes in direction.

c. When the movement to the beach takes place in daylight, or is otherwise simplified, each wave may proceed from its rendezvous area independently. Each wave, as soon as formed, would then proceed in the formation shown for it in the deployment diagram, and at a speed that will permit its arrival at the line of departure at the proper time. This method of moving by waves provides a wider safety factor for remedying or replacing boat casualties in the leading waves and lessens the possibility of confusion in the rendezvous areas.

d. In restricted areas, it may be difficult to deploy straight to the front as shown in figure 14. In this case, each wave may proceed in column of boat divisions and deploy by having all boat divisions turn simultaneously to the right (or left) or execute any other simple maneuver as directed.

425. Boat diagrams.—*a.* The boat assignment table and landing diagrams furnish the boat officer and the senior troop commander in each boat with sufficient information to plan the positions of men and matériel in the boat.

b. The positions of men and matériel in each boat depend primarily upon the following considerations:

(1) The boatload of men and matériel must be distributed so as to keep the boat in trim.
 (2) Men should be placed so as to allow a suitable number to fire their weapons, both at planes and at the beach, with the least danger to each other and with the least change of position in the boat.

(3) For protection against enemy weapons, men should be as low in the boat as possible.

(4) Positions of troops should facilitate their quick debarkation and proper deployment on the beach in the desired formation.

c. The most suitable loading of personnel and matériel can best be determined by tests and training exercises, which should include loading, movement from ship to shore, and landing and deployment, under conditions similar to those to be expected in the contemplated operation.

d. (1) It may be advisable to make rough sketches or diagrams showing the position of each man in the boat and the method of landing and deployment. These diagrams are particularly applicable when there has been little or no opportunity for combined training. (See fig. 20.)

(2) In larger boats used in the later waves, the locations of squads will suffice.

426. Debarkation plans.—*a. General considerations.*—(1) Debarkation of troops and matériel from transports should be accomplished in the shortest possible time. A fast debarkation reduces the period of greatest vulnerability of transports to air and submarine attacks, lessens the value of the information given to the enemy, and shortens the time boats must remain in the water.

(2) Boats should, therefore, be promptly lowered and assembled and boat divisions assigned gangways in such a manner as to continuously utilize each gangway to its fullest capacity.

(3) In order to simplify the stowage of boats and training of personnel, and to insure prompt debarkation in any weather, it is desirable to select one side (port or starboard) for debarkation. The same side should, if possible, be selected for all transports in the transport division in order that they may be headed in the same direction while laying to and providing a lee.

b. Assignment of boat divisions to gangways.—The following considerations govern the assignment of boat divisions to gangways:

(1) The order in which the boats may be lowered and made available for loading. This depends on the manner of stowing boats aboard ship; and also the lowering and running time of boats coming from other ships.

(2) The relative position each boat division is to assume in the landing formation of the boat group: Although it may sometimes be possible to speed up the movement by loading and sending off the slowest boats first, this is likely to cause confusion while boats are en route to the beach. Boat divisions should, therefore, be loaded and sent off in the order in which they are to land, and those which are to be in the same wave should be made ready to proceed as nearly simultaneously as practicable.

LANDING OPERATIONS DOCTRINE

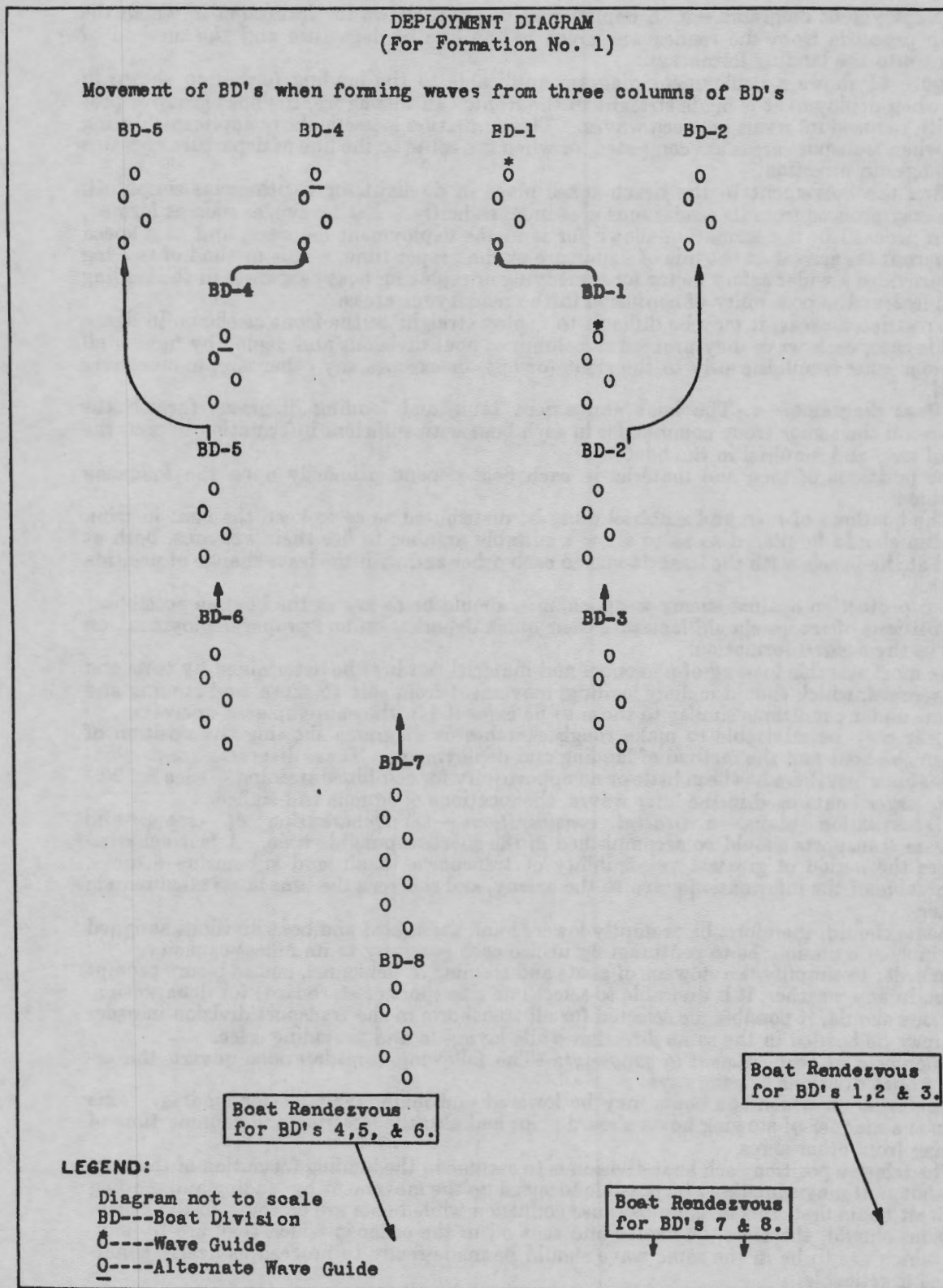


FIGURE 14.—Sample deployment diagram.

SHIP TO SHORE MOVEMENT

Confidential

(3) The time required to load each boat division. The total loading time of each gangway should be equalized.

(4) The location aboard ship of the matériel each boat division is to carry. Boat divisions should be assigned gangways near the matériel they are to carry. This applies particularly to matériel requiring cranes, booms, or davits for handling.

c. Tests.—(1) With the above considerations in mind, and by use of the loading times for various types of boats as shown in chapter III, section II, a tentative assignment of boat divi-

DEBARKATION DATA					
XAP No. 5					
PORT SIDE					
Conditions: Smooth sea, daylight. Time of lowering first boat: "Zero." (NOTE.—Times shown below are "Zero plus.")					
Boats	Time alongside (minutes)	Time cleared (minutes)	Loading time (minutes)	Speed (knots)	Remarks
GANGWAY NO. 2					
LCP (R)-1-----	18	20	2	16	Boats to come from XAO No. 3.
Bt. Div. 1-----	21	35	14	15	
Bt. Div. 2-----	36	49	13	15	
Bt. Div. 3-----	50	64	14	10	
Bt. Div. 7-----	65	82	17	6	
GANGWAY NO. 4					
LCP (L)-18-----	15	17	2	15	Boats to come from XAO No. 3. Last boats to load.
LCP (L)-19-----	18	20	2	15	
Bt. Div. 4-----	21	33	12	15	
Bt. Div. 5-----	34	47	13	15	
Bt. Div. 6-----	¹ 48	67	19	10	
Bt. Div. 7-----	68	² 87	19	6	
GANGWAY NO. 6					
Bt. Div. 8-----	20	60	40	6	
¹ XAO No. 3, which furnishes boats for boat divisions 3 and 6, must have them ready at XAP No. 5, 48 minutes after XAP No. 5 starts lowering boats. (This information should be furnished XAO No. 3.) ² Time last boat clears. Therefore 87 minutes is the debarkation interval for this particular boat group.					

FIGURE 15.—Sample debarkation data sheet.

sions to gangways should be made. Actual tests should then be conducted in order to obtain the following information:

The fastest and most suitable method of lowering boats.

The adjustments which may be made to speed up the debarkation, either by restowage of boats and matériel aboard ship, or by reassignments of boats to gangways.

The actual time required to lower and load the boats of each boat division, and those boats which are to operate separately.

(2) Tests should also be conducted to determine the speed of each boat division and separate boat, with each boat containing the actual load it is to land.

(3) These tests should preferably be made after troops and matériel have been embarked on transports.

(4) The data collected during these tests should be incorporated in a table as shown in figure 15. Such debarkation data should invariably be prepared by each ship transporting any troops which are to be landed on a time schedule. It is desirable to have this data for both rough and smooth seas, and for both daylight and darkness. Due allowance should be made for delays during debarkation under war conditions.

427. Boat assembly and rendezvous areas.—*a.* In order to prevent confusion and delay when several boat divisions are involved, it is advisable to prescribe assembly areas for empty boats; routes for empty boats from assembly areas to gangways; routes for loaded boats from gangways to rendezvous areas; and rendezvous areas. The above may be prescribed in orders, or by a diagram such as shown in figure 16. The rendezvous area, or areas, will be prescribed by the transport or transport group commander, as appropriate.

b. (1) Assembly areas are fixed in reference to the transport and therefore move with the transport if it swings. Assembly areas are designed to prevent confusion. They obviate the necessity of each individual boat coming alongside the transport to report its arrival; provide for each boat a ready access to its gangway for loading; and permit, through an orderly distribution of boats around the transport, a more effective antiaircraft protection.

(2) Rendezvous areas, in which loaded boat divisions are concentrated preparatory to the movement to the line of departure, should be located a short distance from the transport and preferably between the transport and the line of departure. In order to accomplish the latter, it is desirable to designate rendezvous areas in reference to some fixed point. This may be the control vessel which is later to lead the boats to the line of departure, and is temporarily stationed for the purpose. If the control vessel is not available at this time, but is to meet the boats later, the rendezvous areas may be fixed in reference to a buoy or small boat placed by the boat group commander.

(3) When a landing group is embarked on two or more vessels, each ship will prescribe its own assembly areas but the rendezvous areas will be common for the complete boat group.

c. Either one of two general methods may be employed to control the movement of small boats from the time of their arrival in designated assembly areas until the time of their arrival, with their troops, in their rendezvous areas, namely:

The assembly and loading of boats by boat divisions, and

The assembly and loading of boats by type.

d. (1) In the method of assembly and loading of boats *by type*, all empty boats of similar type, speed, and capacity assemble in separate designated assembly areas similar to those shown in figure 16, but without regard to any boat division organization. Individual boats of the desired type are called alongside as needed for loading and organization into the required boat divisions. Designating letter and number boards are placed in each boat at the time of loading. A card showing the landing and deployment diagrams and the position of the particular boat in formation is also delivered to the boat officer of each boat at this time. The first assembly of boat divisions, as such, is made close aboard, after which each boat division proceeds to the rendezvous area.

(2) This method has the great advantage of simplicity in any operation. It will be found particularly applicable:

When there has been little combined training.

When some boats are to come from ships other than the one carrying the troops to be landed.

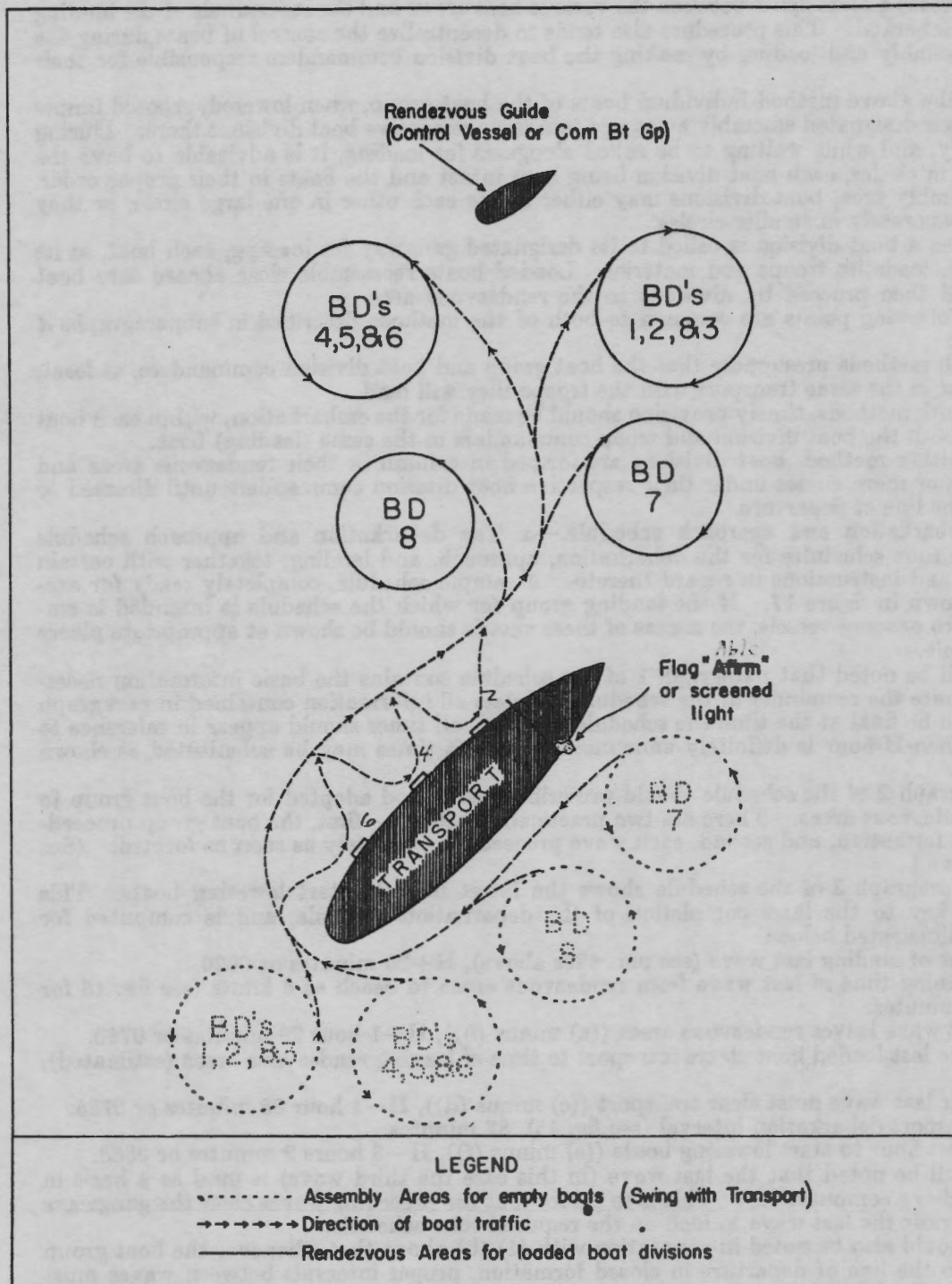


FIGURE 16.—Boat assembly and rendezvous areas (sample).

e. (1) Figure 16 illustrates the assembly and loading *by boat divisions*. This method is applicable when there has been sufficient opportunity for combined training of boat and troop units to inculcate a team spirit between the various boat crews and the individuals of the landing force to be embarked. This procedure also tends to decentralize the control of boats during the period of assembly and loading by making the boat division commanders responsible for their movements.

(2) In the above method individual boats of the boat group, when lowered, proceed immediately to their designated assembly areas and join their respective boat divisions there. During this assembly, and while waiting to be called alongside for loading, it is advisable to have the boats cruise in circles, each boat division being kept intact and the boats in their proper order. In each assembly area, boat divisions may either follow each other in one large circle, or they may cruise separately in smaller circles.

(3) When a boat division is called to its designated gangway for loading, each boat, in its proper order, loads its troops and materiel. Loaded boats reassemble close aboard into boat divisions and then proceed by divisions to the rendezvous area.

f. The following points are common to both of the methods described in subparagraphs d and e above:

(1) Both methods presuppose that the boat group and boat division commanders, at least, are embarked in the same transport with the troops they will land.

(2) In both methods, timely provision should be made for the embarkation, within each boat division, of both the boat division and troop commanders in the same (leading) boat.

(3) In either method, boat divisions are formed in column in their rendezvous areas and cruise in one or more circles under their respective boat division commanders until directed to proceed to the line of departure.

428. Debarkation and approach schedule.—a. The debarkation and approach schedule contains the time schedules for the debarkation, approach, and landing, together with certain information and instructions in regard thereto. A sample schedule, completely ready for execution, is shown in figure 17. If the landing group for which the schedule is intended is embarked on two or more vessels, the names of these vessels should be shown at appropriate places in the schedule.

b. It will be noted that paragraph 1 of the schedule contains the basic information necessary to compute the remainder of the schedule. Unless all information contained in paragraph 1 is known to be final at the time the schedule is issued, all times should appear in reference to H-hour. When H-hour is definitely announced the exact times may be substituted as shown in the figure.

c. Paragraph 2 of the schedule should prescribe the method adopted for the boat group to leave the rendezvous areas. There are two practicable methods—first, the boat group proceeding in closed formation, and second, each wave proceeding separately as soon as formed. (See par. 424 above.)

d. (1) Paragraph 3 of the schedule shows the latest hour to start lowering boats. This hour is the key to the later completion of the debarkation schedule, and is computed for figure 17 as illustrated below:

(a) Hour of landing last wave (see par. 422c above), H+20 minutes or 0920.

(b) Running time of last wave from rendezvous areas to beach at 6 knots (see fig. 15 for speed), 100 minutes.

(c) Last wave leaves rendezvous areas ((a) minus (b)), H-1 hour 20 minutes or 0740.

(d) Time last loaded boat clears transport to time of leaving rendezvous areas (estimated), 15 minutes.

(e) Hour last wave must clear transport ((c) minus (d)), H-1 hour 35 minutes or 0725.

(f) Transport debarkation interval (see fig. 15), 87 minutes.

(g) Latest hour to start lowering boats ((e) minus (f)), H-3 hours 2 minutes or 0558.

(2) It will be noted that the last wave (in this case the third wave) is used as a basis in making the above computations. This is to insure that the preceding waves clear the gangways in time to permit the last wave to load on the required time schedule.

(3) It should also be noted in connection with (1) (b) above that whenever the boat group is to move to the line of departure in closed formation, proper intervals between waves must be taken near the line of departure. In case all waves have approximately the same speeds, this will necessitate the slowing down of the rear waves. In such a case, the running time of the last wave should be increased accordingly.

SHIP TO SHORE MOVEMENT

Confidential

e. Paragraph 4 of the schedule shows the order of loading boats at each gangway and the latest hour each unit is to come alongside and complete loading. Using the hour to start lowering boats as "zero" time, all other times may be computed from the information contained in the debarkation data, illustrated in figure 15.

f. (1) Paragraph 5 of the schedule contains the times each wave leaves the rendezvous areas, passes the control point (or points), crosses the line of departure, and lands.

(2) The times of landing are computed from H-hour.

DEBARKATION AND APPROACH SCHEDULE

BOAT GROUP NO. 1, XAP NO. 5					
1. Basic information:					
Line of departure to beach, 5,000 yards; course, 097°.					
Control point GAST to line of departure: 7,000 yards; course 097°.					
Rendezvous areas to control point GAST , 8,000 yards; course, 020°.					
H-hour, 0900; D-day, 3 June 19... CHARLIE					
2. Method of proceeding from rendezvous areas:					
Waves move separately as soon as formed; first wave guiding on control vessel TERN.					
3. Latest hour to start lowering boats, 0558.					
4. Debarkation schedule.					
Boats	W No.	Principal unit	Alongside by—	Clear by—	Remarks
GANGWAY NO. 2					
LCP (R)-1-----		Bt. Gp. and Bn. Cmdrs--	0616	0618	(First wave completes loading 0647.)
Bt. Div. 1-----	1	1st Pl., Co. A-----	0619	0633	
Bt. Div. 2-----	1	2d Pl., Co. A-----	0634	0647	
Bt. Div. 3-----	2	3d Pl., Co. A-----	0648	0702	
Bt. Div. 7-----	3	Co. C-----	0703	0720	
GANGWAY NO. 4					
LCP (L)-18-----		Asst. Bt. Gp. Cmdr-----	0613	0615	(Second wave completes loading 0705.) (Third wave completes loading 0725.)
LCP (L)-19-----		Asst. Bt. Gp. Cmdr-----	0616	0618	
Bt. Div. 4-----	1	1st Pl., Co. B-----	0619	0631	
Bt. Div. 5-----	1	2d Pl., Co. B-----	0632	0645	
Bt. Div. 6-----	2	3d Pl., Co. B-----	0646	0705	
Bt. Div. 7-----	3	MG. Co., etc-----	0706	0725	
GANGWAY NO. 6					
Bt. Div. 8-----	3	Det. Bty. A-----	0618	{0658 to 0725	
5. Approach schedule:					
		Hour to leave rendezvous	Hour to leave control point	Leave line of departure	Land
First wave-----		0702	0759	0850	0900
Second wave-----		0720	0809	0853	0908
Third wave-----		0740	0820	0855	0920
(Approach schedule to be furnished fire support group and control vessel.)					
A----- B----- Commanding XAP No. 5.					

FIGURE 17.—Sample debarkation and approach schedule.

(3) The time of each wave leaving the line of departure is its time of landing minus its full-speed running time between the line of departure and the beach. If there is a great difference in speed of waves, sufficient interval should be allowed between waves to avoid the necessity of one wave passing through another, or cutting down the speed of the leading boats.

(4) If the boat group is to proceed from its rendezvous areas by waves, the hour each wave leaves should be the time its last element can be made ready. This can be ascertained from paragraph 4 of the schedule. If the boat group is to proceed in closed formation, the time the last wave can be made ready governs the minimum time of departure of the whole boat group from the rendezvous areas.

(5) If the boat group proceeds to the line of departure by waves, each wave proceeds at a speed which will cause it to arrive at the line of departure at the proper time to start its full speed run for the beach. The hour each wave passes the control point is computed by using this speed.

(6) When the approach of several boat groups to the line of departure is to be guided by a single coordinated movement of the control group, the times of leaving the rendezvous areas, or control points, may be prescribed by the attack force commander.

g. When troops are embarked on ships which are to support the landing by gunfire, ample time must be provided to allow the ships to reach their firing stations after the debarkation has been completed. The use of gunfire support vessels as transports should be avoided if practicable since a serious loss in combat efficiency may result from keeping troops in small boats vulnerable to air attack and subject to seasickness, for long periods.

SECTION V

EXECUTION

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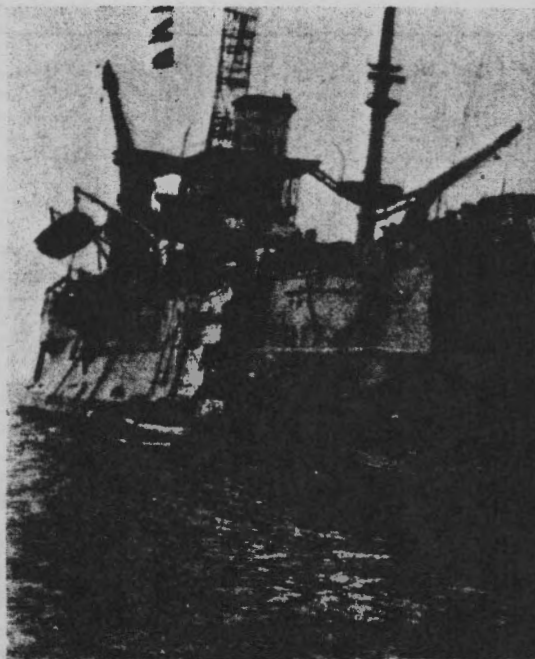
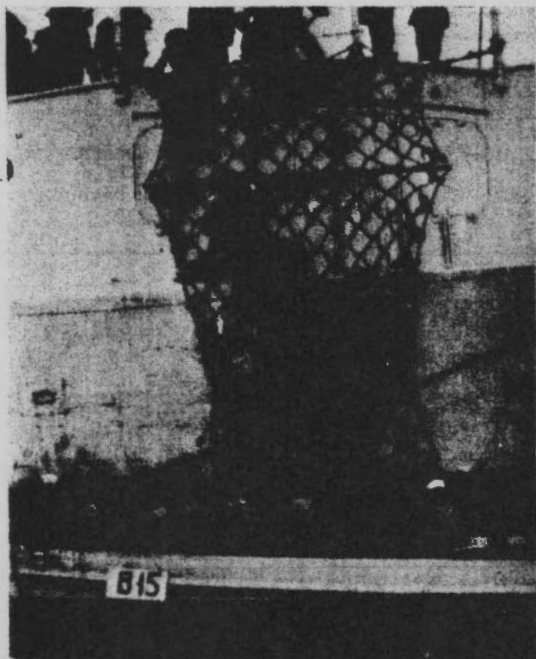


FIGURE 18.—Debarking by cargo nets.

429. Preparation for debarkation.—*a.* In order to avoid delay, details from the deck force should be organized to lower specified boats and gangways, and exercised in these duties.

b. Gangways may consist of ladders or of cargo nets hung over the side of the transport. Cargo nets often offer the quickest and safest means of debarking men. The nets should be sufficiently large to permit four or more men to debark abreast and should reach from the deck to bottom of boat. For loading large boats, two or more cargo nets may be used. When debarking by cargo nets there should be some rigging at the deck level to which men can hold when stepping from the deck onto the nets. As long as any man is on the net, either embarking or disembarking, the bottom end of the net should be tended in the boat by the boat crew or troops, and the net kept free of slack as the boat rises and falls with the sea, in order to form a ladder direct from the ship's deck to the bottom of the boat. Permanent boat lines should be rigged on the side of the transport where they can be readily grasped by the boat crew. Special care should be taken to provide fenders to clear boats of all obstructions on the sides. Scuppers in the way of loading boats should be stopped.

c. (1) All personnel not in boats when lowered should be assigned compartments or other suitable space below decks in which to assemble for debarkation. In each compartment, men should be segregated by boatloads and arranged in file to facilitate rapid debarkation and prompt occupation of assigned spaces in boats. Routes to gangways should be prescribed.

(2) Number boards bearing the tactical type letter and number of each boat in formation, such as "LCP(R)-1," should be prepared by the transport concerned. Three boards should be made for each boat; two to be hung over the bows and one on the stern. When the method of assembly and loading of boats by type is used (see par. 427 above), the number boards and copies of the landing and deployment diagrams are carried into the boats by the troops. Guide flags or other distinguishing marks should be supplied boat officers who are to embark in guide boats. A special designating flag should be provided for the boat carrying the boat group commander.

(3) Each boatload should contain one member of the landing force, who is thoroughly familiar with the boat formation signals. This man should report as boat signalman to the boat officer at the time of loading.

d. (1) Provision should be made to station a naval officer and a marine officer at each gangway, the naval officer being responsible for the loading and the marine officer for having the troops and matériel ready at the gangway. In this connection, a check-off list of personnel and matériel to be loaded in each boat may be useful to the marine officer at the gangway.

(2) Company officers should remain with their troops.

e. (1) All possible measures which will expedite the debarkation of equipment should be taken.

(2) Organization combat equipment, such as machine guns, howitzers, aid station outfits, Cole carts, signal equipment, etc., should be assembled convenient to the gangways. Extra ammunition, gas-defense matériel and equipment, and other supplies should be placed in cargo nets or otherwise made ready for hoisting.

(3) Improvised davits and hand lines should be provided at each gangway for lowering light equipment into the boats.

f. The machinery and gear to be used in opening hatches, lowering boats and gangways, moving matériel, etc., should, shortly before actual use, be thoroughly tested.

g. Provision should be made to synchronize all timepieces shortly before debarkation is to begin.

h. Detailed organization and frequent combined drills of all concerned in the debarkation are essential. Drills during rough weather and darkness are particularly valuable.

430. The debarkation.—*a.* (1) All boats to be lowered from the transport carrying the troops should contain their prescribed boat equipment, gas-defense matériel and equipment, boat group officers, crews, gunners, boat guns, and ammunition. Boats coming from other ships should contain designated crews, gas-defense matériel and equipment, boat guns, and ammunition.

(2) As soon as boats are lowered, boat guns should be mounted and prepared for active anti-aircraft protection, and guide or designating flags displayed when appropriate. All boats which are to form a part of the boat-group formation should then proceed individually to their assembly areas.

(3) Boats arriving from other ships report to the designated officer in the prescribed assembly areas. These officers in turn report the arrival of boats in their areas upon next circling near the transport. (See pars. 427 *c* to *f* above for explanation of the two methods of assembly.)

LANDING OPERATIONS DOCTRINE

(4) Boat-division commanders or assistant boat-group commanders, as appropriate, may be assigned to command all boats in an assembly area containing two or more boats.

b. (1) If the assembly is to be made by type, arriving boats simply form column in the most convenient manner and are called alongside individually as needed. If the assembly is to be made by boat divisions, individual boats upon reaching assembly areas should assemble in the prescribed column formation of their particular boat division, and so remain until called alongside for loading.

(2) While in the assembly areas boats may be conducted in convenient circles which will bring them repeatedly within hailing distance of the transport.

(3) Care should be taken to keep all boats within their designated assembly areas, particularly when the transport swings or otherwise changes position.

(4) Boats should at all times be on the alert for hostile aircraft, and should be prepared to open fire promptly.

c. Prior to or immediately upon his debarkation, the boat-group commander should assure himself as to the location and identification of rendezvous areas. If not marked by a control vessel stationed for the purpose, rendezvous areas should be established by the boat group commander, marking them either by buoys or picket boats. The approach schedule should be delivered to the control vessel at this time.

d. (1) Men and equipment should be debarked with all possible speed as soon as their boats come alongside. It is usually advisable to load first the heavy materiel and sufficient men to stow it properly in the boats. This should be followed by the more easily handled materiel and the remaining personnel.

(2) Equipment carried on the person should be loosened before going over the side. The rifle should be slung vertically over the left shoulder with the sling passed over the bayonet handle in the pack.

(3) Before each loaded boat leaves the gangway it should be informed where its boat division is to assemble and the location of its rendezvous area.

e. (1) When a boat is unable to report alongside on schedule, it should, if possible, be immediately replaced by a boat of the same type and speed from the boat pool.

(2) It is desirable that one or more boats from the boat pool follow each wave until it lands. All such boats should not be sent off on this duty, however, until the actual debarkation of troops is assured.

431. The approach to the line of departure.—a. (1). The assembly of loaded boats into their boat division formations will take place in close proximity to the transport. Boat divisions then proceed by division to the rendezvous areas.

(2) In order to avoid confusion, it may be advisable for boat divisions, while being held in the rendezvous areas, to cruise in circles. When completely assembled, boat divisions arrange themselves in the prescribed boat group or wave formation, under the command of the boat group or wave commander.

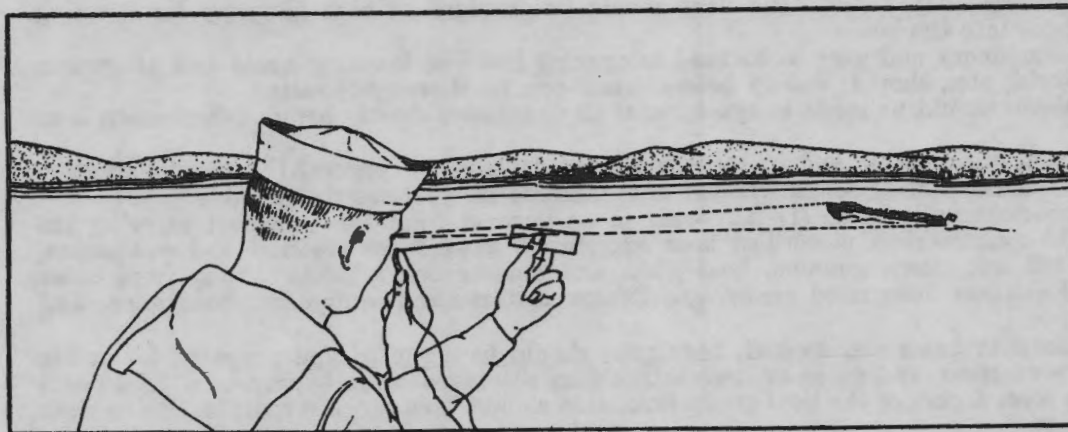


FIGURE 19.—Use of stadiometer.

b. (1) Plans for the approach to the line of departure will usually provide for a single concerted movement by all leading boat groups, guided by several control vessels (preferably one for each boat group) acting as a unit. In such a movement one of the control vessels will be designated as control group guide. This centralized control of all boat movements during this phase is particularly applicable when all leading boat groups are to land nearly simultaneously on adjacent beaches, and (or) when inshore support ships are included in the control group.

(2) If the situation is such that each boat group must move independently to the line of departure and no inshore support ships are included in the control group, there is little need for the control group acting as a unit during the approach.

c. (1) The control vessel assigned to guide a particular boat group after identifying the beach, and marking the line of departure, if necessary, should proceed to the boat rendezvous areas in time to act as the rendezvous guide until the boats are ready to proceed. At the time indicated in the appropriate debarkation and approach schedule as issued and furnished by the transport concerned, or when directed by the attack force or control group commander, it sounds a blast of its whistle (hoists the guide flag if control group guide) and guides the leading wave by the prescribed route to the line of departure.

(2) While acting as rendezvous and boat guide, each control vessel should display a designating flag by day or light by night.

(3) While guiding boat formations, the control vessel should be ahead of the center of the formation and sufficiently in advance of the leading boats for such maneuvering as will be necessary. Care should be taken to prevent the control vessel and the boats losing sight of one another. All speeds should be regulated by the control vessel and should be such as to insure the boats crossing the line of departure at the prescribed time.

(4) If it is impracticable to have a control vessel lead the boats the whole distance from their rendezvous areas, one should meet the boats some distance back of the line of departure and guide their approach thereto.

d. During daylight, each boat division should proceed in a closed Vee formation; in rain, fog, smoke, or darkness, they should proceed in column formation, and if necessary, place their boats in tow.

e. (1) When deployed, boats may maintain their prescribed distances by use of a boat stadiameter. This is an instrument, similar to the musketry rule, consisting of a small strip of any light strong material such as wood, aluminum, or celluloid, with a string attached. A knot should be tied in the string at such distance from the strip that when the knot is held at the eye or in the teeth the strip will exactly subtend the boat being observed at the designated distance.

(2) In using the boat stadiameter the strip must be held parallel to the course of the boat being observed.

(3) The use of a boat stadiameter is particularly desirable in maintaining the proper interval between boat division guides.

f. (1) If attacked by aircraft, boat guns and other weapons designated for this duty should open fire without waiting for orders. Riflemen in boats should fire only when directed.

(2) The control vessels, and such other ships as may be designated, should protect the boats from enemy surface craft, aircraft, and submarines. Nevertheless, when an attack by enemy craft is so severe as to seriously jeopardize the integrity of the boat group, certain boats may be directed by the boat group commander to break away from the formation and engage the enemy craft with their boat guns, rejoining the boat group formation as soon as expedient. The paramount consideration, however, is to deliver the troops at the beach in the tactical formation previously ordered.

g. Accompanying boats of the boat pool should rescue survivors, and tow or replace any boats of the formation which become unable to keep position; transferring troops when necessary.

h. The attack force commander, the commander of the fire support group supporting the landing, and other designated commanders should be kept informed by the control vessel as to the progress of the boat group. The fire support group, particularly, should be notified, when the boats are in the position prescribed by the attack force commander for opening, ceasing, or lifting naval gunfire. (See par. 228f for methods.)

i. If for any reason the line of departure has not been marked by the control group, it may be established by the boat group commander by sending a boat in to take station on that line.

432. Activities near the line of departure.—a. During the approach of the boat group to the line of departure, the guiding control vessel should take frequent ranges on the beach and on the markers at the line of departure. This will enable the control vessel to regulate the speed of the boats so that they may cross the line at the proper time.

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b. As the line of departure is neared, the boat group commander should contact the control vessel of his boat group for last-minute messages from higher commanders, and to obtain the exact bearing of the landing beach.

c. On or before nearing the line of departure, the boat group commander should see that the waves are deployed into their prescribed landing formations and ready to start the run to the beach.

d. The control vessel should signal its arrival at the line of departure. It should then station itself on that line for further activities as described later. If the control vessel is to support the landing by fire, it should then proceed to its designated firing station. If, on the other hand, the control vessel is to guide the boats in beyond the line of departure, it should indicate the moment of crossing the line of departure by signal, and give a further signal when it ceases to be the boat guide. Signals should be prescribed with due regard for the secrecy of the approach.

e. (1) As the first wave crosses the line of departure, the control vessel should so notify the attack force commander, the fire support group, and any other units concerned.

(2) The control vessel, unless assigned other duties which will prevent, acts as an observation station, relaying to appropriate commanders such information of the landings as can be gathered.

433. The dash to the beach.—a. (1) As the line of departure is located as close to the landing beaches as enemy fires permit, the landing boats may expect enemy light artillery and machine-gun fires soon after they cross this line. Each wave should, therefore, proceed at full speed from the line of departure to the beach.

(2) Each boat continues to guide on the leading boat of its boat division, and each boat division guide maintains its place in the wave formation by guiding on the designated wave guide. Care should be taken at this time to insure that all boats maintain their proper distances from each other, particularly the boat division guides. If boats are too close, they become more vulnerable to enemy fire, certain portions of the beach may be left uncovered, and troops are deprived of the necessary space for immediate deployment at the beach; if distances are greater than prescribed, flank boats may be forced entirely off the designated beach, and some enemy groups left unopposed.

(3) Alternate guides hoist their guide flags if the regular guide boats become casualties.

b. (1) It is extremely difficult for boats, depending solely on boat compasses and observation of the shore line, to approach the beach at full speed and land at the exact point desired. This is particularly true when boats must negotiate narrow unmarked channels or land on a beach hidden from view by smoke.

(2) For a daylight landing when no control vessel is acting as boat guide, it may be advisable to employ a guide plane to guide each boat group until it is assured of landing on its proper beach.

(3) The guide plane should fly well in the rear of the wave being guided. When it is evident that the wave should change direction in order to land all of its boats on the assigned beach, the plane should fly directly toward the guide boat and signal the necessary change in direction. One dip of the right (or left) wing signifies a change of direction of 5 degrees to the right (or left); two dips, 10 degrees; etc. The change of course can be observed by the pilot and serves as an acknowledgment of the signal.

(4) Although one of several other methods are possible in small operations, the above method offers the least chance of confusion and the least danger to the guide plane. (See also par. 623.)

(5) One man should be detailed in each boat to continuously watch the guide plane for signals.

c. (1) The fire support group continues the gunfire on the beaches at its maximum volume until the boats approach the pattern. These fires will ordinarily lift in accordance with a predetermined time schedule, verified by direct observation from the control and firing vessels. Provision should also be made to have fires lift upon pyrotechnic signal from the boats, as indicated in chapter VII, section II. In each boat group, the responsibility for firing such a signal should be definitely placed, usually with the wave commander of the first wave. If smoke is employed, difficulty may be experienced at the firing ships in seeing the prescribed pyrotechnic signal from the boats, and provision should be made, if practicable, to have the information also sent by radio.

(2) Inshore supporting ships should continue to fire until such fire is masked by the boats or troops, and control their fire by direct observation.

(3) The last salvo on each beach from offshore supporting ships should, if practicable, contain at least one star shell or other distinguishing shell burst. This is a positive signal which allows planes and boats to go in promptly and deliver their maximum fires on the beach.

d. All available bombing and strafing planes should attack the beach defenders as soon as the naval gunfire ceases or lifts and continue such attacks during the landing and initial advance.

e. (1) During daylight, boats of the leading wave commence firing boat guns upon coming within range of the beach. This fire should be continued at its maximum volume until masked on the beach by debarking troops. After leaving the line of departure, all personnel not operating the boat and boat guns should be kept as low in the boat as possible. Bayonets should be fixed while well off the beach.

(2) While still beyond 200 yards from the beach, each boat should distribute its fire evenly along the whole platoon beach, rather than maintain its fire on any particular point. In this respect the distribution of the fire from each boat should be similar to that of a rifleman within a squad. As each boat approaches closer than 200 yards, this fire should be gradually narrowed to cover the front assigned the troops in the boat. Finally, as the boat is about to ground, the fire should be brought on the most dangerous target as designated by the marine commander in the boat.

(3) In the rare event that one or more enemy weapons particularly dangerous to the landing can be definitely identified, the above doctrine may be modified to the extent that certain boat guns may be sooner directed to maintain their fire on such enemy weapons until they are effectively neutralized. It should be recognized, however, that such procedure may often leave some unidentified enemy weapons entirely free to oppose the landing.

(4) As the success of night landings may depend largely upon surprise, and as darkness will often preclude fire from some boats because of danger to others, boat divisions landing in darkness should delay deploying and opening fire until close in to the beach, or until it becomes imperative to return the enemy fire in order to land.

434. The landing.—a. For methods of landing boats through surf, see chapter III, section III.

b. The brief period embracing the debarkation and deployment of assaulting troops on the beach is one of the most critical in the operation, and must be characterized by the utmost speed and dash.

c. (1) At the instant that each boat of the leading wave is beached, the marine commander in the boat should give the signal to debark. Upon this signal, the assaulting troops, aided by all possible fire from boat guns, spring out of the boat and deploy. Utilizing the fire of their own weapons to the maximum, they charge the immediate beach defenses with the bayonet, and push the attack vigorously to the assigned objective.

(2) Each rifleman in an assault unit about to debark from the port side should carry his rifle above his head in his left hand. He should place his right hand and a foot on the gunwale and spring well clear of the boat, landing feet first facing the beach. Riflemen debark from the starboard side in a similar manner, carrying the rifle in the right hand and using the left hand on the gunwale.

(3) On certain types of beaches, particularly when relatively large boats are used, the bow of the boat may be grounded while farther astern the water may be deep enough to seriously interfere with a man getting ashore promptly, or even over a man's head. If the nature of the beach is unknown in this respect, therefore, men should disembark successively from bow to stern and should be trained to move forward before going over the side in case deep water or high surf is encountered.

d. (1) Boat guns which are still able to function while troops are debarking from the boats and advancing inland should maintain a heavy volume of fire on a single target until such fire is masked by attacking troops. Such a target should be designated to the gunners by the marine commander in the boat, and may consist of a known enemy activity or position, a likely enemy position, or a selected terrain objective for the landing troops.

(2) The troop leader should utilize the boat guns as a fire pivot of maneuver similar to that of an automatic rifle within the squad, by having his troops, supported by this fire, advance and attack the flanks of the selected objective. (See fig. 20.)

(3) The coordination of fire and movement, as explained above, can only be brought to its maximum effectiveness through combined exercises of boat gunners and rifle units. Care should be taken by the advancing troops to keep clear of the line of fire, and thus allow the weapons to continue firing until just before the objective is taken.

(4) When boat guns can no longer be used to advantage, their crews, if marines, rejoin their regular organizations.

LANDING OPERATIONS DOCTRINE

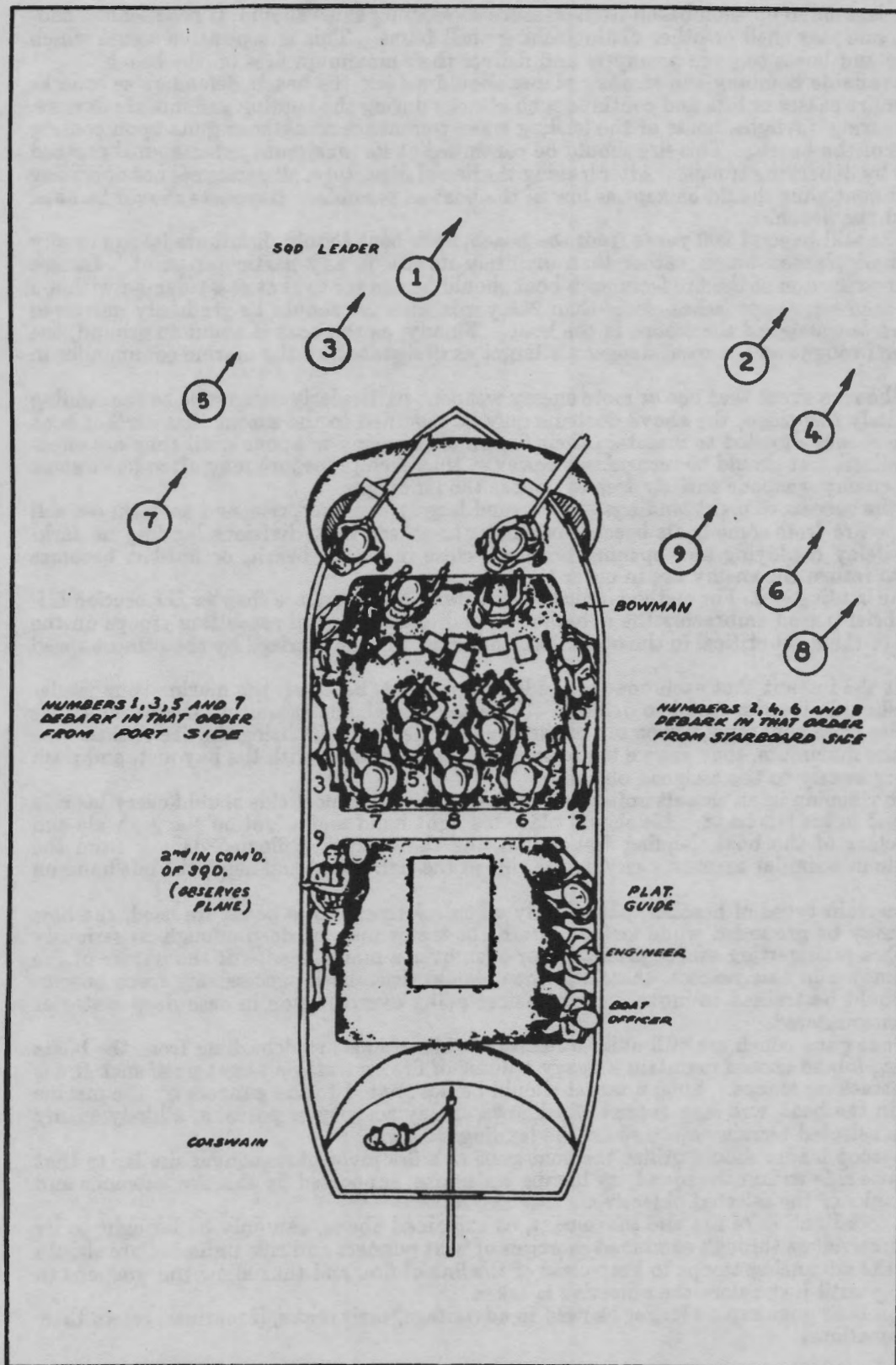


FIGURE 20.—Position of squad in a boat and scheme of maneuver upon landing.

e. (1) As prescribed in paragraph 714b, each platoon should signal by pyrotechnics whether or not its landing has been successful. This signal should be fired as soon as the result of the landing becomes evident. When a support section is employed, it may be designated to fire this signal just prior to, or immediately after, its landing.

(2) In addition to the above, each platoon in the assault battalion, upon landing in daylight, should erect a flag at its landing place. These flags constitute a continuing signal to all succeeding units as to the number and landing places of preceding platoons.

(3) Suitable hooded lights, visible from seaward only, should be made available for use during a landing in darkness in lieu of the flags mentioned above.

f. Units in the second and succeeding waves proceed from the line of departure in open or closed Vee formations, or in line, as required by the existing conditions. Such units land behind assault units which have succeeded in landing. Information of successful landings may be obtained from the visual signals explained above, or by direct observation of the troops. These succeeding waves should make such adjustment in speed as becomes necessary in order to gain the prescribed intervals between waves at the time of landing.

435. Subsequent boat movements.—a. (1) After landing their troops, such boats as have been designated as ambulance, messenger, or patrol boats, proceed on their assigned duties as directed by the beachmaster.

(2) In order to save time and prevent congestion near the beach, boats of the leading boat groups, other than those mentioned above, should return individually to the transports or other designated vessels as soon as cleared. If necessary to land other units in formation in the second trip of the boats, assembly and reorganization of the boats may be accomplished at the transports. Otherwise, boats operate independently on the second and succeeding trips.

b. Boats landing regimental, brigade, or division reserves in the first trip should rendezvous at a designated control vessel, at or near the line of departure, until ordered to land.

c. When transports, after debarking troops, are forced to put to sea or otherwise change position, boats may be directed to rendezvous on a control vessel until their further disposition is decided.

SECTION VI

RECONNAISSANCE PATROLS

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436. Scope.—a. This section deals with reconnaissances of the shore by small patrols and demonstrations in connection therewith, for the purpose of securing information.

b. Where comparatively large bodies of troops are employed in such operations as raids and reconnaissances in force, the doctrines set forth in the preceding sections of this chapter should govern.

c. Demonstrations, conducted with or without secondary landings, for the purpose of diverting enemy reserves, artillery fire, and aircraft from the area of the main landing, necessarily involve a relatively large number of boats and usually a considerable amount of naval gunfire and aircraft support. Such demonstrations, particularly those involving a secondary landing, should be planned and executed in accordance with the methods previously prescribed for a landing in force. (For demonstrations see par. 126.)

d. Patrols, or demolition parties, organized and equipped to cut breaches in or destroy entanglements, booms, and other obstacles in the water or on the beach, may operate in accordance with the methods described in this section for reconnaissance patrols.

437. Information desired.—The information desired includes the following:

Location of enemy defensive positions, and with what strength, if any, such positions are occupied.

Location of enemy weapons, such as machine guns, antiboat guns, and artillery.

Location of obstacles, gassed areas, artillery barrages, and landing fields.
Character of the surf, beach, and terrain inland.
Location, character, and strength of enemy supports and reserves, together with their routes of advance to oppose landings in any locality.
Location of enemy ammunition dumps, communication centers, and command and observation posts.
Identification of enemy units.

438. Courses of action.—In order to secure the desired information, it will usually be necessary to employ any or all of the following courses of action:

Patrolling the coast line from the sea.
Patrol demonstrations.
Placing agents ashore.
Patrolling on shore.
Capturing prisoners.

439. General conduct of patrols.—*a.* Attempts on the part of small patrols to carry out any of the above-mentioned courses of action by approaching the beach during broad daylight would in all probability gain little information of value. The enemy could not be expected to disclose his defensive positions by opening fire on a small, easily recognized boat patrol during daylight unless reasonably assured of being able to sink all of its boats. If the patrol should land in the presence of the enemy, it could easily be destroyed or captured. Reconnaissances by small patrols, therefore, must depend for success upon darkness or fog.

b. (1) Darkness offers the most suitable cover for the conduct of patrols from small boats. It is desirable that the degree of darkness be such as to make discovery of the boats difficult from the shore, and at the same time permit use of the land skyline as an aid to navigation.

(2) Fog will seldom offer a suitable substitute for darkness. This is due chiefly to the difficulties attending accurate navigation in fog, the uncertainty of its duration, and the blanketing of observation of the shore. In exceptional cases, fog may be utilized to cover the landing of agents or the capture of prisoners.

c. In order to achieve the necessary secrecy, patrols should not usually be supported by either gunfire or aviation.

d. (1) Owing to the extreme delicacy of patrol missions, special reconnaissance boats should be assembled and made available for this purpose. These boats should be motor driven, but small enough to be handled readily by oars or paddles when the motor is cut, and should be armed with boat guns. The rubber boat (see par. 326) is well adapted for this purpose. The disadvantage of the noise from its outboard motor may be avoided if rubber boats are towed, by a boat with a quiet-running motor, to within easy paddling distance of the beach. Another alternative is to employ a submarine for the approach, disembarking the patrol in rubber boats at the desired distance from the shore.

(2) The size of a reconnaissance patrol should be limited to the minimum number of men and boats capable of accomplishing the mission. Such patrols, however, should seldom employ less than two boats, at least one of which should be motor driven. All men who are to land should be equipped with self-inflating, pneumatic life jackets.

e. (1) Patrol boats should ordinarily proceed toward the beach in tow. If the patrol is to make a demonstration in an attempt to cause the beach defenders to open fire, motors should be kept running. Otherwise, unless exceedingly quiet-running engines are available, it is advisable to resort to oars before reaching earshot of the beach.

(2) When the beach is neared, at least one motor-driven "get-away" boat should be stationed in observation at a reasonably safe distance to seaward. This precaution is primarily for the purpose of insuring the return of at least one boat with information in case the enemy fires become severe, or the other boats become lost, disabled, or captured. The get-away boat may also serve as a rendezvous for the others and be used to aid them in returning to the ship.

f. When boats are to wait at the landing place for the return of shore patrols, they should be kept in constant readiness for a quick get-away, and adequately guarded by outposts on shore.

g. As all classes of information relating to the enemy's strength and dispositions may be obtained from prisoners, every opportunity to capture them should be grasped by all patrols, unless specifically instructed otherwise.

440. Patrolling the coast line from the sea.—*a.* Boat reconnaissance of the coast line is conducted for the purpose of obtaining information as to the character of the surf, suitability

of the terrain for land operations, location of obstacles, gassed areas, etc. An offshore breeze is highly desirable, both as an aid to secrecy and in the detection of gassed areas by smell.

b. (1) Such patrols should seldom exceed one or two marine observers embarked in each of two boats.

(2) It is preferable to have the patrols operate along and fairly close to the coast, occasionally sending in a boat to tap the beach at suitable points. While within hearing distance from the beach, all boats should operate silently.

441. Patrol demonstrations.—a. A patrol demonstration near the coast line for the purpose of obtaining information of the enemy strength and dispositions involves a deliberate attempt to alarm the enemy and cause him to disclose his positions by opening fire and shooting flares.

b. Patrols making demonstrations should employ boat gunners and marine observers embarked in not less than three, and preferably more, fast motorboats, the number depending upon the extent of beach front to be reconnoitered. It is highly desirable to create the impression of a strong, sudden, determined attack; otherwise the real purpose of the operation may soon become evident to the enemy.

c. (1) Such demonstration patrols should proceed secretly toward the beach until within boat gun range. The get-away boats should then station themselves while the other boats proceed at full speed on a zigzag course toward the beach, firing short bursts from their boat guns just before each change in course. This procedure helps to create the impression of a larger number of boats. Boats should indicate their positions to each other by blinker tubes.

(2) An onshore breeze should be helpful to the patrol in magnifying the sound of the boats and in causing flares to drift inshore over the enemy positions.

(3) When the enemy fire becomes severe, or before reaching the beach, boats should turn about upon a prearranged visual signal and put to sea with the information gathered.

442. Landing of agents.—a. Of all patrol activities, the secret landing of agents is probably the most difficult for the enemy to detect. Agents may be brought by a two-boat patrol within swimming distance of an isolated beach otherwise unsuitable for landing and allowed to swim ashore with the aid of life jackets. They may also be landed by beaching a small pulling boat.

b. When the agent is to return on the same night he is landed, his boat may take one of the following courses: (1) Wait off an easily recognized landmark and pick him up as he swims out, (2) wait for him at the landing place or other rendezvous, or (3) lie off and come ashore on signal from the agent.

c. (1) If the agent is to be left ashore for any extended period, arrangements must be made either to receive his communications from the shore or for a later rendezvous.

(2) Communications with an agent on shore must usually take place through voice radio or improvised visual signals. Lengthy and detailed communications requiring lights or flags must be sent from certain predetermined localities at specified times. Written messages may be left at designated places on the beach to be later recovered by patrols. A single vital piece of information, such as "Enemy in force," may be signaled by firing a canefield or brush. Air-ground communication may also be arranged.

443. Patrolling on shore.—a. Although all other possible means of obtaining information should be fully explored, the importance of actual patrolling on shore should be realized. Information obtained through such reconnaissances, whether positive or negative, is usually definite. Land patrols may be depended upon to determine not only whether or not a particular beach area is actually defended, but often offer the only practicable means, through observation and the capture of prisoners, of obtaining other necessary information.

b. (1) The size of patrols which are to land will vary from two or three men to a rifle platoon, depending upon the nature of the mission, known enemy dispositions, and the configuration of the terrain. The smaller the patrol and the fewer the boats, the greater will be the chances of escaping discovery.

(2) Inasmuch as it may be found expedient to have the land patrol swim from their boats to the shore and return, those men who are to land should be strong swimmers and equipped with life jackets. In addition, they should be stripped of all means of unit identification, lightly equipped, and lightly armed. Men who are to remain in the boats may be equipped with more powerful automatic weapons.

LANDING OPERATIONS DOCTRINE

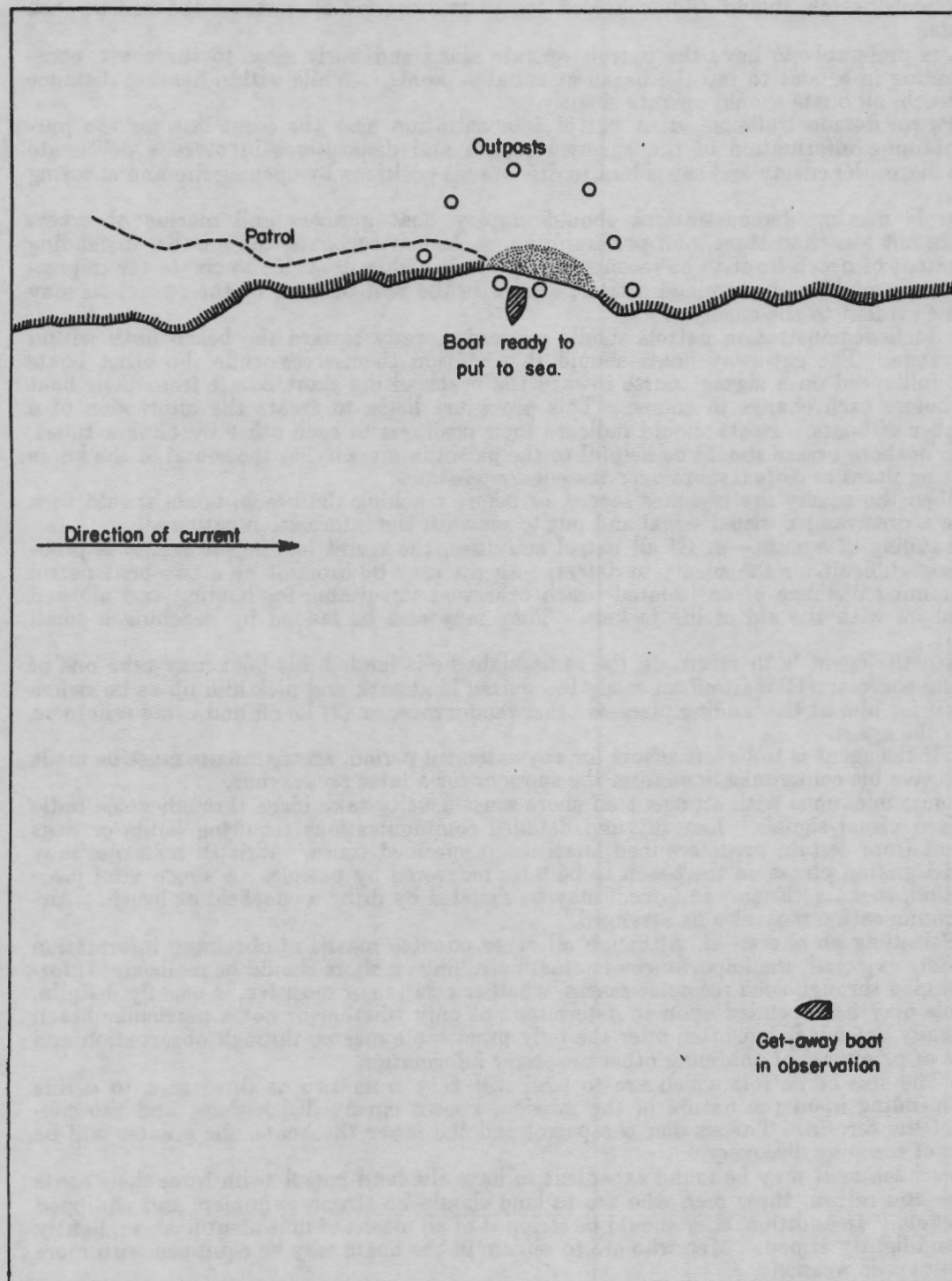


FIGURE 21.—Patrolling on shore.

c. In issuing orders to land patrols, care should be taken to designate specifically and clearly the information they are expected to obtain. Instructions of a general nature lead to uncertainty and indecision when the utmost audacity and boldness is a prerequisite to success.

d. (1) The boats which are to land reconnaissance patrols should approach the beach with the same secrecy as previously prescribed for patrolling the coast line and the landing of agents.

(2) When the boats have approached within earshot of the beach, and the get-away boat has stationed itself in observation, other boats should proceed, usually under oars, to the selected landing. This landing place should preferably be located "down current" from the land area in which the patrol is to operate, so that if the patrol has to take to the water, swimming to the vicinity of the boat will be aided by the current. (See fig. 2.) If more than one boat is required to land the patrol, the leading boat acts as an advance guard, and, immediately upon touching the beach, should post outposts in all directions to protect the boat and the landing place. The other boat or boats containing the patrol proper should then land their men near the leading boat. If only one boat is to beach, it should proceed as outlined above for the leading boat.

(3) All beached boats should be headed to sea and kept in readiness for a quick get-away as shown in figure 2.

e. On shore, patrols are conducted in accordance with the tactics of ordinary land patrols, the principal difference being that the patrol may, through necessity or by prearranged plan, have to take to the water and swim, either to the get-away boat or to a prearranged rendezvous where they can be picked up by the boat in which they landed.

444. Capturing prisoners.—a. (1) One of the best, and often the only, means of obtaining certain classes of information is through the capture of prisoners. Although all types of patrols previously discussed should, while carrying out their assigned missions, seize any favorable opportunity to capture prisoners, these means may not prove sufficiently productive of results. Such a contingency may necessitate the organization of special patrols for the primary purpose of obtaining prisoners.

(2) Patrols may be especially organized to seize enemy patrol boats and capture their occupants, or to land and capture enemy individuals on shore.

b. (1) Boat patrols which are to capture prisoners from enemy patrol boats should be capable of high speed and great fire power, and should be trained to operate together in darkness. The men should be heavily armed and the boats should be equipped with machine guns.

(2) Due to the danger of firing on each other by mistake, the boats should remain in contact with each other throughout the operation. A bright night is advantageous for such an operation.

(3) Boat patrols may lie in wait at selected points or may cruise in areas where enemy patrol boats are known to operate or where they may likely be found. Upon falling in with an enemy boat an effort should be made to cut off his retreat to the beach and drive him to sea. All patrol boats should then give chase, close with the enemy boat, and capture it.

(4) Operations similar to the above may be adopted in order to prevent observation of our own movements by enemy patrol boats.

c. (1) Capturing prisoners on shore may be accomplished either by landing a strong patrol or raiding party to attack a known isolated enemy post, such as may exist on a small island or peninsula, or by landing a small patrol to ambush enemy individuals.

(2) For an attack against an enemy position, the raiding party may contain from a squad to a company. They should usually be landed secretly, as prescribed for patrolling on shore. After landing, the selected enemy position should be quickly approached and the attack launched. The raiding party, with its prisoners, must then repair quickly to its boats and put to sea before the arrival of overwhelming enemy reinforcements. In exceptional cases, where the location of the enemy position, the character of the surrounding terrain, and the visibility of landmarks from the sea permit, such attacks may be supported by ships' gunfire.

(3) For the ambush of enemy individuals, the shore patrol should be limited in size, preferably from two to eight men. The men should be landed secretly as prescribed for the landing of agents. After landing, such patrols should lie in concealment along trails, at the water's edge, or near other points where enemy individuals are likely to move, with a view to seizing such individuals and escaping with them to the waiting boat.

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SECTION VII

BOAT FORMATION SIGNALS

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445. Boat division formations.—

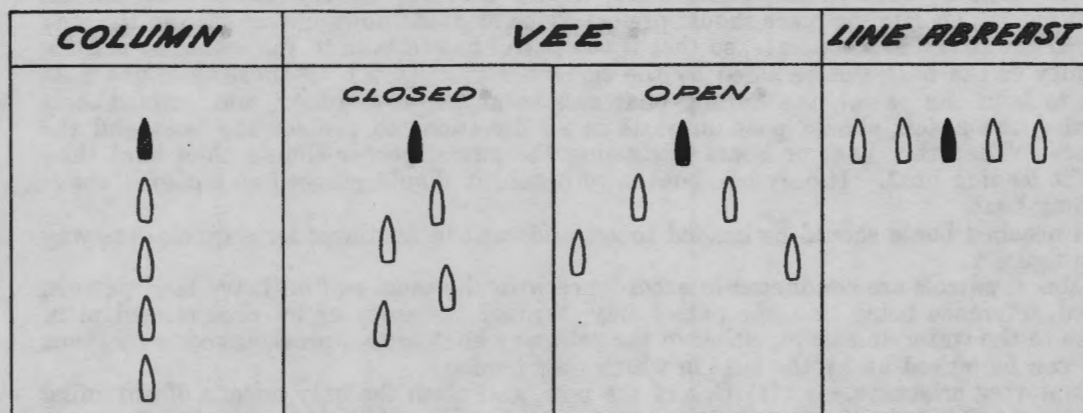


FIGURE 22.—Boat division formations.

446. Boat formation signals.—*a.* The following table prescribes special signals to be employed in the control of boat formations. They may be formed by the arms or flags by day, and by blinker tube or other suitable light by night.

b. There is no signal of execution. Signals are executed as soon as understood. Each should be continued or repeated until it is apparent that it is understood by all concerned.

c. It will be noted that all day signals, except those meaning "attention for boat formation signals" and "Deploy into Vee formation," are identical with the hand and arm signals prescribed for use by troops on land, and should be readily understood by all marines. This will obviate the necessity for a trained signalman in each boat.

d. In addition to the special boat formation signals, a guide flag displayed from a boat means "Guide on me"; lowering of the guide flag means "Disregard my movements."

Meaning—	Day Signal	Night
ATTENTION for BOAT FORMATION SIGNALS	<p><i>BOTH flags and arms execute scissors movement over head, each flag moving from shoulder to shoulder.</i></p>	<p>— — Mike</p>

FIGURE 23a.



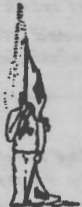

<i>Meaning</i>	<i>Day</i>	<i>Night</i>
<i>ASSEMBLE IN COLUMN</i>	<p><i>ONE flag extended over head and moved in large horizontal circles.</i></p> 	<p>• — <i>Affirm</i> All</p>
<i>FORWARD</i>	<p><i>ONE flag extended in direction of movement and moved up and down in vert- icle semicircle.</i></p> 	<p>• • • • <i>Fox</i></p>
<i>INCREASE SPEED</i>	<p><i>ONE flag extended over head and moved up and down in quick succession.</i></p> 	<p>— • — <i>King</i></p>
<i>STOP</i>	<p><i>ONE flag held vertically over head.</i></p> 	<p>— • • <i>Dog</i></p>

FIGURE 23b.

LANDING OPERATIONS DOCTRINE



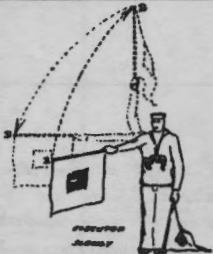
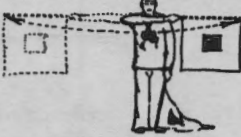

Meaning	Day Signal	Night
DEPLOY INTO LINE ABREAST	<u>BOTH</u> flags extended laterally from shoulders. (Semaphore letter 'R') 	• — • Roger
DEPLOY INTO VEE FORMATION	¹ . <u>BOTH</u> flags extended laterally and 45° upward from shoulders. (Semaphore letter 'U') ² . Flags raised vertically and back to 'U' (UU, UU) means <u>CLOSE THE VEE</u> . ³ . Flags lowered to horizontal and back to 'U' (UR, UR) means <u>OPEN THE VEE</u> . 	• • — — Batt • • — — Half-Tare • • — — Mangle • • — — Half-Roger
MOVE IN DIRECTION INDICATED	<u>ONE</u> flag pointed at boat concerned, then moved slowly over head, then pointed toward new boat objective. 	NONE
COMMENCE FIRING	<u>ONE</u> flag extended on level with shoulder and moved slowly in horizontal semicircle. 	— • • — X-Ray
CEASE FIRING	<u>ONE</u> flag moved quickly up and down across face. 	• • • • Nippo

FIGURE 23c.

SECTION VIII

SALVAGE OPERATIONS

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447. Classification.—Salvage operations are primarily the responsibility of the salvage group—see paragraph 203a (9)—and should be conducted in such a manner that the landing of other boats will not be hindered. These operations may be divided into the following classifications in order of priority:

- (1) Rescue and landing of personnel from disabled boats.
- (2) Hauling clear disabled boats which are adrift.
- (3) Hauling off stranded boats.
- (4) Recovery of sunken equipment.

448. Some boats may be disabled offshore by material failures, stranding, enemy fire, entanglement in underwater obstacles and other causes. The first function of the salvage group is to transfer and land the troops from these boats in order to insure their early entry into action in accordance with the tactical plan.

449. **Hauling off disabled boats.**—*a.* Boats may become disabled or stranded at the beach as the result of hostile fire or difficult surf conditions. Prompt action must be taken by the salvage group to keep the sea approaches to the beach from becoming choked with these disabled boats which, under the action of the surf, may endanger later boats and delay the landing of later waves. The entire operation may thus be jeopardized.

b. The salvage group follows the leading waves until close to the beach. After landing men from the disabled boats, such of these boats as are still adrift are first towed clear of the line of approach. Then stranded boats are hauled off in the most rapid manner practicable. Since king posts and sampson posts of stranded boats may not be able to take the strain of the tow line, the line should be secured to the hoisting gear. Once clear, boats unable to proceed under their own power are towed out of the way of later waves. The vital consideration is to prevent delay in the landing. If necessary for this purpose, badly disabled boats will be sunk in deep water.

c. Boats which cannot be hauled clear readily should be anchored securely and left at the beach. Subsequent salvage of heavily grounded boats is a problem in seamanship for later solution rather than a part of the landing operation itself.

d. The personnel of the salvage group must constantly bear in mind that their task is to expedite the landing, and that salvage is only a means to that end. They must use imagination and judgment in their work to insure that salvage operations facilitate the landing rather than hinder it. If they become too enthusiastic about the salvage it is quite possible that they may themselves become an interference to waves still landing.

450. **Recovery of sunken equipment.**—The salvage group should be equipped with diving and lifting gear in order to facilitate salvage of sunken equipment whose importance or value does not justify its abandonment. These operations usually will not take place until after the landing of the initial assault units.

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CHAPTER V

NAVAL GUNFIRE

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SECTION I

MISSION

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501. Naval gunfire mission.—In amphibious operations, it is the mission of certain naval task groups to replace the landing force artillery in supporting the assaulting troops by fire on shore targets. That is, by delivering fire on enemy personnel, weapons, and other defensive installations, and on critical terrain features which may conceal undiscovered enemy positions, ship batteries enable the landing force first to land, then to advance, hold, or withdraw, with fewer casualties than would otherwise be possible. In some cases, effective naval gunfire may be the critical factor which determines success or failure.

502. Characteristics of defensive positions.—*a.* The exact nature of the fires required in the fulfillment of the above missions depends on the character of the defense against which the amphibious attack is launched. In the absence of definite information to the contrary, it must always be assumed that the assault will be met by an organized defense, and a suitable fire plan must be executed based on this assumption with probable targets located by a study of the terrain.

b. The defense of an area on which a beachhead is to be established will comprise naval, air, and ground forces. All of these defenses must be engaged and rendered ineffective prior to and during the assault to an extent that will permit the establishment of the landing force ashore. Naval gunfire will have an obvious role in the engagement of air and naval defense forces, but provision must be made for these actions, separate from the fire power allotted to the engagement of the ground defenses with which this chapter is concerned.

c. The character of the defense which will be met in any one instance will depend on:

- (1) The terrain.
- (2) The tactical doctrine of the enemy.
- (3) The size, composition, and morale of the enemy force.

All of these factors must be carefully considered on the basis of available information, and the gunfire plan fitted to the estimate of each situation.

d. However, regardless of terrain, enemy doctrine, and the local enemy force, the ground defense may be considered in the following categories:

- (1) The beach defenses.
- (2) Tactical defense areas inland (strong points).
- (3) Artillery.
- (4) Observation and command posts, communication nets, supply areas.
- (5) Reserves.

The naval gunfire plan must contemplate the engagement of all these defensive components at the proper time. (See fig. 1 "Phases of D-day" par. 506 below.)

e. Beach Defenses.—This term is taken to include both passive and active weapons, which are installed on or in the immediate vicinity of the landing area, and the troops which man the weapons. Passive weapons are such installations as land mines, barbed wire, and other obstacles. The active weapons are principally machine guns and light, rapid-fire artillery pieces, emplaced to deliver direct fire on the beaches and the immediate sea approaches. The number of these weapons and the size of the forces manning them will vary with each situation, and their actual location will rarely be definitely known in advance. But in all cases heavy fire must be maintained on their known or probable positions during the approach of the assault landing waves to the beach.

f. Strongpoints.—The terrain inland from the beach will contain a varying number of localities which lend themselves to defensive organization (hills, ridges, stream lines, villages, etc.). These localities are also normally the critical areas which the landing force must seize to secure the beachhead. These strongpoints may or may not be occupied by enemy troops and if occupied the strength of the defensive unit may vary from a squad to a battalion. However, those strongpoints immediately in rear and to the flanks of the landing beaches must be engaged by fire prior to the landing of the assault waves and fire power must be immediately available to engage these strongpoints, and others further inland, when it is found necessary by the attacking troops.

g. Artillery.—Any active defense of an area suitable for landing operations will normally be supported by both field artillery and coast artillery batteries.

(1) The coast artillery normally has a mission to deny the use of the sea approaches. These batteries are permanent installations and must be rendered ineffective before or during the debarkation period. If there is any likelihood of a coast battery being still in firing condition on D-day, its engagement must be planned for by the assignment of one of the largest naval batteries available to this task.

(2) Field artillery is mobile and can move rapidly from place to place in the accomplishment of its mission to place fire on the attacking troops. The location of field artillery batteries will rarely be known prior to the attack, but from a study of the terrain, positions suitable for batteries can be determined and fires should be planned for these areas. Naval gunfire must be prepared to place fire immediately on field artillery batteries discovered in position whether or not they are actually firing.

h. Observation and command posts, communication nets, supply areas.—These are secondary targets and they should be engaged only if definitely located and if ammunition is available above the requirements of more immediately important targets.

(1) The defense depends on ground as well as air observers for vital information as to the nature, strength, and point of attack in order that troops may be alerted and disposed to meet the attack, and in order that mortar and field artillery fire may be adjusted on the attackers. These observation posts will normally be on high ground both in the beach area and further inland, usually within the perimeter of a strongpoint. Naval gunfire may blind the enemy during the debarkation and beach assault periods by engagement of areas containing these observation posts.

(2) The commanders of defending units will establish command posts in small areas centrally located with respect to the various defensive installations. These command posts are normally in defilade and under cover from air observation, and consequently will rarely be definitely located. If, however, their positions are known, fire may be placed on the areas in order to disrupt the execution of the defensive plan.

(3) The defense depends on its communications (wire, radio, roads) for transmission of information, orders, troops and supplies. Fires should be planned for critical points in the communication net in order that they may be delivered on call if schedule fires on these points are not practicable. The critical points are the command posts (since in their vicinity are usually located switchboards and radio sets), and road junctions, bridges, fords, and other restricted points in the road system whose destruction or blocking will impede the mobility of the defenders.

(4) Supplies represented by ammunition dumps, oil storage areas, truck parks, etc., are remunerative targets for naval gunfire if located. They will normally be of easy access to roads or trails, and in the absence of suitable personnel or weapon targets probable supply dump areas should be engaged.

i. Reserves.—Regardless of the number of troops committed to the defense by occupation of the beach positions and of the strongpoints immediately in rear of the beaches, a good proportion of the defense forces will normally be held in reserve in centrally located areas. Bivouac

areas of these units should be engaged early in the naval gunfire plan and provision must always be made to bring heavy fire to bear immediately on these reserves moving up to meet the attack.

j. Figure 11 (see sec. VII) indicates a possible organization for defense by the trace of targets. But it must be clearly understood that definite information on targets will be meager prior to the attack, that enemy tactics and doctrine will vary. In the absence of specific information the principle must be followed of placing fire at the proper times in all areas from which, should he be there, the enemy could defeat the attack.

503. Relative Importance of Targets.—The relative importance of the targets which naval gunfire must engage will vary according to the stage of the attack. During the debarkation period (phase I, in par. 506 below), active coast batteries are the most important, with known beach defenses and other definitely located troops next in order. During the ship to shore movement of assault boat waves, the beach defense areas and the strongpoint areas commanding the beaches are the priority targets. These areas must be covered completely during this period (phase II in par. 506 below). Fire must also be maintained on any coast batteries still active and on active field artillery batteries. If any ship batteries remain unemployed, and if the ammunition supply permits, other targets of importance which should be engaged during this phase are definitely located enemy reserves and rear area strongpoints known to be occupied. During the period of the attack inland (phase III in par. 506 below) most of the targets will be designated by personnel ashore with the landing force. Any target so designated should take precedence over targets designated by other means. Of targets designated by the landing force (or by air observers), a counterattack is of primary importance, with enemy weapons such as artillery, mortars or machine guns next.

504. Classification of fires.—The fires executed in the general performance of the naval gunfire mission may be classified as follows:

- a. *Effect sought:*
 - (1) Neutralization.
 - (2) Destruction.
- b. *Form:*
 - (1) Concentrations.
 - (2) Point fires.
- c. *Prearrangement:*
 - (1) Fires delivered on time schedule.
 - (2) Fires delivered on call.
 - (3) Fires on targets of opportunity.
- d. *Tactical purpose:*
 - (1) Preparation.
 - (2) Close support.
 - (3) Deep support.
 - (4) Special missions.
- e. *Method of fire control:*
 - (1) Direct fire.
 - (2) Indirect fire.

505. Definitions.—a. *Effect sought.*—(1) *Neutralization.*—Neutralization fire is area fire delivered for the purpose of causing severe losses, hampering or interrupting movement or action and, in general, to destroy the combat efficiency of enemy personnel. In the usual case, neutralization is only temporary and the target becomes active soon after fire ceases. Neutralization is accomplished by short bursts of fire of great density to secure the advantage and effect of shock and surprise. Most targets engaged by naval gunfire will be of the type for which neutralization is appropriate.

(2) *Destruction.*—The term is applied to fire delivered for the express purpose of destruction and when it is reasonable to expect that relatively complete destruction can be attained. Destruction should be attempted only under favorable conditions of target designation and observation.

b. *Form.*—(1) *Concentrations.*—A concentration is a volume of fire placed on an area within a limited time. It is the form used for neutralization. The term is applicable regardless of the tactical purpose of the fire. Concentrations may be plotted in the form of numbered circles with the principal part of the target at the center of the circle.

(2) *Point fires.*—Point fire is fire directed at a definite material target to destroy that particular object. Point fires may also be plotted by a numbered circle, usually of smaller size than those used for plotting concentrations.

c. Prearrangement.—(1) *Fires delivered on time schedule.*—Some schedule fires can be definitely planned in advance, both as to time and as to place. A time schedule is made for the purpose of coordinating these fires with the movement of the assault boat waves or with the advance of attacking troops on shore. This schedule may be in tabular or graphic form. The time will normally be shown as so many minutes before or after (minus or plus) H-hour, in order that the actual clock time of execution of these fires may be changed by simply changing the time of H-hour. This principle of flexibility is especially applicable to the preparation. The time schedule fires in this Phase must conform closely to the actual movement of the assault boat waves at each beach. See Section IV for discussion of the necessary coordination.

(2) *Fires delivered on call.*—These are fires which are planned in advance as to location but which are delivered only upon request. They are plotted in the form of numbered concentrations for ease in designating them when required.

(3) *Fires on targets of opportunity.*—Targets of opportunity are targets which appear to the observer and which have not been plotted for execution on time schedule or on call. Observers may designate these targets to the firing ships by reference to a plotted concentration, by coordinates from a grid system standardized for the operation, or by other means (see par. 531).

d. Tactical purpose.—(1) *Preparation.*—This term is used to designate intensive fire delivered on the landing beaches and adjacent areas during the approach to the beach of the landing craft of the leading wave.

(2) *Close support.*—This term designates those fires furnished in support of units ashore. It is fire placed on enemy troops, weapons, or positions which, because of their proximity, present the most immediate and serious threat to the supported unit.

(3) *Deep support.*—This term includes the more distant fires furnished in support of the operation as a whole as distinguished from those of direct and immediate benefit to front line troops. Characteristic applications are fires placed on enemy artillery, on enemy reserves, and on critical points or areas which it is desired to prevent the enemy from using.

(4) *Special missions.*—These may be considered as a type of deep supporting fire for which large caliber naval guns are particularly suitable, such as long range fire on cities, airfields and seacoast batteries, and the destruction of heavy permanent fortifications.

e. Method of fire control.—(1) *Direct fire.*—Direct fires are fires delivered on targets which can be seen from the firing ship. Spotting of the fall of shot is normally carried out from the ship.

(2) *Indirect fire.*—Indirect fires are fires delivered on targets which cannot be seen from the ship. These fires are spotted by plane spotters or by spotters on shore.

506. Shore fires required in amphibious operations.—*a.* The fire support requirements of the infantry in an amphibious operation are essentially the same as the requirements in normal land warfare. The over-all requirement may include fires executed in advance of D-day, such as bombardments for the destruction of enemy supplies and raids to confuse him as to the point of attack. The requirement may extend for some period of time beyond D-day in support of operations seeking to expand the beach head. If such is the case, plans must be made to effect re-supply of ammunition.

b. This chapter is primarily concerned with the requirements of D-day. For the purpose of planning naval gunfire support, it is convenient to divide D-day into three phases as illustrated in figure 1.

FIRES REQUIRED DURING PHASES OF D-DAY

Phase duration	Landing force activity	Required fires	Targets	Spotting agency
I. H-3 hrs. to H-1 hrs. (approx).	Debarkation; Boat waves form.	Deep Support; Special Missions.	Coast batteries. Major beach defenses, other definitely located installations, and troops.	Air, Ship.
II. H-1 hr. (approx) to H hr.	Ship to Shore (assault units).	Preparation; Deep Support; Special Missions.	Preparation on landing beaches. Coast batteries still active. Active field artillery batteries. Any other targets of special importance.	Ship, Air.
III. H hr. to —.*	Assault units are advancing inland from beach. Shore Fire Control Parties begin operations ashore. Reserve elements are landing.	Close Support; Deep Support.	Counterattacks. Strong points. Active field artillery batteries. Other targets called for by SFCP and air observers.	Shore Fire Control Parties, Air, Ship.

*In phases I and II, field artillery support is entirely lacking. At about H plus 2 hours field artillery can begin to take over some of the fires, but it will be rare in landings against opposition that artillery will be able entirely to relieve naval fire support groups during D-day.

FIGURE 1.

SECTION II

CLASSIFICATION OF BATTERIES AND SHIPS

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507. Characteristics of naval gunfire.—The suitability of naval gunfire for the support of shore operations is fixed principally by:

Characteristics of the ammunition.

Weight of metal.

Weight of high explosive.

Type of fuze.

Characteristics of the guns.

Caliber and rate of fire.

Muzzle velocity and elevation.

Pattern.

Characteristics of the batteries.

Number of guns in the battery.

The type of fire control installation.

Characteristics of the ships.

Draft, speed, and maneuverability.

Magazine capacity.

Availability of air spot.

Number and type of batteries available.

a. Characteristics of ammunition.—(1) The ratio, weight of metal to weight of high explosive, generally fixes the type of fragmentation obtained. When the ratio is small, good fragmentation is obtained and the fragments are effective at greater distances. This is the type of shell used against personnel. When the ratio is large, the fragments produced are few and are effective over an area of smaller radius. This is the type of shell used against material since its heavy walls enable it to defeat the walls of the object hit and introduce the high explosive inside of the object.

(2) Fuzes provided for each of the two general types of projectiles are designed, for the first type, to detonate the explosive charge above the ground (time fuze) or on the surface of the ground (superquick fuze); and for the second type, to detonate the charge after penetration of varying depths depending on the amount of delay introduced into the fuze.

(3) Types of ammunition other than high explosive have obvious special uses, such as smoke shell for blinding hostile observation and star shells for illumination of the target area at night.

b. Characteristics of guns.—(1) In general, the caliber and rate of fire determine the type of target for which a gun is best suited. As the caliber (size) of a gun increases the range usually is increased and the rate of fire decreases. Large caliber, slow firing guns are best used against fixed material targets or large critical areas; smaller, rapid-fire guns are suited for the engagement of personnel targets as well as for use against light material, either fixed or mobile.

(2) The muzzle velocity and elevation of a particular gun determine its usefulness in the engagement of targets on reverse slopes or in otherwise defiladed areas. Guns with high muzzle velocity and low maximum elevation are in general restricted to fires on targets on forward slopes or targets at some distance beyond the mask. If a high velocity gun can be elevated up to approximately 45° practically any shore target can be engaged since the resultant angle of fall is sufficiently steep to reach targets in normal defilade. If the guns can be elevated to, and range tables are provided for, elevations above 45°, the ability to search reverse slopes is correspondingly increased. Considerable latitude in the selection of firing areas must be provided if defiladed targets at greatly differing ranges must be engaged by the same battery. Reduced charges furnished with H. C. projectiles lower the normal high velocity of naval guns and permit defiladed targets to be engaged at shorter ranges. The use of firing areas to a flank will sometimes permit targets to be engaged by guns which otherwise would be unable to reach them, since the mask is thus avoided.

(3) The pattern of a gun is the characteristic which principally determines its use in relation to friendly troops. The smaller guns usually have the smaller patterns and this enables

them to place fire close to friendly troops without unduly endangering them from "shorts." A pattern of 300 yards or less is highly desirable for these close support guns since fire should be maintained on the enemy up to the last possible second in order that the interval between the lifting of fire and the actual assault of the enemy position may be as short as possible. Since the deflection pattern is much less than the range pattern, firing areas which permit the use of fire across the front, rather than over the head, of attacking troops are extremely desirable.

c. Characteristics of batteries.—The term "battery" as used in matters pertaining to support of the landing force is defined in paragraph 510 below. So defined, the number of guns responding to one control and bearing on one target is the naval gunfire support battery.

(1) The number of guns in the battery determines the type of fire mission it can best fulfill. For personnel targets (neutralization) a minimum of four guns to a battery is desirable in order to produce the necessary volume of fire quickly and to cover the total target area simultaneously. Batteries with fewer than four guns should not be assigned normal close or deep support missions except in an emergency. More than 6 guns per battery will usually (for the smaller calibers) only result in an unnecessary expenditure of ammunition. For material targets to be destroyed, adjustment is facilitated if the number of guns is kept to one, two, or three (not more than one turret). For large area, special mission targets, involving both material and personnel, such as airfields, cities, large supply dumps, docks, etc., where fine adjustment is not required, more guns per battery are desirable.

(2) The type of fire control installation provided for each battery will determine whether or not the battery is restricted to targets which can be engaged by direct fire or whether it can efficiently furnish fire spotted by air or shore observers. Batteries furnishing fires in close support must have the most modern type of fire control installations capable of executing fires without the use of aiming points, unless the close support fires are furnished units advancing along the shore by ships moving parallel with the supported troops and firing across their front on generally visible target areas.

(3) With the very modern installations and navigational instruments, unobserved fires on large areas are practicable; but should never be used if the target area is close to friendly troops.

d. Characteristics of ships.—(1) The draft, speed, and maneuverability of a ship determines how close to the shore and how close to enemy shore battery positions the ship can take station in carrying out its fire-support mission. Relatively shallow draft, high speed, quick-turning ships are suited for engagement at close range of targets in the vicinity of the beach, both to cover the landing of the assault waves of the landing force by preparation fires, and to cover the heavier, less maneuverable ships by engagement of coastal batteries.

(2) The magazine capacity of a ship determines the probable duration of its employment. As a general guide it may be stated that 50 percent of the total magazine capacity of fire-support ships will be made available for shore-target ammunition. Of this 50 percent, at least one-half must be reserved for targets of opportunity in phase III by close and deep-support ships. Assignment as a close-support ship of a battalion or deep-support ship of a regiment should not ordinarily be made unless the magazine capacity of the ship assigned is such that suitable ammunition sufficient to engage at least 15 targets of opportunity is available during phase III. In the event several destroyers act as a group in close support the combined magazine capacity of the group should provide this supply of shore-target ammunition.

(3) Unless airspot with suitable communication is available, a ship is not very effective as a deep support ship since the majority of targets which it must engage will not be visible either to ship or shore spotters.

(4) The number and type of fire-support batteries determines which landing force echelons a ship can support. A ship with only one battery can effectively support only one unit (either close support of a battalion or deep support of a higher echelon); while a ship with two or more batteries may, depending on the estimated strength of the enemy defense, furnish effective close support to a battalion with one or two batteries and deep support to the regiment of which the battalion is a part with another battery. The same ship, however, should not normally be assigned in close support of battalions of different regiments, nor should it be assigned in deep support of one regiment and in close support of a battalion of another regiment, since the effective support of widely separated units will not normally be practicable due to the difficulties of providing a suitable firing position, and of affording effective liaison and communications.

508. Ammunition classified.—Naval projectiles, according to their characteristics, are classified with respect to their relative effectiveness for neutralization as follows:

- Antiaircraft (air burst).
- High capacity (superquick fuze).
- Antiaircraft (impact burst).
- High capacity (short delay fuze).
- Common.
- Armor piercing.

Their relative effectiveness for destruction of fortifications with direct hits is in inverse order.

509. Guns classified.—The characteristics of the principle types of naval guns classify them as follows:

a. Close support.—Five-inch naval guns possess the necessary high rate of fire and small pattern to fit them for close support missions. They will normally have sufficient range to answer all calls for fires on D-day. Suitable angle of fall is provided for most situations.

b. Deep support.—The 6" and the 5"/38 caliber guns possess the requisite range, rate of fire and the small pattern to make them excellent weapons for deep support of landing force echelons up to and including the division. The 6" gun is especially suited for counterbattery against all types of enemy field artillery in range of the landing areas.

c. Special missions.—The larger caliber guns (8" and above) possess rates of fire too slow and their patterns are too large to make them excellent close support weapons. These large caliber guns are classified tactically as deep support weapons employed on special missions against long range targets as cities, airfields, and major fortifications, and for the destruction of heavy, permanent fortifications. The 8" guns, in the event that 6" guns are not available, can be utilized in long range counterbattery.

d. Preparation.—All guns are suitable for participation in the preparation, the 5-inch on the beach and the larger calibers on adjacent areas, or the heavy calibers in the early part and the lighter calibers in the latter part of the phase.

510. Batteries classified.—For the purpose of planning and executing naval gunfire in support of a landing, a naval battery is defined as two or more guns of the same caliber on the same ship which can be controlled from the same station. The gun and fire-control installations on modern ships provide a high degree of flexibility in the performance of fire missions. Thus, some cruisers can bring to bear on a single target with equal ease and speed, from two to fourteen 5-inch guns; or from three to fifteen 6-inch guns. A modern light cruiser (Cleveland class) can engage effectively a maximum of two targets with 5-inch batteries and two targets with 6-inch batteries simultaneously. The standard naval batteries employed in rendering naval gunfire support are listed in figure 2 and their normal tactical classification is shown. The number of guns in a battery will vary slightly according to the exact nature of the ship.

STANDARD NAVAL GUNFIRE SUPPORT BATTERIES

No. cal.	Classification	Maximum effective range	Standard target area yards (Note 1)	Fire required for effect for neutralization (Note 2)		Targets per hour	Ammunition expenditure per hour
				Rds.	Min.		
(Note 3)							
4 5''/25	Close support.....	12, 500	200 x 200	80	2	6	540
4 5''/38	Close support.....	16, 000	200 x 200	80	2	6	540
	Deep support.....						
6 6''/47	Close support.....	23, 000	300 x 300	60	2	6	420
	Deep support.....						
9 8''/55	Deep support.....	27, 000	400 x 400	54	3	6	384
	Special mission.....						

Larger caliber batteries are normally reserved for special missions and for neutralization of large areas in deep support.

NOTES.—(1) Standard target areas are based on size of normal pattern of guns by caliber as follows:

5"/25 and 5"/38.....	150 yards.
6"/47.....	250 yards.
8"/55.....	400 yards.

(2) The given number of rounds delivered in the areas listed in the time allotted is considered sufficient to establish neutralization of those areas. Therefore, the size of the standard battery is fixed by the number of guns which will deliver the required number of rounds in the set time. A comparison of the standard batteries with comparable field artillery battalions in neutralization capacity is given by the computation below; however, actual experience in shore bombardment also indicates that the above table presents a satisfactory picture of the neutralization capacity of naval batteries.

Naval shell	Weight		FA shell	Weight		Rds. delivered 1 min.		Total weights delivered			
	Metal, lbs.	HE		Metal, lbs.	HE,	Stand. Nav. Bty.	FA Bn. (12 guns)	Stand. Nav. Bty.		FA Bn.	
								Metal	HE	Metal	HE
5" AA	46	7	105 mm. HE	26	5	40	48	1840	280	1248	240
6" HC	92	13	155 mm. HE	77	16	30	36	2760	390	2772	576
8" HC	239	21	8" HE	170	30	18	12	4302	378	2040	360

(3) Number of targets and ammunition expenditure per hour include 10 ranging shots for adjustment on each target and an average time of 7 or 8 minutes per target for turns and ranging salvos.

FIGURE 2.

511. Ships classified.—The principal types of naval gunfire ships are destroyers, light cruisers, heavy cruisers, and battleships. According to their characteristics, the ships, themselves, are classified as follows:

a. Destroyers.—The shallow draft, high speed, and good maneuverability of destroyers fit them particularly for the preparation in phase II. They can stand close inshore, ahead of and to the flanks of the boat waves, and place accurate direct fire on beach area targets at close ranges. They are excellent for the delivery of close supporting fires in phase III, particularly in support of units attacking along the shoreline, and should be used for this purpose to the limit of their ammunition supply. The small total number of targets which one destroyer can engage prevents the normal assignment of one such ship as a close fire support group.

b. Cruisers.—These are equally close support and deep support ships. The availability of airplane spot, adequate radio communication facilities and control systems enable them to engage targets over a wide front, the 5-inch batteries in close support and the main batteries in deep support. The greater suitability of the 6-inch guns for engaging normal land targets as compared to the 8-inch guns makes the light cruiser preferable to the heavy cruiser. The magazine capacity of the cruisers enables them to take part in the preparation with both their 5-inch and main batteries, if necessary, and still to carry out the deep and close support missions.

c. Battleships.—These must be generally classified as deep support ships, particularly suited for participating in the preparation and for the execution of special missions beyond the power of the other ships. If, however, hydrographic conditions permit, and there is no danger of the battleship being caught in restricted waters, these ships are ideal for furnishing close supporting fires with their 5-inch batteries. Figure 3 summarizes the fire support characteristics and capacity of the principal types of naval ships.

FIRE SUPPORT CHARACTERISTICS AND CAPACITIES OF NAVAL SHIPS

Ship	Armament	Standard batteries			Standard target area	To neutralize target		Ship capacity targets per hour	Ammunition expenditure per target	Total ammunition capacity	Total shore target capacity of ship
		Close Support	Deep Support	Special Mission		Minutes	Rounds				
DD	6 5"/38	1	0	0	200 x 200	2	80	6	90	1900	<i>Targets</i> 10
	5 5"/38	1	0	0	200 x 200	2	80	6	90	1900	10
	4 5"/38	1	0	0	200 x 200	2	80	6	90	1100-1900	6-10
CL	16 5"/38	2	0	0	200 x 200	2	80	12	90	7200	40
	12 6"/47	0	2	0	300 x 300	2	60	12	70	3000	21
	12 5"/38	2	0	0	200 x 200	2	80	12	90	5400	30
	15 6"/47	0	2	0	300 x 300	2	60	12	70	3600-3800	26-27
	8 5"/25	1	0	0	200 x 200	2	80	6	90	3000-3500	17-19
CA	9 8"/55	0	1	0	400 x 400	3	54	6	64	1200-1400	9-11
	8 5"/25	1	0	0	200 x 200	2	80	6	90	2400-3100	13-17
	9 8"/55	0	1	0	400 x 400	3	54	6	64	1350	10
	12 5"/38	2	0	0	200 x 200	2	80	12	90	4400	24
BB	9 16"	0	0	2						1100-1200	
	20 5"/38	2	0	0	200 x 200	2	80	12	90	10000-14000	56-78

NOTES.—1. Destroyers have only one control, consequently only one battery regardless of number of guns. One target may be engaged with more rounds or in a shorter time as the situation dictates. Some DD's may have 8 guns but only 1 battery is still available.
2. Cruisers normally have 2 controls for main batteries and 2 for AA batteries. But not all AA guns can bear to one side. One standard battery of 6 inch guns must use direct fire if both 6 inch batteries are employed simultaneously.
3. BB's usually have 2 controls for main batteries and 2 for AA batteries. Not all AA guns can bear to one side.
4. Total shore target capacity based on the assumption that fire support ships will be allocated 50 percent of total ammunition capacity for shore targets.
5. It must be emphasized that this table is a guide only. The actual capacity of the ships assigned in any particular case must be determined.

FIGURE 3.

SECTION III

BASIC ORGANIZATION

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512. Fire support requirements.—Figure 4, paragraph 518, outlines the fire-support requirements from an organizational point of view. The requirements for fire support must be met for organizational reasons as well as for reasons of fire power, before success can be reasonably expected. Below are listed the basic requirements from standpoint of firepower.

a. Requirements in batteries.—(1) Phase I.—Sufficient batteries to establish and maintain neutralization on known and suspected enemy guns capable of reaching the transport area.

Sufficient batteries to neutralize enemy observation, to disrupt his communications and to neutralize his field artillery positions, bivouac areas, outposts and other forward garrisons.

Sufficient batteries to execute any special missions necessary.

(2) Phase II.—Sufficient batteries to neutralize all beach defenses.

Sufficient batteries to continue engagement of coast batteries.

Sufficient batteries to engage field artillery batteries which can fire on beach areas.

(3) Phase III.—Sufficient batteries to furnish necessary close support to each assault battalion.

Sufficient batteries to furnish deep support to each assault regiment and each division.

b. Requirements in ammunition.—Sufficient ammunition of suitable types to engage each target on time schedule twice with an equal amount reserved for targets of opportunity. (The average requirement in ammunition per target is shown in fig. 3, par. 511; this matter is further discussed in par. 532.)

c. Requirements in ships.—Sufficient ships to provide the necessary batteries and ammunition, including sufficient numbers of the following type:

Sufficient highly mobile ships (destroyer or equivalent) to cover the movement of the assault landing waves close in to the beach.

Sufficient cruisers to furnish close support to battalions and deep support to regiments and divisions.

Sufficient battleships (or heavy cruisers) to meet the special mission requirements.

d. Bearing in mind that the requirements must be met both from the standpoint of organization as well as from the standpoint of fire power, it may be stated that the amphibious assault of a beach head protected by a "normal" defense can be adequately supported on D-day by the assignment to the support of each assault regiment of:

4-8 destroyers,

2 light cruisers, and

1 heavy cruiser (or battleship),

with one additional heavy cruiser or battleship per Landing Force division.

513. The Fire Support Group.—*a.* The fire support group is the basic unit for the delivery of fires. They are classified as close fire support groups, deep fire support groups, and special fire support groups. The close fire support groups are assigned on the basis of one per assault infantry battalion of the landing force. The deep fire support groups are assigned on the basis of one per assault infantry regiment, and one additional per division if required. The special fire support groups are assigned as necessary, principally for the preparation and for special targets. The composition of each fire support group is dependent on the estimate of the enemy strength in each landing area (the probable number of targets which must be engaged), and the hydrography of the fire support areas, as well as on simplicity of fire control. By reason of simplicity of communication and fire control it is desirable that only one ship constitute a fire support group whenever practicable. It may sometimes be necessary and desirable to constitute both a close fire support group and a deep fire support group from the same ship (but see par. 507d (4)).

b. The light cruiser is the ideal component of the close fire support group. The 6-inch light cruiser and the heavy cruiser are preferable as components of deep fire support groups for the regiment. The battleship is best reserved for deep support of the division and for use as a special fire support group. The use of destroyers as special fire support groups for participa-

tion in the preparation and for the purpose of firing on targets of opportunity on the flanks of the area to be attacked using ship spot is highly desirable. It may be desirable at times to use several destroyers instead of one cruiser as a close fire support group. When a close fire support group is so constituted, the destroyers will normally rotate in answering calls from shore fire control parties.

514. Observation.—While the effective delivery of unobserved fires is theoretically practicable, naval gunfire must normally be observed and adjusted for the desired effect (large area targets are exceptions). Observers are used stationed either on the firing ship, on another ship, in an airplane, or with front-line elements of the landing force.

a. Ship observers.—In phases I and II, practically all fires delivered in areas visible from seaward will be controlled by the normal ship spotters. Spotters may be placed on control vessels to obtain a better view of the beach and adjacent areas.

b. Air observers.—Air observers are used primarily to control the deep support batteries of cruisers and battleships in the execution of long range fires. Normally, the ship concerned will supply the plane. The spotter may be a specially trained artillery officer of the landing force. The above arrangement reduces the chance of misunderstandings to a minimum.

c. Observers with the landing force.—Once the attack has left the immediate beach areas, fires in close support of the front line units must be called for and adjusted by observers with those units. Shore Fire Control Parties are organized for this purpose. Their functions are discussed in detail in paragraph 517 below.

515. Communications.—Each observer is provided with a primary fire control channel of communication direct to his firing ship, and arrangements are made as far as practicable to supply an alternate means in the event the primary means becomes inoperative. For the observers on the firing ships, the ship's communication system is used; if the spotter is stationed on the control vessel, a portable radio set is used as the primary means with the ship's visual signalling apparatus as the alternate. The airplane radio set is the primary means employed by the air spotter working directly with the ship's radio on an assigned frequency. The communications provided the Shore Fire Control Parties are discussed in paragraph 517 below.

516. Liaison.—Two types of liaison are required: Liaison from the fire-support group to the supported infantry commander, and liaison from the landing-force units to the firing ships. Normally, one naval gunfire liaison officer is sent from each fire support group to the supported commander. He should be well qualified in naval gunnery in general, and have complete information on the characteristics of the ships that compose the group and their armament; his information must also include knowledge of the fire support areas assigned. The naval gunfire liaison officer must be provided with radio equipment operating on the same frequency as the shore fire control party with whom he is associated. The radio equipment and radio personnel are furnished by the landing force.

A minimum of one landing force liaison officer is normally provided for each fire-support group. If a fire-support group contains more than one cruiser or battleship, a liaison officer from the landing force should be furnished each ship. The landing force liaison officer must have a complete knowledge of the proposed scheme of maneuver and of the enemy situation (as shown in the intelligence annex and subsequent reports).

517. The Shore Fire Control Party.—One Shore Fire Control Party is organized for each assault battalion of the landing force, and is attached directly to the staff of the battalion commander. Each party consists of:

- 1 officer—spotter.
- 1 noncommissioned officer—assistant.
- 1 private—instrument operator.

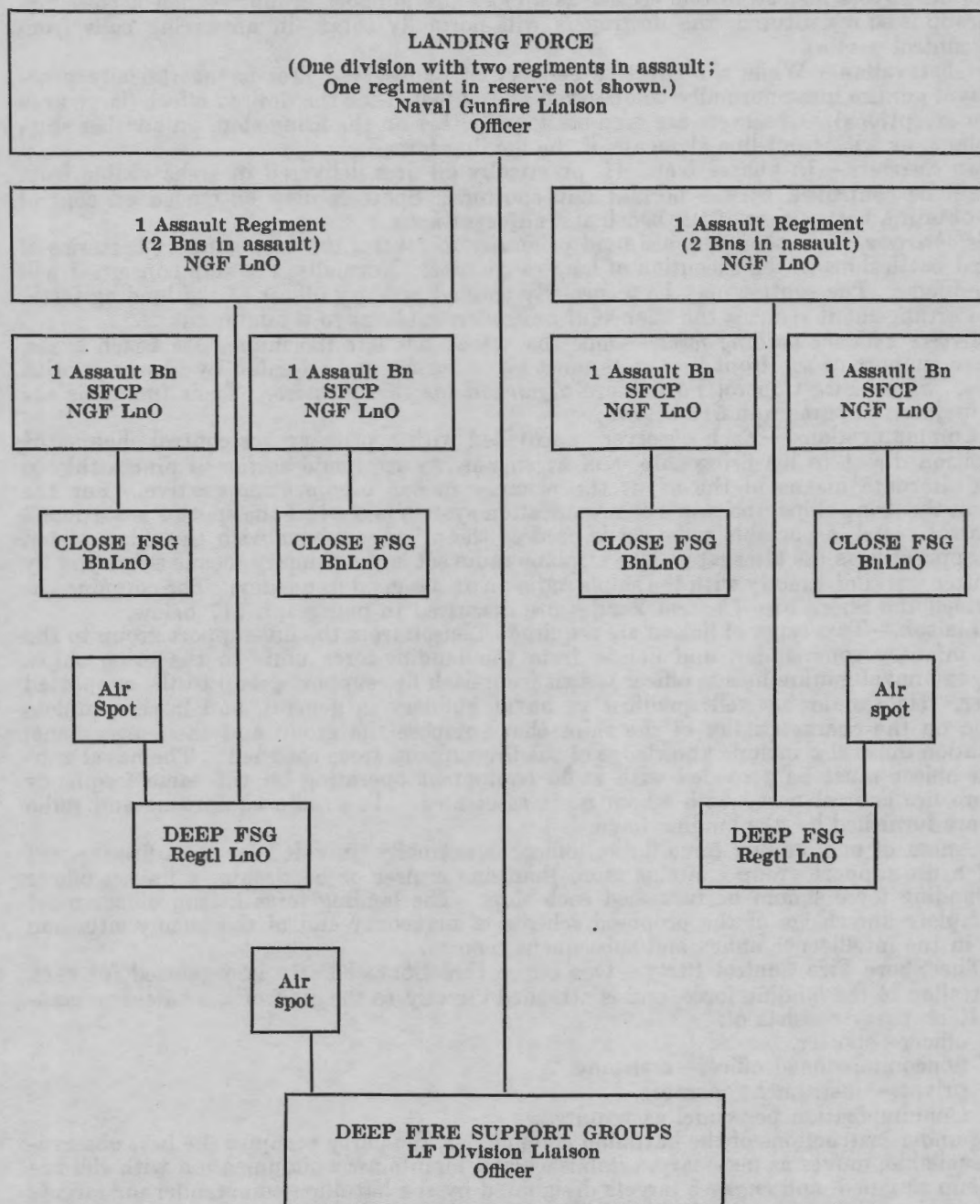
Communication personnel as required.

Acting under instructions of the battalion commander, the party occupies the best observation post available, moves as necessary, establishes and maintains communication with the fire support group assigned, and engages targets designated by the battalion commander, or targets of opportunity in accordance with the instructions of the battalion commander. The assistant, as well as the officer, should be capable of adjusting fires. Communication between the battalion command post and the Shore Fire Control Party is maintained by the battalion. In the event the party's radio equipment becomes inoperative, an alternate means of communication with the fire support group is thus provided by way of the naval gunfire liaison officer at the battalion command post. The personnel and equipment of the Shore Fire Control Parties will be furnished by the artillery component of the landing force.

518. Basic Organization for D-day.—Figure 4 illustrates the basic principles of organization for the delivery of naval gunfire support on D-day.

LANDING OPERATIONS DOCTRINE

BASIC ORGANIZATION FOR NAVAL GUNFIRE SUPPORT ON D-DAY



NOTES.—1. Each assault battalion has been assigned a Close Fire Support Group; Liaison Officers are exchanged, and one Shore Fire Control Party is attached to each battalion. Air spot if necessary.

2. Each assault regiment has been assigned a Deep Fire Support Group; Liaison Officers are exchanged, and air spot is provided for long-range fires.

3. Division is assigned Deep Fire Support Groups as necessary.

4. Special Fire Support Groups for particular missions may also be formed.

FIGURE 4.

519. Training and Technique.—It is incumbent on a commander of a Naval Attack Force to assure himself that all units of his force have been trained and exercised in landing operations, including the delivery of naval gunfire on shore targets in which the fire-support groups, designated to support assault units on D-day, will have executed fire missions controlled by the Shore Fire Control Parties and air spotters with whom they will work on D-day. The technique employed in the delivery of fires should be carefully prescribed and practiced. See section V for a discussion of various techniques.

SECTION IV

COORDINATION OF NAVAL GUNFIRE WITH OTHER ELEMENTS OF THE ATTACK FORCE

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520. Elements with which coordinated.—Coordination is a responsibility and function of command. The orders for the operation must clearly provide for the coordination of naval gunfire in all its aspects with the following elements and activities:

- a. With the transports and transport debarkation areas.
- b. With the boat lanes to the landing beaches and with the movement of the assault wave to its beach.
- c. With the scheme of maneuver of the landing force and with the actual maneuver of the landing force units.
- d. With the activities of combat aviation.
- e. With the landing force artillery.

521. Means of effecting coordination.—To effect the coordination of naval gunfire with these other elements and activities the principal means used are listed below and discussed in succeeding paragraphs.

- a. By prescribing a map, chart, or photograph, suitably gridded as the fire-control map for the operation.
- b. By the assignment of fire-support areas to fire-support groups.
- c. By scheduling various types of firing runs.
- d. By assigning target areas of responsibility to the fire-support groups.
- e. By prescribing a time schedule for the execution of certain fires.
- f. By effecting an exchange of liaison officers between fire-support groups and other units.
- g. By placing gunfire observers with the landing force and in the air.
- h. By prescribing special signals for use in connection with naval gunfire.

522. Maps.—a. A map of suitable size and scale is prepared from the best available data (air photos, hydrographic charts, reconnaissance reports, etc.) and is furnished firing ships, shore fire control parties, air observers, liaison officers, and any others directly concerned with naval gunfire. The standard grid system prescribed for the operation is superimposed on this map, in order that locations of targets from other sources such as infantry front line commanders may be readily plotted on the fire-control map. The map must include sufficient sea area and sufficient shore line data to permit its use in designating the fire-support areas and in plotting the firing runs of the ships. The time schedule and on-call targets are indicated on the map by appropriate numbered circles.

b. There are several different grid systems which may be used. The standard M-square grid system (see CSP 734) is the one most commonly used at present in amphibious operations. It is entirely suitable for naval gunfire purposes and may be considered standard in the absence of specific instructions to the contrary. In section VII (Illustrative Problem, figs. 9, 10, 11, 12) an M-square grid system has been superimposed on the map of the area.

523. Fire-support areas.—By the assignment of a definite sea area to each fire-support group, firing ships are allowed freedom of maneuver in the execution of fires and at the same time are prevented from interfering with transports, boat groups and other fire-support groups. The area assigned each group must, of course, be suitable from the standpoint of depth of water and absence of navigational hazards. Subject to this prime requisite the most important consideration in the assignment of fire-support areas is the ability of the fire-support group to cover effectively all important parts of its target area with fire. The fire-support area must therefore be of such size that positions are afforded which are within range of the most distant target assigned and that other positions are afforded at ranges which permit angles of fall sufficient to engage defiladed targets. Or the area must extend laterally to a position from which fire can be delivered behind the mask. In most cases it will be preferable to assign fire-support areas by showing the space in which the fire-support groups must not operate rather than by specifically restricting a fire-support group to a certain area. It may sometimes be desirable or necessary to assign two fire-support groups to the same fire-support area. This will always be the case, of course, for example, if a single cruiser constitutes a close fire-support group with its 5-inch batteries and a deep fire-support group with its larger batteries. All ships in one fire-support area will normally maneuver as a single unit. Figure 5 illustrates the assignment of fire-support areas.

524. Firing runs.—Firing runs are planned by the fire-support groups within the limits of the respective fire-support areas. The bearing of the firing runs in relation to the line of fire should be such that all the guns of the battery or batteries concerned can bear, and that the range and deflection to the target or targets engaged on the run will change as little as possible during the period of adjustment and fire for effect. The turns at the ends of the run must be made at such times that they do not interfere with the delivery of fires scheduled for specific times nor interrupt the execution of fire on a target of opportunity. From the standpoint of effective delivery of fire the ideal firing run is on a straight course of maximum length and at minimum speed with the center of the target area bearing on the beam at the center of the run. (See fig. 6a.) Where high speed and frequent change of course are necessary as part of planned protective measures, irregular firing runs may be prescribed as illustrated in figure 6b. The firing legs of such runs however must always be of such length as to permit the execution of at least one fire mission (normally at least 7 minutes) and should be as close to perpendicular to the line of fire as possible. Special firing runs for specific periods may be planned and executed for definite missions. Figure 7 illustrates special destroyer runs for participation in the preparation. Such runs are coordinated exactly with the movement of the assault boat wave.

Assignment of Fire Support Areas by Diagram

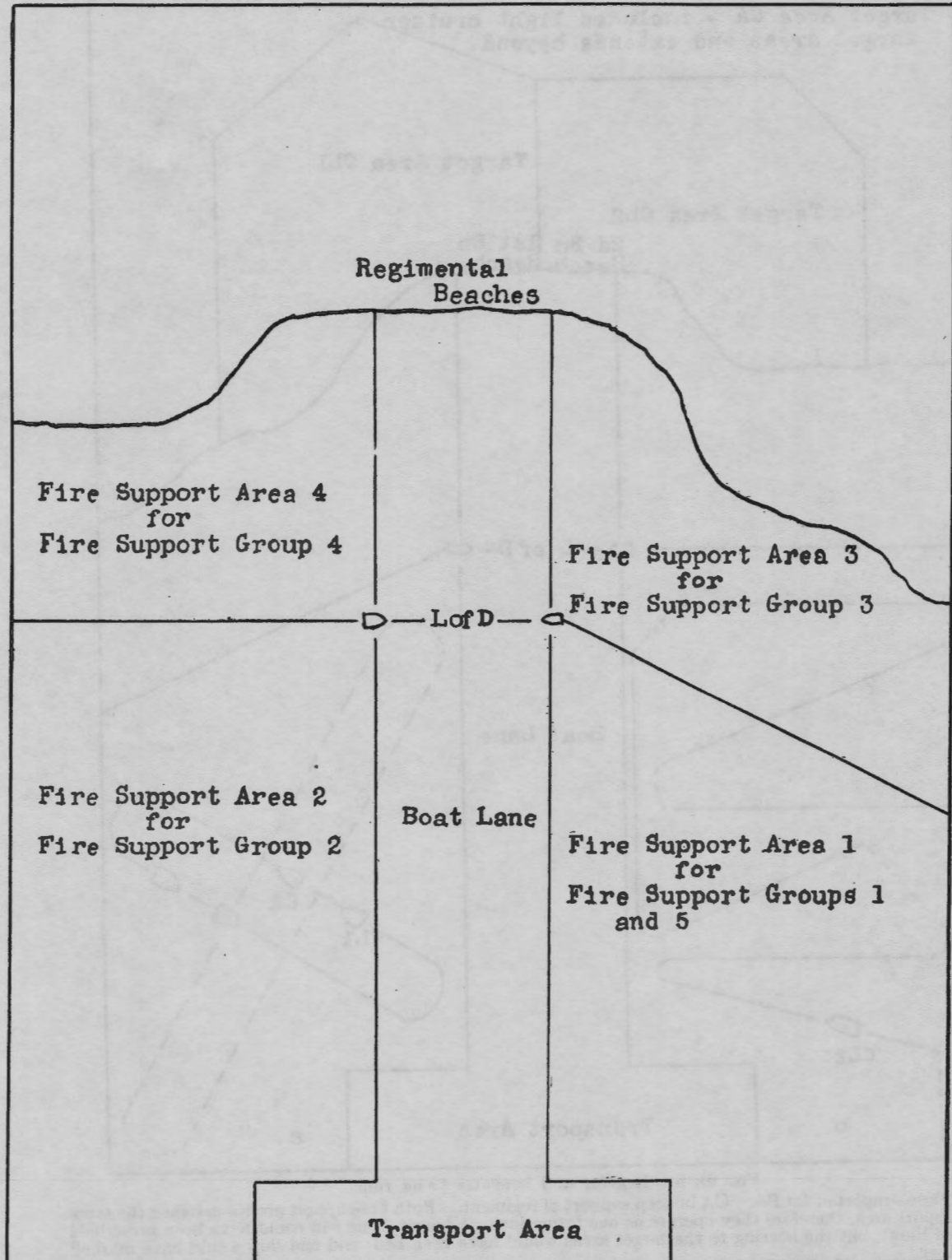


FIGURE 5.—Assignment of fire support areas by diagram.

LANDING OPERATIONS DOCTRINE

Regular and Irregular Firing Runs

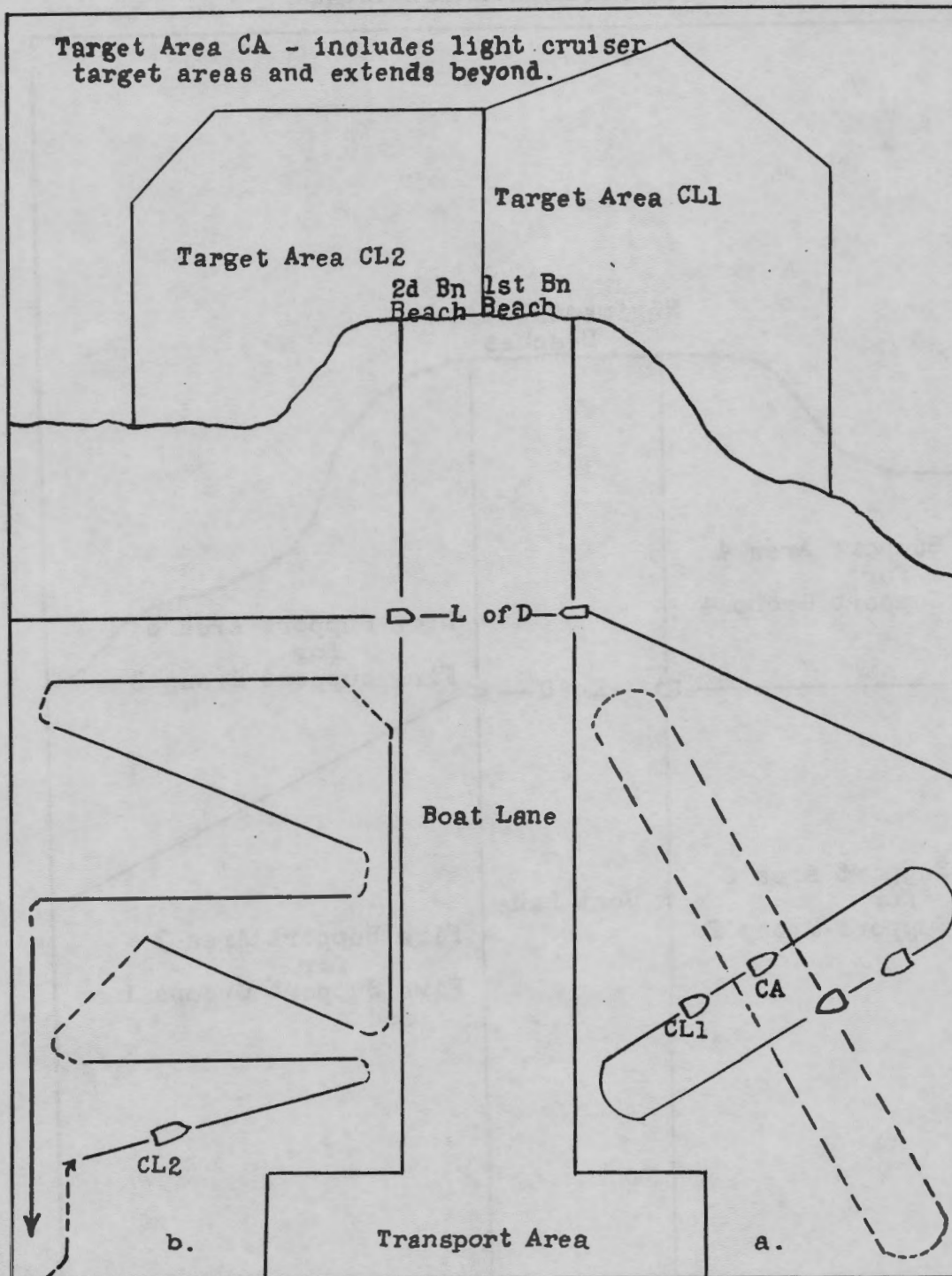


FIGURE 6.—Regular and irregular firing runs.

- a. CL1 in close support of 1st Bn. CA in deep support of regiment. Both fire-support groups assigned the same fire-support area, therefore they operate as one formation. A longer firing run could have been prescribed (dotted lines), but the bearing to the target areas would have been bad; and one ship would have masked the other.
- b. Solid lines are firing legs. Broken lines are turns or legs too short for execution of fire missions. CL2 in close support of 2d Bn.

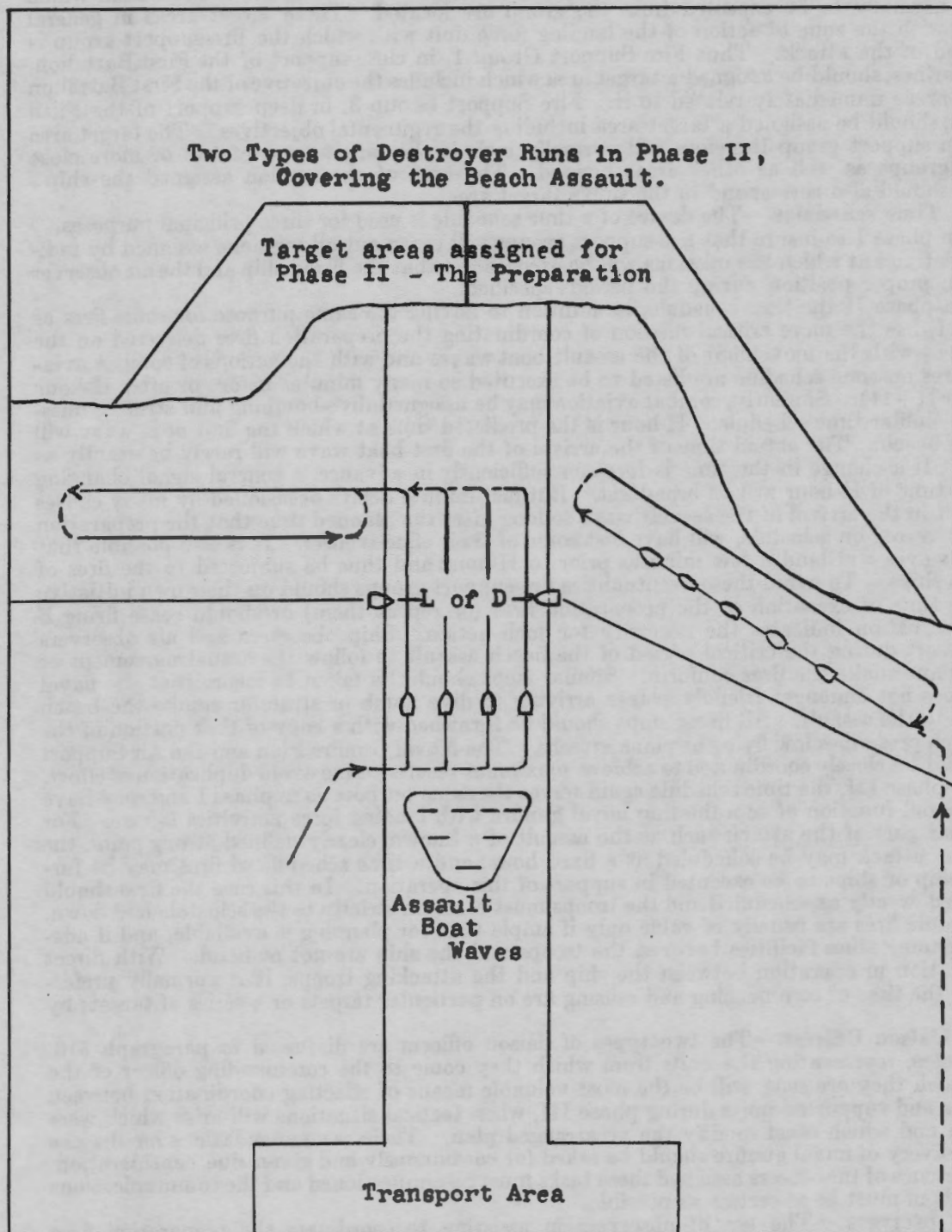


FIGURE 7.

Movement of destroyers coordinated exactly with boat waves by observation. When troops mask fire, destroyers take station assigned, if not to continue in close support.

525. Target areas.—Each fire-support group is assigned a definite land area within which all fires normally to be expected from the group are located. These target areas in general coincide with the zone of action of the landing force unit with which the fire-support group is associated in the attack. Thus Fire Support Group 1, in close support of the First Battalion, Fifth Marines, should be assigned a target area which includes the objective of the First Battalion and the areas immediately related to it. Fire Support Group 3, in deep support of the Fifth Marines, should be assigned a target area including the regimental objectives. The target area of a deep support group therefore will normally include the target areas of two or more close support groups as well as other areas beyond. The area of observation assigned the ship's airplane should also correspond to the ship's target area.

526. Time schedules.—The device of a time schedule is used for three principal purposes.

a. In phase I to insure that fire-support groups will carry out all missions assigned by indicating the times at which the missions will be executed so that the firing ship and the air observer will be in proper position during the periods specified.

b. In phase II the time schedule, in addition to having the same purpose for some fires as in phase I, has the more critical mission of coordinating the preparation fires delivered on the beach areas with the movement of the assault boat waves and with the actions of combat aviation. Fires on time schedule are listed to be executed so many minutes before or after H-hour (H-16 or H+11). Similarly, combat aviation may be assigned dive-bombing and strafing missions on a similar time schedule. H-hour is the predicted time at which the first boat wave will reach the beach. The actual time of the arrival of the first boat wave will rarely be exactly as planned. If a change in the time is foreseen sufficiently in advance, a general signal changing the clock time of H-hour will be broadcast. But last-minute delays occasioned by many causes may result in the arrival of the assault wave so long after the planned time that the preparation fires, if delivered on schedule, will have lost some of their effectiveness. It is also possible that the boat waves will land a few minutes prior to H-hour and thus be subjected to the fires of their own ships. To avoid these eventualities fire-support groups should on their own initiative delay the time of execution of the preparation fires (or repeat them) or should cease firing if direct observation indicates the necessity for such action. Ship observers and air observers must be alert during the critical period of the beach assault to follow the actual movement of the boats and make the fires conform. Similar steps should be taken to insure that the naval gunfire does not endanger friendly planes arriving to dive bomb or strafe or smoke the beach just prior to the assault. All firing ships should be furnished with a copy of that portion of the order which prescribes low flying airplane attacks. The Naval Gunfire Plan and the Air Support Plan should be closely coordinated to achieve maximum results and to avoid duplication of effort.

c. In phase III, the time schedule again serves the same purpose as in phase I and may have the additional function of coordinating naval gunfire with landing force activities ashore. For a particular part of the attack such as the assault of a known, clearly defined strong point, the time of the attack may be scheduled at a fixed hour; and a time schedule of fires may be furnished a ship or ships to be executed in support of this operation. In this case the fires should be delivered exactly as scheduled and the troops must conform strictly to the schedule laid down. Such schedule fires are usually of value only if ample time for planning is available, and if adequate communication facilities between the troops and the ship are not at hand. With direct communication in operation between the ship and the attacking troops, it is normally preferable to fix the time of commencing and ceasing fire on particular targets or a series of targets by message.

527. Liaison Officers.—The two types of liaison officers are discussed in paragraph 516. These officers, representing the units from which they come to the commanding officer of the unit to which they are sent, will be the most valuable means of effecting coordination between firing ships and supported units during phase III, when tactical situations will arise which were unforeseen and which must modify the prearranged plan. Their recommendations on the use and the delivery of naval gunfire should be asked for continuously and given due consideration. The competence of the officers assigned these tasks must be unquestioned and the communications provided them must be as certain as possible.

528. Observers.—The use of observers in assisting to coordinate the preparation fires with the movements of the assault waves has already been noted in paragraph 526 (b) above. During phase III the use of landing force artillery officers as the Shore Fire-Control Party spotters for naval gunfire will further insure the coordination of naval gunfire with the movement of the front-line troops. These spotters normally accompany the leading echelons of the assault battalions and in the execution of their mission must be completely informed of the local situa-

tion and must have direct observation of the critical front-line areas. Their requests for fire on certain areas are a sure indication of the progress of the attack. Since these spotters come from the artillery unit which is part of the combat team operating in that area, effective coordination with landing-force artillery is easily achieved. At the time that artillery batteries are in position to support the infantry regiment to which he is attached or which he is supporting, the artillery battalion commander should insure that both the liaison officers and the spotters are informed in order that targets which can be more effectively engaged by artillery will not be engaged by ships' gunfire.

529. Special Signals.—Coordination with movement of boats, with aircraft, and with elements of the landing force may be achieved under certain conditions by using special signals such as flares, lights, etc. When other means of communication are lacking, such signals may be the only means of requesting "on call" fires or of requesting "Cease fire." The use of such signals however should be severely restricted, their meaning should be unmistakable, and the probability of similar signals originating from enemy sources should be taken into account.

SECTION V

TECHNIQUES

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530. General.—The techniques herein described have been developed in training and tested, most of them in combat. They offer a solution to the problems, and are presented for use when desired or for use when no other technique is prescribed by competent authority. It must be borne in mind that a technique is designed for a certain type of equipment; and that any change in equipment may render a technique obsolete. Technique is not doctrine; the responsibility of the commander for prescribing a suitable technique for an operation and of training the components of his Force in the execution of the technique is doctrine.

531. Target Designation.—*a.* Targets on time schedule are designated by coordinates or preferably by marked photo, marked map or by overlay prepared for the photo or map, contained in the Naval Gunfire Annex of the operations order. A circle of standard size (100, 200, 300, or 400 yards in diameter) is drawn around the area in which the target is located, the circles are identified by numbers and are referred to as "concentration No. 6," etc. The size of the circle used depends on the effect desired and on the type battery assigned to the target; a 100-yard circle may indicate a target to be destroyed regardless of the battery assigned; on targets to be neutralized a 200-yard circle may be used for 5-inch battery targets, a 300-yard circle for 6-inch battery targets, and a 400-yard circle for 8-inch or larger battery targets. If such refinements in the preparation of the Gunfire Annex are not practicable, due, for instance, to the fact that the number of batteries by caliber is not known far enough in advance, the circles representing targets to be neutralized should be all of 200-yard diameter in order to insure that there will be no gaps in the preparation. These gaps will result if larger circles are drawn and 5-inch batteries with 200-yard patterns are used in the execution of most of the fires. The center of the circle is the point at which it is desired to place the mean point of impact. If the order furnishes only the coordinates, the coordinates of the center of the target are given and the circles may be drawn by the firing ships for ease in identification. The use of marked oblique photographs to supplement the designation of these targets to ships and low-flying observing planes will facilitate identification on D-day.

Panoramic strip mosaics prepared from photos taken from seaward by ships or by planes flying at very low altitudes should be furnished firing ships if possible in order that gunnery personnel may become familiar in advance with how the target area will actually look on D-day. These mosaics should show:

- (1) The grid lines most normal to the coast (E-W or N-S lines).
- (2) The name or number of visible hills.
- (3) The location of terrain features not apparent (river mouths, low promontories, etc.).
- (4) Landing beaches to be used.
- (5) Exact location of all targets that show.
- (6) Any other information of value.

Marked vertical photographs are preferable for air observers operating at heights above 1,000 feet.

b. Targets on call are designated as for those on time schedule.

c. (1) Targets of opportunity may be designated by coordinates, or they may be designated by reference to a numbered concentration with an appropriate shift. For example: "Concentration No. 5. Down 200, left 400, etc.," means that a target has been discovered whose center is approximately 200 yards short of, and 400 yards left of, the center of the circle designating concentration No. 5. Or they may be designated by a simple shift from the target on which the battery concerned is firing or on which it has just completed firing. Thus if an observer sends a message to a ship which is firing for effect on a target previously designated by the observer, such as "New target, up 300, right 100, etc.," it means that a target has been discovered whose center is approximately 300 yards beyond and 100 yards right of the mean point of impact of the salvos being fired. If an observer uses coordinates to designate a target of opportunity, the coordinates should refer to the standard map in effect for the operation. However, in an emergency, polar coordinates may be used. An unmistakable terrain feature should be named as origin and the bearing and distance of the target center from the origin is given. For example, "Target bears 300° True (or Magnetic), distance 5,000 yards, from Point Vaca."

(2) It should be noted that targets may be designated to observers as well as to firing ships. Thus a landing force unit commander or his naval gunfire liaison officer may direct a ground or air spotter to adjust fire on a target designated by any one of the above methods.

532. Engagement of Targets.—The execution of a fire mission is divided into three parts: Determination of initial data for laying the guns, adjusting the mean point of impact on the center of the target, and the delivery of fire for effect. The technique employed in each of these three operations may vary according to the type of fire control employed (direct or indirect), and according to the tactical purpose of the fire and the importance of the target.

a. *Direct fire.*—The use of direct fire implies that the target is visible from the firing ship.

(1) The range to the center of the target is determined by radar or rangefinder. Continuous ranging on the beach line is sufficient for targets in the vicinity of the beach, since the distance of such targets from the beach may be accurately estimated. Care must be taken to insure that the rangefinder operator is on the proper target. If rangefinders are not available a range from navigational plot may be used. Aiming points in deflection and in elevation are selected and the offsets applied. For prearranged fires a study of oblique photographs will often permit the selection of aiming points in advance. The aiming points should be outside the target area if it is probable that they will be obscured by the initial bursts. The aiming point in deflection should be at approximately the same range as the target in order that the offset will remain relatively constant. The shore line is a convenient aiming point in elevation, particularly for targets close to the beach. The range tables will give the necessary range change to compensate for differences in angle of position between the elevation aiming point and the target, if this difference is material.

(2) Ranging salvos are fired, observed, and spotted to bring the mean point of impact on the center of the target. With 6-inch guns and larger, one turret may be used satisfactorily for adjustment. For the 5-inch calibers at least 4-gun salvos should be used. From 3 to 5 salvos will normally be required to establish the hitting gun range. For this reason, as well as to allow time for turns in the firing run, the Gunnery Annex should allow at least 10 minutes for each time schedule target. The exact times shown (H-15, etc.) for the targets are subject to minor adjustments by the firing ships to take care of rapid or unduly long adjustments and to permit turning. In the event a ship becomes hopelessly out of step with the time schedule the commanding officer must decide whether it is better to continue to fire by the times prescribed, or to fire on targets in the order prescribed, the determining factor being which method will better aid the troops. Ranging salvos are fired with all guns laid at the same range and parallel to each other in deflection.

(3) As soon as the hitting gun range is established, fire for effect is commenced with all guns of the battery assigned to the mission. Unless otherwise specified in the Gunnery Annex, all targets will be *neutralized* and fire for effect will be accomplished by the execution of rapid fire for 2 minutes with 5- or 6-inch batteries (approximately 80 rounds and 60 rounds, respectively) and for 3 minutes with 8-inch batteries (approximately 54 rounds). All guns are fired at the same range throughout, normal dispersion accomplishing the desired coverage, and parallel to each other in deflection. If adequate coverage of the area in width is not obtained during the first few salvos, a deflection change is ordered for the succeeding salvos.

b. Indirect fire.—The use of indirect fire implies that the target is not visible to the firing ship. However, these fires will usually be observed and adjusted either by air spot or by Shore Fire Control Party spotters.

(1) The range to the center of the target is determined by measuring a line joining the ship's position (fixed by continuous navigational plot) and the point designated as the center of the target by the observer (either by coordinates or by reference to a plotted concentration). It is for this reason that a standard map or chart on which has been superimposed the standard grid, and which includes the fire support areas, should be furnished to all firing ships. To the range thus determined is added the position correction necessary because of the altitude of the target. The true bearing of the target is determined and the guns are laid with an appropriate deflection.

(2) Adjustment is accomplished as for direct fire except that full battery salvos are normally used. After each ranging salvo, fire is suspended until the spot is received and applied.

(3) When adjustment is complete and the spotter requests fire for effect, neutralizing fire is delivered as in the engagement of targets by direct fire. If the target has not been sufficiently covered in area or in density, the spotter will transmit an appropriate spot (if necessary), and request that fire for effect be repeated.

c. Ammunition.—Appropriate projectiles, fuzes and charges for certain targets, and for target areas, should be decided on prior to D-day from a study of the character of the targets and the relation of the target area to the fire support area in range and mask. Unless otherwise specified, targets are to be *neutralized*, and therefore high explosive AA common or HC projectiles should be used with the fuze which will give the maximum effect (see par. 508 above). If AA shell with air burst is to be used for effect, adjustment is usually carried out with impact burst and when the hitting gun range is determined, the trajectory is raised above the target approximately 20 to 30 yards to produce the air bursts. It should be noted that effective air burst is usually obtained with nondelay impact fuzes when the target area is heavily wooded. Under such conditions the impact fuzes should be used. The type charge for HC projectiles (normal or reduced) and the range band for AA projectiles (below or above 45°) required to reach certain areas should be determined in advance and a standard procedure for use during the operation should be prescribed on each ship.

d. Special targets.—The great bulk of targets will be targets on which fire for neutralization as above outlined will be delivered. Certain targets however will require special attention, such as targets to be destroyed and some targets fired on in deep support.

(1) Targets to be destroyed will normally be engaged by not more than a single turret. Adjustment is continuous throughout the mission and the mission is continued until destruction is obtained. Delay fuzes are used and armor piercing, common, or HC projectiles are employed, depending on the penetration required. The amount of ammunition and the length of time required for each target can be predicted only in the most general terms; consequently batteries assigned destruction missions should not be included in the fire plan for close support of battalions or deep support of regiments.

(2) Some deep supporting fires are placed in areas the free use of which should be denied the enemy, such as cross roads, bridges, fords, etc. Also some fires in deep support may be executed solely for their annoyance value. These missions may well be accomplished with less than the standard allotment of ammunition for neutralization fires. If it is so decided, it is usually better to continue the fire over the period designated but at a slower rate of fire. Such fires (for interdiction and harassment only) should be executed only if there is ample ammunition above the requirements of other fires.

533. Methods of Fire Control.—Methods of fire control for both direct and indirect fires have been indicated under paragraph 532 above. The detailed mechanics of the various operations required—in navigation, in plot, at the director and at the guns are here purposely omitted. Standing operating procedures should be prescribed for each ship, depending on its equipment, to accomplish the desired result.

534. Spotting.—The technique of spotting naval gunfire on shore targets by ship observers is in every respect similar to that employed in spotting fire against waterborne targets, except that the effect of slope must be taken into consideration when making range changes. The technique of spotting by air observers and by Shore Fire Control Party spotters is laid down in the Shore Fire Control Code. Any variations in the procedure therein prescribed should be specifically authorized by the Commander, Naval Attack Force. In general, it is desirable that the same system of spotting be employed by air observers, by Shore Fire Control Party spotters and by field artillery forward observers. In this way maximum flexibility in the use of spotters is obtained without confusion.

LANDING OPERATIONS DOCTRINE

SECTION VI

NAVAL GUNFIRE ANNEX

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535. Formulation.—The Naval Gunfire Annex is that part of the Naval Attack Force Order which contains the directions for furnishing naval gunfire support for the landing force. Its preparation is a joint function of the staff of the Commander Attack Force and the staff of Commander Landing Force. Before it can be drawn up, the number and type of ships and the amounts of ammunition available must be known, the scheme of maneuver must have been decided on, and the minimum requirements in ships and ammunition for the various phases of D-day must have been estimated.

536. Essential elements.—The Naval Gunfire Annex must contain specific information on the following points:

- (a) The composition of each fire support group.
- (b) The mission(s) of each fire support group.
- (c) The fire support area(s) for each fire support group.
- (d) General target area assigned each group.
- (e) Specific targets assigned each group, the nature of the targets, if known, the effect desired, and the time of engaging each.
- (f) The landing force unit each fire support group supports and the liaison to be effected.
- (g) The observer(s) for each group and the communication provided.
- (h) Any restrictions imposed on movements or firing.

The annex should include appropriate charts and diagrams whenever practicable.

537. Simplicity.—The guiding principle in the formulation of the Naval Gunfire Annex is simplicity.

SECTION VII

ILLUSTRATIVE PROBLEM

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538. General.—The following illustrative problem is presented for the purpose of suggesting a procedure which may be followed in planning naval gunfire support. Considering the many variations that may be more applicable or necessary, the methods shown below should be regarded only as a general guide.

539. Mission of the Naval Attack Force.—*a.* It is assumed that a naval attack force has been assembled and assigned the mission of projecting a military force ashore on an enemy island to seize a beachhead sufficient to permit the conduct of further operations.

b. Intelligence reports as outlined in the Intelligence Annex have been studied and it has been concluded that the enemy defending this island consists of one division of approximately 15,000 men, organized with 3 regiments of infantry, 4 battalions of light and medium artillery, 1 battalion of tanks, with the necessary engineer, service and medical troops. This defense force is supported by a local naval defense force, and an undetermined number of land-based aircraft. It must be understood that we will be carrying on a continuous reconnaissance of the island with all available agencies. Further, preliminary operations will be instituted prior to D-day to neutralize seacoast batteries and the defending enemy air force.

c. The attack force includes combatant ships and the First Marine Amphibious Corps, consisting of Corps Troops and two Marine Infantry Divisions. The basic plan calls for the projection of the First Marine Division ashore in area X, with the Second Marine Division landing in area Y, the two divisions to effect a junction, seize a beachhead and be prepared for further operations on shore. This will necessitate the formation of naval fire support groups to support the First Marine Division landing in area X, and the Second Marine Division, landing in area Y. (See fig. 9.)

d. From the intelligence reports it is indicated that area X and the terrain contiguous thereto (see fig. 10) is defended by one regiment of infantry, supported by one light artillery battalion and probably one medium artillery battery. The enemy in this area is apparently maintaining an active defense, with light defenses manned on the probable landing beaches, with observation of the remainder of the coastline and with the bulk of his troops bivouaced in the hills in reserve.

e. Preliminary study of the needs of both Marine Divisions has been made by the staffs of Commander Landing Force and of Commander Naval Attack Force and it has been decided that 8 destroyers, 6 light cruisers (but none of the 16 5-inch gun type) and 1 heavy cruiser will be available for naval gunfire support on D-day to support the First Marine Division. Ample stocks of shore bombardment ammunition of the most suitable types are available. Examination of available charts indicates that no navigational hazards exist to interfere with the operation of fire support vessels off the proposed landing beaches. Sufficient gunfire is therefore available to permit the planning of an assault on a wide front. (See par. 512.)

540. The Landing Force scheme of maneuver.—The Commander of the First Marine Division has prepared a scheme of maneuver (see fig. 10) requiring the simultaneous landing of two assault regiments, each regiment with two battalions in the assault echelon. The plan calls for the seizure of objective O^a by H plus 1 hour, and the further seizure of objective O¹ by H plus 5 hours.

541. Fires required.—a. The staff of the First Marine Division Commander now outlines on the map prepared for the operation the probable target locations, based on presently known and probable enemy dispositions in the area to be attacked. (See fig. 11.)

b. *Analysis of Targets.*—Nos. 1 to 32—Probable beach defenses.

Nos. 34, 42, 45, 46, 47, 56—Routes of approach of enemy forces to probable and known defensive positions.

Nos. 33, 35, 36, 37, 38, 39, 40, 41, 43, 44, 48, 49, 50, 51, 52, 53, 54, 55—Possible strong-points. Terrain features most likely to be occupied by enemy forces, and which, if occupied, would present a serious threat to our advance.

No. 57—Possible enemy command post.

Nos. 58, 59, 60, 61, 62, 63, 64—Critical points on road communication net.

NOTE.—Additional intelligence data will probably be obtained by reconnaissance agencies; it is anticipated that such data will permit the designation of enemy battery positions and other targets prior to D-day.

c. *Target Requirements.*

Phase I: (Deep Support)--- Nos. 57, 58, 59, 60, 61, 62, 63, 64 (8 6- or 8-inch battery targets) on time schedule; targets of opportunity as practicable; air-spot. Nos. 32, 34, 42, 45, 46, 47, 56 (7 5-inch battery targets) on time schedule; ship spot.

Phase II: (Preparation)--- Nos. 1 to 32 (inclusive), 33, 34, 37, 38, 39, 42, 35, 36, 43, 44, 45, 46, 47 (45 5-inch battery targets), ship spot. Repeat the 8 6- or 8-inch battery targets of phase I; air-spot.

Phase III:

(Close Support)----- Nos. 33, 34, 37, 38, 39, 40, 41, 42, 35, 36, 43, 44, 45, 46, 47, 48 (16 5-inch battery targets) (ship spot). SFCP engage targets of opportunity upon establishment ashore.

(Deep Support)----- Targets of opportunity by air-spot beyond O^a until H plus 45 minutes, then beyond O¹ until H plus 4 hours, 30 minutes. Fires short of these lines only on request of landing force units ashore.

d. *Capabilities of Fire-Support Ships.* (See par. 511, fig. 3.)

8 DD's 64 5-inch battery targets (200 x 200).

6 CL's 154 5-inch battery targets (200 x 200).

136 6-inch battery targets (300 x 300).

1 CA 24 5-inch battery targets (200 x 200).

10 8-inch battery targets (400 x 400).

Total Shore Target Capacity:

242 5-inch battery targets (200 x 200).

136 6-inch battery targets (300 x 300).

10 8-inch battery targets (400 x 400).

One-half of this capacity should be reserved for fires on targets of opportunity during phase III (see par. 507c(2)). This will allow, for scheduled fires during phases I and II and the first part of phase III, the following:

121 5-inch battery targets.

68 6-inch battery targets.

5 8-inch battery targets.

The following have already been scheduled:

	5-inch battery targets	6- or 8-inch battery targets
During Phase I.....	7	8
II.....	45	8
III.....	16	0
Total scheduled fires.....	68	16

The number of scheduled fires is well within the allowance, permitting the scheduling of many more targets selected as a result of continuous reconnaissance and later intelligence reports.

From this analysis, it is thus seen that the requirement for time schedule fires already planned, as well as for those which probably will be planned from results of future reconnaissance, is well within the capabilities of the fire-support ships during all phases.

542. Number of Fire Support Groups.—Since there are two assault regiments, each with two assault battalions landing simultaneously, a minimum of six fire support groups is indicated:

1 Close Fire Support Group per assault battalion.

1 Deep Fire Support Group per assault regiment.

Eight destroyers, 6 CL's and one CA will be available to support the attack of the First Marine Division on D-day. The target analysis indicates that one light cruiser is adequate for each battalion and regimental Fire Support Group. Therefore, 9 fire support groups should be set up; i. e., 2 Special Mission Fire Support Groups of 4 destroyers each, to assist in the preparation, 4 Fire Support Groups of 1 CL each to provide close support for the assaulting battalions, 2 Fire Support Groups of 1 CL each to provide deep support for the First and Fifth Marines, and 1 Fire Support Group consisting of the 1 CA to provide deep support for the First Marine Division.

543. Composition and Location of the Fire Support groups.—The composition and location of each fire support group is dependent on the probable number, range and direction of targets in each area and on the hydrography of the sea approaches. It has already been determined that the sea approach presents no restrictions on the use of fire support groups; therefore, the composition has been (see par. 542 above), and the location of the fire support groups can be, based entirely on the targets to be engaged. The assignment of fire missions is a function of the staff of the Commanding General, First Marine Division, and includes coordination of the fires with the movement of the landing force components both in boats and on the shore. The composition of the fire support groups and the location of the fire support areas, and the coordination of the fire support groups with the movements and positions of the other naval components of the attack group, including combat aviation, is the function of the staff of the Commander Naval Attack Force. The staffs must consult with each other to insure agreement of the two aspects of the problem.

544. Preparation of the Naval Gunfire Annex.—The combined staffs of the Commander Naval Attack Force and First Marine Division now prepare the plan of Naval Gunfire. Upon approval, this plan is authenticated and issued as the Naval Gunfire Annex. The following appendices must be prepared and attached thereto, i. e.:

(1) Plan of Naval Gunfire (prepared by joint staffs).

(2) Time Schedule (prepared by joint staffs).

(3) Fire Support Areas (prepared by NAF).

(4) Radio Frequency Plan (prepared by NAF).

(5) Composition of Liaison and Shore Fire Control Parties (prepared by joint staffs).

Figure 13 is a Plan of Naval Gunfire for support of the First Marine Division in the attack. Figure 14 is a sample time schedule. Figure 12 shows the fire support areas assigned. The composition of the Shore Fire Control Parties and the personnel assigned liaison duties as well as the radio frequency assigned each is shown in figure 15.



FIGURE 9.

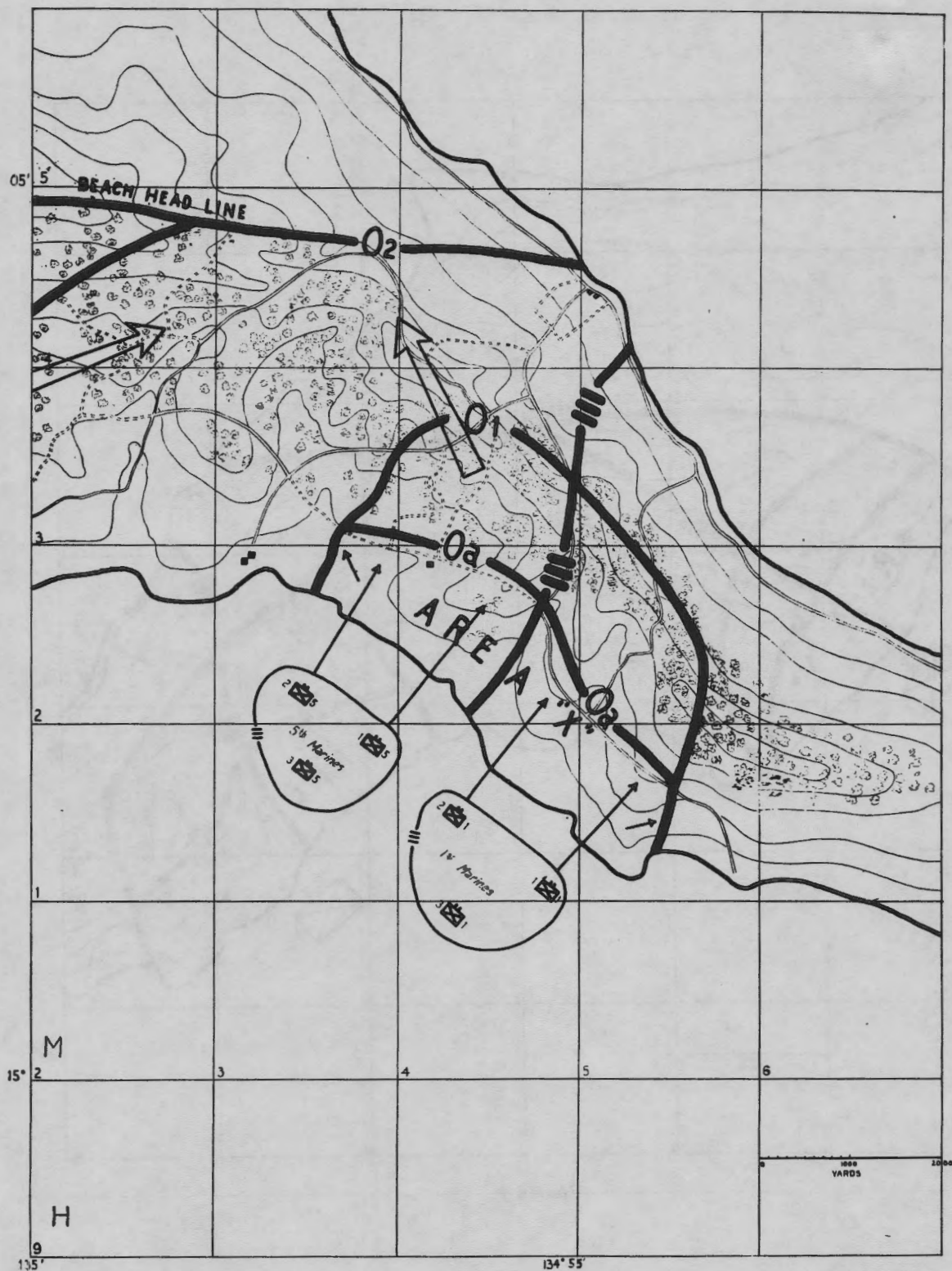


FIGURE 10.

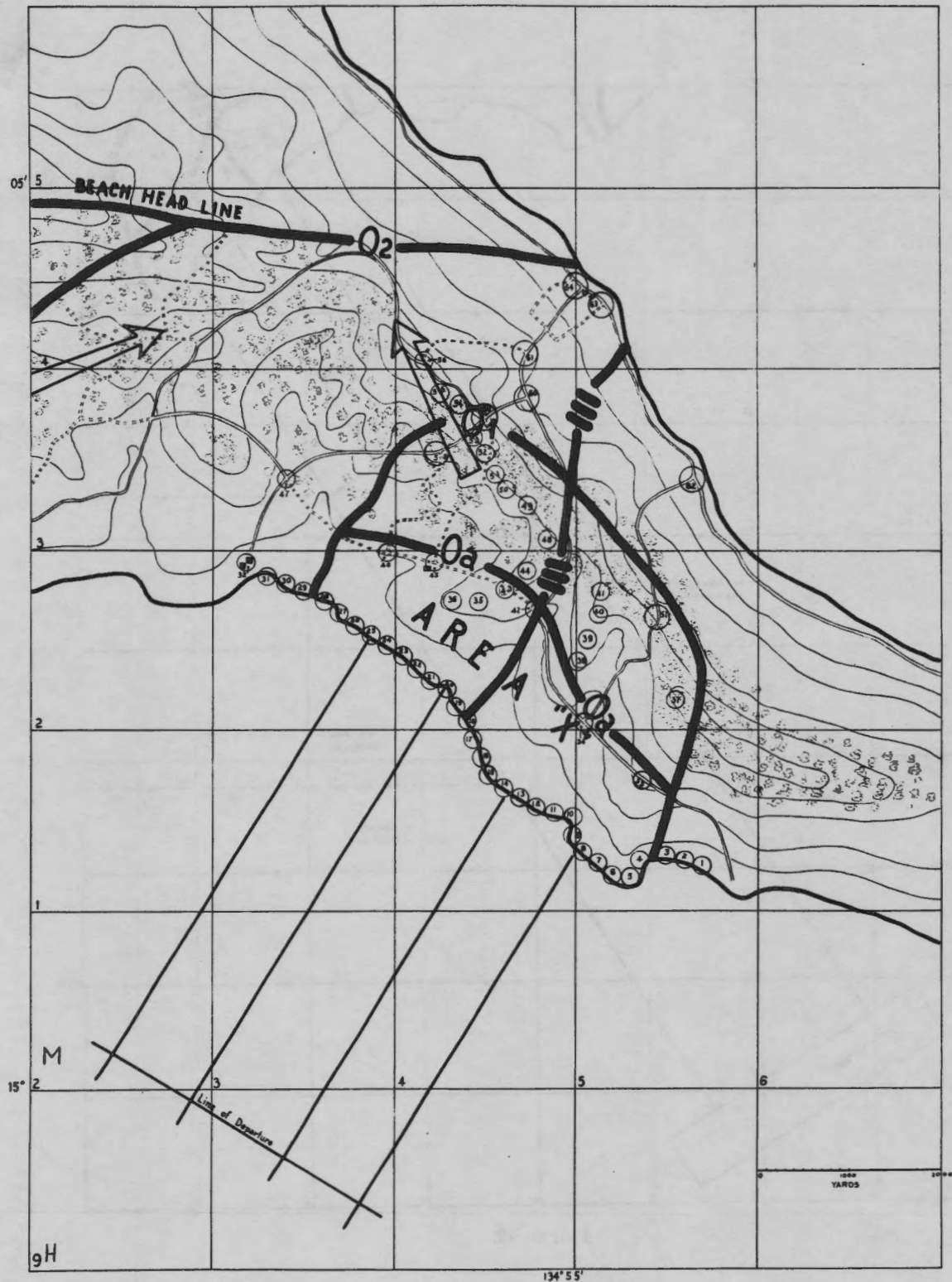


FIGURE 11.

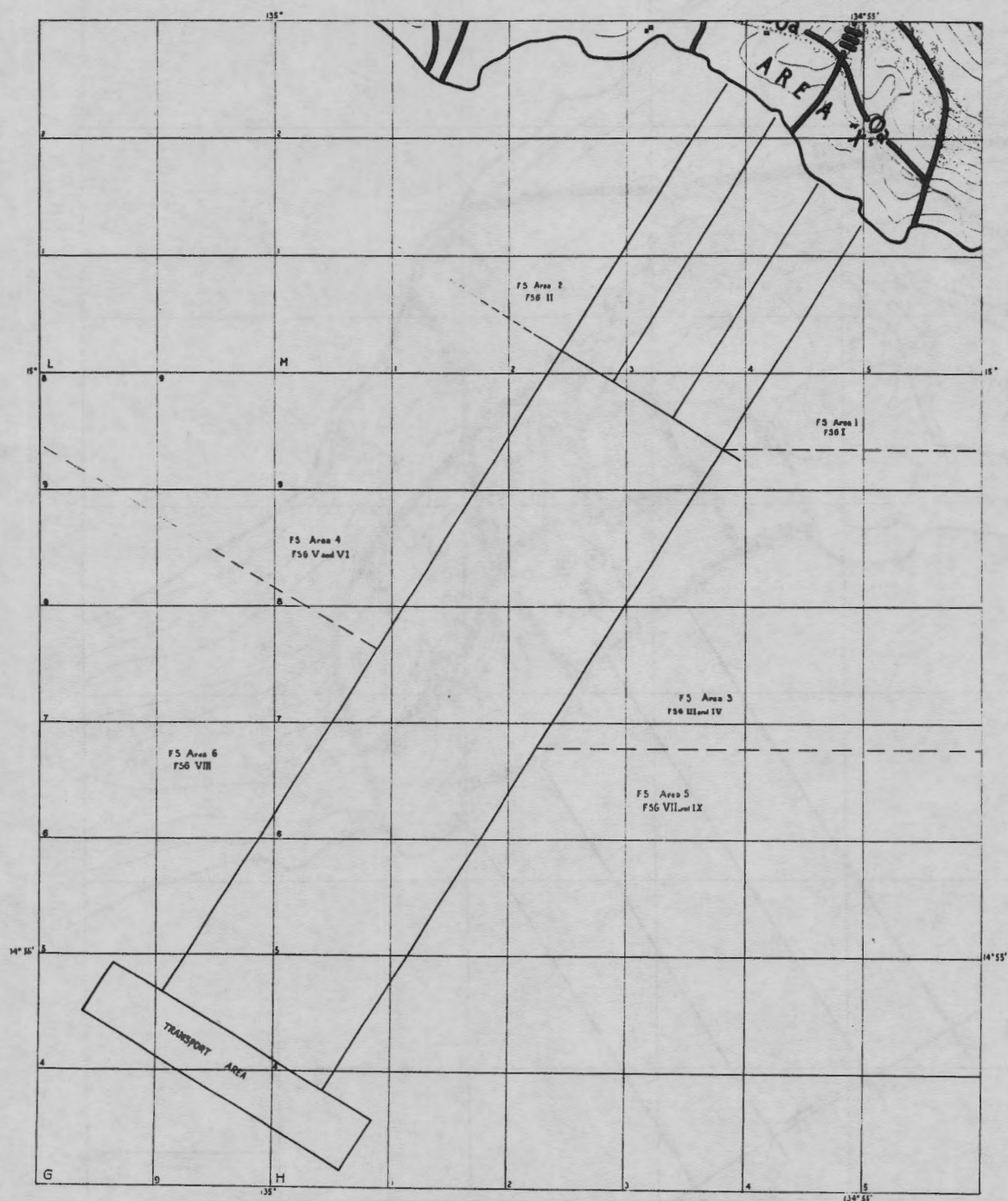


FIGURE 12.

Plan of Naval Gunfire

FSG	Composition	Mission	Phase I	Phase II	Phase III
I.....	Des Div 1 (4 DD's).	Special, 1st Marines.....	Screen Transports.....	Preparation. Targets 1 to 12 (incl.) (ship spot).	Move to east flank. Fire on targets of opportunity flank of O1 (ship spot).
II.....	Des Div 2 (4 DD's).	Special, 5th Marines.....	Screen Transports.....	Preparation. Targets 21 to 32 (incl.) (ship spot).	Move to west flank. Fire on targets of opportunity flank of O1 (ship spot).
III.....	CL.....	Close Support, 1st Battalion, 1st Marines.	-----	Targets 9, 10, 11, 12, 13, 33, 34, 37 (ship or air spot).	Targets 33, 34, 37 (ship or air spot). Thereafter on call SFCP.
IV.....	CL.....	Close Support, 2nd Battalion, 1st Marines.	-----	Targets 14, 15, 16, 17, 18, 38, 39, 42 (ship or air spot).	Targets 38, 39, 40, 41, 42 (ship or air spot). Thereafter on call SFCP.
V.....	CL.....	Close Support, 1st Battalion, 5th Marines.	-----	Targets 19, 20, 21, 22, 23, 35, 36, 43, 44 (ship or air spot).	Targets 35, 36, 43, 44, 48 (ship or air spot). Thereafter on call SFCP.
VI.....	CL.....	Close Support, 2nd Battalion, 5th Marines.	-----	Targets 24, 25, 26, 27, 28, 45, 46, 47 (ship or air spot).	Targets 45, 46, 47 (ship or air spot). Thereafter on call SFCP.
VII.....	CL.....	Deep Support, 1st Marines.	Targets 34, 42, 57, 62 (ship and air spot).	Repeat targets 34, 42, 57, 62, (ship and air spot).	Targets of opportunity zone of action 1st Marines beyond Oa until H plus 45, then beyond O1 until H plus 4 hours 30 minutes (air spot). Answer calls ground units.
VIII.....	CL.....	Deep Support, 5th Marines.	Targets 32, 45, 46, 47, 56, 58, 59, 60, 61 (ship and air spot).	Repeat targets 32, 45, 46, 47, 56, <i>58, 59, 60, 61</i> (ship and air spot).	Targets of opportunity zone of action 5th Marines beyond Oa until H plus 45 then beyond O1 until H plus 4 hours 30 minutes (air spot). Answer calls ground units.
IX.....	CA.....	Deep Support. First Marine Division.	Targets <i>63, 64</i> (air spot).	Targets <i>63, 64</i> (air spot).	Search for targets of opportunity outside of O1. (air spot). Use either 5- or 8-inch battery on appropriate targets.

FIGURE 13.

Targets in italics are 6- or 8-inch Battery targets.

NAVAL GUNFIRE

Confidential

LANDING OPERATIONS DOCTRINE

Naval Gunfire Time Schedule

FSG	Target	Time
—I—	9, 10, 11, 12 5, 6, 7, 8 1, 2, 3, 4	H-25 H-15 H-5
—II—	21, 22, 23, 24 25, 26, 27, 28 29, 30, 31, 32	H-25 H-15 H-5
—III—	34 33, 37 9 10, 11 12, 13	H-45 H+20 H-35 H+10 H-25 H-15 H-5
—IV—	42 38, 39 18 16, 17 14, 15 40, 41	H-45 H+20 H-35 H+10 H-25 H-15 H-5 H+30
—V—	43, 44 35, 36 19 20, 21 22, 23 48	H-45 H+20 H-35 H+10 H-25 H-15 H-5 H+30
—VI—	47 45, 46 28 26, 27 24, 25	H-45 H+20 H-35 H+10 H-25 H-15 H-5
—VII—	34 42 57 62	H-120 H-35 H-100 H-25 H-80 H-15 H-60 H-5
—VIII—	60, 61 58, 59 56 45, 46 32, 47	H-120 H-45 H-100 H-35 H-90 H-25 H-80 H-15 H-60 H-5
—IX—	63 64	H-120 H-15 H-100 H-5

FIGURE 14.

NAVAL GUNFIRE

Confidential

Composition of Liaison and Shore Fire Control Parties With Frequencies Assigned

Group	Furnished by —	Composition	Report to —	Radio channel*	
				Pri- mary	Alter- nate
NGF Ln O 3.....	FSG3.....	1 Lieutenant, USN.....	1st Bn 1st Mar.....	F3	F1
Bn Ln O 3.....	1st Marines.....	1 Captain, USMC.....	FSG3.....	F3	F1
SFCP 3.....	1st Marines.....	1 Lieutenant, USMC.....	1st Bn 1st Mar.....	F3	F1
	(Reinforced)	(Artillery)			
NGF Ln O 4.....	FSG4.....	8 enlisted, USMC.....	2d Bn 1st Mar.....	F4	F1
Bn Ln O 4.....	1st Marines.....	1 Lieutenant, USN.....	FSG4.....	F4	F1
SFCP 4.....	1st Marines.....	1 Captain, USMC.....	2d Bn 1st Mar.....	F4	F1
	(Reinforced)	(Artillery)			
NGF Ln O 5.....	FSG5.....	8 enlisted, USMC.....	1st Bn 5th Mar.....	F5	F2
Bn Ln O 5.....	5th Marines.....	1 Lieutenant, USN.....	FSG5.....	F5	F2
SFCP 5.....	5th Marines.....	1 Captain, USMC.....	1st Bn 5th Mar.....	F5	F2
	(Reinforced)	(Artillery)			
NGF Ln O 6.....	FSG6.....	8 enlisted, USMC.....	2d Bn 5th Mar.....	F6	F2
Bn Ln O 6.....	5th Marines.....	1 Lieutenant, USN.....	FSG6.....	F6	F2
SFCP 6.....	5th Marines.....	1 Captain, USMC.....	2d Bn 5th Mar.....	F6	F2
	(Reinforced)	(Artillery)			
NGF Ln O 7.....	FSG7.....	8 enlisted, USMC.....	1st Marines.....	F1	F9
Regtl Ln O 7.....	1st Marines.....	1 Lieutenant, USN.....	FSG7.....	F1	F9
NGF Ln O 8.....	FSG8.....	1 Captain, USMC.....	5th Marines.....	F2	F9
Regtl Ln O 8.....	5th Marines.....	1 Lieutenant, USN.....	FSG8.....	F2	F9
NGF Ln O 9.....	FSG9.....	1 Captain, USMC.....	1st Division.....	F9	
Division Ln O 9.....	1st Marine Division.....	1 Lieutenant, USN.....	FSG9.....	F9	
		1 Major, USMC.....			

*See Signal Communication Annex for frequencies assigned.

FIGURE 15

CHAPTER VI

AVIATION

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SECTION I

GENERAL

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601. Air superiority.—a. Air superiority is essential to the success of a landing operation; it constitutes the best defense against possible disastrous results at the hands of enemy aircraft. Troop transports and troops in small boats offer concentrated targets for hostile aircraft and are extremely vulnerable to strafing, bombing, and gas attacks. Even a small opposing air force, skillfully handled at the crucial moment and not effectively neutralized, may so disrupt the landing as to force withdrawal. It is extremely important, therefore, that supporting aviation be prepared to furnish adequate protection against hostile air attacks during the critical phase of debarkation from the transports and the subsequent passage ashore in small boats. This protection against hostile aircraft is also of invaluable assistance to the conduct of own aircraft offensive missions against shore targets.

b. To accomplish the above mission, it will be necessary to gain and maintain local control of the air within the area of and during the time required for the landing operation. The dependence which a landing force must place upon its floating bases in launching an attack is so great, and the protection of the ship to shore movement is so vital to success as to magnify greatly the value of aircraft as a supporting arm. To offset the advantages accruing to the defender by reason of being able to operate from land bases, and to compensate for the attacker's disadvantages due to distance of floating or land aircraft bases, preponderance of aircraft within the landing area is essential. The degree of such preponderance cannot be generally determined but must in each case depend upon a careful weighing of the factors involved. A ratio of 4 to 1 is indicated for initial planning.

602. Air support.—a. Responsibility for air support and for gaining control of the air within the zone of the proposed operation rests initially with the naval aviation of the attack force. Such air units of the landing force as can be made available will participate.

b. In the event conditions require that the landing force planes be shipped partially knocked down or crated, and no land base is available for their assembly and operation, Naval aviation must be prepared to continue conduct of all air operations until the air units of the landing force are established on shore. Naval aviation will be progressively relieved by aircraft of the landing force as soon as facilities for their operation can be provided.

c. Marine pilots and observers may be utilized in naval planes engaged in land reconnaissance, attack in support of ground operations, and other air missions for which they may be specially trained.

d. Careful planning is essential to insure proper air support. Not only must the closest cooperation exist between the various air units themselves but also between the air units, the supported troops, and fire support groups.

603. Composition of the air force.—*a.* An air force charged with the responsibility of supporting a landing should be comprised largely of those classes of aviation which are peculiarly adapted to gaining, maintaining, and exploiting air superiority.

b. A preponderance of fighting and ground strafing units (VF and VSB) is the prime consideration from the standpoint of neutralizing the hostile air menace and reducing the enemy's effectiveness on the beach.

c. Next in importance is a sufficient number of scouting and observation planes (including photographic) for reconnaissance and spotting missions, guide planes, and smokers (VS and VO).

d. Heavy bombers (VT's capable of 2,000-pound bomb-load), while extremely desirable for use against fortified bases, may necessarily be limited if air operations be confined to carriers. Light or dive bombing (VB) squadrons, however, should be provided for destroying overhead cover and other objectives offering considerable resistance to explosives. If supporting land bases are available, heavy bombing units of all types should be provided as required, or in such strength as transportation facilities permit.

e. Patrol bombing planes (VPB) are highly essential in any overseas advance, and particularly in those operations prior to and during the seizure of an advance base.

f. Utility planes (VJ) will prove particularly useful for transportation purposes and other special missions required by this type of operation.

g. In planning the operation consideration should be given to the employment of parachute and air troops landed from patrol or utility planes.

604. Air reconnaissance versus surprise.—*a.* Adequate and timely information regarding the hostile defenses, and the number and suitability of landing beaches and approaches thereto may prove far more essential to the success of the landing than would any benefits derived from attempted surprise without such knowledge. Strategical surprise against an alert enemy will be exceedingly difficult to accomplish. Air and surface scouting carried long distances to sea by enemy air forces will, in all probability, result in the early discovery of the approaching expedition. Therefore, the question of possible strategical surprise must be weighed against the marked advantages accruing to the attacker through the early employment of a part of his air forces on distant reconnaissance.

b. While it will seldom be possible to conduct distant aerial reconnaissance without sacrifice of strategical surprise, no such difficulty should attend tactical operations. It is entirely feasible to disguise aerial reconnaissance missions among the general air operations incident to the landing so that the enemy will be unable to derive any definite conclusions therefrom. Prior to the landing, tactical reconnaissance of beaches and contiguous areas inland should be conducted over a broad front, and concentration of aerial activities over any particular sector where a landing may be planned carefully avoided. Aerial reconnaissance may, in fact, be made to aid in tactical surprise. Marked aerial activity over certain beaches where no landing is intended may lead to a partial redistribution of enemy defense forces and therefore to a weakening of the defense at the selected landing sites. In this way tactical surprise against specific beaches may be effected without foregoing any of the advantages of aerial reconnaissance.

605. Transportation of aircraft.—*a.* Since a landing ordinarily will require maximum employment of all the aviation that can be made available, every effort should be made to provide for the participation of the Fleet Marine Force aircraft, which is specially trained to operate with ground troops, in the initial operations. Where aircraft can fly the entire distance from their home base to the scene of the landing, few serious problems are involved. Where a long overseas movement is required, however, the question of transportation of planes presents a serious problem.

b. The ideal arrangement involves the assignment of carriers to support the seizure and establishment of an advanced air base from which the main landing operation will be supported. The next alternative is the assignment of carriers for the aircraft supporting the landing operation. If carrier space does not permit of either of these plans, the planes might be stowed aboard carriers for initial launching only. Another plan would be to carry planes fully set up on auxiliary vessels of the train, launching to be effected by catapulting or by lowering planes into the water (seaplanes or amphibians). Another alternative, less desirable, is the selection of transports which permit planes to be stowed above and below decks almost completely set up. These planes might then be transferred to carriers for final assembly and launching. Least desirable is the method of transporting planes knocked down and crated; such aircraft are cumbersome, difficult to put into operation, and will not serve any useful purpose until a considerable beachhead has been gained.

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AERIAL MISSIONS

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606. General aerial missions.—Missions assigned will in general conform to those which the various types of aircraft are normally expected to perform. Situations will arise, however, in which it will be necessary to employ aircraft on other than the normal duties of the type. Aircraft supporting a landing operation may, subject to type limitations, be required to perform additional duties as set forth in this section.

607. Strategic reconnaissance.—Secures general information by visual observation and by photography of enemy land and sea areas before the main forces are in contact. The information thus secured influences the selection of the area and the allocation of forces for the operations which follow. These reconnaissance flights are carried out by single high-flying planes or by small formations of observation or scouting planes, at times amply escorted by fighters.

608. Tactical reconnaissance.—Secures, in the area selected for the operations, detailed information which will influence the tactical dispositions of the attacking force. Tactical reconnaissance usually begins when the landing is imminent and continues throughout the operation. The methods used are similar to those prescribed for strategic reconnaissance.

609. Battle missions.—Battle missions are special missions conducted during the actual landing and are normally performed by scout or observation type airplanes. These missions are of the following types:

a. Command missions are special flights executed under the direct orders of higher commanders of the landing force for the purpose of securing specific information or the verification of questionable information.

b. Liaison missions keep commanders informed of the location and needs of friendly troops.

c. Contact missions are special forms of visual reconnaissance limited to the period of actual ground combat and are concerned only with observing and reporting on advanced hostile elements.

d. Guide planes in landing operations may be assigned to direct the approach of assault units from the debarkation area to their respective beaches.

e. Artillery missions are those conducted in connection with the control of fire of field batteries or naval guns. This includes location of targets of opportunity, spotting, and reports of damage. Spotting formations employed will depend on the number of planes available, the character of the terrain, weather conditions, and enemy opposition encountered, and will be prescribed by the flight commander.

610. Smoke and chemicals.—Airplanes may be fitted with tanks for laying smoke or spraying chemicals as the tactical necessities of the situation may dictate.

611. Ground attack.—In the absence of specially trained and equipped units to function as ground strafing airplanes, fighters and light bombers may be employed in attacks against personnel and light material objectives by means of machine-gun fire, light bombs, and chemicals.

612. Parachute troops.—Special planes of suitable type, usually transport, may be required to drop groups of parachute troops behind enemy defenses for the purpose of seizing airdromes, vital communication centers, enemy headquarters, and for executing demolitions, sabotage, intelligence missions, or delaying actions.

613. Air troops.—Companies or battalions of air troops may be landed on enemy air fields to consolidate capture of important airdromes or to seize nearby strategic points. Air troops equipped with rubber boats may be used in a similar manner to effect surprise landings from seaplanes.

LANDING OPERATIONS DOCTRINE

SECTION III

AERIAL OPERATIONS PRELIMINARY TO LANDING

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614. Reconnaissance.—*a.* Loss of a certain degree of strategical surprise will usually result from a thorough preliminary reconnaissance. When the enemy situation, however, is obscure and the necessity for information of the terrain, hydrographic conditions, enemy defensive measures, and suitability of beaches outweighs considerations of the element of complete surprise, aerial reconnaissance will be highly advisable, if not mandatory. Troop commanders should when practicable, be given every opportunity to make personal aerial reconnaissances.

b. Orders to air units performing reconnaissance missions should clearly designate the type of reconnaissance desired, areas to be reconnoitered, information desired, areas to be photographed, type and number of photographs required, and time and place where reports of the missions should be made.

615. Photographic reconnaissance.—*a.* Any suitably equipped airplane, including VP and VCS types, may be employed for photographic reconnaissance. Employment of specially trained personnel is particularly desirable in operations of this nature.

b. Photographs and mosaic maps, together with a careful analysis of the information, will serve as a basis in drawing up final plans for the operation or in revising those already made. Airplanes flying at high altitudes may be able, under favorable conditions, to obtain the required data without revealing their presence or identity. In low-altitude work, every means should be adopted to complete the mission without sacrifice of secrecy. It will frequently be necessary to provide mosaic maps showing specified areas and objectives in detail. (See par. 506.) 522

c. Aerial photographs will be useful in checking information regarding the best channels of approach to beaches, location and character of defensive works, presence of obstacles, configuration of the ground at the beaches, and possibly, by comparison with photographs of known surf conditions, the amount of surf to be encountered. Some indication of depth of water and of underwater obstructions may also be gained by comparing views taken at low and high tides.

d. Oblique photographs, particularly those taken from seaward, will be valuable to boat group officers in identifying beaches, to troop commanders in planning operations on shore, and to gunnery officers in selecting targets and aiming points and planning the gunfire support.

616. Reduction of hostile defenses.—*a.* The hostile air force, whenever found, will be the first priority objective for all preliminary air offensives. This force represents the greatest potential threat to the attack, and its neutralization must be accomplished whatever the cost. The initial air superiority of the attacker must be exploited to the limit during this phase. Particular care must be taken to seek out and destroy air units on concealed airdromes; air base facilities of a permanent nature must be made untenable; and aircraft in flight must be intercepted and constantly harassed by a superior fighter force.

b. After the hostile air force has been neutralized, consideration can be given to the elimination of the next most important threats to the success of the landing. These are listed below in the usual order of priority:

- (1) Heavy gun emplacements.
- (2) Fortifications of a permanent nature.
- (3) Critical points in the line of communications inland.
- (4) Troop concentrations in the rear areas.
- (5) Logistical establishments.

c. Submarines and floating mines will be targets of opportunity, or secondary objectives, for all missions. Heavy gun emplacements, if located, will be primary objectives for dive bombing units until neutralized. The attack of beach defenses during the preliminary period will be unusual, as such practice would forfeit tactical surprise on that beach, and would accomplish little unless the defenses were fully manned. Rear area targets should be attacked during this phase, reserving the beach strafing until necessary to cover actual boat landings. Antiaircraft installations which menace the operation of reconnaissance airplanes should be neutralized during this period.

d. Air units engaged in attack missions in this phase of the operations should be particularly alert to observe enemy installations and activities and report them immediately upon return to

base or carrier. It is of primary importance that any additional information thus gained be forwarded at once to the Commander Naval Attack Force and the Commander Landing Force.

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AERIAL OPERATIONS DURING DEBARKATION

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617. Protection of the transport area.—*a.* To afford adequate protection to the vessels of the attack force during embarkation into small boats, access to the landing area must be denied the hostile air force; at least, all enemy aircraft entering the area must be effectively neutralized. This will not only entail control of the air in the vicinity of the transports and other vessels, through the use of a preponderance of fighting aviation and the coordinated support of the antiaircraft defenses, but will include attacking hostile aircraft on the ground to prevent their entry into action.

b. An additional menace during debarkation is the submarine. Search by scouting planes equipped with bombs for attacking submarines will minimize this hazard to a considerable extent. Battleship and cruiser aircraft, not required for gunnery observation, may be employed to establish an inner air patrol.

c. In planning the time of arrival in the transport area, consideration should be given to the disadvantages accruing to the attacker during darkness due to the greater difficulty of operating aircraft from ships as opposed to shore bases.

618. Reconnaissance.—*a.* Intensive and continuous reconnaissance of hostile defenses and shore establishments should be initiated prior to, or simultaneously with, the debarkation, or as soon thereafter as visibility permits. Particular attention should be paid to beach defenses, artillery positions, airdromes, and the location of the enemy general reserve. Definite knowledge of the enemy dispositions gained at this time is vitally important to all units and will exercise a material effect on the later employment of aviation, especially those units to be used for the purpose of (1) covering the landing when ships' gunfire lifts, and (2) employment against the enemy general reserve.

b. During this phase, adequate dissemination of new enemy information is vital. The communication channels to reach key commands must be adequate and carefully organized, and the location of their commanders must be known. The commander of the landing force, the fire support units, the air support units, and the combat teams are primarily interested.

619. Offensive.—*a.* Air attacks on shore objectives during debarkation of leading landing groups will normally be limited to destruction of hostile aviation at its airdromes, to supplementing ships gunfire in the neutralization of long-range guns, and to the destruction of defenses of a permanent or semipermanent nature. In night operations, searchlight batteries will be sought out and neutralized.

b. This is an advantageous period in which to land parachute troops and air infantry for seizing airdromes, communication centers, headquarters installations, and for executing delaying actions or demolitions.

SECTION V

AERIAL OPERATIONS DURING APPROACH TO THE BEACH

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620. General support.—General support furnished by fighting squadrons during the period when the small boats are en route from transport to beach is of utmost importance. The vulnerability of troops and supplies makes it imperative that protection against aerial attack during this period be positive and continuous. Fighting planes should operate to destroy or neutralize all enemy aircraft encountered and to furnish protection to friendly aviation operating in the general area. Fighting units assigned this mission patrol the transport and beach areas to protect the boat groups and friendly air operations from air attacks.

621. Use of smoke.—*a.* Smoke laid and maintained by airplanes may be employed to advantage in concealing the approach of the landing boats and in reducing the effectiveness of hostile fire. If employed, it should be maintained in sufficient quantities to blind the beach defenses and observation posts until the leading units have disembarked from the small boats and gained the beach.

b. It should be realized that smoke is extremely difficult to lay properly, usually requires fire from ships and boats to cease while being laid, deprives the attacker of observation of the shore, increases the difficulties of controlling boats, interferes with visual and pyrotechnic signals, and takes a number of planes from other tasks. Smoke should not be used on or near the beach, therefore, where an adequate number of naval vessels employing direct fire are available, as the observed fire of these vessels will usually constitute a better protection from enemy fire than smoke.

622. Laying of smoke screens.—*a.* In general, smoke should be laid near the shore, the ideal being reached when a continuous blanket is maintained at the beach line. This scheme is more effective than laying screens successively ahead of the advancing boats, but has the disadvantage of exposing the smoke planes to antiaircraft fire at close range, and, with an onshore breeze, requires a larger number of smokers. The danger from antiaircraft guns may be partially offset by continuous slight changes in altitude of the plane and by strafing the beach while the smoker is operating.

b. In laying smoke, the wind direction and velocity must be carefully considered and the point of initiation of the screen, as well as the course of the plane, must be carefully calculated. The duration of the screen, its drift during its period of usefulness, the frequency of repetition and its density during varying weather conditions, are all factors requiring consideration and analysis prior to take-off.

c. Smoke may be laid by means of chemical tanks or by bombs. Duration is dependent upon meteorological conditions; with high humidity and no wind, duration may be for a considerable period. (For technique and screen effects, see par. 839.)

d. The exact time for initiating a smoke screen should be left to the pilots charged with doing the work. The pilot should know the hour boats are scheduled to land so that he can be on station, but a schedule prescribing the exact hour and minute of laying the first screen is not advisable. The initial screen should be laid the instant boats are observed to be in their prescribed positions.

e. See also chapter VIII, section IV, Smoke.

623. Guide planes.—*a.* When, for a daylight landing, accurate surface navigation of the boat group is likely to become impossible due to a difficult approach course, poor observation of the shore line because of smoke, or other reasons, guide planes should be assigned to direct assault battalions to their designated beaches. When the beaches are not contiguous, one plane should be furnished for each beach. (See also par. 433*b*.) Identification of the plane may be established by any convenient means, usually by streamers, the position and number of which may be varied. Position and number of streamers afford more positive identification than color.

b. Several methods of operating a guide plane are feasible. One method involves flying continuously just in rear of the boat unit being guided. When it becomes evident that the course must be changed in order to land on the assigned beach, the plane should fly close to the guide boat and signal the necessary change by dipping the right or left wing, each dip indicating a change of direction of five degrees to right or left. Another method is to fly at low altitude from the center of the boat group toward the designated beach, and return, thus showing to boat officers the proper course to follow. Since this latter method requires the guide plane to fly in the area between the boats and the beach, it involves considerable danger to the aircraft from naval gunfire, fire from beach defenses, and fire from the boats. In any event, care must be taken by the plane to avoid the trajectory of naval gunfire.

c. It is highly desirable that unrestricted two-way communication be established between the guide plane and the battalion and boat group commanders. This would permit the detailed transmission of much vital information as to the progress of the leading troops at the beach and thus allow a prompt decision as to the landing of reserves and artillery, the guide plane continuing on contact, liaison, or strafing missions as directed. (For battle missions see par. 625 below.)

624. Support when ships' gunfire lifts.—*a.* A critical stage in the ship to shore movement occurs when ships' gunfire lifts; this may take place when the leading boats are 1,000 yards or more offshore. Commencing at this time, the advancing boats must receive intensive support from the aviation units. Planes employing machine guns and bombs must neutralize beach

defenses, antiboat guns, artillery, reserves, and possibly searchlights. It is highly important, when planning aircraft missions, to provide for a strong striking force for employment at this time, as aviation may be practically the only supporting arm during the period.

b. This mission, like laying of smoke screens, should not be previously laid out on an exact time schedule but should be left to the judgment of squadron commanders. Unless ships' gunfire ceases during the aircraft attacks, bombing and machine-gun firing must be done at such altitudes as will avoid the trajectories of gunfire from supporting vessels.

c. Further details for coordinating aircraft combat operations with ship's gunfire, especially counter-battery and close support of advancing infantry, are given in ~~paragraph 572~~ section IV, chapter V.

625. Reconnaissance.—a. Tactical reconnaissance of the enemy positions should be continuous throughout the various phases of the actual landing, paying particular attention to enemy troop movements and the location of his reserves. Planes assigned liaison, artillery, and contact missions will establish and maintain communication with the units they are supporting and furnish the commanders thereof with pertinent information.

b. The necessity for prompt and adequate dissemination of reconnaissance information is vital. (See par. 618b.)

c. Pilots and observers of planes assigned to command, liaison, and contact missions should be specially trained for these missions and must be thoroughly instructed in the detailed orders covering the operations of the landing force units. Furthermore, every effort should be made to keep intact the pilot-observer teams which existed during preparatory training.

626. Air spot.—When naval gunfire lifts from the beach to targets in the rear areas, the necessity for more spotting planes increases. Scattered targets in the rear areas place an increased burden upon spotting personnel. Reserve planes for this duty are normally available aboard the firing vessels of the attack force. Due to the inadvisability of breaking up the naval spotting team and also to the increased demand at this time for all available landing force air support, the aircraft of the Fleet Marine Force, if operating, should not ordinarily be employed for naval air spot.

SECTION VI

AERIAL OPERATIONS DURING THE ADVANCE INLAND

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627. Support near the shore line.—a. Field artillery cannot be landed until some ground in the vicinity of the beach has been gained. Meanwhile the fire from ships will be falling several hundred yards in advance of the troops. Aircraft must, therefore, continue to supplement the naval gunfire by providing intense close support of the troops during this phase. The missions assigned to aircraft in paragraph 624 above should continue in effect, particular attention being paid to the protection of the flanks of advancing troops.

b. Fighting planes (VF) continue to play an important role in clearing the air of hostile planes, but if not required for this purpose may be diverted to other missions. During the early stages of the advance inland, a large part of the air strength, in reality, assumes the fire missions usually assigned field artillery.

628. Support during advance from the beach.—a. As the seizure of the terrain progresses and field artillery comes into action, the employment of aviation reverts to the normal practices of land warfare, except that the ships of the attack force and the ship to shore lines of communication should continue to receive adequate protection.

b. During these operations certain specific duties are assigned to the various classes of the air component as follows:

(1) Observation units (VO or VS) will furnish gunnery observation and other tactical and strategical reconnaissance, and provide planes for battle missions. (See par. 625 above.) Particular attention will be paid to the enemy general reserve.

(2) Strafing units (VSB or attack) will destroy, immobilize, or delay hostile reserves, attack aircraft on the ground, neutralize antiaircraft defenses, and assist the advance of the infantry.

(3) Fighting units (VF) will furnish general and special support over the sea and land area occupied by the landing force, transports, and supporting vessels, and will provide protective escorts when needed.

(4) Bombing units (VT, VSB, or VB) will destroy hostile airdromes and aircraft on the ground, heavy artillery, lines of communication, transportation and supply centers, and other key points.

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AIR BASES

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629. Seaplanes.—Due to the many handicaps under which the seaplane operates, its employment in active operations involving aerial combat is undesirable. Where landing fields, however, are not available, and where it appears that runways cannot be constructed, it may become necessary to resort to the use of this type of plane. In selecting sea areas for seaplane operations, due consideration must be given to the size of the area, water conditions, protection, character of beaches, suitability of beaches for seaplane ramps, and anchorages.

630. Landplanes.—*a.* For the operation of landplanes, large level areas must be made available. In order to operate airplanes efficiently from such fields, there should be available thereat stores of gasoline, aviation and ordnance material, sufficient for more or less protracted operations. Landing fields so equipped are referred to as airdromes.

b. Temporary airdromes should be established ashore as soon as the landing force has gained possession of the necessary terrain. A preliminary study of maps and aerial photographs, combined with later visual reconnaissance, will prove advantageous in the selection of possible locations. Preparation of selected fields should be accomplished without delay. As the advance inland progresses, temporary airdromes may be expanded into a more permanent status and facilities gradually increased.

c. Auxiliary airdromes, intended primarily for the greater dispersion and more effective concealment of aircraft while on the ground, are important from the standpoint of preventing undue losses, as well as for providing facilities for the operation of additional units. They should be near enough to the main airdrome to permit centralized tactical control and yet sufficiently distant to avoid congestion.

d. A judicious use of alternate airdromes, in connection with the skillful use of camouflage and dispersion, together with the shuttling of units from one airdrome to another, will tend to deceive the enemy and greatly lessen the hazard of aerial attack and artillery fire. The early provision of alternate airdromes is advisable, and especially so prior to the time that adequate antiaircraft defenses are established ashore.

e. As the landing force progresses inland, advanced landing fields, when suitable sites are available, will permit command planes to be held in constant readiness for the use of higher commanders. If conveniently located with respect to command posts, advanced landing fields will greatly facilitate communication between observation planes and ground units and between the various command posts when other means of communication break down.

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COMMUNICATIONS

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631. Radio.—Every airplane should be equipped with radio capable of being used in two-way telephonic and telegraphic air-ground and interplane communication; each plane should also be fitted with a direction finder. Aircraft, particularly those engaged in reconnaissance and spotting missions, should be able to communicate direct with radio stations of ground units concerned, and also with transport and supporting ships. Necessary frequencies will be assigned by the commander attack force. (See ch. VII, Communications.)

632. Searchlights.—Signals by searchlight code are standard naval practice. The use of this system, however, is more or less limited and is recommended only in case of radio silence or emergency. (See ch. VII.)

633. Panels.—Ground panels are extremely useful for identifying ground units, for marking front-line positions, and for transmitting messages to planes. Coupled with message drops, the panel system is a very efficient means of two-way air-ground communication. (See ch. VII.)

634. Message pick-ups and drops.—This method of communication will be most useful in connection with command posts that are not equipped with radio. When lengthy or involved messages must be exchanged, this system offers many advantages. (See ch. VII.)

635. Pyrotechnics.—Signals by pyrotechnics are limited in number and use. They are employed principally for simple prearranged messages, acknowledgments, and distress warnings. (See ch. VII.)

636. Air-ground code.—The current air-ground code (U. S. Marine Corps) which covers general and detailed instructions relative to air-ground communication, should be furnished not only to units of the Fleet Marine Force, but to naval pilots as well. (See ch. VII.)

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REQUIREMENTS IN BOMBS

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637. Fragmentation bombs.—*a.* In determining the number of fragmentation bombs required for missions against personnel, the 100-yard square is used as a basis and the effect desired is computed in terms of 75 mm shells. ~~as described in section III, chapter V.~~ A consideration of the relative characteristics of the 75 mm shell (weight 15 pounds) and the 30-pound fragmentation bomb indicates that the effect against exposed personnel of a pound of bomb is roughly equivalent to the same weight in a 75 mm shell. This may be expressed by the formula

$$1 \text{ 30-pound fragmentation bomb} = 2 \text{ 75-mm shells}$$

b. This is not a mathematically exact formula, but is an estimate which may be used as a basis for planning. Due allowance must of course be made for the percentage of bombs which fall outside the desired area and the total number dropped should be increased accordingly.

638. Chemical bombs.—Requirements in chemical bombs are covered in paragraph 832.

639. Demolition bombs.—Demolition bombs should be employed solely against material objectives. Aside from the possible moral effect due to noise and concussion, the use of such bombs against personnel may be expected to produce less result than a corresponding weight of fragmentation bombs.

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CHAPTER VII

COMMUNICATIONS

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SECTION I

GENERAL

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701. Scope.—This chapter deals only with those phases of naval communication which are directly involved in a landing operation and which differ from, or are in addition to, normal naval and military communication requirements.

702. Communications in landing operations.—Landing operations present problems in communication which differ in many respects from those encountered in other types of fleet or field operations. The large number of task groups involved in a landing operation places a heavy burden on all communication agencies. The necessity of coordinating and linking communication systems afloat and ashore requires careful planning and consideration of the operation as a whole. Special training is required and additional personnel must be provided for certain activities not elsewhere encountered, such as, for example, the control of naval gunfire from the shore. The nature of the operation is such that great dependence must be placed on the communication system; adequate and efficient communications are prerequisite to success.

703. Communication officer of landing force.—The communication officer of the landing force has the same status as the communication officer of any task group within the attack force. He should consult with the communication officer on the staff of the attack force commander in the preparation of the communication plan for the landing force. He should also be prepared to advise the communication officer on the staff of the attack force commander with regard to communication requirements not normally encountered in naval operations, but which should be included in the attack force communication plan.

704. Personnel, additional.—The attack force communication plan must make provision for furnishing the additional communication personnel required. Additional radio operators and visual signalmen may be necessary, as follows:

- On transports.
- On control vessels.
- By boat group, boat division, and wave commanders.
- By the beachmaster.
- By fire control parties ashore.

705. Equipment, additional.—*a.* The attack force communication plan must make provision for the procurement and proper distribution of signal matériel not normally provided, for example:

- Radio sets for boats, for vessels of control group, for beachmaster, or fire control parties ashore, and for transports.
- Pyrotechnics for boats and for control vessels.
- Designating flags or lights for control vessels.
- Semaphore and guide flags for boats.
- Blinker tubes for boats.

Portable signal searchlights for the beaches.

Air-ground code and panels for fire control parties ashore.

Portable telephones with breast reel and wire for fire control parties ashore.

b. All signal matériel required for the operation should be distributed to the proper units prior to the arrival of the attack force in the landing area.

706. Utilization of signal agencies.—All practicable communication systems and agencies must be installed and the utilization of no agency should be neglected. Intelligent management of the system and equalization of the traffic load between the various agencies will increase the efficiency of communications. The most rapid methods should be employed for transmitting dispatches of the highest priority.

707. Parallel systems.—Communication plans should make provision for placing separate systems on parallel channels. Where two such separate systems are installed, the failure of one system will still leave the alternative system available. The above principle is fundamental, and can only be disregarded at the risk of a complete failure of communications. When within visual range, for example, visual methods should parallel radio and wire. Even though radio, wire, and visual communication has been established between adjacent beaches, it is desirable also to establish a messenger boat service.

708. Reduction in traffic.—A reduction in communications of all kinds both before and during the landing operation is essential for the smooth execution of the operation and as a measure of security against enemy intelligence. This applies particularly to radio telegraph and telephone, as they are the most vulnerable to enemy intercept and goniometric activities. Well-planned, detailed operation and communication plans and orders will do much to obviate the necessity of later communications. In particular, an operation schedule, as prescribed in paragraph 227 will permit the various phases of the operation to be conducted with a minimum of communications.

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SHIP TO SHORE MOVEMENT

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709. Requirements.—During the ship to shore movement, in addition to the normal naval communication requirements between the task groups of the attack force, communication must be maintained between—

Boat group, wave, and boat division commanders.

Boat group and wave commanders, control vessels, and attack force commander.

Wave commanders and guide planes.

Control vessels and fire support groups.

Attack force commander and aircraft engaged on important reconnaissance missions.

710. Communication within the boat group.—*a. Visual.*—Communication between boat group, wave, and boat division commanders is normally direct by means of visual methods. Wave and boat group commanders should be provided with visual calls to enable them to communicate more readily with control vessels. Trained signal personnel should be provided for this purpose. It should not be necessary to assign visual calls to boats and boat divisions, as they will use boat formation signals (ch. IV, sec. VII).

b. Boat formation signals.—These signals do not require a trained signaller for sending and receiving (ch. IV, sec. VII).

c. Radio.—Portable radio equipment for use in boats during the movement from ship to shore should be limited to such installations as are indispensable. Placing a considerable number of radio sets in boats may result in a dispersion of trained radio personnel at a time when it is important to keep such personnel concentrated and available for other use. Two types of radio installations may be used in boats, as follows:

(1) *Super-high-frequency telephony.*—Radiotelephone equipment, operating on frequencies lying generally between 30 and 80 megacycles may be used. Such frequencies are, in general, effective when using low-power apparatus over distances up to 5 miles. Equipment of this kind is more suitable for communicating over water surfaces than over land. Land masses and inter-

vening ships between stations tend to prevent reception. Radiotelephone equipment may be advantageously installed in the boats of each boat group and wave commander, and on control vessels.

(2) *High-frequency telegraphy.*—It is practicable to install in ships' boats portable field radio sets such as are used by the various units ashore. Suitable frequencies for this purpose are approximately 3 megacycles and higher. Difficulties of installation are encountered with lower frequencies due to the greater length of antenna required.

d. Messenger boats.—High-speed messenger boats, if available, will be very valuable, especially for intergroup communication.

711. Communication between boat group, control vessels, and the attack force.—*a.* The methods normally used for communicating between the above-named elements are as follows:

(1) Two-way communication between boat group or wave commander and control vessel: Semaphore, blinker tube, radiotelegraph, super-high-frequency telephone, and messenger boat. Additional means from control vessel only: Searchlight, flag hoist, dipping of designating flag, blinking of identification lights, and blasts on whistle. (See pars. 431 and 432.)

(2) Between control vessels and the attack force commander: Radio, searchlight, and flag hoist. Communication between control vessels and the attack force commander should be direct, when possible.

b. A heavy communication burden is thrown on the vessels of the control group during the ship to shore movement, particularly in the case of the flagship of the control group commander. The vessels of this group must maintain radio and visual communication with fire support groups, boat group commanders, with other vessels of the control group, and with the attack force commander. As destroyers or mine sweepers, which are particularly weak in communication facilities, will often be used for this duty, it will usually be necessary to provide them with additional equipment such as portable radio or portable super-high-frequency telephones. It is important that fire control be kept on a separate circuit from tactical communications. Communication by radio should be kept at a minimum, the maximum use being made of visual.

c. Because of limitations of equipment and personnel on board the various ships, and in order fully to utilize the equipment on board all vessels, the attack force commander may charge certain ships, other than his flagship, with responsibility for maintaining contact with control vessels, and with the beaches.

712. Communication between control vessels and fire support groups.—Communication between control vessels and designated fire support groups is by radio and visual. In order that fire control signals may be handled promptly, the control vessel should communicate direct with the fire support group rather than through the control group commander or attack force commander.

713. Communication between attack force commander and aircraft.—The attack force commander will communicate direct by radio with aircraft engaged on important reconnaissance missions or on any mission concerning which the attack force commander desires immediate information.

714. Pyrotechnic signals.—*a. Lifting gunfire.*—(1) Although gunfire is placed on the beaches in accordance with a time schedule and is observed and verified from the firing ships and control vessels, it is necessary to have an emergency pyrotechnic signal meaning "Lift fire" that can be made by the leading wave. This signal would be used if the leading boats were about to run into the salvo pattern of the gunfire directed at the beach.

(2) The signal "Lift fire" is normally made when directed by the commander of the leading wave and should be immediately relayed to the firing ships and control vessels by succeeding waves of the same boat group.

b. Exploiting success.—(1) Units embarked in boats approaching the beach in the second and succeeding waves must have immediate notification of the success or failure of units that have preceded them. Such knowledge is necessary to enable succeeding waves to exploit a successful landing, and to avoid landing at localities that have proven disastrous to their predecessors. Intelligence of this nature is most readily and reliably conveyed by pyrotechnic signals and by beach flags or lights.

(2) Each rifle platoon in an assault battalion will, upon reaching the beach, fire the prescribed pyrotechnic signals indicating whether or not the landing has been successful. (See par. 726, following.) The firing of the signal indicating that the landing has not been successful will be controlled by an officer. In assault platoons, the pyrotechnic signals may be made by the support group, and as directed by company and battalion commanders.

(3) In addition to the above, each rifle platoon, upon landing, should plant a flag in the ground at its landing place. Suitable lights may be used in lieu of flags or pyrotechnics at night.

SECTION III

COMMUNICATION BETWEEN SHIP AND SHORE

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715. Normal radio channels.—*a.* During the early stages of a landing operation and until the necessity therefor ceases to exist, landing force unit commanders ashore will communicate direct by radio with their superior landing force commanders and rear echelons afloat. The latter will be provided with ship's radio equipment for this purpose, if available. Otherwise ships will provide adequate sheltered space in which portable radio equipment may be installed, together with necessary fixed antennas. Direct communication is also maintained between fire support ships and their fire control parties ashore.

b. The beachmaster maintains radio communication with naval commanders afloat which may be used as an alternate channel by which landing force unit commanders can relay dispatches to units afloat in event of failure of their direct channels of communication. During the later stages of a landing operation, as the necessity for direct ship-shore landing force communications ceases to exist, the beach becomes the dividing line where dispatches from forward units are delivered to the naval communication system, and vice versa.

716. Shore party communications.—*a.* In the chain of communications between ship and shore, except as noted in paragraph 715 above, the message center of the shore party is the agency on the beach which communicates directly with units of the landing force ashore. This message center communicates also with Marine units on adjacent beaches. For purposes of liaison and quick transmission of messages it should operate near the beachmaster.

b. The installation of the shore party's message center and of all wire communication between agencies of the shore party will be established by the shore party. Where sufficient personnel and material cannot be assigned permanently to shore parties, communication personnel and material of the most available units may be utilized.

717. Beachmaster.—Communicates by radio, visual, and messenger-boat systems with all commanders afloat, and with adjacent beaches through shore party message center. Also communicates direct with adjacent beach.

718. Channels of communication.—*a.* Provision should be made for separate and distinct channels for handling the two general classes of dispatches that will be encountered. These two classes of dispatches relate to subject matter concerning:

Gunfire support.

Operations and administration.

b. The communication system must be so flexible and adaptable that when necessary dispatches of either class may be routed expeditiously over channels normally devoted to the other. If the gunfire support channel becomes inoperative or congested, priority should be given over the other channel to dispatches relating to gunfire support.

719. Beachmaster's communication agencies.—*a.* The communication agencies at the shore party message center available to the beachmaster are as follows:

Radio.

Visual.

Messenger boat.

Linking vessels.

Message center and messengers.

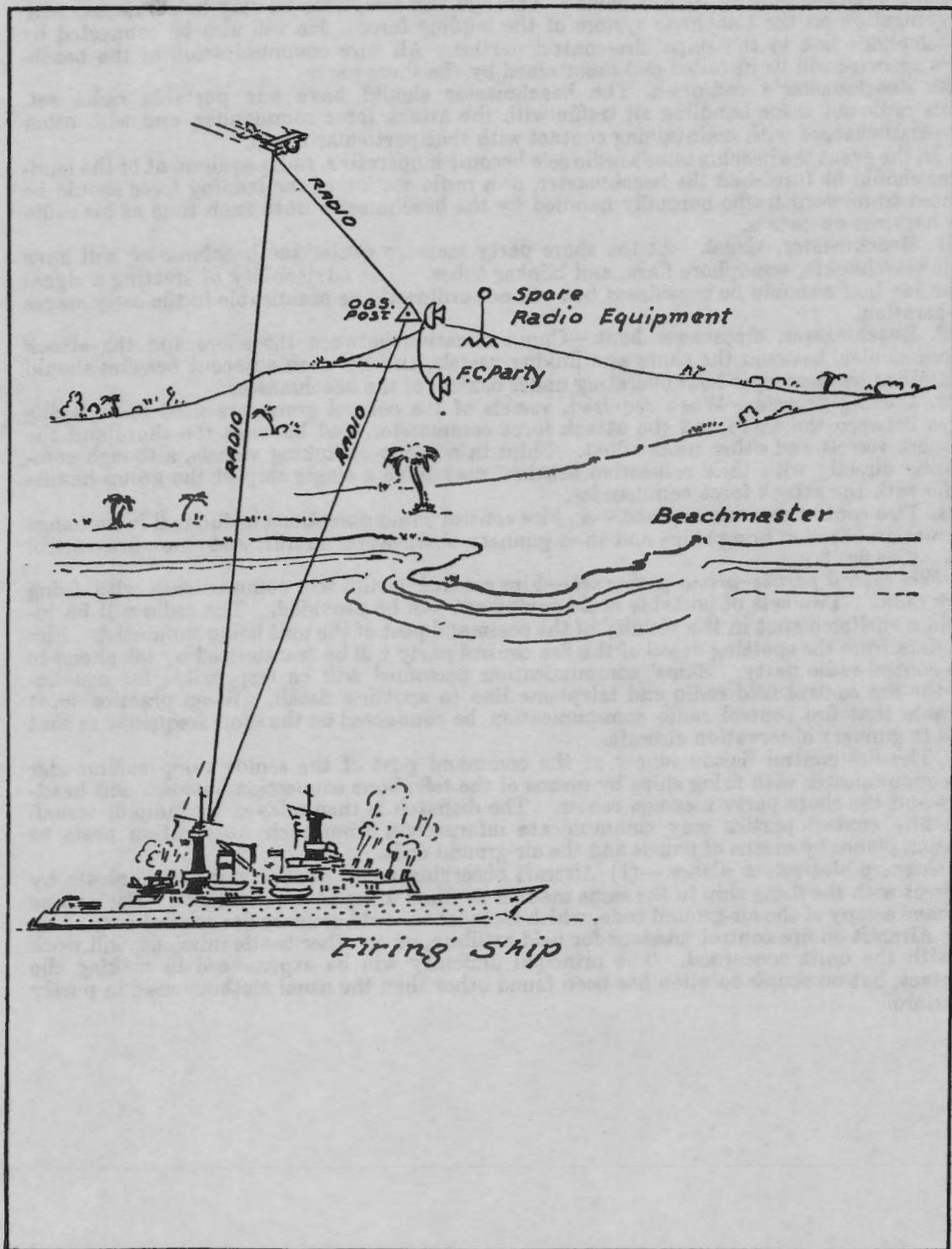


FIGURE 1.—Fire control communications.

b. In addition to the foregoing, the beachmaster will be connected with the shore party commander's message center by telephone. Through this telephone he may be connected with any organization on the telephone system of the landing force. He will also be connected by direct telephone line to the ships' fire-control parties. All wire communication of the beachmaster's agencies will be installed and maintained by the shore party.

720. Beachmaster's radio.—*a.* The beachmaster should have one portable radio set. This radio set is for handling all traffic with the attack force commander, and with other naval vessels charged with maintaining contact with that particular beach.

b. In the event the beachmaster's radio sets become inoperative, radio equipment of the landing force should be furnished the beachmaster, or a radio station of the landing force should be designated to forward traffic normally handled by the beachmaster until such time as his radio station becomes operative.

721. Beachmaster, visual.—At the shore party message center the beachmaster will have portable searchlights, semaphore flags, and blinker tubes. The advisability of erecting a signal mast for flag hoists should be considered but will not ordinarily be practicable in the early stages of an operation.

722. Beachmaster, messenger boat.—Communication between the shore and the attack force commander, between the shore and linking vessels, and between adjacent beaches should be maintained by messenger boat operating under control of the beachmaster.

723. Linking vessels.—When required, vessels of the control group are used for relaying messages between the shore and the attack force commander, and between the shore and the fire support vessels and other units afloat. Ships in a group of linking vessels, although communicating directly with their respective beaches, may have a single ship of the group handle all traffic with the attack force commander.

724. Fire control communications.—*a.* Fire control communications include all interchange of information between firing ships and their gunnery observation aircraft and shore fire control parties. (See fig. 1.)

b. Fire control parties—primary channel.—Fire control parties will communicate with firing ships by radio. Two sets of portable radio equipment will be provided. The radio will be installed in a sheltered spot in the vicinity of the command post of the unit being supported. Fire control data from the spotting detail of the fire control party will be transmitted by telephone to the fire control radio party. Ships' communication personnel will be responsible for installation of the fire control field radio and telephone line to spotting detail. When practicable, it is desirable that fire control radio communication be conducted on the same frequency as that assigned to gunnery observation aircraft.

(1) The fire control liaison officer at the command post of the senior troop commander ashore communicates with firing ships by means of the telephone connection between unit headquarters and the shore party message center. The dispatch is then relayed by radio or visual.

(2) Fire control parties may communicate information from their observation posts to observation planes by means of panels and the air-ground code.

d. Gunnery observation planes.—(1) Aircraft observing naval gunfire will communicate by radio direct with the firing ship in the same manner as when firing at naval targets. Each plane should have a copy of the air-ground code, which includes the field artillery fire control code.

(3) Aircraft on fire control missions for field artillery, or on other battle missions, will work direct with the units concerned. The principal difficulty will be experienced in making the first contact, but no simple solution has been found other than the usual methods used in purely land warfare.

LANDING AND FIRE-CONTROL FREQUENCY ALLOCATION (Sample)

Unit	Call (illustrative)	Kilocycles (illustrative)									
		3000	3200	3400	3600	3800	4500	33000	35000	37000	39000
ATFORCOM (<i>Argonne</i>)	C5Y					X	X				
CG, FMF, afloat (<i>Argonne</i>)	M8W					X	X				
CG, FMF, ashore	M8W					X					
<i>Oklahoma</i> , Fire Sup Gr 1	NADN	X									
<i>Nevada</i> , Fire Sup Gr 2	NADK		X								
<i>New York</i> , Fire Sup Gr 3	NADT			X							
<i>Texas</i> , Fire Sup Gr 4	NADV				X						
Obs plane <i>Oklahoma</i>	13E	X									
Obs plane <i>Nevada</i>	19F		X								
Obs plane <i>New York</i>	23L			X							
Obs plane <i>Texas</i>	27P				X						
<i>Barry</i>	Control and linking ships	X						X			
<i>Humphreys</i>			X						X		
<i>Sands</i>		X								X	
<i>Lawrence</i>			X								X
Fire-control party A	W1A	X									
Fire-control party B	W2B		X								
Fire-control party C	W3C	X									
Fire-control party D	W4D		X								
Beachmaster A	X1A						X				
Beachmaster B	X2B						X				
Beachmaster C	X3C						X				
Beachmaster D	X4D						X				
Boat Gr Comdr A	Y1A							X			
Boat Gr Comdr B	Y2B								X		
Boat Gr Comdr C	Y3C									X	
Boat Gr Comdr D	Y4D										X
Wave Comdr A	Z1A							X			
Wave Comdr B	Z2B								X		
Wave Comdr C	Z3C									X	
Wave Comdr D	Z4D										X

Calls and frequencies indicated are merely illustrative.
It is assumed that the normal naval frequency plan provides or communication between the attack force commander and vessels of the control group.

FIGURE 2.—Sample frequency allocation for the ship-to-shore movement and control of ships' fire.

725. Radio frequency allocations.—*a.* Figure 2 is a sample table showing radio frequency assignments in a landing operation. It does not include frequency requirements for communication between task organizations of the attack force, nor does it include the frequency requirements for radio communication between elements of the landing force ashore. In figure 2, it is assumed that Fire Support Group 1 supports first a landing on beach A and then shifts fire to

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support a landing on beach C. While firing in support of beach A the *Oklahoma* works on 3000 kilocycles with its gunnery observation plane, control vessel for beach A (*Barry*) and, after the landing, with the fire control party and beach party on beach A. Later, when firing in support of beach C, the *Oklahoma* works on 3000 kilocycles with the corresponding units at beach C. Similarly, Fire Support Group 2 supports successively beaches B and D. Fire Support Groups 3 and 4 are engaged in counterbattery in enemy rear areas, requiring plane spot.

b. The Navy communication plan should make adequate radio frequency allocations in accordance with current fleet frequency plans for use by the landing force ashore. The frequency requirements will depend on the size of the force and the nature of the operation. Figure 3 shows an example of the frequency requirements of a marine infantry division.

LANDING FORCE FREQUENCY ALLOCATION

Organization	Call	Kilocycles															
		3800	2200	2000	2900	3900	4000	4100	4200	2300	2400	2500	2700	2800	3000	3100	6000
ATFORCOM	C5Y	x															
1st Division	A3D	x	x	A									X	A	X	A	
1st Marines	O9Q		x	A	x	A											
1st Bn	A1Z				x	A											
2d Bn	G3L				x	A											
3d Bn	A7U				x	A											
5th Marines	D1F		x	A			x	A									
1st Bn	C5M						x	A									
2d Bn	C9G						x	A									
3d Bn	G3F						x	A									
7th Marines	A6C		x	A					x	A							
1st Bn	G5K								x	A							
2d Bn	G7D								x	A							
3d Bn	M2G								x	A							
11th Marines	A1W		x	A							x	A					
1st Bn	C6P										x	A					
2d Bn	C1L										x	A					
3d Bn	D1K										x	A					
4th Bn	F3M										x	A					
1st Sp W Bn	F5J	(See note 3)															
1st Amph Bn	A2Y	(See note 3)															
1st Scout Co	B1A	(See note 3)															
1st Tank Co	B2B												x	A			
3d Tank Co	C7D												x	A			
1st Mar Air Wing	B6U														x	A	
1st Mar Air Gp	B7L															x	A
Airon	D7Q															x	A
Airon	A9C															x	A
2d Mar Air Gp	C3W															x	A
Airon	M3Y																x
Airon	B5T																x
Inf Com Plane	F2T	(See note 4)															
Inf Lia Plane	G7L	(See note 4)															
Arty Plane	M3L	(See note 4)															

NOTES

1. X—Primary frequency; A—Alternate frequency.
2. Calls and frequencies indicated are merely illustrative.
3. The Special Weapons Battalion, Amphibian Battalion, and Scout Company are assigned frequencies and work in radio net of unit supported or to which attached.
4. Command, liaison, and artillery planes use frequencies assigned to units with which working.
5. Channels for units equipped with ultra-portable radio sets are assigned in a manner similar to the above.
6. Frequencies and channels for subordinate battalion and company radio nets are assigned in a manner similar to the above.

FIGURE 3.—Illustrative frequency allocations for units of a Marine Infantry Division.

726. Pyrotechnic code.—It is essential that pyrotechnic signals be restricted to the transmission of information of the highest priority. The following pyrotechnic code is given as an example of suitable signals to convey meanings for which provision must be made in the code:

"Landing successful" or "Reached objective"—white star parachute.

"Firing falling short" or "Lift fire"—red star cluster.

"Landing not successful"—red position light.

Position lights are burned on the ground, in a boat, or on a float. The other signals are projected into the air by a ground signal projector.

SECTION IV

INITIATION OF THE SHORE COMMUNICATION SYSTEM

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727. Platoons.—*a.* Platoon commanders, upon landing, will leave one runner on the beach to report to the company commander. This runner must know the direction in which the platoon advanced when it left the beach, and must be prepared to give the company commander all pertinent information concerning the platoon.

b. Each rifle platoon of assault battalions will, upon landing, plant a flag on the beach where it can be seen from seaward. The number of such flags in a row will show the number of platoons that have succeeded in landing on that beach. Screened lights, if available, may be similarly used at night.

728. Companies.—Company commanders, upon landing, will leave two runners on the beach to report to the battalion commander. Such runners must know the direction of the advance of the company headquarters and must be prepared to give the battalion commander all pertinent information concerning the company. At night, or if advancing in brush, platoon and company headquarters will mark the route of their advance with tape to facilitate messenger communication with the beach. Messenger routes of battalions and larger units ordinarily follow wire lines.

729. Battalions.—*a. Command posts.*—Battalion commanders will, upon landing, set up their command posts as soon as practicable. A staff officer and two runners will be left at the beachmaster's headquarters to report to the regimental commander as soon as he lands.

b. Battalion wire circuits.—(1) A wire circuit will be pushed forward following the progress of the attack. This circuit is provided to maintain communication between successive locations of the battalion command post, and the message centers of the beach and shore parties. An additional wire circuit should, if necessary, as when separated by an appreciable distance, be run from the battalion command post to the fire control party to enable the battalion commander to communicate with the fire control party without interfering with any fire control communications.

(2) A direct line will also be laid from the headquarters of the beachmaster to the successive locations of the naval fire control party. This is a task for the communication detail of the shore party. Where sufficient personnel and material cannot be provided permanently for shore parties, however, orders for the operation may assign this task initially to the battalion. If this circuit follows the battalion wire axis its maintenance will be facilitated.

c. Forward message center.—Each battalion commander keeps his company commanders informed of the most forward location where messages may be delivered to the battalion communication system. This location forward of the command post is known as the forward message center. It is on the battalion axis of signal communication. A wire circuit is run to the forward message center as soon as possible. Pending the installation of the wire circuit, messages are delivered from the forward message center to the command post by runners placed at the forward message center for this purpose, or by ultra portable radio.

d. Air-ground liaison.—Messages dropped from planes are normally received by units down to and including the battalion. In an emergency, or by prearrangement, messages may be dropped to any unit or detachment. The message dropping ground is used also for display of

LANDING OPERATIONS DOCTRINE

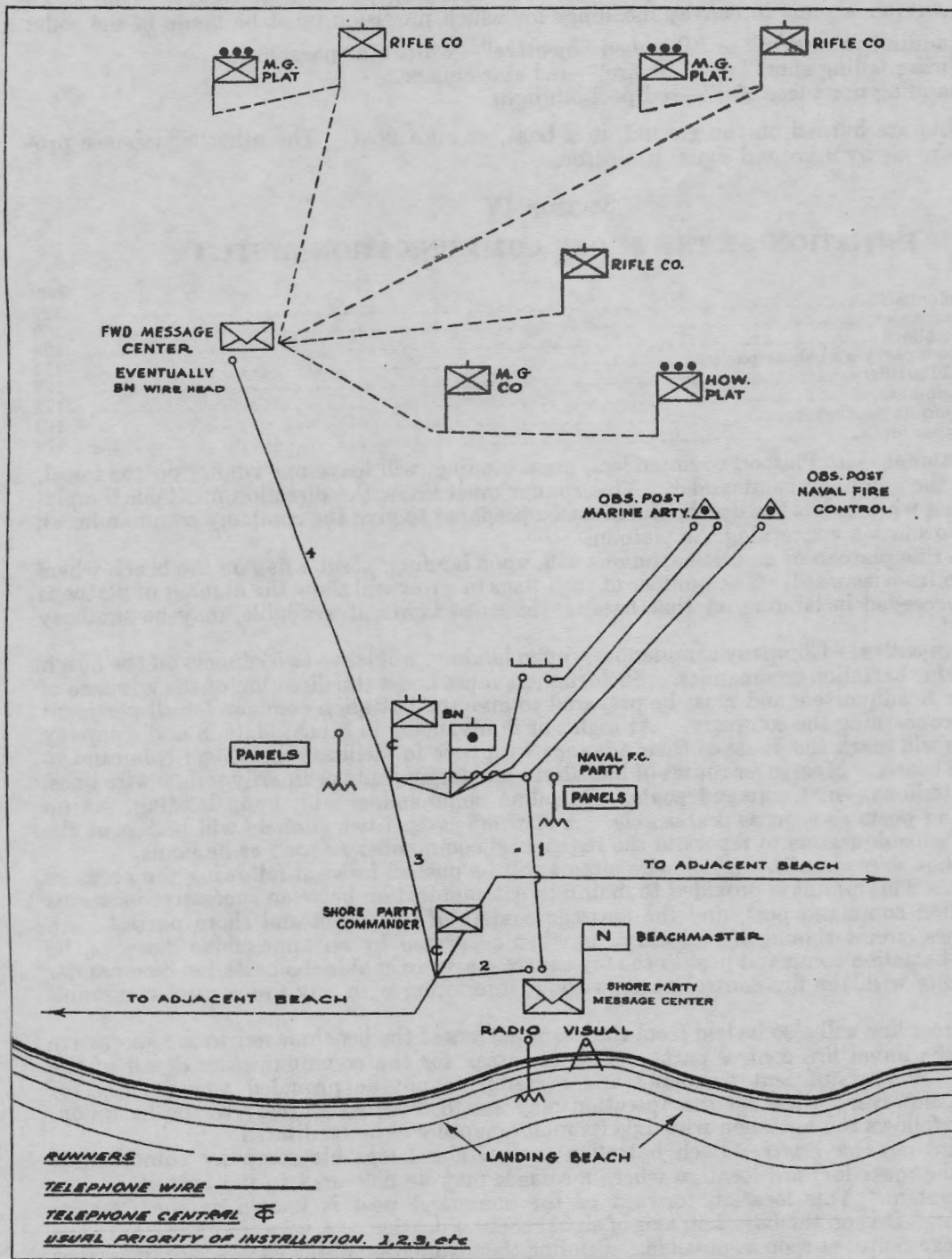


FIGURE 4.—Initial communication system on a beach.

panels and is located in an open space so that panels can be seen by planes at wide angles from the vertical. The air-ground code prescribes the signal to be made by a plane as a call for the display of identification panels. By panel signals from the air-ground code a plane may be notified that the troops on the ground have a message to be picked up. The air-ground code is part of the prescribed equipment for Marine Corps organizations and it should also be furnished to all naval pilots taking part in a landing operation. It contains general and detailed instructions relative to air-ground communications.

730. Shore party.—*a.* The communication detail of the shore party, upon landing, establishes radio, visual, and messenger boat communications with the vessels designated. It also establishes messenger boat communication with adjacent beaches, and radio and visual communication with such beaches where practicable.

b. The communication detail of the shore party is also responsible for establishment and maintenance of communication between the shore party commander and the beachmaster whenever the distance between these two activities makes it necessary.

731. Field artillery.—The establishment of field artillery communications after a landing does not differ from normal procedure at any other time, except that every effort should be made for adequate communication with the naval fire control party ashore. This may be accomplished by having the observation posts of the two gunfire agencies close together, or connected by a circuit laid by the field artillery.

732. Regiments.—It is usually advisable for regiments to send a small detail of signal personnel and a limited amount of signal equipment with each shore party. These men will familiarize themselves with the battalion communication installations, and will make arrangements to take over, without interruption, the wire circuits connecting battalions and observation posts to the beach. When the regiment lands, this regimental communication detail with the shore party should revert to the regimental communications officer. The battalions should then be relieved of responsibility for communications to their rear.

733. Adjacent beaches.—In addition to the messenger boats to adjacent beaches mentioned above, such beaches are interconnected by wire lines. Field wire, if in good condition, will operate satisfactorily for periods of a week or longer while submerged in water. Where the terrain and enemy activity prevent wire being laid overland, wire connecting adjacent beaches may be laid from boats. The responsibility for connecting adjacent beaches by wire should be placed on specific units. The regiment is ordinarily better able than the battalions to establish wire communication between beaches, and should normally be directed to make such installation.

734. Higher units.—Units higher than the regiment should, prior to landing, send a detail of signal personnel ashore to become familiar with the communications already installed. This detail should make plans so that the higher unit can, upon landing, take over its normal duties in the communication system without delay.

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CHAPTER VIII

FIELD ARTILLERY, TANKS, CHEMICALS, AND SMOKE

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SECTION I

FIELD ARTILLERY

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801. Field artillery in landing operations.—*a.* The employment of field artillery in the early stages of a landing operation differs from that of ordinary land warfare in the following essential features:

(1) In land warfare field artillery fires all preparatory and supporting fires. In a landing operation, all fire is executed by ships' guns until field artillery is ashore and is prepared to reinforce the ships' fire or take over certain fire missions.

(2) Due to difficulties in transporting and landing guns and ammunition, the amount of field artillery available in a landing operation will usually be less than in a land warfare operation on a corresponding scale. This factor may require ships' guns to continue on certain fire missions during all or a large part of the operation. Careful coordination of field artillery and ships' gunfire is required.

(3) On land, field artillery can usually go into position anywhere along its route and open fire as soon as it comes within range. In a landing operation, the initial movement is by boat, and field artillery must reach the beach before it can go into action. This factor, together with the necessity of reinforcing or relieving naval guns at the earliest possible time, makes it necessary to employ field artillery in a landing operation with greater boldness than in land warfare. However, as field artillery is particularly vulnerable to direct fire from machine guns and other infantry weapons, it may often prove disastrous to land the guns or howitzers before the infantry has had an opportunity to make the landing beach reasonably secure from such fire. Some provision as to the time of landing of artillery which will reconcile the above factors should, therefore, always be made.

(4) In offensive operations on land, field artillery can coordinate its fire with the advance of the infantry at the beginning of the attack by means of the line of departure, and when batteries displace forward to follow the progress of the attack, they can utilize fire data obtained from rear batteries. In a landing operation, the field artillery goes into action after the attack is well underway, requiring the most careful planning and coordination for the prompt execution of close supporting fires without danger to friendly troops.

(5) Due to the impracticability of exercising centralized control of artillery units throughout the periods of embarkation, debarkation, and landing, the bulk of the field artillery, in the movement overseas and during the initial phases of a landing operation, will usually be attached to

infantry units (brigades, regiments, or battalions). This necessarily reduces flexibility in the utilization of artillery fires and makes more difficult the concentration of a number of batteries on important objectives. As soon as the situation on shore permits, field artillery units should revert to the command of artillery battalion, regimental, or brigade commanders.

(6) In the early phases of a landing operation, field artillery units will have little if any motor transportation available on the beach. This will necessitate the movement of guns, equipment, and ammunition, and the laying of wire, largely by hand. As hand displacement of guns and ammunition is seldom practicable for the distances necessary for any appreciable tactical advantage, such hand displacement will usually be limited to placing the weapons in firing positions in the vicinity of their landing beach.

b. The above considerations are discussed in more detail below.

802. Types of field artillery.—*a. Light artillery.*—Light artillery includes all guns and howitzers of 105-mm caliber (4.13 inches), or smaller. The following are the most suitable light artillery weapons for employment in a landing operation, listed in the order of desirability:

75-mm pack howitzer.

3-inch mountain guns.

75-mm gun.

b. Medium artillery.—Medium artillery includes the 155-mm howitzer. This weapon is too heavy for use in the early phases of a landing operation, but once landed, could be used to advantage in later attacks on shore.

c. Heavy artillery.—Heavy artillery includes the 155-mm gun, and all guns and howitzers of larger caliber. Heavy artillery is used principally in base defense, but the 155-mm gun may under favorable conditions be landed sufficiently early to be utilized in the later phases of an offensive operation.

d. Antiaircraft artillery.—(1) Although not considered field artillery, the 3-inch antiaircraft guns and their complementary 50-caliber antiaircraft machine guns are the most suitable antiaircraft weapons for the type of operations under consideration. While intended primarily for base defense, these weapons may be utilized in offensive operations to furnish antiaircraft protection to rear establishments and, in some situations when terrestrial targets are within range, to augment the light artillery on certain missions.

(2) Antiaircraft gun batteries are designed for protection against high-altitude bombing and, after establishment on shore, may be coordinated with any antiaircraft guns on ships in the area.

(3) Antiaircraft machine guns (50 caliber) are for protection of rear establishments against low-flying aircraft. Some of these machine guns should be landed with the leading boat groups and set up near the beach to protect rear echelons of our field artillery and the landing of succeeding troops, supplies, and equipment.

803. Landing characteristics of field artillery.—The weight and dimensions of the various types of weapons and vehicles used by the artillery of the Fleet Marine Force are given in "Logistic Data, U. S. Marine Corps".

804. Organization for landing.—*a. Light artillery.*—(1) In order to permit flexibility in the assignment and landing of light artillery, it is desirable that complete gun sections be embarked in separate boats and the boats transporting a battery organized into a boat division. This will permit sections or batteries to be attached to boat groups, transporting infantry units, or the artillery battalion to be landed intact. In either case, the artillery boat divisions, after leaving the line of departure, may be made to cruise independently of those carrying the infantry and thus provide for landing at the most propitious time; that is, as soon as the landing beach is reasonably secure from the direct fire of enemy weapons.

(2) Artillery liaison details precede their units to the beach. They usually go in the same boats as the headquarters of the infantry unit to which they are attached, or are supporting. Liaison details should be prepared to furnish their organizations immediately upon landing with the latest details pertaining to the situation.

(3) Reconnaissance details should be landed sufficiently early to permit them to carry out the following duties prior to arrival of the gun sections: Selection of locations for firing positions, observation posts, and other artillery installations; routes from beach to same, and the point for landing each section. It is desirable that reconnaissance details be provided a separate boat, not only to permit changes in the assignment of artillery units by boatloads, but also to facilitate the guiding in of waiting artillery boats after decision has been made as to the point and time of landing.

b. Heavy and antiaircraft artillery.—(1) With the exception of some 50-caliber antiaircraft machine guns landed for early protection of the landing beach, the heavy and antiaircraft artillery will not be landed until an adequate beach head has been secured and all of the infantry and field artillery are ashore. Lighters, barges, or large boats transporting heavy and antiaircraft artillery will usually operate separately.

(2) Antiaircraft 50-caliber machine guns and ammunition which are to land with the leading troops should be assigned to the boat group with which they are to move, and given a specific place in the formation. These guns will seldom precede the landing of the battalion reserves.

805. Ammunition supply.—*a.* The landing and movement inland of an adequate ammunition supply presents a more serious problem than that of guns and howitzers. A 75-mm. pack howitzer, for example, can fire twice its own weight in ammunition every hour. In the assignment of boat spaces, therefore, allowance must be made for an adequate ammunition supply.

b. A unit of fire for any artillery unit is the average daily expenditure of the unit during several days' combat. The expenditure of ammunition is not uniform, and from two to three units of fire may be expended daily during the initial stages of a landing operation. A unit of fire for light artillery is 300 rounds per gun or howitzer, and will last from 2 to 3 hours' actual firing.

c. At least two-thirds of one unit of fire should be landed with each battery; the remaining third to follow within 1 hour. It is desirable that this ammunition be distributed so that each gun section will have its quota loaded with it in the same boat. Assuming that the ammunition is HE, and will be carried ashore unboxed but in fiber containers, this would require about 50 boat spaces per section; approximately 50 boat spaces being required for the section and its whole unit of fire. Sufficient beach and shore party personnel should be available to dump the ammunition on the beach, so that the battery personnel may be utilized for getting the guns promptly into action.

d. Provision should be made to continue to land additional ammunition in time to insure batteries maintaining an appropriate rate of fire, making due allowance for losses en route and in the destruction of dumps ashore.

806. Motor transportation.—*a. Light artillery.*—If boat space is available, it is desirable to land at least some of the ammunition carts, tractors, and trailers with, or close behind, the firing batteries. These vehicles will be of great assistance in moving guns and howitzers into position and transporting ammunition from the beach to firing positions. For early movements by hand, see paragraph 801a (6), above.

b. Heavy and antiaircraft artillery.—Except in case of early landing of some 50-caliber antiaircraft machine guns (see pars. 802d and 803b (2)) tractors should be landed with, or before, the firing sections so that the tractors will be available to haul the guns and other matériel from

lighters or barges to firing positions. Trailers for handling ammunition should be landed as soon as practicable.

807. Assignment of field artillery.—a. (1) When an artillery unit is placed temporarily under the direct command of an infantry commander, it is designated as "attached" artillery. While so attached, the infantry commander gives orders direct to the commander of the artillery. Depending upon the period for which attached, such orders may cover the embarkation, debarkation, landing, and the tactical employment of the artillery on shore.

(2) An "accompanying gun" is a gun or howitzer attached to a subordinate infantry unit for the purpose of accompanying the assault echelons in the landing and advance inland. Such guns are vulnerable to enemy fire and the ammunition supply is difficult to maintain. They should not be landed in the face of direct fire. After the fire fight in the vicinity of the beach, accompanying guns may be directed to remain in position and gather fire data for the remainder of the battery which is to land and join them later.

b. Supporting artillery is that which executes fire missions in support of specific infantry units but remains under the command of the next higher artillery commander. It is classified as general or direct support as follows:

(1) General support artillery executes the fires directed by the commander of the unit to which it organically belongs or is attached. It fires in support of the operation as a whole, rather than in support of a specific subordinate infantry unit.

(2) Direct support artillery is assigned the task of executing the fires requested by a specified subordinate infantry unit. Requests for fires are made direct upon the supporting artillery by the infantry unit being supported.

c. (1) Field artillery operates at its highest efficiency when the fire of all batteries is coordinated and controlled by a single commander. This should always be the ultimate aim of all planning.

(2) In a landing operation, however, light artillery battalions will usually be attached to infantry regiments for the embarkation, debarkation, landing, and tactical employment ashore during the initial phases of the operation. The infantry regimental commander may attach sections, platoons, or batteries to assault battalions, or he may employ the artillery battalion as a unit. In the latter case, all batteries may be kept in general support, or certain batteries may be put in direct support of assault battalions.

(3) The attachment of batteries to assault infantry battalions is applicable under the following conditions:

When such decentralization of control is necessary in order to provide for the timely debarkation from ships and movement to the beach:

When there is no time to install means for immediate centralized control on the beaches at the time artillery support first becomes necessary.

When it is the only sure way of providing timely artillery support for the battalion when it must operate independently, either because of landing on a separate beach or otherwise becoming isolated from other friendly troops.

d. Heavy artillery will usually be in general support.

808. Landing diagrams.—a. (1) Figure 1 illustrates an artillery battalion attached to an infantry regiment landing with two battalions in assault and one in reserve. One battery is attached to each assault battalion, and the artillery battalion (less two batteries) is held under control of the infantry regimental commander. The boats transporting each attached battery are organized into a boat division assigned to the boat group transporting the assault battalion. The boats transporting the remainder of the artillery battalion are also organized into a boat division which is assigned to the boat group transporting the reserve infantry battalion.

(2) Each assault battalion is landing with two companies in assault and one in reserve. The reserve rifle company usually lands behind the assault company most successful in its advance. As the boat group approaches the range of effective enemy fire, the boat division transporting the attached artillery, when practicable, should be maneuvered to avoid such fire by slowing up or stopping until it can proceed further on its course toward the beach with reasonable safety. As soon as the beach is considered sufficiently secure from enemy direct fire, and when directed by the infantry battalion commander, the battery should be brought in and landed. This may be accomplished by having the artillery reconnaissance officer contact the artillery boat division by signal or by messenger boat from the beach. (See par. 804a (3) above for duties of reconnaissance details.)

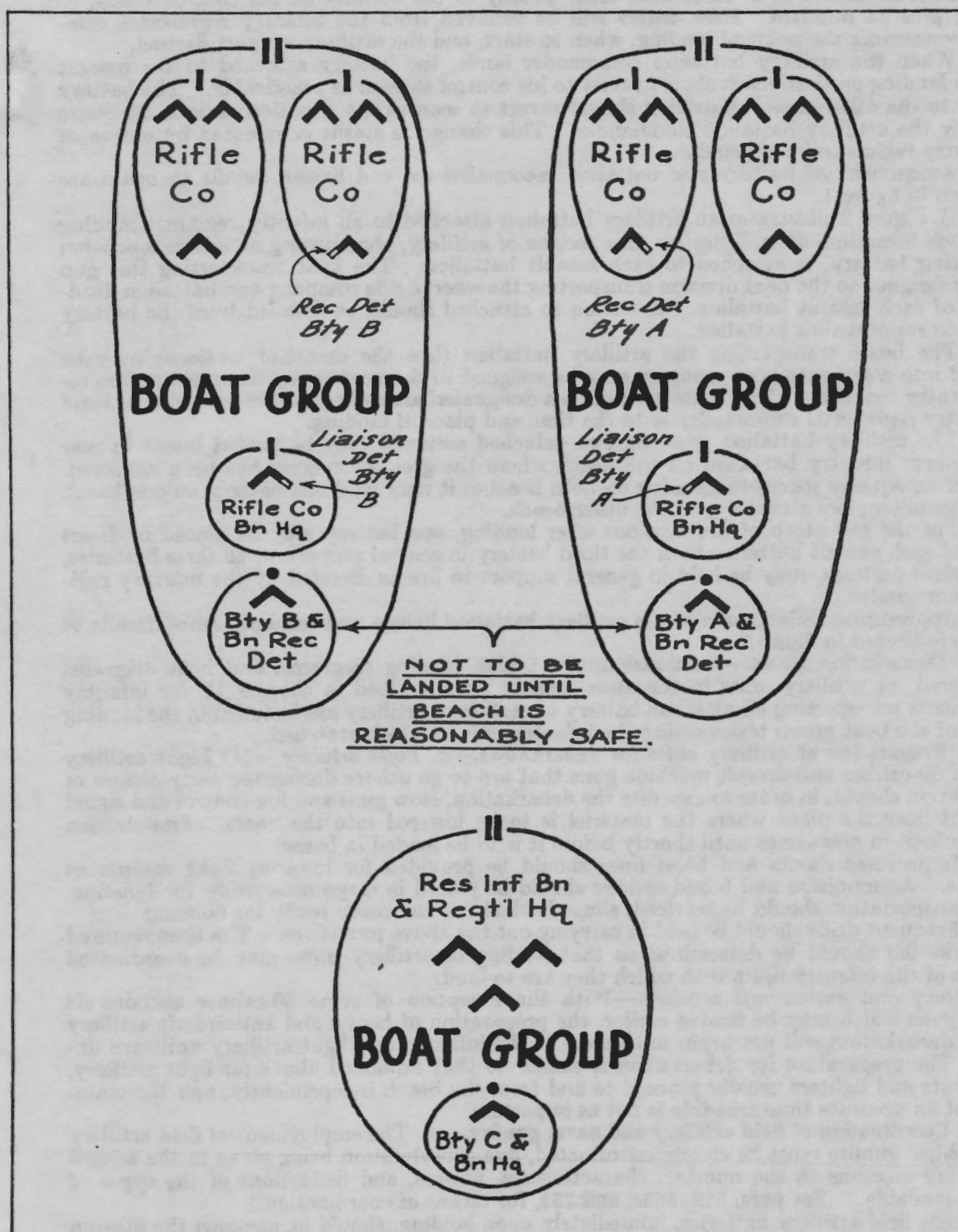


FIGURE 1.—Artillery batteries attached to infantry battalions.

(3) The boats transporting the reserve infantry battalion and the remainder of the artillery battalion should arrive at a designated area, usually in the vicinity of the control vessel, at about H plus 15 minutes. Here orders will be received from the infantry regimental commander concerning the point of landing, when to start, and the artillery support desired.

(4) When the artillery battalion commander lands, the battery attached to the assault battalion landing on that beach should revert to his control as soon as practicable. The battery attached to the other assault battalion should revert as soon as the situation permits adequate control by the artillery battalion commander. This change in status is executed by orders of the infantry regimental commander.

(5) Assignment of battery and battalion reconnaissance and liaison details to boats are also shown in figure 1.

b. (1) Figure 2 illustrates an artillery battalion attached to an infantry regiment landing in the same formation as in figure 1. One section of artillery, constituting an advance echelon of the firing battery, is attached to each assault battalion. The boat transporting this gun section is assigned to the boat division transporting the reserve rifle company and battalion headquarters of each assault battalion. A section so attached should be detailed from the battery which is to support that battalion.

(2) The boats transporting the artillery battalion (less the detached sections) may be organized into a separate boat group or may be assigned to the boat group transporting the reserve infantry battalion. The boats proceed to a designated area where orders are received from the infantry regimental commander as to the time and place of landing.

(3) The artillery battalion (less the two detached sections) may be landed intact in rear of the reserve infantry battalion on the beach where the greatest success has been achieved. In case of an equally successful landing on both beaches it may land one battery on one beach and the battalion, less a battery, on the other beach.

(4) For the execution of fire missions after landing, one battery may be placed in direct support of each assault battalion with the third battery in general support, or all three batteries, less detached sections, may be held in general support to fire as directed by the infantry regimental commander.

(5) Appropriate assignments of the artillery battalion liaison and reconnaissance details to boats are indicated in figure 2.

809. Debarkation plans.—Boat assignment tables, landing diagrams, and boat diagrams are prepared for artillery units in the same manner as prescribed in chapter IV for infantry units. Boats transporting an attached battery or section of artillery are included in the landing diagram of the boat group transporting the infantry unit to which attached.

810. Preparation of artillery units for debarkation.—*a. Light artillery.*—(1) Light artillery units and 50-caliber antiaircraft machine guns that are to go ashore during the early phases of and operation should, in order to expedite the debarkation, stow guns and fire control and signal equipment near the place where the matériel is to be lowered into the boats. Ammunition should be kept in magazines until shortly before it is to be loaded in boats.

(2) Improvised davits and hand lines should be provided for lowering light equipment into boats. Ammunition and boxed articles should be placed in cargo nets ready for hoisting. Motor transportation should be serviced, slings hooked on, and made ready for hoisting.

(3) Frequent drills should be held in carrying out the above provisions. The time required for debarkation should be determined so that loading of artillery units may be coordinated with that of the infantry units with which they are to land.

b. Heavy and antiaircraft artillery.—With the exception of some 50-caliber antiaircraft machine guns which may be landed earlier, the preparation of heavy and antiaircraft artillery units for debarkation will not begin until most of the infantry and light artillery units are unloaded. The preparation for debarkation is similar to that explained above for light artillery, except boats and lighters usually proceed to and from the beach independently, and the maintenance of an accurate time schedule is not as important.

811. Coordination of field artillery and naval gunfire.—*a.* The employment of field artillery fire and ships' gunfire must be closely coordinated, due consideration being given in the assignment of fire missions to the number, characteristics, powers, and limitations of the types of weapons available. (See pars. 542, 552c, and 731, for means of coordination.)

b. Light field artillery batteries, immediately upon landing, should be assigned the mission of close support. As additional batteries are landed, they should progressively take over appropriate fire missions from ships' guns. Medium and heavy artillery will usually not be available;

see section IV, chapter V,

or may be very limited in amount, particularly during the early phases of the operation, and it may be necessary for ships' guns to continue deep supporting, counterbattery, and interdiction fires for a considerable period of time.

c. All field artillery agencies, such as intelligence, liaison, and reconnaissance details, should give all information and assistance possible to ships' fire control parties ashore. Field artillery

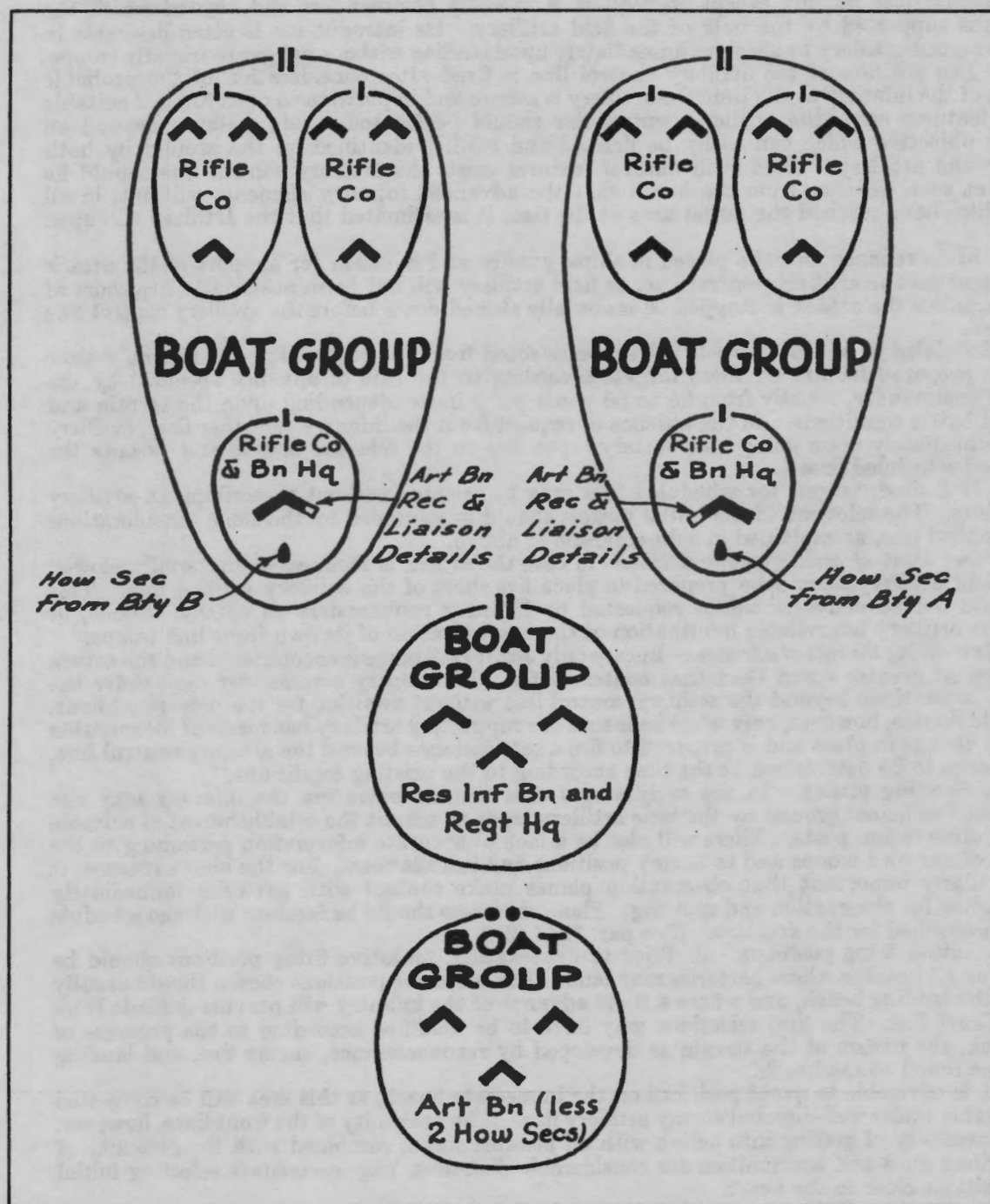


FIGURE 2.—Howitzer sections attached to infantry battalions.

observation posts and communication installations should also be made available for ships' fire control parties.

d. It is desirable that artillery officers of the landing force, if available, be assigned to ships furnishing gunfire support. It is also desirable to assign field artillery officers, experienced as air observers, to planes detailed for spotting field artillery fire.

812. Execution of fires.—a. Artillery control line.—(1) This is a line short of which the field artillery does not fire except on request of infantry commanders and beyond which the advance is supported by the bulk of the field artillery. Its introduction is often desirable in order to permit artillery to open fire immediately upon landing without danger to friendly troops.

(2) The position of the artillery control line is fixed after consideration of the probable position of the infantry at the time the artillery is ashore and in position to open fire. If suitable terrain features exist, the artillery control line should be located a safe distance beyond an infantry objective which can easily be defined and readily identified on the ground by both infantry and artillery. If no such natural features exist, the artillery control line should be located at such distance from the beach that the advanced infantry elements will not, in all probability, have reached the target area at the time it is estimated that the artillery will open fire.

(3) Main reliance must be placed in ships' gunfire and aviation for support of the attack until it reaches the artillery control line, as field artillery will not be in position to fire short of this line unless the attack is stopped or materially slowed down before the artillery control line is reached.

b. Scheduled fires.—(1) Targets should be selected from the control line inland and a time schedule prepared for fire on these targets according to the rate of advance specified by the infantry commander, usually from 25 to 50 yards per minute, depending upon the terrain and expected battle conditions. In the absence of request from the infantry for other fires, artillery units, immediately upon going into battery, open fire on the selected targets and execute the prescribed scheduled fires.

(2) If desired, targets for scheduled fires may be selected without prescribing an artillery control line. The selection of the initial targets should be governed by the same considerations as the control line, as explained in subparagraph a, above.

c. Fires short of artillery control line.—In case the attack is stopped or materially slowed down, field artillery should be prepared to place fire short of the artillery control line. This fire should not be delivered unless requested by infantry commanders on specific targets, or unless the artillery has reliable information of the exact location of its own front-line troops.

d. Increasing the rate of advance.—In case only slight resistance is encountered and the attack progresses at greater speed than that contemplated, the infantry commander may order the advance to continue beyond the artillery control line without awaiting for the prescribed hour. He should do this, however, only when he is sure the supporting artillery has received information as to the change in plans and is prepared to fire a safe distance beyond the artillery control line, this distance to be determined at the time according to the existing conditions.

813. Spotting planes.—In the early stages of a landing operation the infantry may not have gained sufficient ground by the time artillery lands to permit the establishment of suitable artillery observation posts. There will also be a lack of accurate information pertaining to the position of our own troops and to enemy positions and installations. For the above reasons, it is particularly important that observation planes make contact with batteries immediately upon landing for observation and spotting. Plane observers should be familiar with the schedule of fires prescribed for the artillery. (See par. 724d (2).)

814. Initial firing positions.—a. Prior to debarkation, tentative firing positions should be selected on all beaches where batteries may land. The tentative positions chosen should usually be near the landing beach, and where a short advance of the infantry will provide defilade from enemy direct fire. The first selections may have to be modified according to the progress of the attack, the nature of the terrain as developed by reconnaissance, enemy fire, and landing conditions found at the beach.

b. It is advisable to avoid positions on the immediate beach, as this area will be congested and probably under well-directed enemy artillery fire. The proximity of the front lines, however, and the necessity of getting into action with all possible speed, combined with the difficulty of manhandling guns and ammunition for considerable distances, may necessitate selecting initial firing positions close to the beach.

c. As soon as sufficient ground has been gained and motor transportation is available for handling ammunition, arrangements should be made for displacing batteries inland.

815. Protection of artillery against ground and air attack.—*a.* The superior knowledge of the terrain possessed by the defender, combined with the tendency of assault troops to pass beyond small enemy groups, will facilitate infiltration by the enemy and make mopping-up difficult for the attacker. Artillery also approaches closer to the enemy front lines in the early stages of a landing operation than in land warfare. Due to the above considerations and despite precautions taken to land it only after the beach is clear, artillery in the early stages of a landing operation will be particularly vulnerable to attack by small parties of the enemy, and must be prepared by training and equipment to protect itself against such attack both while en route and in position.

b. Antiaircraft units may not be able to operate ashore in the early phases of the attack and artillery must be prepared to defend itself against low-flying attack planes. The early landing of some .50-caliber antiaircraft machine guns, as indicated in preceding paragraphs, should be provided for this purpose.

816. Support of advance inland.—In the support of the advance inland the employment of field artillery is much the same as in any land offensive, the principal difference being the possible shortage of motor transport and the consequent desirability of maintaining firing positions within a short haul from the beach.

SECTION II

TANKS

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817. Use of tanks in landing operations.—*a.* The primary mission of tanks in the landing operation is to facilitate the passage of infantry through the immediate beach defenses by destroying enemy wire and machine gun defenses at or near the water's edge. They are particularly valuable in covering the flanks of the landing.

b. In addition, tanks in adequate numbers should be provided to support the advance to the final objective. Their speed and maneuverability make them particularly effective for rapid exploitation.

818. Method of landing.—The most effective use of the tanks results when a special self-propelled tank landing craft or ship is provided which can keep up with the leading boats and permits the tank to run rapidly ashore under its own power as soon as the craft beaches.

819. Assignment of tanks.—In the initial phases tanks are normally assigned to assault battalions in accordance with the importance of the task assigned the individual battalion and the nature of the terrain. The distribution should be such as will provide for a heavy concentration of tanks against the more important objectives. During the advance inland tanks may be organized into separate task units for special operations.

820. Preliminary reconnaissance.—In order to select the best landings and routes inland, the most thorough preliminary reconnaissance possible should be made of beaches on which it is proposed to land tanks. Particular attention should be paid to surf conditions, depth of water, and obstacles to the passage of the tanks inland. Observation from aircraft and submarines, aerial photographs, maps, charts, and reports of marine patrols may be used to secure the desired information.

821. Time of landing tanks.—*a.* When the leading troops arrive at the beach, naval gunfire may be firing several hundred yards inland. Field artillery will not be landed and ready to fire in support of the advance for possibly 20 or 30 minutes, and aircraft must be largely depended

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upon initially to deliver close supporting fires between the beach and the area being shelled by naval gunfire. It is during this phase of the operation that tanks will be of the most value, particularly where the number of planes for close support is limited.

b. In order to provide immediate support for the advance from the beach during the critical stage described above, tanks should be landed ahead of or with the leading troops.

c. When tank lighters are available, tanks should be assigned to the leading waves. Under these conditions tank weapons should be used to supplement the fire of boat guns.

d. Where landing conditions are known to be bad, tanks should be landed in the second or succeeding waves. Under these conditions, reconnaissance agents should be landed in the leading waves.

822. Organization for landing.—a. In order to permit flexibility in the landing formation, it is desirable, initially, to organize the boats or lighters transporting a tank platoon (five tanks) into a separate boat division. This division may operate as a unit or the individual boats or lighters may be later assigned to boat divisions transporting rifle units, depending upon the speed and type of the boat or lighter, landing conditions on the beach, routes of advance inland, and the proposed tactical employment ashore.

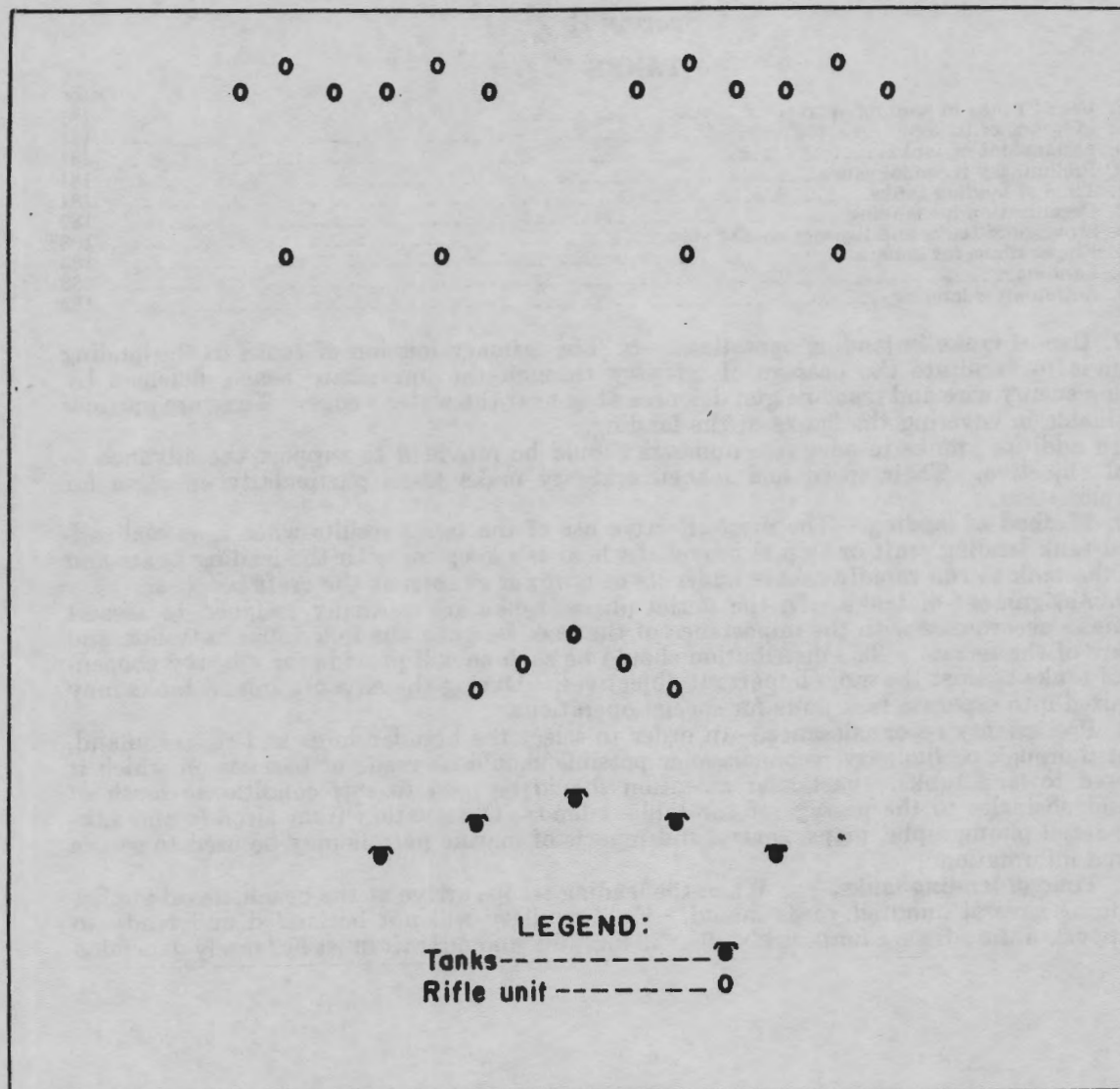


FIGURE 3.—Tank lighters in second wave.

b. Figure 3 shows a boat division transporting a tank platoon operating as a unit in the second wave. Figure 4 shows tank lighters assigned to boat divisions transporting rifle platoons in the leading wave.

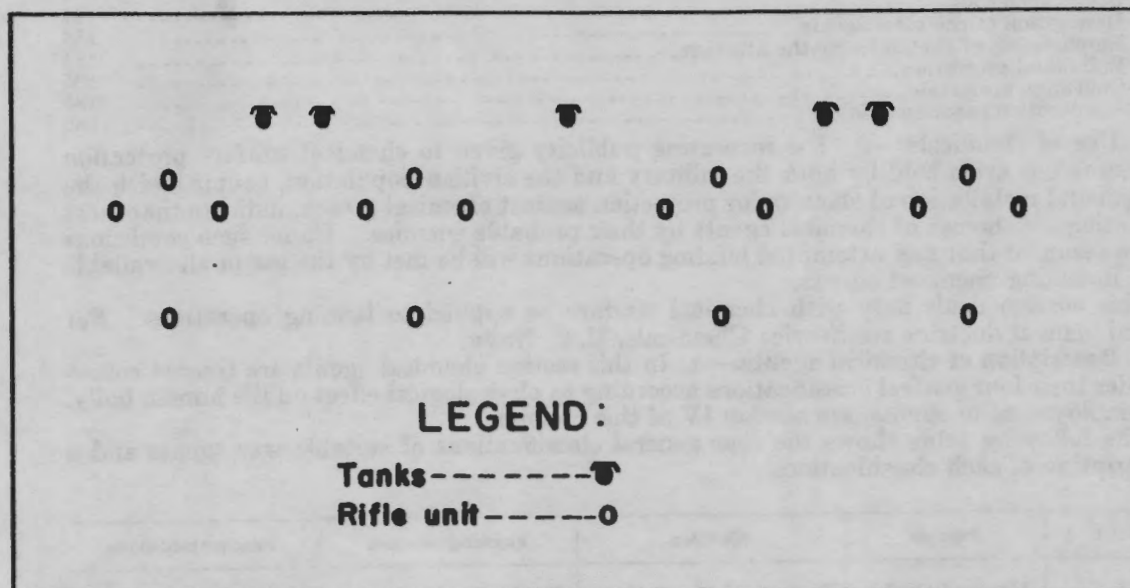


FIGURE 4.—Tank lighters in leading wave.

c. Boats and lighters transporting tanks will usually be included in the boat assignment table and landing diagram of the boat group transporting the infantry battalion to which the tanks are attached. If at the time landing diagrams are prepared it is not definitely known to which infantry battalions tanks will be attached, orders may be issued later covering the task assignment of the boat division of tank lighters and its position in the formation of the boat group to which attached.

823. Stowage of tanks and lighters aboard ships.—a. In order that the lowering of tanks may not delay the debarkation, it is desirable that the tanks of a platoon be stowed in two or more holds.

b. Tank lighters or boats should be stowed so that they may be lowered and loaded in time to leave with, or even ahead of, the leading wave, depending upon their speed.

824. Preparations for debarkation.—a. In the preparation of debarkation data, the time of loading boats or lighters transporting tanks should be carefully ascertained.

b. Prior to the hour set for lowering boats, tanks should be run under the hatches, slings hooked on, and the full allowance of ammunition loaded. Prior to lowering, or immediately thereafter, gasoline tanks should be filled, engines tested, and the tanks made in all respects ready for immediate entry into combat.

825. Landing.—Tank engines are started when well offshore and all preparations made for landing. As soon as the lighter or boat beaches, ramps are rigged, if necessary, and the tank landed with all possible speed.

826. Action after landing.—The tactics of tanks after landing are much the same as those of ordinary land warfare. The plan of attack will prescribe important objectives against which the tanks will be concentrated, but tank commanders should use great initiative in attacking enemy weapons, particularly those along and on the flanks of the beach which are endangering the landing or advance inland. Tanks will usually be attached to appropriate rifle units.

LANDING OPERATIONS DOCTRINE

SECTION III

CHEMICALS

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827. Use of chemicals.—a. The increasing publicity given to chemical warfare protection and the numerous drills held by both the military and the civilian population, coupled with the preparation and installation of shelters for protection against chemical attack, indicate that most nations anticipate the use of chemical agents by their probable enemies. Under such conditions it must be assumed that any attempted landing operations will be met by the use of all available weapons, including chemical agents.

b. This section deals only with chemical warfare as applied to landing operations. For details and general doctrine see Service Chemicals, U. S. Navy.

828. Description of chemical agents.—a. In this section chemical agents are treated collectively under their four general classifications according to physiological effect on the human body. For the employment of smoke, see section IV of this chapter.

b. The following table shows the four general classifications of suitable war agents and a brief description of each classification:

Classification	Example	Munition	Physiological action	Principal tactical use
Vesicants.....	Mustard (HS)---	Bombs, shell, airplane spray.	Blisters and sores on skin and in lungs.	To produce casualties in personnel and deny areas to enemy.
Lung irritants....	Phosgene (CG)---	Shell (6 inches and larger) and cylinders.	Burns lungs.....	To produce casualties in personnel.
Sternutators (irritant smokes).	Adamsite (DM)---	Candles, bombs, and destroyers.	Coughing, sneezing, and vomiting.	To harass personnel.
Lacrimators.....	Tear gas solution (CNS).	Bombs, grenades, shell, airplane spray.	Lacrimation, skin itching, vomiting.	Do.

c. In addition to the above-mentioned classes of agents, white phosphorus (WP), although usually classed as a smoke producer, may be used in shell or airplane bombs for producing casualties in personnel, and as an incendiary.

829. Employment of chemicals by the attacker.—a. The employment of chemical agents by the attacker during a landing operation will be limited by two important factors, namely:

(1) No employment of chemical agents should be allowed to interfere with the movement of the attacking troops, either while they are on the water or immediately after landing. For example, even a light concentration of a nonpersistent lacrimator to the windward of landing troops may force them to wear the gas mask. This wearing of the mask handicaps the attacker much more than it does the defender.

(2) Persistent agents, such as vesicants, should not be laid on any shore area, the use of which may later be necessary to the landing force for its operations on shore during the period of persistence of the particular agent.

b. Subject to the above restrictions, aircraft may be employed before, during, and after the ship to shore movement of troops, for the following tasks:

The denial of use of hostile airdromes and landing fields to the enemy by bombing and spraying with a persistent vesicant.

The silencing of shore batteries, particularly large-caliber coast-defense guns and mortars, by bombing and spraying with all types of chemical agents.

The extension of the deep supporting fires from ships' guns by bombing and spraying areas known to be occupied by the enemy for casualties and harassment of personnel. Nonpersistent sternutators and lacrimators are suitable for this task.

Although most of the above classes of agents are called nonpersistent, the length of time which must elapse before their complete dissipation depends on the conditions of wind, weather, and terrain.

The production of casualties in, and delay in the movement of, enemy reserves located in rear areas. This may be accomplished by bombing and spraying with any type of agent.

The denial of the use of certain bridges, fords, passes, roads, and larger areas to the enemy by bombing or spraying with vesicants or other sufficiently persistent agents.

The production of casualties, and the denial of certain areas to the enemy, by setting fire to dry brush, canefields, and grass, by bombing with white phosphorous. As this agent produces great quantities of smoke, it should be employed only when complete visibility is not necessary for the conduct of other more important operations.

c. If chemical projectiles are available for naval guns, nonpersistent lacrimators and possibly sternutators may be included at the beginning of a bombardment, for harassment of personnel. Persistent agents may be used to advantage against large-caliber, coast-defense gun positions, and isolated areas not needed later for the operation of our own forces. The smaller calibers are (usually the most effective for firing persistent agents.)

d. Except for the light concentrations necessary to harass the enemy and force him to wear masks, it should be remembered that, in order to be effective, chemicals must be laid down in heavy concentrations.

830. Individual protection.—a. (1) In a landing operation the employment of all types of chemicals by the defender is particularly applicable, and he may be expected to continue chemical attacks throughout the operation. These chemical attacks may include airplane spraying of transports and small boats with vesicants and lacrimators, airplane bombing with white phosphorous; the releasing of clouds of lung irritants, sternutators, and lacrimators from the shore line against landing boats; the releasing of vesicants on the surface of the water adjacent to beaches; the contamination of certain beaches, islands, peninsulas, and interior areas by a persistent vesicant; and the employment of all types of agents against the beach head during the time of greatest congestion of troops and matériel following a successful landing.

(2) Protective measures, therefore, assume an important part in the planning of any ship to shore movement. At the same time, these protective measures must not be such as to prevent the various operations being carried out or to cause undue delay. Complete protection of men and matériel against chemical attacks is no more to be expected than complete protection against other weapons.

b. A high degree of individual protection may be provided by gas masks, impregnated or impermeable clothing, protective gloves, and protective shoes. If an adequate supply of all the above articles is not available, gas masks, at least, must be issued to all personnel, and protective clothing, gloves, and shoes should be provided for those who are most likely to be exposed to the spray of liquid vesicants and to those detailed for decontamination work.

831. Collective protection.—a. In addition to the above precautions for the protection of the individual, certain measures must be taken for group or collective protection. These measures include—

- Reconnaissance;
- Planning the scheme of maneuver to avoid gases;
- General organization for protection;
- Special protection of men and matériel in boats; and
- Decontamination of beaches and routes inland.

b. *Reconnaissance.*—Every effort should be made to ascertain by preliminary reconnaissance or demonstrations the enemy plan for the utilization of chemicals, so that the most effective protective measures may be initiated in advance, or the contaminated areas avoided. (See ch. IV, sec. VI, Reconnaissance Patrols.)

c. *Scheme of maneuver.*—In planning the scheme of maneuver every effort should be made to avoid areas known or suspected of being contaminated, or which are likely to be subjected to gas attack. Lacking definite information, open beaches and high, open, wind-blown terrain is the safest; conversely, protected beaches, wooded areas, ravines, hollows, and defiles are the most favorable for the effective use of chemicals.

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d. General organization.—(1) Officers trained in chemical warfare should be assigned all ships, regiments, and battalions, and trained noncommissioned officers to all companies. Their general duties are to take charge of chemical warfare protective matériel and to give technical advice. (See ch. VI, Service Chemicals, U. S. Navy.)

(2) Gas sentries trained to recognize various gases by smell should be posted whenever there is likelihood of a chemical attack, so that an alarm may be promptly given.

(3) Standing orders covering procedure for protection against chemical attacks should be issued.

(4) Alarm systems, both general and local, should be installed. Alarms should be made by sound, such as the sounding of a bell, klaxon, whistle, or gong. Advance warning of a chemical attack at sea may be obtained by signal from aircraft or other ships.

(5) Materials for decontamination should be kept available for use in all ships and boats and the methods of using them disseminated to all concerned.

(6) Provision should be made for prompt treatment of gas casualties.

e. Protection of men and matériel in boats.—(1) Security measures against chemical attacks for men and matériel in small boats include local control of the air by friendly aircraft, protective covering for boats, warning of attack by gas sentries, development of the maximum antiaircraft fire, and decontamination measures.

(2) Close-fitting tarpaulins of oilcloth or canvas should be made a part of the equipment of each boat to protect the occupants from liquid spray. When possible, this covering should be furled thwartships with one edge made fast just abaft the boat gunners and ready to be quickly spread to the rear over the heads of the troops. All equipment and munitions not likely to be used until the boats reach the beach should be covered with separate mustard proof coverings. Snug-fitting canvas tarpaulins while not mustardproof, offer considerable protection. All food not in airtight containers is subject to contamination.

(3) At least one gas sentry should be detailed in each boat to watch for and give warning of a chemical attack, and sufficient men should be assigned to adjust the tarpaulin covering on short notice.

(4) While a quick and complete decontamination of the skin and equipment of personnel and the interior of boats is doubtful, the effects of an attack by spray of a liquid vesicant can be alleviated if each boat is supplied with a quantity of decontamination material. A thorough scrubbing with soap and fresh water will reduce the severity of mustard burns; scrubbing with a rag soaked in kerosene, gasoline, or even lubricating oil is also a great aid. After such scrubbing the application of a weak solution made of chloride of lime and water (not stronger than 50 to 50 by weight) will further counteract the effects of the mustard. It should be borne in mind, however, that decontamination measures must not be allowed to interfere with the operation of the boats or the fire of the weapons therefrom.

f. Decontamination of beaches and routes inland.—(1) If, when the small boats approach the beach, pools or globules of oily liquid vesicant are discovered floating on the surface of the water, every effort should be made to avoid them, as troops wading through such contaminated water are very likely to become casualties within a short time. Such vesicants are more likely to be found on still water than in running water or surf. When it is necessary to land through water so contaminated, the best protection is afforded by shallow-draft landing boats capable of running well up on the beach and thus permitting the troops to disembark directly onto the beach. Beating the water with oars, and backing with the engine may help in a measure to dissipate the liquid floating on the surface or lessen the effects through partial hydalization.

(2) Sufficient material, such as chloride of lime or CC No. 1 solution, should be landed to provide for decontamination of vital positions on the landing beach immediately after the landing of the assault troops, and sufficient men of the shore parties should be properly equipped with protective clothing to do this work.

(3) Although decontamination of large areas may be impracticable, this work may well be undertaken at the landing points for succeeding troops, in areas necessary for certain limited activities on the beach and on roads or trails leading inland to ungassed areas.

(4) Large signs should be brought ashore by members of the shore parties and set up at proper places to warn personnel of gassed areas and indicate alternate routes.

(5) As soon as practicable after the landing, decontamination stations should be improvised for the purification of clothing and equipment. (See Service Chemicals, U. S. Navy.)

832. Ammunition requirements.—(a) (1) Table A shows aircraft chemical ammunition requirements for each of several tasks.

(2) Table B shows ammunition requirements for chemical shell necessary to produce an effective density in each 100-yard square of target area. The requirements shown are based on three representative chemical agents fired by 75- and 155-mm guns or howitzers.

(3) Table C shows the weights of the three representative chemical agents in the 75- and 155-mm shell.

(4) Ammunition requirements for other calibers can be computed for mustard and CN solution from tables B and C by plotting the figures in these tables on a piece of cross-section paper, using the "X" coordinate for the number of shells required and the "Y" coordinate for the weight of chemical in each shell. After the points are thus established for the 75- and 155-mm, the points should be connected by a line. From this line, or a continuation thereof, the required number of shells of any given chemical charge can be obtained. At least 368 pounds of phosgene, released within 2 minutes, is required for each 100-yard square of target.

TABLE A.—Ammunition requirements for aircraft

30-pound chemical bomb filled with 7.4 pounds mustard (HS): ¹	
Bombs per square (100 by 100 yards) of target area.....	15
Bombs per 100 linear yards of occupied road.....	5
Bombs per 100 linear yards of road for interdiction.....	10
Nonpressure tank apparatus for planes, each tank containing approximately 15 gallons of liquid mustard or other chemical agent. Planes are normally equipped with two wing tanks. Figures given below are for one tank only. The length of the area may be doubled by release in turn, or the width of the area may be increased 50 percent by simultaneous release:	

Character of target	Area effectively covered
Unprotected personnel.....	800 by 500 yards
Equipped with mask only, or poorly trained.....	800 by 250 yards
Fully equipped and well trained.....	800 by 75 yards

¹ (1) Ammunition requirements remain the same for bombs containing an equal weight of any other liquid filler. (2) Corrections for weather and terrain in the case of mustard: Temperatures below 50° increase requirements 25 percent. Except for point targets, reduce quantities 50 percent when targets are wooded.

TABLE B.—Ammunition requirements for chemical shell necessary to produce effective density in each 100-yard square of target

Caliber	Mustard ¹	CN solution ²	Phosgene ³
75-mm (2.95 inches).....	80	5	
155-mm (6.1 inches).....	17	2	23

¹ No time limit in firing. Persistent for several days.

² Rounds per hour.

³ Fired within 3 minutes.

Corrections for weather and terrain applicable to the above table: Mustard: Temperature below 50°, increase requirements 25 percent. Except for point targets, reduce quantities 50 percent when targets are wooded. CN solution: Temperature below 50°, increase requirements 25 percent. Figures indicate number of rounds which must strike in the target area. Rounds necessary to cover inaccuracies in fire, due to range, dispersion of guns, etc., must be added.

TABLE C.—Chemical content of field artillery shell

Caliber	Approximate weight of content of chemical shell, in pounds		
	Mustard	CN solution	Phosgene
75-mm (2.95 inches).....	1.3	1.5	
155-mm (6.1 inches).....	11.0	13.0	11.1

SECTION IV

SMOKE

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833. Use of smoke.—*a.* Smoke may be used in connection with a landing for the following purposes:

- To reduce the effectiveness of enemy fire.
- To conceal the point of the main attack.
- To increase the effect of a demonstration or secondary landing.
- To simulate or camouflage a chemical attack.

b. (1) The effective use of smoke to cover a landing requires special skill and training on the part of those charged with laying it, and the closest degree of coordination between aircraft, supporting vessels, and landing boats, together with an accurate knowledge of the effect of various weather conditions. (See ch. V, ~~para 843~~, for coordination.) *section IV*

(2) It must also be realized that smoke blinds the attacker as well as the defender, precludes the use of certain planes and ships for other tasks, increases the difficulties of navigation of ships and boats, curtails the use of signals from boats and the shore, and, when projected from aircraft tanks, may require ships and boats to suspend fire while it is being laid. As smoke often obscures aiming points and targets on the beaches, direct fire by supporting ships, particularly inshore ships, is not only greatly handicapped but often precluded.

(3) The effective use of supports and reserves depends upon securing immediate information of the success or failure of preceding units. This information is preferably obtained by direct observation, which will usually be rendered difficult or impossible by the use of smoke.

c. It should be realized that the effective laying of smoke is to a great extent indeterminable. The decision as to whether or not it will be used requires consideration as to the probability of laying an efficient screen, and a careful balancing of the benefits expected from the smoke against the supporting value of weapons or troops it displaces or renders less effective. The following factors will largely govern the final decision: The availability of vessels and planes for laying smoke, probable weather conditions, the number and type of supporting vessels available for use in the operation, and navigational considerations. In this connection, it should be noted that while firing into a smoke-covered area reduces the accuracy of the fire, tests have demonstrated that the reduction in accuracy is many times greater when firing from a smoke-covered area.

834. Means of projecting smoke.—Smoke to cover a landing may be projected by the following means:

- Aircraft—tanks or bombs.
- Destroyers.
- Shell fired from guns, mortars, or howitzers.
- Small boats—tanks, candles, bombs, or floats.

835. Smoke from aircraft.—In connection with the laying of smoke screens by aircraft tanks and bombs, see illustrations in paragraph 839, below, and chapter VI, section V, Aerial Operations During Approach to Beach.

836. Smoke from destroyers.—*a.* Destroyers may be used to screen the vessels of the attack force and the distant approach of the landing boats. A dense smoke which tends to cling to the surface of the water should be used. Where wind conditions are favorable destroyers may also be used to blanket the beach to cover the landing of troops, as indicated in figure 5.

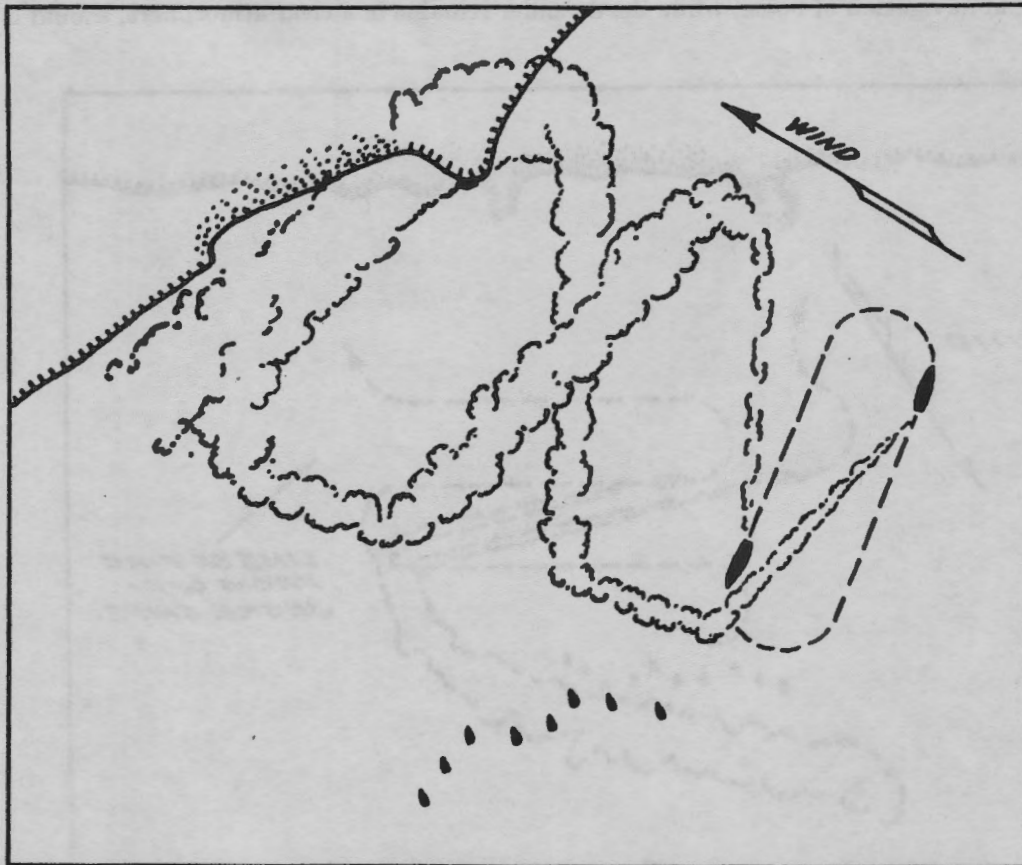


FIGURE 5.—Destroyers blanketing a beach.

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b. When there is an offshore breeze, destroyers used as inshore supporting vessels may screen the approach of the boats into the firing position of the destroyers without blanketing their own observation and possibly that of offshore supporting ships, as indicated in figure 6. The tactical disadvantages in laying smoke under these conditions, however, are emphasized in many respects. The difficulties imposed on observation, signaling, fire from boats and ships, and control and navigation of boats, while the defender remains in a clear atmosphere, should be realized.

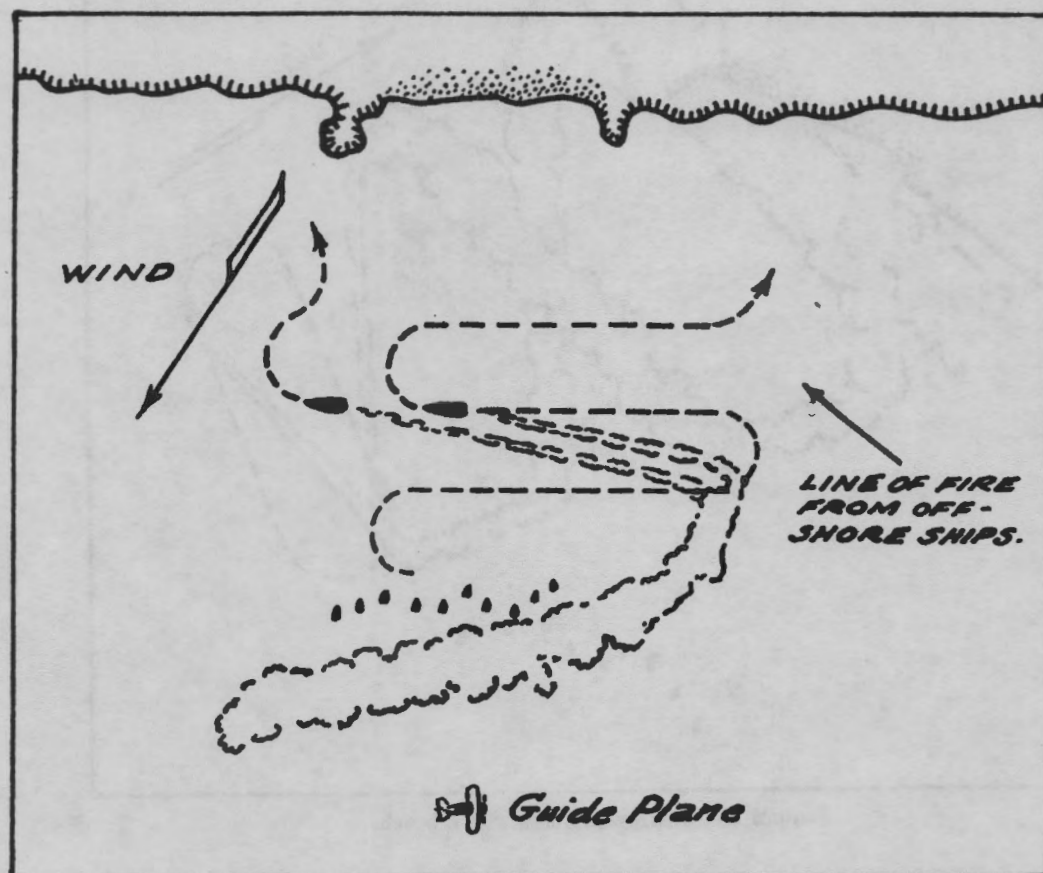


FIGURE 6.—Inshore supporting vessels screening boat movements.

c. (1) The orientation of smoke from a destroyer may be roughly computed as indicated in the following example: Suppose a destroyer is cruising at 25 knots from S to R (fig. 7); the wind is blowing from O to P at 5 knots. What will be the orientation of the smoke?

(2) As the destroyer is moving five times as fast as the smoke, lay off A-B five times A-C and draw the parallelogram A-B-D-C. When the destroyer is at B, the smoke will lie along B-C-E. When the destroyer is at R, the smoke will lie along R-F, parallel to B-C-E. If the destroyer is moving from R to S, the smoke will lie along lines parallel to A-D.

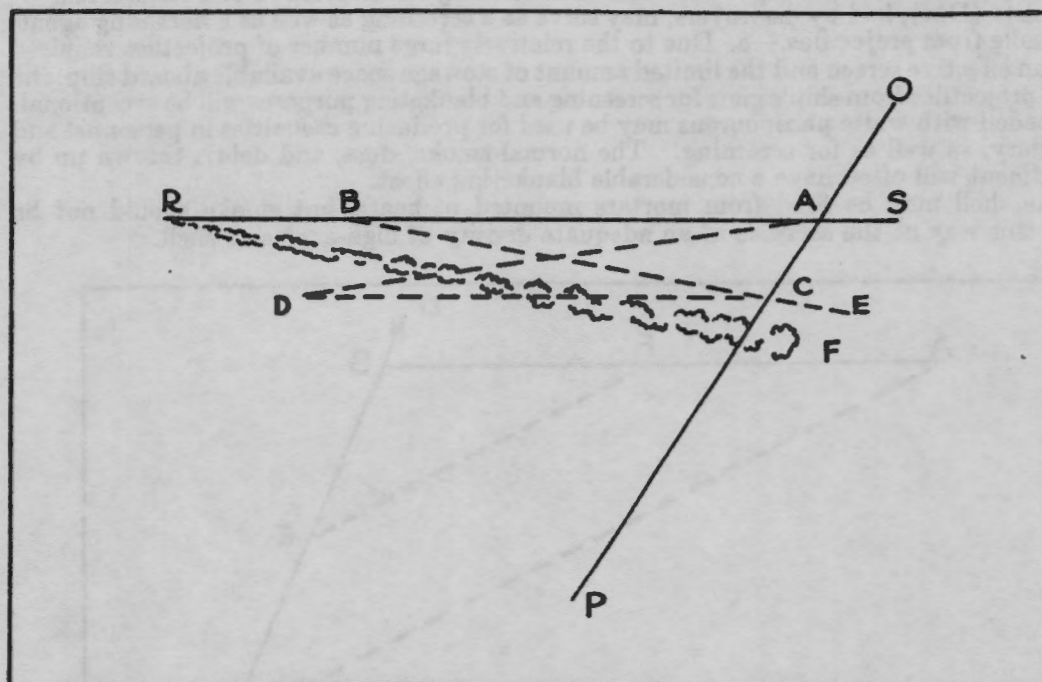


FIGURE 7.—Drift of smoke.

d. (1) The course of a destroyer to lay a cloud in a given position may be determined as indicated in figure 8.

(2) Chart the desired position of the cloud A-B; chart the direction of the wind C-D. Determine the speed of the wind, say 10 knots. Fix speed of destroyer, say 20 knots. From any point as E, on CD, lay off E-F twice E-B. From A, draw A-G parallel to F-E. Then, a destroyer steaming from G to A will lay the desired cloud along A-B.

e. Destroyers can be used to advantage in connection with demonstrations, particularly at night, by laying smoke over extended areas and thus creating the impression of a large force.

f. Adamsite (DM), laid by destroyers, may serve as a screening as well as a harassing agent.

837. **Smoke from projectiles.**—a. Due to the relatively large number of projectiles required to maintain an effective screen and the limited amount of stowage space available aboard ship, the use of smoke projectiles from ship's guns for screening and blanketing purposes will be exceptional. Projectiles loaded with white phosphorous may be used for producing casualties in personnel and as an incendiary, as well as for screening. The normal smoke, dust, and debris thrown up by any bombardment will often have a considerable blanketing effect.

b. Smoke shell may be fired from mortars mounted in boats, but smoke should not be employed in this way at the sacrifice of an adequate density of high-explosive shell.

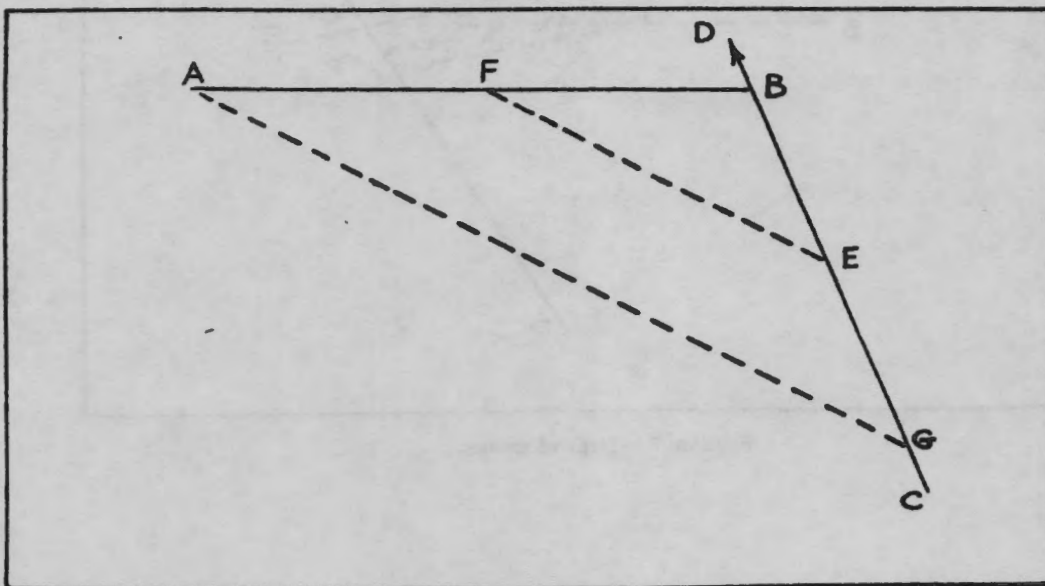


FIGURE 8.—Course of destroyers.

838. **Smoke from boats.**—a. Small boats, equipped with smoke tanks or candles, may be used to screen the movement of boats in a manner somewhat similar to that explained for destroyers. Fast boats should be utilized so that they may keep ahead of the leading wave while running a zigzag course. In employing burning substances, adequate safeguards must be taken against fire.

b. Boats may also be used to drop smoke bombs or floats. Under favorable weather conditions, floats may be laid at a distance beyond shore machine gun range to cover the approach of boats laying such smoke floats closer inshore, thus continuously screening boat and aircraft operations from observation from low-lying ground positions ashore.

839. Illustrations; smoke laying by planes.—a. Aircraft smoke screen tanks.—The following illustrations have been selected for the purpose of demonstrating the maximum number of points in regard to the laying of smoke with aircraft smoke screen tanks rather than for the perfection of the execution.

A battalion of marines is to land at H-hour, between points A and B on a frontage of 700 yards. A is approximately north of B. The problem presented aviation was to screen the movement of the boats and the landing of the troops, particularly from machine guns supposed to be located in the vicinity of points A and B. This picture shows a plane beginning to lay the first smoke screen at H minus 3 minutes, 400 yards from the beach. The plane laying the smoke is extremely vulnerable to fire from the beach, and its operations should be covered by other planes strafing and bombing the defensive positions. The boats, making 6 knots are 700 yards east of the beach. The pictures which follow were taken at intervals of approximately 30 seconds.

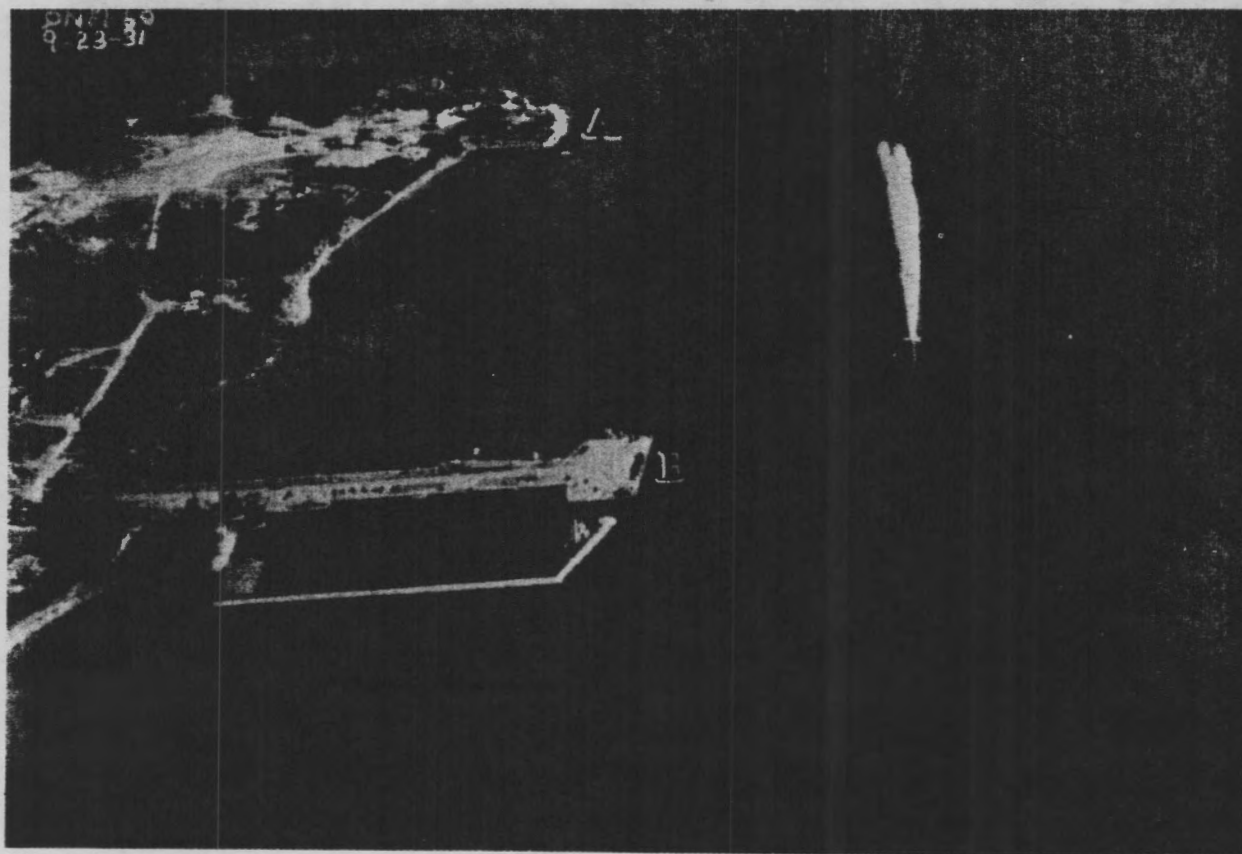


FIGURE 9.—Smoke screens.

Time: H minus 2½ minutes. This picture shows the development of the first screen. When the plane took off, the wind was southeast, but, before the screen was laid, shifted to the northeast. The pilot saw that the screen was laid too far to the south and is going back to try to fill in the northern part, but did not, however, have sufficient smoke left. This shows the necessity of having reserve planes or tanks available to supplement screens which are not effective. It may be noted that the plane would have been safer from enemy fire if it had returned outboard of the smoke.

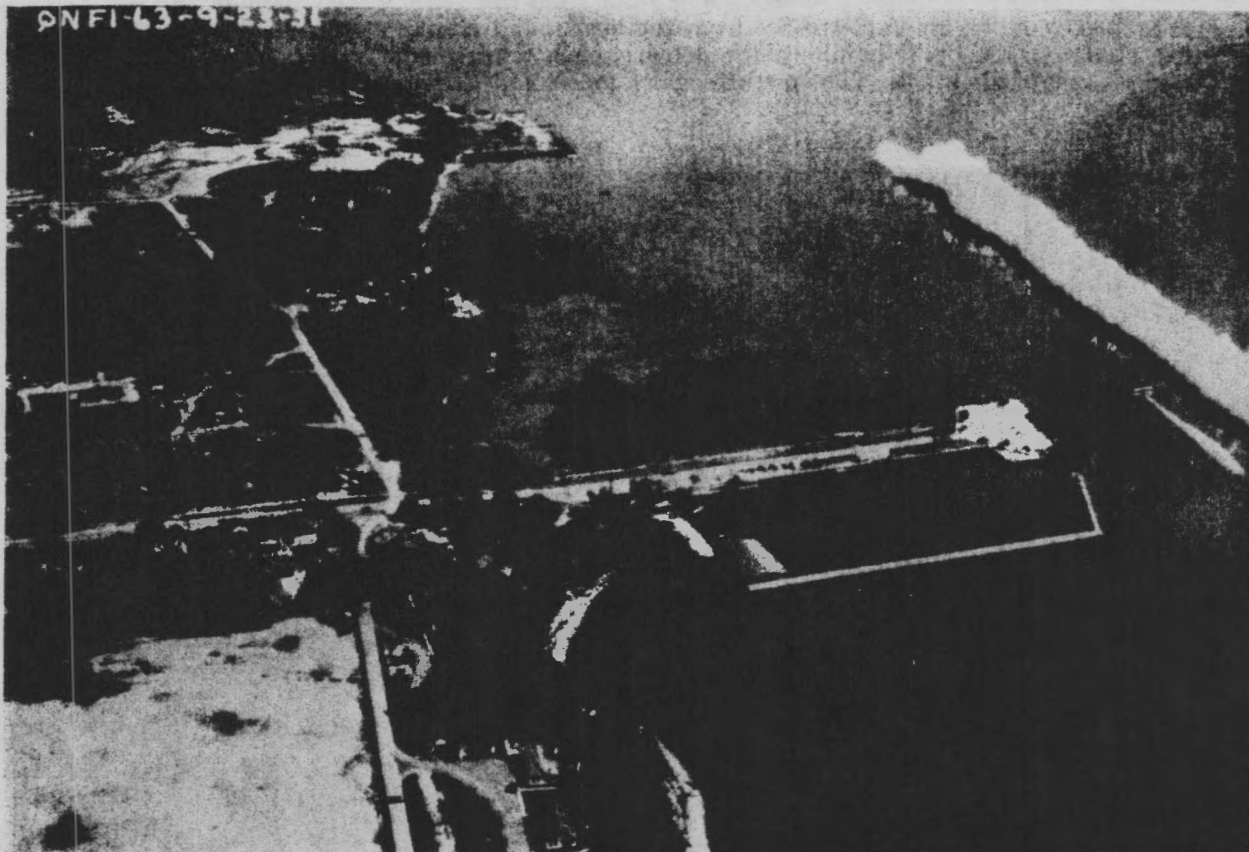


FIGURE 10.—Smoke screens.

Time: H minus 2 minutes. Boats of the first wave can be seen approaching the smoke screen. The wind held fairly steady at from 3 to 5 knots. The smoke drifted to the southwest instead of the northwest, as expected by the pilot. This shows the necessity of determining the direction and velocity of the true wind shortly before a screen is laid. This may be accomplished by use of the drift sight on shore objects or smoke bombs. Observation of whitecaps or wind streaks on the surface of the water will permit a rough estimate of the direction of the wind.

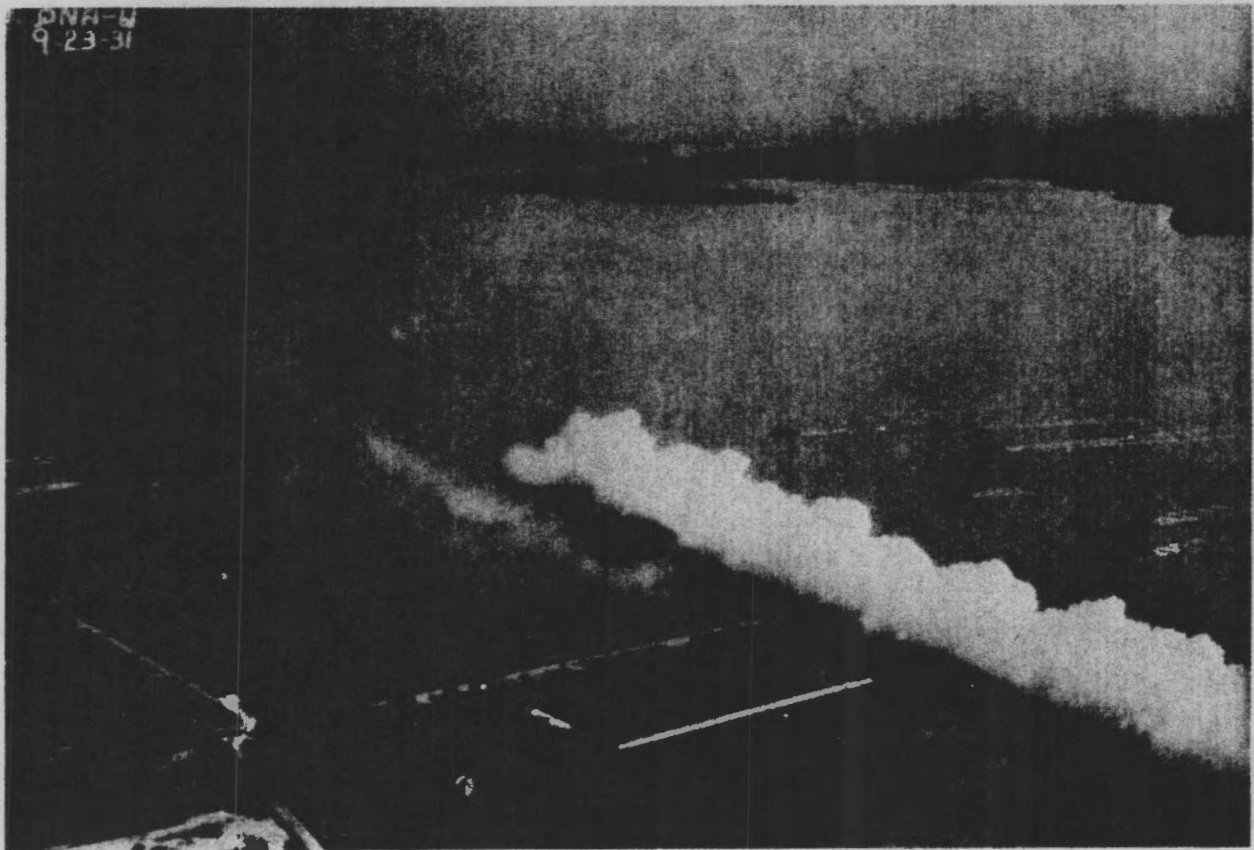


FIGURE 11.—Smoke screens.

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Time: H minus 1½ minutes. The boats on the right are under direct aimed fire from the northern point, showing the necessity of having sufficient smokers to extend the screens well beyond the flank boats. When a battalion is landing on a separate beach, it is advisable to have the screen cover from two to three times the front of the battalion. This picture shows how a guide plane can see over the smoke and guide the boats to the proper landing. In the picture, boats are executing a change of direction to the right on signal from the guide plane.

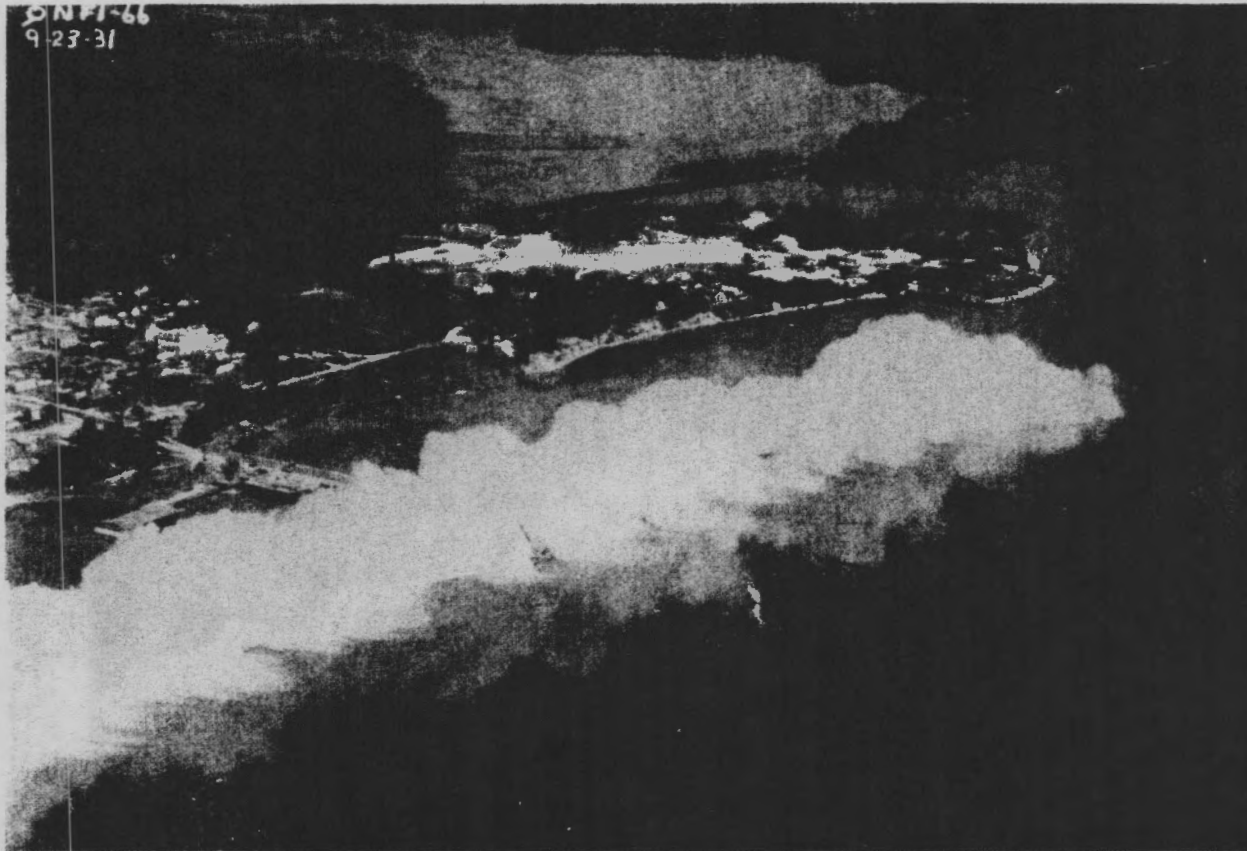


FIGURE 12.—Smoke screens.

Time: H minus 1 minute. The second plane lays its screen 75 yards off the beach. Smoke is more effective when actually covering the defender, but this procedure requires more smokers; for example, if the second plane had laid its screen directly along the beach, the smoke would have drifted inland prior to the landing of the troops, requiring another screen at about H minus one-half minute. Boats are in the first screen and are well protected from observation and aimed flanking fire from the dock, indicating that this screen was laid the proper distance to seaward.

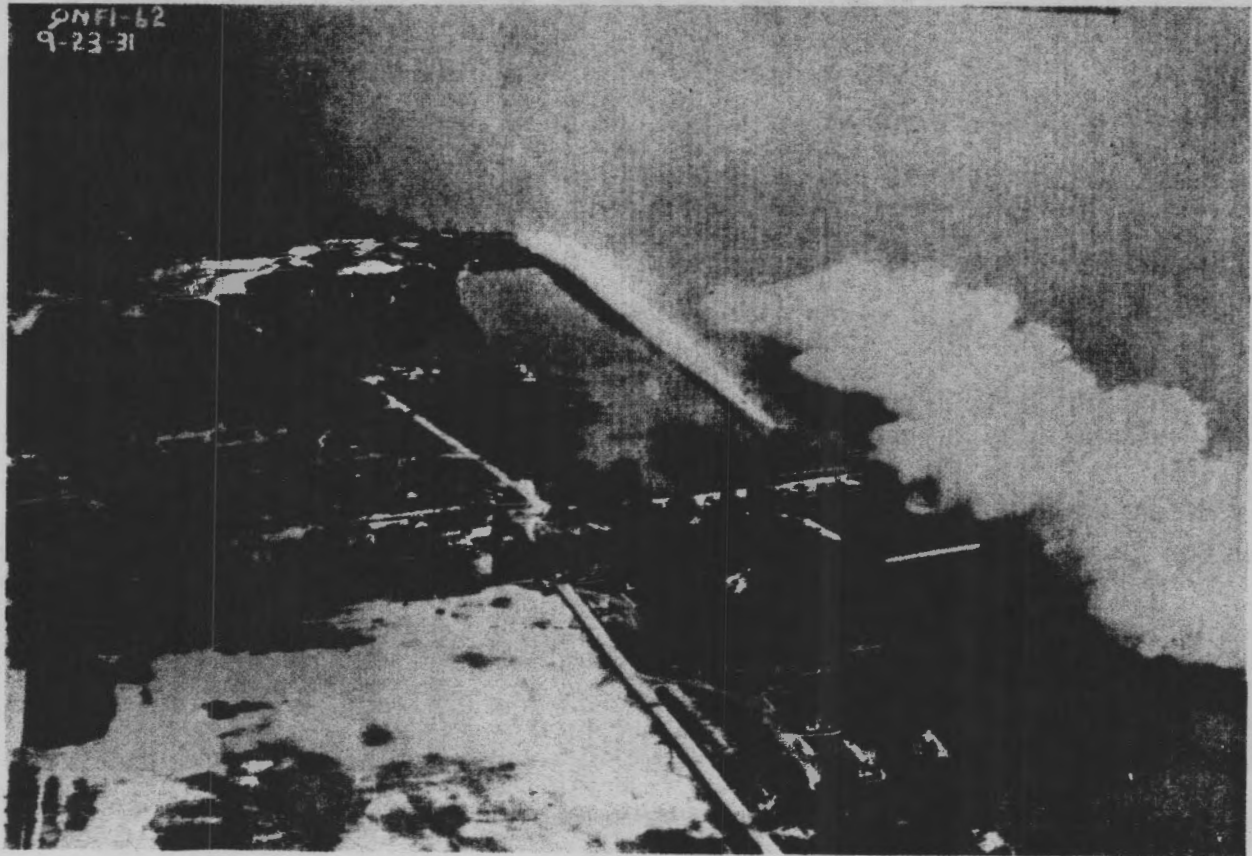


FIGURE 13.—Smoke screens.

Time: H minus one-half minute. The pilot of the second plane observed the drift of the smoke and laid his screen in the correct lateral position. The leading boats are in the smoke and are well covered from observation and aimed fire from the dock and point, and from the beach in between. Note the spread of the first screen compared to the second.

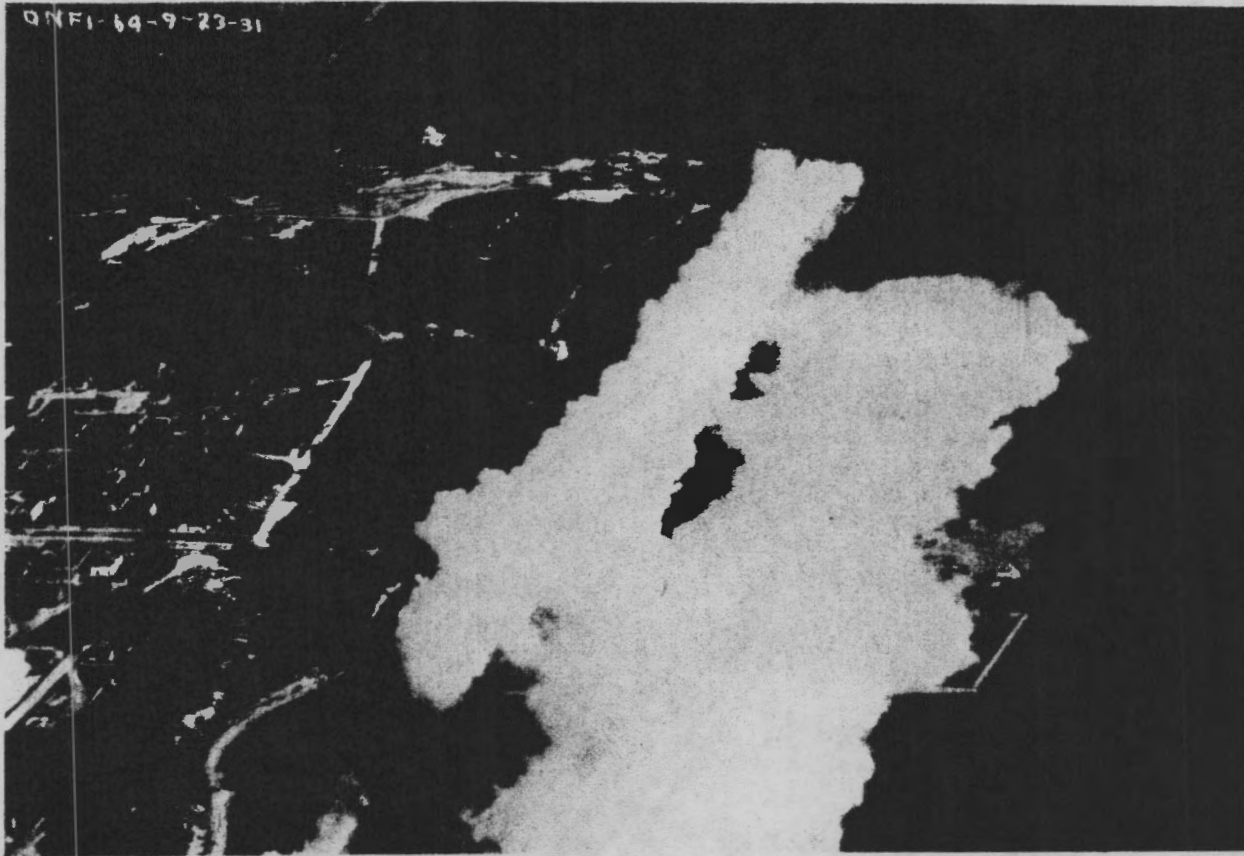


FIGURE 14.—Smoke screens.

Time: H-hour. The disembarkation from the boats is taking place in the smoke, indicating that, under existing weather conditions, the second screen was laid at the proper distance off the beach. The smoke is in the ideal location, that is, blanketing the defender during the most critical stage of the attack. Actually none of the troops were seen by observers on the beach while disembarking, and assaulting infantry passed within a few feet of these observers without being seen.

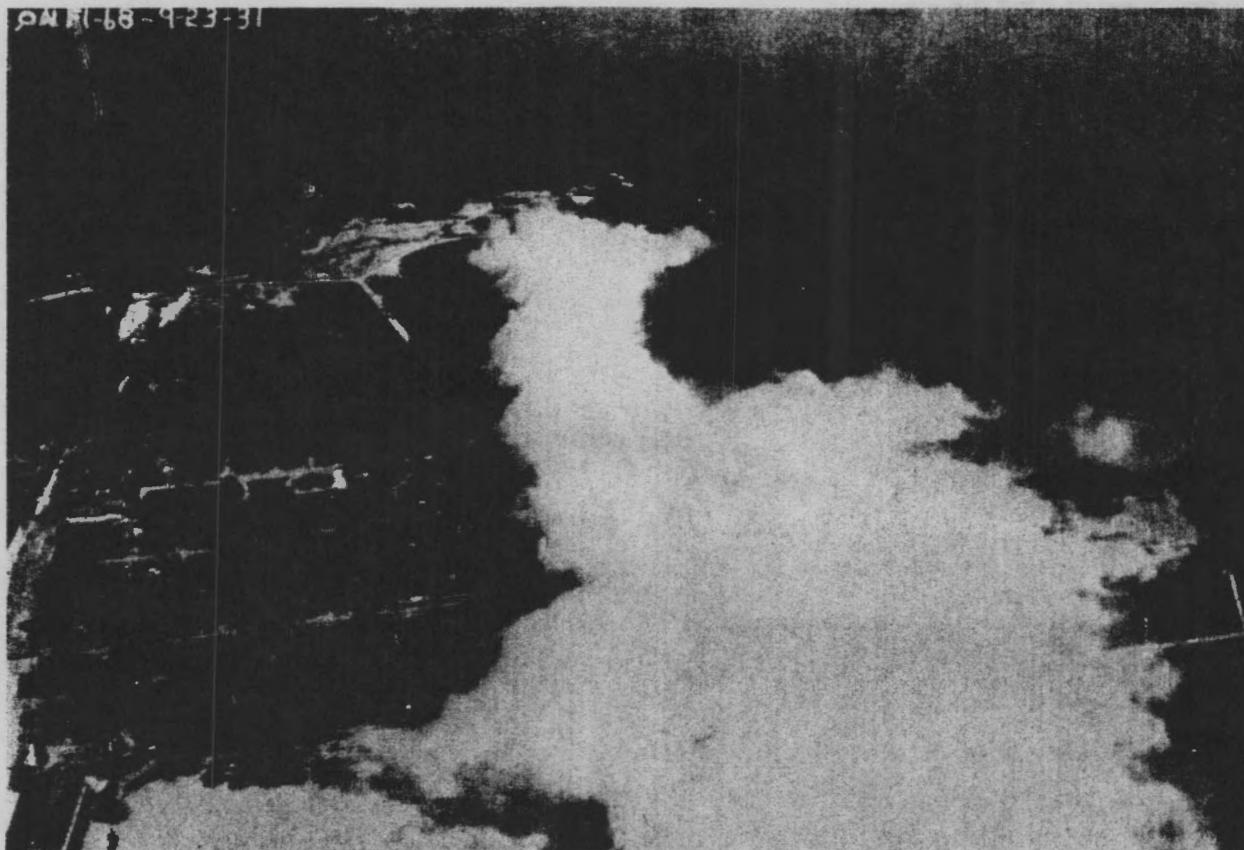


FIGURE 15.—Smoke screens.

b. *Aero smoke bombs*.—Figure 16 shows a smoke screen produced by smoke bombs dropped in the water by aircraft. As shown at right of the photograph, screens from smoke bombs are more effective when the wind is diagonal or parallel to the beach, the bombs being dropped upwind. Smoke bombs have certain advantages over smoke-screen tanks. The bombs can be dropped from a considerable height, rendering the plane less vulnerable to enemy fire and not necessitating naval gunfire to cease; and the cloud is generated gradually on the surface of the water or land, consequently it can be maintained on the desired position for a longer period of time regardless of wind direction.

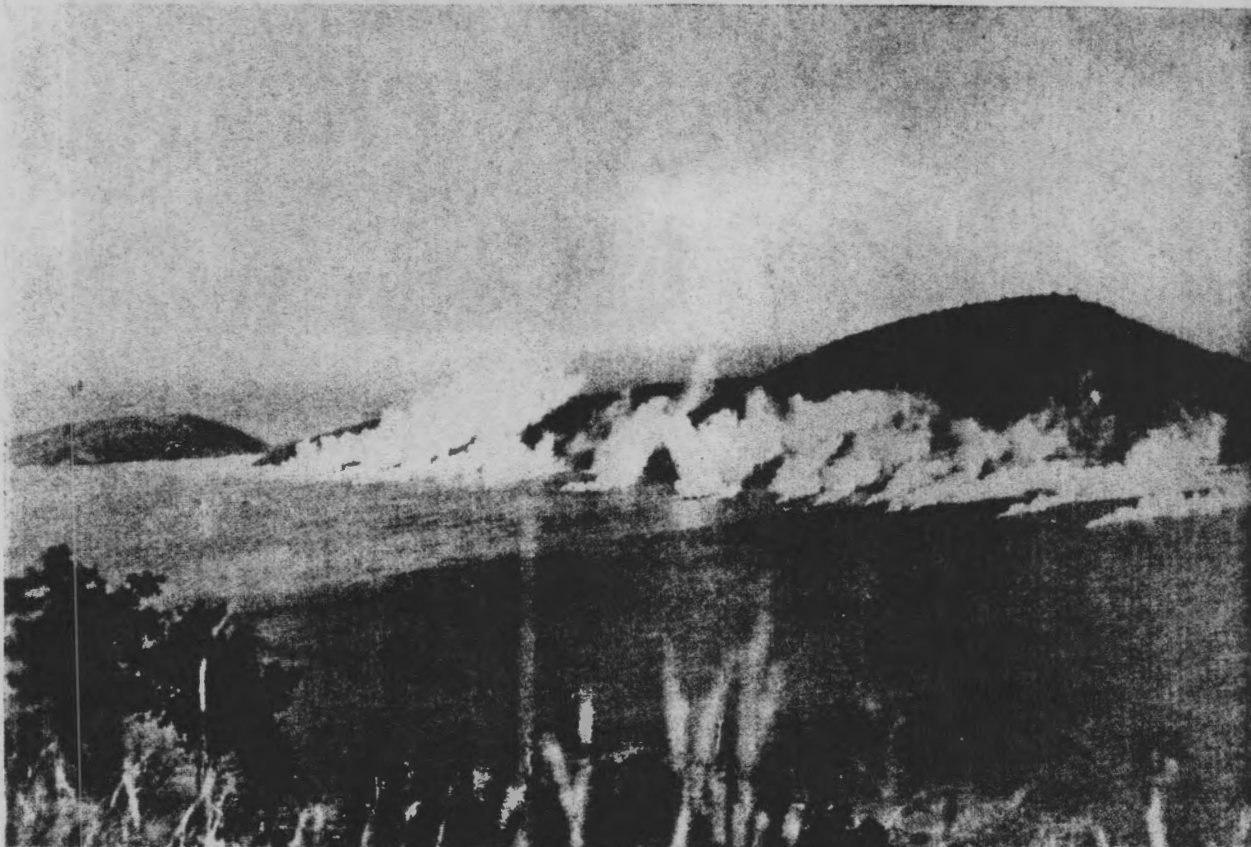


FIGURE 16.—Smoke Screens.

CHAPTER IX

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SECTION I

CLASSIFICATION OF MARINE CORPS MATÉRIEL

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901. Equipment and supplies.—*a.* Marine Corps expeditionary matériel is classified and divided into groups for the purpose of facilitating plans and orders relative to the equipment and supply of organizations and the movement of matériel, particularly its loading and stowage aboard ship and its debarkation and issue ashore.

b. Matériel is divided into two general classifications, as follows:

(1) Equipment, which includes all articles prescribed for initial issue to individuals and organizations.

(2) Supplies, which includes all articles required for maintenance of organizations.

902. Grouping of equipment and supplies.—Equipment and supplies are divided into groups, as follows:

a. Equipment.—

- GROUP 1. Individual equipment.
- 2. Baggage.
- 3. Office equipment.
- 4. Organization combat equipment.
- 5. Supplementary equipment.
- 6. Mess equipment.
- 7. Camp equipment.
- 8. Transportation.
- 9. Special equipment.

b. Supplies.—

- GROUP 10. Ammunition.
- 11. Automatic supplies.
- 12. Replacements.
- 13. Post exchange supplies.

903. Explanation of groupings.—*a. Equipment.*—

GROUP 1. *Individual equipment.*—This includes that equipment needed in field operations and combat which is issued to the individual officers and men, and is normally carried on their persons. The weight of a marine with his individual combat equipment averages 224 pounds, or one-tenth of a long ton. No hold space is required for this group.

GROUP 2. *Baggage.*—This includes trunk lockers, sea bags, etc. Provision should be made for stowage of this group in troop compartments or other suitable space where it will be available during the voyage.

LANDING OPERATIONS DOCTRINE

GROUP 3. Office equipment.—This includes organization records, stationery, field desks, typewriters, etc. This equipment will be needed during the voyage and should be stowed in space assigned as organization offices.

GROUP 4. Organization combat equipment.—This includes equipment essential in combat but not issued to individuals, such as tanks, howitzers, machine guns, hand-drawn carts, signal and medical equipment. This equipment must be so loaded as to be available to accompany troops ashore.

GROUP 5. Supplementary equipment.—This includes miscellaneous company, battery, or squadron property such as cleaning material, spare parts for weapons, and other items which, while not absolutely essential in combat, may be needed early in active operations.

GROUP 6. Mess equipment.—This includes equipment required to operate a mess in the field, such as ranges, water cans, etc. This equipment will be needed shortly after a landing is effected. It may be loaded on organization vehicles prior to embarkation.

GROUP 7. Camp equipment.—This includes tentage and other articles required for the establishment of a camp. As this equipment will not be needed until the situation on shore has become somewhat stabilized, it may be stowed below other matériel.

GROUP 8. Transportation.—This includes motor vehicles, such as trucks, tractors, ambulances, etc. Some of these vehicles, such as artillery tractors, may be required in combat. Special consideration must be given to the stowage of this group.

GROUP 9. Special equipment.—This group includes matériel, not included in standard equipment, but determined as essential to the contemplated operation such as barbed wire, construction materials, etc. The articles to be carried, the amount of each, and priority of loading must be decided in planning each operation.

b. Supplies.—

GROUP 10. Ammunition.—This group includes all types of ammunition, including chemicals, pyrotechnics, and demolition explosives. A part of this ammunition must be available for issue to troops before landing; the remainder must be available for landing as required.

GROUP 11. Automatic supplies.—This includes supplies such as subsistence, kerosene, gasoline, and oils which are consumed at a fairly uniform daily rate in any type of operation. This group should be stowed so that at least 2 days' supply will be available for issue to troops prior to landing; from 3 to 5 days should be available for landing immediately following the troops, and the remainder thereafter as required.

GROUP 12. Replacements.—This includes replacements for articles of initial issue. Replacements should not be required for several days after landing.

GROUP 13. Post exchange supplies.—This includes articles intended for sale by the post exchange. They should be stowed so that essential articles may be supplied daily.

904. Issue of equipment.—In order to maintain the mobility of units it is desirable to issue to organizations (companies, batteries, and squadrons), prior to embarkation, only that equipment which is essential in combat and field operations. In general, this essential equipment consists of the items listed in groups 1 to 6, inclusive, and group 8. The equipment which is not issued to organizations is carried by designated quartermasters and kept available for issue to organizations when required.

905. Issue of supplies.—*a.* The amount of supplies is expressed in units of fire for ammunition, and number of days, preferably in multiples of 30 for other supplies. One unit of fire is estimated as sufficient for 1 day's average fighting.

b. The bulk of the supplies are carried by quartermasters of regimental and higher units and are issued to organizations as required. Limited amounts of ammunition, rations, and other essential supplies may be issued to organizations prior to embarkation.

SECTION II

ADMINISTRATIVE PLANS

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906. General.—*a.* Administrative plans for an overseas operation must be prepared in detail prior to embarkation. Inadequate administrative measures and a consequent breakdown of the supply system may result in the failure of the operation regardless of tactical success. Problems involved in the planning and execution of administrative measures must be worked out jointly by all echelons of the forces involved. In minor operations, or where serious enemy opposition at a beach is not expected, the administrative steps outlined in this chapter may be appropriately modified.

b. Administrative plans must be based upon the probable tactical requirements of the landing operations contemplated. All plans, however, must be susceptible to modification due to changes in the situation which may occur prior to the actual landing. It is important, therefore, that the administrative plans permit a forced landing in any one of a number of localities in the theater of operations.

c. Estimates of supply requirements must be liberal, particularly when contemplated operations are to take place at considerable distances from supply bases. The estimates must consider possible enemy interference en route, and the loss or detachment of one or more ships with their cargoes.

d. Administrative plans must take into account the probability of adverse weather conditions after the initial landing is effected. An adequate reserve of supplies must be established on shore without delay, and provision made for maintaining this supply in any condition of weather.

e. Administrative plans must provide for shipment of supplies by later convoys in time to maintain supplies in the theater of operations at adequate levels.

907. Basic decisions.—Basic decisions relative to administrative plans must be made as early as possible in order that all agencies may have time to complete details and provide for the procurement and assembly of ships, personnel, boats, supplies, and matériel. Basic decisions should cover the following:

- Characteristics of the base, if one is to be established.
- Strength and composition of the landing force.
- Personnel replacements.
- Matériel of the landing force.
- Supplies to be taken in the initial movement.
- Additional naval personnel and material to be provided.

908. Characteristics of the base.—If a base is to be established its characteristics must be determined in advance in order that the proper equipment and material may be available to construct it.

909. Strength and composition of the landing force.—*a.* The composition of the combat elements of the landing force is determined from tactical requirements. The composition of the service elements such as medical, transport, engineers, and military police should meet the administrative requirements of the contemplated operation. The organization prescribed in Marine Corps Organization Tables should be modified as necessary to meet these conditions.

b. Civilian labor.—In order to reduce the number of service troops to be transported, plans should be made for utilizing civilian labor which may be available in the theater of operations.

910. Personnel replacements.—The number of personnel replacements to be provided for the landing force will depend upon the type of operation and estimated casualties from sickness and battle. These replacements should be available to the force when needed in order that veteran organizations may be maintained at full strength. Past experience has demonstrated the advantage of maintaining existing units at effective strength over the system of raising or employing new units. It is, therefore, desirable that replacements equal to the estimated casualties for a period of 30 days after the first landing be included in the initial movement, and that later replacements be available as they are needed. Since casualties in a landing operation are likely to be high initially, estimates of replacements to accompany the force should be liberal.

911. Matériel of the landing force.—*a.* Standard equipment for units of the Fleet Marine Force is prescribed by Marine Corps Equipment and Supply Tables. This matériel is designed primarily for the type of operations contemplated in this manual, but certain decisions relative thereto are essential for any particular operation or for any particular theater. Among others, the following items must be considered:

b. Motor transport.—The system of supply of units of the Fleet Marine Force operating ashore is based upon the use of light motorized vehicles. Animal transportation is confined to what may be obtained locally. The amount and type of motor transportation needed will vary,

depending largely on the nature of the terrain and the depth of advance contemplated. Estimates may indicate the advisability of an increase, decrease, or change of type from that specified in equipment tables. It should be noted, however, that a decision to decrease the motor transportation materially will preclude the adoption of an alternate plan in which such transportation is essential. In most operations, tractors and trailers can be used advantageously in clearing flying fields and moving matériel on or near the beaches, thus permitting a reduction in the size of working parties.

c. Special equipment.—(1) This group is important in determining cargo requirements as it includes such bulky cargo as engineer and construction material, material for organization of the ground, and other material that may be required for special purposes. The items to be carried and the amounts of each must be decided according to the estimated needs in any particular operation.

(2) The amount of construction material taken on the initial movement should ordinarily be limited. Tentage, which is a part of the standard equipment of marine units, is available and can be used for sheltering personnel and matériel. When the situation becomes stabilized or a base is established, temporary buildings for hospitals, storehouses, mess halls, etc., may be advisable. Construction materials for these purposes may be shipped on later convoys as a part of the base requirements.

d. Ammunition.—Decision must be made as to the types and amounts of ammunition and explosives to be taken. The transportation of high explosives presents a stowage problem which may require alteration of transports or provision of ammunition ships.

e. Rations.—Attention must be given to the procurement of suitable reserve rations in containers convenient for carrying on the individual. Unless there is time for manufacture of specially designed reserve rations, the components will have to be confined to articles which are put up commercially in small cans or packages which can be procured in the necessary quantities.

f. Method of transporting airplanes.—Due to their weight and bulk, the transportation of aircraft of the landing force must receive special consideration. If planes cannot be flown to the landing area they may be carried as follows:

- Set up on carriers (landplanes).
- Set up on transports or other vessels (seaplanes).
- Partially set up on transports.
- Crated.

It is most desirable that catapults be installed on train vessels to as great an extent as practicable, and all train vessels, transports, and cargo ships be loaded with the maximum number of set-up aircraft consistent with deck cargo requirements for boats and other special matériel. The method of transportation will materially affect the shipping requirements of the landing force, and the requirements in lighters and other landing facilities. (See ch. VI, Aviation.)

g. Gasoline and oil.—The requirements of aviation units in gasoline are so large that it may be necessary to transport the bulk of the supply in tankers or cargo vessels. Gasoline and oil needed initially for motor transportation should be made available on the transports carrying the vehicles. An adequate supply of drums should be provided for landing gasoline carried in bulk.

912. Supplies carried in the initial movement.—*a.* Decision must be made as to the length of time for which supplies will be carried in the initial movement. This is governed largely by the following factors:

- Availability of stocks of supplies.
- Amount of cargo space in the ships available for the initial movement.
- Availability of future shipping.
- Desirability of limiting the size of the initial convoy.
- Distance of the theater of operations from supply bases.
- Danger of interruption of supply by enemy activities.
- Resources in theater of operations.

b. The decision as to supplies should cover—

- The amount to be carried for subsistence of crews and troops en route, to be provided by the Navy.
- The amount to be carried by the landing force for use on shore.

c. Adequate provision should be made for the sale to troops of the necessary articles from ships' stores, ships' service stores, and post exchanges, both en route and ashore, or for the issue of such articles without charge.

913. Special naval personnel and matériel.—a. Personnel.—(1) The large number of small craft to be operated, the beach party personnel to be provided, the additional communications and gunnery personnel required on shore, and the need of rapidly unloading supplies from ships necessitate the provision of commissioned and enlisted personnel in addition to that of the normal ships' complements. This personnel should be composed of qualified naval ranks and ratings in numbers suitable to the tasks to be performed. Provision should be made for their early assembly, organization, and training.

(2) Medical personnel, both commissioned and enlisted, in addition to the regular medical complements, should be provided for transports in sufficient numbers to take care of the wounded for whom there may be no space available in hospital ships or facilities ashore. Provision should also be made for the assignment of medical personnel to ambulance boats and other small craft for the evacuation of casualties during the landing and subsequent operations on shore.

b. Matériel.—Decision must be reached as to the naval matériel, in addition to normal equipment, which must be provided. The following should be considered:

Ammunition for ships' guns, aviation, boat guns.

Chemical ammunition and supplies.

Communication matériel for boats, beach parties, transports, control vessels, and for fire control and liaison parties ashore.

Boats, boat equipment, armament, matériel for repair and upkeep, gasoline and oil, and special boats for heavy matériel.

Special gear for debarkation of troops and matériel from transport into boats.

Wharves and special equipment for landing matériel ashore.

Construction materials and equipment for initial requirements of a base, if a base is to be established.

Medical matériel for ambulance boats, and transports to be used as auxiliary hospital ships.

Ships for distilling water, portable distilling plants, water barges, pumps, and other matériel for delivery of water ashore.

SECTION III

EMBARKATION

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914. Embarkation plans.—An embarkation plan includes (1) the allotment of transports to embark the landing force, (2) the determination of the troops and matériel to be embarked on each transport, and (3) the schedules of embarkation, showing time, place, and other details of loading each vessel.

915. Organization of the transport group.—a. The transports, or other noncombatant vessels, upon which troops and matériel of the landing force are embarked, constitute the transport group. Where certain elements of the landing force, such as base defense artillery, and other base defense units, will not accompany the initial movement, two or more transport groups may be organized.

b. The transport division is a subdivision of the transport group, and consists of two or more vessels.

c. When two or more transport divisions are to operate together on an independent mission, they may be organized into a transport squadron.

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916. Organization of the landing force for embarkation.—The subdivision of the landing force for embarkation will consist of (1) the organization of embarkation groups to be embarked upon transport divisions, and (2) the designation of troops and matériel to be embarked upon each ship.

917. Sequence of planning.—Plans for embarkation are best developed in the following sequence:

Determination of shipping requirements.

Allotment of transports.

Organization of embarkation groups and transport divisions.

Assignment of troops and matériel to each transport.

918. Determination of shipping requirements.—*a.* The basic decisions outlined in the preceding section having been approved, data relative to personnel may be obtained from Marine Corps Organization Tables. Marine Corps Tonnage Tables give the necessary data from which the detailed cargo requirements may be computed.

b. Force personnel and tonnage table.—This table is prepared by the landing force and submitted to the appropriate naval commander. It shows the number of officers and men, the amount and type of matériel for each organization of the force, and for the force as a whole. It shows the amount of any matériel requiring special consideration in loading such as high

FORCE PERSONNEL AND TONNAGE TABLE

	Personnel			Matériel						
	Officers	En-listed	Total	Hold cargo		Troop space cargo (cubic feet)	Deck cargo		Total cargo	
				General cargo and vehicles (cubic feet)	High explosives (cubic feet)		Inflammables (cubic feet)	Un-crated planes, etc. (cubic feet)	Cubic feet	Long tons
Column No. 1	2	3	4	5	6	7	8	9	10	11
Division Special Troops										
1st Marines										
5th Marines										
7th Marines										
11th Marines (Arty.)										
Division Service Troops										
1st Mar. Air. Wing										
Airplanes										
Force Supplies										
Total										

Footnotes:

It is assumed that, prior to the preparation of this table, the basic decisions outlined in sec. II of this chapter have been made, particularly the number of days of supplies and the number of units of fire to be carried in the initial movement, and the method of transporting airplanes. Based upon these decisions, data necessary for computing cargo requirements for each organization are contained in Marine Corps Tonnage Tables.

In the table, airplanes, crated, are considered as "General cargo" (column 5); airplanes to be carried on deck, as "Deck cargo" (column 9); any large vehicles or other matériel (not inflammables) which must be stowed on deck are considered as "Deck cargo" (column 9).

Tonnage figures under "Total cargo, long tons" (column 11), represent actual weight of matériel, and do not include weight of personnel.

Footnotes should contain information necessary to clarify or supplement the table, such as: List and description of airplanes and other matériel requiring special consideration, amount of gasoline included under "Inflammables" (column 8), etc.

FIGURE 1.—Suggested form for force personnel and tonnage table.

explosives, inflammable matériel, and aircraft. A suggested form for a force personnel and tonnage table is shown in figure 1.

c. Naval requirements.—(1) Similar data will be needed showing the personnel and cargo requirements for naval personnel and matériel specially provided for the operation, including subsistence stores for troops while aboard ship.

(2) The stowage of boats for the landing force and their allocation to vessels presents a problem of vital importance. A list of boats, showing types, dimensions, weights, etc., should be included in the data furnished.

919. Allotment of transports.—*a.* The troop and cargo requirements as shown in the force personnel and tonnage table, plus the requirements for naval personnel and matériel, is the basis for the allotment of transports.

b. In the determination of the troop and cargo capacity of a transport, consideration should be given to the necessity of avoiding undue crowding, particularly on long voyages and under adverse weather conditions. Troops must be in good physical condition when the landing takes place. Proper ventilation of troop spaces is necessary. Space is required for drills, instruction, and exercise enroute; for troop and staff officers; for care and cleaning of weapons and other combat equipment; as well as clear deck space for gun crews in defense of the ship.

c. After determining the total troop and cargo capacity of each ship in accordance with the above considerations an additional safety factor of 10 percent should be added to the troop and cargo requirements in order to permit latitude in the assignment of troops and matériel and to assure the maintenance of the integrity of organizations.

d. The landing force will require, as soon as it can be procured, complete information concerning each of the transports allocated, including the rated troop and cargo capacity, blueprints of the vessel and each hold, plans for conversion, speed, draft, capacity of booms, and other characteristics affecting embarkation. An example of the data required is shown in figure 2.

e. The following special ships may be required:

Special boat carriers to supplement the boat capacities of other ships in transporting the requisite number of landing boats and lighters.

Hospital ships, with capacity based upon casualty estimates.

Ships for distilling water, as necessary.

Ammunition ships for high-explosive ammunition of the landing force which is beyond the capacity of the various transports, and additional ammunition for ships' guns required in support of the landing.

Tankers or cargo ships for transporting gasoline. The requirements for gasoline, particularly by aviation, are usually beyond the deck capacity of the transports.

920. Embarkation groups and transport divisions.—*a.* Effective control of all the details of the embarkation, movement overseas, and debarkation, particularly when the landing beaches are separated by considerable distances, requires that the transport group be subdivided into appropriate task organizations, designated as transport divisions.

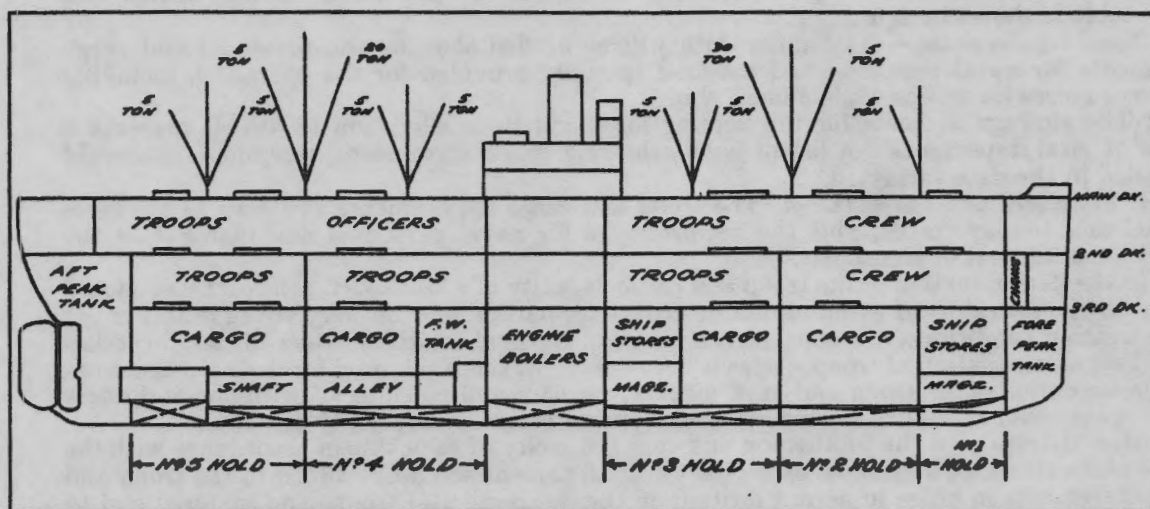
b. A parallel subdivision of the landing force into task organizations is also required. The task organization of the landing force, consisting of the troops and matériel embarked upon the vessels of a transport division, is termed an embarkation group.

c. The organization of the embarkation groups and the transport divisions upon which they will be embarked are interdependent and governed largely by the following considerations:

(1) The organization of the landing force into embarkation groups is determined primarily by tactical requirements. This organization must provide for the accomplishment of the various tasks required under the preferred and alternate plans, and should permit a modification of these plans or the substitution of a new plan. Each embarkation group, insofar as practicable, should be so constituted as to permit its detachment on an independent mission involving combat on shore, and should carry supplies for at least 30 days. Troops and matériel should be so distributed among the embarkation groups that the detachment of any particular group will not deprive the remainder of the force of an unduly large percentage of any one arm, service, or type of matériel.

(2) Each embarkation group is preferably based upon an infantry brigade or regiment to which is attached a proportionate part of the supporting arms and services, such as artillery, engineers, and medical units. A part of the aircraft, tanks, and other force troops may also be included. The normal chain of command of infantry units is interrupted as little as possible. Artillery and other auxiliary troops which operate on shore under their own commanders are,

LANDING OPERATIONS DOCTRINE



LENGTH (OVERALL) 456'-5" DRAFT (MAXIMUM) 31'-7"
SPEED 14. BEAM 57'-0' BUNKER FUEL 2,131 TONS.
STEAMING RADIUS 12,000 MILES AT 14 KNOT SPEED.

TROOP CAPACITIES INCLUDING OFFICERS.						CARGO HOLDS AVAILABLE for LANDING FORCE USE.					
DECK	HOLD SECTION	TROOPS (NUMBER)	CAPACITY CUBIC FEET	AREA SQUARE FEET	DECK HT. CLEAR OF GIRDER	HOLD SECTION	MAIN DECK MATCH OPENING		CAPACITY CUBIC FEET	FLOOR AREA SQ. FT.	DEPTH CLEAR OF GIRDER
							LENGTH	WIDTH			
2 nd	ENTIRE DECK	148	—	—	—	1	17'-0"	21'-0"	SHIP	STORES	
3 rd	1-2	CREW	29,200	3650	6'-6"	2	23'-0"	"	50,000	2,300	21'-0"
3 rd	3	590	37,600	4700	6'-6"	3	27'-0"	"	47,500	2,430	19'-0"
3 rd	4	566	34,800	4340	6'-6"	4	20'-0"	"	42,200	2,300	7'-6" & 17'-0"
3 rd	5	376	27,800	3450	6'-6"	5	18'-0"	"	30,000	1,800	8'-3"
						5	14'-6"	"			

<u>GUNS:</u> SIX 5" ^{or} 6" MAIN BATTERY. FOUR 3" A-A. <u>BOATS:</u> TWO 24'-0" MOTOR LAUNCHES ONE 22'-0" " TWO 28'-0" LIFE BOAT TWO 24'-0" " THREE 22'-0" "	TOTAL BERTHS	<u>NAME:</u> <u>XAP 1.</u>
	NAVY	
	OFFICERS 27	
	C. P. O. 20	
	CREW 274	
	LANDING FORCE	
	OFFICERS 44	
	N. C. O. 9	
	TROOPS 1636	

FIGURE 2.— Required transport data.

for embarkation, subdivided and attached to infantry organizations. Subdivision of such troops should avoid splitting the smallest unit which has the equipment to operate independently.

(3) The characteristics of available transports will vary to some extent in the facilities for loading and stowing heavy matériel. This may be a determining factor in the selection of vessels upon which certain units will be embarked.

(4) The allocation of units to embarkation groups should permit of economical loading. For example, the distribution of base defense artillery and aircraft among a large number of vessels results in the most economical loading of this type of matériel.

(5) The transports selected to embark each group should be suitable for operating together as a transport division. The number of vessels in each transport division should be such as to permit effective control of the various operations involved. Divisions of three to five ships is the most suitable organization.

(6) Where practicable the embarkation should provide for independent action on the part of one or more vessels comprising the transport division. For example, a small reinforced brigade embarked upon a transport division of four ships, may embark each regiment, reinforced, upon two ships, and thus be prepared to execute two independent operations.

(7) It may be desirable to embark reserve units, reserve supplies, or a part of base defense units upon separate ships in order to permit these ships to be kept out of the landing area until they are needed. Separate transport divisions may be organized for this purpose.

(8) Each embarkation group must be of the proper size to use to full advantage the troop and cargo capacity of the transport division. Lost space in one division will result in unnecessary crowding in another. It is usually possible to meet this requirement without sacrificing tactical considerations because there remains, after the preliminary assignment of troops to embarkation groups, a pool of unassigned force troops and supplies. These troops and supplies can be assigned as necessary to utilize the space available to each group. In this connection, it should be noted that a number of vessels have certain 'tween-deck compartments which may be utilized for either troops or cargo. This affords a desirable degree of flexibility in working out the detailed assignments.

(9) If desirable, a part of force special troops may be organized into a separate embarkation group.

(10) Hospital ships accompanying the expedition may be utilized for transporting some of the medical units of the landing force. This will result in economy in transport space and will provide greater safety for such units. Provision should be made for landing such units at the proper time.

d. The organization of embarkation groups and transport divisions should be worked out jointly between representatives of the landing force and the naval commanders concerned. Since the factors governing embarkation are to some extent conflicting, compromises will usually be necessary.

e. Each transport division is assigned a number such as "Transport Division No. 1." It should be provided with suitable command personnel and communication facilities.

f. Embarkation groups are designated by a number followed by the name of the major troop organization, as "Embarkation Group No. 1 (1st Marines, reinforced)." The appropriate troop commander in the group is responsible that troops and matériel are embarked in accordance with the approved plan. He will be embarked on the flagship of the transport division.

g. Figure 3 is a suggested form showing the detailed organization of embarkation groups and transport divisions, together with the personnel and cargo requirements of each embarkation group.

921. Assignment of troops and matériel to transports.—Troops and matériel are assigned to individual ships in accordance with the following principles:

The embarkation must permit debarkation and operations on shore in accordance with the tactical plans.

Integrity of tactical units, such as battalions of infantry and batteries of artillery, should be maintained.

It is desirable that each ship carry a proportionate part of all arms and services. It should carry necessary supplies for a period of at least 30 days for all troops embarked.

Facilities of each ship for handling and stowing heavy matériel assigned must be adequate.

Troop and cargo capacity of each ship should be fully utilized.

LANDING OPERATIONS DOCTRINE

ORGANIZATION OF EMBARKATION GROUPS AND TRANSPORT DIVISIONS

	Personnel			Matériel						
	Of- ficers	En- listed	Total	Hold cargo		Troop space cargo (cubic feet)	Deck cargo		Total cargo	
				General cargo and vehicles (cubic feet)	High ex- plosives (cubic feet)		Inflam- mables (cubic feet)	Unrated planes, etc. (cubic feet)	Cubic feet	Long tons
Column No. 1	2	3	4	5	6	7	8	9	10	11
Embarkation Group No. 1 (1st Marines, reenforced) Colonel D. E. F. —, U. S. M. C. Transport Division No. 1, Captain A. B. C. —, U. S. N. Transports: S. S. <i>President Smith</i> , S. S. <i>Lake James</i> , S. S. <i>Ruth Baker</i> .										
1st Marines										
1st Bn, 11th Marine Arty										
Hq and Ser Btry, 11th Mar Arty										
Co A, 1st Engr Bn										
Co A, 1st Med Bn										
1st Plat, MT Co, Serv Bn										
1st Guard Co (less Dets)										
Hq Co, 1st Mar Div										
Hq Sq, 1-M, Mar Aircraft										
Ob Sq, 1-M, Mar Aircraft										
Airplanes (18 VO)										
Force supplies										
Total										
Embarkation Group No. 2 (2d Marines, reenforced) Colonel J. K. L. —, U. S. M. C. Transport Division No. 2, Captain G. H. I. —, U. S. N. Transports: S. S. —, S. S. —, S. S. —.										
5th Marines										
Etc., etc										

Footnotes:
The footnotes contained in force personnel and tonnage table (fig. 1) are equally applicable to this table.
Force supplies are allotted to embarkation groups in accordance with cargo capacity available.

FIGURE 3.—Suggested form for showing organization of embarkation groups and transport divisions.

922. Embarkation tables.—When troops and matériel have been assigned to each transport the information is published in the form of an embarkation table, as an annex to the embarkation orders of the force or lower units. A sample embarkation table is shown in figure 4.

SECTION IV

TRANSPORT LOADING

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923. Responsibility.—*a.* The Marine Corps is responsible for the procurement of all matériel for the Fleet Marine Force and for the assembly of this matériel at the port of embarkation, properly placed on piers, cars, or lighters to facilitate loading in accordance with the loading plans, and for the protection of this matériel until loaded. The Marine Corps will cooperate with the Bureau of Medicine and Surgery and the Bureau of Aeronautics in the procurement and assembly of medical and aviation matériel for units of the Fleet Marine Force.

b. The Navy is responsible for the procurement and assembly of special naval matériel to accompany the expedition, and for the provision of special equipment and labor needed in the loading. Experienced stevedores and longshoremen may be used advantageously in securing efficient stowage of cargo.

c. Efficient organization of the activities of the port of embarkation is most essential. Matériel of every description will arrive in large quantities in a relatively short time. This matériel must be received, segregated, and stored so as to prevent congestion and to permit the delivery of the matériel to the various transports in accordance with their loading plans. An officer who is familiar with the matériel and the administrative plans should be detailed in charge as early as possible, and should be provided with adequate assistants and facilities.

d. The loading of each transport must be in accordance with the approved tactical and logistical plans, and the matériel must be so stowed as to be available to the landing force at the time and in the sequence it will be needed. Responsibility for this stowage rests with the transport commander.

924. Methods of loading.—*a. Commercial loading.*—This method of loading utilizes ship space to maximum efficiency. It applies in movements between established and well-secured ports. Troops moved by this method are not available for tactical employment against hostile forces until after they have landed and the necessary equipment and supplies have been issued.

b. Unit loading.—This method gives primary consideration to the readiness of troops and matériel for combat immediately upon landing, rather than economical utilization of ship space. The readiness for combat depends upon the degree to which organizations are unit loaded as follows:

(1) *Combat unit loading*, in which certain units selected because of their probable employment to meet tactical situations immediately upon landing, are completely loaded in a single transport with at least their essential combat equipment, transportation, and supplies available for immediate debarkation with the troops.

(2) *Organizational unit loading*, in which organizations, with their equipment and supplies, are loaded in the same transport, but not loaded so as to allow debarkation of troops and their equipment simultaneously. As to ship space, this method is more economical than combat unit loading. It permits debarkation of complete units available for tactical employment as soon as the troops and essential matériel have been assembled on shore. Like combat unit loading, this method permits diversion, en route, by complete shiploads from the destination originally intended.

(3) *Convoy unit loading*, in which the troops with their equipment and supplies are loaded in transports of the same convoy, but not necessarily in the same vessel. This method may be used to fill in space in transports carrying combat unit loaded organizations. Troops which are convoy unit loaded are available for tactical employment only when landed at established beach heads, and after the lapse of time necessary to assemble them on land with their equipment and supplies.

LANDING OPERATIONS DOCTRINE

EMBARKATION TABLE

Transport Division No. 1 Capt. A. B. C —, U. S. N.				Embarkation Group No. 1 (1st Marines, reenforced) Col. D. E. F —, U. S. M. C.						
Column No. 1	Personnel			Matériel						
	Of- ficers	En- listed	Total	Hold cargo		Troop space cargo (cubic feet)	Deck cargo		Total cargo	
				General cargo and vehicles (cubic feet)	High ex- plosives (cubic feet)		Inflam- mables (cubic feet)	Unorated planes, etc. (cubic feet)	Cubic feet	Long tons
2	3	4	5	6	7	8	9	10	11	
S. S. <i>President Smith</i> , Capt. M. N. P —, U. S. N., Lt. Col. R. S. T —, U. S. M. C., commander of troops.										
Hq Co, 1st Marines										
1st Bn, 1st Marines										
1st Bn, 11th Marines (less Btrys B and C)										
Hq Co, 1st Mar Div										
1st Plat, Co A, 1st Engr Bn										
Det, 1st Med Bn										
Det, 1st MT Co										
1st Div, Obs Sq 1-M, Marine Aircraft										
Airplanes (6 VO)										
QM, 1st Marines (matériel)										
Post exchange supplies										
Force supplies										
Total S. S. <i>President Smith</i>										
S. S. <i>Lake Clare</i> , Capt. U. V. W —, U. S. N., Lt. Col. X. Y. Z —, U. S. M. C., commander of troops.										
Etc., etc										

Footnotes:
The footnotes to force personnel and tonnage table (fig. 1) are applicable to this table. In addition to the decisions noted therein, the following decisions are necessary: First, groups of equipment and amount of supplies to be issued to organizations prior to embarkation; second, equipment and supplies to be carried by regimental and force headquarters. For example, the regimental quartermaster might be directed to carry certain groups of equipment, 30 days' rations, and other supplies for all units embarked.
Force supplies to be carried by the embarkation group are assigned to ships in accordance with space available.
Aggregates for the embarkation group should be the same as shown in fig. 3. In the table (fig. 3), all classes of equipment and supplies for each organization were included in the cargo figures for the organization. In this table (fig. 4), the items carried by the regimental quartermaster and post exchange officer are listed separately and cargo figures for organizations reduced accordingly.
Tonnage figures under "Total cargo, long tons" (column 11) represent the actual weight of matériel only. The weight of an officer or man with his individual equipment is assumed to average $\frac{1}{10}$ of a long ton. This weight should be added to the total cargo tonnage when it is desired to determine that the weight carrying capacity of a ship is not exceeded.

FIGURE 4.—Suggested form for embarkation table.

c. Necessity for combat unit loading.—The nature of operations contemplated by this publication are such that it is essential that most of the organizations of the Fleet Marine Force be combat unit loaded. This does not necessarily mean uneconomical loading. If the loading is carefully planned, it will be found in actual practice that, for Marine Corps matériel, combat unit loading will be practically as economical as organizational or convoy unit loading. This is possible because—

(1) The distribution of organization combat equipment, such as field guns, tractors, trailers, etc., among the various ships permits the loading of such matériel in 'tween-deck spaces and compartments which are particularly suitable for this type of equipment, thus enabling cargo space to be used to full advantage.

(2) Supplies in excess of the immediate needs of the troops may be distributed in the holds of the whole transport group to take full advantage of cargo space.

925. Commanding officer of troops.—*a.* The senior commander of the organizations embarked on each transport becomes the "commanding officer of troops." This officer will make the necessary arrangements with the transport commander relative to the embarkation, including assignment of troop space, space for organization officers, messing, and other administrative details.

b. The commanding officer of troops will make the necessary arrangements with the transport commander relative to the loading and stowage of matériel. The details of this work may be delegated to the transport quartermaster.

926. Transport quartermaster.—*a.* An officer will be detailed as transport quartermaster for each transport carrying organizations or matériel of the landing force. The transport quartermaster should be detailed as soon as possible after the allocation of vessels has been decided. He should be given opportunity for frequent conferences with the ship's officers, and to familiarize himself with the arrangement and facilities of the transport.

b. The duties of the transport quartermaster are—

To act as liaison officer between the transport commander and appropriate troop commanders.

To furnish the ship with all necessary information relative to troops and matériel, including a consolidated tonnage table (fig. 5).

To assist in the preparation and execution of the loading and stowage plans.

To arrange for the delivery of matériel to the ship in the order required by the loading and stowage plans.

To keep complete records of matériel loaded and its disposition.

To assist in the preparation and execution of the debarkation plan for the personnel of rear echelons and services, and equipment and supplies not landed with combat troops.

c. Unless permanently assigned to the ship, the transport quartermaster is under the immediate command of the commanding officer of troops. Prior to embarkation, however, and after troops are debarked at destination, the transport quartermaster may work under the direct supervision of force headquarters, in which case he will have the status of an additional staff officer of the force.

d. The relief of the transport quartermaster from other duties will usually be necessary, particularly when the transport is not in the immediate vicinity of the mobilization point. He may be detailed from one of the organizations to be embarked on the transport, or an additional officer may be appointed. The latter is preferable in large operations.

e. Assistants to the transport quartermaster will be detailed as necessary. These should include an assistant transport quartermaster and at least one noncommissioned officer for each hatch and, if available, an additional noncommissioned officer for each hold.

f. The transport quartermaster should not be made an accountable officer for matériel loaded in the transport. Accountability for such matériel should remain with appropriate organization quartermasters.

927. Marine Corps consolidated tonnage table.—*a.* A consolidated tonnage table will be prepared giving detailed information relative to the organizations and matériel of the landing force to be embarked aboard each transport. A sample consolidated tonnage table is shown in figure 5.

b. Classification of cargo.—In order to facilitate the preparation of loading plans, cargo is divided into seven classes, according to the nature of stowage required, as follows:

(1) *Vehicles.*—These include all wheeled vehicles, such as Cole carts, tractors, trucks,

CONSOLIDATED TONNAGE TABLE, S. S. "PRESIDENT SMITH"

Item No.		Hold cargo					Troop space cargo (cubic feet)	Deck cargo		Total cargo			
		Vehicles		General cargo (cubic feet)	High explosives (cubic feet)	Total hold cargo (cubic feet)		Inflammables (cubic feet)	Uncrated planes, etc.		Cubic feet	Long tons	
		Square feet	Cubic feet						Square feet	Cubic feet			
1	Column No. 2	2	4	5	6	7	8	9	10	11	12	13	
	ORGANIZATIONS												
1	Hq Co, 1st Mar.....												
2	Hq Co, 1st Mar Div.....												
3	1st Bn, 1st Mar.....												
4	Hq and Ser Btry, 1st Bn (Arty).....												
5	Btry A, 11th Mar Arty.....												
6	1st Plat, Co A, 1st Engr Bn.....												
7	Det, 1st Med Bn.....												
8	Det 1st MT Co.....												
9	1st Div, Obs Sq 1-M Mar Air.....												
10	Airplanes (6 VO).....												
	QM—1ST MARINES												
11	Group 7, camp equipment.....												
12	Group 9, special equipment.....												
13	Group 10, ammunition.....												
14	Group 11, automatic supplies:												
15	Rations.....												
16	Gas and oil.....												
	Misc. automatic supplies.....												
17	POST EXCHANGE OFFICER												
	Group 13, Post exchange supplies.....												
18	FORCE QM												
	Group 10, ammunition.....												
19	Group 11, automatic supplies:												
20	Rations.....												
21	Gas and oil.....												
22	Misc. automatic supplies.....												
	Group 12, Repl. supplies.....												

Footnotes:
 The footnotes contained in figs. 1 and 4 apply.
 In the preparation of this table, it was assumed that organizations carry certain groups of their equipment and supplies for a limited period; and that the quartermaster, 1st marines, carries the remaining equipment, and supplies for an additional period for all organizations embarked.
 Vehicles, airplanes, and very heavy matériel should be listed on supplementary sheets. For data on vehicles and airplanes, see "Logistic Data, U. S. Marine Corps." Dimensions, weights, etc., of vehicles, airplanes, and other heavy matériel not contained in this pamphlet should be ascertained and shown on the supplementary sheet.
 This table is compiled from the data contained in Organization Tonnage Tables of each unit embarked, which should be referred to for further details. It may be advisable to furnish smooth copies of the Organization Tonnage Tables with the consolidated tonnage table.

FIGURE 5.—Suggested form for consolidated tonnage table.

guns mounted on wheels, etc. Vehicles require a definite amount of deck space regardless of the cubic capacity of the hold.

(2) *General cargo*.—This includes boxes, bales, crates, barrels, and bundles generally known in commercial shipping as package freight. This type of cargo is susceptible of loading in any available hold according to the priority desired.

(3) *Perishables*.—This consists of fresh meat, fruit, vegetables, and other perishable components of the ration.

(4) *High explosives*.—This includes artillery ammunition, grenades, airplane bombs, demolition explosives, some groups of chemical ammunition, etc., requiring stowage in a magazine or other suitable compartment.

(5) *Troop space cargo*.—This includes baggage of individuals and office equipment of organizations. No hold space is usually required for this equipment as it should be stowed in troop sleeping compartments and offices.

(6) *Inflammables*.—This includes gasoline, oil, kerosene, some groups of chemical ammunition, and pyrotechnics. On transports, this class of cargo is normally stowed on weather decks.

(7) *Airplanes*.—This includes airplanes, crated and uncrated, requiring special consideration in loading and stowage.

c. Tonnage data.—The necessary data for the compilation of the consolidated tonnage table, and instructions for the preparation thereof, are contained in Marine Corps Tonnage Tables.

d. Broken stowage.—(1) Broken stowage is lost space between items of cargo, around stanchions, against bulkheads, and between the cargo and deck above.

(2) The figures given in all Marine Corps Tonnage Tables include allowances for broken stowage as shown below:

(a) For vehicles and uncrated planes 50 percent has been added to the actual volume and 25 percent to the actual area of deck space necessary for the articles.

(b) For all other cargo 20 percent has been added to the actual volume of the articles.

(3) These percentages are based upon the best available data from naval and commercial sources. If suitable spaces are utilized for the various classes of cargo and the stowage is carefully planned and executed, the cargo should stow in the space assigned in the tables. It should be noted, however, that for vehicles and planes particularly, the percentage of broken stowage will vary between wide limits, depending upon the shape and dimensions of the available cargo space and the character of the matériel to be loaded therein. In practice, therefore, the figures given in the consolidated tonnage tables should be used for making preliminary estimates of shipping requirements and a tentative allotment of matériel to stowage spaces. The figures should be checked by detailed stowage plans as shown in paragraph 930, below.

928. Navy consolidated tonnage table.—A consolidated tonnage table should be prepared for each ship, showing all special Navy matériel to be loaded. It is desirable that this table be prepared in the same form and with the same classification of cargo as is used in the Marine Corps consolidated tonnage table, with a probable addition of a column for "Perishables."

929. Transport loading plans.—*a.* Based on the consolidated tonnage tables a loading plan is prepared for each transport showing what matériel will be loaded in each hold, 'tween-deck compartment, magazine, and other space on the transport available for cargo, including cargo to be carried as a deck load. Loading plans are prepared under the direction of the transport commander. The transport quartermaster, or other responsible officer of the landing force, will assist in the preparation of these plans, or prepare tentative plans for approval of the transport commander. Figure 6 shows a convenient form for preparing loading plans.

b. Tactical and administrative factors.—(1) All equipment and supplies should be allocated to cargo spaces so as to permit debarkation in the order required.

(2) When practicable, the matériel belonging to each organization should be kept together and loaded in a part of the ship convenient to the organization.

(3) In order that lowering of fighting tanks may not delay debarkation, it is desirable that they be stowed in positions where they will be readily available.

(4) Force supplies are allocated to holds to utilize the cargo space to best advantage.

c. Classes of cargo.—The various classes of cargo must be assigned space suitable to the nature of the cargo.

d. Distribution of weight.—Loading and stowage plans must provide for proper distribution of weight longitudinally, laterally, and vertically. Ballast tanks may be utilized to compensate for unequal distribution of weight.

LOADING PLAN, "S. S. PRESIDENT SMITH"

Data on cargo space				Data on matériel to be loaded					
Hold, Compt., etc.	Capacity		Height clear of girder	Item No	Organization	Type of matériel	Amount		
	Cubic feet	Square feet					Cubic feet	Square feet	Long tons
1	2	3	4	5	Column No. 6	7	8	9	10
Magazine B-6	xx	xx	xx	5	Btry A, 11th Mar Arty	H. E. ammunition	xx		xx
				9	Obs Sq, 1-M, aircraft	do	xx		xx
					Total magazine B-6		xx		xx
Etc					Etc				
Compt. No. 1, 3d deck	xx	xx	xx	3	1st Bn, 1st Mar	Org. Eq. and supplies	xx	xx	xx
				1	Hq Co, 1st Mar	Vehicles	xx	xx	xx
				14	QM, 1st Mar	Rations	xx		xx
					Total Compt. No. 1, 3d deck		xx	xx	xx
Etc					Etc				
Hold No. 1	xx	xx	xx	11	QM, 1st Marines	Camp equipment	xx		xx
				12	do	Special equipment	xx		xx
				13	do	Rations	xx		xx
					Total hold No. 1		xx		xx
Etc					Etc				
					Total hold cargo		xx	xx	xx
Main deck, aft		xx		10	Obs Sq 1-M, aircraft	3 VO airplanes	xx	xx	xx
				9	do	Gasoline in drums	xx	xx	xx
					Total main deck, aft		xx	xx	xx
Etc					Etc				
					Total deck cargo		xx	xx	xx

Footnotes: This table is compiled from data contained in the consolidated tonnage table (fig. 5), supplemented as necessary by Organization Tonnage Tables for units to be embarked. Due provision must be made for special naval matériel which must also be loaded.
Item numbers refer to item numbers in the consolidated tonnage table.
The number of square feet (columns 3 and 9) need be entered only for vehicles, uncased planes, etc., which require a definite area of deck space.
Total cubic feet and long tons for hold cargo and deck cargo should agree with aggregate for such cargo as shown by consolidated tonnage table.
The stowage plan for Compt. No. 1, 3d deck, is shown in fig. 3.

FIGURE 6.—Suggested form for ship's loading plan.

e. Stowage factors.—(1) Proper distribution of weight is based on the stowage factor; that is, the number of cubic feet per ton for the various types of matériel to be loaded. The stowage factor for any article or group of articles can be obtained from the Marine Corps Tonnage Tables by dividing the volume in cubic feet by the weight in tons.

(2) A partial table of the stowage factors of Marine Corps matériel, including allowances for broken stowage, is as follows:

	Cubic feet per ton
75-mm guns.....	326
75-mm pack howitzers.....	291
155-mm gun.....	195
Tractors, No. 25.....	145
Trailers, 3-ton, empty.....	408
Trailers, 3-ton, loaded.....	142
Trucks, 2-ton, empty.....	462
Trucks, 2-ton, loaded.....	299
Camp equipment.....	159
Small-arms ammunition.....	36
Artillery ammunition.....	48
Rations.....	68

(3) It will be seen from the above table that, contrary to the usual belief, guns, tractors, and trailers have comparatively large stowage factors and consequently can be loaded at high levels on the ship; that is, in 'tween-deck compartments or on deck. This is not only economical in space but it is desirable from a tactical standpoint, as much of this matériel will be needed early in the operation.

(4) Ammunition and rations have relatively low stowage factors requiring that the bulk of these supplies be stowed at low levels. Some of these supplies, however, must be available to accompany troops ashore, and provision should be made for stowing a certain amount of ammunition and rations 'tween decks, or in other readily accessible space.

f. Sequence.—In the preparation of the loading plan it will be found convenient to allocate cargo to cargo space in the following sequence:

(1) High explosives, inflammables, and perishables, for which special stowage space must be provided.

(2) Troop space cargo, if not loaded in troop compartments.

(3) Airplanes.

(4) Heavy, bulky items, such as 6-inch guns, machine shop trucks, etc.

(5) Other vehicles; square feet of available deck space must not be exceeded.

(6) Remaining organization equipment and supplies.

(7) Quartermaster matériel; the bulk of this is general cargo, and space is assigned according to desired priority.

g. Verification of loading plan.—As a final verification, the loading plan and the consolidated tonnage tables should be compared to see that each group of articles is accounted for and that the totals of tonnage and volume agree.

930. Hold stowage plans.—*a. Plans.*—After the loading plan for the transport has been completed, a stowage plan is prepared for each hold, magazine, and 'tween-deck compartment used for cargo. The necessary data is taken from the consolidated tonnage tables supplemented by detailed information contained in the tonnage tables for the organizations to be embarked. These plans will indicate in detail how the items of cargo will be stowed in the space available, and should include—

A drawing showing the hold and arrangement of cargo therein (fig. 8-a).

A table showing the items, order in which loaded, and such other information as is necessary (fig. 8-b).

b. Stowage.—(1) Matériel may be stowed as follows:

Highest priority under the hatches and immediately accessible thereto, lower priority outward therefrom;

By layers with highest priority on top;

In groups separated by vertical planes radiating from the hatch; or

Combinations of the above.

(2) It is desirable to begin stowage in the wings and complete near the hatches, and the order of loading as shown in the stowage table should so provide.

LANDING OPERATIONS DOCTRINE

c. *Vehicles*.—(1) "Logistic Data, U. S. Marine Corps" contains complete data relative to dimensions and weight of Marine Corps vehicles, guns on wheels, and uncrated planes. It contains a photograph of each vehicle or article, and a diagram showing the deck space required in stowage. Where vehicles can be nested, the diagram shows space required for nested vehicles.

DELETED

FIGURE 7.—Sample sheet from pamphlet "Reference Data for Loading and Stowing Marine Corps Matériel."

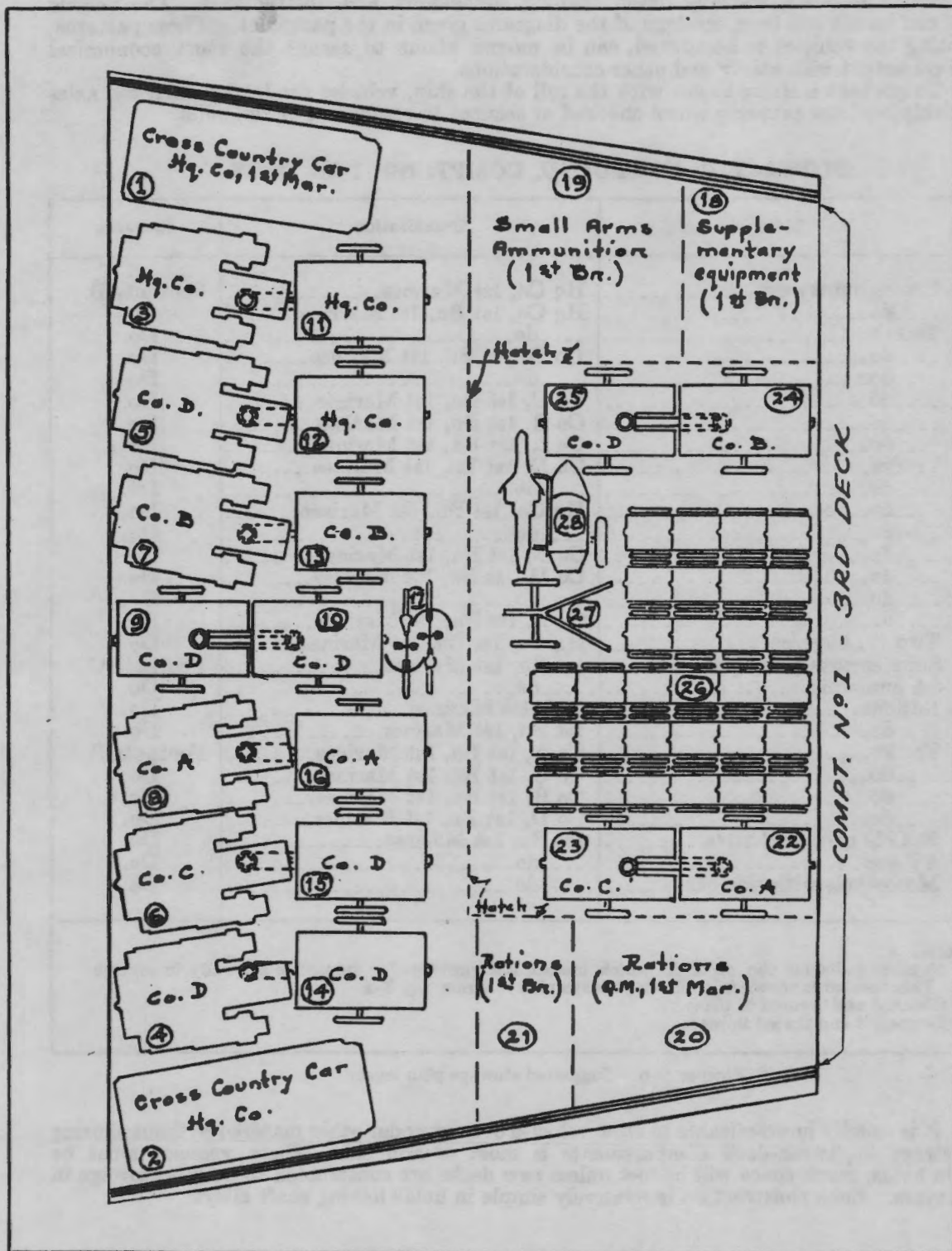


FIGURE 8-a.—Stowage plan diagram.

LANDING OPERATIONS DOCTRINE

(2) In preparing a stowage plan for stowing vehicles or planes a diagram of the hold or deck is drawn to scale, showing hatch opening, stanchions, and obstructions. The vehicle patterns can be cut out from tracings of the diagrams given in the pamphlet. These patterns, representing the vehicles to be stowed, can be moved about to secure the most economical stowage consistent with safety and other considerations.

(3) To prevent shifting at sea with the roll of the ship, vehicles are loaded with the axles athwart ship, and are properly wheel chocked or secured to stanchions or ringbolts.

STOWAGE PLAN LEGEND, COMPT. NO. 1 3D DECK

No.	Matériel	Organisation	Remarks
1	Cross-country car	Hq Co, 1st Marines	Footnote B.
2	do	Hq Co, 1st Bn, 1st Marines	Do.
3	Tractor	do	Do.
4	do	Co D, 1st Bn, 1st Marines	Do.
5	do	do	Do.
6	do	Co C, 1st Bn, 1st Marines	Do.
7	do	Co B, 1st Bn, 1st Marines	Do.
8	do	Co A, 1st Bn, 1st Marines	Do.
9	Trailer	Co D, 1st Bn, 1st Marines	Do.
10	do	do	Do.
11	do	Hq Co, 1st Bn, 1st Marines	Do.
12	do	do	Do.
13	do	Co B, 1st Bn, 1st Marines	Do.
14	do	Co D, 1st Bn, 1st Marines	Do.
15	do	do	Do.
16	do	Co A, 1st Bn, 1st Marines	Do.
17	Two (2) bicycles	Hq Co, 1st Bn, 1st Marines	Do.
18	Supplementary equipment	1st Bn, 1st Marines	Footnote C.
19	SA ammunition	do	Do.
20	Rations	QM, 1st Marines	Do.
21	do	1st Bn, 1st Marines	Do.
22	Trailer	Co A, 1st Bn, 1st Marines	Footnote B.
23	do	Co C, 1st Bn, 1st Marines	Do.
24	do	Co B, 1st Bn, 1st Marines	Do.
25	do	Co D, 1st Bn, 1st Marines	Do.
26	29 Cole carts and 1 reel	1st Bn, 1st Marines	Do.
27	AT gun	do	Do.
28	Motorcycle with side car	do	Do.

Footnotes:

(A) Number indicates the order in which loaded, and provides for unloading generally in reverse order. This number is shown in circle on stowage plan diagram, fig. 8-a.

(B) Chocked and secured in place.

(C) Dunnaged and fenced in place.

FIGURE 8-b.—Suggested stowage plan legend.

(4) It is usually impracticable to stow vehicles over or under other matériel without shoring up. Stowage in 'tween-deck compartments is most economical. Where vehicles must be stowed in holds, much space will be lost unless new decks are constructed to permit stowage in several layers. Such construction is relatively simple in holds having shaft alleys.

(5) Care should be exercised to see that vehicles can actually be lowered or moved into the assigned space, due consideration being given to the location of the hold opening, turning radius of the vehicle, and stanchions, hatch combings, and other obstructions.

d. General cargo.—Stowage plans for holds in which general cargo will be stowed need not be so detailed.

e. Sample stowage plan.—Figures 8-a and 8-b show a sample stowage plan of a 'tween-deck compartment in which both vehicles and general cargo are stowed.

931. Loading.—*a. Delivery of matériel.*—The stowage plans show the order in which matériel will be loaded in each hold. These plans, together with the order of loading the various holds, determine the priority, the place, and the approximate time matériel should be delivered alongside.

b. Laying out holds.—Prior to receipt of the matériel, holds in which vehicles or planes are to be stowed should be laid out with chalk, showing the exact space to be occupied by each vehicle or plane. A similar deck marking may be desirable to indicate space assigned to other classes of cargo. The spaces should be numbered serially in the order in which the matériel is to be loaded, as indicated by the stowage plan for the hold. This will not only provide for orderly and speedy loading when the matériel arrives, but is desirable as a check on the stowage plans.

c. Identifying matériel.—Organization equipment will bear an identifying insignia indicating the company, battery, or squadron to which each article belongs. As a further means of identification, each vehicle should be marked in chalk with the number of the space it is to occupy, and the hold number. If time permits, it is desirable to mark other matériel with its priority and hold number as indicated on the stowage plans.

d. Shifting of cargo.—(1) Precautions are necessary to prevent shifting of cargo with consequent damage to ship or matériel. This danger is always present when there is any empty space within the hold or between and around articles. Much of the expeditionary matériel, such as gunsights, is very fragile and easily damaged.

(2) The precautions against shifting include the following measures:

If possible, leave no space into which cargo may shift.

If there is space left, the cargo must be thoroughly shored or secured so that it will not move under any circumstances.

If the cargo will settle, some provision must be made to secure it after it has settled.

(3) Dunnage is material used to prevent cargo from shifting and chafing and to fill in broken stowage. Lumber and cordwood are the usual materials used for this purpose. The percentage of dunnage to the total cargo varies, but 10 percent is a fair average. Dunnage should, as far as practicable, be confined to materials which will be useful after arrival at destination.

e. Modifying loading and stowage plans.—In order that loading and stowage plans may furnish an accurate record of where each item of cargo is stowed, these plans are modified to show all changes made during the actual loading.

SECTION V

SYSTEM OF SUPPLY

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932. System of supply on shore.—The landing force is responsible for the establishment and maintenance of its system of supply on shore. The principles of supply of ordinary land warfare must be modified to meet the peculiar conditions existing in a landing operation. Motor transportation will be very limited, particularly in the early phases of the operation; supplies are delivered by boat requiring rehandling at the beach, often under difficult conditions; and the point of delivery cannot be advanced inland to follow troop movements.

933. Supply echelons.—*a.* Supplies are echeloned in depth. The amount and kind of supplies maintained in each echelon must be sufficient for all needs of the troops until the next echelon is made available. In a force approximating a division, the supply echelons are—

Battalion supplies, which are in the custody of companies or battalion quartermasters.
Regimental quartermaster supplies, which are in the custody of quartermasters of regiments or corresponding special units.

Force supplies, which are the reserve supplies in the custody of the force.

b. In forces larger than a division, divisional supplies will constitute an additional echelon.

c. If the battalion is acting independently, it is furnished with additional supplies by higher echelons and supply personnel as appropriate.

934. Supply echelons on vessels.—The total amount of supplies carried by the landing force are echeloned as follows:

a. Battalion supplies.—(1) Rations and ammunition for 1 or 2 days, stowed so as to be available for issue to individuals prior to landing. It will prevent loss and wastage if these supplies are issued to troops just before debarkation.

(2) Additional rations, ammunition, and other automatic supplies sufficient for a period of from 3 to 5 days for all troops in the battalion. These supplies must be segregated prior to loading and stowed so that they are immediately available to follow troops ashore. It is desirable that they be issued to battalions prior to debarkation. If this is not practicable they may be landed under supervision of the regiment and issued to organizations ashore.

b. Regimental quartermaster supplies, sufficient for a designated period, usually 25 days or more, loaded so as to be available for debarkation early in the operation. These supplies are loaded on the various ships carrying the regiment.

c. Force supplies, usually 30 to 90 days as determined. These can be loaded at lower levels in the ships and in the most economical manner. Force supplies are preferably well distributed among the various ships in the convoy.

d. The proportion of the total supplies to be carried on each vessel will vary with the situation. Normally, in addition to the naval stores to be used aboard, it is advisable to load on each vessel at least 30 days' supplies for the personnel of the landing force embarked.

935. Debarkation of supplies.—*a.* Except for small amounts landed with troops, supplies are landed by second and succeeding trips of boats. Careful planning is required to insure the most efficient use of boats and the proper priority in movement of supplies to the beach. Transports must be prepared to modify priority schedules should conditions ashore so require.

b. As soon as it is safe to do so, transports should move to positions close to the beach in order to expedite the movement of supplies to shore.

c. The landing schedule and other orders will show in general terms priorities of landing of troops and matériel. These instructions should be amplified on each transport and compiled in a priority table as shown in figure 9. The table should include all matériel and rear echelon personnel not landed in accordance with debarkation schedules.

d. All boats carrying supplies only should be loaded to capacity. The transport quartermaster must adjust the priority table as necessary. For example, space available in boats carrying vehicles is used for rations, ammunition, or other general cargo which may have later priority than the vehicles.

936. Supply dumps.—*a.* Supply dumps of various classes, such as water, rations, ammunition, signal, medical, and engineer, are established near the beach, and supplies arriving by boat are moved directly to these dumps. The locations are tentatively selected prior to the landing, and finally determined after reconnaissance by supply personnel landing ahead of the supplies. Locations finally selected must be approved by the shore party commander. Primary considerations affecting selection of locations are convenience to boat landings, cover from enemy observation and fire, traffic routes inland, and facilities for handling supplies. The locations selected should not be such as to create concentrated targets for aerial attacks or lead to congestion of traffic.

b. The necessary service troops, transportation, and matériel for moving supplies from small craft to the beach, and from beach to supply dumps, and for organizing dumps, should be landed with or prior to the landing of the matériel. Inadequate provision for this need will cause confusion at the beach and may disrupt the supply service.

937. Landing battalion supplies.—*a. Supplies carried on or with troops.*—(1) The amount of supplies carried by the individual on landing must be limited so that the mobility and aggres-

siveness of the troops will be maintained. Loads on individuals comprising the leading troop units particularly will be reduced to a bare minimum.

(2) Boats of the second and succeeding waves should carry additional water, ammunition, and hard rations in order that troops may have on the beach, including what is carried on the man, essential combat supplies for a period of from 2 to 3 days. Supplies not carried by the individual, or on organization vehicles, are unloaded on the beach and transferred to dumps. This work is performed by beach party and shore party personnel in order that troops will not be delayed at the beach.

(3) When combat near the beach is anticipated, men should be equipped with combat packs only. The remainder of the packs (or blanket rolls) should be left aboard ship and furnished to organizations when conditions permit.

b. Supplies immediately following troops.—The remainder of the battalion supplies are landed as soon as practicable, and not later than 24 hours after the initial landing. These supplies are usually landed on the same beaches upon which the troops are landed; however, they may be landed at other beaches when the lateral movement of troops or beach conditions make it advisable.

c. The supply sections of companies and battalions land with these supplies, assist in handling and segregating them into battalion dumps, and initiate the battalion supply system. If battalion trains or other vehicles are not available, supplies are issued to companies and batteries direct from the dumps and handled by carrying parties. Where a deep advance is contemplated, battalion trains should be landed early, prepared to move supplies and company kitchens to the vicinity of the companies.

d. Battalion dumps must be sited without delay. Locations should, as far as practicable, be suitable for later use by the regiment.

938. Landing regimental quartermaster supplies.—*a.* Regimental quartermaster supplies of all types are landed in accordance with priority schedules and the development of the situation. The supplies are landed on beaches selected because of favorable landing conditions, shelter from enemy fire, and convenience in movement of supplies inland.

b. The regiment may take over the battalion dumps and continue to use these locations as regimental dumps, or establish dumps in new locations. The regiment will have more time than the battalion for deliberate selection of locations and will require storage space for a larger quantity of matériel. Battalion dumps should be taken over by the regiment as soon as practicable in order that battalion supply personnel may devote their full attention to the movement of supplies from dumps to organizations.

939. Landing force supplies.—*a. Force supplies.*—Force supplies constitute the reserve echelon of all classes of supplies accompanying the force. The amounts of supplies in lower echelons determine the time limit within which force supplies must be landed and made available. Shipping considerations will make it desirable to clear the ships as soon as conditions permit.

b. Force depots.—The locations where force supplies in large quantities are landed and stored are termed force depots. Such depots must have ample facilities for landing, sorting, storing, and distributing supplies. Danger from air attack will require that supplies be segregated in groups.

c. Location of force depots.—The locations selected for the landing of force supplies may be on the original landing beaches, at some other more sheltered part of the coast, or at a base after it has been secured. The force may take over some or all of the regimental dumps, thus permitting regiments to establish their supply systems inland. The large amounts of supply in the force echelon render sheltered waters and adequate docking facilities most desirable.

d. Force depots at supporting bases.—Where a supporting base is established prior to the conduct of a landing operation, it will be advantageous to establish a force depot at the supporting base. If such a base is conveniently located with respect to the landing area, the distribution of supplies may be effected by transshipment in small craft.

940. Post exchange supplies.—Post exchange supplies, because of their favorable influence on health and morale, should be made available whenever practicable. It is highly desirable that they be distributed regularly along with automatic supplies.

941. Captured and salvaged matériel.—The importance of such matériel increases with the distance of the theater of operations from home bases. The collection, repair, and use of such matériel will result in a saving of time and cargo space.

942. Water.—*a. Importance.*—An adequate and constant supply of water is of paramount importance. While men can, in an emergency, carry on for a limited time without rations and

PRIORITY TABLE FOR LANDING MATERIEL AND REAR ECHELON PERSONNEL FROM S. S. "PRESIDENT SMITH"

Prior-ity No.	Organisation	Matériel	Where stowed	Personnel	Total boat spaces	Remarks
1	2	3	4	5	6	7
1	Btry A, 11th Mar Arty-----	1 unit of fire-----	xx	xx	xx	Personnel from Hq. Co., 1st Mar. Do.
2	do-----	3 tractors and 3 trailers, C Tn--	xx	xx	xx	
3	Hq and Serv Btry, 11th Mar Arty-----	2 tractors and 4 trailers, C Tn--	xx	xx	xx	
4	1st Bn, 1st Mar-----	2 tractors and 4 trailers, C Tn--	Compt. No. 1, 3d deck	xx	xx	
5	Det 1st, Med Bn-----	2 ambulances-----	xx	xx	xx	
6	1st Plat, Co A, 1st Engr Bn-----	Engr. matériel-----	xx	xx	xx	
7	QM, 1st Mar-----	5 days' water, all units-----	xx	xx	xx	
8	do-----	5 days' automatic supplies for all units.	Hold No. 1.	xx	xx	
9	Btry A, 11th Mar Arty-----	3 tractors and 6 trailers, C Tn--	xx	xx	xx	
10	1st Bn, 1st Mar-----	2 units of fire-----	xx	xx	xx	
11	Btry A, 11th Mar Arty-----	1 unit of fire-----	xx	xx	xx	
12	Etc., etc-----	-----	-----	-----	-----	

Footnotes:
A. Matériel carried ashore with troops is not included in this table. Personnel (column 5), from rear echelons of organisations, is included in determining number of boat spaces required.
B. Water, rations, and ammunition will be loaded in boats carrying vehicles so that available boat space is used to capacity. All boats will carry at least 20 gallons of water in containers which will be dumped at the beach.
C. All vehicles will carry normal loads.

FIGURE 9.—Suggested form for priority table for landing of matériel and rear echelon personnel.

other supplies, an interruption of the water supply even for a short period will probably result in a break-down of the operation.

b. Responsibility.—The Navy is responsible for the procurement of water and its delivery at the beach until a supply from land sources can be made available. The landing force is responsible for the reception, stowage, and distribution of this water ashore, and for the location and development of water from land sources as rapidly as possible.

c. Plans.—(1) Knowledge of conditions with respect to water supply in localities where operations are contemplated is a basic item of military intelligence and should be included in any study of the locality. The situation relative to water may have an important bearing on the plan of operation and the scheme of maneuver.

(2) Plans must be carefully drawn so that the necessary personnel and matériel may be procured and properly loaded. All plans and estimates relative to water must include an ample factor of safety to provide against enemy interference, leakage, evaporation, loss due to imperfect water distribution, and other emergencies.

d. Requirements.—The amount of water required will vary materially with the climate and the training of the troops. Men in good physical condition, accustomed by training to water abstinence and to regulations relative to the use and distribution of water, can do for a short period with a minimum of from 1 to 2 gallons daily. Over more extended periods the requirements are considerably larger.

e. Supply of water afloat.—A considerable amount of water may be made available from the distilling system of the transports and other ships of the convoy, and some additional water may be carried as cargo. If these sources are not sufficient, ships for distilling water or water tankers will be required.

f. Landing a water supply.—(1) Every man should land with one or more full canteens. Each boat of the second and subsequent waves should carry water in water cans, breakers, or other containers to build up a reserve of water ashore.

(2) As soon as the situation permits, water in bulk should be transported to the beach in suitable containers or water barges. Under favorable harbor conditions water may be pumped directly from water barges into tanks ashore. The forward compartment of motor launches can be rigged with a tarpaulin to provide a tank for transporting water in bulk.

g. Stowage tanks ashore.—(1) Prior to the time that the situation becomes stabilized, the most practicable tank is the standard canvas water storage basin as issued. When additional tanks are required they may be constructed of tarpaulin or sailcloth. The tarpaulin or sailcloth should have three thorough coatings of tar. Either type of basin must be set into a strong wooden frame, with floor boards raised 6 inches or more from the ground to prevent rot and facilitate transfer of water to containers. Tanks should be covered with canvas as a protection from dust, evaporation, and reflection of light to airplanes. This type of tank possesses many advantages over other types, principally because of relative light weight and ease of transportation.

(2) Tanks constructed of other material, such as wood or galvanized iron, may be carried in sections to be assembled after landing. Such tanks have a greater application to stabilized situations.

(3) A necessary part of the equipment of stowage tanks is an ample supply of hose or pipes with pumps for the transfer of water to smaller containers.

h. Distribution ashore.—Plans should provide for adequate distribution on shore. In the early phase of the operation, the usual method of transporting and distributing water will be in standard 5-gallon liquid containers, by hand from boats to organizations. This method should be supplemented by vehicles, water carts or trucks, as soon as they can be made available.

i. Development of water supply ashore.—(1) If water in sufficient quantity is available ashore in surface streams, lakes, or wells, the problem will be simplified; otherwise it may be necessary to sink wells. If conditions permit the use of tube wells, a water supply can be developed in a minimum of time. Preliminary intelligence studies should determine whether it is practicable to sink wells, and indicate the type required.

(2) The collection and stowage of rain water may be feasible. Watersheds may be constructed of galvanized iron, wood, or canvas, with leads to stowage tanks.

(3) When the above-mentioned sources cannot be sufficiently developed, it may be necessary to resort to the distillation of salt water. When such a need is indicated, portable distilling apparatus should be provided.

j. *Water purification.*—All water found ashore should be considered as unfit for drinking without purification unless proved otherwise by medical test. Chlorination of water should be standard practice. Water purification units will normally be included in the equipment of the landing force.

SECTION VI

MILITARY POLICE

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943. Duties.—Military police should be provided in numbers adequate for the following duties: Control of traffic; guarding of dumps and depots; apprehension of stragglers; collection, evacuation, and custody of prisoners of war; and control of enemy civilians when necessary. Detachments of military police should form part of shore party complements. Conditions may require that military police be reinforced by troops from other units, or their duties allocated to other troops.

944. Prisoners of war.—*a. Estimates.*—The probable number of prisoners of war which must be cared for should be estimated in plans for the operations.

b. Evacuation.—Prisoners are evacuated from front lines under escort of walking wounded or other available personnel, via headquarters of units, to collecting points. They are retained in the collecting points until evacuated to designated ships or prisoner of war inclosures.

c. Collecting points.—Collecting points for prisoners of war are located initially in the vicinity of the beach. Locations are tentatively selected prior to landing and finally determined after reconnaissance ashore. Such locations must not interfere with other activities and must be approved by the shore party commander. New collecting points are established inland as required by the progress of the attack. Collecting point personnel will record and report pertinent data relative to all prisoners passing through the collecting points.

d. Inclosures.—Inclosures for the safekeeping of prisoners of war over extended periods may be required.

e. Work.—Prisoners of war are assigned to such work as they are capable of performing, consistent with international law.

945. Stragglers.—Provision must be made for the collection of stragglers. Collecting points are established initially in the vicinity of the beach and new stations established inland as the attack progresses. Stragglers should be returned to their organizations as soon as practicable.

946. Civilian population.—Should there be a considerable civilian population in the theater of operations it may be necessary, as the operation progresses, to arrange for their control or evacuation. Arrangements may have to be made for their shelter, rationing, and transportation. In the case of enemy nationals, close supervision of their activities will be necessary.

947. Traffic.—*a.* The smooth and orderly flow of traffic on the beaches and inland is essential. The greatest difficulty may be anticipated on or near the beach, where every precaution must be taken to avoid congestion. Stragglers, prisoners, and wounded should be kept clear of the beach.

b. Traffic signs.—Units and administrative agencies should be equipped, prior to landing, with canvas signs bearing the name of the unit or agency and a direction arrow. These signs should be set up at the beach and along the routes of advance inland. Military police erect signs not otherwise provided for.

SECTION VII

ENGINEERS

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948. Engineer plans.—*a.* Engineering work discussed in this section, except temporary landing facilities, is generally that which is necessary to support the seizure of the land objectives, and therefore comes under the responsibility of the landing force engineers. They are assisted when necessary by personnel of the Corps of Civil Engineers of the Navy attached to the various beach or shore parties. Construction of base facilities such as wharves, docks, storehouses, improved roads, etc., is the responsibility of the naval civil engineers.

b. Prior to embarkation, the landing force engineer should have all available information relative to the area in which the landing operations will be conducted. This will include beaches, landing facilities, road nets, bridges, water supply, local facilities for procuring construction material, possible landing fields, etc. Based upon this information and the plan of operations, the specific tasks which will probably be assigned the engineers may be determined, and estimates drawn of the personnel and matériel required.

c. Detailed plans for the various landings will usually indicate the need for engineers at many or all of the landing beaches, requiring the distribution of engineers and engineer matériel among the ships of the convoy. This will necessitate the attachment of engineer units to subdivisions of the force, and a large part of the engineering work may be planned and executed under commanders of subordinate units.

949. Landing engineer units.—A detachment of engineers will usually be included in each shore party and landed with the first boat groups. The size and composition of these detachments will depend upon the work contemplated at the beach concerned. Upon landing an early reconnaissance and estimate of engineer work required should be initiated. The time of the landing of succeeding elements will be determined by the nature and importance of the tasks to be accomplished. An early priority for landing engineer personnel and matériel will usually be necessary. Debarkation and priority schedules, covering the landing of engineer personnel and matériel, should be subject to modification as a result of the reconnaissance and developments ashore.

950. Engineer duties.—*a.* The duties assigned to the engineers include the following:

Compilation, reproduction, and distribution of maps.

Assistance to the beach party in the removal of underwater obstructions at the beach, construction and maintenance of improvised landings and temporary wharves, and in the landing of heavy matériel.

Repair, construction, and maintenance of traffic routes from the water's edge to combat units and, if necessary, assistance in the movement of heavy vehicles.

Construction, shelter, and camouflage of important rear-area establishments (see par. 911c (2)).

Construction and maintenance of facilities for the reception, stowage, and purification of water, the development of water supply ashore, and the organization and maintenance of water distributing points.

Construction of landing fields for aviation.

Furnishing technical assistance, and provision and distribution of tools and matériel for the construction of defensive positions, artillery positions, and command and observation posts.

Demolition of enemy obstacles on shore, and roads and bridges which might be of assistance to the enemy.

Repair, maintenance, and temporary operation of existing railways and, if necessary, other public utilities.

The execution of engineering work of a special character.

b. Landing force engineer units are prepared to be used as infantry in combat.

c. Civilian laborers and prisoners of war, as available and required, are used on engineering projects.

951. Maps and charts.—*a.* (1) Topographic maps, as accurate and complete as the existing data permit, should be made available prior to embarkation for all units engaged in the operation. Suitable maps, however, will rarely be available and it will usually be necessary to compile new maps. Hydrographic charts may be used to furnish the outline of the coast and certain information relative to the interior. Additional sources of information are sailing directions, existing maps, airplane photographs, sketches, and intelligence reports. If time is not available for the preparation of new maps, hydrographic charts, on the desired scale and on suitable paper, should be reproduced in sufficient quantities.

(2) Topographic maps should include sufficient sea area so that both the position of the firing ships and shore targets can be plotted thereon.

(3) Topographic maps should, if practicable, conform to uniform standard scales. Maps on the approximate scales indicated below are most useful for the purposes shown:

1:20,000 (approximately 3 inches equals 1 mile): Fire control and detailed operations.

1:62,500 (approximately 1 inch equals 1 mile): Tactical map for general use in field operations.

1:500,000 (approximately 1 inch equals 8 miles): Strategical and air-navigation map. Special large-scale maps of 1:10,000 and 1:5,000, when required.

(4) Reproduction of topographic maps should provide for a wide distribution, including all naval units of the attack force. Additional maps, overprints, and overlays should be provided as necessary for use as annexes to plans and orders so that they may be prepared in a form which is more concise and readily understood.

b. Hydrographic charts.—As a rule, hydrographic charts are not suitable for use as fire control and operations maps because of the small scale and inadequate data relative to land areas. It is highly desirable, provided the importance of the operation so warrants, to have new large-scale hydrographic charts of the landing area published and issued to units concerned. Prior to publication of such charts, topographic data should be added, particularly the location of important landmarks which could be used as aiming and orientation points. When such procedure is not practicable, existing hydrographic charts should be completed on each ship to show essential topographic features on the coast and in the interior.

c. Uniform grid system.—All maps, hydrographic charts, mosaics, and vertical aerial photographs should be provided with a uniform grid system based upon a common point of origin. The system of numbering the grids and designating points thereby should be simple and understood by all echelons of the attack force. The grid system should cover all land and water areas involved in the operation. In connection with the establishment of a grid system on a chart or map not already gridded, see CSP 734. It is usually inadvisable to superimpose a new system in addition to the grids on a map that has any standard system. It is preferable to superimpose the standard navy grid system over the one existing on the map, making both systems coincide, and extend the standard Navy system to cover the whole desired area.

d. Information obtained after embarkation.—Information not available prior to embarkation may be obtained later by aerial and surface reconnaissance, and possibly other sources. Essential information must be disseminated throughout the command and, depending upon the time and facilities available, the following methods may be used:

(1) All data obtained from sketches, interpretation of aerial photographs, and other sources may be used in compiling new maps of all or part of the landing area. These new maps may be reproduced and issued to replace or supplement maps previously issued.

(2) Data noted in (1) above, which supplements existing maps, may be distributed as overlays or in other form, in order that all units may make necessary additions and corrections on maps and charts in their possession.

(3) Aerial mosaics may be prepared and issued. Such mosaics are usually confined to small areas of particular importance.

(4) Aerial photographs, particularly obliques of the landing beaches and enemy defensive positions, are very valuable and should be secured and distributed whenever possible. Sufficient points should be identified and marked on the prints to permit ready orientation and location of topographic features.

(5) Panoramic sketches and photographs made by submarines and surface craft may be very valuable and should be reproduced and issued as necessary, with land features adequately identified.

e. Responsibility.—While the compilation, reproduction, and distribution of maps and overlays is a function of the engineers, aerial photography and the preparation and reproduction of prints and mosaics is a function of aviation. The necessity for such activities while aboard ship en route to the landing area must be anticipated and plans made accordingly.

952. Wharves and landing facilities.—*a. Necessity.*—The matériel of the Fleet Marine Force needed in the early phases of an operation can be landed on an open beach from special Navy landing craft. Prompt measures should be taken, however, to provide wharves and landing facilities at selected beaches to facilitate the landing of all types of matériel, partic-

ularly very heavy articles, and to permit the use of boats and lighters not capable of running close to shore.

b. Responsibility.—The construction of wharves and other facilities for landing matériel is a responsibility of the naval civil engineer detail of the beach party. Engineer units of the landing force may be assigned as necessary to assist in these projects.

c. Locations.—The general location of wharves will be governed by the logistical and tactical requirements; the exact location will be governed by technical considerations. The most important factors determining choice of location are the nature of the beach, cover from observation and fire, and accessibility to sea and land traffic routes.

d. Standard equipment.—Speed in construction of wharves and efficient utilization of personnel and matériel will best be attained by the use of standard equipment. Such equipment should be rugged, capable of being broken down into parts readily stowable aboard ship, and of being quickly assembled. Each part should be light enough to be carried in or towed by standard Navy boats. The wharf should be sectional and susceptible to extension or replacement of damaged sections. It should be suitable for erection on any type bottom, rugged enough to carry the weight intended, and to withstand the beating of the surf.

e. Types.—(1) The type of work undertaken prior to the time the situation stabilizes will ordinarily be limited to projects of a temporary or emergency character. The wharf should, as far as possible, be designed to permit—

- (a) Direct loading with minimum lift from boats and lighters to trailers or other vehicles.
- (b) A number of boats and lighters to be tied up alongside and unloaded simultaneously.
- (c) Movement of vehicles on and off the wharf without delay and traffic congestion.

(2) Various types of wharves may be considered, of which the following are most important:

(a) *Metal trestle wharves.*—Metal sectional-trestle wharves have the characteristics noted in subparagraph *d*, above. The parts are of tubular steel or lighter metal. The trestle consists of a vertically adjustable transom supported by two standards. The standards have steel shoes, adaptable to any angle or character of footing. This type of construction has many advantages.

(b) *Pontoons.*—This type also has the characteristics noted in subparagraph *d*. The advantages are the light weight of material and speed of construction. The lack of stability, ruggedness, and weight-carrying capacity are disadvantages.

(c) *Raft wharves.*—Such construction requires a large amount of very heavy material with relatively small and decreasing buoyancy. If material is available locally, this type offers possibilities.

(d) *Barrel wharves.*—The buoyancy is supplied by barrels or drums, secured by timber and lashings. Barrels or drums which may become available can be utilized for this purpose.

(e) *Sandbags.*—The empty bags are light and require relatively little stowage space. They can be filled on shore but the process requires considerable time and labor. They may be used to best advantage when the amount of construction is limited and for strengthening other types of wharves. When vehicles are to run over sandbags, a plank or corduroy road must be provided.



FIGURE 10.—Temporary crib dock.

(f) *Other types.*—Various other types of construction are possible, depending upon the situation and material available. Small craft filled with stone or other heavy material may be sunk off the beach. Material obtained ashore may be used for stone jetties, piles, or crib work.

f. Lifting gear and ramps.—The wharf should be provided with adequate equipment and rigging for lifting heavy matériel from boats and lighters, and suitable ramps for running matériel ashore.

953. Roads and trails.—*a.* The movement of traffic through heavy sand on the beach, particularly heavy vehicles and supplies in large quantities, will usually require some type of road surfacing on the beach early in the operation. Material for this purpose, such as planks or heavy wire netting, may be landed, or material such as hard soil or corduroy may be obtained on shore.

b. Reconnaissance of routes inland should be initiated as early as practicable so that the details of the supply system on shore can be perfected and put into execution. Vehicles equipped for emergency road work should be made available for use in improving the road net. The most immediate need will be trails for the tractors of artillery and combat trains. Thorough reconnaissance by personnel familiar with the weight, power, and general characteristics of the vehicles, and trained in the selection and laying out of suitable trails, will result in a great saving in time, labor, and material.

954. Boat channels.—*a.* A clear channel for boats can frequently be obtained with a small amount of blasting without drilling or diving. Explosive charges placed on top or at the side of obstructions will frequently be very effective. This work can usually be done from small boats.

b. Channel marking.—It may be necessary to mark boat channels and obstructions to navigation. This work may follow immediately the landing of the first boat groups in order that other boats and barges may approach the beach with safety.

SECTION VIII

MEDICAL SERVICE

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955. Medical plans.—*a.* The medical plans must provide for the evacuation and hospitalization of sick and battle casualties, including captured enemy casualties. In addition to the personnel and matériel of medical units attached to the landing force and for normal fleet requirements, the medical plans should provide for the following:

Additional hospital ships.

Conversion of certain transports for care of slightly wounded and sick.

Medical personnel and equipment for ambulance boats for evacuation from shore to ship.

Medical personnel and equipment for beach parties.

Provision for retention of convalescents who are to be returned to duty.

Evacuation of permanently disabled to home ports.

b. As indicated in paragraph 920c (10) of this chapter, some of the medical units attached to the landing force, or base hospitals, may be embarked on hospital ships for the movement overseas.

956. The attack force medical officer.—*a.* The attack force medical officer serves on the staff of the attack force commander. He will be responsible for the preparation of detailed plans for hospitalization afloat and for the evacuation of casualties from shore to hospital or

evacuation ships, and their further transfer as appropriate. He will coordinate the activities of the medical units of beach parties and vessels of the attack force with those of the landing force.

b. In order that he may supervise the assembly of medical personnel and matériel, and make recommendations regarding the preparation of additional hospital and evacuation ships, the attack force medical officer should be selected at an early date and should be provided with adequate assistants.

c. During the period of preparation he should consult with the transport group commander, and assign his senior assistant to serve on the latter's staff during the movement overseas and the landing operations.

957. Estimates of casualties.—An estimate of casualties for the operation as a whole and for each beach must be made in advance, and plans made accordingly. Based on experience at Gallipoli, battle casualties at the various beaches offering resistance may vary from a minimum of 10 percent of troops landed over a period of 3 days to a maximum of 15 percent for the first day. In estimating probable casualties consideration should be given to the amount and effectiveness of covering fire, terrain, cover available, enemy resistance anticipated, objectives, climate, weather, season of the year, and sanitary conditions ashore.

958. Estimates of hospitalization.—World War experience, which cannot be accepted as conclusive for a particular landing operation, indicates that of all battle casualties, 30 percent were permanently lost as a military asset; 37 percent returned to duty in from 30 to 90 days; and 33 percent returned to duty in from 2 to 30 days, averaging 14 days. One-third of all wounds were serious. It is estimated that the probable battle casualties in a landing operation will occur in the ratio of 1 killed to 4 wounded.

959. Hospitalization afloat.—a. In an offensive operation, hospitalization afloat must be adequate for all casualties requiring hospital treatment until hospitals are established ashore. Hospital ships entitled to immunities provided by the Geneva Conventions should be available for the seriously wounded, and, as far as practicable, for all other wounded requiring hospitalization. Certain transports should be equipped as auxiliary hospital ships and should be provided with medical personnel and medical facilities to supplement the hospital ships.

b. In order to avoid long trips in small boats, a relatively larger number of hospital ships and transports provided with hospital facilities will be needed if the landing beaches are separated by wide intervals. Each transport division conducting a more or less detached or isolated landing should include the ships necessary for the hospitalization of all classes of casualties.

960. Classification and sorting of casualties.—a. In order to make the best use ashore and afloat of the available medical facilities, and to expedite evacuation and treatment, casualties are classified as follows:

(1) According to treatment required:

- Desperately wounded (usually nonevacuable).
- Seriously wounded (stretcher cases).
- Slightly wounded (walking or sitting cases).
- Gas cases.
- Sick.

(2) According to method of transporting:

- Walking cases.
- Sitting cases.
- Stretcher cases.
- Nonevacuables.

b. Classification, tagging, and sorting of casualties begin at the battalion aid station and continues as necessary in rear establishments. Sorting ashore, however desirable, should not delay shore to ship evacuation when boats are available.

961. Shore to ship evacuation.—a. Medical units assigned to the landing force are responsible for evacuation to the beach and the care of casualties until boat transportation can be provided. Casualties ready for evacuation will be assembled at an evacuation station, which should be located with due regard to suitable boat landings, cover from enemy fire, location of the aid or collecting station, and natural drift of the wounded. One or more evacuation stations may be designated for each beach.

b. The medical detail of the beach party is responsible for the loading of casualties into boats. The beachmaster directs the movement of boats carrying casualties in accordance with the attack force medical plan.

c. Specially designed ambulance boats, or other boats converted for exclusive use as ambulance boats, should be identified as provided by the Geneva Conventions. They should at no time be used for the transportation of combat personnel and matériel. They may be utilized to transport medical personnel and matériel from ship to shore as well as for the evacuation of the wounded.

d. Certain designated landing boats may be used as improvised ambulance boats after landing combat elements. They should be provided with medical personnel and equipment from hospital ships, transports, or other vessels, for the emergency treatment of casualties en route. Such boats will not fly the Red Cross flag.

e. The attack force medical plan should designate the ships to which each class of casualty should be evacuated. Insofar as practicable, wounded will be sorted and loaded into ambulance boats accordingly and the boats dispatched directly to the designated ships.

f. If the number of boats available is so limited that support and reserve battalions have to land in the second or later trips of the boats, the use of landing boats for the evacuation of casualties may necessarily be delayed until after the landing of such battalions. In this event, it is advisable to provide for the evacuation of the slightly wounded to any transport by boats returning for a second load. The concentration of these casualties on the ships designated for them may be undertaken later. While the landing of combat troops and matériel must have first consideration, it is highly desirable to have ambulance boats for the evacuation of the seriously wounded direct to hospital ships.

g. Some methods employed to facilitate and expedite the evacuation of casualties from shore to ship are illustrated in paragraph 967.

962. Medical personnel attached to the battalion.—a. Equipment.—The equipment of the battalion medical detachment consists of the first-aid equipment carried on the person; chests or packs containing instruments, medicines and dressings; and a limited amount of camp equipment. Equipment not carried on the person should be so packed that it can be carried either on a hand cart, trailer, or by hand.

b. Company aid men.—The battalion medical detachment will usually be divided for combat into an aid station group and company aid men. Just prior to debarkation, three company aid men are normally assigned to each assault company. Upon landing, the aid men will attend such wounded as they can reach along the beach, and direct walking cases to the evacuation station. Thereafter, following their respective companies, they will apply first aid to casualties, direct those able to walk to the rear, mark the location of casualties unable to walk, and, insofar as possible, place them in groups under shelter from fire along the axis of advance of the battalion aid station. The only equipment carried by the aid men will be that carried on the person.

963. Battalion aid station.—a. The remainder of the battalion medical detachment plus such other personnel as may be assigned as litter bearers constitutes the aid station and is organized into litter squads and the aid station group. Its duties are: Evacuation of casualties in its sector from the front line to the aid station; rendering first aid or supplementing that already given; and sorting, tagging, and recording of casualties. Wounded able to walk are directed to the beach or the nearest collecting station; others are evacuated thereto by litter bearers from the rear.

b. The aid station personnel, with their equipment and necessary supplies, will usually land with the last units of the battalion. Initially, the battalion aid station may be established on or near the beach. Should the advance of the battalion inland be rapid, it will be advisable to delay establishing the aid station until the battalion is held up, otherwise contact may be lost.

c. Sites for stations should provide proximity to the largest number of wounded and to the line of drift of wounded, good routes forward and to the rear, cover, and water.

964. Regimental aid stations.—The regimental medical section will set up an aid station in the rear area of the regimental zone of action. This installation is not a second echelon in the chain of evacuation; it will serve as such only when units of the medical battalion are delayed in assuming this task. It serves the personnel of regimental headquarters and other rear area elements. Like battalion aid stations, it is organized for the handling of battle casualties and evacuates them to collecting stations or to beach medical establishments.

965. Collecting stations.—a. Duties.—Collecting stations evacuate casualties from the battalion aid stations and from the field; sort, tag, and give emergency treatment to casualties; and forward medical supplies to the aid stations. Wounded, who cannot walk, are evacuated by litter until ambulances are available. No operations are performed except as immediately necessary to save life.

b. Time of landing.—Collection station personnel must land early in the operation in order to relieve the battalion aid stations and permit them to follow the battalions inland. The division of the personnel into small groups, each with appropriate equipment for landing at several beaches, may be necessary.

c. Sites.—Collecting stations should be established initially near the beach and, after evacuating casualties in that vicinity or upon arrival of hospital units, should move forward to follow the progress of the attack. Initial sites are selected by the collecting station commander. General considerations governing sites are similar to those for aid stations; however, provision should be made to accommodate their larger size and greater amount of traffic. The immediate vicinity of targets likely to draw fire should be avoided.

966. Ambulance service.—Ambulance service should be provided for whenever the situation permits the effective use of motor transportation for the evacuation of casualties in advance of the collecting stations and between the collecting stations and the beach. Ambulances should be landed as soon as the advance has progressed sufficiently to provide a reasonable area for their employment.

967. Hospitalization ashore.—*a. Hospital stations.*—(1) Hospitals established ashore during the early phases of the operation will afford treatment, rest, and shelter for wounded pending evacuation to ships. Surgical treatment is confined to what is immediately necessary, to save life and to prepare patients for further evacuation. Facilities should be sufficient for the care of about 30 percent of the estimated casualties to provide for delays in shore-to-ship evacuation, and the care of nonevacuables.

(2) Hospital stations are landed and established ashore when the number of wounded and other conditions so justify and there is reasonable protection against enemy fire.

(3) The site of the establishment should be initially near the beach, protected as much as possible from enemy fire, and with good communications with the collecting stations and the beach. An ample supply of good water is essential. Existing buildings, household conveniences, straw, wood, etc., if available, can be used to advantage. It is advisable to locate hospital stations well away from other important military establishments.

b. Base hospitals.—Base hospitals with complete facilities are established when necessary by the commander attack force or the commander base force, as appropriate. They will be located either in the landing area or elsewhere within the theater of operations. The medical personnel of the Fleet Marine Force is not adequate to establish or operate a base hospital.

c. Identification.—The buildings and areas used exclusively for the care of the wounded should be plainly marked with the Geneva Cross.

968. Illustrations.—Some methods employed to facilitate and expedite the evacuation of casualties from shore to ship are shown in the following illustrations:

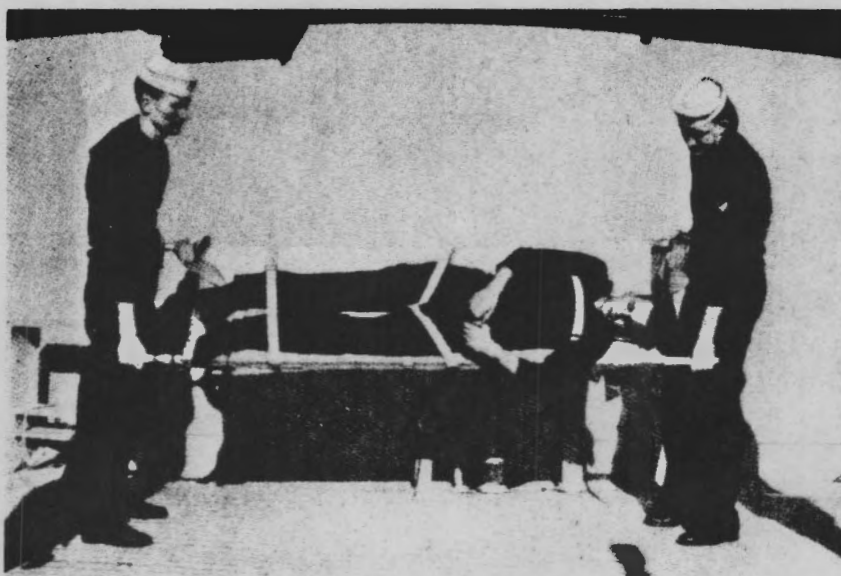


FIGURE 11.—Army litter. Navy standard bunk straps used to secure patient.

LANDING OPERATIONS DOCTRINE

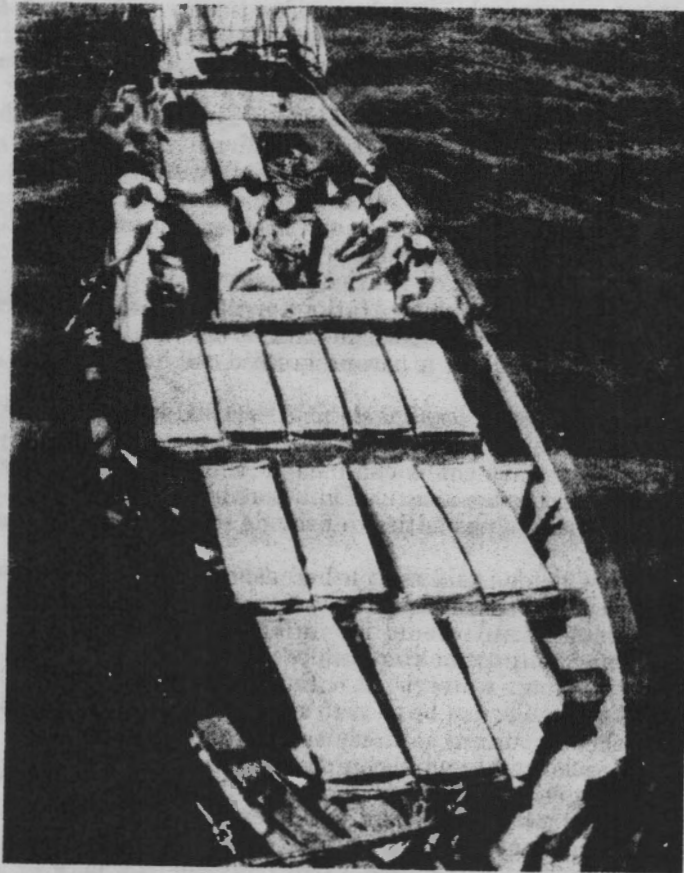


FIGURE 12.—Navy standard 50-foot motor launch with thwarts in place carrying 24 litters and ambulatory cases.

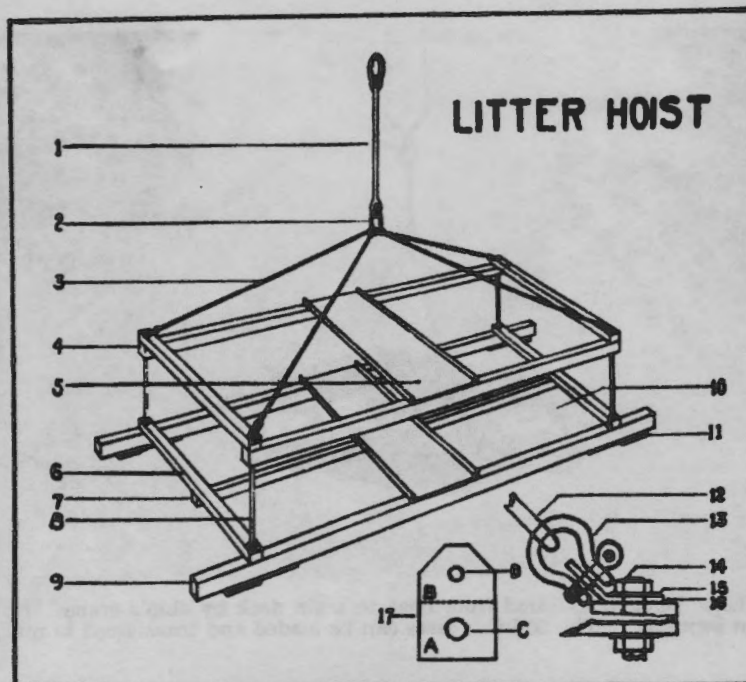


FIGURE 13.—Litter Hoist. Weight with floor boards 400 pounds. Capacity 10 litters or 14 ambulatory cases. Can be readily constructed by ship's force.

LEGEND

1. $\frac{1}{2}$ " steel cable, 2' long, spliced to hoisting ring at each end and wrapped with marlin.
2. $\frac{3}{4}$ " steel hoisting ring 6" in diameter.
3. Steel rod $\frac{3}{4}$ " diameter, 7' long, with 1" welded eye at each end. Upper eyes welded in hoisting ring and held loosely together between two small rings welded transversely around diameter of hoisting ring.
4. 4" x 4" wood beam, 10' 6" long.
5. Panel slide 2' wide with $1\frac{1}{4}$ " flange along either edge.
6. 2" x 4" wood beam, 4' 9" long.
7. 2" x 4" wood beam, 10' 9" long, held on under side of lower 2" x 4" end pieces of frame by iron clip at either end.
8. $\frac{3}{8}$ " mild steel rod, 29" long, with 8" threads.
9. 4" x 4" pine wood beam, 13' long.
10. This space and space on other side of slide covered with $\frac{3}{4}$ " wooden panel put in place when ambulatory patients are to be carried.
11. Chocks to keep hoist from sliding sideways on gunwales of boat.
12. Hoisting rod showing shackle connection to hoisting pad.
13. $\frac{3}{8}$ " shackle showing connection with hoisting rod and hoisting pad.
14. $\frac{3}{4}$ " nut showing how beams and hoisting pads are held together at corners.
15. $1\frac{1}{2}$ " washer.
16. $\frac{3}{4}$ " steel hoisting pad, side view showing angle.
17. Top view of hoisting pad.
 - (a) Flat of hoisting pad 2" x 3".
 - (b) Angle of hoisting pad 2" x 3".
 - (c) $\frac{3}{4}$ " hole in flat of pad for receiving corner steel rod.
 - (d) $\frac{1}{4}$ " hole in angle of pad for shackle connection to hoisting rod.

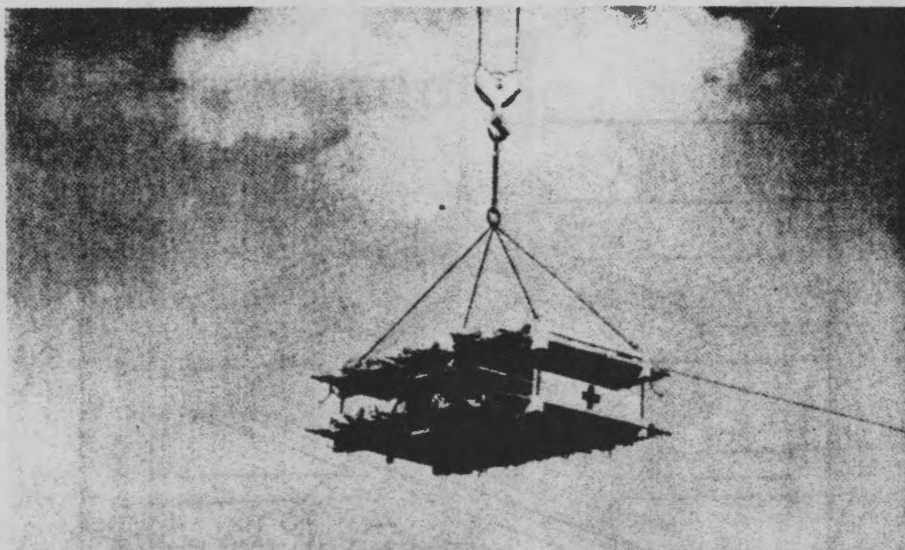
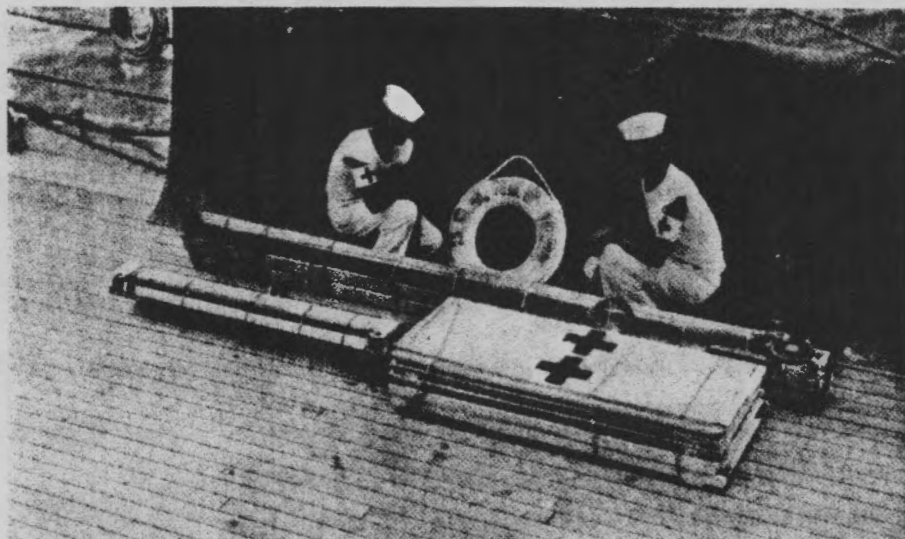


FIGURE 14.—Loaded litter hoist being transferred from boat to main deck by ship's crane. Note heavy line bent on hoist to prevent swinging. The 10-litter cases can be loaded and transferred to main deck in 6 to 7 minutes.



FIGURE—15. Litter hoist broken down and secured in three compact bundles for stowage. All parts marked to facilitate assembling.

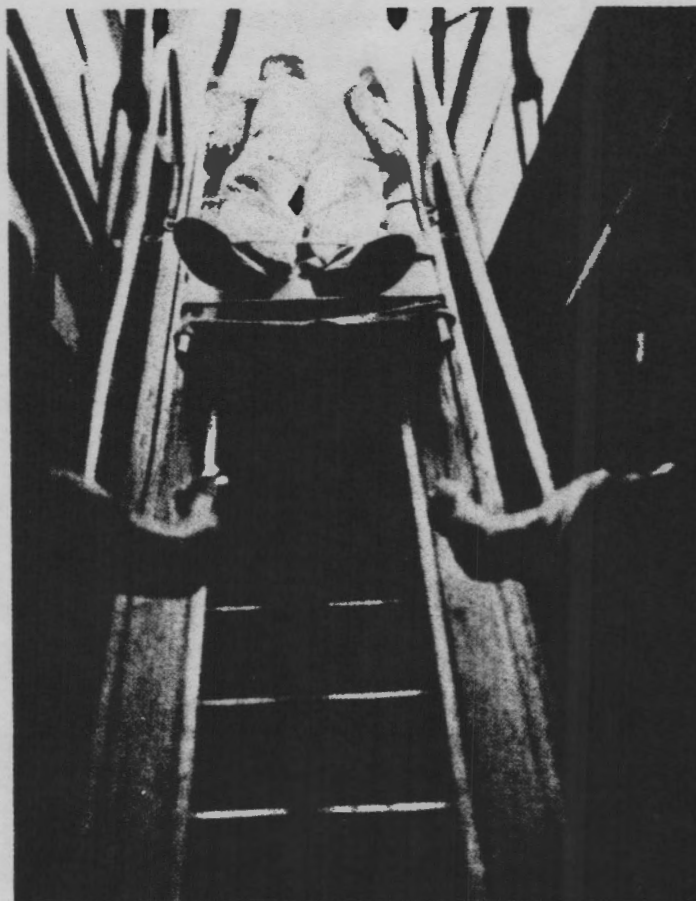
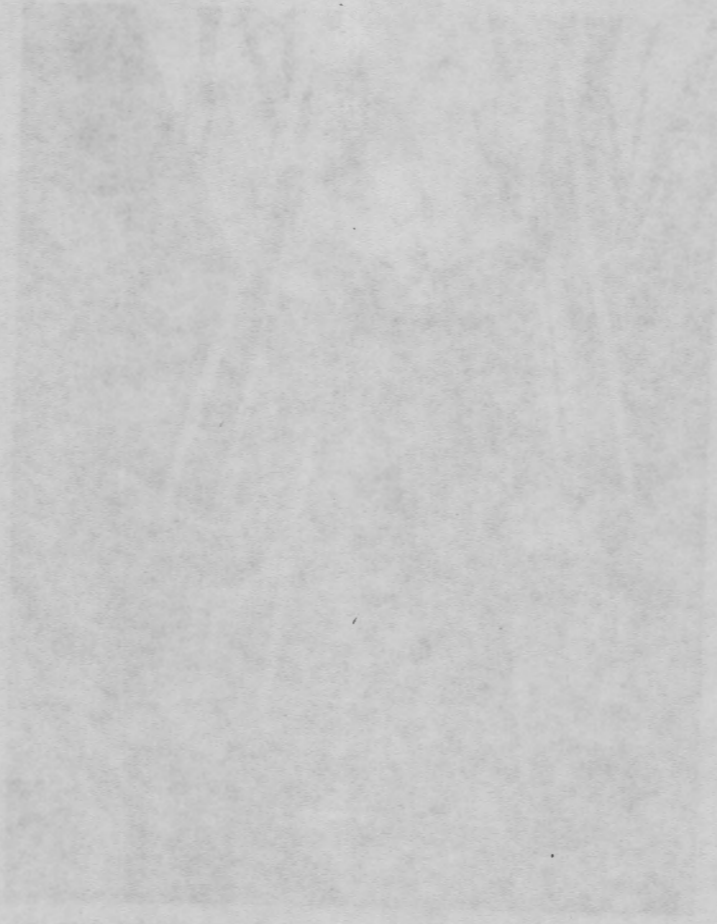


FIGURE 16.—Litter conveyor, consisting of wooden runways held parallel by strap-iron spreaders and secured to hatch coaming by strap-iron hooks. Litter cases can be quickly and safely passed down conveyor and delivered to a nearby sick bay in a minimum of time.

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