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BASIC FIELD MANUAL

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LANDING OPERATIONS ON HOSTILE SHORES

June 2, 1941

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BASIC FIELD MANUAL

LANDING OPERATIONS ON HOSTILE SHORES

Prepared under direction of the
Chief of Staff

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FM 31–5, Landing Operations on Hostile Shores, is published for the information and guidance of all concerned.

The general policies of the Army and the Navy on oversea expeditions are contained in Joint Action of the Army and the Navy.

This manual is based to a large extent on Landing Operations Doctrine, U. S. Navy, 1938. The arrangement of subject matter is similar to the Navy publication and many of the illustrations are taken from it.

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BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,
Chief of Staff.

OFFICIAL:

E. S. ADAMS,
Major General,
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(For explanation of symbols, see FM 21–6.)

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BASIC FIELD MANUAL

LANDING OPERATIONS ON HOSTILE SHORES

CHAPTER 1

GENERAL

SECTION I

GENERAL

■ 1. JOINT OVERSEA EXPEDITION.—*a. Definition and purpose.*—A joint oversea expedition is a combined Army and Navy force dispatched to a theater of operations by sea for the purpose of undertaking military operations ashore which may involve all or any of the following:

(1) The securing of a beachhead from which to project major land operations.

(2) The seizure and securing of an area for use in connection with other military operations; or for use as a naval or air base from which to carry out further operations.

(3) The seizure and securing of an area in order to deny its use to the enemy.

(4) The destruction of enemy installations and facilities.

b. Phases.—The execution of a joint oversea expedition divides itself into the following phases for which appropriate plans should be prepared:

(1) *Concentration and specialized training* at or near suitable areas where the water conditions and beach terrain are similar to those of the proposed landing area. This phase should include the operations of joint staffs and the use of appropriate Navy equipment and personnel.

(2) The *embarkation phase* consists of all additional preparatory measures required to assemble the troops and their

equipment, the supplies and the transportation at or near the port of embarkation, and the actual loading of the troops and supplies on the transports.

(3) The *movement overseas* from the time the expedition departs from the port of embarkation until the joint attack forces rendezvous within their landing areas.

(4) The *landing phase* which begins with the movement of the expedition from the rendezvous within the landing area, and continues until the landing forces are securely established on shore.

c. Responsibility.—The respective responsibilities of the Army commander and the Navy commander in the embarkation, movement overseas, and landing phases are set forth in Joint Action of the Army and the Navy.

d. Joint basic decisions and directives.—See Joint Action of the Army and the Navy.

e. Command and coordination.—See Joint Action of the Army and the Navy.

■ 2. Considerations Affecting Landing Operations.—*a. Nature of operations.*—(1) A joint oversea expedition may involve many of the features inherent in offensive warfare. It will ordinarily have the initiative which will permit, within limits prescribed by higher authority, the choice of objectives and the lines of approach towards them. Its mobility combined with the use of feints frequently will conceal the objective selected until the coast is approached. Through the use of the mobility of reserves retained afloat, it has excellent opportunity to exploit successes ashore.

(2) On the other hand, certain disadvantages of landing operations should be appreciated. It requires a longer time to launch an attack by troops from transports than from a position already established ashore. Troops being brought ashore are unable to take any effective part in the combat, but are especially vulnerable to all enemy weapons. Troops usually will land on and fight over comparatively unfamiliar terrain where information of hostile dispositions will be difficult to obtain. Difficulties of supply and communication are greatly increased. Success will depend to a great degree upon proper coordination and cooperation of two distinct services. The fire support in the initial stages of the attack must be furnished by naval guns and aviation. For details of naval

gunfire and aviation support of landing operations, see chapters 6 and 7.

b. Special organization.—Special organization of Army units is required to facilitate debarkation of appropriate intact combat units, to reduce ship cargo requirements, to provide increased small-arms, machine-gun, and other weapon fire in lieu of normal artillery support, and to insure mobility of the first units ashore. Similarly, special naval organization is required to embark, escort, debark, and land the Army forces, including provision for effective artillery, communications, and air support until the Army can establish its own artillery and air units ashore.

c. Special equipment.—Depending upon the nature and extent of the projected operations and the conditions existing in the contemplated area of landing operations, special equipment will be required by participating Army and Navy elements. For this reason, necessary steps must be taken to determine and procure the required special equipment in sufficient time to permit some training in its use before embarkation.

■ 3. Joint Planning and Training.—For the scope and nature of joint plans and training, see Joint Action of the Army and the Navy and chapter 11.

■ 4. Relationship of Embarkation to Debarkation Plans.—Embarkation of forces to participate in a landing operation is so intimately related to and dependent upon the projected landing operations, that is, the debarkation, that the details of embarkation plans cannot be completed until decision has been reached as to the projected method of debarkation. This is necessarily dependent upon the tactical plan of employment of the landing forces.

■ 5. Scope of This Manual.—This manual covers the landing phase of joint oversea operations primarily from the Army viewpoint. Embarkation is considered in its relationship to debarkation. Naval plans and operation are discussed only to the extent necessary for an understanding of the related plans and operation of Army forces.

■ 6. Plans for Landing Force.—*a.* After the development of the basic plan for the operation, including any required

special equipment or weapons, plans usually required for each echelon of the landing force are—

(1) Plan of special training.

(2) Plan of movement of troops from concentration centers to ports of embarkation.

(3) Plan of embarkation and loading of transports.

(4) Plan of debarkation and ship-to-shore movement, including any troops transported by air.

(5) Plan of operations ashore.

b. A preferred plan and separate alternative plans are prepared for *a*(4) and (5) above. They are subject to modifications necessary because of weather conditions and changes in the situation that may occur between departure and arrival at destination.

■ 7. CENTRALIZATION IN PLANNING.—Centralization of planning is customary. The necessity for centralization arises from the following considerations that are peculiar to oversea expeditions:

a. The plans of all echelons are based on the tactical plan of the combat teams. Hence before any plan of higher echelons can be finally determined upon, the plans of the combat teams for seizing the beachhead line must be developed.

b. The nonavailability of commanders and staffs of lower echelons or lack of time may limit the extent to which the usual procedure in planning may be carried down through the chain of command.

c. Need for secrecy may make it desirable to withhold plans from the lower echelons as long as practicable. However, the more realism that can be imparted to training and rehearsals, the more effective will be the execution of actual operations.

■ 8. GLOSSARY.—*a. Boat nomenclature.*—See appendix I.

b. Types of Navy ships.—See appendix II.

c. Types of small boats.—See appendix III.

d. Sea terms.—See appendix IV.

e. Other definitions.—It is essential that there be a common understanding of terms generally used in joint oversea expeditions. The following terms are used in this manual in the sense indicated:

(1) *Naval attack force* is the naval unit in landing opera-

tions, consisting of transports, cargo ships, and supporting naval vessels, operating against a continuous shore line, usually designated by the geographical name of the locality, or by the terms "right," "left," "center," etc.

(2) *Landing force* consists of the Army organizations which are to carry out landing operations from the transports of a naval attack force. Some elements of this force may be transported by air.

(3) *Joint attack force* includes a naval attack force and the landing force associated therewith.

(4) *Landing area* is the area within which are included the operations of a joint attack force and comprises the shore and sea area involved in the landing operations. A large joint oversea expedition may require the use of more than one landing area.

(5) *Transport area* is the water area assigned for debarking troops from the transports.

(6) *Naval support area* is the sea area assigned to naval vessels detailed to support a landing.

(7) *Beach* is that portion of the shore line of a landing area normally required for the landing of a force approximating a combat team. A combat team is defined in (11) below.

(8) *Beachhead* is a position organized in depth, with a view to offensive or defensive operations, which protects the beach initially from enemy light artillery fire (range about 10,000 yards) and eventually from medium artillery (range about 15,000 yards). For detailed discussion, see section III, chapter 5.

(9) *Beachmaster* is a naval officer detailed to control the beach from the high water mark seaward. For composition and functions of beach party, see section II, chapter 2 and section II, chapter 8.

(10) *Shore party commander* is an Army officer detailed to control Army administrative activities at the beach. For composition and function of shore party, see section II, chapter 2, and section II, chapter 8.

(11) *Combat team* is the basic Army unit in landing operations, consisting normally of an infantry battalion and supporting troops, including any or all of the following, depending upon the requirements of the situation and the availability of transportation: a platoon of antitank guns;

battalion medical detachment; a battery of field artillery; a company of engineers; a detachment of antiaircraft automatic weapons; necessary liaison and communication agencies.

(12) *Artillery concentration* is artillery fire placed on an area.

(13) *Counterbattery* is fire delivered by naval vessels or the Army artillery on enemy artillery for the purpose of neutralizing or destroying it.

(14) *Boat group* is a group of boats organized for transporting a combat team or some other similar tactical unit. See also section II, chapter 4.

(15) *Boat division* is a subordinate task organization of a boat group organized for transporting a subordinate unit of a combat team or other similar tactical unit. See also section II, chapter 4.

(16) *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. See also section II, chapter 4.

(17) *Commercial loading* utilizes to the maximum the ship space and does not contemplate tactical employment of the troops on landing until their equipment other than personal equipment has been issued to them. This method of loading is applicable to movements from an established port to an established and well-secured port. Troops moved by this method are not available for tactical employment in landing operations against hostile forces.

(18) *Unit loading* gives primary consideration to the availability of the troops for combat purposes on landing rather than utilization of ship space. The degree of readiness for employment depends upon the degree to which organizations are unit-loaded as follows:

(*a*) *Combat unit loading*, in which certain units selected because of their probable destination and employment in landing on hostile shores are completely loaded on one ship with at least their essential combat equipment and supplies immediately available for debarkation with the troops, together with the animals for the organization, when this is practicable. This method of unit loading is particularly applicable to units which probably will be required for an assault

on hostile shores by a landing from small boats. Such an operation against any one beach will require an Army combat team. This of course is subject to modification to meet special requirements. Combat teams will be loaded in such manner as to permit simultaneous debarkation.

(*b*) *Organizational unit loading,* in which organizations with their equipment and supplies are loaded on the same transport, but not so loaded as to allow debarkation of troops and their equipment simultaneously. This is somewhat more economical in ship capacity than is combat unit loading. It permits debarkation of complete units available for employment as soon as the troops and their equipment have been assembled on land. Like combat unit loading, this method permits diversion en route by complete ship loads from the destination originally intended.

(*c*) *Convoy unit loading,* in which the troops with their equipment and supplies are loaded on transports of the same convoy, but not necessarily on the same transport. This allows a considerable utilization of ship space, particularly by using this method of loading to fill in space on transports carrying combat unit loaded organizations. Troops which are convoy unit loaded are available for tactical employment only when landed at established beachheads, and after the lapse of time necessary to assemble them on land with their equipment and supplies.

Section II

ADVANCE FORCES

■ 9. Purpose.—Landing operations may be preceded by advance forces for the purpose of reconnaissance, creating diversions by means of feints and demonstrations, seizure of a supporting base, and operations against defending aircraft and naval defense forces.

■ 10. Reconnaissance.—*a.* A successful landing requires careful, comprehensive reconnaissance and utilization of all intelligence means. This involves the procurement or preparation photogrammetrically of complete detailed maps of the landing areas.

b. The naval information desired includes—

(1) Locating enemy naval forces.

(2) Verifying and supplementing existing hydrographic and meteorologic data.

(3) Selecting from a navigational standpoint the beaches and sea areas for landing operations.

(4) Preparing sailing directions.

(5) Establishing aids to navigation.

c. The military information desired includes—

(1) Nature of the terrain, including beaches.

(2) Enemy dispositions.

(3) Installations ashore such as defensive works, artillery positions, location of reserves, landing fields, gassed areas, and supply facilities.

d. The stronger the defensive dispositions, the more thorough the reconnaissance must be except when surprise or time considerations are paramount. The means employed include—

(1) Surface craft.

(2) Submarines.

(3) Aerial observation and photography.

(4) Landing parties transported ashore either by boat or by air.

e. Based on a study of existing data, an intelligence plan is prepared which lists the additional naval and military information required. This plan is considered when the size, composition, and tasks of the reconnaissance force are determined.

f. The furtherance of surprise requires that reconnaissance measures apt to become known to the enemy cover all practicable landing areas and beaches whether or not they are to be used.

g. Specially trained Army personnel and suitable boats accompany advance forces for shore reconnaissance.

h. The desirability of detailed reconnaissance must not be allowed to obscure the fact that in many cases there will be greater chance for success if the landing is initiated within the shortest possible time after the presence of a fleet with transports becomes known to the enemy. Therefore, the period of reconnaissance must be held to a minimum.

■ 11. SUPPORTING BASES.—*a.* Supporting bases facilitate supply, permit employment of seaplanes and land-based aviation,

afford shelter for vessels, serve as a rendezvous for subsequent landings, and may deny landing fields and other facilities to the enemy.

b. Generally the defender fortifies certain areas; others are lightly held or unoccupied. It is usually necessary to operate step by step, seizing first the weakly defended areas for use as supporting bases in the subsequent landings against the fortified positions. The initial operation may take the form of a landing in force, or a foothold may be secured by advance forces.

c. The enemy may be expected to bring the full strength of his aviation against the establishment of a supporting base.

■ 12. OPERATIONS AGAINST AIRCRAFT AND NAVAL DEFENSE FORCES.—*a.* Operations against defending aircraft are considered in chapter 7.

b. Opposing naval forces are cleared from the sea areas required for conducting operations or neutralized during the course of the landing.

SECTION III

MAIN AND SECONDARY LANDINGS

■ 13. GENERAL.—*a.* Landing operations generally involve the main landing, one or more secondary landings, and one or more demonstrations or feints.

b. Landings usually include three phases:

(1) *First.*—The first phase includes the seizure of the terrain immediately in the rear of the beach, followed, when sufficient strength has been landed, by an advance to a position—about 10,000 yards inland—which secures the beach from enemy light artillery fire.

(2) *Second.*—The second phase consists of an advance to a position—at least 15,000 yards inland—which denies enemy medium artillery fire on the beach.

(3) *Third.*—The third phase includes further land and air operations made for securing the objectives for which the landing was undertaken.

■ 14. MAIN LANDING.—The main landing is the one upon which the ultimate success of the tactical plan depends. In the assignment of troops, ships, and aircraft, it has first

consideration, and is provided with the forces necessary for success. The detachment of any forces from the main landing for the conduct of a subsidiary operation is justified only when the results reasonably to be expected are greater than if these forces were used in the main landing.

■ 15. SECONDARY LANDINGS.—*a.* Secondary landings are made outside the immediate area of the main landing and directly or indirectly support the main landing. They may be made prior to, simultaneously with, or subsequent to the main landing.

b. (1) Secondary landings are made to seize an area in order to deny it to the enemy; to delay or divert enemy reserves, artillery fire, and aircraft from action against the main landing; or to seize an area which permits an easy entry into action of field artillery and land-based aircraft.

(2) If the purpose is to divert enemy reserves or forces from other sectors, the strength of the secondary landing force must be sufficient to seize or threaten an area important to the defender.

c. The term "secondary landing" is not used in orders. Secondary landings are conducted with the same determination as the main landing.

d. A secondary landing may be ultimately exploited rather than the main landing. Plans must therefore be flexible so that unexpected success may be exploited rapidly either by employment of local or floating reserves.

■ 16. DEMONSTRATIONS.—*a.* Demonstrations, or feints, are exhibitions of force, or movement, indicating an attack. They may divert or retard movement of enemy reserves against main and secondary landings, or deceive the enemy as to the direction of attack. Usually they are more effective than a weak landing.

b. The mobility of ships should be utilized to threaten important enemy objectives over a large area.

c. Demonstrations or feints are coordinated with landing operations as to time and distance in order to divert enemy mechanized and motorized formations, aircraft, surface vessels, and submarines from 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 usually

have a *normal zone* covering one or more beaches and a *contingent zone* covering other beaches or areas. The defensive artillery plan generally provides for a concentration of the fire of all batteries within range of a designated area. A few boats approaching a beach, particularly when they are accompanied by smoke and some gunfire, may make all enemy batteries, within the normal zone of which the beach lies, open fire on that particular beach or boats rather than join in general concentration on the actual landing. This is particularly desirable when the main landing is conducted on a comparatively narrow front.

e. The plans for the demonstration should be sufficiently flexible and the composition of the force suitable to permit the exploitation of any unusual success by the demonstration force.

f. Demonstrations may be conducted in connection with reconnaissance prior to landing.

Section IV

SELECTION OF LANDING AREAS

■ 17. Governing Considerations.—The landing area comprises the sea and land areas required for establishing a beachhead of sufficient depth to protect the beach from medium artillery. Its selection is governed by the mission, strength of enemy's position, available landing facilities such as piers and wharves, number and types of beaches and approaches thereto, suitability of terrain for shore operations, station and maneuver areas for naval vessels, configuration of the coast line, time element, and weather conditions.

■ 18. Mission.—The area selected should permit the landing of sufficient troops at a place from which they can reach their objective and accomplish the mission for which the landing is undertaken.

■ 19. Enemy Positions.—*a.* Fortified areas are avoided if the mission can be accomplished from other beaches. They are attacked only when sufficient ships, aircraft, and ammunition are available to neutralize enemy weapons, or when seizure by parachute troops can be supported promptly and successfully.

b. The probable location of enemy reserves and the facility and speed with which they can be employed are given consideration.

■ 20. BEACHES.—*a.* A beach should be large enough for the landing of a force of at least an infantry battalion with supporting troops.

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 windward side where surf is likely to break during the several days of landing operation are especially unfavorable, particularly where there are rocks or coral. They also increase the difficulty of supply.

d. Gently shelving beaches, or those having offshore reefs, cause small boats to ground at a considerable distance from the shore line and lengthen the time of disembarking, with consequent increase in the effect of hostile fire.

e. Approaches to the beach should be free from natural or artificial obstructions to navigation under all conditions of tide. There should be sufficient room to seaward for boats to deploy into attack formations before coming under effective artillery or small-arms fire. Narrow entrances between islands and channels in reefs prevent early deployment.

f. Some of the beaches must provide suitable landing conditions and routes inland for armored and wheeled vehicles and tractors. These beaches may be captured initially or in subsequent operations. Other beaches may be suitable only for landing infantry and pack artillery. Precipitous slopes can be negotiated by determined foot troops and often offer dead spaces from enemy fires. Landing conditions at the foot of rocky cliffs, however, are hazardous and generally are possible only in calm seas.

g. The area around a beach in which the defender can place weapons for direct fire on the beach is limited by the configuration of the ground. When the beach area permits the defender clear fields of fire and observation over a depth of several hundred yards, the immediate landing is difficult because of the large zone which must be neutralized. Shallow areas are advantageous in that they reduce the size of this

zone and permit the attacker to deprive the defender of observation on the beach after a relatively short advance. The presence of woods or a bluff close to the beach is advantageous to the attacker, provided the advance of necessary combat equipment is not seriously impeded. They may render difficult the support by naval gunfire of the subsequent advance inland.

h. The number of beaches required for an operation depends 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 beaches is desirable even for a comparatively small force, for 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 favors tactical surprise in that it offers the attacker a choice in the selection of beaches and denies the defender knowledge of 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 entirety, but the various beaches should permit mutual support by the landing units.

■ 21. SUITABILTY OF TERRAIN FOR SHORE OPERATIONS.—*a.* The influence of the terrain on the shore operations is identical with that in ordinary land warfare. Examination of the proposed zone of advance includes road and rail net, covered routes of advance, natural obstacles or defiles which have to be forced, observation points, maneuver room for the force engaged, landing fields which permit the early entry into action of the attacker's land-based aircraft, and areas suitable for the landing and operation of parachute units. For factors to be considered in terrain estimate, see FM 101–5.

b. A movement along the coast line affords protection to at least one flank and facilitates supply because the shore base may be shifted as the action progresses, resulting in shorter and more easily protected lines of communication. The attacker can reinforce field artillery fire by ships' guns firing under the most advantageous conditions.

■ 22. AREAS FOR NAVAL FORCES.—*a.* The naval forces require station and maneuver areas free from mines and obstructions and with suitable approaches. The areas must be conven-

iently located with respect to the available beaches. (See sec. III, ch. 2.)

b. Water deep enough for maneuvering vessels close inshore enables ships supporting the landing boats to deliver fire at short range.

c. A sheltered transport area materially decreases the time required for unloading troops and equipment and lessens the danger of interruption of the operation by unfavorable weather.

d. Water with a depth suitable for anchoring marking ships or buoys is desirable. In some cases anchoring transports or even firing ships may be advantageous. Water of less than 10 fathoms furnishes considerable protection against large submarines if the shallow depth extends far enough to keep enemy submarines outside of maximum torpedo range.

e. 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, the landing and operations ashore should be planned with a view to securing a sheltered anchorage as quickly as possible.

■ 23. CONFIGURATION OF COAST LINE.—*a.* Favorable landing conditions usually are found in harbors, bays, and indentations in the coast line. Such indentations favor the concentration of enemy artillery fire on the entrances and permit the defender to bring flanking fire upon the boats from automatic and other weapons. These weapons are neutralized either by air craft, naval gunfire, or the leading elements of the landing force before the boats carrying the main force come within effective range of the flanking fire.

b. Land projections facilitate flanking fire by ships' guns and permit attacking units to protect both flanks by resting them on the water's edge. 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, and it may be advisable or necessary to seize one or more prior to the main landing. Ordinarily this operation will not be as difficult as other types of landing.

Naval gunfire, particularly counterbattery, is relatively effective for island targets. Even though the islands may be capable of mutual support by fire, the effective use of general reserves by the defender will usually be impossible. An island once seized may be used as a base for further operations. On the other hand, landings on a chain of small islands may present certain disadvantages, especially where the defenders on each must be overcome successively.

■ 24. TIME ELEMENT.—Certainty of getting ashore is of primary importance, but a successful landing is of no value if the landing force, by reason of the distance or the difficulties of the terrain, is unable to reach its objective in time to carry out its mission. If time is limited, it may be necessary for the attacker to land relatively near the objective regardless of enemy dispositions. If more time is available, the landing may be made in an area in which the beaches are less heavily defended, even though more extensive shore operations are required for the carrying out of the mission.

■ 25. METEOROLOGICAL CONDITIONS.—Meteorological conditions influencing the selection of landing areas include humidity, temperatures, snows, prevailing winds, storms, direction of the sun, phase of the moon, and tide.

■ 26. CONCLUSION.—*a.* Landing areas possessing the best beaches and the most favorable approaches inland are usually those most heavily defended by the enemy. Conversely, landing areas with unfavorable beaches and easily defended avenues of approach inland are less heavily defended.

b. The final selection of the landing area is usually a question of deciding between these conflicting conditions. A correct decision demands a careful estimate of the situation, including a study of the physical features of the beaches, a thorough knowledge of the methods, capabilities, and limitations of the opposing forces, and computation of the time and space factors.

SECTION V

TIME OF LANDING

■ 27. GENERAL.—In selecting the time of landing, consideration is given the influence of daylight and darkness, par-

ticularly as they affect surprise, air operations, enemy's sea, land, and aviation forces, navigation, and shore operations.

■ 28. SURPRISE.—*a.* Darkness increases the chance of securing some measure of tactical surprise. It deprives the defender to a material degree of the information necessary for the proper maneuver of his forces to meet the attack. Illumination of water areas is difficult but may be partially accomplished by searchlights and flares. Information at night is obtained largely by airplanes or patrol vessels and is subject to delay, error, or loss in transmission. Landing operations at night are difficult and liable to be attended by greater confusion than during daylight.

b. During daylight hours the defender, with his extended system of observation and his permanent means of signal communication, can more rapidly secure complete and accurate information than at night. Such information permits him to act with greater promptness and certitude in the movement of defense forces and means.

■ 29. AIR OPERATIONS.—Bombing under cover of darkness, though less accurate than in the daytime, can hardly be prevented regardless of the numerical superiority in the air. A night operation involving the anchoring or laying to of transports for several hours in the face of an active enemy air force is therefore hazardous. This hazard may be reduced, however, when destroyers or small craft not so vulnerable to air attack are used for transporting troops for the initial assault echelons.

■ 30. ENEMY SEA AND LAND FORCES.—*a.* The attacker's control of the sea in the area of operations does not preclude the defender launching night attacks with destroyers and other small surface craft, day and night submarine attacks, and mining operations. Countermeasures against these threats are more effective during daylight than in darkness.

b. The fire of all weapons is less effective at night. During the day the effectiveness of the defender's small-arms fire may be reduced by smoke and other chemicals.

■ 31. NAVIGATIONAL CONSIDERATIONS.—The navigation of ships and the handling of small boats are facilitated by daylight operation. On an unfamiliar coast without thorough reconnais-

sance and the establishment of navigational aids, there is no assurance that a landing can be made at night on the designated beaches. The establishment of 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. Navigational hazards may dictate a day landing.

■ 32. OPERATIONS ON SHORE.—*a.* Night attacks are difficult to execute and are rarely attempted in land warfare except under special conditions. Even if a night landing of the initial assault elements is contemplated, the bulk of the force should be landed shortly before or at daybreak so that the troops will have the benefit of daylight in conducting the operations on shore.

b. A day landing should allow sufficient daylight for the operations contemplated for the first day.

■ 33. SUMMARY.—*a.* The principal advantages of a night landing are that it tends to secure tactical surprise and reduces the effectiveness of the defender's fire. The principal advantages of a day landing are that air and naval superiority are best obtained, the navigation of ships and boats is facilitated, and shore operations are easier to execute.

b. The initial assault elements of the landing force will normally be brought in under cover of darkness, debarking and movement to shore being made preferably before dawn or shortly thereafter, and shore operations will be conducted principally during daylight. Transports carrying the main forces may best come in after daybreak under the protection of the attacker's air force.

CHAPTER 2

ORGANIZATION FOR LANDING OPERATIONS

SECTION I

ORGANIZATION AND COMMAND

■ 34. CONTROL.—*a.* A joint expeditionary force may be organized into two or more joint attack forces if separate operations are contemplated at such distances from each other as otherwise to make control difficult or impracticable. A joint attack force includes a naval attack force and the landing force associated therewith.

b. Coordination of the operations of Army and Navy forces is by mutual cooperation or by the exercise of unity of command. See Joint Action of the Army and the Navy.

c. For the normal respective tasks of the Army and the Navy in the joint oversea movement and the subsequent landing operations, see Joint Action of the Army and the Navy.

d. Army and Navy commanders of a joint expeditionary force with their respective staffs should be embarked on the same ship, as should also the respective Army and Navy commanders of a joint attack force. This method should be applied, where practicable, through all echelons of command.

e. The mutual exchange of highly qualified liaison agents assures a degree of cooperation between the Army and the Navy not otherwise readily obtainable. In joint operations the commander of one service should have on his staff members of the other service.

■ 35. NAVAL ATTACK FORCE.—A naval attack force is the naval unit in landing operations, consisting of transports, cargo ships, and supporting naval vessels, operating against a continuous shore line, usually designated by the geographical name of the locality, or by the terms "right," "left," "center,"

etc. The naval attack force is subdivided into naval task groups appropriate for the various operations involved and the scheme of maneuver adopted.

■ 36. NAVAL TASK GROUPS.—*a*. The normal Navy missions (tasks) during the landing operations are reconnaissance; protection against enemy naval forces; furnishing, manning, equipping, and operating the small craft required for landing personnel and matériel of the landing force; support of the operation by mine sweeping, ship gunfire, aircraft and screening operations, fire from boat guns, and removing underwater obstacles; and signal communication between ships and shore.

b. Vessels of the naval attack force are organized into task groups to carry out the above missions.

■ 37. RECONNAISSANCE GROUP.—*a*. The reconnaissance group or groups consists of vessels assigned the task of reconnoitering the area selected for the operation, and such other areas as may be considered desirable in order to deceive the enemy as to the point of landing. The reconnaissance group is generally composed of suitable vessels from the other task groups listed below.

b. The reconnaissance group's missions include—

(1) Identifying fixed reference points on the beach and establishing other aids to navigation.

(2) Securing photographs and panoramic sketches to assist boat group commanders in locating their beaches, troop commanders in planning shore operations, and fire support groups in planning and executing supporting fires.

(3) Ascertaining enemy naval dispositions within and in the vicinity of the landing area.

(4) Determining the suitability of beaches and sea areas for the conduct of the operations.

(5) Locating mined areas, underwater obstacles, and other obstructions such as booms and nets.

(6) Ascertaining if beaches have been contaminated with chemicals.

(7) Locating enemy dispositions on shore and selecting suitable targets, landmarks, and aiming points for fire support ships.

(8) Securing information regarding the enemy air force.

■ 38. FIRE SUPPORT GROUP.—*a.* The fire support group or groups consists of vessels assigned gunfire missions in support of the landing and subsequent operations.

b. For detailed missions and organization of the fire support groups, see chapter 6.

■ 39. AIR GROUP.—*a.* The air group consists of aircraft assigned to support the operations. Aircraft of the landing force may be attached to the air group during such periods as desired.

b. The operations of the air group include—

(1) Reconnaissance and photographing of enemy positions.

(2) Observation of gunfire of the fire support group and the Army artillery.

(3) Protection of the attack force against enemy air operations.

(4) Attack of enemy objectives.

(5) Transport of parachute and other air landing troops.

(6) Close support of the landing force, and liaison with the landing force.

c. Since aerial reconnaissance will be one of the primary means of obtaining information as to enemy dispositions, special arrangements should be made for Army personnel to accompany naval aerial reconnaissance where matters of joint interest are concerned.

■ 40. TRANSPORT GROUP.—*a.* The transport group or groups consist of the transports and supply vessels used in carrying troops, equipment, and supplies.

b. The missions of the transport group are—

(1) Preparation and assembly of transports, boats, and special equipment for the landing, and assembly and training of personnel for the operation of vessels, boats, and equipment.

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

(3) Embarkation of troops and matériel.

(4) Conduct of the transport group in the movement overseas.

(5) Debarkation of troops and matériel.

(6) Designation of boat rendezvous area, or areas.

■ 41. CONTROL GROUP.—*a.* The control group consists of vessels designated to control 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 are utilized at convenient times to lay smoke screens, assist in furnishing fire support, and similar missions.

b. The normal tasks of the control group are to—

(1) Mark control points to regulate the ship-to-shore movement, and other points designated by the attack force commander.

(2) Control the movement of all boats between the rendezvous areas and the beach.

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

(4) Assist in control of naval gunfire.

(5) Relay messages to and from the landing beaches.

c. If practicable, one vessel of the control group is assigned to each leading boat group.

d. Each control vessel is equipped to communicate directly with the landing boats, the landing beaches, the flagship of the attack force, fire support groups, control group, and other designated vessels. Control vessels communicate to higher commanders and fire support groups information regarding the time when waves pass control points and the line of departure (see pars. 55 and 56). Visual, radio, and messenger boat communication is established with the beach party as soon as it has landed. Special observers are detailed to watch for pyrotechnic signals from the boats, aircraft, and the landing force.

e. After marking or identifying the line of departure and control points, designated vessels of the control group rendezvous with the boat groups at the specified time and place, assume control, guide them in to the line of departure, and regulate the speed so that successive waves will cross the line at the scheduled times. In this manner orders modifying the plan may be transmitted to the boat groups through the proper control vessels.

f. Whenever practicable, the approach from the boat rendezvous areas to the line of departure is a simultaneous guided movement, each control vessel acting as a guide to a boat group.

g. Designated control vessels may be utilized as a rendezvous for boats transporting field artillery and reserves after the leading boat groups have landed.

h. In case 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.

■ 42. ANTISUBMARINE GROUP.—The antisubmarine group consists of the vessels designated to protect the attack force from submarines. This group may also be given the task of laying smoke screens.

■ 43. MINE GROUP.—*a.* The mine group consists of the vessels assigned the task of mine-sweeping and mine-laying operations. It may also remove underwater obstacles. Boats assigned the mission of removing enemy obstacles near the shore should be protected at least against enemy small-arms fire.

b. Part or all of the mine group may be assigned to the reconnaissance group for mine-sweeping operations in connection with the preliminary reconnaissance of the landing area.

c. Particular attention is paid to mine sweeping of transport and fire support areas, and approaches thereto.

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

■ 44. SCREENING, SALVAGE, AND DEMONSTRATION GROUPS.—The screening, salvage, and demonstration groups are vessels assigned, respectively, to provide security from enemy forces afloat, to rescue personnel and salvage boats and equipment, and to make demonstrations outside of the designated landing area.

■ 45. LANDING FORCE.—The landing force consists of the Army (or Marine) organizations which are to carry out landing operations from the transports of a naval attack force.

NOTE.—Marines employed as landing forces function in the same manner as Army landing forces, whether operating with the Navy alone or in conjunction with the Army and Navy.

a. Tasks.—The normal Army tasks in landing operations are—

(1) Deployment into the boats used for landing which are operated by the Navy.

(2) Delivery of fire with its own weapons while landing, and furnishing assistance in manning designated naval boat guns.

(3) Gaining of a foothold on shore.

(4) Organization of a beachhead.

(5) Organization and conduct of operations to extend the beachhead.

(6) Conduct of operations beyond the beachhead for the accomplishment of the mission.

b. Organization.—(1) Transportation facilities of available transports, boats, and small craft are limited as are also the facilities for debarking matériel from the boats and small craft. These limitations impose restrictions on the organization of the landing force. For support in the first stage of attack the landing of tanks, except amphibious types, is difficult and the landing of heavy artillery and other heavy matériel is impracticable. The absence of operating bases ordinarily makes it impracticable to employ Army air units before and during the early stages of the landing. Special organization is therefore required to reduce ship cargo requirements, facilitate debarkation of intact combat units, provide increased rifle, machine-gun, and mortar fire in lieu of normal artillery support, and insure mobility of the first units ashore.

(2) The organization of the landing force must be such as to facilitate employment of battalion combat teams in independent action at least during the first phase of the landing operation. For definition of combat team, see paragraph 8*e*.

(3) Based on tactical requirements primarily but also on economy of transport loading, the landing force is organized into embarkation groups. The necessity of careful organization in the embarkation phase is obvious when consideration is given the close relation between embarkation and the debarkation for ship-to-shore movement in the actual landing operations.

(4) For the movement from ship to shore the landing force is subdivided into landing groups each consisting of a bat-

talion combat team and other elements such as a beach and a shore party, forward echelons of higher headquarters, and liaison personnel. A battalion combat team is the basic Army unit in landing operations; for composition see paragraph 8*e*. It is normally transported in the ship-to-shore movement by a boat group.

SECTION II

BEACH AND SHORE PARTIES

■ 46. BEACH PARTY.—*a*. The beach party is a Navy task organization for the control of the beach from the high-water mark seaward. It is commanded by a naval officer, the *beachmaster*.

b. The size of the beach party depends on the extent and importance of the beach and the troops and matériel to be landed thereon. It normally consists of the following details: signal communication, boat repair, medical, civil engineer, labor, and mess. It should include one or more liaison agents from each battalion combat team and previously trained artillery and Air Corps liaison personnel from the Army.

c. Tasks of the beach party are—

(1) Reconnaissance of the beach, and selection and marking of landings (landings are usually marked by signs or flags showing the letter assigned the beach followed by a number, as A–1, A–2, etc.).

(2) Marking all hazards to navigation.

(3) Boat traffic control.

(4) Landing and hauling off of boats.

(5) Communications with naval task groups and with beach parties on adjacent beaches and transmission of messages of the landing force, both ship to shore and shore to ship.

(6) Emergency boat repairs.

(7) Construction of landing facilities.

(8) Unloading matériel of the landing force.

(9) Evacuation of casualties and prisoners of war.

d. The order for the landing provides for the designation by boat group commanders of the traffic control and messenger boats for operation by the beachmaster after troops disembark.

■ 47. SHORE PARTY.—*a*. The shore party is the task organization of the landing force for the control of Army adminis-

* * * * * * *

c. Tasks of the beach party are—

(1) Reconnaissance of the beach and selection and marking of landings (landings are usually marked by signs or flags showing the letter assigned to the beach followed by a number, as A–1, A–2, etc.). The limit of each beach should be marked with two stakes set at such distance one behind the other that they may serve as aiming (guide) stakes for boats approaching from seaward. To assist in the navigation of small boats at night it may be desirable to point seaward various colored lights, assigning each beach a different color, and providing an appropriately hooded lamp at each extremity of the beach to reflect the color assigned to that beach.

* * * * * * *

d. Both prior to and after the assembly of the joint force, combat team training should provide that more than one combat team rehearse the landing and assault on each beach. Such training will assure flexibility and readily permit changes in the plan of landing combat teams should contingencies, such as loss of transports en route to or at the landing area, require such changes.

trative activities at the beach. It is commanded by an Army officer who is on the staff of the senior troop commander on the beach and is known as the *shore party commander*.

b. The shore party consists of a headquarters and any or all of the following detachments from units of the landing force: medical, supply, labor, engineer, military police, chemical, and communications. These detachments, assigned to the shore party to secure effective operations at the beach during and immediately after the landing, revert to control of their respective organization commanders as soon as the situation warrants.

c. The tasks of the shore party include—

(1) Maintenance of liaison between beachmaster and senior troop commander ashore.

(2) Maintenance of order.

(3) Control of stragglers.

(4) Direction of traffic and work of prisoners.

(5) Selection and marking routes inland.

(6) Assignment of operating, bivouac, parking, and storage areas for the services using the beach.

(7) Prompt movement of equipment and supplies from shore.

(8) Decontamination of gassed areas.

(9) Establishment of information and message centers.

(10) Making recommendations as to landing of vehicles and supplies and the establishment of a supply system.

■ 48. LANDING.—*a*. The beachmaster and shore party commander, with a small nucleus of the beach and shore parties, land in the leading boat group. The remainder of the parties are not landed until required. The bulk of the working details will not be needed on the beach until the second or subsequent trips of the boats when large quantities of supplies begin to arrive.

b. Beach party personnel may be used to assist boat crews during the movement from ship to shore.

c. Shore party personnel may be used as gunners, ammunition passers, or to assist the boat crews in any way during the ship-to-shore movement.

■ 49. INITIAL EVACUATION SERVICE.—*a*. The beach party (Navy) is responsible for the evacuation of casualties from

the beach to hospital ships or transports. Medical personnel for ambulance boats are furnished by a hospital ship or transport, as directed in the administrative plan.

b. The beachmaster should have the ambulance boats assemble where they will be least exposed to fire and can be called to the evacuation landings as required.

c. In case the number of boats is so limited that there are insufficient boats to handle the evacuation until reserve battalions have been landed, evacuation of casualties to hospital ships may be delayed until after the landing of these reserves.

d. For details of the medical service afloat and ashore, see section VII, chapter 10.

■ 50. PERSONNEL.—*a.* Beach and shore parties are not normally provided in the unit organization of either the Army or the Navy. They are therefore organized by detaching personnel temporarily from permanent organizations.

b. The number of beach and shore parties is dependent on the size of the landing force and the number of beaches utilized. Labor details, in particular, will vary with the amount and type of equipment and supplies landed at each beach. In general, one beach party and one shore party are organized for, and embarked on the same transport with, each assault battalion combat team. If a particular operation does not require all of the beach and shore parties so constituted, the personnel not needed initially may be held in reserve or used to reinforce the parties on the more important beaches. In the same manner, when beaches are abandoned, beach and shore party personnel thereat are moved promptly to reinforce the parties of beaches to be kept in operation.

■ 51. COOPERATION.—*a.* The fullest cooperation is required between the beachmaster and shore party commander in order that available personnel and facilities may be utilized to the best advantage.

b. The shore party commander and beachmaster should make a joint reconnaissance of the beach and the terrain in the immediate vicinity thereof in order that storage areas for landing force matériel may be so located in respect to the best landing places that handling may be reduced to a minimum.

c. The shore party commander utilizes engineers to assist the beach party in building and improving landings, in unloading heavy equipment, and in removing beach and surf obstacles or mines. Signal and medical personnel of the two parties operate in close liaison, and message centers of the two commanders should be in close proximity to each other.

NOTE.—The Navy term "communication center" is equivalent to the Army term "message center."

d. The shore party commander maintains liaison between the beachmaster and the senior troop commander on a beach. The shore party commander thus provides one officer through whom the beachmaster conducts all necessary transactions with units ashore.

SECTION III

STATION AND MANEUVER AREAS

■ 52. ASSIGNMENT OF AREAS.—*a.* The naval task groups are assigned appropriate station and maneuver areas within the landing area to permit them to carry out their assigned tasks. These areas include one or more transport areas in which transports or other vessels disembark troops and equipment, and one or more fire support areas in which the fire support groups operate.

b. In addition, other stations or cruising directions are prescribed to coordinate the naval operations within the landing area.

c. The transport and fire support areas are so located in relation to each other that movements of boats transporting troops and matériel and movements of firing ships will not conflict.

■ 53. TRANSPORT AREAS.—Transport areas are conveniently located in respect to landing beaches, and as close inshore as enemy artillery fire and depth of water permit. So far as the hydrography of the landing area permits, they should afford smooth water for debarkation and protection against attack by surface craft and submarines, and they should be free of mines. Two or more transport areas may be necessary if beaches are separated by considerable distances. The location of the area or areas should not disclose to the enemy the

exact point of landing. As soon as the situation permits, the transports move as close to the beach as possible to facilitate landing equipment and supplies.

■ 54. FIRE SUPPORT AREAS.—The number of fire support areas depends on the number of supporting ships, the fire missions, and the hydrography and topography of the landing areas.

■ 55. LINE OF DEPARTURE.—*a.* The line of departure is a coordinating line (offshore) 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 or more from the beach. If hostile light artillery is disposed on or near the beach, the line of departure must be established at a greater distance 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 prescribed direction lines.

c. In order that boats may land on schedule it is highly desirable that the line of departure be accurately located with reference to the beach. However, if this is impracticable or incompatible with secrecy, airplanes may be employed to guide and regulate the approach to the beach.

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

■ 56. REFERENCE AND CONTROL POINTS.—*a. Reference.*—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, and lines of departure. Each reference point is designated by a letter and is fixed by giving its direction and distance from a known point, grid coordinates, or the latitude and longitude.

b. Control.—(1) Control points are reference points which are marked by buoys, boats, or small craft as aids to navigation for the vessels and boats of the attack force. They are established to indicate lines of departure; points where boats change direction or pass through lanes between fire support groups, and points which will assist the control group in regulating boat movements; and to aid the various supporting groups to move into the landing area, take accurate station therein, and conduct prescribed operations in the area on the 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 control points buoys which are not visible from shore. 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. Small craft may be stationed at the buoys at the proper time to insure their being identified by boats or vessels not familiar with the landing area. 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 fly identifying flags by day and show a light to seaward by night. Provision is 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 (airplane radio navigational equipment).

c. Table.—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.

■ 57. 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 E for a straight run for beaches C and B. In order

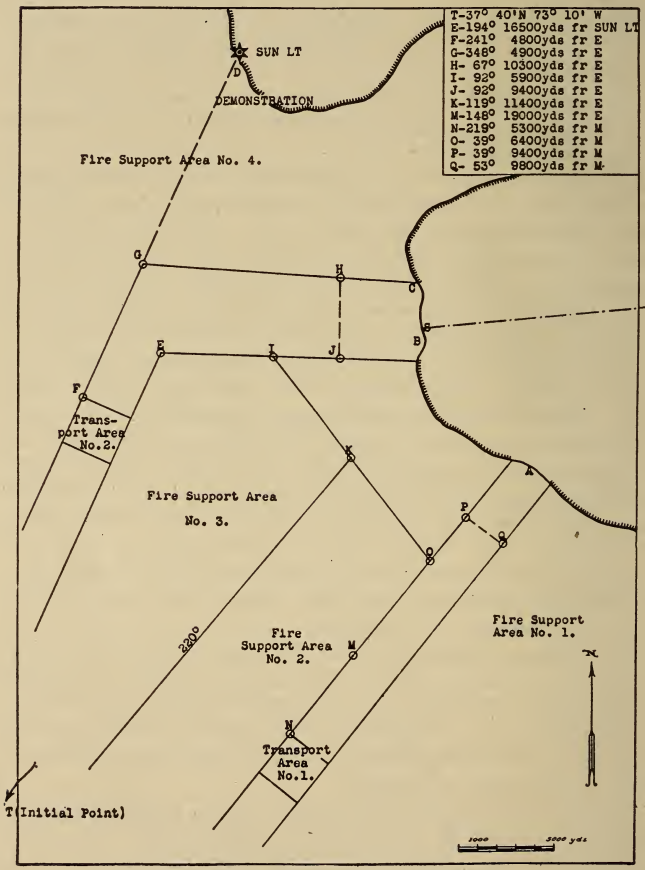


FIGURE 1.—Station and maneuver areas.

still further to deceive 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.

c. Control points H, J, P, and Q mark the lines of departure. Control points E and M 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 T is the initial point for regulating the movement into the landing area.

CHAPTER 3

LANDING BOATS

SECTION I

GENERAL

■ **58. BOAT REQUIREMENTS.**—*a.* Successful landing against opposition requires boats in adequate numbers and with suitable characteristics to land the personnel and matériel of the Army forces in accordance with the tactical and administrative plans. The Navy is charged with providing and operating these boats. The detailed information needed by the Navy to determine the requirements in landing boats is furnished by the Army in the embarkation and debarkation tables, with their appendices. Basic data are developed from the joint plan of the Army and Navy commanders designated for the expeditionary force (see chs. 5 and 10).

b. It is desirable to land all combat troops in one trip. With large forces this is not practicable. The number of boats provided should at least permit the landing in the first trip of the assault combat teams and local reserves required to gain and to hold the first objective until additional troops are landed.

■ **59. FOR ASSAULT COMBAT TEAMS.**—It is desirable that the assault combat teams be landed in boats capable of producing a heavy volume of fire, armored to give protection against small-arms fire, and having high speed and shallow draft.

■ **60. SIZE.**—*a.* The use of relatively small boats in landing the leading echelons has advantages, namely:

(1) A heavy volume of fire can be delivered upon approaching the shore.

(2) Landing can be made near the shore.

(3) Troops can be disembarked quickly and deployed promptly for attack.

(4) Small boats present a less concentrated target.

(5) Can be carried in spaces not otherwise used and on vessels not equipped with large capacity booms.

b. Figure 2 illustrates some of the advantages of small boats over large boats in leading waves. Company A, on the right, lands its leading wave in eight small shallow draft boats. The boats run well in to the beach and troops are on shore without 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

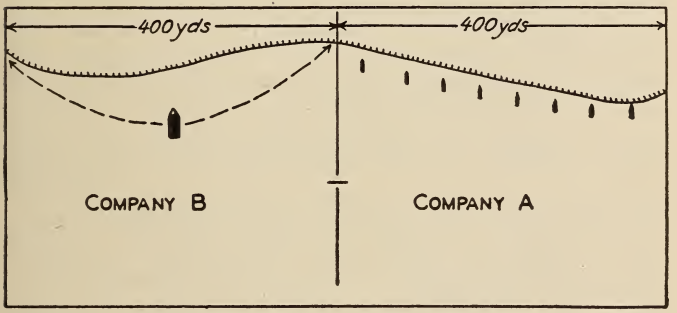


FIGURE 2.—Comparison of small and large boats in landing leading subwave.

its leading wave in one large boat. This boat beaches relatively far out, has less firepower, enemy fire can be concentrated, and troops must move laterally to get into attack formation. For example, the flank squads of Company B have to debark and move 200 yards directly by the flank under enemy fire to reach their proper place in formation.

c. Large boats, however, have certain advantages, particularly for rear waves. To land a given number of men 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. Based upon tactical employment, procurement, and transportation, it will usually be advisable for each boat group to contain boats of several sizes. The most suitable sizes are boats with a capacity of—

(1) From 12 to 25 fully equipped soldiers, in addition to the crew, for landing the leading waves.

(2) 20 to 40 soldiers for landing support echelons.

(3) 40 or more soldiers for landing reserve echelons.

■ 61. SPEED.—Fast boats are less vulnerable to enemy fire, reduce the time available to the enemy to concentrate his troops and perfect his defensive measures, and decrease the interval between the lifting of the naval supporting fire and the arrival of the boats at the beach. Since the enemy may be expected to man his defenses near the beach upon the lifting of the supporting fire, any decrease in this interval enhances the assaulting combat team's chances for success.

■ 62. ARMAMENT.—To compensate for the limitations of naval gunfire and the necessity of lifting this fire when boats are still well off the beach, each boat of the leading wave should be heavily armed with machine guns, 37-mm guns, or other suitable weapons, mounted for rapid and accurate laying from a moving platform. Owing to their ease of landing, rapid fire, and usefulness as antiaircraft weapons, a large percentage of the boats should be equipped with machine guns, including submachine guns. The effectiveness of the fire from boat guns will vary materially, depending upon the training and experience of the personnel.

■ 63. DRAFT.—Light draft boats are preferable for leading echelons. The light type boats not only can proceed closer to the beach but also can be extricated more easily and rapidly under their own power after grounding or beaching. 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, and equipment is handled with difficulty. Under such conditions heavy

casualties against even slight enemy opposition may be anticipated.

■ 64. RESERVES.—Boats with large capacity are preferred for transporting reserve battalions which are landed under the protection of other troops. Standard Navy motor launches or boats of larger capacity may be used for this purpose. 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.

■ 65. LIGHTERS AND BARGES.—*a.* The landing of heavy artillery requires especially adapted lighters. Such lighters must have the necessary capacity with comparatively shallow draft. They should be able to run well up on the beach and permit unloading of guns by ramps between lighter and shore. These lighters can also be used for the landing of other vehicles, airplanes, and heavy matériel, as well as supplies in large quantities.

b. Self-propelled lighters capable of carrying and debarking available amphibian tanks or of landing light tanks with or ahead of the leading waves are desirable. The lighters should be of shallow draft and permit nonamphibian tanks being run ashore without delay under their own power. The lighter should be heavily armed in order to provide a point of support on the beach and cover the landing of the tank.

c. Lighters capable of transporting guns and other heavy matériel can be improvised by building a platform over two standard 50-foot motor launches.

d. Water barges may be required for the delivery of water in bulk to the beach during the later phase of landing.

SECTION II

STANDARD ARMY AND NAVY BOATS

■ 66. GENERAL.—Standard Navy boats, while not well suited for a landing against opposition, constitute the principal source of boat procurement and, because of their availability, are used. They are suitable for landing reserves and supplies when the beach is fairly well protected from enemy fire or when the landing is lightly opposed. The Army 36-foot Hig-

gins boat and the 45-foot tank lighters carry armor plate sufficient to protect the boat crews and other personnel against small-arms fire.

■ 67. TABLE OF CHARACTERISTICS.—Characteristics of standard Army and Navy boats are shown in the tables below. The explanation given in the paragraphs which follow should be considered when using the data given in the tables.

■ 68. CAPACITY IN BOAT SPACES.—*a.* Referring to column 2 of the table, "boat space" is a term employed to indicate the space and weight required for one soldier with his individual equipment. A soldier so equipped is assumed to weigh 224 pounds ($\frac{1}{10}$ of a long ton) and to occupy 13.5 cubic feet of space.

b. Boat spaces available for troops or matériel are computed as 60 percent of the rated maximum personnel capacity of the boat, less the number of men in the crew. This loading is approximately 80 percent of the maximum capacity of the boat *by weight.*

c. Boats are not filled to capacity under adverse conditions of weather, sea, or surf. If under fire, there should be room to keep troops low in the boat. If weapons are to be fired from the boat, space is allowed for their operation.

STANDARD ARMY BOATS

1	2	3	4		5	6	7
Type	Boat spaces (in addition to minimum crew)	Speed (miles per hour)	Time to load (minutes)		Minimum crew	Mean draft loaded (approximate)	Weight (approximate) [1]
			Day	Night			
						Ft. In.	
Higgins boat, 36-foot	86	10	6	8	4	2 9	16,534
Navy launch, 40-foot	36		8	10	3	2 10	9,800
Diesel		10					
Gasoline		14¾					
Tank lighter, 45-foot	(2)	10			6	2 10	50,500

[1] Includes hull, engine, standard equipment, and fuel.

[2] 1 tank (27,000 pounds).

STANDARD NAVY BOATS

1	2	3	4		5	6	7	8
Type	Boat spaces (in addition to minimum crew)	Speed (knots)	Time to load (minutes)		Designating letter	Minimum crew	Mean draft loaded (approximate)	Weight (approximate)[1]
			Day	Night				
Motor launch:							*Ft. In.*	
50-foot	110	7	15	20	A	4	3 1	21,400
40-foot	50	6	8	10	B	4	2 5	14,500
36-foot	38	6	6	8	C	4	2 2	11,100
33-foot	27	4	5	7	D	3	2 2	8,400
30-foot	21	5	4	6	E	3	2 2	8,400
24-foot	10	5	3	4	F	2	1 11	5,600
Motorboat:								
50-foot	25	10	5	7	I	4	3 1	19,500
40-foot	18	9	4	6	K	4	2 8	15,000
35-foot	12	8	3	4	L	4	2 9	13,600
26-foot	8	6	3	4	M	3	2 1	6,200
Motor whaleboat,[2]								
26-foot	11	5½	3	4	N	3	2 1	5,300
Whaleboat:								
30-foot	22	(3)	4	6	O	2	1 9	3,300
28-foot	17	(3)	4	6	P	2	1 8	2,900
24-foot	12	(3)	3	4	Q	2	1 7	2,300
Dinghy:								
20-foot	7	(3)	3	4	R	1	-------	1,200
16-foot	5	(3)	3	4	S	1	-------	700
Wherry:								
14-foot	3	(3)	3	4	T	1	-------	600
12-foot	2	(3)	3	4	U	1	-------	400

[1] Includes hull, Diesel engine, standard equipment, and fuel.
[2] Unsuited for landings in heavy or even moderate seas.
[3] Pulling boat; must be towed.

d. Consideration is given to the dimensions of each vehicle and to the height of the center of gravity of the load as they affect stability afloat. For example, only one tractor and two trailers requiring (together with boat rig A) by weight 71 boat spaces can be loaded in a 50-foot motor launch which has a rated capacity of 110 boat spaces (see par. 73). The remaining capacity can be utilized for personnel or general cargo.

e. The space and weight of any protective armor, boat guns and ammunition, and extra anchors reduces the capacity of a boat.

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

g. In planning landing operations, tables are prepared showing the boat spaces for Army equipment. The following examples are from Navy tables for Navy boats:

	Boat spaces
Ammunition, 100 rounds, 75-mm pack howitzer, H. E., boxed (4 rounds per box)	11.4
Boat rig A and ramp	34.0
Container, water, 10-gallon, filled	.5
Caisson, ammunition, 75-mm gun, with load	15.0
Car, cross-country, empty	12.0
Gasoline, 1 case of two 5-gallon cans	.4
Gun, 75-mm	12.0
Motorcycle, with side car	5.0
Rations (1 day for 100 men)	2.5
Reel, wire, hand	2.0
Truck, light, ½-ton, empty	10.0
Truck, light, 1½-ton, with load	28.0

■ 69. SPEED.—The speeds (in miles per hour for Army boats and knots for Navy boats) indicated in column 3 of the tables are 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.

■ 70. TIME TO LOAD.—The loading times in the tables are based upon debarking under average conditions, 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 are expected under war conditions. The time given includes delays incident to placing the boat alongside transports. 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.

■ 71. 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 for Navy boats. For example, the designation "A–1" is used instead of "50-foot motor launch No. 1." These designating letters are placed on the boat. Similar procedure is advisable for Army boats.

■ 72. CREW.—*a.* The figures shown in column 5 for Army boats and column 6 for Navy boats 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. Army personnel to be landed may be used as gunners. Members of the beach party can be detailed to duty such as boat officers and linesmen. The number of additional officers and men is determined for any particular situation, and the number of boat spaces shown in column 2 of the tables is reduced accordingly.

b. The exact strength of the crew and other Navy personnel that will embark in each boat must be determined early. This information is furnished the landing force commander before the boat assignment tables are initiated.

■ 73. BOAT RIG AND RAMP.—*a.* For landing tractors, trailers, trucks, light artillery, and other vehicles from standard 50-foot motor launches, the Navy provides a special boat rig (boat rig A) and ramp (see figs. 3 and 4). Boat rig A consists of a wooden platform and runway to the bow, the necessary supports therefor, and the gear for securing the ramp to the bow. The rig weighs about 4,700 pounds (not including the weight of the ramp) which reduces the capacity of the boat accordingly.

b. The rig is designed to fit a 50-foot motor launch, without modification of either boat or ramp. Because of variation in design of 50-foot motor launches in service, minor alterations are sometimes necessary to fit the rig. After fit has been assured, the rig can be installed before lowering or when the boat is alongside in about 30 minutes.

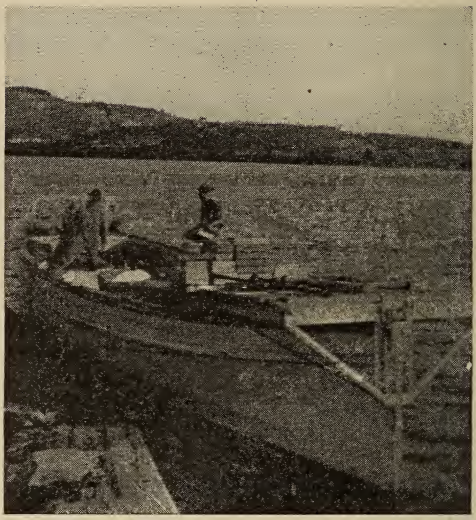


FIGURE 3.—Boat rig A installed in 50-foot motor launch.

FIGURE 4.—Unloading tractors from 50-foot motor launch equipped with boat rig A and ramp.

c. The ramp is pivoted at the bow of the boat, permitting both vertical and lateral movement. The shore end of the ramp is fitted with two rounded bearing lugs which ride in the grooves of angle irons laid on the bottom, permitting a free fore-and-aft movement of about 6 feet. The ramp is carried disassembled in the boat. The heaviest piece weighs 260 pounds, and the total weight of the ramp is 2,800 pounds. Upon arrival at the beach the ramp can be assembled and made ready for use by 8 men in about 10 minutes.

d. When the boat is unloaded and it is intended that repeated landings at the same place will be made, the ramp may be left assembled on the beach. In this case, the same ramp may be used for unloading several boats, reducing the relative number of ramps that will be required at this landing beach. An assembled ramp can be connected to an incoming boat in about 5 minutes.

e. Upon favorable conditions, vehicles up to 5-ton weight can be landed from standard 50-foot motor launches by means of boat rig A and ramp. After the ramp is connected, about 1 minute is required to land a tractor and two trailers.

f. A disadvantage of this rig is the relatively high center of gravity of the boat with a vehicle load, limiting or precluding its use under adverse conditions of weather, sea, or surf. Ammunition, rations, or other heavy matériel should be loaded in the boat to provide ballast when boat is used for vehicles.

g. Special type lighters, especially artillery lighters and the 45-foot tank lighter, are preferable to boat rig A.

h. The Army 45-foot tank lighter carries already installed equipment similar to the Navy rig which must be fitted to the 50-foot Navy launch. The Army tank lighter is designed to carry one light tank with its crew and equipment.

CHAPTER 4

SHIP-TO-SHORE MOVEMENT

SECTION I

GENERAL

■ 74. 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 battalion combat team and smaller units, and the corresponding boat organizations. Naval gunfire and aviation support, and the landing of field artillery, tanks, and other arms and services are treated in separate chapters.

b. In the formations illustrated in this chapter, the X-boat and the Y-boat have been used. These are special type boats capable of transporting about 15 and 25 fully equipped men, respectively.

■ 75. 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 realized readily 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

demoralization. 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 columns. 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 or as near thereto as the small boats will permit, deployed as skirmishers. 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

ORGANIZATION

■ 76. Major Groupings.—*a.* The organization for any ship-to-shore movement of troops is naturally divided into two main categories, the subdivision of the landing force into task organizations, and the organization of the small boats in which landing force units are to move and initiate the action.

b. The task organization of the landing force is based on the integrity of units (squads, platoons, companies, and battalions). The task organizations of the small boats should, as far as the number and type of boats permit, conform to those of the landing force so as to facilitate landing of troops in intact units which will enable them to carry out their missions on shore.

c. The basic task organizations of the landing force are *the landing groups* (battalion combat teams and additional parties), and the basic organizations of the small boats are the *boat groups*.

■ 77. Landing Group.—*a. Composition.*—For composition, see paragraph 45*b*(4).

b. Organization.—(1) In order to make the best use of available boats, provide for combined training, and simplify the issuance of orders, all troops to be landed in formation are organized into landing groups. Each landing group is identified by a number, followed by the name of its principal organization, such as Landing Group No. 1 (1st Bn 1st Inf, rein.).

(2) The organization of landing groups is published in the form of a table, as shown in *c* below, which should include all the landing groups organized in the landing force. This table should be issued as early as practicable after the composition of the landing force is known, preferably before embarkation, and independent of any tactical orders for a landing. The table may then be used as a basis for assignment of boats, organization of embarkation groups, transport loading, and similar purposes. The table shows 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 to be used as assault units should be so designated in order that suitable boats may be assigned.

c. Model form for organization of landing groups.

ORGANIZATION OF LANDING GROUPS

Organization	Boat spaces		
	Personnel	Matériel	Total
Landing Group No. 1 (1st Bn 1st Inf rein) [1]			
1st Bn 1st Inf (with Bn Com Sec and Med Sec)			
1st Plat, AT Co, 1st Inf			
Btry A 1st FA Bn (4 guns; 1 truck, ½-ton, 4 x 4, command; 2 prime movers) [2]			
1st Plat Co A 1st Engr Bn (1 truck, 1½-ton, 4 x 4, dump) [2]			
1st Plat Btry —, — CAC (AA)			
Additional transportation as prescribed [2]			
Beach party No. 1			
Shore party No. 1			
Total			
Landing Group No. 2 (2d Bn 1st Inf rein) [1]			
2d Bn 1st Inf (with Bn Com Sec and Med Sec)			
2d Plat AT Co 1st Inf			
Btry B 1st FA Bn (4 guns; 1 truck, ½-ton, 4 x 4, command; 2 prime movers) [2]			
2d Plat Btry —, — CAC (AA)			
2d Plat Co A 1st Engr Bn (1 truck, 1½-ton, 4 x 4, dump) [2]			
Additional transportation as prescribed [2]			
Beach party No. 2			
Shore party No. 2			
Total			
Landing Group No. 3 (3d Bn 1st Inf rein) [1]			
* * * * *	*	*	

[1] To be organized and equipped as an assault unit (if available, a detachment of amphibian tanks may be included but disregarded in assignment of boat spaces).

[2] To be embarked in a separate boat division.

■ 78. BOAT GROUP.—*a.* A *boat group* is a group of boats organized to transport a landing group from ship to shore. It is designated by a number, such as Boat Group No. 1, and is commanded by a naval officer, the boat group commander.

b. When the operation of two or more boat groups in a restricted area demands the actual presence of a single commander, they are combined into one organization called a *boat flotilla.* The flotilla commander is embarked for the ship-to-shore movement on a fast boat, and proceeds so as best to exercise command of his several boat groups during the movement.

c. The boat group is subdivided into task organizations called *boat divisions.* A boat division consists of two or more small boats used to transport a tactical subdivision of the landing group such as a platoon or a company (see fig. 5). During the ship-to-shore movement, the boat division operates as a unit under the boat division commander. Since the boat group commander is able to exercise command through the boat division commanders rather than by dealing directly with the individual boats, his control is facilitated by the organization of boat divisions. Each boat division is designated by a number such as Boat Division No. 1, Boat Group No. 1.

d. Boat groups move from ship to shore and land in successive waves corresponding as nearly as possible to the tactical formation desired during and after landing. A *wave* consists of one or more boat divisions which land approximately simultaneously. Waves are designated successively from front to rear, as first wave, second wave.

■ 79. ASSIGNMENT OF BOATS TO BOAT GROUPS AND BOAT POOLS.—*a.* The table showing the organization of landing groups (see par. 77c) is the basis for the assignment of boats to boat groups. Boat groups to transport assault combat teams are assigned a sufficient number of the smallest and fastest boats available to accommodate the landing group in one trip. Boat groups organized to carry units which are to land later consist of larger motor launches, troop barges, or lighters.

b. In addition to the boats assigned to boat groups, a pool should be provided to aid or replace boats which may become disabled prior to or during the landing. Pools should include all types of boats used in the boat group they support, and

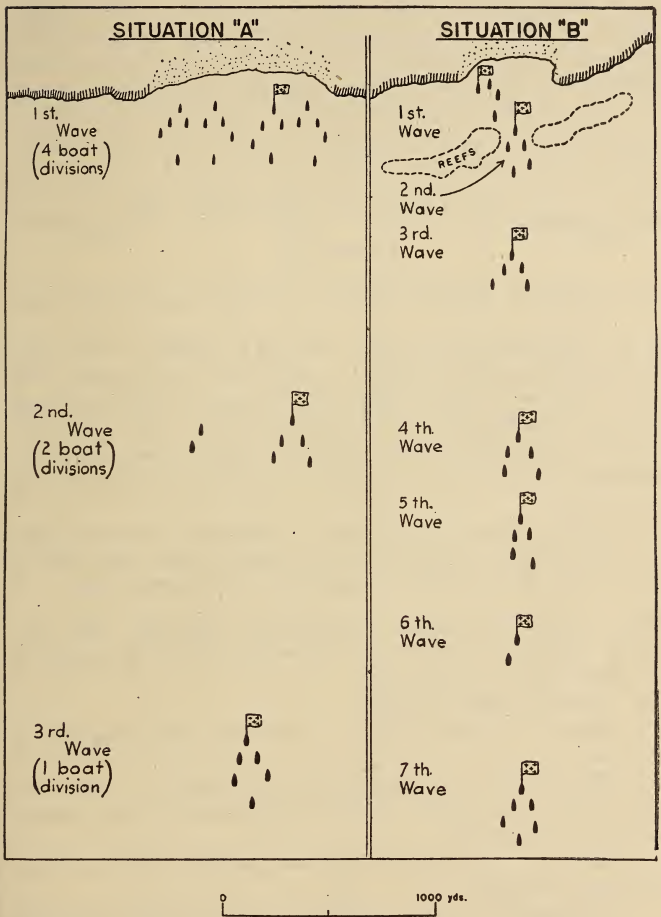


FIGURE 5.—Boat group, boat division and wave (flags shown are wave guide flags).

the crews should be familiar with the formation and plan of landing. Certain of these boats accompany boat groups of the first wave and operate under the orders of the commander of the boat group which they accompany.

■ 80. EMBARKATION OF BOAT GROUP AND LANDING GROUP OFFICERS.—In order to insure the essential close cooperation between boat group officers and officers of the landing group which are to operate together under fire, these officers should be embarked on the same transport. Such personal contact also permits changes to be made readily in the plan for the ship-to-shore movement of the unit concerned in case information received while at sea indicates the desirability of such changes.

SECTION III

BOAT GROUP FORMATIONS, PLATOON AND COMPANY

■ 81. COORDINATION OF ARMY AND NAVY TERMS.—*a.* To avoid misunderstandings, it should be noted that in the Navy the term *"distance"* indicates the space between individual ships or boats *measured in any direction,* and the term "interval" indicates the space between groups of ships or boats measured between the corresponding ship or boat in each group *in any direction.*

b. In this manual Army usage is followed; distance means the space between elements from front to rear, and interval means the space between elements of the same line.

■ 82. FACTORS INVOLVED.—Formations, frontages, and distances employed within boat groups are governed largely by the following considerations:

a. Types of boats available.

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

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

d. Effective use of boat weapons against enemy aircraft and beach defenses.

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

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

■ 83. LANDING A PLATOON.—*a.* (1) Figure 6 illustrates a boat division landing an assault platoon in four X-boats and one Y-boat. It will be noted that the leading boats are deployed in a V similar to that used by aircraft. This formation facilitates effective leadership and control from the command

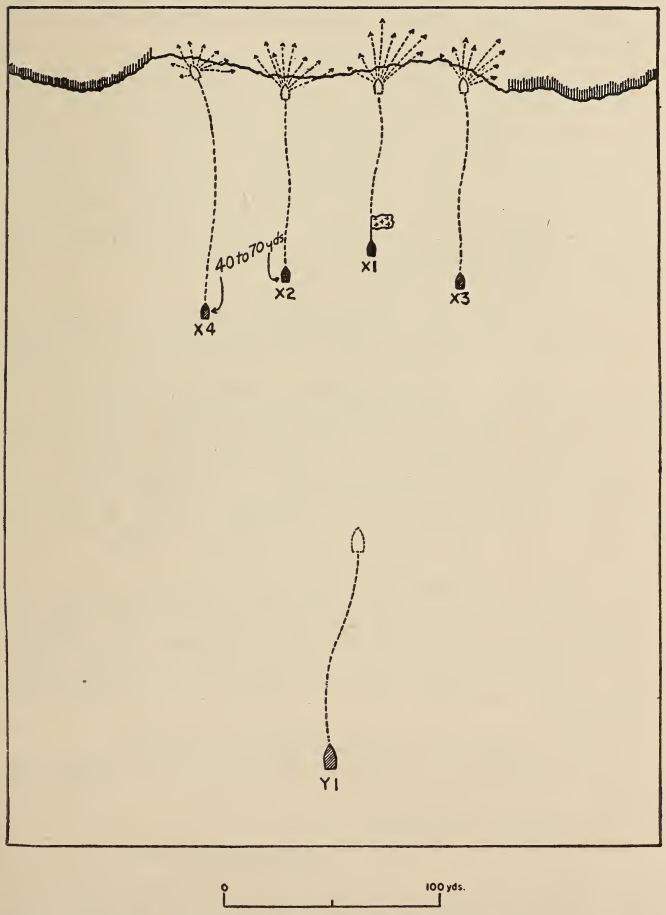


FIGURE 6.—Boat division landing an assault platoon.

and guide boat (X-1), permits the four leading boats to fire on the beach, and is less vulnerable to aerial attack than a line or column formation. Whenever advisable, the V may be opened to a formation with boats abreast by appropriate signals from the leading boat. In order to avoid further the effects of hostile fire, all boats should move toward the beach in zigzag courses while maintaining approximately their relative positions in the formation.

(2) The third (support) element of the platoon in Y-1 keeps sufficiently close to the leading boats to maintain contact. As the leading boats approach the beach, it should be from ½ to 2 minutes traveling time in rear. This enables its commander to select the most advantageous point to land and support the attack. If the enemy opens fire from positions on the flank of the platoon, the support element should not hestitate to change course so as to engage him with boat guns at point-blank range.

(3) Since a platoon after landing is held responsible for a frontage of from 150 to 200 yards and the leading boats are uniformly distributed over the assigned front to insure covering it with fire and engaging all enemy weapons on the beach, the interval between the leading boats varies from 40 to 70 yards. This interval will usually prevent more than one boat being damaged by a single shell or aerial bomb.

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

■ 84. LANDING AN ASSAULT COMPANY.—Four boat divisions, each carrying a platoon, are usually employed to transport an assault company from ship to shore. Another boat division may be organized to transport attached or supporting units. The assault company may be landed in the following formations:

a. Three platoons in assault and one in support.

b. One platoon as a covering force and three initially in support.

c. In column of platoons.

d. Exceptionally, with the four platoons abreast.

■ 85. THREE PLATOONS IN ASSAULT.—*a.* The boat formation, three boat divisions in the leading wave and one in the second

wave, is suitable when the company is to be landed on a front of 250 to 500 yards. The assault platoons are transported by the boat divisions constituting the first wave. The support platoon, company headquarters, and any attached or supporting units are carried in the boat division which constitutes the second wave. The second wave should follow the first at sufficient distance 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. It should not follow at such great distance, however, as to permit the assault platoons to be defeated in detail as they arrive on the beach. When the company is to make a relatively deep advance, the leading platoons should be given an opportunity to advance from the beach before the support platoon lands, the distance being greater in open country than in wooded or broken country. The time it will take the troops to advance 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.

b. When the company is to land in a bay, the boat divisions carrying the 2 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 boat division carrying the support platoon may move on the center of the beach.

■ **86. One Platoon as Covering Force.**—For a landing with one platoon as a covering force and the remainder of the company initially in support, the boat formation comprises a leading wave of one boat division carrying the covering force platoon and a second wave of boat divisions abreast transporting the support platoons. This formation contemplates that the platoons transported in the second wave will be landed under protection of the engagement of the covering platoon, and pass through it to drive the enemy farther from the shore. The formation is applicable when the company is to land on a front of less than 250 yards and then extend shortly after landing to cover a wider front.

■ **87. Column of Platoons.**—*a.* A formation of four waves, each composed of a boat division carrying a platoon, is ap-

plicable when the company is to be landed on a beach of less than 250 yards width and is not to be required to extend its front to any considerable degree after landing. The formation may also be employed to prevent congestion when the landing is to be made on a very restricted beach, or it may be required in order to negotiate a narrow channel.

b. As this formation facilitates the concentration of enemy shore weapons on each boat division in turn, the time interval between boat divisions is 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 to be employed as a covering force for the remainder of the battalion combat team, the intermingling of platoons after landing ceases to be a governing factor, and the time interval between boat divisions should approach the minimum figure.

■ 88. PLATOONS ABREAST.—A formation in a single wave with all boat divisions which transport the company moving from ship to shore abreast is seldom employed. As all of the platoons of the company are immediately engaged upon landing, this formation permits little opportunity for the company to maneuver after reaching shore and the company cannot be expected to do more than deliver a severe attack on the enemy groups close to the beach. This formation is applicable when no amphibian tanks are available and the company is to act as a covering force for the battalion landing on a broad front. It has the advantage of developing enemy weak points and rapidly establishing small local beachheads.

SECTION IV

BOAT GROUP FORMATIONS, ASSAULT BATTALION

■ 89. BOAT FORMATIONS FOR LANDING ASSAULT BATTALION.—*a.* A boat group transports the assault battalion combat team from ship to shore. The boat group formations are dependent upon the plan of tactical employment of the infantry battalion, which in turn is largely dictated by the extent of the beach and the terrain adjacent to the beach. The assault infantry battalion is transported for employment with two rifle companies in assault, and one in reserve; with one rifle company in assault, and two initially in reserve; with rifle

companies in column; or with rifle companies abreast. The antitank platoon and heavy weapons company are assigned positions in the boat group in accordance with proposed tactical employment on shore. Usually in the ship-to-shore movement, the caliber .30 machine-gun platoons are attached to assault rifle companies, and the remainder of the heavy weapons company is landed with the battalion reserve. The battalion headquarters and headquarters detachment is also normally in the same wave as the battalion reserve. A battalion staff officer with part of the detachment may accompany an earlier wave to establish an advance message center ashore.

b. Figure 7 illustrates several dispositions of the infantry assault battalion, less heavy weapons company, in boat group formations. As previously stated, units of the heavy weapons company are normally attached to assault rifle companies and the battalion reserve. The assignment, within the boat group formation, of other elements of the battalion combat team is outlined in paragraph 97.

■ 90. Two Companies in Assault.—Figure 7 A shows a formation of a boat group in part, which is applicable particularly when the assault battalion is to be landed on a beach of from 600 to 1,000 yards extent on a regular coast line with open country extending inland for a considerable distance. The formation is designed to land simultaneously sufficient troops to drive quickly toward the battalion objective, with a reserve available to extend the front or push through to greater depth. The main disadvantage of this formation is that a large part of the battalion is located in the first wave and therefore will be committed to the fight at the water's edge.

■ 91. Part of Battalion as Covering Force.—Figure 7 B, C, and D show formations in which the leading wave is to be employed as a covering force. The succeeding waves move to the beach under the security of the covering force, the primary task of which is to clear the beach of enemy resistance and protect it from observation and direct fire. The use of these formations is applicable when the landing is to be made on a beach of less extent than 500 yards. These formations are particularly suitable when the terrain adja-

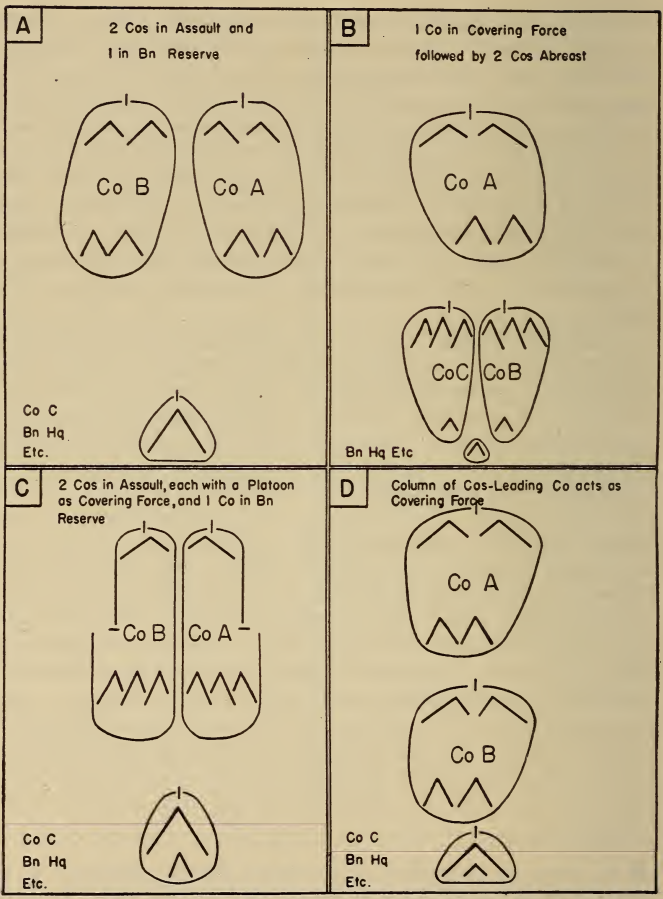


FIGURE 7.—Boat group landing assault battalion (diagram not to scale).

cent to the beach is such that a limited objective or short advance on the part of the covering force will afford the desired protection for the succeeding waves.

■ 92. ONE COMPANY AS COVERING FORCE.—Figure 7 B illustrates a covering force of one company with two platoons

in the leading wave and two support platoons in the second wave. The remaining rifle companies of the battalion are transported in boat formations moving abreast. The advantage of this formation is that one company commander is in charge of the first attack on the beach, and a support platoon is at his disposal to influence the action. The remaining rifle companies, landing abreast, will be in proper formation to pass through the covering force, continue the attack, and extend the front. However, this formation results in committing the entire battalion soon after landing, and the absence of a reserve other than that which may be reconstituted from the covering force is a distinct disadvantage.

■ 93. Two Assault Companies With Covering Force Platoons.—In the formation shown in figure 7 C, the leading wave consists of two platoons, one from each of two rifle companies, to be landed abreast as a covering force. The second wave consists of the remaining assault rifle companies' platoons abreast, and the third rifle company follows in succeeding waves to be landed as a reserve. This formation has the advantage of providing a mobile battalion reserve. It is particularly applicable when the battalion is to be landed on two separate beaches and only a short advance of the covering force is required to furnish the desired security.

■ 94. Column of Companies.—Figure 7 D illustrates a boat formation in which the battalion is transported in column of rifle companies, each company in two waves. This formation tends to divide the battalion into a succession of three efforts of equal magnitude, which increases the danger of defeat in detail and slows up the process of extending the front. This formation has the advantage inherent in a disposition in depth and may be desirable when the battalion is to be landed in darkness, when it is to attack on a narrow front, or to prevent congestion on a very narrow beach.

■ 95. Companies Abreast.—The battalion will seldom be transported from ship to shore with all companies abreast, except when preceded by amphibian tanks as a covering force. In the absence of amphibian tanks this 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 to determining enemy weakness and utilizing other battalions to exploit a successful landing on any part of the front.

■ 96. BATTALION RESERVES.—The most desirable landing place for battalion reserves can seldom be foreseen before the assault companies are landed. Therefore, sufficient time interval should be allowed between waves carrying assault companies and waves carrying reserves to insure an opportunity to divert the reserves to a landing behind a company that has already succeeded in getting ashore. This time interval, however, should not be so great as to expose an assault company to defeat for lack of prompt support. A time interval between 5 and 15 minutes is applicable in most situations.

■ 97. OTHER ELEMENTS OF COMBAT TEAM.—*a*. The location of boat divisions carrying the elements of the combat team other than the infantry battalion depends upon the plan for their employment after landing. The following discussion of the position of such elements in the boat formation is furnished as a general guide only. In so far as the orders of higher commanders permit, the combat team commander must decide on the location of each element for the particular situation confronting him.

(1) When a landing is likely to be opposed on or near the beach and conditions permit the use of armored vehicles by the defense, an antitank platoon or more should be a component of each combat team. When conditions are favorable therefor, the leading waves may be struck on the beach by enemy armored vehicles. Hence, the antitank weapons should be landed with the first assault elements ashore.

(2) Similar considerations with respect to the action of hostile aircraft will make it desirable to land a platoon of antiaircraft automatic weapons with the leading waves of each combat team.

(3) The battalion medical detachment and engineer units pertaining to the combat team will be needed ashore soon after the assault companies have landed. These units therefore may be included in the wave containing the reserve rifle company or they may be assigned to a wave intermediate

between the assault and reserve companies. Company aid men of the battalion medical detachment should go ashore with the companies.

(4) When a battery of field artillery is a part of the combat team, it ordinarily will be placed in the last wave. It is highly vulnerable to hostile machine-gun fire at the time of landing and preferably should not land until the beach is secure from aimed small-arms fire. A reconnaissance detail should land sufficiently in advance of the battery to insure prompt entry of the battery into action upon landing.

(5) If light tanks are a part of the combat team they should be landed about the same time as the leading wave to provide immediate assistance in the advance from the beach. Tanks are especially valuable at this time owing to the lack of adequate close supporting artillery fire. If amphibian tanks or other armored vehicles are available they may constitute the covering force and lead the first wave ashore. When tank lighters of sufficient speed are available and landing conditions are favorable, the tanks should be assigned to the first wave; when these conditions do not exist, tanks should be in the second or later wave.

(6) The naval artillery liaison party accompanying the combat team is assigned a position in the boat group such as to facilitate the early establishment of contact with the combat team commander when he lands.

b. The commanders of the shore party and the beach party land with the leading wave of each assault combat team. Additional personnel of these parties may be distributed among boats in succeeding waves to assist in landing equipment. The remainder of the shore party and beach party in boats assigned to these parties usually are placed in the last wave.

Section V

LANDING OF REGIMENTAL, DIVISION, OR LANDING FORCE RESERVES

■ 98. Provision for Small Boats.—In order to exploit quickly the successes gained by leading battalions, reserve units must be disposed for prompt landing. Sufficient boats should be provided to land at least the assault combat teams and the regimental and division reserves in one trip. When a short-

age of boats makes this impossible due to the number of boats required to carry assault combat teams for a planned operation, consideration must be given to reducing the frontage of the initial attack in order that reserves may be immediately available in boats ready to land. To facilitate control, reserves are embarked preferably in relatively large boats.

■ 99. SEA AREAS FOR RESERVE BOAT GROUPS.—The time and place of the landing of regimental, division, or landing force reserves can seldom be determined until information has been received of the progress of the initial action on shore. Upon debarkation from transports, boat groups carrying these reserves proceed to a designated sea area and await orders from the commander of the tactical unit of which the reserves are a part. This sea area is centrally located in reference to probable landing points and at a reasonably safe distance from shore artillery. Frequently one of the control group vessels is designated as the rendezvous in order to facilitate transmission of orders.

■ 100. HOLDING RESERVES ON TRANSPORTS.—*a.* Where the probable beaches for landing the reserve units are separated by long distances, it may be desirable to hold the units aboard transports even though boats are available for their immediate debarkation. In such case, when a decision is reached regarding the employment of these reserves, the transports proceed opposite the selected landing point for the debarkation, thus expediting the movement ashore.

b. When it is necessary to land reserves in the second trip of the boats, the transports or other vessels carrying the reserves proceed as close to the beach as enemy fire and depth of water permit. Under such conditions it is necessary to provide for the rendezvous of boats with the transports or other vessels.

c. When conditions permit, reserves are landed directly from transports and smaller craft onto a dock or sea wall. Landing from beached transports, however, usually involves the use of small boats or rafts to ferry the troops to the beach. Under these conditions time will usually be saved by having the transports or other vessels anchor in sufficient water to keep them afloat, although a greater ferrying distance is involved.

■ 101. Floating Reserve.—The floating reserve is the reserve of the entire landing force. It is held afloat on transports suitably located to assist or exploit any of the landing operations, but especially the main landing, until the situation permits locating it ashore. In major operations, it is preferably a self-contained unit of all arms capable of independent action. Particular attention is paid to its antiaircraft and antisubmarine defense.

Section VI

PLANNING

■ 102. General.—Planning for the ship-to-shore movement is a continuing process. Even prior to embarkation, decision is made as to the composition of the combat teams constituting the landing force and the probable method of debarking them for the landing. The combat teams and the boat groups which are expected to transport them are trained together, both prior to and after embarkation, in preparation for the execution of the tentative ship-to-shore movement plans. Embarkation groups (sec. II, ch. 10) are organized to facilitate debarkation in suitable landing groups. The embarkation order is based on the tentative ship-to-shore plan for the preferred tactical plan. During the movement from ports of embarkation, information received afloat may make modification of the preferred tactical plan or the adoption of an alternate tactical plan necessary. If so, the tentative plan for the ship-to-shore movement is changed as required. Therefore, most of the plans for the ship-to-shore movement are prepared well in advance of arrival in the landing area.

■ 103. Landing Schedule.—*a.* To plan the details of the ship-to-shore movement in conformity with the Army scheme of maneuver, the Navy must be furnished complete information as to the desired schedule of landing of Army units. A landing schedule is therefore issued as an annex to the field orders of the landing-force unit for each separate landing operation. The landing schedule contains the place, hour, and priorities of landing of all landing groups as well as a tabulation for movements from the transports. The time of landing of the first trip of the boats is expressed in terms of H-hour, which is the time of the initial landing in the main operation.

b. A model form for a landing schedule is shown below.

LANDING SCHEDULE

Landing group No.	Beach	Boat group No.	Troop unit	From transport	Time of landing
1	A	1	1st Bn 1st Inf combat team; shore party No. 1; beach party No. 1.	XAP 14	H-hour.
4	B	4	1st Bn 2d Inf combat team; shore party No. 4; beach party No. 4.	XAP 13	H-hour.
2	C	2	2d Bn 1st Inf combat team; shore party No. 2; beach party No. 2.	XAP 14	H plus 30 min.
3	A or B	3	3d Bn 1st Inf combat team; shore party No. 3; beach party No. 3.	XAP 10	H plus 40 min.
5	C	5	2d Bn 2d Inf combat team; shore party No. 5; beach party No. 5.	XAP 13	H plus 70 min.
*	*	*	* *	*	*

Priorities of landing of units in second trip of boats:

	Beach	Boat groups
From transport XAP 14:		
Hq and Hq Btry 1st FA Bn	A	1 and 2 (boats running individually).
A Co 1st Eng Bn (less dets)	A	
Advance party 1st Inf	A	
From transport XAP 13:		
* * * *	*	* *
From transport XAP 10:		
* * * *	*	* *

■ 104. NAVY CLOCK TIME.—Army personnel employed with a joint force should understand Navy methods of designating time. In the Navy, the hours from midnight to midnight are numbered from 0000 to 2400. Thus 1:00 AM is 0100; 2:00 AM is 0200; 1:00 PM is 1300; 6:00 PM is 1800; 9:00 PM is 2100.

All plans and orders affecting employment of Navy units will utilize the Navy method of time designation.

■ 105. DETAILED PLANS.—*a.* Detailed plans for the debarkation and ship-to-shore movement of all troops from each transport are made jointly by the commanders of the landing groups and the boat groups concerned with the cooperation of the transport commander, and in accordance with the landing schedule and other orders of the landing force commander. The considerations that govern the formation of boat groups carrying assault units, the landing of reserves, and other details of planning are outlined in sections II to V, inclusive.

b. Rapid debarkation reduces the period of greatest vulnerability of transports to air and submarine attacks, lessens the value of information given the enemy, and shortens the time boats must remain in the water. Plans provide therefore that boats are promptly lowered and assembled and that boat divisions are assigned gangways in such manner that each gangway will be used continuously to fullest capacity. Prior to debarkation tests should be made to determine the fastest and most suitable method of lowering and loading boats, and the speed of loaded boats in smooth and rough seas and in darkness and daylight. Data secured by such tests are used in formulating the plan for debarkation for the landing.

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 are useful in planning and issuing orders for the ship-to-shore movement: boat assignment table, landing diagram, deployment diagram, boat diagram, boat assembly and rendezvous diagrams, and debarkation and approach schedule.

■ 106. BOAT ASSIGNMENT TABLE.—*a.* The boat assignment table following shows the organization of a boat group into boat divisions, the boat-division formations, and the personnel carried in each boat. It is made up as soon as the composition of the landing group and the number, types, and speeds of boats assigned to the boat group are known. In each boat division, the order of boats when in column is that which facilitates deployment into desired positions in the V formation. Each boat division commander and the commanding officer of the troops to be carried are transported

in the leading boat of the boat division. Boats of each division, together with the troops they carry, are listed in the order in which they are arranged in column formation. This is

BOAT ASSIGNMENT TABLE

Boat No.	Personnel and matériel	Boat spaces	Formations
x-0	Comdr Bt Gp, Comd detail (3), and crew (3)	7	
	Comdr 1st Bn, Staff (2), and runners (4)	7	
	Machine gunners 1st Plat Co D	2	
	Total	16	
	Boat Division No. 1		
			V
	(1st Plat Co A; Weapons Plat Co A)		x-1
x-1	Comdr Bt Div & Crew (3)	4	x-3 x-2
	Sec Ldr & gunners LMG Sec (2)	3	x-4
	Comdr 1st Plat and runners (2)	3	Y-1
	Armd Sqd	8	
	Total	18	
x-2	Bt O & Crew	4	
	Plat Sgt 1st Plat & 1st Rifle Sqd	13	
	Total	17	Column
x-3	Bt O & Crew (3)	4	x-1
	Plat Guide & 2d Rifle Sqd	13	x-2
	Total	17	x-3
x-4	Bt O & Crew (3)	4	x-4
	Comdr & Sgt Weapons Plat, Cfr, msgrs (2)	5	Y-1
	Comdr LMG Sec	9	
	Total	18	
Y-1	Bt O, Crew (3)	4	
	Sqd LMG Sec	5	
	60-mm Mortar Sec	19	
	Total	28	
	Boat Division No. 2		
	* * * * * * *		
	Boat Division No. 3		
	(Continued until boat group is completed.)		

the order in which boats come alongside the transport for debarkation of troops. Types of matériel which require extra boat spaces, such as mortars, tanks, guns, other vehicles, and bulky ammunition, should be shown in their proper places in the table. For boat spaces of various types of Navy boats, see paragraph 67; for boat spaces required by various types of matériel, see section II, chapter 3.

b. The following points are considered in planning the organization of boat divisions, the determination of their formations, and the assignment of troops to boats:

(1) A separate boat is assigned for the boat group commander and his communications detail and, if available, a separate boat is furnished each of the assistant boat group commanders. The landing group commander with a part of his staff is transported in one of these boats, preferably that of the boat group commander. These boats are not a part of any boat division, but cruise independently as directed by the commander concerned.

(2) The smallest and fastest boats are assigned to assault platoons, the next larger types to support platoons, and the largest boats to the reserve echelon. Boats of approximately equal speed are assigned to each boat division, and to boat divisions which are to be landed abreast.

(3) It is desirable that at least four platoons per infantry battalion be assigned boats suitable for assault echelons so that the battalion can be landed on a broad front or in a variety of formations.

(4) The integrity of troop units is maintained as far as possible and units are landed in proper formation. For example, a rifle squad is kept together in one boat; boats carrying rifle squads of the same platoon are landed adjacent to each other; each platoon in a reserve rifle company is transported intact in one boat or boat division.

(5) The risk of heavy loss of any one essential unit, such as a signal communications platoon, a machine-gun platoon, or an 81-mm mortar platoon, is reduced by distributing such units among two or more boats.

c. The following sequence in the preparation of the table is recommended:

(1) Assign a separate boat to the boat group commander and his communications detail and, if available, one to each of his assistants.

(2) Assign the landing group commander and staff required initially to one of these boats.

(3) Assign such heavy weapons company personnel and beach and shore party personnel as are required to act as gunners or to assist boat crews.

(4) First, assign rifle units of the assault platoons and any associated tank platoons to boats, then support or reserve echelons.

(5) Assign the remainder of the heavy weapons company, headquarters units, and attached or supporting troops.

(6) Designate ambulance boats and assign personnel and equipment.

(7) Fill any vacant boat spaces with the remainder of the beach and shore parties.

(8) Make use of a check list to account for all units and to check with total available boat spaces.

■ 107. LANDING DIAGRAM.—*a.* A landing diagram shows graphically the landing formation of the boat group, and the guide and alternate guide of each wave. A separate diagram is made for each formation the boat group may be required to employ. Figure 8 shows a model diagram with four boat divisions in the first wave. Additional instructions, together with the intervals and distances between elements, are included on the diagram if it is not to be accompanied by written orders.

b. An example of the instructions issued separately (or included on the diagram) is as follows:

Boat group No. 1 will use landing formation No. 1.

Distance and interval between boats within BDs: 50 yards; support sections, 1st wave, as directed by BD commanders.

1st wave: Lt P comdg in X–15 (not in formation); intervals: between BD's 2 and 1, 200 yards; BD's 1 and 4, 150 yards; BD's 4 and 5, 200 yards.

2d wave: Lt Q comdg in V–3; lands 8 minutes after 1st wave; interval between BD's 300 yards.

3d wave: Lt R comdg in V–15; lands 12 minutes after 2d wave; distance between BD's, 300 yards.

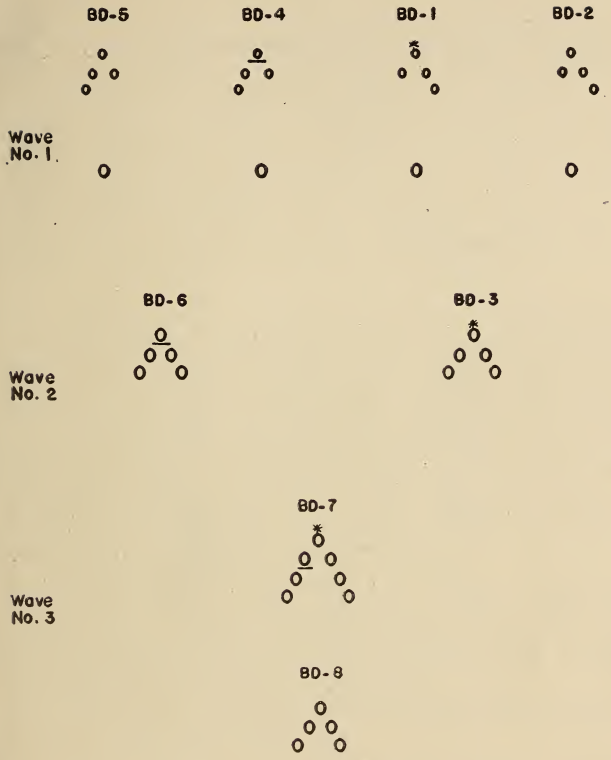


FIGURE 8.—Landing diagram (formation No. 1).

■ 108. DEPLOYMENT DIAGRAM.—A deployment diagram shows the formation in which the boat group proceeds from the rendezvous areas to the line of departure, and the method

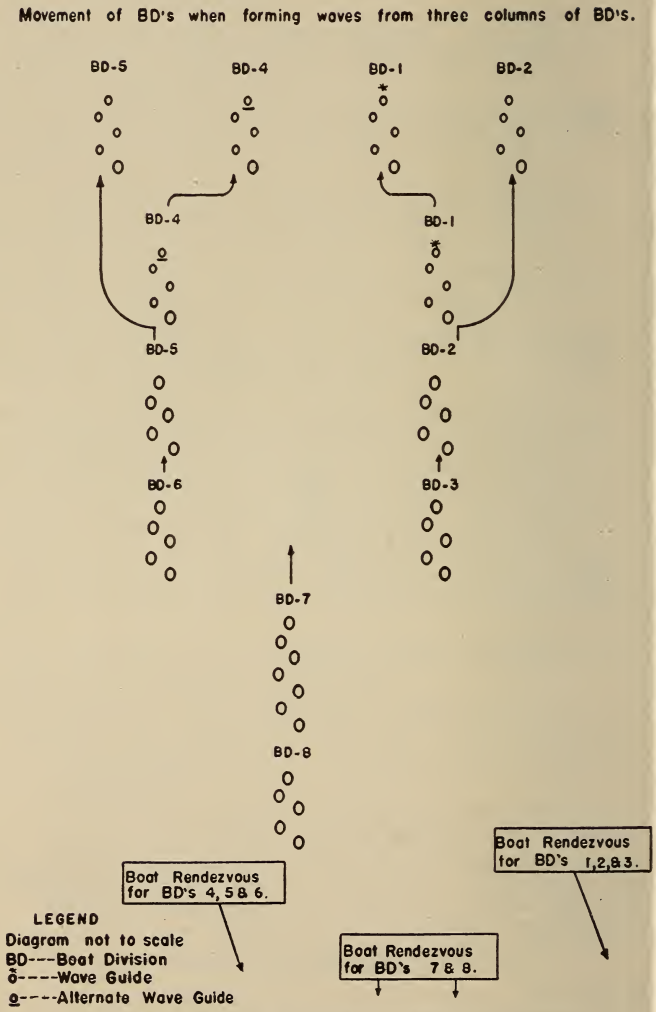


FIGURE 9.—Deployment diagram (formation No. 1).

of deployment into the landing formation. Figure 9 shows a deployment diagram applicable to the landing formation shown in figure 8 when deployment is made straight to the front. In this figure, the boat group is shown proceeding with reduced distances between waves. This formation is applicable during darkness, when the transport areas are congested, or when the route to the line of departure contains changes in direction. During daylight or when the movement is otherwise simplified, each wave may proceed from its rendezvous area independently in the formation shown on the deployment diagram, and at a speed which permits it to arrive at the line of departure at the designated time.

■ 109. Boat Diagram.—*a.* A boat diagram is a rough sketch or diagram showing the positions of individuals and equipment in each boat. In the boat diagrams prepared for larger boats used in the later waves, the locations of squads will suffice insofar as personnel are concerned. Preparation of these sketches or diagrams is particularly desirable when there has been no opportunity for combined training; if thorough training exercises have been carried out, they are unnecessary.

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

(1) Distribution to keep the boat in trim.

(2) Provision for a suitable number of men to fire their weapons, both at planes and at beach targets with the least danger to each other and with minimum change in position.

(3) Maximum protection for personnel.

(4) Provision for rapid debarkation and for deployment on the beach in the desired formation.

■ 110. Boat Assembly and Rendezvous Diagrams.—*a.* Boat assembly and rendezvous diagrams (or written orders) indicate the assembly areas of empty boats preparatory to debarkation, routes to gangways, and rendezvous areas of loaded boats, all of which are prescribed to prevent confusion and delay when a number of boat divisions are involved (see fig. 10).

b. Assembly areas are fixed in reference to the transport, and therefore move with the transport if it swings. Rendezvous areas are located in reference to some fixed point such as a control vessel temporarily stationed for that purpose, a

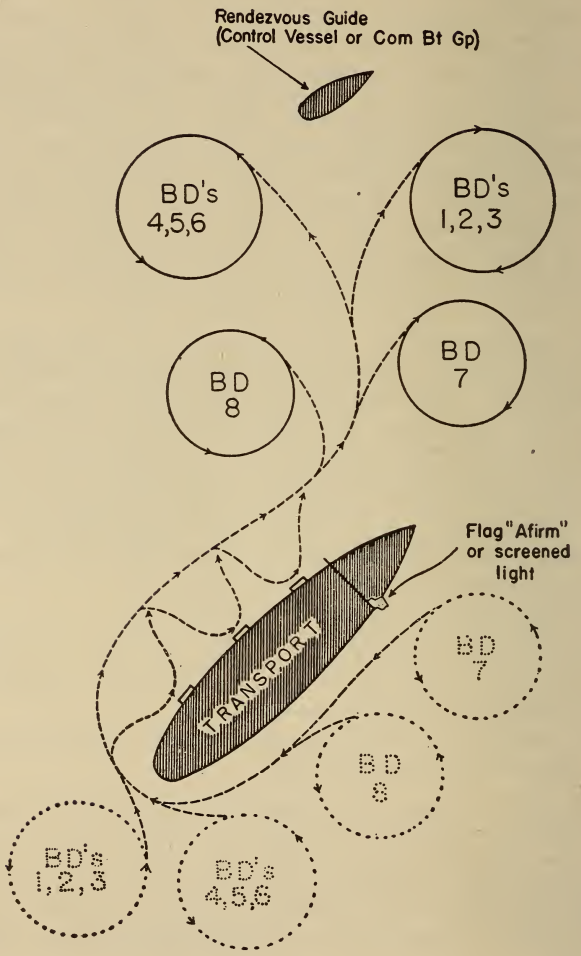


FIGURE 10.—Boat assembly and rendezvous areas.

buoy, or a small boat; they are preferably between the transport and the line of departure. When a landing group is embarked on two or more transports, each transport prescribes its own assembly areas but the rendezvous areas are common to the complete boat group.

c. Two general methods are employed to control the movement of small boats from the time of arrival in designated assembly areas to the time of arrival, loaded, in their rendezvous areas, namely, the assembly and loading by boat divisions (fig. 10), and assembly and loading by boat type. The *boat division method* decentralizes control of boats during assembly and loading to boat division commanders, and is applicable when boat and troop units have had thorough combined training. The *boat type method* provides for assembly of empty boats of similar type, speed, and capacity without regard to any boat division organization; and boats are called alongside as needed for loading an organization into the required boat divisions. The organization into boat divisions is accomplished either as soon as the boats are loaded at gangways or upon arrival at the rendezvous areas. This method is applicable when there has been little or no combined training, when the majority of boats are to come from ships other than the one carrying the troops to be landed, or when the operation requires relatively few boats and this procedure is consequently possible without confusion. Both methods presuppose that the boat group and boat division commanders are embarked in the same transport with the troops they will land.

■ 111. Debarkation and Approach Schedule.—The debarkation and approach schedule contains the time schedules for the debarkation of the boat group, its approach, landing, and any necessary explanatory remarks or instructions.

a. Model schedule.—The model schedule shown below is for a boat group (No. 1) to be debarked from one vessel (XAP No. 5). If the landing group for which the schedule is prepared is embarked on two or more vessels, the names of these vessels are entered at appropriate places in the schedule.

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 C to line of departure: 7,000 yards; course, 097°.
   Rendezvous areas to control point C, 8,000 yards; course, 020°.
   H-hour, 0900; D-day, 3 June 19—.
2. Method of proceeding from rendezvous areas:
   Waves move separately as soon as formed; first wave guiding on control vessel T.
3. Latest hour to start lowering boats, 0558.
4. Debarkation schedule:

Boats	Wave No.	Principal unit	Alongside by—	Clear by—	Remarks
GANGWAY NO. 2					
X—0	------	Bt Gp and Bn Cmdrs	0616	0618	
Bt Div 1	1	1st Pl, Co A	0619	0633	
Bt Div 2	1	2d Pl Co A	0634	0647	(First wave completes loading 0647.)
Bt Div 3	2	3d Pl, Co A	0648	0702	
Y—15,16,17, and 18 of Bt Div 7.	3	Co C	0703	0720	
GANGWAY NO. 4					
X—18	------	Asst Bt Gp Cmdr	0613	0615	
X—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	(Second wave completes loading 0705.)
Y—19, 20, and 21 of Bt Div 7.	3	Hv W Co, etc	0706	0725	(Third wave completes loading 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

b. Time.—It will be noted that the Navy method of indicating time is employed in this model schedule. (See par. 104.) Paragraph 1 of the schedule contains basic data necessary to complete the remainder of the schedule. In this case H–hour has been definitely announced, 0900, or 9:00 AM on D–day; if H–hour is not definitely known, all times are shown in reference to H–hour, for example: H–3 hours, 2 minutes, instead of 0558 as entered in paragraph 3 of the sample schedule. All times in the sample schedule are figured from the time each wave is to land, which is shown in the last column under paragraph 5 of the schedule. Data as to the time required for loading the small boats and their speed are necessary for figuring the time when boats should be lowered; when they should report alongside designated gangways; when they clear gangways; and when they leave rendezvous areas, control points, and the line of departure. These data should be available as a result of the tests mentioned in paragraph 105*b*.

Section VII

EXECUTION

■ 112. Preparation for Debarkation.—*a.* Required gangways for debarkation of personnel are placed in position by the transport crew simultaneously with the lowering of boats. Gangways consist of ships' ladders or cargo nets hung over the side of the transport. Cargo nets afford 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 the water line (see fig. 11). The assignment of troops and corresponding boats to gangways is such as to permit simultaneous and continuous use of all available gangways in order to keep the time of debarkation to a minimum.

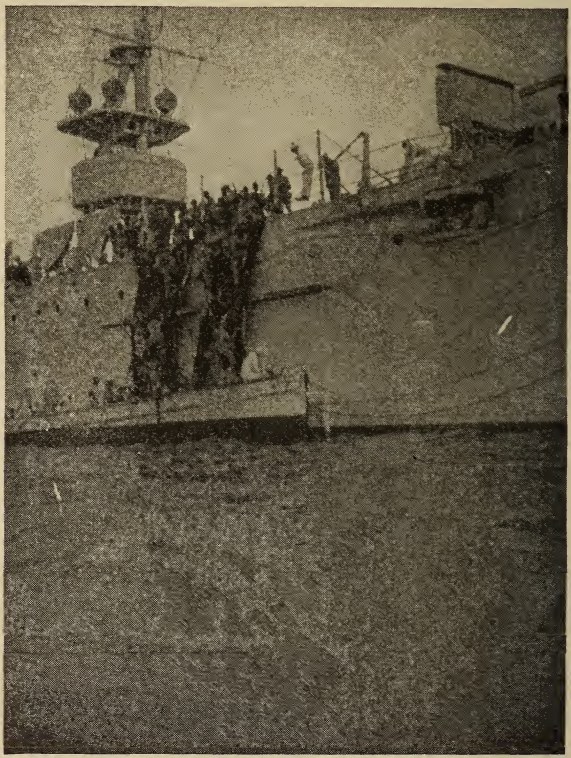


FIGURE 11.—Method of using cargo nets for debarkation of men.

b. All personnel not in boats when lowered are assigned compartments or suitable space below decks in which to assemble for debarkation. In each compartment men are segregated by boatloads and arranged in file to facilitate rapid debarkation and prompt occupation of assigned boat spaces.

Routes to gangways are prescribed. A naval officer and an Army officer are stationed at each gangway, the naval officer being responsible for loading and the Army officer for having troops and matériel ready at the gangway. Company officers remain with their troops.

c. Every possible measure is taken which will expedite the debarkation of equipment. Organization combat equipment, such as heavy weapons, company machine guns, and mortars, and signal equipment are assembled convenient to the gangways. Extra ammunition, gas defense matériel and equipment, and other supplies are placed in cargo nets or otherwise made ready for hoisting. Improvised davits and hand lines are provided for lowering equipment into the boats. Slings are adjusted on heavy equipment, motor transportation and armored vehicles are serviced, and all are made ready for hoisting. All timepieces are synchronized shortly before debarkation is to begin.

d. Detailed organization and frequent combined drills of all concerned are essential. Drills during rough weather and darkness are particularly valuable.

■ 113. DEBARKATION OF PERSONNEL AND MATÉRIEL.—*a.* All boats provided from a transport to carry landing troops from that transport 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. As soon as the boats are lowered, boat guns are mounted and prepared for firing, and a guide or designating flag displayed when appropriate. All boats which are to form a part of the boat group formation then proceed individually from the transport to their assembly areas where they report to their boat division commander or other designated officer in the prescribed assembly area.

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

vidually as needed. In the assembly areas, boats are conducted in convenient circles which will bring them repeatedly within hailing distance of the transport. Care is taken to keep all boats within designated assembly areas, particularly when the transport swings or otherwise changes position. Gunners are on the alert for hostile aircraft and are prepared to open fire promptly.

c. As boats come alongside from assembly areas, men and equipment are debarked with all possible speed. It is usually advisable to load first the heavier matériel and sufficient men to stow it properly in the boats; the more easily handled matérial and remaining personnel are then loaded. Equipment carried on the person is loosened before starting to debark from a transport. This enables the individual to free himself in the event of falling into the water. The rifle is slung vertically over the left shoulder with the sling passed over the bayonet handle in the pack. An alternate method is to carry the rifle slung over the shoulder with the muzzle down and the butt held in the arm pit, gun sling to the rear, and engage the gun sling under that part of the front pack suspender which hooks into the suspension D-ring of the haversack. Normal loads are retained on vehicles if possible. It may be necessary to remove the load from the vehicle in order to load the latter or to keep the boat seaworthy; if so, the vehicle and its load should go ashore in the same boat. Debarkation of artillery and tanks is outlined in chapter 9. Suitable details are left aboard ship for debarking equipment and supplies which do not accompany troops ashore.

d. When a boat is unable to report alongside on schedule, it should, if possible, be replaced immediately by a boat of the same type and speed from the boat pool. It is desirable that one or more boats from the boat pool follow each wave until it lands to rescue personnel and tow or replace boats as necessary. All boats should not be dispatched on this duty, however, until the actual debarkation of troops is assured.

■ 114. DEBARKATION OF ANIMALS.—*a.* (1) The most satisfactory and rapid method of debarking animals involves the use of a sling by means of which the animals are lowered from the transport to the deck of a mine sweeper or similar vessel of shallow draft where they are tied on a picket line. The vessel approaches the beach as closely as possible, and the

animals are lowered into the water, by means of the sling, to swim ashore.

(2) Figure 12 shows the sling in operation. The sling is made of heavy canvas, with rope sewed in around the edges

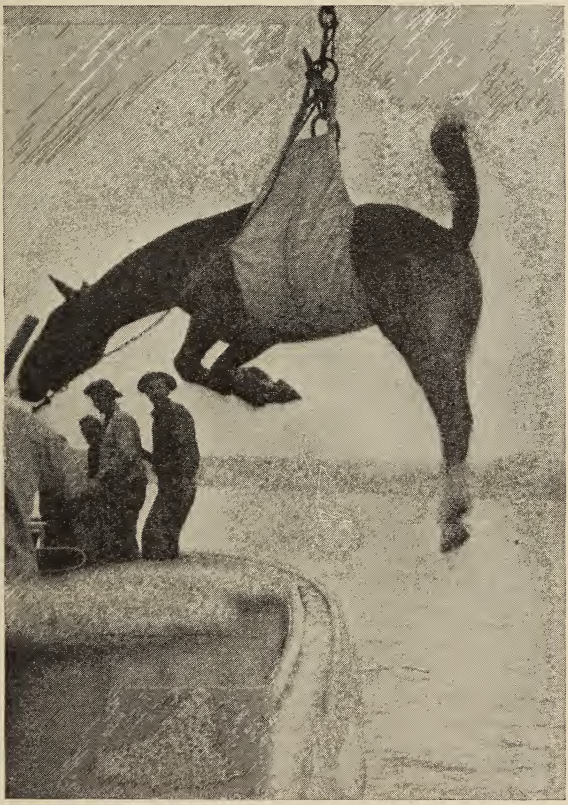


FIGURE 12.—Sling used for lowering animals into the water.

and with a hardwood spreader in each side. At each end of the sling is a heavy iron ring for hooking into the cable from the winch. A breeching and a breast strap should be attached to the sling for lowering an animal from the transport

to the deck of the smaller vessel in order to prevent the animal from falling out of the sling. For lowering animals into the water the breeching and breast strap are not used and a quick-release device is provided to release the sling just before the animal is fully afloat. A suitable quick release may be provided by attaching the sling to the cable hook by means of the iron ring at one end of the sling and fastening the ring at the other end of the sling to the ring attached to the cable hook. The two rings are thus held together by a rope fastened as a full hitch, through which is thrust a hardwood pin. By means of a line attached to this wooden pin it is pulled out at the proper time, thus disconnecting the two ends of the sling and allowing the animal to drop free of the sling.

b. (1) If animals must be transported from ship to shore in small boats, such as the standard Navy 50-foot motor launch, the flying stall and dumping stall are used instead of the sling (see figs. 13 and 14). The flying stall is strongly built of wood; is about 8 feet long, 2½ feet wide, and 6 feet high; and can be knocked down very quickly. The door at each end of the stall shown in the figures is hinged. It is preferable, however, to have doors which slide into place to facilitate removal when the stalls are placed end to end. The 50-foot motor launch carries six flying stalls. The animals are loaded on the motor launch facing toward the dumping stall, a ramp being provided for leading the animals from the flying stalls to the dumping stall.

(2) The dumping stall is used to drop animals into the water from the motor launch. It consists of a platform about 8 feet long and 3 feet wide, with sides about 5 feet high. This stall extends over the water and trips downward when a catch is released. A snubbing line prevents the stall from lowering with a jerk, thus projecting the animal into the water gradually.

c. Animals can swim distances as great as 1,000 to 1,500 yards, but the distance required should be as short as possible and preferably not greater than 500 yards. To head animals toward shore promptly and avoid needless swimming, a small motor or row boat should be stationed at the point where the animals are put into the water. Some of the weaker animals may have to be assisted by means of a tow. A sufficient number of men should be available on the beach

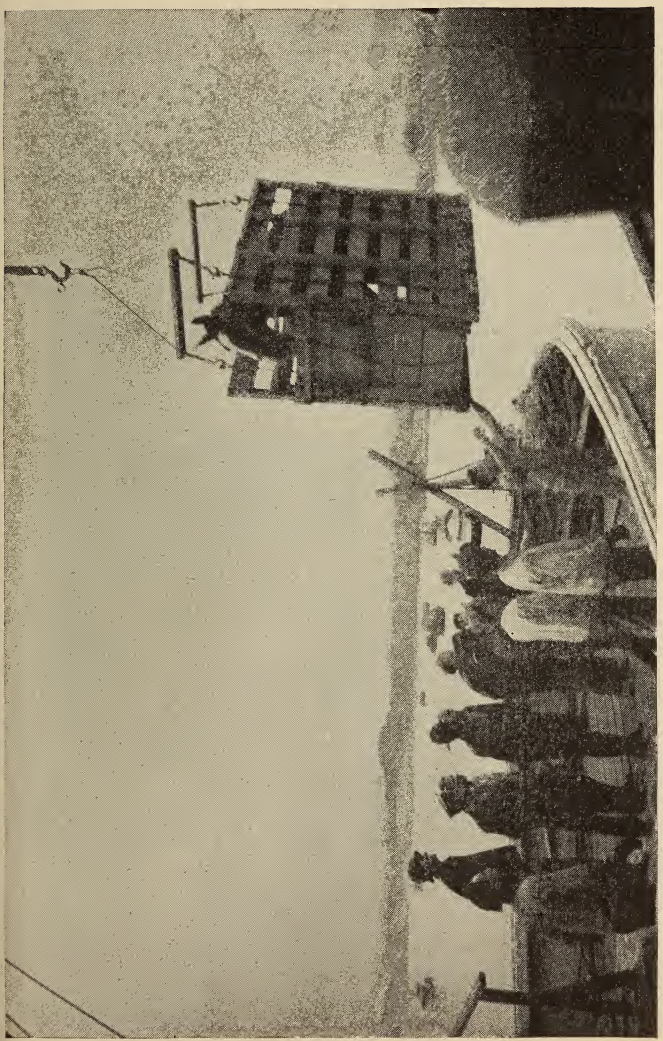


FIGURE 13.—Lowering animal from transport to motor launch by means of flying stall.

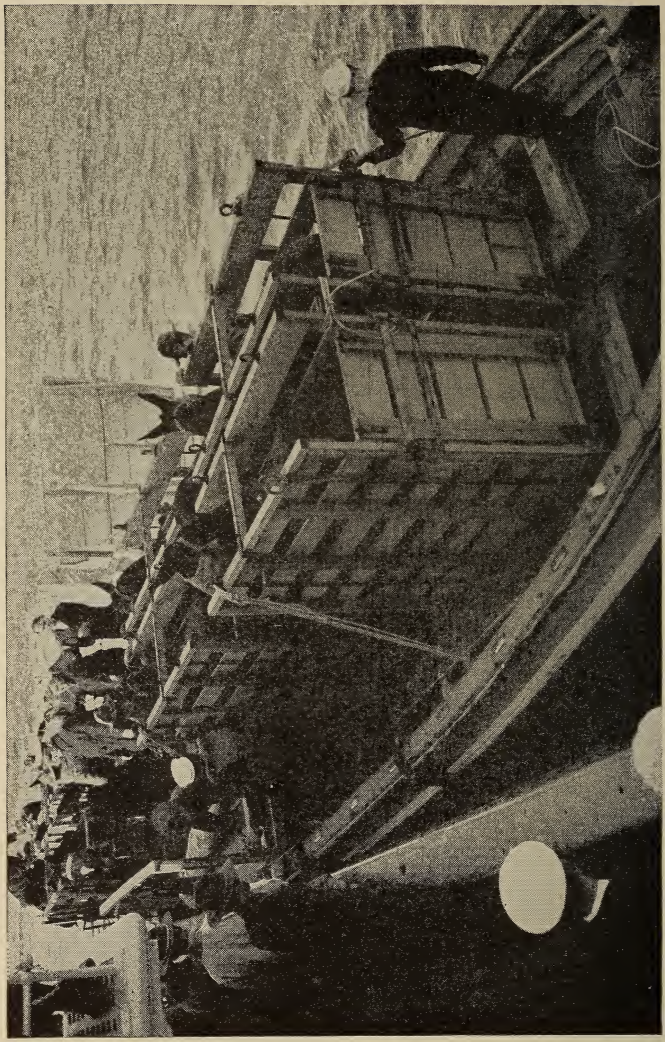


FIGURE 14.—Disposition of flying stalls on motor launch. Note dumping stall projecting over water at right.

to catch the animals and assemble them at the proper place. See also FM 25–5.

■ 115. Movement to Line of Departure.—*a.* After completing loading, boats either proceed individually to their rendezvous areas or assemble in their boat divisions just off the gangways and move in formation to the rendezvous areas. The latter method is usually preferable, particularly at night. When completely assembled in the rendezvous areas, the boat divisions are arranged in the prescribed boat group or wave formation under the command of the boat group or wave commander.

b. The control vessel assigned to guide a boat group identifies the beach and marks the line of departure, if necessary, and then proceeds to the rendezvous areas and acts as a rendezvous guide. At the time prescribed in the debarkation and approach schedule or when directed by the control group commander, the control vessel guides the leading wave to the line of departure. All speeds are regulated by the control vessel so that boats will cross the line of departure at the prescribed time.

c. If attacked by aircraft, boat guns and other weapons designated for antiaircraft defense open fire without orders. Riflemen fire only when directed.

d. Upon arrival on the line of departure the control vessel commander notifies the boats of that fact by prearranged signal, and in accordance with control group instructions, either proceeds to its firing station to assist in furnishing fire support or takes position on the line of departure as an observation station. The naval attack force commander and the fire support group commander are notified by the control vessel when the first wave crosses the line of departure and also when the boats are in the position prescribed for opening and lifting naval gunfire.

e. On crossing the line of departure waves deploy into their prescribed landing formations.

■ 116. Dash to Beach.—*a.* Since the landing boats may expect fire from hostile light artillery and machine guns shortly after crossing the line of departure, each wave proceeds at full speed from this line to the beach. Each boat guides on the designated guide boat of its boat division which,

in turn, guides on the boat designated as wave guide. Boats preserve proper intervals in order to reduce vulnerability to hostile fire and to insure proper distribution of their own fire on the beach.

b. It is extremely difficult for boat commanders, depending solely on compasses and observation of the shore line, to approach the beach at full speed and land at the point desired. In daylight therefore the Navy may employ an airplane to guide each boat group from the line of departure to the beach; this method is particularly advantageous when landing behind a smoke screen. Flying in rear of the wave, the guide airplane by prearranged signals indicates necessary changes of direction.

c. Naval supporting vessels continue to place the maximum volume of fire on the beach until the boats approach the area where shots are falling short. The gunfire then lifts in accordance with a prearranged time schedule, verified by direct observation by control and firing vessels. Provision also should be made to have fires lift upon pyrotechnic signal fired by the commander of the leading wave (a naval officer). Supporting vessels located inshore regulate their fire by direct observation and lift it when masked by the boats or troops. Appropriate arrangements must be made whereby personnel in boats and aircraft may, in emergency, be warned by pyrotechnics or other means of the termination of supporting naval fire.

d. During daylight, boats of the leading wave commence firing when within range of the beach. The fire of boat guns is supplemented by weapons of the landing troops. Initially, this fire is more or less evenly distributed over the platoon landing front. As the boat approaches the beach, fire should be gradually concentrated on the front assigned to the troops it carries, and finally, when the boat is about to ground, fire is concentrated on the particular target designated by the commander of these troops.

e. In order to obtain the maximum surprise effect in a landing under cover of darkness, it may be desirable to withhold all supporting fires until it becomes apparent that the enemy has discovered the attempt to land. Darkness not only greatly decreases the effectiveness of supporting fire, but fire from one landing boat may endanger others. Boat divisions

landing in darkness should therefore delay deploying and opening fire until close to the beach, or until it becomes necessary to return the hostile fire in order to land.

■ 117. LANDING.—*a.* The brief period embracing the debarkation and deployment of the assaulting troops on the beach is one of the most critical in the entire operation, and must be characterized by the utmost speed and dash. At the instant that each boat of the leading wave is beached, the Army commander in the boat should give the signal to debark. Upon this signal, the assaulting troops, aided by all practicable fire from boat guns, spring out of the boat and deploy. Each rifleman in an assault unit about to debark from the port (left) side, should carry his rifle above his head in his left hand. He should place his right hand and right foot on the gunwale and spring well clear of the boat, landing feet first facing the beach. Similarly, riflemen debarking from the starboard (right) side carry the rifle in the right hand and use the left hand and foot on the gunwale.

b. Boat guns which can be used effectively while troops are debarking from the boats and advancing inland should be employed to maintain a heavy volume of fire on a single target until such fire is masked by attacking troops. Targets selected by the Army commander in the boat may consist of a known enemy activity or position, a likely enemy position, or a selected terrain objective for the landing troops.

c. Each assault 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 is known. In addition to this signal, each platoon in the leading combat team, upon landing in daylight, should erect an identifying flag or marker at its landing place. At night, lights may be used in lieu of flags.

d. Units in the second and succeeding waves may proceed from the line of departure in open or closed V 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. The second and succeeding waves should make such adjustment in speed as becomes necessary in order to gain the prescribed distances between waves at the time of landing.

e. Equipment taken ashore by units in the leading combat team should, as far as practicable, be limited to that which can be unloaded at the beach by hand; this is especially applicable to units in the early waves. Such equipment must be unloaded with the greatest possible speed. Personnel of beach and shore parties may be allotted to boats for the purpose of assisting in unloading equipment.

■ 118. SUBSEQUENT BOAT MOVEMENTS.—*a.* 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. In order to save time and prevent congestion near the beach, boats of the leading boat groups other than those mentioned above 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 or brigade reserves in the first trip 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.

■ 119. RECONNAISSANCE; AIR AND NAVAL GUNFIRE SUPPORT.—A brief discussion of the reconnaissance during the landing is contained in section II, chapter 5. Air support during the ship-to-shore movement is outlined in section IV, chapter 7, and naval gunfire support is covered in chapter 6.

CHAPTER 5

OPERATIONS ON SHORE

SECTION I

GENERAL

■ 120. SCOPE.—*a.* This chapter deals with the operations up to the time when the beach has been secured against hostile medium artillery fire. The operations which follow do not differ essentially from other land operations, such as those following the seizing of a bridgehead in an opposed river crossing. (See FM 100–5.)

b. During the movement ashore and establishment of the beachhead, the doctrines governing the employment of the landing force are the same as for other land operations based on similar missions, but the detailed application of the doctrines is affected by conditions not found in other land operations. The discussion in this chapter is limited to features of the employment of Army forces peculiar to a landing attack. It relates specifically to the operations in the main landing area, but applies equally to operations in secondary landing areas.

■ 121. TACTICAL UNITY.—It is imperative that the integrity of tactical units even down to the squad be preserved in the landing. This results if careful attention is paid to the loading of units in each boat and the assignment of successively larger tactical units to the same boat division, wave, and boat group, respectively, as discussed in section II, chapter 4. The success of the initial landing may depend on the team fighting power of separate squads and platoons, and each small unit must be supported by the timely arrival of the

remainder of the next larger tactical unit if the initial success is to be developed.

■ 122. NAVAL GUNFIRE, AIR, AND BOAT GUN SUPPORT.—*a.* Naval gunfire support of the landing is discussed in chapter 6.

b. Air support of the landing and of forces ashore is discussed in chapters 7 and 9.

c. A brief discussion of the fire from boat guns during the ship-to-shore movement is contained in paragraph 117*b*. If practicable, during the initial advance from the shore, leaders of the landing group units utilize the boat guns as fire pivots of maneuver, by means of which assaulting units advance against the flanks of selected objectives. This fire support, however, requires careful coordination of fire and movement, and is usually obtained only when boat gunners (normally Navy personnel) and landing units have had thorough combined training. In night assaults boat gun support of the initial advance on shore is obviously limited by darkness.

SECTION II

RECONNAISSANCE PATROLS PRIOR TO AND DURING LANDING PHASE

■ 123. PURPOSE.—*a.* Reconnaissance of the shore line and ashore prior to landing and demonstrations in connection therewith are conducted for the purpose of securing information in accordance with the intelligence plans for the landing force operations. Advance force reconnaissance is discussed in paragraph 10; air reconnaissance is outlined in section I, chapter 7. The continuing reconnaissance by the landing force ashore is omitted from this manual as it does not differ essentially from the normal reconnaissance measures taken in any ground operation.

b. Raids and reconnaissances in force, employing comparatively large bodies of troops, are planned and executed as for landings in force.

c. Patrols or demolitions parties, organized and equipped to cut breaches in or to 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.

■ 124. INFORMATION DESIRED.—The information desired includes—

a. Location of enemy defensive positions and with what strength such positions are occupied.

b. Location of enemy weapons such as machine guns, antiboat guns, and artillery.

c. Location of obstacles including underwater, gassed areas, and landing fields.

d. Character of the surf, beach, and terrain and terrain corridors inland.

e. Location, character, and strength of enemy supports and reserves, together with their routes of advance to oppose landings.

f. Location of enemy ammunition dumps, signal communication centers, and command and observation posts.

g. Identification of enemy units, air landing fields within supporting distance of the beach, and all map errors.

■ 125. COURSES OF ACTION.—In order to secure the desired information, it will be necessary usually to employ some or all of the following courses of action:

a. Patrolling the coast line from the sea.

b. Patrol demonstrations.

c. Placing agents ashore.

d. Patrolling on shore.

e. Capturing prisoners.

f. Photographic reconnaissance consistent with secrecy considerations.

■ 126. 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 daylight will in all probability gain little information of value. The enemy cannot 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 a small patrol lands in the presence of the enemy, it can be destroyed easily or captured. Reconnaissances by small patrols therefore must depend for success upon darkness or fog. Darkness offers the most suitable cover for the conduct of patrols from small boats. It is desirable that the degree of darkness be that which makes dis-

covery of the boats difficult from the shore, and at the same time permits use of the land skyline as an aid to navigation. 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 either by boat or parachute or the capture of prisoners. In order to achieve the necessary secrecy, patrols are not supported usually by either gunfire or aviation.

b. Owing to the extreme delicacy of patrol missions, special reconnaissance boats should be made available for this purpose. These boats should have a speed of at least 12 knots and quiet-running motors, be small enough to be handled readily by oars when the motor is cut, be heavily armed with boat guns, and have some protection against small-arms fire. The size of a reconnaissance patrol is limited to the minimum number of men and boats capable of accomplishing the mission. Such patrols, however, seldom employ less than two boats, at least one of which should be motor driven. All men who are to land are equipped with self-inflating, pneumatic life jackets.

c. 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. 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 to aid them in returning to the ship. 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.

d. As all classes of information relating to the enemy's strength and dispositions may be obtained from prisoners,

126. GENERAL CONDUCT OF PATROLS.—*a.* (1) Attempts on the part of small patrols * * * are not supported usually by either gunfire or aviation.

(2) Consideration should be given to the landing of agents and patrols from submarines where hydrographic conditions permit the necessary approach of the undersea craft close enough to shore. Movement from the submarine to shore and return may be made by canoe carried in and launched from the submarine. For communication between the submarine and party ashore, infrared signal lights may be successfully utilized.

every opportunity to capture prisoners should be grasped by all patrols unless the patrols are specifically instructed otherwise.

■ 127. PATROLLING COAST LINE FROM 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, and similar information. An offshore breeze is highly desirable, both as an aid to secrecy and in the detection of gassed areas by smell.

b. Boat reconnaissance patrols should seldom exceed one or two observers embarked in each of two boats. It is preferable to have the patrols operate along and fairly close to the coast, occasionally sending in a boat to investigate the beach at suitable points. While within hearing distance from the beach, all boats operate silently, resorting to oars if necessary.

■ 128. 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 employ boat gunners and landing force 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. Demonstration patrols proceed secretly toward the beach until within boat gun range. The get-away boats then take station 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 than are actually present. An onshore breeze is helpful to the patrol in magnifying the sound of the boats and in causing flares to drift inshore over the enemy positions. When the enemy fire becomes severe, or before reaching the beach, boats turn about upon a prearranged visual signal and put to sea with the information gathered.

■ 129. 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 boat or may be landed by parachutes from aircraft.

b. When the agent is to return on the same night he is landed, he is picked up by a boat which may either wait off an easily recognized landmark and pick him up as he swims out, wait for him at the landing place or other rendezvous, or lie off and come ashore on signal from the agent. If the agent is to be left ashore for any extended period, arrangements must be made either to receive his signals from the shore or for a later rendezvous.

c. Communication with an agent on shore must usually take place through voice radio or improvised visual signals. Lengthy and detailed transmissions 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 recovered later by patrols. A single vital piece of information, such as enemy in force, may be signaled by any prearranged means. Air-ground communication may also be arranged.

■ 130. 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 appreciated. Information obtained through such reconnaissances, whether positive or negative, is usually of definite value. Land patrols determine not only whether or not a particular beach area is actually defended, but also often offer the only practicable means, through observation and the capture of prisoners, of obtaining other necessary information. Patrols may be placed ashore either by means of boats or parachute landings when conditions permit.

b. The size of patrols which are to land by boat 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 are the chances of escaping

discovery. Inasmuch as it may be found expedient to have the land patrol personnel swim from their boats to the shore and return, strong swimmers are selected, and are equipped with life jackets. In addition, they are lightly equipped and lightly armed and are stripped of all means of unit identification. Men who are to remain in the boats may be equipped with more powerful automatic weapons. In issuing orders to land patrols, care is taken to designate specifically and clearly the information they are expected to obtain.

c. The boats which are to land reconnaissance patrols approach the beach with the same secrecy as previously prescribed for patrolling the coast line and the landing of agents. When the boats have approached within earshot of the beach, and the getaway 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 enter the water swimming to the vicinity of the boat will be aided by the current. 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. All beached boats should be headed to sea and kept in readiness for a quick get-away.

d. If patrols are landed by parachute, appropriate arrangements must be made for bringing them off by boat as outlined in paragraph 129*b*.

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 enter 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.

131. CAPTURING PRISONERS.—*a.* 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 seize any favorable opportunity to capture prisoners, these means may not prove sufficiently productive of results. This contingency may necessitate the organization of special patrols for the primary purpose of obtaining prisoners, either by seizing enemy patrol boats and capturing their occupants, or by landing and capturing enemy individuals on shore.

b. Boat patrols which are to capture prisoners from enemy patrol boats should be capable of high speed and great fire power, and the crews should be trained to operate together in darkness. The men should be heavily armed and the boats should be equipped with machine guns or 37-mm guns. Due to the danger of firing on each other by mistake, the boats remain in contact throughout the operation. When two or more boats comprise the patrol, appropriate methods of identification must be arranged and employed should boats become separated. A bright night is advantageous for such an operation. 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 are likely to be found. Upon discovering an enemy patrol boat, an effort is made to cut off its retreat to the beach and drive it to sea. All patrol boats engage in the pursuit, close with the enemy boat, and capture it. Similar operations may be adopted in order to prevent observation of our own movements by enemy patrol boats.

c. Capturing prisoners on shore is 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. For an attack against an enemy position, the raiding party may vary in strength from a squad to a company. Usually it is landed secretly. After landing, the selected enemy position is quickly approached and the attack launched. The raiding party with its prisoners repairs quickly to its boats and puts to sea before the arrival of 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, these attacks may be supported by ships' gunfire. For the ambush of enemy individuals the shore patrol is limited in size, preferably from two to eight men. The men are landed

secretly as prescribed for the landing of agents. After landing, the patrols lie in concealment along trails, at water's edge, or near other points where enemy individuals are likely to move with a view to seizing and escaping with them to the waiting boat.

■ 132. DURING LANDING PHASE.—During the landing phase, continuous reconnaissance is conducted by all echelons of the command. Air forces, submarines, and patrols landed from small boats, as well as the troops when landed, carry out this reconnaissance.

SECTION III

BEACHHEAD

■ 133. BEACHHEAD.—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 secure the terrain features and maneuver space requisite for the projected operations on shore. 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. As a matter of security, it is 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 is 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 is also given to depriving the enemy of terrain features which are most advantageous to him in the defense.

■ 134. BEACHHEAD LINE.—The beachhead line 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. 15).

■ 135. RECONNAISSANCE AND SECURITY LINE.—*a.* The security line is one which prescribes the minimum distance beyond the beachhead line to which security detachments will be pushed by units occupying the beachhead line. Active reconnaissance will be conducted in the prescribed zone by designated units. The designation of the line prevents a greater dispersion of the force as a whole than is desired by the beachhead force commander (see fig. 15).

b. The reconnaissance and security line for landing operations differs from that employed in other ground operations in that it is normally closer to the beachhead line (the tentative main line of resistance) and becomes the outpost line in case the beachhead line is occupied for defense, whereas in other ground operations the reconnaissance and security line is normally in advance of the outpost line. It must be far enough in advance to protect the beachhead line from surprise ground attack and screen it from hostile ground observation and attack.

■ 136. EXTENT AND FORM OF BEACHHEAD.—*a.* The beachhead should be of sufficient depth and frontage to protect the landing points from medium artillery fire. Usually, this will be possible only with comparatively large forces. A landing force must guard against overextension of its units with consequent endangering of its flanks, beach establishments, and land lines of communications. The depth and frontage of the beachhead will be dependent 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 15 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 15①, the terrain is assumed to be suitable for maneuver throughout its whole extent. In figure 15② and ③, the effect is shown of certain impassable obstacles which may be encountered in a variety of forms and combinations. Figure 15④ shows a beachhead where it is necessary to land in a town. In most situations of this kind it would be advisable to land outside the town unless only very weak resistance is anticipated or complete surprise is practicable.

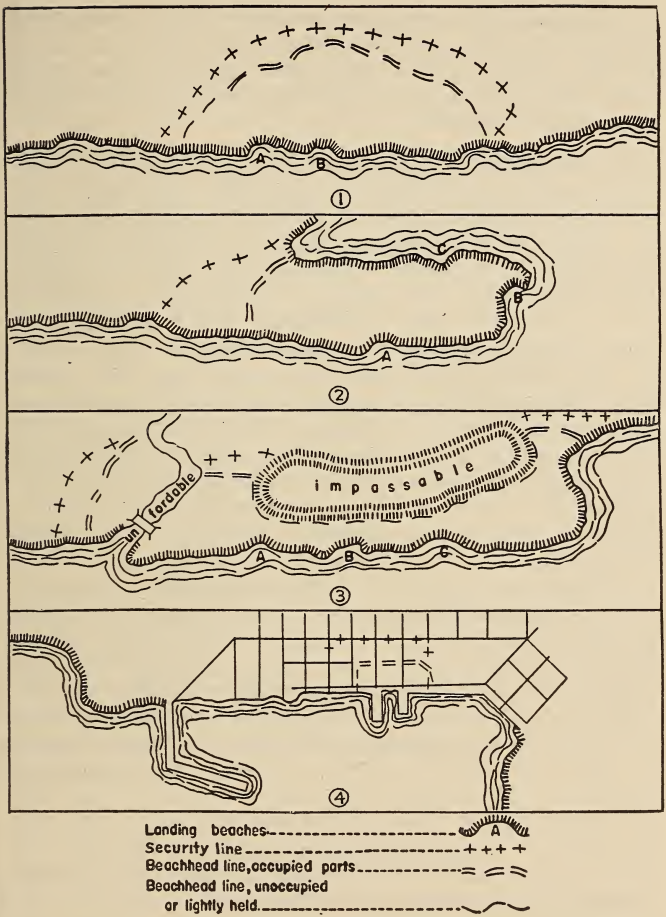


FIGURE 15.—Beachheads (illustrative only and not to scale).

■ 137. SUCCESSIVE OBJECTIVES.—The commander of the landing force may designate successive objectives to coordinate the advance from the beach to the beachhead line. These successive objectives have the advantages of permitting reorganization of attacking troops, passage of lines, coordina-

tion of field artillery and ships' gunfire with the advance, and of facilitating the execution of an appreciable change in direction of the attack. Successive objectives may entail delay and should not be prescribed unless actually needed for a definite purpose.

■ 138. INTERMEDIATE BEACHHEAD LINES.—*a.* Subordinate commanders may find it desirable to prescribe intermediate objectives or beachhead lines for their units, particularly when the landing force commander has not prescribed successive objectives. If successive objectives have been designated, these usually serve the purpose of intermediate beachhead lines, at least for major subdivisions of the landing force. Lower echelons, particularly when beaches are not contiguous, may require intermediate beachhead lines short of the first of the successive objectives prescribed by the superior commanders in order to reorganize, bring forward supporting weapons, or to establish liaison with adjacent combat teams. When intermediate beachhead lines are prescribed, they are designated CT (combat team)—1st Objective,—Infantry, 1st Objective, and so on, according to the unit for which prescribed.

b. Prescribing intermediate beachhead lines is desirable because disorganization and loss of control may result during the ship-to-shore movement and the initial advance ashore, particularly when strong opposition is encountered. The establishment of an intermediate beachhead enables the commander to regain control of his unit and to maintain control of it until he has sufficient information on which to base his plans and orders for further advance. It also provides security for the landing of the rear elements of the unit. The prescribing of intermediate beachhead lines must not be allowed to cause unnecessary delay in the advance. On arrival at these lines, no halt should be made if the situation is such that the advance can be continued.

c. The intermediate beachhead line prescribed by the commander of a major subordinate element of a landing force as large as a division should, if practicable, protect the landing beaches of the unit against hostile light artillery fire. A regimental or battalion (combat team) beachhead line should protect the landing beaches of the regiment against effective small-arms fire.

■ 139. ESTABLISHING BEACHHEAD.—In a landing operation, troops must clear the beach rapidly. There must be no delay at the water's edge. This requires that leading units be landed in assault formation as fully deployed as the available boats permit. Once landed, every individual must thoroughly understand that he must clear the beach promptly and move rapidly inland or in the designated direction. Assault units push the attack to their designated objectives without waiting for the advance of units on their flanks. If a unit is landed on a beach other than that designated for its landing, its commander will initiate such action a ; will best further the general scheme of maneuver.

■ 140. ADVANCE FROM BEACHHEAD.—The desirability of establishing a security zone around his shore base should not lead a landing force commander to adopt a defensive attitude after the beachhead is secured. Any mission other than merely holding the beachhead is best accomplished by agressive action, and agressive action often affords the best protection to the beach establishments. The advance from the beachhead line however may entail the breaking of contact with the shore on one or both flanks and the establishment of shore lines of communication. Under such conditions, the securing of a beachhead may be followed by a period of stabilization for the necessary regrouping of forces. Reconnaissances by aviation and ground troops should be pushed vigorously during reorganization and the delay on the beachhead line reduced to the minimum. During this phase, liaison between naval aviation and ground troops may be difficult but is highly important.

SECTION IV

SCHEME OF MANEUVER

■ 141. GENERAL.—The decision as to the scheme of maneuver to be adopted by the landing force is affected by many allied decisions which are discussed in other sections of this manual. Some of these decisions are—

a. Determination of the landing area to be utilized, which is dependent on the expected opposition, the character of available beaches, suitability of the terrain for shore operations, configuration of the coast line, the effect of the time

element in reaching objectives, and similar factors (see sec. IV, ch. 1).

b. Selection of the time of landing, which is based on the relative advantages and disadvantages of daylight and darkness for the specific operation in prospect (see sec. V, ch. 1).

c. Decision as to the formation to be adopted for the ship-to-shore movement, which is determined by a consideration of the strength and composition of the landing force, available boats, size of beaches, prospective action after landing, and similar conditions (see secs. III and IV, ch. 4).

d. The naval gunfire and aviation support to be furnished (see chs. 6 and 7).

■ 142. FRONTAGE OF ATTACK.—*a.* The frontage to be covered by the landings and the subsequent advance inland is an important consideration in formulating the scheme of maneuver. 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. The strength and equipment of the attacking force is, however, an almost equally important consideration. During the initial stages of the landing, ship's guns and aviation provide the artillery in support of the attacking force. The attacking force therefore comprises two elements of major importance, namely, the landing force and naval and aviation support.

b. The landing force attacks on a wide front in order to increase the speed of landing and to cause a dispersion of the defender's efforts, but it must not overextend. It must concentrate its effort and assign sufficient forces to the various tasks to insure their success. 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. Therefore, leading assault units usually secure an intermediate beachhead and cover the landing of additional troops. In many cases landings are not made on the entire front of the beachhead. This results in the zone of attack increasing in width as the advance 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. 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 before thought can be given to reserves for future contingencies. An operation which initially requires all of the attacker's forces to secure the foothold on the beach is rarely justified. Units must be assigned frontages which permit a depth of formation commensurate with the effort expected of them. Frontages suitable for assault companies and battalions are discussed in sections III and IV, chapter 4.

c. Naval gunfire and combat aviation must be concentrated in support of the landing. Even a relatively small number of enemy machine guns and light artillery pieces firing under favorable conditions have a devastating effect on units as they approach and land on the beach. Assault units will probably be unable to get ashore and advance against this fire unless adequately supported by ship fire and combat aviation. A landing attack must not be held up while naval support groups are moved in order to augment inadequate supporting fires arranged for initially. Usually there is only one opportunity for a successful landing. Successive efforts subsequent to an attack which has failed are increasingly difficult. It is necessary therefore to limit the landings to frontages which are commensurate with the amount of supporting fire available. The scheme of maneuver may provide for adequate fire support either by restricting the landings to beaches of such number and extent as can be supported by all available ships and aviation, or by landings echeloned in time so that ships and available aviation can support the landings in turn (see ch. 6).

■ 143. INFLUENCE OF LANDING BOATS.—The speed with which troops can be put ashore depends 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. The frontage of the initial attack is affected also by the number of small fast boats

available for assault troops. Such boats should be provided for the leading platoons of battalions which are to be landed in assault (see ch. 3). All boats in any group should have the same speed. Slower boats should be used where speed is not of vital importance.

■ 144. HOSTILE DISPOSITIONS.—Beaches strongly organized for defense are avoided, if possible, in the initial landings. Advantage is taken of undefended or lightly defended portions of the shore line, even though they present 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 assist the landing at more favorable beaches.

■ 145. LANDING BY ECHELON.—If a simultaneous landing cannot be made on all selected landing beaches, the landing may be made by echelon. In attacking by echelon it is generally desirable to land the last echelon 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 is given to the advisability of exploiting a landing already successfully executed rather than attempting a new landing against opposition. 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 ship 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. Landings by echelon should be attempted only when the beaches, or groups of beaches, are separated by sufficient distances that troops landed on one beach will not be endangered by naval gunfire on another beach. 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 or combat aviation should be employed to neutralize the enemy batteries.

SECTION V

WITHDRAWAL AND REEMBARKATION

■ 146. PLANS.—*a.* Withdrawal of troops engaged in landing operations, with consequent evacuation of positions on shore which have been occupied, may be required by strategical considerations or may be necessary by reason of unsuccessful tactical operations.

b. The withdrawal and reembarkation of the forces in close contact with an enemy in relatively greater strength are exceedingly difficult and hazardous operations. They may, in desperate situations, involve the deliberate sacrifice of part of the forces ashore in order to extricate the bulk.

c. Decision to withdraw having been approved by the authority having responsibility for the expedition as a whole, the necessary plans in as great detail as possible are drawn up by the commander of the Army forces in consultation with the commander of the Navy forces.

d. The means available to the Navy for clearing the reembarkation points will determine the stages of the withdrawal. The direction of withdrawal is closely limited by the location of the reembarkation points, and such withdrawals involve the passing of troops, matériel, and supplies through the reembarkation points which are defiles of the most constricted nature.

e. When the situation permits an orderly withdrawal, the plan will usually provide for evacuation in the following sequence: animals, supplies, artillery matériel, and troops. However, when in close contact with a superior enemy it may be necessary to establish different priorities for evacuation such as troops, artillery, supplies, and animals. In this case provision will be made for the destruction of the artillery, equipment, supplies, and animals which cannot be evacuated.

■ 147. SECRECY.—The importance of secrecy cannot be overemphasized. For this reason, the withdrawal should be con-

ducted under the cover of darkness or a smoke screen, and every possible precaution must be taken to conceal the movements of the forces and other activities indicative of a withdrawal. Ruses to conceal any changes and to convey to the enemy impressions of normal conditions are desirable, but these ruses must be carefully planned and executed in order not to arouse the curiosity or suspicions of the hostile force.

■ 148. AIR SUPERIORITY.—As long as the enemy is able to maintain air reconnaissance, concealment of the operations involved in withdrawal is difficult and therefore necessitates a maximum use of darkness and smoke screens and other deception measures. Local air superiority through the coordinated effort by both the Army and Navy air forces is particularly essential during reembarkation. Every effort must be made to retain such temporary air superiority until the forces have been reembarked.

■ 149. WEATHER CONDITIONS.—Reasonably favorable weather conditions, at least during the last stages of the withdrawal and reembarkation, are a desirable requisite to the success of the operations. However, withdrawal and reembarkation may, under some situations, be necessary regardless of weather conditions. Through its aerological service, the Navy will furnish the Army with weather predictions. The utmost effort will be made by the Navy to take advantage of favorable weather conditions during the reembarkation.

■ 150. NAVAL SUPPORT.—*a.* The operations of the Navy forces during a withdrawal of the Army forces from the shore are similar to those during a landing operation, the phases occuring in reverse order.

b. In addition to providing the sea transportation and the small boats to reembark the Army forces, including crews to man the boats, the Navy will be prepared to furnish gunfire and air support during the withdrawal. As in the case of the initial stages of the landing operation, the Navy will provide for signal communications between ship and shore until the last unit is evacuated.

CHAPTER 6

NAVAL GUNFIRE

SECTION I

TARGETS AND FIRE MISSIONS

■ 151. CHARACTERISTICS OF DEFENSIVE POSITIONS.—*a.* To plan the artillery fire support for a landing operation, it is necessary to understand the characteristics of a defensive position. These characterisitcs are similar for either a coast line or an inland position.

b. Defensive fires may be opened initially at maximum ranges of the weapons, and thereafter maintained on the approaching boats or troops. The fires which may be expected immediately in front of a defensive position are shown in zone X, figure 16. This zone may be along and immediately to seaward of the beach or in front of an inland position. A heavy concentration of fire of all types of weapons may be expected on the ground or water over which the attacking troops must advance.

c. The bulk of the fires in zone X are delivered by rifles, automatic rifles, machine guns, and antiboat or antitank guns, located in or near the enemy front lines, and capable of delivering direct fire upon the approaching boats or troops. Some field artillery weapons may be located in zone A for the purpose of executing direct fire on small boats approaching the shore and delivering enfilade fire on critical sections of the beach. Some large caliber artillery weapons may also be well forward to execute fire on transports while they are unloading men into small boats. Zone A, in which these direct-fire weapons are located, may extend a distance of several hundred yards in rear of the enemy front line, depending upon the terrain, but those located close to the front line are the more dangerous to the attacker.

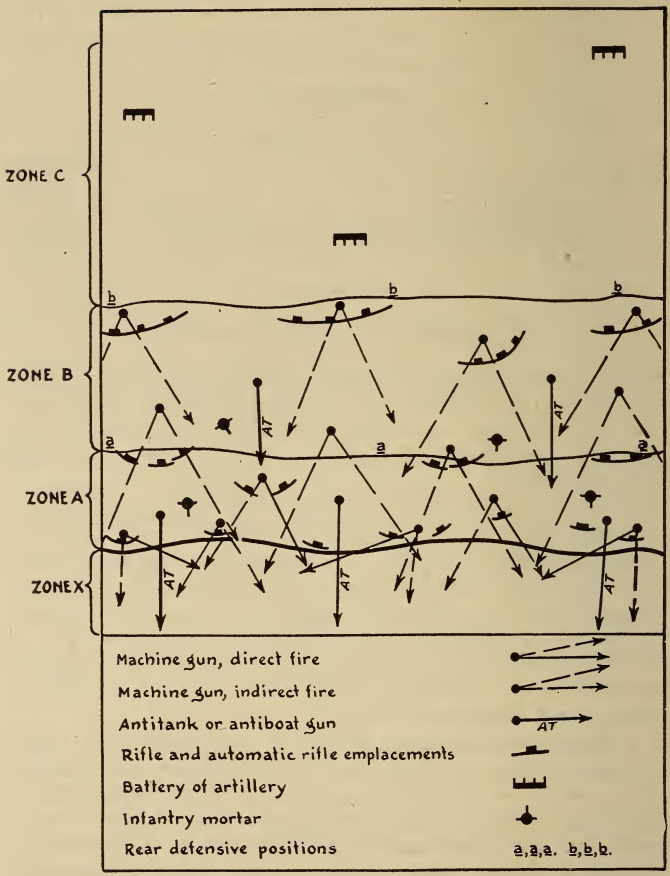


FIGURE 16.—Defensive position.

d. Zone B contains the rear defensive lines, and may extend as far back as 2,000 yards from the front line. Machine guns and mortars located in this zone support the front line by indirect fire. If the front line is disrupted, machine guns in these rear positions change to direct fire, and rifles and automatic rifles which had previously been masked may become

effective. The rear position then assumes some of the characteristics of the front line position illustrated. For example, other zones similar to zone A might be developed along the general line: *a–a–a,* or *b–b–b*. Machine guns employing overhead fire from zone B are not as dangerous to the initial attack as those employing grazing fire from the vicinity of the front line; but the fire of mortars and antiboat guns located in zone B is particularly dangerous.

e. Zone C contains the bulk of the artillery and for calibers of 155-mm or less normally extends about 6,000 yards in depth from the beach. This artillery supports the original front line. In case of a break-through of the front line it supports positions in rear such as the line *a–a–a,* or *b–b–b*.

f. Infantry supported by artillery and other available means defends the position by a combination of fighting in place and counterattack. Thus, in addition to the hostile troops initially in position in zone A, important targets are reserves in rearward positions or moving forward either to take up a defensive position or counterattack. Other targets are command posts, observation posts, centers of communication, ammunition dumps, and other facilities used by the enemy for command or administrative purposes.

■ 152. FIRE MISSIONS.—Types of fire missions assigned naval fire support groups are supporting fire, counterbattery, interdiction, destruction, harrassing fire, fire on targets of opportunity, and countership fire.

■ 153. SUPPORTING FIRE.—*a.* Supporting fire is delivered on the enemy defensive position to neutralize personnel and matériel most dangerous to our own infantry in overcoming resistance. The Navy has two classifications: close supporting fire, delivered initially on the beach and lifted as the attack progresses to positions to be assaulted; and deep supporting fire, the principal objective of which is to deepen close supporting fire by neutralizing reserves and weapons firing from rear positions and disrupt the hostile command, communication, and observation system.

b. Close supporting fire, being difficult for naval guns to deliver, is reinforced by aviation, boat guns, inshore support vessels, and by tanks and artillery of the landing force.

■ 154. INTERDICTION FIRE.—Characteristic targets for interdiction fire are roads used for moving reserves or supplies and areas where military or naval work is in progress. Suitable points to be fired upon are crossroads, assembly places, detraining points, defiles, bridges, and fords.

■ 155. DESTRUCTION FIRE.—Fire for destruction by naval guns requires considerable time, a heavy expenditure of ammunition, and continuous observation. In landing operations, destruction fire by ship guns is usually limited to targets of limited areas which are visible from seaward. Such targets are particularly dangerous machine-gun and antiboat gun emplacements, important bridges, or coast and field artillery weapons, including antiaircraft weapons, located close to the shore.

■ 156. FIRE ON TARGETS OF OPPORTUNITY.—Fire on targets of opportunity may include enemy troops forming for counterattack, working parties, troop or train movements, batteries of artillery, and troops preparing or occupying a defensive position not previously located.

■ 157. COUNTERSHIP FIRE.—Countership fire is delivered on enemy vessels which attempt to interfere with the landing operation.

SECTION II

CHARACTERISTICS

■ 158. GENERAL.—*a.* Artillery support, at least in the initial stages, is furnished by naval gunfire exclusively. Detailed joint planning by the Navy and Army attack force commanders is required, including liaison and signal communication between advancing troops and their supporting artillery.

b. Naval artillery has a high velocity and a flat trajectory. Objectives selected for naval artillery should be large, well defined, and farther ahead of our infantry for safety reasons than is usually the case when field artillery support fires are employed. The limited supply of ammunition available for all types of naval guns prevents the firing of barrages and firing on minor or suspected targets. Naval artillery support is usually by short concentrations fired according to a pre-

arranged schedule on targets visible from the firing ships, from observation points on land, or from spotting aircraft. Provisions are made for firing on targets of opportunity. Map firing is employed only as a last resort, but a liberal use is made of maps in the designation of naval artillery objectives in the plan of fire support.

c. If naval antiaircraft guns are not required against enemy air operations, they may be used advantageously against shore objectives.

d. Gunfire support begins with preparation and continues through successive stages of the landing operation. During the time the troops are disembarking from the transports into the leading boat groups and until the leading boats reach the beach, fire is placed normally on known hostile artillery positions, organized strong points, machine-gun nests, defiles on routes over which supports and reserves must pass and, generally, on objectives the neutralization of which will weaken the enemy's defense. Naval artillery support plans provide for effective fire on the beach to cover the movement of the leading waves ashore. Just before our troops reach the shore, fire is lifted to targets farther inland. The terrain beyond the beach influences the distance the fire is lifted.

e. Two general methods are employed by naval forces in affording artillery support where two or more landing forces land simultaneously. One is to keep all firing units centralized under the highest commander; the other is to decentralize naval support groups to support subordinate Army units. The following are examples of the second method. When two infantry divisions land simultaneously and the naval units have been divided into two naval attack forces, it may be desirable to—

(1) Have the naval vessels of one naval attack force support one division, and the naval vessels of the other naval attack force support the other division.

(2) Divide the naval force into three supporting groups, one group being assigned to support each division and the remaining group to support the operation as a whole.

(3) Make a division by calibers, the large caliber main batteries of large ships being assigned to general support while the smaller caliber secondary batteries are assigned to support subordinate units.

■ 159. FACTORS INVOLVED.—The suitability of naval gunfire for supporting shore operations is influenced by muzzle velocity and trajectory, pattern, type of projectile and fuzes, direct fire, indirect fire, ammunition supply, and mobility.

■ 160. MUZZLE VELOCITY AND TRAJECTORY.—High velocity fire is effective on targets on a forward slope and has a demoralizing effect on the enemy. The disadvantage of the flat trajectory of naval artillery against a reverse slope may be overcome by selecting a location from which naval weapons may bring fire to bear from a flank or rear firing position.

■ 161. PATTERN.—Naval gunfire has a relatively large pattern and is not as well suited for the close support of infantry as fire support furnished by the field artillery.

■ 162. TYPES OF PROJECTILES AND FUZES.—Armor-piercing naval projectiles have a delay action fuze; common projectiles have an instantaneous fuze. Both projectiles have a smaller bursting charge than high explosive shell of the same caliber employed by the field artillery and are not well suited for general use in support of a landing. Flat-nose, antiaircraft, and bombardment projectiles compare favorably to field artillery shell, and should be made available for the bulk of the supporting fires. Shrapnel is infrequently used by the Navy.

■ 163. DIRECT FIRE.—Against a strongly defended coast line, the greatest danger to the immediate landing is the fire of rifles, automatic weapons, and antiboat guns located on or in the vicinity of the beaches and capable of delivering direct fire on landing boats and disembarking troops. These weapons are difficult to discover and locate accurately. Ordinarily, they will not open fire until the boats are close to the beach and after offshore ships have ceased firing, or lifted their fire inland. Inshore supporting vessels, protected by counterbattery fire from offshore groups, move in close to the shore. This facilitates picking up targets when the enemy opens fire and permits the supporting fire to be maintained closer to boats and troops.

■ 164. INDIRECT FIRE.—*a.* Indirect fire is generally more difficult to deliver from ship guns than from field artillery weapons. Its accuracy depends largely upon continuous air or

surface observation, or exact plotting of the position of the ship and target at all times.

b. It may be possible, particularly when attacking small islands or peninsulas, to select firing positions for the supporting ships which will obviate to a great extent the necessity for indirect fire.

c. Missions which necessitate particularly difficult indirect fire should be assigned to aircraft.

■ 165. AMMUNITION SUPPLY.—*a.* The relatively small magazine capacity aboard ship and the necessity of keeping combatant vessels and aircraft prepared for fleet engagements limit the supply of ammunition for the support of a landing.

b. Second line combatant ships, suitable Coast Guard vessels, and converted merchantmen are utilized to the fullest extent to provide gunfire support.

■ 166. MOBILITY.—The mobility of ships permits flexibility in the employment of naval gunfire. Advantages of this mobility are—

a. Inshore supporting vessels can move in with the landing boats and engage the beach defenses at short range.

b. The fire of several ships can be concentrated successively in support of landings at different beaches.

c. A wide choice in the selection of firing positions for the execution of particular fire missions is possible.

d. Protection from enemy submarines, aircraft, and shore artillery is afforded.

In developing the scheme of maneuver and planning the fire support for a landing operation, advantage is taken of these characteristics.

SECTION III

REQUIREMENTS IN GUNS AND AMMUNITION

■ 167. FIRE SUPPORT REQUIREMENTS.—*a.* Destruction of a major portion of enemy personnel, weapons, and field works by naval gunfire is seldom practicable because of the expenditure of ammunition required. Sufficient fire is provided to cause the enemy to cease firing and to take cover. This fire is maintained long enough to reduce the enemy resistance to the extent that he can be overcome by attacking infantry.

b. In firing over a considerable period of time, the best results are obtained by firing several bursts with varying intervals between each burst. This leaves the enemy in doubt as to when the bombardment has finally ceased and makes him hesitate to rush from his shelter to his combat stations.

c. Once the enemy is under cover, he can be kept there with less density of fire. It is advisable to open with an intense bombardment and then reduce the rate of fire. For the last few minutes of fire, every gun of every caliber which can be brought to bear fires at its maximum rate in an attempt to make the bombardment overpowering.

d. If the time interval between lifting fire and the attack of the defensive position is greater than 2 minutes, the density of fire is increased accordingly.

e. Another essential element considered is the ability of the attacking troops to make use of their own weapons immediately before and after the naval artillery fire lifts. During the approach to the beach, the fire from boat guns replaces the fire of troops in land warfare. The volume of fire from this source is increased by all possible means. The use of small boats permits more guns to be brought into action. Accurate laying on specific targets is not expected, and it is often more desirable to spray the whole area with machine-gun bullets and high-explosive shells. This fire is provided for the purpose of keeping the enemy under cover until the troops can disembark and make use of their own weapons.

■ 168. REQUIREMENTS FOR CLOSE SUPPORTING FIRE.—*a.* Close supporting fire, particularly that delivered immediately prior to the assault, should reach a density equivalent to sixteen 75-mm shells per minute per 100-yard square. Just prior to a landing this density is maintained on the enemy defenses at the beach, and a minimum density equivalent to eight 75-mm shells is extended inland to engage weapons from which direct fire may be expected. In planning close supporting fires, target areas are shown preferably on a map or air photograph.

b. The routine of fire is varied as to the length and number of bursts and the interval between them. The following naval fire schedule is an example.

Time	*Percentage of total ammunition fired*
First 3 minutes	33⅓.
Next 5 minutes	None.
Next 10 minutes	33⅓ (with 1 minute of rapid fire).
Next 3 minutes	None.
Next 3 minutes	33⅓.

Total period: 24 minutes.

c. The final burst of fire is of sufficient duration to enable it to start before the landing boats arrive within effective small-arms range of the beach and to continue until the boats are about to enter the beaten zone.

d. If inshore supporting groups are to fire during the same period as offshore groups, the total number of shells fired by both groups is the basis for the computations. Sufficient ammunition, however, is provided to enable inshore ships to maintain their maximum rate of fire during the close approach of the boats and to cover the flanks of the advance inland.

e. When inshore vessels can approach *close* to the beach the fire, shell for shell, is more effective than that of offshore groups because vessels firing at short ranges will probably be able to locate enemy weapons, and maintain a heavy concentrated fire on them until the boats are practically beached. Under these conditions, inshore vessels do not have to deliver as great a density of fire over the whole area as offshore ships to produce the same effect.

■ 169. REQUIREMENTS FOR OTHER FIRE.—In a similar manner, the Navy determines the density and ammunition requirements for deep supporting fire, counterbattery, interdiction, and destruction.

■ 170. FIRE SUPPORT GROUPS.—The ships assigned the task of furnishing gunfire support for a landing are organized into one or more task organizations, and given designations such as Fire Support Group ONE, Fire Support Group TWO.

■ 171. FIRE SUPPORT AREAS.—*a.* Fire support areas are located to avoid the employment of indirect fire. Close supporting fires on the beach are invariably provided by direct laying.

b. Advantage is taken of flanking fires, particularly in de-

livering supporting fires on the beaches, and in positions sited on reverse slopes or otherwise defiladed. The location of fire support ships on the flanks permits more room for the movement of the boats, their fire is more demoralizing to the enemy, and boats or troops on land can approach closer to the area being shelled before it is necessary to lift the fire.

SECTION IV

COORDINATION OF FIRE

■ 172. COOPERATION BETWEEN ARMY AND NAVY.—*a.* Complete plans for gunfire support are made prior to embarkation by the commanders of the naval groups which are to give the support and by the commanders of the respective Army units they are to support. Commanders of Army units indicate the objectives upon which they desire fire, the purpose of the fire, and the times they are to be fired upon. The naval commander concerned indicates exactly how much of the desired support he can give. In case the Navy has not sufficient guns to provide the minimum artillery support desired, every effort is made to secure additional ships or to provide the support by means of combat aviation.

b. Plans include provision for the interchange of liaison officers between Army and Navy units. Officers of artillery organizations which do not debark initially may be used for the purpose. All liaison officers report to the headquarters to which assigned in time—normally prior to embarkation—to become familiar with the other service and to be able to interpret the desires and needs of the commanders of the units whom they represent.

■ 173. COORDINATION OF CLOSE SUPPORTING FIRE WITH MOVEMENT OF BOAT.—*a.* Observers on Navy ships engaged in fire support watch for signals from the control vessels and boats. Ships open close supporting fire when the leading boats are in the position prescribed by the attack force commander rather than on the time schedule. About 15 minutes prior to the arrival of the boats in this position, the control vessel concerned informs the commanders of the naval attack force and the fire support group the exact time the boats are expected to arrive at the prescribed position. This gives the fire support group sufficient time to get into the position

selected for opening fire. If control vessels are not with the leading boats, it may be advisable to designate an observing plane to transmit this information.

b. Firing ships observe or are informed when the leading boats leave the line of departure. Plans are made to cease or lift the fire a designated number of minutes after the line of departure is crossed. This will be the running time of the boats from the line of departure to the danger zone of supporting ships' fires. As it is important that the boats approach as close as possible to the area being shelled before the fire is lifted, the movement of the boats is observed and the fire maintained on the beach as long as practicable.

c. Boats are furnished pyrotechnic signals to signal that the fire is falling short or should be lifted.

d. The distance the fires are lifted ahead of the boats depends on the range, pattern, visibility, caliber of supporting guns, character of aiming points, roll and pitch, and the direction of approach of the boats in relation to the line of fire. Fragments may be considered dangerous to friendly troops and boats at the following distances from the point of burst:

3-inch, 150 yards.
4-inch, 250 yards.
5-inch, 400 yards.
6-inch and above, 500 yards.

■ 174. Coordination of Naval Supporting Fire With Landing Force Artillery.—*a.* After the field artillery is ashore it takes over the fire missions of naval supporting groups as rapidly as possible. Normally, the first fire mission to be taken over by artillery ashore is that of close supporting fire, as this is the type of fire most difficult for naval guns and for which light field artillery is best suited. Because medium or heavy artillery will probably not be available, particularly during the early phases, and light artillery may be limited in amount, naval guns may have to continue deep supporting fires, counterbattery, and interdiction during the attack on shore.

b. Field artillery executes the close supporting fire generally on call from the liaison officers with the front line infantry battalions. Naval fire support groups are advised of the expected rate of advance of the infantry. This pre-

dicted rate of advance, together with current reports from field artillery liaison officers, permits the fire support ships to displace their deep supporting fire the proper distance ahead of the close supporting fires of the field artillery.

■ 175. Coordination of Naval Supporting Fire With Aircraft.—*a.* In planning fire support of a landing, available aircraft should be used to take over and supplement the gunfire missions. Missions most suitable for assignment to aircraft after local control of the air is assured are—

(1) Attack to destroy and demoralize beach defenses.

(2) Close support of the infantry immediately prior to the landing and during the advance from the beach.

(3) Attack of hostile reserves, especially armored units.

(4) Interdiction of roads, particularly those lying a considerable distance from the coast and not visible from seaward.

(5) Counterbattery on batteries difficult to reach by naval guns.

b. Usually there will not be sufficient aircraft to carry out all of the missions desired. First consideration is given to those missions directly supporting the landing and the immediate advance from the beach.

CHAPTER 7

AVIATION

SECTION I

GENERAL

■ 176. ADVANCE AIR BASES.—*a.* When the theater of operations is beyond the operating radius of land-based aircraft, the seizure of an advance air base prior to landing is always desirable and often mandatory. Carrier-based aircraft, even with great numerical superiority, are at a serious disadvantage compared to land-based aircraft because of the limited number and vulnerability of airplane carriers. An advance airbase also has the advantage of permitting the early operation of Army aircraft.

b. The seizure of an advance air base is ordinarily the function of the Navy, but in some situations it constitutes a separate landing operation for which the necessary landing force is provided by the Army.

c. Air transported troops may be used for the seizure of an advance air base within operating radius of friendly flying fields. Consideration should be given to dispatch of air transported troops from carriers when operations from land-based fields are impracticable due to distance. For operations of this character see FM 100–5.

■ 177. AIR SUPERIORITY.—*a.* Whether or not an advance air base has been secured, local air superiority is essential to the success of a landing operation. Troop transports and troops in small boats offer concentrated targets for hostile aircraft and are extremely vulnerable to bombing and gas attacks. Even a small opposing air force skillfully handled and not effectively neutralized may disrupt the landing and force a

withdrawal. It is therefore essential that hostile combat aviation capable of intervening during the landing operations be destroyed or neutralized prior to the approach of the transports and supporting naval units within the transport area. Subsequently, supporting aviation must be prepared to furnish protection against air attacks during the critical landing phase.

b. Operations to neutralize the defending air forces include destruction of airdromes and planes on the ground and aerial combat. The enemy will, if possible, utilize a large number of landing fields, camouflage will be employed to the maximum to protect his establishments, and dummy planes will be displayed, actual planes being widely separated and camouflaged. Thus, thorough reconnaissance is necessary before successful attacks can be launched. To render enemy landing fields unusable requires extensive operations and a heavy expenditure of bombs. See FM 1–10 and Joint Action of the Army and the Navy.

■ 178. AIR SUPPORT.—*a.* Responsibility for air support and for control of the air within the zone of the proposed operation usually rests initially with the naval aviation of the attack force until such time as adequate support is practicable by land-based aviation of the landing force. Any available aircraft of the landing force participates. Naval aviation is relieved progressively by aircraft of the landing force as soon as facilities for their operation can be provided.

b. Pilots, observers, and other aviation personnel of the Army may be utilized by the Navy when naval planes are engaged in land reconnaissance, attack in support of ground operations, and similar missions. When this is envisaged, it must be appreciated that special training of Army personnel will be necessary because of differences in naval types of aircraft and in naval procedure.

c. The closest cooperation is required between air units, the supported troops, and the naval fire support group.

■ 179. COMPOSITION OF AIR FORCE.—In general, the circumstances affecting the composition of the air force lie between the following two extremes: the most favorable situation, which is that permitting employment of all types of Army aviation from adequate, well-located land bases throughout

the operation; and the most disadvantageous situation, which makes necessary the employment of naval aviation alone in support of the landing and the initial advance. In any situation, however, the air force should be composed of the classes of aviation which can best accomplish the following missions:

First, gain and maintain local air superiority.
Second, closely support the landing force.
Third, furnish necessary reconnaissance and observation, including photographic missions.

■ 180. AIR RECONNAISSANCE.—Information regarding the hostile defenses, and the number and suitability of landing beaches and approaches thereto may prove more essential to the success of the landing than benefits derived from attempted surprise without this knowledge. Strategical surprise against an alert enemy is exceedingly difficult to obtain. Air and surface scouting by enemy air forces will probably result in early discovery of the approaching expedition. While it is seldom possible to conduct intensive distant aerial reconnaissance without sacrifice of strategical surprise, it is often feasible to include aerial reconnaissance missions among the general air operations being carried out in the theater in such manner that the enemy will be unable to derive any definite conclusions therefrom. Prior to the landing, tactical reconnaissance of beaches and contiguous areas inland is conducted over a broad front, and concentration of air activities over the particular sectors where landings are planned is carefully avoided. Marked aerial activity over several areas may, in fact, be used as a demonstration or a feint and thereby aid in gaining tactical surprise. Because of the ability of air missions to cover extensive areas or numerous beaches, aerial reconnaissance and photography provide satisfactory means of obtaining general information without sacrificing tactical surprise. See FM 1–20.

■ 181. TRANSPORTATION OF AIRCRAFT.—*a.* Because a landing requires the maximum employment of available aviation, every effort is made to provide for the early participation of Army aircraft. Where aircraft can fly the entire distance from their home base to the scene of the landing, or where advance air bases have been secured, few serious problems are involved.

b. When land bases are lacking, carriers may be assigned for use of the landing force aircraft; failing this, the airplanes may be assigned to the fleet carriers. If carrier space does not permit the adoption of either of these plans, the airplanes may be stowed aboard carriers for initial launching only. Another plan is to carry airplanes fully set up on auxiliary vessels, launching to be effected by catapulting or from specially constructed take-off platform. A less desirable alternative is to use transports which permit airplanes to be stowed above and below decks partially set up. These airplanes can be transferred to carriers for final assembly and launching. Least desirable is the method of transporting airplanes knocked down and crated. Crated aircraft are cumbersome, difficult to put into operation, and cannot be made ready for use until a considerable beachhead or advance air base has been gained.

SECTION II

AIR OPERATIONS PRELIMINARY TO LANDING

■ 182. RECONNAISSANCE.—Aerial reconnaissance is made when the necessity for information of terrain, hydrographic conditions, enemy defensive measures, and suitability of beaches outweighs considerations of surprise. When aerial reconnaissance is made, it is so conducted that it will serve to confuse the hostile defenders as to the probable points of landing. Air reconnaissance by troop commanders is desirable.

■ 183. PHOTOGRAPHY.—*a.* Air photographs and mosaics, carefully studied, are of assistance in drawing up final plans for the operation. Airplanes flying at high altitudes are able under favorable conditions to obtain the required data without sacrificing tactical surprise.

b. Air photographs are particularly useful in determining the best channels of approach to beaches, the location and character of defensive works and installations, presence of obstacles, the configuration of the ground at the beaches, and the amount of surf to be encountered. Some indication of depth of water and underwater obstructions is also gained by comparing views taken at low and high tides.

c. Oblique photographs, particularly those taken from seaward, are 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.

■ 184. Reduction of Hostile Defenses.—Prior to landing, unless secrecy is the primary consideration, advantage must be taken of every opportunity to deliver air attacks on the hostile defenses. Aircraft, airdromes, aviation matériel, fortifications, gun emplacements, communication and transportation centers, supply bases, and troop movements and concentrations are appropriate targets.

Section III

AIR OPERATIONS DURING DEBARKATION

■ 185. Protection of Transport Area.—*a.* Protection is furnished to the vessels of the attack force during debarkation into small boats by denying hostile aviation access to the landing area. Neutralization is obtained by the use of pursuit aviation and the coordinated support of the antiaircraft defenses, and by attacking hostile aircraft on the ground.

b. Submarines are an additional menace during debarkation. Employment of scouting planes equipped with bombs for attacking submarines reduces this hazard. Battleship and cruiser aircraft not required for gunnery observation are also employed to establish an air patrol.

c. In planning the time of arrival in the transport area, consideration is given to the disadvantages of operating aircraft during darkness. It is extremely difficult to provide proper air support for a night landing in the presence of an alert hostile air force because the transport area can be illuminated by flares and effectively bombed by the defenders.

■ 186. Reconnaissance.—Intensive and continuous reconnaissance of hostile defenses and shore establishments is initiated prior to or simultaneously with the debarkation, or as soon thereafter as visibility permits. Beach defenses, artillery positions, airdromes, and the locations of enemy general reserves are reconnoitered intensively. Definite knowledge of the enemy dispositions gained at this time will exercise a material effect on the later employment of aviation.

■ 187. ATTACKS ON SHORE OBJECTIVES.—During debarkation of leading landing groups some aircraft may supplement naval gunfire on the beach defenses while others are utilized against airdomes and any movement of enemy reserves.

SECTION IV

AIR OPERATIONS DURING APPROACH TO BEACH

■ 188. GENERAL SUPPORT.—The vulnerability of troops and supplies during the period when small boats are en route to shore makes it imperative that protection against air attack be positive and continuous at this time. Pursuit airplanes should operate to destroy or neutralize enemy aircraft and to protect friendly aviation operating in the area.

■ 189. SMOKE SCREENS.—*a. Use.*—(1) Smoke laid and maintained by airplanes may conceal the approach of the landing boats and reduce the effectiveness of hostile fire. If employed, it is maintained in sufficient quantities to blind the beach defenses and observation posts until the leading units have disembarked from the small boats and have gained the beach.

(2) Smoke is extremely difficult for airplanes to lay properly, usually requires cessation of fire from ships while it is being laid unless placed by means of smoke bombs. Smoke deprives the attacker of observation of the shore, increases the difficulties of controlling boats, interferes with visual and pyrotechnic signals, and takes airplanes from other tasks. Smoke is not used on or near the beach when an adequate number of naval vessels employing direct fire are available, as the observed fire of these vessels constitutes a better protection from enemy fire than smoke.

b. Laying.—(1) In general, smoke is laid near the shore, the ideal being reached when a continuous blanket is maintained at the beach line. Screens may be laid successively ahead of the advancing boats, but has the disadvantage of exposing unduly the smoke airplanes to antiaircraft fire at close range, and with an onshore breeze requires a larger number of planes.

(2) In laying smoke, the direction and velocity of the wind must be considered and the point of initiation of the screen as well as the course of the airplane must be calcu-

lated. The duration of the screen, its drift during its period of usefulness, the frequency of repetition, and its density during varying weather conditions are factors requiring consideration. Smoke may be laid by means of wing tanks or by bombs. The duration of a smoke screen is dependent upon meteorological conditions; with high humidity and no wind, duration may be for a considerable period. The exact time for initiating a smoke screen should be left to the pilots charged with the work. The pilot must know the hour boats are scheduled to land, but a schedule prescribing the exact hour and minute of laying the first screen is not advisable.

■ 190. GUIDE AIRPLANES.—*a.* Guide airplanes are assigned to direct assault battalions to their designated beaches during a daylight landing when conditions make accurate navigation of boat groups impossible. When the beaches are not contiguous, one airplane should be furnished for each beach. Identification of the plane is established by any convenient means such as the use of streamers.

b. Several methods of operating a guide airplane are feasible. One method involves flying continuously in rear of the boat unit being guided. When the course must be changed in order to land on the assigned beach, the airplane flies to the guide boat and signals the necessary change in direction by dipping the right or left wing. Another method is to have the airplane fly at low altitude from the center of the boat group toward the designated beach and return, thus indicating the proper course. This method involves considerable danger to the aircraft from naval gunfire and fire from beach defenses.

■ 191. SUPPORT WHEN SHIP GUNFIRE LIFTS.—Overhead ship gunfire lifts when the leading boats are 1,000 yards or more offshore. At this time the advancing boats must receive intensive support from aviation units. Combat airplanes, employing guns and fragmentation bombs, neutralize beach defenses, antiboat guns, artillery, reserves, and located searchlights. A strong aviation striking force is provided for employment at this time. The time schedule for its operations is prepared by the landing force commander and must be coordinated with the naval forces. Unless ship gunfire ceases during the aircraft attacks, bombing and aircraft gunfire must be conducted at safe altitudes.

■ 192. RECONNAISSANCE.—Air reconnaissance of enemy dispositions should be continuous throughout the actual landing, particular attention being paid to enemy troop movements and the location of reserves. If only naval airplanes are available during this phase, arrangements should be made for Army observers and liaison officers to make the necessary flights.

SECTION V

AIR OPERATIONS DURING ADVANCE INLAND

■ 193. SUPPORT NEAR SHORE LINE.—*a.* Field artillery is not 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. Therefore aircraft must continue to supplement naval gunfire by providing intense close support for the troops until field artillery support can be furnished. The missions assigned to aircraft in paragraph 191 should continue in effect, particular attention being paid to the protection of the flanks of advancing troops.

b. When hostile airplanes are present, pursuit airplanes continue the mission of clearing the air. During the early stages of the advance inland a large part of the air force is employed on missions usually assigned field artillery.

■ 194. SUPPORT AFTER LANDING OF FIELD ARTILLERY.—*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 ships of the attack force and ship-to-shore lines of communication continue to receive adequate protection.

b. During operations after field artillery support is available, duties assigned to the various classes of the air component include—

(1) Observation units furnish observation and reconnaissance, and provide airplanes for battle missions.

(2) Light and medium bombardment units continue close support of the infantry; destroy, immobilize, or delay hostile reserves; attack aircraft on the ground; and neutralize antiaircraft defenses.

(3) Pursuit units furnish general and special support over the sea and land area occupied by the landing force, transports, and supporting vessels, and provide protective escorts.

(4) Heavy and medium bombardment units destroy hostile airdromes and aircraft on the ground, heavy artillery, lines of communication, transportation and supply centers, and other key installations.

(5) Transport and other suitable aircraft are utilized to carry parachutist or other air landing troops to operate against selected objectives.

CHAPTER 8

SIGNAL COMMUNICATION

SECTION I

GENERAL

■ 195. GENERAL.—*a.* Adequate signal communication during landing operations can be had only if joint planning has foreseen and provided all necessary equipment, information, and instructions governing signal communication, joint training, signal communication security, and coordination of ship and shore signal means.

b. Each transport has a communication center operated by Navy personnel assisted by Army personnel.

c. Liaison officers exchanged between Army and Navy commanders should have copies of communication plans for the various phases of the operation, signal operation instructions, and copies of authorized cryptographic systems of their own service.

d. The Navy is responsible for signal communication from shore to ship, and communication with Navy boats used for landing and all ships engaged in or supporting the landing.

e. A naval liaison detachment accompanies each combat team to provide radio and visual communication and operate facilities necessary for effective naval gunfire support of the combat team.

f. The Army establishes its own signal communication ashore, and provides wire and messenger communication from the command post of each Army combat team to the commander of the naval liaison detachment assigned to accompany his combat team. This naval commander's command post is located habitually at the combat team command post.

g. Signal communication systems employ all practicable agencies. (See FM 24–6 and FM 11–5.)

h. Prior to the landing of assault units, the use of radio is kept to a minimum in order to further the chance for surprise. The maximum use is made of other means of signal communication.

■ 196. JOINT PLANS.—*a.* Signal communication plans provide for—

(1) The additional personnel such as radio operators and visual signalmen required for transports; control vessels; boat groups, boat divisions, and wave commanders; the beachmaster; and fire-control parties ashore.

(2) The procurement, distribution, and test of signal equipment not normally provided, for example, radio sets for boats, vessels of control group, beachmaster, fire-control parties ashore, and transports; pyrotechnics for boats and control vessels; designating flags or lights for control vessels; semaphore and guide flags for boats; blinker tubes for boats; portable signal lamps for the beaches; and air-ground code and panels for fire-control parties ashore.

(3) The distribution of signal equipment to units for training prior to the arrival at port of embarkation.

(4) The preparation and issue of necessary waterproof covers for all equipment which may be damaged by spray.

(5) The preparation and distribution of joint signal operations instruction. (See par. 198.)

(6) The establishment of alternate channels. When within visual range, visual methods as well as radio and wire communication should be established. In addition to radio, wire, and visual communication between adjacent beaches, it is desirable to employ a messenger boat service.

b. Prior to landing of assault units, curtailment in the use of signal communication is essential as a counterintelligence measure. The silencing of radio, both telegraph and telephone, is of primary importance as this means is most vulnerable to enemy interception and direction-finding agencies. Communication plans should provide complete instructions to all units on the silencing of radio for purposes of secrecy and to prevent interference on important channels.

■ 197. INSTRUCTION TO SIGNAL COMMUNICATION OFFICERS.—Prior to embarkation, all signal communication officers should be made cognizant of—

a. The instruction covering the responsibility for communication during various phases of the expedition.

b. The actual command set-up of the communication system.

c. The instructions for both services covering communica-

tion security. The communication channel requirements, cryptographic systems, and frequency plans for all phases of the operation.

d. The signal operation instructions of the Army for the various phases of the operation and the similar instructions issued to cooperating units of the Navy.

■ 198. SIGNAL PLANS.—Prior to embarkation the following signal plans and orders must be prepared and issued:

a. Signal operations instructions covering—

(1) Radio call and frequency assignments for both Army and Navy stations.

(2) A common radio procedure. (See FM 24–10.)

(3) Common codes and ciphers with geographic appendix to each code.

(4) Pyrotechnic code, coordinated with Navy and Naval Air Service.

(5) Airplane identification markings.

(6) Visual signaling.

(7) Telephone and telegraph code names and numbers.

b. Assignment of attached signal communication personnel to shore parties, to liaison parties, and to reinforce organic signal communication units.

c. Plans for the procurement and issue of special signal communication equipment and for the provision of waterproof covers for equipment which may be damaged by spray during landing.

d. Plans for joint training in signal communication prior to embarkation (see sec. III, ch. 11).

e. Plans for communication during movement overseas.

f. Plans for communication during landing (a signal plan for each tactical plan).

g. Signal communication plan for operations subsequent to landing. Each signal communication plan should include—

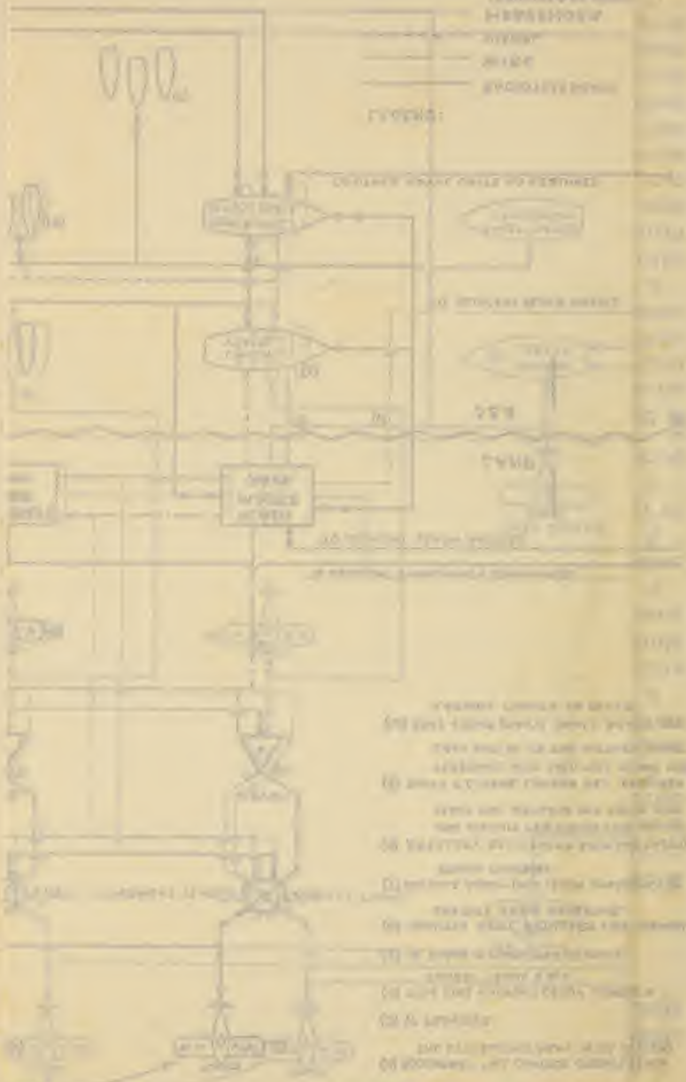
(1) Radio net organization and frequency assignments.

(2) Provision for communication security.

(3) Radio intelligence.

(4) Signal supply.

h. Signal orders and operation instructions must be issued sufficiently early to permit all subordinate headquarters, both Army and Navy, to prepare and issue signal orders and instructions. Sufficient time should be allowed to permit a thorough



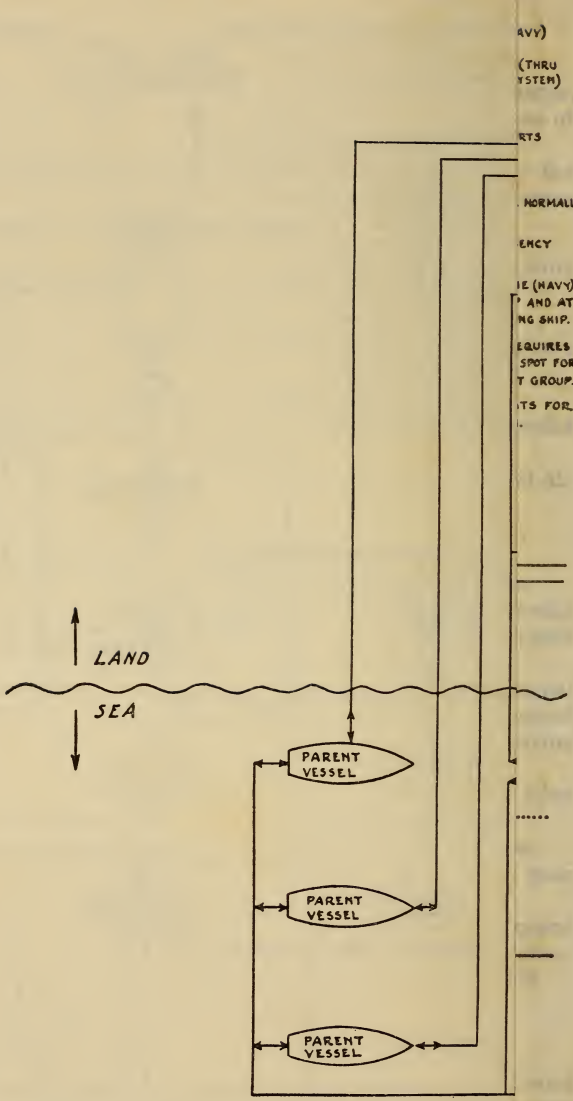


FIGURE 17.—Typic

study by operating personnel of the appropriate sections of the signal orders and signal operating instructions.

Section II

SHIP-TO-SHORE AND ASHORE

■ 199. Movement to Shore.—A typical joint signal communication system for one beach during the landing phase is shown in figure 17. During the ship-to-shore movement signal communication is maintained between—

a. Boat group, wave, and boat division commanders, normally by visual signals and with the minimum of portable radio equipment.

b. Boat group and wave commanders, control vessels, and attack force commander, generally by semaphore flags, blinker tube, radiotelegraph, radiotelephone, and boat messenger.

c. Control vessels and fire support groups, principally by radio, signal lamp, and flag hoist.

d. Navy artillery liaison party and Navy fire support group, by radio and visual signals (see fig. 18).

e. Attack force commander and aircraft engaged on important reconnaissance missions, usually by radio.

■ 200. Pyrotechnic Signals.—*a.* Pyrotechnic signals are restricted to the transmission of messages of the highest priority. The influence of meteorological conditions on the visibility of pyrotechnic signals must be appreciated and considered.

b. 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 if about to run into the salvo pattern of supporting gunfire. This signal is immediately relayed to the firing ships and control vessels by succeeding waves of the same boat group. Similarly, adequate arrangements must be made for timely communication with supporting aviation, especially that operating against beach defenses.

c. Each rifle platoon in an assault battalion upon reaching the beach sends the prescribed pyrotechnic or other signals

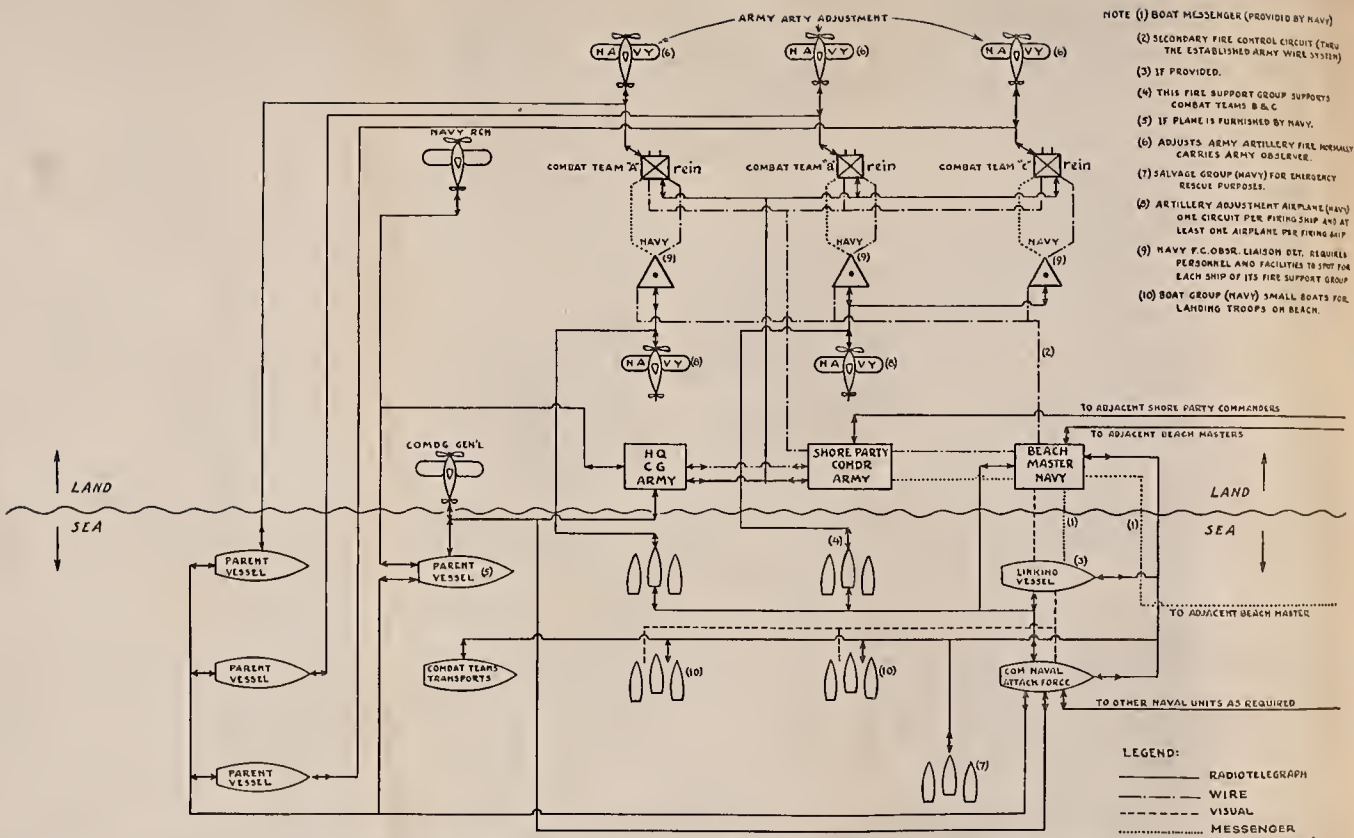


FIGURE 17.—Typical signal communication system for one beach during landing phase of joint oversea expedition.

indicating whether or not the landing has been successful. The signal indicating that the landing has not been successful is controlled by an officer.

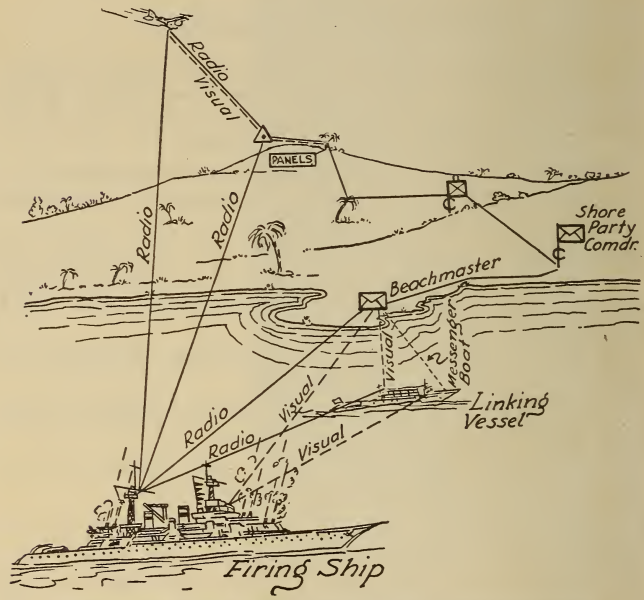


FIGURE 18.—Naval fire control signal communication.

■ 201. PLATOON.—*a.* Platoon commanders leave at least one messenger on the beach to report to the company commander. This messenger informs the company commander of the direction in which the platoon has advanced and other pertinent information.

b. Each rifle platoon of the assault battalion upon landing plants an identifying flag or marker on the beach where it can be seen from seaward. Screened lights are used at night.

■ 202. COMPANY.—Company commanders upon landing leave messengers on the beach to report to the battalion commander. These messengers are given the direction of the advance of the company headquarters and other pertinent informa-

tion. At night or if advancing in brush, platoon and company headquarters mark the route of their advance with tape or other means to facilitate messenger communication with the beach. Messenger routes of battalions and larger units ordinarily follow the routes of wire lines.

■ 203. COMBAT TEAM.—*a.* Combat team commanders upon landing immediately establish their command posts unless this has been done by a staff officer who has preceded the respective commanders ashore. A staff officer and messengers are left at the beachmaster's headquarters to report to the regimental commander as soon as he lands.

b. The initial signal communication system established is shown diagrammatically in figure 19. The combat team establishes a wire circuit to the observation post of the naval artillery liaison party.

c. The artillery battery of the combat team establishes wire communication with the command post of the combat team. It is desirable that the artillery battery observation post is near the observation post of the naval artillery liaison party. This insures certainty of signal communication between these two observation posts and facilitates coordination of the field artillery and naval fires. Sufficient suitable type radios should be provided to enable each battery to communicate directly with the observation airplane.

d. Direct radio communication should be established between the senior Army commander ashore and the superior commander afloat. Airplanes afford a valuable means of signal communication between the combat team commander and higher commanders afloat. A drop and pick-up message ground and panel station are provided near the command post of the combat team. A panel station also is established by the naval artillery liaison party in the vicinity of its observation post. While the combat team ordinarily is the lowest unit to which dropped messages are delivered, in an emergency or by prearrangement messages may be dropped to any unit or detachment.

e. Messengers and other available agencies are employed to supplement wire communication and provide alternative means of communication. Use may be made of portable high frequency radio sets to supplement other types of communication ashore and to communicate with the regimental com-

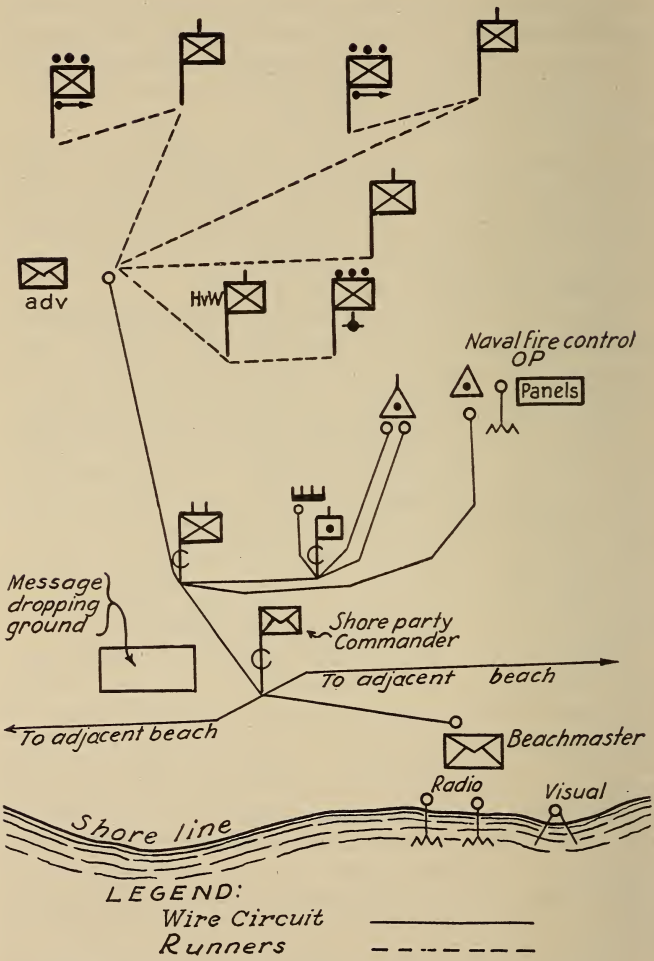


FIGURE 19.—Initial signal communication system on beach.

NOTE.—For signal communication between combat team command posts ashore and regimental command posts afloat, see figure 18.

mander after he lands. Communication established with subordinate units by messenger is indicated in figure 19.

■ 204. Beach Party.—A beachmaster is assigned to each beach. He establishes a communication center at each landing beach to handle communication between ship and shore. He employs radio, visual, and messenger boat communication with vessels designated in orders, messenger boat communication with adjacent beaches, and radio and visual communication with adjacent beaches when practicable.

■ 205. Shore Party.—*a.* The shore party is a special task organization of elements of the landing forces, commanded by an Army officer. He is a staff officer of the senior troop commander on the beach.

b. The shore party consists of a command section and may comprise detachments of any or all of the following:

(1) Signal communication personnel and equipment.
(2) Engineers.
(3) Military police.
(4) Supply personnel.
(5) Labor details.
(6) Chemical troops.
(7) Antiaircraft weapons.
(8) Antitank weapons.

c. The shore party commander, likewise the beachmaster, with a part of the shore party and beach party land in the leading boat group. During the initial trip to the beach, shore party personnel may be used as gunners, ammunition passers, or to assist boat crews in other ways.

d. The shore party commander and beachmaster must work in the closest cooperation in order to utilize all available personnel and facilities to the best advantage.

e. The signal communication detachment of the shore party should include message center personnel, messenger personnel, and wire and radio teams with appropriate equipment.

f. The shore party commander establishes his message center near the headquarters of the beachmaster. Signal communication is established from this message center to the combat team command post, the beachmaster's headquarters and, when directed, to command posts of adjacent shore parties. If it is necessary to employ a boat to lay the wire to

connect with other shore parties, provision for the necessary boat should be foreseen and indicated in orders.

■ 206. OTHER UNITS.—*a. Infantry regiment and supporting artillery battalion.*—Sufficient communication personnel and equipment of the infantry regiment and the supporting artillery battalion to establish their initial command posts and signal communication to their subordinate units accompany the second combat team at each beach.

b. Infantry brigade and supporting artillery.—Action similar to that in *a* above is taken when the first combat team of the second infantry regiment of a brigade goes ashore.

c. Larger units.—Signal detachments of larger units are sent ashore at the earliest practicable time, preceding the headquarters, for the purpose of establishing command posts, relieving shore parties of their signal communication responsibilities, and improving signal communication to subordinate units.

■ 207. PERSONNEL AND EQUIPMENT.—*a.* Signal communication plans provide signal personnel and equipment to replace losses during the ship-to-shore movement as well as during the early subsequent operations ashore, and to meet the needs of the situation for special equipment. This applies particularly to the assault combat teams and the shore parties.

b. All signal communication equipment of the assault combat teams and shore parties is portable. Adequate equipment for laying wire is provided. To guard against total loss of equipment through the sinking of a boat, it is desirable to provide duplicate sets of equipment in separate boats. The lack of transportation and the disorganization likely to prevail during the early operations ashore impose unusual demands on the signal communication personnel of the assault combat teams. This personnel is frequently augmented by the attachment of regimental or higher unit signal communication personnel.

c. In every case, wire to replace that expended by assault combat teams and reel units, with transportation therefor, for the mechanical laying of wire are sent ashore and pushed forward at the earliest opportunity.

CHAPTER 9

FIELD ARTILLERY, ANTIAIRCRAFT PROTECTION, TANK AND ENGINEER UNITS, AND CHEMICALS

SECTION I

FIELD ARTILLERY

■ 208. EMPLOYMENT OF FIELD ARTILLERY.—The employment of field artillery in the early stages of a landing operation differs from its employment in ordinary land operations in the following essential features:

a. In ordinary land operations field artillery, from the beginning, executes preparatory and supporting fires. In a landing operation, preparatory and supporting fires are executed by naval guns until field artillery is ashore and is prepared to reinforce the ship fire or take over certain fire missions.

b. Due to difficulties in transporting and landing guns and ammunition, the amount of field artillery available in a landing operation is usually less than in a land operation on a corresponding scale. This factor may require ship guns to continue on certain fire missions during all or a large part of the operation. Coordination of fire of field artillery and ship guns is required.

c. Normally, in a landing operation 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 with great boldness. It is sometimes practicable to emplace field artillery weapons on old cargo vessels, fire from such vessels grounded off shore being employed to supplement ship gunfire in close support during the early stages of the operation.

d. In offensive operations on land, field artillery coordinates its fire with the advance of the infantry from the beginning of the attack. In a landing operation, the field artillery support begins after the attack is well under way. Liaison with the front line troops is continuous in order that close supporting fires may be delivered as soon as batteries are prepared to fire.

e. Because of the impracticability of exercising centralized control, field artillery batteries are usually attached to infantry units during the initial phases of a landing operation. This makes difficult the concentration of fire of a number of batteries on a designated objective. As soon as the situation on shore permits, field artillery is placed under centralized control.

f. In the early stages of a landing operation, movement of weapons, equipment, and ammunition, and the laying of wire is largely by hand.

■ 209. TYPES AND LANDING CHARACTERISTICS OF FIELD ARTILLERY.—*a.* The 75-mm pack howitzer is especially suitable for use in landing operations. It can be broken down into loads which may be debarked from transports by manpower, transported in small boats, and landed and moved forward on shore by hand. Assembled, it weighs approximately 1,300 pounds.

b. Other types of light field artillery which may be employed are: 75-mm field howitzer, weight approximately 2,100 pounds; 75-mm gun, weight approximately 2,700 to 3,900 pounds, depending on its model; and 105-mm howitzer, weight 4,300 pounds. Any of these weapons can be landed from a 50-foot motor launch equipped with boat rig A and ramp.

c. Since the relatively heavy weights limit hand displacement of light artillery, light-weight tractors, animals, or suitable trucks should be made available on the beach as soon as practicable.

d. If 75-mm pack artillery is not available or suitable motor vehicles for movement or other light artillery cannot be made available promptly on the beach, consideration should be given to providing additional 81-mm mortars in each combat team to furnish initial support during the early phase of combat ashore.

e. The 155-mm howitzer, weight about 9,000 pounds, and the 155-mm gun, weight approximately 30,000 pounds, require artillery lighters or barges to transport and land them on an open beach.

■ 210. ORGANIZATION FOR LANDING.—*a.* It is desirable that complete gun sections are debarked in separate boats, and that the boats transporting a light artillery battery are organized into a boat division. This permits attaching batteries to infantry units or landing the artillery battalion as a unit. The artillery boat divisions, after leaving the line of departure, may cruise independently of those carrying the infantry and land when the beach is reasonably secure from direct fire.

b. Artillery liaison details are transported in the same boats as the headquarters of the infantry unit they support.

c. Reconnaissance details landed in the leading wave select and mark the points for landing, routes from the beach, firing positions, and observation posts, and install necessary signal communication prior to arrival of gun sections. Reconnaissance details are usually provided separate boats to permit them to guide waiting artillery boats after decision has been made as to the point and time of landing.

d. The medium and heavy field artillery are not landed until suitable facilities and protection are available ashore. Lighters, barges, or large boats transporting artillery will usually operate separately.

■ 211. AMMUNITION SUPPLY.—At least two-thirds of a unit of fire is landed with each battery and the remaining third should follow within 1 hour. Each gun section should have its quota loaded with it in the same boat. Beach and shore party personnel unload the ammunition on the beach so that battery personnel may be utilized for placing guns into action promptly. The ammunition supply plan allows for heavy losses en route and ashore.

SECTION II

ANTIAIRCRAFT PROTECTION

■ 212. GENERAL.—*a.* Troops on transports, in small boats, and on the beaches provide concentrated targets for hostile aviation and are extremely vulnerable to aircraft gunfire, bomb-

ing and chemical attack. For this reason, control of the air in the area of and during landing operations is essential and constitutes the best defense against possible disastrous interference by enemy aircraft. Supporting aviation must therefore be prepared to furnish adequate protection against hostile air attacks during the critical phases of debarkation and the subsequent movement ashore in small boats.

b. To supplement the protection afforded by friendly aviation and to provide protection against low-flying hostile aircraft, each combat team should contain a detachment of antiaircraft automatic weapons.

c. Provision should be made for appropriate weapons on each boat and for mounting and manning of such boat guns as soon as the boats are lowered. Designated individuals in each boat should be detailed to look out for and warn of the approach of hostile aircraft. Boat guns and other designated weapons on each boat open fire on attacking aircraft without waiting for orders. Riflemen in the boats should fire only when directed.

d. Control vessels and such other ships as may be designated should protect the landing units from hostile aircraft.

■ 213. EMPLOYMENT OF ANTIAIRCRAFT UNITS.—*a.* To supplement the protection afforded by antiaircraft automatic weapons with the combat teams, plans should provide for the landing of additional antiaircraft automatic weapons units as soon as practicable after the advance from the beach has begun. Weapons are manhandled, their transportation being landed later with other heavy equipment.

b. In addition to execution of antiaircraft missions to protect beach installations and the landing of succeeding troops, supplies, and equipment, the small caliber antiaircraft weapons and antiaircraft artillery assist in antimechanized defense when such asistance does not interfere with its primary mission of defense against hostile aircraft. Antiaircraft gun units, once established on shore, are employed as in other land operations. Their employment must be closely coordinated with the naval antiaircraft guns and with the operation of friendly aviation.

■ 214. LANDING OF UNITS.—With the exception of the antiaircraft automatic weapon units landed with leading units,

the preparation of antiaircraft artillery units for debarkation will not begin until most of the infantry and light artillery are unloaded. The preparation for debarkation is similar to that explained for light artillery, except that the maintenance of an accurate time schedule is not as important. Boats and lighters carrying antiaircraft gun units may proceed to and from the beaches independently.

■ 215. AMMUNITION SUPPLY.—Plans should provide for approximately one unit of fire to accompany each antiaircraft automatic weapon detachment sent ashore with the combat teams. For antiaircraft units landed later, the same considerations and procedure apply as previously outlined for the supply of artillery ammunition.

SECTION III

TANK UNITS

■ 216. EMPLOYMENT.—*a.* Tank units are particularly valuable in a landing operation. They are effective against beach defense—machine guns and barbed wire. They assist the advance of assault units during the period when field artillery support is lacking, and are used in later phases in attacks against especially stubborn resistance and counterattacks. Their employment is dependent upon suitable landing boats and terrain.

b. (1) Tank units should be concentrated against important objectives. Plans for the employment of tank units should be based on initial cooperation with combat aviation and other ground troops to disrupt or destroy enemy installations, light artillery, and reserves which are most dangerous to a successful landing.

(2) In order to provide immediate assistance to the leading troops ashore, tank units should be attached initially to the combat teams at the rate of not less than one platoon to each. However, as soon as the advance from the beach has progressed sufficiently to gain freedom of maneuver, tank units should revert to control of higher commanders in order to permit mass employment.

■ 217. METHODS OF LANDING.—When amphibian tanks are not available, special self-propelled tank lighters able to accompany fast landing boats are the best means for landing tanks.

The tanks are driven ashore rapidly under their own power as soon as the lighters are beached. Tanks may be landed from small shallow draft lighters towed by motor launches. They may also be landed from 50-foot standard motor launches, with boat rig A and ramp. However, this method is much less desirable since it requires considerable time for landing the tanks, necessitates accomplishment under cover of other troops, and prevents the tanks from being available for combat during the critical period when their assistance would be most valuable.

■ 218. TIME OF LANDING.—Tanks should be landed with the leading troops in order to be able to provide immediate assistance for the initial advance. If amphibian armored vehicles or self-propelled tank lighters are available and landing conditions favorable, tanks are assigned to leading waves. When practicable tank weapons supplement the fire of boat guns. When towed lighters or standard boats are used or when landing conditions are uncertain, tank units should be in the second or succeeding waves.

■ 219. ORGANIZATION FOR LANDING.—*a.* Initially, boats or lighters transporting a tank platoon are organized into a separate boat division which normally operates as a unit. Individual tank boats or lighters may later be assigned to boat divisions transporting rifle units, if speed and type of boats, landing conditions, routes of advance, proposed employment, or similar considerations make such action desirable or necessary.

b. Boats and lighters transporting tanks are included in the boat assignment table and landing diagram of the boat group transporting the combat team which the tanks are assigned (see pars. 106 and 107).

■ 220. DEBARKATION OF TANKS AND LIGHTERS.—Debarkation of tanks is facilitated if they are stowed in several holds. Prior to the hours set for lowering tank boats or lighters, tanks are run under the hatches, slings hooked on, gasoline tanks filled, engines tested, and the tanks made ready for action.

■ 221. LANDING.—For tanks transported on boats or lighters, engines are started when well offshore, and all preparations are made for landing with the maximum possible speed.

SECTION IV
ENGINEER UNITS

■ 222. ENGINEERS WITH LANDING FORCES.—*a.* Because of the great need for engineer troops in landing operations, each combat team will comprise a unit of combat engineers ordinarily from divisional or similar engineer unit. The engineer component of the shore parties should be provided preferably from other than division engineer organizations.

b. For detailed discussion of the function of engineers in support of landing operations, see section VI, chapter 10, and FM 5–5.

SECTION V
CHEMICALS

■ 223. CHEMICAL AGENTS.—Chemical agents of all classes may be used or encountered in landing operations.

■ 224. EMPLOYMENT.—*a.* Persistent agents are not laid on any area which may later be necessary to the landing force for its operation. Subject to these restrictions, aircraft using chemicals may be employed before, during, and after the ship-to-shore movement of troops for such tasks as—

(1) Denial of airdromes and landing fields to the enemy.

(2) Silencing of shore batteries, particularly large caliber guns, mortars, and antiaircraft batteries.

(3) Extension of deep supporting fires from ship guns by bombing and spraying areas known to be occupied by the enemy.

(4) Attacks against enemy reserves.

(5) Denial to the enemy of bridges, fords, passes, roads, and critical areas.

(6) Production of casualties, and the denial of areas to the enemy by firing dry brush, canefields, and grass with incendiary bombs.

b. If chemical projectiles are available for naval guns, nonpersistent tear and irritant smoke shells may be employed at the beginning of a bombardment for harassment of personnel. Persistent agents may be used to advantage against large caliber, coast artillery gun positions, and isolated areas not needed later for the operation of the landing force.

■ 225. PROTECTION.—*a. Individual.*—(1) Employment of all types of chemicals by the defender is particularly applicable

in a landing operation. This employment may include spraying of transports and small boats, bombing with white phosphorus; releasing clouds from the shoreline against landing boats; contamination of beaches, islands, peninsulas, and adjacent waters, and interior areas by a persistent agent; and employment of all types of agents against the beachhead following a successful landing.

(2) Protective measures must receive consideration in the planning of any ship-to-shore movement. Gas masks are issued to all personnel and protective clothing, gloves, and shoes should be provided for those who are most likely to be exposed to liquid spray and to those detailed for decontamination work.

b. Collective.—In addition to individual protection, measures must be taken for group or collective protection. These measures include reconnaissance, planning the scheme of maneuver to avoid chemicals, general organization for protection, special protection of men and matériel in boats, and decontamination of beaches and routes inland. (See FM 21–40.)

■ 226. RECONNAISSANCE.—Effort is made to ascertain by preliminary reconnaissance the enemy's utilization of chemicals so that the most effective protective measures may be initiated in advance or the contaminated areas avoided.

■ 227. SCHEME OF MANEUVER.—In planning the scheme of maneuver effort is 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 are safest; conversely, protected beaches, wooded areas, ravines, hollows, and defiles are most favorable for the effective use of chemicals by the defender.

■ 228. GENERAL ORGANIZATION.—Officers and noncommissioned officers trained in chemical warfare take charge of chemical warfare protective matériel and give technical advice. Gas sentries are posted whenever there is likelihood of a chemical attack. Standing orders covering procedure for protection against chemical attacks are issued. Alarm systems are installed. Materials for decontamination are kept available for use in all ships and boats, and instructions

for their use are disseminated to all concerned. Provision is made for prompt treatment of gas casualties.

■ 229. Protection of Men and Matériel in Boats.—Protective measures against chemical attacks for men and matériel in small boats include protective covering for boats, warning of attack by gas sentries, antiaircraft fire, and decontamination means. Close-fitting tarpaulins of oilcloth or canvas are included in the equipment of each boat to protect the occupants from liquid spray. When possible, this covering is rolled up with one edge made fast behind the boat gunners so that it can be spread quickly to the rear over the heads of the troops. All equipment and munitions not likely to be used until the boat reaches the beach are covered with separate mustardproof coverings. Snug-fitting canvas tarpaulins while not mustardproof offer considerable protection. All food not in airtight containers is subject to contamination. At least one gas sentry is detailed in each boat to watch for and give warning of a chemical attack, and sufficient men are assigned to adjust the tarpaulin covering on short notice. Each boat is supplied with a quantity of decontamination material and personnel instructed in its use. Decontamination measures must not be allowed to interfere with the operation of boats or the fire of weapons.

■ 230. Decontamination of Beaches and Routes Inland.—When small boats approach the beach, effort is made to avoid pools or globules of oily liquid vesicant discovered floating on the surface of the water. If it is necessary to land through contaminated water, the best protection is afforded by shallow draft landing boats which permit the troops to disembark directly onto the beach. Material such as chloride of lime must be provided for decontamination of vital positions on the beach, and men of the shore parties should be equipped with protective clothing to do this work. Although decontamination of large areas may be impracticable, decontamination of landing points, areas necessary for activities on the beach, and roads or trails leading inland to ungassed areas must be effected without delay. Large signs should be brought ashore to warn personnel of gassed areas and to indicate alternate routes. As soon as practicable after the landing, decontamination stations should be improvised for the purification of clothing and equipment.

CHAPTER 10

ADMINISTRATION

SECTION I

GENERAL

■ 231. ADMINISTRATIVE PLANS.—*a.* Administrative plans are prepared in detail prior to embarkation. Inadequate administrative measures and a consequent breakdown of the supply, evacuation, and replacement systems may result in failure of the operation regardless of initial tactical success.

b. Administrative and tactical plans are interdependent and must be developed concurrently.

■ 232. BASIC DECISIONS.—Basic administrative decisions are made as early as possible. All agencies require considerable time to prepare and execute plans for the procurement and assembly of ships, personnel, boats, supplies, and matériel. These decisions include—

a. Strength and composition of service units in the landing force.

b. Personnel replacements.

c. Matériel of the landing force.

d. Supplies to be taken in the initial movements.

e. Level of supplies to be maintained.

f. Naval personnel and supplies to be provided.

■ 233. SUPPLIES.—*a.* The amount of supplies taken initially with the landing force depends upon—

(1) Mission, strength, and composition of the force.

(2) Supplies required en route and the amount of beach reserves and landing force reserves to be established and maintained.

(3) Available ocean transportation, the distance from source of supply, and the period of time that is to elapse before another convoy sails.

(4) Security of ocean transports from hostile submarine and air attack.

(5) Climate and season of the year.

(6) Desirability of limiting the size of the initial convoy.

(7) Supplies available for exploitation in the theater of operations.

(8) Expected resistance.

b. The estimate of supply requirements is liberal, and must include an allowance for possible cargo losses en route.

■ 234. MOVEMENT TO PORT OF EMBARKATION.—*a.* The concentration of the Army expeditionary force is arranged by the War Department at a time which permits the necessary reorganization, reequipment, and training. The movement from the concentration center to the port of embarkation is in general the same as other troop movements.

b. At each port of embarkation an embarkation center is established under control of the commander of the port of embarkation. Here troops are received, equipped, inspected, and cared for while awaiting embarkation.

SECTION II

EMBARKATION

■ 235. PLANS.—*a. General.*—Army embarkation plans include—

(1) Organization and equipment of Army forces.

(2) Date on which troops commence loading.

(3) Requisitioning of supplies for delivery at port as requested by the Navy.

(4) Subdivision of the Army force for assignment to transports in accordance with the tactical plan.

(5) Embarkation tables for troops and loading tables for cargo accompanying troops in accordance with the tactical plans, the Navy assignment of ships to meet Army grouping of troops, and unloading requirements.

b. Sequence.—Plans for embarkation are usually developed in this sequence:

(1) Determination of shipping requirements.

(2) Allotment of transports.

(3) Organization of embarkation groups and transport divisions.

(4) Assignment of troops and matériel to each transport.

■ 236. SHIPPING REQUIREMENTS.—*a.* After the basic decisions have been made, a landing force personnel and tonnage table (see *b* below) is prepared and submitted to the appropriate naval commander. This table is the basis for the allotment of transports by the Navy and the preparation by the Army of embarkation plans and other tables.

b. A model form for landing force personnel and tonnage table is shown on page 144.

c. Similar data are prepared by the Navy showing the requirements for naval personnel and matériel specially provided for the operation, including subsistence for the landing force while aboard ship, and the types, dimensions, and weights of boats for the landing force.

■ 237. ALLOCATION OF TRANSPORTS.—*a.* The commander of the Navy transport group furnishes to the commander of the Army landing force complete information concerning each transport allocated. This information includes the rated troop and cargo capacity; blueprints of the vessel, including each hold; plans for conversion, speed, draft, and capacity of booms, as well as other characteristics affecting embarkation.

b. Special ships may be required for hospitalization, ammunition, and gasoline.

■ 238. TRANSPORT GROUP.—Transports or other noncombatant vessels provided by the Navy are organized into a transport group for the embarkation of troops and matériel of the landing force. A transport group is divided into transport divisions of two or more vessels each.

■ 239. EMBARKATION GROUPS AND TRANSPORT DIVISIONS.—*a.* The landing force is divided into embarkation groups consisting of troops and matériel embarked upon the vessels of a transport division.

b. The organization of embarkation groups and of transport divisions is interdependent, and is governed primarily by the following considerations:

(1) The organization must provide for the accomplishment of the various tasks required under the preferred plan and alternate plans.

(2) The organization of each embarkation group should be such that the group will be capable of being detached on an independent mission involving combat on shore. Each group should carry an appropriate amount of supplies.

(3) Troops and matériel are distributed among the embarkation groups so that the detachment of any group does not deprive the remainder of the force of an unduly large percentage of any one arm, service, or type of matériel.

(4) Each embarkation group is preferably based upon combat teams. A part of the aircraft, tanks, and other landing force troops may also be included in each group.

(5) The normal chain of command is interrupted as little as possible.

(6) Artillery and other auxiliary troops which normally operate on shore under their own commanders are subdivided for embarkation and attached to combat teams or divisions.

(7) The facilities for loading and stowing heavy matériel may be a determining factor in the selection of vessels upon which certain units will be embarked.

(8) The organization of embarkation groups should permit economical loading. For example, aircraft may be distributed among a large number of vessels.

(9) The number of vessels in each transport division should permit effective control. Three to five ships in each division are preferred.

(10) It may be desirable to embark reserve units and reserve supplies upon separate ships in order that these ships may be kept out of the landing area until they are needed. Separate transport divisions may be organized for this purpose.

(11) Each embarkation group should use all the troop and cargo capacity of the transport division. It is usually possible to meet this requirement without sacrificing tactical considerations because there remains, after the preliminary assignment of combat teams to embarkation groups, a pool of unassigned troops and supplies. These troops and supplies can be assigned as necessary to utilize the space available to

LANDING FORCE PERSONNEL AND TONNAGE TABLE

Unit	Personnel			Matériel						
				Hold cargo			Deck cargo		Total cargo	
	Officers	Enlisted men	Total	General cargo and vehicles (cubic feet)	High explosives (cubic feet)	Troop space cargo (cubic feet)	Inflammables (cubic feet)	Uncrated airplanes etc. (cubic feet)	Cubic feet	Long tons
1	2	3	4	5	6	7	8	9	10	11
Special troops:										
1st Inf										
Etc										
1st FA										
Etc										
1st Bn Engrs										
1st Med Bn										
Etc										
Etc										
Airplanes										
Landing force supplies:										
Etc										
Total										

NOTE.—1. It is assumed that prior to the preparation of this table the basic decisions 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, tonnage tables are prepared from which are computed the cargo requirements for each organization.

2. In the table, crated airplanes 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).

3. Tonnage figures under total cargo, long tons (column 11) represent actual weight of matériel, and do not include weight of personnel.

4. 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 inflammable (column 8), etc.

each group. A number of vessels have certain compartments which may be utilized for either troops or cargo; thus a degree of flexibility is afforded in working out the detailed assignments.

(12) A part of army or corps special troops may be organized into a separate embarkation group.

c. The organization of embarkation groups and transport divisions is worked out jointly by representatives of the landing force commander and of the naval commander concerned. The factors governing embarkation are to some extent conflicting; compromises are usually necessary.

d. Each transport division is assigned a number such as Transport Division No. 1.

e. Embarkation groups are designated by a number followed by the name of the major troop organization such as Embarkation Group No. 1 (1st Infantry, reinforced). The appropriate Army commander in the group is responsible for seeing that troops and matériel are embarked in accordance with the approved plan. He embarks on the flagship of the transport division.

f. A model form for showing the detailed organization of embarkation groups and transport divisions, together with the personnel and cargo requirements of each embarkation group, is shown on page 148.

■ 240. ASSIGNMENT TO TRANSPORTS.—Troops and matériel are assigned to individual ships in accordance with the following fundamentals:

a. Embarkation must permit debarkation and operations on shore in accordance with the tactical plans.

b. Integrity of tactical units, such as battalions of infantry and batteries of artillery, should be maintained.

c. Each ship should carry a proportionate part of all arms and services and proper reserve supplies.

d. Facilities of each ship for handling and stowing heavy matériel assigned must be adequate.

■ 241. EMBARKATION TABLE.—*a.* When troops and matériel have been assigned to each transport, this information is published in the form of an embarkation table as an annex to the embarkation orders of the landing force or lower units. A model embarkation table is shown on page 150.

b. The same blank forms can be used in making out the landing force personnel and tonnage table, the organization of embarkation groups and transport divisions table, and the embarkation table.

SECTION III

TRANSPORT LOADING

■ 242. RESPONSIBILITY.—*a.* The Army is responsible for loading Army personnel, equipment, and supplies subject to Navy approval as to stability of vessels. This function is accomplished through the embarkation service.

b. The maintenance of troops aboard transport is the responsibility of the Navy.

c. The senior commander of the organizations embarked on each transport is the commanding officer of troops.

■ 243. TRANSPORT QUARTERMASTER.—*a.* An Army officer is detailed as transport quartermaster for each vessel carrying organizations or matériel of the landing force. The transport quartermaster confers with the ship's officers, and familiarizes himself with the arrangement and facilities of the transport.

b. The commanding officer of troops is the immediate superior of the transport quartermaster. The transport quartermaster may be assigned by the War Department, the commander of the port of embarkation, or by the landing force commander from one of the organizations to be embarked on the transport.

c. Assistants to the transport quartermaster may include an assistant transport quartermaster, at least one noncommissioned officer for each hatch, and if available an additional noncommissioned officer for each hold.

■ 244. LOADING.—*a. Commercial.*—Commercial loading utilizes ship space to maximum efficiency. It is applicable in movements between established and well-secured ports. Troops loaded by this method are not available for combat until they have landed and the equipment and supplies have been issued.

b. Unit.—(1) Unit loading gives primary consideration to the readiness of troops and matériel for combat immediately upon landing rather than to the most economical utiliza-

ORGANIZATION OF EMBARKATION GROUPS AND TRANSPORT DIVISIONS

Unit	Personnel			Matériel						
				Hold cargo			Deck cargo		Total cargo	
	Officers	Enlisted men	Total	General cargo and vehicles (cubic feet)	High explosives (cubic feet)	Troop space cargo (cubic feet)	Inflammables (cubic feet)	Uncrated planes etc. (cubic feet)	Cubic feet	Long tons
1	2	3	4	5	6	7	8	9	10	11
Embarkation Group No. 1 (1st Inf, rein.), Col. D, 1st Inf										
Transport Division No. 1, Capt. A, U. S. N										
Transports: *S. S. President Smith, S. S. Lake James, S. S. Ruth Baker*										
1st Inf										
3d Bn, 3d Inf										
1st Bn, 1st FA										
Etc., etc										
Co A, 1st Engr Bn										
1st Bn, 1st Med Regt										

1st Obsn. Sq										
Airplanes										
Landing force supplies										
Total										
Embarkation Group No. 2 (2d Inf., rein.) Col. E, 2d Inf										
Transport Division No. 2, Capt. G, U. S. N										
Transports: *S. S.* ————, *S. S.* ————, *S. S.* ————										
2d Inf										
Etc., etc										

NOTE.—The notes contained in landing force personnel and tonnage table (see par. 236*b*) are equally applicable to this table. Landing force supplies are allotted to embarkation groups in accordance with cargo capacity available.

EMBARKATION TABLE

Transport Division No. 1, Capt. A, U. S. N.

Embarkation Group No. 1 (1st Inf, rein.) Col. D, 1st Inf.

Unit	Personnel			Matériel						
				Hold cargo			Deck cargo		Total cargo	
	Officers	Enlisted men	Total	General cargo and vehicles (cubic feet)	High explosives (cubic feet)	Troop space cargo (cubic feet)	Inflammables	Uncrated airplanes, etc. (cubic feet)	Cubic feet	Long tons
1	2	3	4	5	6	7	8	9	10	11
S. S. *President Smith*, Capt M, U. S. N., Lt Col R, 1st Inf, commander of troops										
Hq and Hq Co, 1st Inf										
1st Bn, 1st Inf										
1st Bn, 1st FA (less Btrys B and C)										
Etc										
1st Plat, Co A, 1st Engr Bn										
Det, 1st Med Bn										
Etc										
1st Obsn Sq										
Aircraft										
Airplanes										

Etc.										
Supplies 1st Inf, rein										
Total *S. S. President Smith*										
S. S. *Lake Clare*, Capt U, U. S. N., Lt Col X, 1st FA, commander of troops										
Etc. etc.										

NOTE.—1. The notes to landing force personnel and tonnage table (see par. 236b) are applicable to this table. The following decisions are necessary: First, amount of supplies to be issued to organizations prior to embarkation; second, equipment and supplies to be carried, including initial and beach reserves.

2. Landing force supplies to be carried by the embarkation group are assigned to ships in accordance with space available.

3. Aggregates for the embarkation group should be the same as shown in paragraph 239*f*. In the table all classes of equipment and supplies for each organization are included in the cargo figures for the organization.

4. 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.

tion of ship space. The readiness of troops for combat depends upon the degree to which organizations are unit loaded. For types of unit loading (combat, organizational, and convoy units), see section I, chapter 1.

(2) Combat unit loading is essential to units which will probably be required for combat immediately upon landing. The minimum requirements for combat efficiency are as many combat teams loaded one or more per ship as there are beaches to be assaulted.

(3) To secure the best use of ship's space and at the same time provide the combat unit loading required, combinations of the different methods of loading may be made on the same transport. Thus the same transport may contain a combat team, combat team unit loaded; the infantry regimental headquarters; and possibly other elements, organizational unit loaded; and freight, equipment, and supplies, together with other units designated to debark later in the operation, convoy unit loaded.

c. Plans.—(1) A consolidated tonnage table is prepared for each transport showing the organizations and matériel to be embarked on that transport. Based on these tables and data and drawings furnished by the transport commander a loading plan is prepared for each transport showing what matériel will be loaded in each hold, magazine, and other space on the transport available for cargo, including cargo to be carried as a deck load. Model forms for ship loading plan and consolidated tonnage table are shown on pages 154 and 156.

(2) Loading plans must insure that troops, equipment, and supplies can be debarked in their proper sequence. Therefore, the preparation of these plans must be based on command decisions and directives prescribing the tactical and logistical plan of landing and operations ashore.

(3) Loading plans are prepared under the direction of the transport commander. The commanding officers of troops, the transport quartermaster, or other officers of the landing force may assist in the preparation of these plans.

■ 245. STOWAGE.—*a. Plans.*—After the loading plan for a transport has been completed, a stowage plan is prepared for each hold, magazine, and other compartments used for cargo. The data are taken from the consolidated tonnage tables supplemented by detailed information contained in the ton-

nage tables for the organizations to be embarked. These plans indicate in detail how the items of cargo will be stowed in the space available. They should include—

(1) A drawing showing the hold and the arrangement of cargo in it.

(2) A table showing the items to be loaded and the organization to which they belong.

b. Priority.—(1) Matériel should be stowed as follows:

(*a*) Highest priority under the hatches and in space immediately accessible to them, lower priority outward from them.

(*b*) By layers with first priority on top.

(*c*) In groups separated by vertical partitions radiating from the hatch.

(*d*) In one or more of these methods.

(2) Stowage should begin in the wings and be completed near the hatches, and the order of loading shown in the stowage table should so provide.

c. Vehicles.—(1) In preparing a stowage plan for vehicles or aircraft, a diagram of the hold or deck may be drawn to scale showing hatch openings, stanchions, and obstructions. Vehicle patterns are prepared to this scale, and the patterns moved about on the diagram to secure the most economical stowage consistent with safety and other considerations.

(2) To prevent shifting at sea, vehicles are loaded with axles across ship, and are properly wheel-chocked or secured to stanchions or ringbolts.

(3) It is usually impracticable to stow vehicles over or under other matériel without additional construction. Where vehicles must be stowed in holds, much space will be lost unless new decks are constructed to permit stowage in several layers.

■ 246. General Considerations.—*a. Equipment and supplies are stowed so as to permit debarkation in the order required by tactical plans.*

b. The matériel of each organization is kept together, if practicable, and loaded in a part of the ship convenient to that organization.

c. Organization equipment should bear an identifying insignia indicating the company, battery, or squadron to which each article belongs. Each vehicle should be marked in chalk

SHIP LOADING PLAN

Data on cargo space				Data on matériel to be loaded					
Hold; compartments; other locations	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	6	7	8	9	10
Magazine B-6	xx	xx	xx	5	Btry A, 1st FA	H. E. ammunition	xx		xx
					Etc	do	xx		xx
					Total magazine B-6		xx		xx
Etc					Etc				
Compt No. 1, 3d deck.	xx	xx	xx	3	1st Bn, 1st Inf	Orgn equipment and supplies.	xx	xx	xx
				1	Hq and Hq Co, 1st Inf	Vehicles	xx	xx	xx
					Total Compt No. 1, 3d deck.		xx	xx	xx

Etc					Etc				
Hold No. 1	xx	xx	xx	11	1st Inf	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	1st Obsn Sq	Airplanes	xx	xx	xx
					Total main deck, aft		xx	xx	xx
Etc					Etc				
					Total deck cargo		xx	xx	xx

NOTE.—1. This table is compiled data contained in the consolidated tonnage table, supplemented as necessary by tonnage tables for units to be embarked. Provision should be made for special naval supplies which are to be loaded.

2. Item numbers refer to item numbers in the consolidated tonnage table.

3. The number of square feet (columns 3 and 9) need be entered only for vehicles, uncrated airplanes, etc., which require a definite area of deck space.

4. 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.

CONSOLIDATED TONNAGE TABLE

Item No.	Organization	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 airplanes, etc.			
		Square feet	Cubic feet						Square feet	Cubic feet	Cubic feet	Long tons
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Hq and Hq Co 1st Inf											
2	1st Bn 1st Inf											
3	Hq & Hq Btry 1st FA											
4	Btry A 1st FA											
5	1st Plat, Co A 1st Engrs Bn											
6	Det 1st Bn 1st Med Regt											
7	Etc											
8	Etc											
9	Airplanes											
10	Supply officer, 1st Inf											
11	Camp equipment											
12	Special equipment											
13	Ammunition											
14	Rations											

15	Gas and oil												
16	Etc												
17	Landing-force supplies												
18	Ammunition												
19	Rations												
20	Gas and oil												
21	Etc												
22	Etc												

NOTE.—1. In the preparation of this table, it is assumed that organizations carry supplies for a limited period, and that the regimental supply officer carries supplies for an additional period for all organizations embarked.

2. This table is compiled from the data contained in organization tonnage table prepared for each unit embarked.

with the number of the space and with the hold number it is to occupy. Other matériel should be marked with its priority and hold number as indicated on the stowage plans.

d. Dunnage is material used to prevent cargo from shifting and chafing and to fill in broken stowage. Lumber and cordwood are generally used. The percentage of dunnage to the total cargo varies, but 10 percent is a fair average.

e. Loading and stowage plans are modified to show all changes made during the actual loading.

Section IV

SYSTEM OF SUPPLY

■ 247. General.—In a landing operation the system of supply given in FM 100–10 requires some modification until a beachhead is established. For example, motor transportation is very limited in the early phase of the operation; animal transportation, when used, cannot be landed until the beach is free from effective small-arms fire; supplies are delivered by boat and require rehandling at the beach often under difficult conditions; and carrying parties must be used to advance supplies inland until other means of transportation are available.

■ 248. Debarkation of Supplies.—*a.* The amount of supplies carried by the individual on landing is limited so that his mobility is not unduly impaired. When combat near the beach is anticipated, assault combat teams land with stripped packs, extra bandoleers of ammunition, one or more individual reserve ration, and water, depending on the water situation ashore. Extra water is carried in each boat. Boats of later waves of the assault combat teams carry additional ammunition, rations, and water.

b. Succeeding combat teams land with full equipment, extra ammunition, and rations. These supplies are unloaded from the boats by the beach party and shore party personnel.

c. The landing schedule and other orders show in general terms priorities of landing of troops and supplies. These instructions are amplified on each transport by arranging a priority table as shown in model form below. The table includes all supplies, equipment, and rear echelon personnel not landed in accordance with debarkation schedules.

PRIORITY TABLE FOR LANDING SUPPLY AND EQUIPMENT AND REAR ECHELON PERSONNEL FROM S. S. "PRESIDENT SMITH"

Priority No.	Organization	Matériel	Where stowed	Personnel	Total boat spaces	Remarks
1	2	3	4	5	6	7
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

NOTE.—1. Supplies carried ashore with troops are not included in this table. Personnel (column 5) from rear echelons of organizations are included in determining number of boat spaces required.

2. 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 ____ gallons of water in containers which will be dumped at the beach.

3. All vehicles will carry normal loads.

d. Boats carrying only supplies are loaded to capacity. The transport quartermaster adjusts the priority table as necessary. For example, space available in boats carrying vehicles is used for rations, ammunition, or other general cargo having a later priority than the vehicles.

■ 249. SUPPLY POINTS.—*a.* Dumps of various classes of supplies such as water, rations, ammunition, gasoline and oil, signal, medical, and engineer, are established near the beach. Supplies arriving by boat are moved directly to dumps. The locations are tentatively selected prior to the landing. Final determination is made after reconnaissance by advance supply personnel and approval by the shore party commander. The selection of dump sites is affected by convenience to boat landings, cover from enemy observation and fire, traffic routes inland, and facilities for handling supplies and trains. The locations selected should not be such as to create concentrated targets for air attacks or lead to congestion of traffic.

b. As the advance progresses, selected dumps near the beach become division supply points, the supplies in others are exhausted, and the division establishes distributing points well forward from which units are served.

c. Base depots are established as soon as the advance justifies and they take over supplies remaining at dumps near the beach. They function as Army depots until such time as advance depots are required. Reserves in base depots are maintained at a level prescribed in the administrative plan.

d. When an established port is secured as a base, administration, supply, and evacuation present those problems common to any oversea theater of operations.

■ 250. SUPPLY ECHELONS.—Supplies carried by the landing force consist of individual reserves, initial reserves, beach reserves, and landing force reserves.

a. Individual reserves are rations and ammunition for 1 or 2 days issued to individuals before debarkation.

b. Initial reserves are rations, ammunition, and other supplies required for 3 to 5 days for all troops of a battalion combat team. These supplies are segregated prior to loading and stowed so that they are immediately available to follow assault troops ashore.

c. Beach reserves are supplies of all classes required to insure continuity of supply for a period of 5 to 25 days in the event of temporary interruptions by weather or hostile operation.

d. Landing force reserves are those necessary for between 15 and 90 days of supply. They may be loaded at lower levels in the ships than other supplies and in the most economical manner. They are well distributed among the ships of the convoy.

■ 251. INITIAL RESERVES.—*a.* It is highly important that initial reserves are landed as soon as possible after the first landing. These supplies are landed generally on the same beaches on which the troops are landed. The supply sections of companies and battalions land with the initial reserves.

b. Initial reserves include the loads of unit trains and such engineer, signal, and medical supplies as are brought ashore by the shore party. Unit vehicles are debarked loaded or with loads in the same boat. Unit trains should be debarked early, particularly where a deep advance is contemplated. When it is impracticable to debark unit trains in time to issue class I supplies to troops, attachments of regimental service personnel are landed. Carrying parties are organized to transport rations between the beach and the troops.

■ 252. BEACH RESERVES.—Beach reserves of all classes of supply for troops ashore are landed and placed in dumps on the beach in accordance with the priority schedule and the development of the situation. The bulk of these supplies, particularly rations, grain, gasoline and oil, water, and ammunition should be debarked within 48 hours after the first landing. Representatives of the various services in the division and service personnel land with or prior to these supplies. Supplies already on the beach in excess of those required by units are placed in these dumps. From the beach reserves daily requirements of troops ashore are filled. The beach reserves are maintained at a prescribed level from supplies on transports until more permanent installations are established.

■ 253. LANDING FORCE RESERVES.—When the depth of the advance permits, the landing force organizes the beach area into a temporary base and establishes the landing force re-

serves. These reserves consist of all classes of supplies accompanying the expedition. The amount of supplies in lower echelons determines the time limit within which the supplies are landed and made available. Shipping considerations usually require early clearance of transports. Ships carrying the landing force reserves remain usually well out at sea during initial landing operations. Supplies are landed and stored in base depots. Depots should have ample facilities for landing, sorting, storing, and distributing supplies. Danger from air attack requires that supplies be dispersed.

■ 254. WATER SUPPLY.—*a.* The Navy is responsible for the procurement of water and its delivery at the beach until a supply from land sources is available. The landing force is responsible for the reception, storage, and distribution of this water ashore, and for the location and development of water from land sources as rapidly as possible.

b. (1) Knowledge of conditions with respect to water supply in localities where operations are contemplated is a basic item of military intelligence and is included in any study of the locality.

(2) All plans and estimates relative to water include an ample safety factor to provide against enemy interference, leakage, evaporation, loss due to imperfect water distribution, and other emergencies.

c. The amount of water required varies materially with the climate and the training of 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 with a minimum of from 1 to 2 gallons daily. Animals require a minimum of 10 gallons per day. Over more extended periods the requirements are much larger.

d. A considerable amount of water may be made available from the distilling system of 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 are required.

e. (1) Boats of the second and subsequent waves should carry a minimum of 2 gallons per man. Thereafter each boat should carry water in containers to build up a reserve of water ashore.

(2) As soon as the situation permits, water in bulk is trans-

ported 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.

f. The most practicable tank is the standard canvas water storage basin as issued. A necessary part of the equipment of storage tanks is an ample supply of hose or pipes with pumps for the transfer of water to smaller containers.

g. If water in sufficient quantity is not available ashore in surface streams, lakes, or wells, it may be necessary to sink wells. Preliminary intelligence studies should determine the best type.

h. Portable distilling apparatus may be used, but the operation of distilling salt water requires the transportation of a large amount of fuel.

■ 255. CAPTURED AND SALVAGED SUPPLIES.—The importance of captured and salvaged supplies increases with the distance of the theater of operations from home bases. The collection, repair, and use of such supplies result in a saving of time and cargo space.

SECTION V

MILITARY POLICE

■ 256. GENERAL.—Detachments of military police 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.

■ 257. PRISONERS OF WAR.—*a.* The probable number of prisoners of war to be cared for is estimated and included in plans for the operations.

b. 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 at collecting points until evacuated to designated ships or prisoner of war enclosures.

c. 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. Those locations must not interfere with other activi-

ties 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 collecting points. (See FM 30–15.)

d. Prisoners of war are assigned to such work as they are capable of performing consistent with the rules of land warfare.

■ 258. STRAGGLERS.—Collecting points are established initially in the vicinity of the beach. Stragglers are returned to their organizations as soon as practicable.

■ 259. CIVILIAN POPULATION.—It may be necessary as the operation progresses to arrange for the control or evacuation of civilians. Arrangements may have to be made for their shelter, rationing, and transportation. In the case of enemy nationals, close supervision of their activities is necessary.

■ 260. TRAFFIC.—*a.* Precaution is necessary to avoid congestion and maintain an orderly flow of traffic on the beaches and inland. Stragglers, prisoners, and wounded should be kept clear of the beach.

b. 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 are set up at the beach and along the routes of advance inland. Military police erect signs not otherwise provided for.

SECTION VI

ENGINEERS

■ 261. PLANS.—*a.* Prior to embarkation, the landing force engineer collects information relative to the area in which the landing operations will be conducted. This includes beaches, landing facilities, road nets, bridges, water supply, local facilities for procuring construction material, and possible landing fields. Based upon this information and administrative and tactical plans, missions are assigned the engineers and estimates drawn of the personnel and material required.

b. Detailed plans for the various landings will indicate the need for engineers at many or all of the landing beaches, requiring the distribution of engineers and engineer material

among the ships of the convoy. Engineer units may be attached to subdivisions of the landing force, and a large part of the engineering work may be planned and executed under commanders of subordinate units.

■ 262. UNITS.—A detachment of engineers with appropriate material is usually included in each shore party and landed with the first boat groups. The size and composition of these detachments depend upon the work contemplated at the beach concerned. Upon landing an early reconnaissance and estimate of engineer work required are initiated. The time schedule of the landing of succeeding engineer elements is determined by the nature and importance of the tasks to be accomplished. Debarkation and priority schedules covering the landing of additional engineer personnel and material should have sufficient flexibility to permit modification as a result of the reconnaissance and developments ashore.

■ 263. DUTIES.—*a*. The general administrative duties of engineers are stated in FM 100–10.

b. Duties particularly applicable in a landing operation include—

(1) Assistance to beach party in removal of underwater obstructions at the beach, construction and maintenance of improvised landings and temporary wharves, and in the landing of heavy material.

(2) 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.

(3) Demolition of enemy obstacles on shore.

(4) Creation in front of the beachhead line of a barrier of demolitions, mine fields, and other obstructions to protect landing operations from mechanized raids.

(5) Construction, shelter, and camouflage of important rear area establishments.

(6) Construction and maintenance of facilities for the reception, storage, and purification of water, the development of water supply ashore, and the organization and maintenance of water distributing points.

(7) Construction of landing fields for aviation.

(8) Furnishing technical assistance, and provision and distribution of tools and material for the construction of de-

fensive positions, artillery positions, and command and observation posts.

(9) Construction of bomb shelters.

(10) Operation of existing railways and other public utilities.

(11) Development of additional landing facilities.

c. Landing force engineer units are prepared in an emergency to be used as combat troops.

d. Civilian laborers and prisoners of war, as available and required, are used on engineering projects.

■ 264. MAPS.—*a.* Topographic maps as accurate and complete as the existing data permit are made available prior to embarkation for all units engaged in the operation, including units of the naval attack force. It is usually necessary to compile new maps. Sources of information are hydrographic charts, sailing directions, existing maps, airplane photographs, sketches, and intelligence reports.

b. Topographic maps should include sufficient sea area so that both the position of the firing ships and shore targets can be plotted thereon.

c. They should, if practicable, conform to uniform standard scales prescribed for the Army.

d. Hydrographic charts are seldom suitable for fire-control and operations maps because of the small scale and inadequate data relative to land areas. It is desirable to have new large scale hydrographic charts of the landing area published and issued to units concerned. Prior to publication 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 on each ship should be completed to show essential topographic features on the coast and in the interior.

e. Joint plans should provide for obtaining additional information by air and surface reconnaissance.

f. Panoramic sketches and photographs made by submarines and surface craft are valuable, and are reproduced and issued with land features identified.

g. While the compilation, reproduction, and distribution of maps and overlays are functions of the Corps of Engineers, air photography and the preparation and reproduction of small quantities of prints are a function of the Air Corps. The

quantity reproduction of air photographs is a function of the Corps of Engineers.

h. Additional maps, overprints, and overlays are provided for use as annexes to plans and orders so that they may be prepared in a form which is concise and readily understood.

■ 265. WHARVES AND LANDING FACILITIES.—*a.* The matériel of the landing force needed in the early phases of an operation can be landed on an open beach from special shallow draft lighters, and under favorable conditions from 50-foot motor launches equipped with boat rig A and ramp. Prompt measures should be taken however to provide wharves and landing facilities at selected beaches to facilitate the landing of all types of material, particularly very heavy articles, and to permit the use of boats and lighters not capable of landing on the beach.

b. In the initial stage of a landing operation, the construction of wharves and other facilities for landing material 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.

■ 266. ROADS AND TRAILS.—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 gravel or corduroy may be obtained on shore.

SECTION VII

MEDICAL SERVICE

■ 267. SCOPE.—This section outlines briefly the responsibilities and duties of the Army and Navy during a landing operation. For additional discussion, see FM 8–25.

■ 268. RESPONSIBILITY.—*a.* The Army is responsible for the medical service of its own forces during embarkation, landward of the high watermark in the landing operation areas, and for debarkation and after debarkation at home ports.

b. The Navy is responsible for the medical service of all Army personnel between ports of embarkation and high

watermark on oversea landing beaches, including evacuation and hospitalization afloat. This includes furnishing hospital ships, ambulance boats, and other equipment and necessary supplies.

c. Army battle casualties are hospitalized and evacuated by the Navy until the establishment of Army hospitalization ashore.

■ 269. PLANNING.—Based on a joint medical estimate, a joint medical plan is prepared by the Army force and the Navy force commanders covering embarkation, movement overseas, and the landing phase. Similar plans are prepared by subordinate commanders.

■ 270. ARMY.—*a.* During the first phase of the landing, battalion and regimental medical detachments go ashore with their organizations and render on shore the type of service they are organized to furnish. They collect, treat, and sort at unit aid stations the casualties within the zone of their unit. The casualties of the leading combat team are treated and left near or on the beach for evacuation to ship. As the battalions advance inland, aid stations follow in support. Elements of collecting companies are landed early in order to permit aid stations to follow their battalions closely. These elements move forward to locate and collect casualties from advance and aid stations. The wounded are brought to the vicinity of the beach. Casualties ready for evacuation from the beach are assembled as designated by the shore party commander, with due regard to suitable boat landings, cover from enemy fire, location of the aid or collecting stations, and natural drift of the wounded. One or more such locations may be designated for each beach. The shore party commander and the beachmaster arrange for the movement of casualties to boats through their respective medical officers.

b. By the end of the first phase, it is desirable that part of the medical battalion be ashore to operate collecting stations and provide ambulance service. During or following the second phase of the landing, units of the landing force medical service are landed and take over activities near the beach. This allows the division medical battalion to move forward in support of the action of the division. During the third phase, evacuation and surgical hospitals and other

medical units of low landing priority may be established in suitable locations to care for casualties on shore.

■ 271. NAVY.—*a.* 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 medical plan.

b. When specially designed ambulance boats or other boats converted for exclusive use as ambulance boats are provided, they should be identified in accordance with the Geneva Convention. The boats are not used for the transportation of combat personnel or matériel, but may transport medical personnel and supplies from ship to shore.

c. Landing boats may be designated as ambulance boats after landing combat elements. They are provided with medical personnel and equipment from hospital ships or transports for the emergency treatment of casualties en route and should be such that litter cases can be transported on them. These boats will not fly the Red Cross flag.

d. The medical plan designates the ships to which each class of casualty is to be evacuated. So far as practicable, wounded are sorted and loaded into ambulance boats accordingly and the boats dispatched directly to the designated ships.

e. If the number of boats available is so limited that support and reserve battalions have to land in the second or later trips, the use of landing boats solely 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 another load; the secondary evacuation to the designated ships may be undertaken later. It is highly desirable to have ambulance boats provided for the evacuation of the seriously wounded direct to hospital ships. Provision should be made on each ship for hoisting wounded aboard at a location out of sight and not near gangways used by debarking troops.

f. The senior Navy medical officer is kept informed of the number of casualties to be evacuated from each beach in order that he may make needed changes in previously prepared plans for evacuation as may be necessary.

g. 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 Convention 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 provided with medical personnel and medical facilities to supplement the hospital ships. Army medical personnel and equipment from units of low landing priority will usually be utilized initially on auxiliary hospital ships and on transports in caring for casualties.

h. 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 widely separated. Each joint attack force conducting a detached or isolated landing should include the ships necessary for the hospitalization of all classes of casualties.

CHAPTER 11

SPECIAL TRAINING FOR LANDING OPERATIONS

SECTION I

GENERAL

■ 272. SCOPE.—*a.* This chapter outlines the special training required to prepare a landing force for operations on a hostile shore. It is assumed that the landing force is trained for ordinary land operations. For planning and execution of landing operations, see sections VI and VII, chapter 4.

b. Training programs and schedules are omitted as they are prepared for a specific landing operation, and are based on actual conditions such as mission, transport and boat facilities, characteristics of the landing area and of the beachhead terrain.

c. The discussion of training contained in this chapter is applicable in the formulation of plans for peacetime joint exercises.

■ 273. JOINT TRAINING.—*a.* Joint training of the landing force and the naval attack force is necessary to develop proficiency and teamwork and to establish mutual confidence.

b. The landing force should be concentrated for specialized training at or near a suitable landing beach, and should be furnished all necessary Navy equipment and assistance for the training. During this period embarkation procedure and especially all landing operations projected should be rehearsed in as realistic a manner as facilities permit. Operating joint staffs for the exercise should work together during this period.

c. Joint training should be held in an area where the water conditions and beach terrain are similar to those of the proposed landing area.

■ 274. BASIC TRAINING UNITS.—The landing group and the corresponding boat group may be considered as the basic joint training units. The landing group, composed of the battalion combat team, naval artillery liaison party, and the beach and shore parties, should be thoroughly trained with its boat group by means of repeated practice landings.

■ 275. GENERAL TRAINING OBJECTIVES.—The general training objectives are the development of—

a. Initiative on the part of individuals and leaders of small groups.

b. Teamwork within squads, platoons, companies, battalion combat teams, and landing groups.

c. Cooperation between Army and Navy components. This includes coordinating the activities of landing groups and boat groups, naval gunfire, field artillery and air support, naval gunfire and the advance of assault units, activities of Army and Navy air components, protective fires of Army and Navy antiaircraft, and Army and Navy signal communication facilities and procedure.

d. Speed in execution.

■ 276. TRAINING DURING MOVEMENT OVERSEAS.—During the movement overseas it may be practicable to continue some of the training outlined in section II, for example, physical drill, machine-gun drill, forming by boat loads and moving by prescribed routes to gangways with and without blackout conditions on the transport, and schools of instruction for personnel.

SECTION II

TRAINING PRIOR TO EMBARKATION

■ 277. SEQUENCE.—*a.* As much as possible of the special training of the landing force should be completed prior to the assembly of the joint force. The joint training period following the separate training of Army and Navy components of the joint attack force should be utilized to the maximum for activities requiring the presence of Navy personnel, airplanes, ships, boats, and equipment.

b. Landing force training prior to the assembly of the joint force begins with the individual and progresses through successive echelons, with emphasis on the training of the

individual soldier and the leaders of small units. Men and animals are trained in swimming. Expedients are used in lieu of ships and small boats; for example, men are taught to go down the side of a ship by using nets hung from the second story windows of their barracks, and they learn their places in small boats by means of diagrams. Individuals and small units are trained in the assault of machine-gun nests and similar beach defenses. Instruction is given in the destruction of barbed wire entanglements both in water and on shore. Additional as well as assigned signal communication personnel are trained. Shore parties are constituted and instructed in their duties. Squad, platoon, company, and battalion combat teams are trained successively on terrain similar to that expected in the landing operation. Throughout all instruction both initiative and teamwork are stressed. Sand tables, relief maps, ordinary maps, and air photographs or mosaics are used for the purpose of war gaming the contemplated landing attack.

c. After the assembly of the joint force, training progresses through the stages requiring ships, boats, and naval equipment, and cooperation of Army and Navy personnel. It culminates with as many exercises as possible in which landing groups embark on ships, debark personnel and equipment into landing boats, and make actual landings. During each of these exercises beach and shore parties are required to function, and teamwork and cooperation are developed. Actual problems of signal communication, supply, and evacuation are included.

■ 278. EMBARKATION EXERCISES.—Training and tests in loading personnel, equipment, and supplies on ships for speed, economy of space, and accessibility should be conducted when transports are available. The exercises furnish data on which are based readjustments of embarkation plans to secure maximum efficiency in loading.

■ 279. DEBARKATION.—*a.* Personnel are drilled in assembling by boatloads in assigned compartments or spaces below deck, and in movement by designated routes to gangways, both with and without blackout conditions on the transport. Officers and men are trained in their individual duties in preparing equipment and animals for debarkation.

b. Training under open water conditions supplements preliminary debarkation training on shore, and is essential to secure proficiency and confidence when the ships and small boats are oscillating. Men must learn by practice to use ship ladders or cargo nets, to carry arms and equipment while debarking, and their stations and duties in the small boats. Practice increases proficiency and lessens the probability of accidents. Similarly, training is required to expedite debarkation of matériel and supplies, and to determine by test the methods of stowage, debarkation, and loading of small boats which will save time. During this period of training special consideration should be given to determine the best method of lowering equipment and supplies from transports to small boats, and to actual practice of the methods adopted. In addition to the training landing force personnel, these training exercises insure that Navy boat crews, gunners, and boat division and boat group commanders are familiar with Army personnel and matériel to be embarked in the small boats, and that boats will be brought alongside transports in the proper order for expeditious loading.

■ 280. MOVEMENT FROM SHIP TO SHORE.—Landing exercises insure that the landing force will move from ship to shore in the least vulnerable formations and arrive at the points desired in the best condition and formation for action. Naval personnel in each boat and boat division and the Army personnel transported therein become a team; similarly, boat groups and the landing groups they transport develop teamwork. Such training tests Navy operation in getting boats into assembly and rendezvous areas, advancing to and crossing the line of departure according to schedule, and keeping the desired formation and direction of movement in the dash to the beach. This ship-to-shore training is similar in purpose to extended order exercises for ordinary land operations. Guide airplanes are trained in their functions. Gas and antiaircraft defense in small boats is practiced.

■ 281. FIRING FROM SMALL BOATS.—Prior to and during the landing exercises, the landing force personnel who are to assist the Navy as gunners for boat guns and those who are to fire weapons of the landing force during the ship-to-shore movement are trained in firing from moving boats. This

■ 280. MOVEMENT FROM SHIP TO SHORE.—*a.* Landing exercises insure * * * in small boats is practiced.

b. Experience has indicated that the construction of scale models of the landing areas and their study in connection with rehearsals will greatly assist in training. Each landing group should be furnished photographs of the reproduced model; at least one view should be photographed from the angle of approach which will be followed by the group approaching the particular beach.

training includes antiaircraft firing as well as firing at shore targets.

■ 282. Landing on Beach.—During the joint training period, landing force personnel are trained in landing on the beach during daylight and darkness and in varying depths of water and surf conditions, first by single boatloads, then by boat division loads, and lastly by complete landing groups. Training is also given in landing matériel from small boats and from lighters and barges, and in the use of special equipment such as boat rig A.

■ 283. Advance From Beach.—Training in the assault of beach defenses conducted prior to the assembly of the joint force is supplemented during the joint training period. The advance from the beach is tied in with the ship-to-shore movement and the landing, and all concerned get a complete picture of the operation. The exercises cover—

a. Coordination of ship gunfire.

b. Conduct of supporting fire from boat guns.

c. Close support by aviation.

d. The operation of the signal communication, supply, and evacuation systems.

e. Coordination of beach and shore party activities.

f. Functioning of naval and field artillery liaison parties.

g. Manhandling of weapons and ammunition.

Section III

JOINT SIGNAL COMMUNICATION TRAINING

■ 284. Army and Navy Aviation.—*a.* Navy aviation personnel should be trained in signal communication with the ground units to be supported during the landing, recognition of Army panel and pyrotechnic signals used in lieu of radio, and picking up messages from and dropping messages to ground troops. In addition, this Navy personnel is made cognizant of so much of the signal communication plans and instructions issued to ground troops as may be necessary for effective operations.

b. Army observers assigned to Navy airplanes are trained in the use of the Navy radio equipment and in Navy spotting procedure.

c. All radio communication personnel are trained in joint Army and Navy radio procedure. (See FM 24–6 and FM 24–10.)

■ 285. ARMY GROUND ELEMENTS.—Army ground elements are trained in identification of friendly and hostile aircraft. The personnel of those Army radio stations that will be required to communicate with Navy airplanes engaged in reconnaissance, liaison, and Army artillery adjustment missions receive training in communicating with the Navy aviation personnel that will be assigned to cooperate with them in the actual landing. Elements of the antiaircraft defense forces are informed of the recognition signals (visual or radio) that will be employed by Navy aircraft operating in support of the landing.

■ 286. NAVAL LIAISON AND COMMUNICATION DETACHMENTS.—Naval liaison officers and naval communication detachments assigned to accompany the Army assault elements are trained in the use of the mobile field radio equipment and the Army visual (including pyrotechnic) signals such as—

a. Landing successful.
b. Landing not successful.
c. Reached objective.
d. Location of front lines.
e. Gunfire falling short.
f. Lift gunfire to next objective.
g. Place gunfire on a particular objective.

■ 287. LIAISON AND COMMUNICATION OFFICERS.—*a.* Liaison officers between the higher elements of command of the two services make themselves thoroughly familiar with—

(1) Provisions governing responsibility for signal communications during the several phases of a landing operation.

(2) Actual command set-up of the signal communication systems.

(3) Rules of both services governing signal communication security.

b. Signal communication officers are made cognizant of the communication channel requirements, cryptographic systems, and frequency plans for the operation.

Appendix I

BOAT NOMENCLATURE

Accommodation ladders.—Ladders placed at the gangway in port for convenience in coming on board.

Anchors:

Bower.—Anchors carried in the bow and used for all anchoring, except in unusual circumstances.

Stream.—An anchor of medium weight for miscellaneous use.

Stern.—Any anchor which is carried at the stern, regardless of weight or purpose.

Kedges.—Small anchors, usually of the Navy type, the heaviest of which does not weigh more than a ton.

Boat.—Small Navy type anchors for use in boats.

Apron.—A timber fitted abaft the stem to reenforce the stem or forward portion of the keel.

Beams.—Transverse supports running from side to side to support the deck.

Bilge.—The part of the bottom on each side of the keel on which the boat would rest if aground.

Billboard.—A sloping shelf or edge on the ship's side to support the old-fashioned type anchor.

Bitts.—Vertical pieces of timber or metal securely fastened to the deck of the vessel and used to secure hawsers or for any purpose where heavy strains are to be taken.

Blade, oar.—The broad flattened part of an oar as distinguished from the loom.

Boat falls.—Blocks and tackle with which the boats are hoisted aboard at davits.

Boat hook.—A pole with a blunt hook on the end to aid in landing operations or hauling alongside.

Boat plug.—A screwed metal plug fitted in the bottom planking of the boat to drain the boat when it is out of the water.

Bottom boards.—The fore and aft planks secured to the frames or to floor beams, forming the floor of the boat, frequently removable.

Bow.—Forward end of the ship.

Bowsprit.—A small metal or wood spar attached to the bow of a boat.

Braces, rudder, upper and lower.—Strips of metal secured to the rudder, the forward ends of which fit over the rudder hanger on the sternpost, thus securing the rudder and forming a pivot upon which the rudder swings.

Breaker.—A small cask for carrying potable water. (Also a wave that breaks on the shore.)

Breast hook.—A wood or metal fixture behind the stem structure.

Bridge.—The raised platform extending athwartships in the forward part of the ship, sometimes amidship or aft, from which the ship is steered and navigated.

Bulwarks.—The planking or plating around the vessel above the upper deck.

Cabin.—A compartment, usually for passengers.

Calking.—Oakum driven between the planks of a deck.

Capstan.—A barrel of wood or steel turning around vertically on a central spindle, used to hoist heavy weights or to weigh anchor.

Carling.—A fore and aft beam at hatches.

Chains.—Platforms projecting out from the ship's side where the lead man stands to take soundings.

Chain lockers.—Compartments in the forward portion of the vessel under the chain pipes for carrying and storing cables.

Chain pipes.—The pipes for the cable where it passes from one deck to another from the chain lockers.

Chock.—A metal casting used as a guide or block.

Cleat.—A horned casting for belaying lines.

Clew (of a sail).—The lower after corner of a fore and aft sail.

Coaming.—The raised boundary of hatchways or doors to keep water from going below or entering adjacent compartments.

Cockpit.—A compartment, usually for passengers, in an open boat.

Counter.—The portion of the stern from the water line to the overhand of the vessel.

Crutch.—Special type of rowlock for a steering oar.

Cutwater.—The forward edge of the stem; the part that cuts the water when the ship is in motion.

Davits.—Curved metal spars projecting over the ship's side used for hoisting heavy articles or weights; also at hatches for ammunition.

Deadlights.—Pieces of heavy glass fixed in the deck or ship's side to admit light.

Decks:

Forecastle.—A partial deck above the main deck at the bow.

Half.—A partial deck above the lowest complete deck and below the main deck.

Main.—The highest deck extending from stem to stern.

Platform.—A partial deck *below* the lowest complete deck.

Poop.—A partial deck above the main deck at the stern.

Quarter.—Extends from the mainmast to the poop or to the stern if there is no poop.

Second.—A complete deck immediately below the main deck; additional decks are called the second deck, third deck, fourth deck, etc.

Superstructure.—A partial deck above the main, upper, forecastle, or poop deck and not extending to the side of the ship.

Upper.—A partial deck above the main deck amidships.

Double bottom compartment.—The spaces between the inner and the outer bottoms.

Draft.—Determined by the figures. The bottom of each figure marks the exact number of feet from the bottom of the keel; the tops of the figures indicate the half feet.

Draft numbers.—Placed on the bow and on the stern to show the draft of the ship at any time.

Eyes.—The extreme forward portion of the ship where the plating joins the stem.

Falls.—The lines to which power is applied for hoisting.

Fenders.—Portable wooden or rope bumpers hung over the side during landing to protect the hull.

Flat.—A walking surface in the engine room or any special platform; for example, the coxswain's flat.

Floors.—The transverse timbers which reenforce the frames and carry the strength athwartships across the keel.

Footlings.—Bottom boards or walking flats attached to the insides of the frames on boats without fitted floors.

Forecastle.—That part of a vessel which extends from the foremast forward on the uppermost deck.

Foresheets.—The portion of the boat forward of the foremost thwart.

Frames.—The ribs of the boat secured to the keel and extending upward to the gunwale or deck.

Galley.—Cooking compartments on board ship.

Garboard.—The lowest strake of outside planking next to the keel.

Gooseneck.—A hook-shaped fitting on the forward end of main boom used for securing the latter to the mainmast. Sometimes called a pacific iron.

Grapnel.—A small multiple-fluked anchor used in dragging or grappling operations.

Gratings.—Coverings of latticework for the hatchways, waterways, bridges, etc.

Gripes.—The fitting used to secure a boat in its stowage position on board ship.

Grommets.—Rings formed of rope.

Gudgeons.—Small metal fittings, similar to eyebolts, secured to the sternpost of very small boats on which the rudder hangs. Used in place of the rudder hanger of larger boats.

Gunwale.—The upper edge of the side of an open boat.

Halyards.—Flag and signal hoists or ropes used to hoist and lower sails.

Hammock cloths.—Pieces of canvas for covering the openings to the hammock nettings.

Hammock nettings.—Spaces in which hammocks are stowed when not in use.

Hanger, rudder.—A vertical strip of metal, secured to the sternpost, forming the traveler upon which the rudder braces are secured.

Hatchway.—An opening in the decks forming a passageway from one deck to another and into the holds.

Hawse pipes.—Pipes in the bow of a ship for anchor cables to pass through.

Hawse plugs.—Plugs fitted in the hawse pipes to prevent the water from coming on board through them. When made of canvas, stuffed or filled with oakum, they are called jackasses.

Heel of mast.—The lower end of the mast; the end of the mast which fits in the receptacle on the keel.

Hoisting pads.—Metal fittings inside the boat often attached to the keel to take the hoisting slings or hoisting rods.

Hold.—A general term to indicate the lower stowage compartments of a ship.

Keel.—The principal member or timber of a boat extending from stem to stern at the bottom of the hull and supporting the whole frame; the first metal parts laid when building the ship.

Keelsons.—Fore and aft structural timbers either above or outboard of the keel.

Leather.—The portion of an oar which rests in the rowlock.

Loom.—Rounded portion of an oar between the blade and handle.

Magazine.—A compartment where powder or shell is stowed.

Manger.—The part of the deck that is partitioned off forward on some vessels to prevent any water that may enter through the hawse holes from running aft over the decks.

Mast step.—A metal receptacle on the keel in which the heel of the mast rests.

Midships.—The middle part of the ship.

Norman pin.—A metal pin fitted in a towing post or bitt for making secure the line.

Pacific iron.—(*See* Gooseneck.)

Painter.—A rope used in the bow for towing or for securing the boat.

Pintles.—Small straight pieces of metal secured to the rudder and fitting in the gudgeons on the sternpost of very small boats to support the rudder.

Plank sheer.—The outermost deck plank at the side.

Ports.—Openings in the ship's side for various purposes such as air ports, gun ports, or cargo ports.

Port side.—The left-hand side looking forward.

Rowlocks.—Forked pieces of metal in which the leathers of oars rest while pulling.

Rudder.—The apparatus used to steer a vessel.

Run.—The narrowing of a hull aft between keel and counter.

Scuppers.—Holes in the ship's side through which water is discharged through pipes from the waterways.

Scuttles.—Round or square holes cut in the deck for the passage of coal, ammunition, etc.

Sea ladder.—Steps secured to the ship's side for use in coming on board when the gangway is unshipped; used chiefly at sea.

Shell room.—A magazine where shell are stowed.

Shrouds.—Lines stretched from the masthead to a boat's rail to support the mast on each side.

Shroud whip.—Lines used to haul the shrouds taut.

Sick bay.—The hospital of the ship.

Side fender.—A longitudinal timber projecting beyond the outside line of the hull planking to protect the hull.

Slings.—Gear of wire rope and close-link chain for handling boats at booms or cranes.

Spars.—Masts, booms, and gaffs upon which sails are spread.

Stanchions.—Vertical members of wood or metal supporting a beam or some other portion of the ship.

Starboard side.—The right-hand side looking forward.

Steering rowlock.—A form of swivel rowlock, near the stern of a whaleboat or motor whaleboat, in which the steering oar is placed.

Stem.—Upright timber in the forward part of a boat.

Stern.—After end of the ship.

Stern fast.—A stern line for use in securing the stern of a boat.

Stern hook.—Same as breast hook for stern on a double-ended boat.

Sternpost.—Principal vertical piece of timber at the after end of a boat, its lower end fastened to the keel or shaft log of the boat.

Stern sheets.—The space in the boat abaft the thwarts.

Storerooms.—Rooms for stowing the various stores and located in various parts of the ship.

Strakes.—Continuous lines of fore and aft planking. Each line of planking is known as a strake.

Stretchers.—Athwartship, movable pieces against which the oarsmen brace their feet in pulling.

Stringers, bilge.—Longitudinal strengthening timbers inside the hull.

Taffrail.—The rail around the vessel's stern.

Tarpaulin.—A waterproof fabric cover to keep stores dry while being transported.

Tholepin.—A pin fitted in the gunwale plank for use in place of a rowlock.

Thrum mats.—Mats made of a small piece of canvas, with short strands of rope yarn sewed on, placed between the rowlocks and the oars to prevent noise in pulling.

Tiller.—A bar or lever, fitted fore and aft in the rudder head, by which the rudder is moved.

Towing bitts (or towing posts).—A vertical timber securely fastened for use in towing or mooring.

Trailing lines.—Lines secured to the boat and around the oars to prevent the latter from getting adrift when trailed from swivel rowlocks.

Transom.—The planking across the stern in a transomed boat.

Truck.—A fitting, usually of metal, fitted at the upper end of a flagstaff or mast.

Waist.—The portion of the upper deck on each side between the forecastle and the quarter-deck.

Wardroom.—The quarters of all officers junior to the captain, except the junior officers and warrant officers, who occupy the junior officers' and warrant officers' quarters.

Water line.—The line the water makes along the ship's side when afloat in still water.

Watertight compartment.—Each separate compartment of the large number of rooms and passages that ships are divided into and so fitted as to be watertight. The compartments serve to keep the ship afloat by confining the water if her hull is pierced.

Waterways.—Small gutters extending all around the edge of the weather decks from which water is carried away through scuppers.

Wheel.—The handwheel used to move the tiller and rudder.

Wings.—The portion of the hold nearest the side of the ship.

Appendix II

TYPES OF NAVY SHIPS AND AIRCRAFT

■ 1. Ships.

Type	*Class*	*Designating symbol*
Battleship	Battleship	BB
Cruiser	Heavy	CA
	Large	CB
	Light	CL
	Battle	CC
Aircraft carrier	Aircraft	CV
	Seaplane	CVS
Destroyer	Destroyer	DD
	Destroyer leader	DL
Submarine	Submarine	SS
	Mine-laying submarine	SM
Mine vessel	Mine layer	CM
	Light mine layer	DM
	Mine sweeper	AM
Patrol vessel	Eagle	PE
	Submarine chaser	PC
	Gunboat	PG
	River gunboat	PR
	Yacht	PY
Auxiliary	Tender for destroyer	AD
	Tender for submarine	AS
	Tender for aircraft	AKV
	Repair ship	AR
	Provision storeship	AF
	Oiler	AD
	Ammunition ship	AE
	Hospital ship	AH
	Cargo ship	AK
	Transport	AP
	Ocean-going tug	AT
	Water tanker	AWK
	Miscellaneous (other special types).	
District craft	Boat, barge, derrick, dredge, ferryboat, lighter, tug, etc.	

■ 2. AIRCRAFT.

Type	*Class*
Aircraft (heavier than air).	Bombing, observation, fighting, torpedo, scouting, patrol, utility, training, experimental.
Airship (lighter than air).	Rigid airship, nonrigid airship, kite balloon and balloon, experimental.

APPENDIX III

SMALL BOAT TYPES

Motor boat.—Fitted with canopy and are used as officers' boats and for dispatch service. Motor boats used by flag officers are known afloat as *barges,* and those used by commanding officers and staff officers as *gigs.* Barges are generally transferred from ship to ship with the flag. Motor boats are not fitted to mount guns. The 20-foot motor boats for submarines have a buggy-top canopy.

Motor launch.—Undecked work boat for heavy duty, having square transom stern. They are designed for such services as carrying stores, liberty parties, kedging, etc., and are frequently fitted with special equipment for survey work. With the exception of the 24- and 26-foot launches, all are fitted for mounting a light gun in the bow.

Motor whaleboat.—Double-ended boat which is convenient for a wide variety of light duties. Large ships are supplied with the open type for use as lifeboats in addition to the pulling whaleboat.

Whaleboat.—Double-ended pulling boat, pulling 5 oars single-banked (24-foot size), and 12 or 10 oars double-banked (30-foot and 28-foot sizes, respectively).

Dinghy.—Small, handy boat with transom stern. They are pulled by 3 or 4 men, each with 1 or 2 oars, depending on the size and design.

Wherry.—Light handy boat with transom stern. They may be pulled by 2 or 3 men, each using 2 oars, and are not furnished sails.

Punt.—Square-ended, flat-bottomed boat, intended for painting and general cleaning around the ship's water line.

They are fitted with rowlocks but are usually propelled by sculling.

Racing cutter.—Lightly built boat with transom stern designed to stimulate interest in oarsmanship and for recreational competition.

Appendix IV

DEFINITIONS OF SEA TERMS

Barnacle.—A shellfish often found on a vessel's bottom.

Battens.—Strips of wood such as those secured over the tarpaulins of a hatch to batten down in bad weather; also strips of wood fastened to spars to take chafe of gears (chafing battens); also strips of wood on which a sight may be lined up.

Beacon.—A post or buoy placed over a shoal or bank to warn vessels of danger. Also a signal mark on land.

Bearing.—The direction of an object from the person looking.

Belay.—To make fast.

Bends.—The strongest part of a vessel's side to which the beams, knees, and futtocks are bolted. The part between the water's edge and the bulwarks.

Berth.—An anchorage; a station; a sleeping billet.

Betwixt wind and water.—That portion of the vessel along the water line which when the vessel rolls is alternately above and below water.

Bitter end.—The end of a rope.

Boarding.—The act of going on board a vessel, either for the purpose of getting information or extending courtesies.

Boat cloak.—A cloak used by officers.

Booby hatch.—A raised small hatch.

Bos'n's chair.—The piece of board on which a man working aloft is swung.

Brackish.—Half salt and half fresh water.

By the head.—A term applied to a vessel when she is deeper forward than aft.

By the stern.—Applied to vessel when she is deeper aft than forward.

Cast.—To pay a vessel's head off and bring the wind on the desired side, as to cast to port. Hence, to head in a certain direction in bringing up the anchor. To take a sounding or cast the lead. The throw with a heaving line.

Chock-a-block.—Full; filled to the extreme limit.

Coaster.—A vessel engaged only in running up and down the coast.

Cockbill.—A yard is cockbilled when one yardarm is cocked up above the other; and anchor, when hanging by ring stopper up and down.

Conning.—Directing the helmsman in steering a vessel.

Dead reckoning.—A reckoning kept so as to give the theoretical position of a ship without the aid of objects on land, sights, etc. It consists of plotting on a chart (map) the distance believed to have been covered along each course which has been steered. On a long voyage the navigator runs it from noon to noon.

Dead water.—The eddy under a vessel's counter when she is in motion.

Dismantle.—To unrig a vessel and discharge all stores.

Dog vane.—A small wind vane placed on the truck or above the rail.

Dolphin.—A piling or a nest of piles off a wharf or beach, or off the entrance to a dock for mooring purposes.

Ease off.—To slack away a line.

Ebb.—The outflow of the tide.

Eddy.—A circular motion in the water caused by the meeting of opposite currents.

Fend off.—To shove off.

Field day.—Day for cleaning up of all parts of a ship.

Forging ahead.—Going ahead slowly.

Freeboard.—That portion of a vessel out of water.

Freshen the nip.—To set up again; to veer on the cable or pull upon a backstay to shift the chafe from a particular spot.

Full due.—To secure permanently; secure for a full due.

Furl.—To roll up snugly and secure, as a sail or awning.

Heave to.—To put a vessel in the position of being stopped, but ready to proceed.

Holystone.—A sandstone, used in holystoning decks.

Hull down.—Said of a vessel when due to its distance only the spars are visible.

Irish pennants.—Rope yarns or loose ends hanging about the rigging or deck.

Jury mast.—A temporary mast rigged in place of one lost or broken.

Labor.—To roll or pitch heavily.

Landfall.—Sighting land. A good landfall is made when a vessel sights the land as intended.

Lanyards.—Pieces of small line used for securing.

Latitude.—Distance north or south of the equator, expressed in degrees, minutes, and seconds.

Lee side.—The side away from the wind.

Lee shore.—A shore onto which the wind is blowing. Dangerous.

Leeward.—The direction toward which the wind is blowing; away from the wind.

Leeway.—The lateral movement of a ship to leeward of her course, owing to the side thrust of the wind.

Lend a hand.—To assist; to aid.

Let go by the run.—To let go all at once, as by throwing a rope off a pin.

Life lines.—Lines to prevent men falling overboard.

Lighter.—A craft used in loading and unloading vessels.

Longitude.—Distance east or west of the meridian which runs through Greenwich, England. Expressed in degrees, minutes and seconds.

Lookouts:

Battle.—In time of war and in battle problems battle lookouts are stationed in the top and secondary battery control stations.

Foretop.—Duties same as masthead lookout and also as specially ordered.

Port bow.—Watch fog buoy of ship ahead and keep lookout on port bow.

Port bridge.—From ahead to abeam.

Port quarter and astern.—To watch a ship's own fog buoy and keep lookout aft.

Starboard bridge.—From ahead to abeam.

Starboard bow.—Watch fog buoy of ship ahead and keep lookout on starboard bow.

Starboard quarter and astern.—To watch ship's own fog buoy and keep lookout aft.

Lower booms.—Swinging spars along the ship's side to which ship's boats secure. Usually placed a little forward of amidships.

Oakum.—Stuff made by picking rope yarns to pieces. Used for calking and other purposes.

Off and on.—Coming alternately near the land and then standing off again.

Overhaul.—To take apart, thoroughly examine, and repair; to overtake.

Pipe down.—A boatswain's call denoting the completion of an all-hands evolution, and that you can go below. This expression is also used to mean keep quiet.

Quarter booms.—Boat booms aft.

Rake.—The incline which most masts have toward the stern of the ship. Also, an instrument for estimating fall of shot.

Ride.—To be held by the cable, as a vessel riding to her anchor.

Round in.—To haul in, as round in the main brace.

Run down.—One vessel fouling or sinking another by running into her.

Scotchman.—A piece of iron with ring attached, seized to the shrouds.

Screw.—The propeller.

Scuttle.—To make holes in a ship's bottom to sink her. A round or square opening in the deck.

Sea painter.—A bow painter which leads well forward of the bow of the lifeboat and outboard of all rail stanchions, etc.

Sheer off.—To shove off; to separate by altering course.

Ship.—To take on board. To enlist; to serve on board ship.

Slack.—To lessen tension on a rope by letting it run out.

Snub.—To check a rope or chain suddenly.

Spring tides.—The highest and lowest course of tides, occurring every new and full moon.

Spur shores.—Long timbers used to keep a ship off a dock. The heel of the spar is lashed to the ship's side and the other end rests on the dock.

Strike the colors.—To lower the flag in surrender.

Strongback.—A spar which is lashed between davits at their upper bends against which the lifeboat is griped when secured for sea.

Surge.—A large, swelling wave. To surge a rope or cable is to slack it up suddenly where it renders around a pin or around the windlass or capstan. This gives an irregular jerky movement.

Swamp.—To sink by filling with water.

Swing.—A ship turns or swings to her anchor with the wind or tide.

Swing ship.—To head the ship successively on various points of the compass for obtaining the error of the compass. The error may be obtained on one heading without swinging.

Tack (noun).—One leg of the zigzag course steered in beating to windward.

Tonnage rules:

Deadweight.—Expresses the number of tons (of 2,240 pounds) of cargo, stores, and bunker fuel that a vessel can transport. It is the difference between the number of tons of water a vessel displaces light and the number of tons it displaces when submerged to the load water line. Deadweight tonnage is used interchangeably with deadweight carrying capacity. A vessel's capacity for weight cargo is less than its total deadweight tonnage.

Cargo.—Either weight or measurement. The weight ton in the United States and in British countries is the English long or gross ton of 2,240 pounds. In France and other countries having the metric system a weight ton is 2,204.6 pounds. A measurement ton is usually 40 cubic feet, but in some instances a larger number of cubic feet is taken for a ton.

Gross registered.—Applies to vessels, not to cargo. It is determined by dividing by 100 the contents in cubic feet of the vessel's closed-in spaces. A register ton is 100 cubic feet. The register of a vessel states both gross and net tonnage.

Net registered.—A vessel's gross tonnage minus deductions of space occupied by accommodations for crew, by the propelling power plant, fuel, and spaces necessary for operating the vessel. A vessel's net tonnage expresses the space available for the accommodation of passengers and the stowage of cargo. A ton of cargo in most instances occupies less than 100 cubic feet; hence the vessel's cargo tonnage usually exceeds its net tonnage, and may in some instances exceed the gross tonnage.

Displacement (of a vessel).—The weight, in tons of 2,240 pounds, of the vessel and its contents. Displacement

light is the weight of the vessel without stores, fuel, or cargo. Displacement loaded is the weight of the vessel plus cargo, fuel, and stores.

Transoms.—Pieces of timber going across the sternpost, to which they are bolted. Raised platforms in small vessels and yachts, officers' quarters, etc., and used for seats.

Truck.—A cap at the summit of a flagstaff or masthead.

Turnbuckle.—A link with an adjustable screw for connecting two parts of a bar or a rod together; used on Jacob's ladders, ridge ropes, guys, etc. It allows them to be tautened after they are rigged.

Typhoon.—A violent whirlwind. Those which are encountered in the Far East are usually the only ones so called.

Unship.—To take anything from the place where it is installed for use.

Veer and haul.—To veer on one part of a line and haul on the other, both being connected to the same spar or movable article; also the shifting of the wind.

Waterlogged.—When a vessel is so full of water as to be heavy and unmanageable.

Weather gage.—To windward of; to get the better of.

Wind ship.—To turn her end for end; at a dock, for instance (pronounced wīnd).

Windfall.—A rush of wind from the high land; a stroke of good luck.

Yaw.—To veer suddenly and unintentionally off the course.

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