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FM 6-20-1

DEPARTMENT OF THE ARMY FIELD MANUAL

July 1979

FIELD ARTILLERY TACTICS

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**HEADQUARTERS, DEPARTMENT OF THE ARMY
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FIELD MANUAL

No. 6-20-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 1 July 1965

FIELD ARTILLERY TACTICS

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*This manual supersedes FM 6-20-1, 27 October 1961, and C1, 7 March 1962.

CHAPTER 1

INTRODUCTION

1. Purpose and Scope

a. This manual is a guide for field artillery officers and for force commanders and staffs, and provides doctrine for employment of field artillery at all levels.

b. The material presented herein is applicable in nuclear and non-nuclear warfare and in counterinsurgency operations.

c. The term artillery as used in this manual refers to field artillery. Field artillery techniques are discussed in FM 6-20-2.

d. Air defense artillery is discussed in FM 44-1 and other field manuals of the FM 44-series.

e. Users of this manual are encouraged to submit recommended changes or comments to improve the manual. Comments should be keyed to the specific page, paragraph, and line of the text in which the change is recommended. Reasons should be provided for each comment to insure understanding and complete evaluation. Comments should be forwarded direct to Commanding Officer, United States Army Combat Development Command Artillery Agency, ATTN: CAGAT-DO, Fort Sill, Oklahoma. Changes involving safety of personnel should be transmitted by electrical means.

2. Mission of Field Artillery

a. Mission. The mission of field artillery is to provide continuous and timely fire support to the force commander by destroying or neutralizing, in priority, those targets that jeopardize the accomplishment of his mission.

b. Functions. In the accomplishment of its mission, field artillery will—

- (1) Support the maneuver forces with timely, close, and accurate fires on hostile maneuver elements.
- (2) Deliver counterbattery fires throughout the range of the weapons systems.
- (3) Give depth to combat by delivering fires on logistical installations, reserves, command posts, communication facilities, and other targets throughout the area of influence of the supported force.

3. The Field Artillery System

The field artillery system consists of all of those elements that are necessary to obtain the desired effect on the target. These elements include weapons, target acquisition, survey, ballistic meteorology, communications, mobility (both air and surface), logistics, fire control and coordination, automatic data processing, ammunition, organization, and employment.

4. General Considerations

The development of nuclear, chemical, and biological weapons and their delivery systems has had an impact on the tactics of all combat arms. Even though nuclear weapons may not be employed, they pose a constant threat to all operations. When the threat of nuclear war exists, nonnuclear war will assume many of the aspects of nuclear war, including detailed planning for the initiation of nuclear combat and a continuing analysis of friendly vulnerability. Similarly, those tactics which are applicable to the employment of artillery in nonnuclear warfare are applicable under chemical and biological conditions.

CHAPTER 2

FIELD ARTILLERY CHARACTERISTICS

Section I. CLASSIFICATION OF FIELD ARTILLERY WEAPONS

5. Classification by Weapon

Artillery weapons are classified as cannons or missiles.

a. Cannons are classified by type as guns, howitzers, or mortars.

- (1) Guns have relatively long barrels, and operate with a relatively low angle of fire and have a high muzzle velocity.
- (2) Howitzers have medium length barrels (between those of guns and mortars) and operate with a relatively high angle of fire and have a medium muzzle velocity.
- (3) Mortars normally operate with a higher angle of fire and have a lower muzzle velocity than howitzers. Mortars are not employed by field artillery.

b. Cannons are further classified according to caliber (tube diameter).

- (1) Light. 120-mm and less.
- (2) Medium. Greater than 120-mm but not greater than 160-mm.
- (3) Heavy. Greater than 160-mm but not greater than 210-mm.
- (4) Very heavy. Greater than 210-mm. Very heavy cannons are not employed by active Army field artillery units.

c. Missiles are classified by type as rockets or guided missiles.

- (1) A rocket is aimed by orienting the launcher; it cannot be further guided after it has been fired.
- (2) A guided missile's course is subject to correction or alteration while the missile is in flight.

d. Missiles are further classified by range characteristics.

- (1) Short range rocket. Maximum range less than 30 kilometers.
- (2) Long range rocket. Maximum range 30 kilometers or more.
- (3) Short range guided missile. Maximum range less than 100 kilometers.
- (4) Medium range guided missile. Maximum range at least 100 kilometers but less than 500 kilometers.
- (5) Long range guided missile. Maximum range 500 kilometers or more.

6. Classification by Means of Transport

a. Artillery weapons are further classified according to their method of transport.

- (1) *Towed*. Weapons mounted on carriages designed to be towed or transported by a separate vehicle (generally termed a prime mover). A towed weapon may be auxiliary propelled by a mounted propulsion means.
- (2) *Self-propelled (SP)*. Cannons and launchers installed on carriages which provide automotive power for the vehicle and the weapon.
- (3) *Aerial*. Artillery weapons mounted upon or structurally integrated with aircraft, which serve as the primary means of mobility and from which the weapons can be fired.

b. Artillery weapons are also classified according to the method of transportation which can be used to deliver the weapons to a combat area. All artillery weapons can be transported by road, rail, or ship. Weapons that can be moved by air are classified as follows:

- (1) *Helicopter transportable*. Weapons which can be carried by rotary-wing aircraft and landed sufficiently assembled to permit immediate employment.
- (2) *Air transportable (par 3, AR 705-35)*.
 - (a) *Phase I (parachute and assault landing)*.—Weapons transportable in assault landing aircraft capable of landing on unprepared surfaces within enemy territory or capable of parachute drop. All phase I artillery must be capable of immediate effective employment.
 - (b) *Phase II (initial air landing)*. Weapons transportable in light and medium transport or assault type aircraft capable of landing on minimum criteria airlanding facilities held by friendly forces. Artillery normally moved during this phase is in the followup elements of the phase I units. All phase II artillery should be capable of effective employment within 1 hour after delivery.
 - (c) *Phase III (heavy air landing)*. Weapons transportable in aircraft capable of landing on prepared airlanding facilities held by friendly forces. Normally, artillery moved during this phase is in the followup elements of the phase I and II units.

Section II. CAPABILITIES AND LIMITATIONS

7. General

Artillery is the principal element of an Army force for delivering artillery fire on surface targets. Artillery operations are those combat

operations of artillery units in support of other combat forces. The artillery is prepared to provide fire support under all conditions of warfare—nuclear, nonnuclear, and chemical and biological conditions.

a. In the nonnuclear battle, the artillery provides close, continuous support to maneuver elements. Artillery is ideally suited for the neutralization and destruction of enemy units.

b. In the nuclear battle, the artillery provides nuclear and continuous nonnuclear artillery support to maneuver elements. High priority targets are the enemy's nuclear delivery means. Priority of position is normally given to nuclear delivery units.

c. The employment of artillery under chemical and biological conditions is discussed in paragraph 75.

8. Capabilities

The artillery is capable of—

a. Shifting the fires of its weapons rapidly within a large area and on a wide front without displacing.

b. Massing fires on one or more targets.

c. Placing indirect fires on targets from firing positions in defilade.

d. Accurately delivering fires with appropriate ammunition under all conditions of visibility, weather, and terrain from weapons emplaced laterally and in depth throughout the zone of action.

e. Placing fire on targets in defilade.

f. Delivering accurate fires without adjustment.

g. Displacing rapidly to new positions and employing artillery units to mass fires where required.

h. Conducting assault fire to effect destruction of point targets.

i. Conducting direct fire against enemy forces.

j. Providing aerial artillery fire support.

9. Limitations

The artillery is limited in that—

a. Its mission effectiveness is reduced when it is required to engage in close combat.

b. Its effectiveness is reduced and its vulnerability is increased during displacements.

c. It is vulnerable to enemy air attack.

CHAPTER 3

ARTILLERY ORGANIZATION AND ORGANIZATION FOR COMBAT

Section I. ARTILLERY ORGANIZATION

10. General

The objective of artillery organization is to provide an organization for combat which can most effectively and economically support the maneuver forces. The organization of artillery units and headquarters is shown in detail in appropriate tables of organization and equipment.

11. Division Artillery

Division artillery consists of a division artillery headquarters and headquarters battery, other units organic to division artillery, and artillery units attached to the division artillery. The division artillery is organized for combat to support the division scheme of maneuver. Flexibility is achieved through the assignment of suitable tactical missions to the units of the division artillery. Additional artillery support is normally provided by attaching artillery units to the division or by reinforcing the fires of the division artillery with other artillery.

12. Corps Artillery

Corps artillery consists of a headquarters and headquarters battery and those artillery units assigned or attached which are not further attached to subordinate elements of the corps. *Artillery with the corps* includes the corps artillery and all other artillery units which are organic or attached to subordinate elements of the corps.

13. Army Artillery

Army artillery consists of units assigned or attached to the army and retained under command of the army commander. The army artillery officer exercises, in the commander's name, operational control of these units. *Artillery with the army* includes the army artillery and the artillery with its subordinate corps.

14. Army Group and Theater Army Artillery

Army group and theater army artillery consists only of the artillery staff sections necessary to fulfill the artillery requirements of these headquarters. Normally, artillery units are not retained under the direct control of army group or theater army.

15. Artillery Group

The artillery group consists of a headquarters and headquarters battery and attached units. It provides flexibility in organization for combat, since the number, type, and caliber of the attached units may be varied to meet the situation. Although units attached to a group may be of any caliber and type, mixed calibers and types within a group permit greater flexibility in employment. The group organization provides centralized training and tactical control, as well as a limited degree of administrative and logistical supervision.

16. Artillery Battalion Group

In the absence of a group or other suitable tactical headquarters, one battalion may be attached to another battalion to form a battalion group. The battalion group headquarters functions only as a tactical headquarters for limited periods. The numerical designation of the battalion group is that of the battalion providing the battalion group commander.

Section II. TACTICAL MISSIONS

17. Assignment of Tactical Missions

a. General. The fire support responsibilities to be executed by artillery units are designated by the assignment of tactical missions. Tactical missions for artillery units are assigned by the force commander on the recommendation of the force artillery commander and published in the force operation order.

b. Authority of Subordinate Artillery Commanders. A subordinate artillery commander has the authority, inherent in his command responsibility, to issue orders to his subordinate elements that are necessary to the accomplishment of his assigned mission. This includes organizing for combat and assigning tactical missions, provided that such action does not derogate his overall capability to accomplish his assigned mission, nor reduce the degree of centralized control retained by the commander who originally assigned the tactical mission.

18. Standard Tactical Missions

Field artillery battalions may be assigned one of four standard tactical missions. Listed in descending order of the amount of centralized control retained, they are general support, general support-

reinforcing, reinforcing, and direct support. The responsibilities inherent to each of these standard missions are tabulated in figure 1.

a. General Support. An artillery unit assigned the mission of general support provides artillery fires in support of the force as a whole. Units with this mission remain under the control of the force artillery commander and provide the force commander with a means of directly influencing the action.

b. General Support-Reinforcing. An artillery unit given the mission of general support-reinforcing, furnishes artillery fires in support of the force as a whole and, in addition, reinforces the fires of another artillery unit. A quick-fire communication channel is established with the reinforced unit to facilitate calls for fire. A unit with this mission remains under the control of the force artillery commander. Calls for fire from the force artillery headquarters take precedence over those from the reinforced unit.

c. Reinforcing. An artillery unit assigned the mission of reinforcing augments the fires of another artillery unit. The reinforcing unit remains under the command of the commander assigning the reinforcing mission, but its fires are planned and controlled by the reinforced unit. A quick-fire communication channel is established between the reinforced and the reinforcing unit to facilitate calls for additional fires. The reinforced unit calls directly on the reinforcing unit for fires.

d. Direct Support. An artillery unit assigned the mission of direct support provides close and continuous artillery support to a designated maneuver element and must coordinate its fires with those of the element it supports. The direct support artillery commander positions his unit as necessary to properly support the operations of the supported element. When practicable, the same artillery unit is habitually placed in direct support of the same maneuver element in order to facilitate combined arms teamwork. An artillery unit with a mission of direct support remains under the command of the higher artillery commander assigning the mission. Although the direct support mission is most frequently applied to place an artillery battalion in support of an infantry, mechanized, or armored brigade, the mission is appropriate for a single battery, a battalion group, or an artillery group when it is desired to employ one unit in support of a single maneuver element.

e. Modified Missions. Whenever the intent of the commander cannot be accurately and completely conveyed by the use of a standard tactical mission, a standard mission may be modified or amplified by appropriate instructions. In the modification of a standard tactical mission, care must be taken not to degrade the ability of the unit to accomplish the specific inherent fire support responsibilities of that

standard mission. The direct support mission is especially sensitive in this regard, and normally should not be modified.

19. Warning Orders

Warning orders serve to alert units of pending changes (AR 320-5 and FM 101-5). Certain phrases can also be included in operation orders and fire support plans to alert units of pending changes. Any foreseeable change in the tactical mission should be included.

Section III. ORGANIZATION FOR COMBAT

20. General

Artillery is organized for combat to insure that the maneuver elements, as well as the force as a whole, are provided required artillery support. This is done by placing each artillery unit in a tactical organization and assigning to each unit a tactical mission. The purpose of organizing artillery for combat is to provide the best possible support for the scheme of maneuver, employing all available weapons and exploiting their capabilities. Therefore, the mission, concept of operation, and situation of the supported force must be analyzed prior to the development of an effective artillery organization for combat. Other pertinent factors which have an impact on organization for combat are as follows:

- a. Amount and types of artillery units available.
- b. Capabilities of the weapon systems.
- c. Availability of suitable position areas.
- d. Availability of ammunition.
- e. Availability of other fire support agencies.
- f. Enemy intelligence, particularly target intelligence.
- g. Weather.
- h. Terrain.
- i. Unit operational readiness.
- j. Future operations.

21. Fundamentals

In developing an effective organization for combat, the following fundamentals must be placed in proper balance:

a. *Maximum Feasible Centralized Control.* Field artillery is most effective when control is centralized at the highest level consistent with its fire support capabilities and the requirements of the overall mission. Centralized control of artillery permits flexibility in its employment, facilitates massing of fires, and insures that effective fire support is provided to each subordinate element of the command and to the force as a whole. Each of the standard tactical missions represents a selected degree of centralized control. The optimum degree of centralized control varies with each tactical situation. However, the following general rules apply:

- (1) A high degree of centralized control is desired in a defensive situation. Since the enemy has the initiative, it is difficult to predict when and where he will strike. Therefore, in order to facilitate the force commander's ability to influence the action wherever it may develop, flexibility of employment is insured through greater centralization of control.
- (2) A lesser degree of centralized control is acceptable in offensive situations, because the supported force possesses the initiative. To assist the close combat elements in retaining this initiative and maintaining the momentum of the attack, artillery commanders are granted wider latitude in the employment of their artillery, and the responsiveness of the artillery is more sharply focused on the specific fire support requirements of the several maneuver elements of the force.

b. Adequate Artillery Support for Committed Maneuver Units. Adequate artillery support is normally considered to be, as a minimum, one artillery battalion in direct support of one committed brigade. However, consideration must be given to requirements for additional fire support, because of the composition and zone of action of the committed force, as well as requirements for massing of fires.

c. Weight to the Main Attack in the Offense or Additional Strength to the Most Vulnerable Area in the Defense. Weight is provided by positioning additional artillery units so that they can fire into the critical areas and by assigning to such units missions of *general support-reinforcing* or *reinforcing* the appropriate direct support battalions. In addition to assignment of tactical missions, weight to the main attack is provided by—

- (1) Assignment of position areas and zones of fire to general support artillery.
- (2) Allocation of ammunition.

d. Facilitate Future Operations. When it is anticipated that future artillery support requirements will be derived from the force commander's concept and scheme of maneuver, including anticipated tactical contingencies, *on-order missions* are employed to facilitate future operations. For example, adequate artillery support must be provided to the reserve when it is committed. This is done by issuing warning orders to designated artillery units to be prepared to support the reserve, when committed, and by positioning these units in proximity to likely areas of employment.

e. Immediately Available Artillery Support With Which the Commander Can Influence the Action. The force artillery commander retains artillery support means immediately available with which the force commander can influence the action. Such means normally

consist of units equipped with the heavier caliber weapons which are employed in general support.

22. Considerations Applicable to Specific Artillery Echelons

Important considerations applicable to specific artillery echelons are as follows:

a. Division artillery provides close and continuous support to maneuver elements and employs counterbattery fire, flak suppression fires, harassing and interdiction fires, and other programs of fire as required to support the maneuver force.

b. Corps artillery provides depth to combat, augments the artillery support provided by the division artilleries, and provides the bulk of counterbattery fires to be delivered under corps control in support of the operation.

c. Army artillery provides depth to combat and augments the artillery support provided by the artillery with the corps to be delivered under army control in support of the operation—

- (1) Army cannon battalions are usually attached to corps and then further attached to artillery groups or to divisions.
- (2) Army short-range artillery missile battalions are usually attached to corps. These missile battalions may be further attached to artillery groups or to divisions.
- (3) Army long-range artillery missile units are usually retained under army artillery control.

23. Attachment

Attachment is not a tactical mission; it is a status. Artillery attached to a force for an operation is under the command of the commander of the force to which attached and is assigned tactical missions approved by that force commander. The force commander is further responsible for the provision of administrative and logistical support to the attached artillery. Normally, artillery units are not attached to a force unless the artillery support requirement cannot adequately be executed through the assignment of a tactical mission, or unless control requirements dictate the establishment of a command relationship between the force commander and his supporting artillery commander.

24. Groupments

In the absence of an artillery group or other suitable tactical headquarters, an artillery battalion may be attached to another artillery battalion to form a *battalion group*. *Battery groups* may also be formed when the situation warrants. Groupments are formed *only* when it is desirable for one unit to exercise a greater degree of control

over another unit than that established by a reinforcing mission. They are formed only for limited periods of time or for the execution of an operation of short duration. When a battalion group is formed—

a. The commander is designated by the authority establishing the groupment.

b. The numerical designation of the group is that of the battalion providing the groupment commander.

CHAPTER 4

COMMAND AND CONTROL

Section I. COMMAND AND STAFF RESPONSIBILITIES

25. Artillery Officer (Theater Army, Army Group, and Field Army)

a. In theater army, army group, and field army, the senior artillery officer in the artillery staff section is designated the *artillery officer*. He is the special staff officer who advises the commander on fire support and artillery matters and exercises, in the commander's name, operational control of those artillery units which have not been assigned or attached to subordinate units.

b. The duties and responsibilities of the artillery officer are assigned by the commander. The theater army, army group, or field army artillery officer is usually assigned the responsibility for—

- (1) Determining the number and types of nonorganic artillery units required by the forces in the command, including special equipment for these units.
- (2) Recommending the allocation of the various types or artillery units to subordinate commands.
- (3) Recommending the assignment of personnel and estimating replacement requirements for these units.
- (4) Supervising the training of units and replacement personnel within the command and the operation of artillery schools under the control of the commander.
- (5) Publishing information and intelligence of interest to the artillery.
- (6) Planning the reception and processing of units within the command.
- (7) Determining ammunition requirements and recommending the allocation of available ammunition.
- (8) Exercising, in the commander's name, operational control of those units which have not been assigned or attached to subordinate units.
- (9) Providing for target analyses and damage assessment of nuclear fires employed on surface targets by own forces.

26. Artillery Commanders

a. Corps, Division, and Task Force. In corps, division, and task force, the senior officer of the artillery headquarters is the artillery *commander*. He commands the artillery units retained under control of the force. He advises the commander and his staff on all artillery matters and normally is the fire support coordinator (FSCOORD) for the force. The responsibilities of the artillery commander of a corps, division, or task force are as follows if appropriate:

- (1) Acts as fire support coordinator for the force and, as such, is responsible for the functions enumerated in chapter 5.
- (2) Advises on matters pertaining to artillery support and on deception operations by artillery.
- (3) Determines requirements for artillery support means and recommends the artillery task organization.
- (4) Provides information on the status of artillery ammunition on hand; recommends the artillery ammunition required supply rate; provides an estimate of the adequacy of the artillery ammunition available supply rate; and recommends the available supply rate for subordinate commands.
- (5) Recommends the allocation of special ammunition for artillery missions and the artillery special ammunition load (SAL) for artillery units, subordinate units, supply points, and depots, as appropriate.
- (6) Assists in the preparation of operation plans and orders to include preparation of the artillery fire plan appendix to the fire support annex.
- (7) Coordinates artillery target acquisition and survey within the command and with higher and adjacent commands.
- (8) Studies and evaluates enemy artillery capabilities.
- (9) Prepares the artillery portion of training programs and exercises special staff supervision over artillery training throughout the command.
- (10) Monitors the operational readiness of artillery units and advises the commander and responsible staff personnel of related problems.
- (11) Provides for target analysis and damage assessment of nuclear weapons employed on surface targets by artillery units of own forces.

b. *Field Artillery Group*. In addition to the tasks inherent to the tactical missions assigned the group, the field artillery group commander's responsibilities include the following command functions:

- (1) Coordinating survey control for the group.
- (2) Planning fires to carry out the tactical missions assigned the group, if appropriate.

- (3) Controlling the group fires.
- (4) Directing the training of the group headquarters and, in some situations, the training of battalions attached to the group.
- (5) Providing logistical and administrative assistance to battalions attached to the group.

c. Field Artillery Battalion Group. The commander of a battalion group is designated by the authority establishing the group. He has tactical functions and responsibilities similar to those of a group commander plus the command of his own battalion.

d. Field Artillery Battalion. In this manual the term "field artillery battalion commander" refers to the commander of an artillery unit that is assigned a tactical mission. He is responsible for providing the artillery support inherent to the accomplishment of the assigned mission.

Section II. RESPONSIBILITIES

27. Combined Arms Team

Field artillery is an element of the combined arms team employed by the force commander to accomplish his mission. When artillery is assigned or attached to the supported unit, the artillery officer is a subordinate commander of the supported unit commander. When artillery is neither assigned nor attached to, but is placed in support of the supported unit, the artillery commander's relationship to the supported unit commander is that of an adviser and an independent commander who must provide effective artillery support in accordance with his assigned tactical mission.

28. Command Channels

Instructions for the corps artilleries of a field army are issued to the corps commander in the name of the army commander; likewise, instructions for the division artilleries are issued to the division commander in the name of the corps commander. This procedure is used because there is no chain of command between the artilleries of the various echelons. Each artillery commander commands only the artillery at his echelon. However, communication channels for fire direction are established to facilitate coordination of artillery fires.

29. Liaison

a. General. Liaison is established between units to insure mutual understanding and unity of purpose and action. Liaison is usually performed by a unit representative visiting or "living" with another unit to exchange information. Liaison established by artillery units may encompass additional duties which are peculiar to the artillery.

b. Command Liaison. Through personal contact, artillery commanders establish command liaison with supported and reinforced

commanders. This is the most effective type of liaison. The liaison established by commanders is maintained by liaison officers furnished by the unit responsible for its establishment.

c. Liaison Officers. The liaison officer is the artillery commander's personal representative to the unit with which liaison is maintained. When working at the command post of the supported combat unit, he normally acts as the fire support coordinator in the absence of the artillery commander. The principal duties of an artillery liaison officer are listed in FM 6-20-2. Frequent changes of liaison officers are undesirable; however, in situations requiring the prolonged absence of a liaison officer from his parent unit, it may be desirable to rotate liaison officers to keep them informed of the current situation, plans, and command policies.

d. Staff Liaison. Liaison is not restricted to liaison officers but may be performed by any staff officer or other designated officer. Liaison between staff sections of one unit and similar staff sections of an associated unit is desirable for further cooperation and coordination; e.g., liaison may be established with the engineers in regard to survey control and with the Air Weather Service in regard to meteorological data.

Section III. ARTILLERY ESTIMATES AND REQUIREMENTS

30. Responsibility for Artillery Estimates

a. An estimate of the situation is a logical process by which a commander considers all the circumstances affecting the military situation and arrives at a decision as to the course of action to be taken to accomplish his mission.

b. Artillery estimates are made to determine the number and types of artillery units required, the amount of ammunition required to support the contemplated operation, and the allocations of units and ammunition to lower echelons.

c. The artillery officer of an echelon ordering or conducting an operation is responsible for making the estimate of artillery requirements. In doing so, he considers the eventual organization for combat and assembles the necessary artillery and ammunition at the time and place desired. Subordinate artillery commanders may assist in the preparation of the estimate.

31. Basis of Artillery Estimates

a. The minimum artillery requirements are that sufficient artillery be available to—

- (1) Place the required mass of fire on all confirmed and suspected targets.

(2) Attack effectively all enemy installations that can influence planned operations during any anticipated phase.

b. The amount and types of artillery required in support of an operation depend primarily on the commander's plan, the type of enemy resistance expected, duration of the operation, and the terrain. Units making supporting attacks or defending in less critical areas may be allowed only limited amounts of artillery in order to permit the massing of artillery in areas where decisive results may be achieved.

32. Estimate of Artillery Requirements

Artillery requirements will vary widely and will differ for each tactical situation. FM 101-10, Part I, contains tables showing basic loads and expenditure of ammunition experience tables which are of assistance in making artillery estimates for various types of operations. As the operation progresses, commanders should develop accurate experience data applicable to local conditions for use as a guide in the conduct of future operations. Factors which must be considered in estimating the number and types of artillery units and the amount of ammunition required are the—

a. Composition, tactics, disposition, and organization of the enemy forces.

b. Availability and known or expected use of artillery units and ammunition.

c. Type of operation (attack, defense, delay, or special operation).

d. Availability of reinforcing fires from higher artillery headquarters

e. Availability and known or expected use of air support, naval gunfire, reinforcing fires by tanks and air defense artillery, and other means of support.

f. Terrain, weather, and operational environment.

g. Available time and capacity of road net.

h. Main and secondary attack plans and counterattack plans.

i. Allowance for losses during combat.

j. Logistical capabilities.

CHAPTER 5

FIRE SUPPORT COORDINATION

Section I. PRINCIPLES AND RESPONSIBILITIES

33. General

a. Fire support is one of the principal means available to the force commander for influencing an action. It is also the most flexible. The *objective* of fire support coordination is to provide the most effective fire support possible with the means available, to avoid duplication of effort, and to achieve complete integration of all supporting fires in the scheme of maneuver or plan of defense. The effectiveness with which the commander uses fire support in his plan of action will be a decisive factor in the battle. Fire support coordination is the coordinated planning and initiation of fire support so that targets are adequately attacked by appropriate means. Although established principles for the coordination of fire support do not change with the addition of nuclear weapons or chemical and/or biological agents, their importance is enhanced by the increased lethality of these weapons. Troop safety and possible damage to equipment will have contingency effects that would have to be considered.

b. Maneuver and fire support are interdependent, and their planning and execution must be coordinated. No rigid system can be equally effective at all echelons or at all times. The procedures to accomplish the tasks involved in the coordination of fire support will vary with the headquarters, the amount and type of fire support available, and the type of operation. Details of the techniques and procedures of fire support coordination are discussed in FM 6-20-2.

c. The commander at each maneuver echelon is responsible for the coordination of fire and maneuver. To assist the commander in this responsibility, the force G3 (or S3) has the general staff function of integrating fires with maneuver.

d. The senior artillery officer at each echelon is normally the fire support coordinator (FSCOORD). Coordination of fire support is usually accomplished at the headquarters of the force commander.

34. Principles

The principles of fire support coordination enumerated in *a* through *j* below are commensurate with the principles of war and support them

accordingly. A detailed discussion of the principles of war is given in FM 100-5.

a. The supported force commander, through combat orders, policies, or priorities, employs all fire support available to his command.

b. The organization and procedure for coordinating fire support provides for the following:

- (1) Adequate control and supervision by the supported force commander.
- (2) Concentration of fire support on any target or targets.
- (3) Distribution of effective fire on several targets simultaneously.
- (4) Prompt attack on targets of opportunity.
- (5) Modification of the fire support plan to meet unforeseen or changing situations.

c. Primary consideration is given to furnishing the type of fire support requested.

d. Fire missions are assigned to, or requested of, the agency that can deliver the most effective fire within the required time.

e. Fire support coordination is accomplished at the lowest echelon which can effect complete coordination of the fire support mission.

f. Rapid coordination is essential in attacking targets of opportunity.

g. Fire support is accomplished at the lowest echelon having the necessary means available.

h. Measures are provided to safeguard friendly troops, vessels, aircraft, and installations from friendly fires.

i. A common system of target designation is required.

j. Unnecessary duplication is avoided.

35. Responsibilities

a. The force commander is responsible for the coordination of fire support and the integration of fire support and maneuver.

b. The fire support coordinator (FSCOORD) is responsible for the following functions:

- (1) Advising the commander and his staff on artillery target acquisition matters.
- (2) Advising the commander and his staff on all fire support matters concerning the delivery of fire on surface targets, to include—
 - (*a*) Requirements for fire support means and recommendations concerning their use.
 - (*b*) Recommendations concerning the required supply rate of ammunition, the allocation of nuclear weapons, and the special ammunition load.
 - (*c*) Enemy fire support capabilities.
 - (*d*) Deception operations by fire support on surface targets.

- (3) Coordinating all supporting fires delivered on surface targets.
 - (4) Preparing the fire support annex to operation plans and orders and coordinating and integrating the air, artillery, chemical and biological, and other fire plan appendixes to the fire support plan annex.
 - (5) Providing for target analysis and damage assessment of nuclear fires employed on surface targets by own forces.
- c. The G3 (S3) has staff responsibility for integrating fire and maneuver. The FSCOORD and the G3 (S3) work jointly to insure this integration.

Section II. COORDINATING MEASURES

36. Zones of Fire

Zones of fire are assigned to artillery units for control of fire laterally and in depth to support the action. Lateral limits within which a unit must be able to fire are designated by points or lines. Zones in depth may be designated by prescribing minimum range lines and lines to be reached by the fires of the unit. Zones of fire are designated with the tactical mission.

37. Boundaries

In addition to their use in defining areas of responsibility, boundaries also serve as a measure for coordinating fire support. When fires employed by one force adversely influence the tactical operations of, or will have casualty- or damage-producing effects in, the zone of an adjacent force, these fires must be coordinated with, and approved by, the adjacent force commander or the commander who controls both forces.

38. No-Fire Lines

The no-fire line (NFL) is a line short of which no artillery unit may fire without prior clearance from the headquarters which established it. The location of the no-fire line is established by the direct support artillery commander in coordination with the supported unit commander. Each artillery echelon is kept informed of the location of, and changes to, the no-fire line. Division artillery consolidates and disseminates this information to subordinate units, to artillery reinforcing the division artillery, to adjacent division artilleries, and to corps artillery headquarters. Corps artillery headquarters consolidates division no-fire lines and sends the location of the corps no-fire line to corps artillery units, to the artillery of the divisions of the corps, and to the adjacent corps. Only the artillery unit which established the no-fire line may fire short of the no-fire line in its own sector. Other artillery units must obtain clearance from

the artillery unit which established the no-fire line before they can fire short of it.

39. Fire Support Coordination Line

The fire support coordination line (FSCL) is established by the appropriate ground commander to insure coordination of fire not under his control but which may affect current tactical operations. When possible, the fire support coordination line should follow well-defined terrain features. The establishment of the fire support coordination line is normally coordinated with the appropriate tactical air commander and other supporting elements.

40. Fire Coordination Line

The fire coordination line (FCL) is a line between two forces beyond which fire may not be delivered without coordination with the other force. This line is normally established by the headquarters controlling both forces.

41. 0-0 Line

The 0-0 line is a line established by the corps artillery commander as a means of coordinating target search in depth. Usually, the front-line divisions conduct target search short of the 0-0 line, and corps artillery searches beyond it; however, this arbitrary division does not restrict the zones of observation or attack of targets. The 0-0 line should be easily identifiable by terrain features. Its location is changed as dictated by the situation.

CHAPTER 6

FUNDAMENTALS OF EMPLOYMENT

42. Positioning of Field Artillery Units

The artillery commander is responsible for insuring that his unit is positioned so that it provides effective artillery support inherent to his mission. This requires—

- a.* That the mobility of artillery be equal to or greater than that of the supported force.
- b.* That all artillery commanders be informed of the plans of the supported unit and anticipate the requirements for artillery support.
- c.* The proper organization for combat, necessary changes thereto during the operation, and decentralization of control when appropriate.
- d.* Coordinated movement of artillery units and proper disposition within march columns.
- e.* The selection of position areas from which effective fire can be delivered.
- f.* Continued reconnaissance for position areas, observation posts, and locations for other installations and routes.
- g.* Timely displacement of artillery units to provide continuity of artillery support.
- h.* Sound procedures for effecting relief of artillery units in combat and for receiving attached artillery.
- i.* Effective security measures coordinated with the overall security plan.

43. Marches

a. References. Details concerning the basic doctrine governing troop movements are given in FM 100-5; technical and logistical data and march tables, FM 101-10, Part I; march orders, FM 101-5; motor movements, FM 55-30; marches of field artillery battalions, FM 6-20-2; and protection by air defense artillery, FM 44-1.

b. Tactical Marches. When a force is marching in several march columns, artillery is placed in each column to insure its availability for early and adequate support of the security forces and the initial action of the main body. Artillery may be attached to the main body during the march.

c. Air Defense Protection. Continuous air defense will be provided for the force and will be deployed so as to provide air defense for march columns.

44. Artillery With Security Forces

A maneuvering military force provides protection with reconnaissance and security elements (covering forces) operating as advance, rear, and flank guards when necessary. Self-propelled artillery is desirable when providing such support to the security forces.

a. Covering Force. A covering force should be strong in artillery. Planning and reconnaissance must be continuous to enable the artillery to occupy positions promptly in support of an action. Artillery with a covering force may be required to displace rapidly and frequently; it is positioned well forward to allow it to open fire at long ranges and so that other elements of the covering force can protect it from surprise attack. Weapons of mixed calibers are employed to delay, deceive, deny, and destroy the attacking force. Radio communication and minimum survey are used to speed the opening of fire.

b. Advance Guard. Artillery in support of the advance guard may be either attached or assigned a mission of direct support. If the advance guard is small and its area of operation can be covered effectively, artillery support may be furnished by the artillery from the main body. The amount of artillery support depends on the mission and size of the advance guard and the expected enemy action. The position of the artillery and the requirement for rapid entry into action is similar to that for support of the covering force. When contact is imminent, the artillery supporting the advance guard moves by echelon from one firing position to another.

c. Rear Guard. Artillery in support of the rear guard may be either attached or assigned a mission of direct support. The artillery occupies positions close behind each of the rear guard positions. Fire is opened early to force the enemy to deploy and thus to delay his advance. Roads, road junctions, and key terrain features are placed under interdiction fire. When the rear guard is engaged, the supporting artillery moves by echelon from one position to another.

d. Flank Guard. The flank guard may be supported by artillery attached to the flank guard elements, if any, or by the artillery supporting the main body. The employment of artillery attached to the flank guard is similar to the employment of that with the advance guard.

45. Position Areas

a. General. The selection of artillery position areas is governed mainly by the mission, the terrain, mobility of available weapons, the nature of the tactical operation, and the need for dispersion as a protective measure. Artillery commanders may have to define areas for the locations of the major elements of their commands in order to coordinate the position areas with the operation. In nonnuclear warfare, the order of priority for artillery positions is division artillery,

corps artillery, followed by army artillery. However, special requirements of the force may require deviations of the above priorities.

b. Responsibility. Artillery commanders habitually coordinate position areas with the maneuver force commander. Commanders of direct support artillery units normally select their own position areas subject to the approval of the next higher artillery commander. Position areas for general support units are selected by the force artillery commander. Position areas for GS reinforcing units are selected by the force artillery commander, considering recommendations made by the reinforced unit commander. Position areas for reinforcing units are selected by the reinforced unit commander. Corps and army artillery position areas within the division area are coordinated with the division artillery commander concerned; army artillery position areas within the corps area are coordinated with the corps artillery commander concerned.

46. Displacements

Planning for displacement is continuous. Displacements include the reconnaissance, selection, and occupation of position. Movement must conform to the plan of the maneuver force. Authority for the displacement of artillery units varies with the assigned tactical mission (fig. 1). Timely and rapid displacements of artillery units are necessary to deliver continuous fire support. Continuous artillery support is maintained by displacing units by echelon or by using other artillery units to answer calls for fire. Displacements are completed as rapidly as possible in order to resume fire with minimum delay and to minimize the probability of enemy detection. When a nuclear attack is imminent, the area of displacement will be broadened and planning time will be decreased.

47. Relief in Combat

a. General. Relief in combat is of two general types—relief in place and passage of lines. During the relief, the artillery maintains its normal fires. When possible, relief is accomplished at night or by echelon to maintain secrecy. When a relief in place or a passage of lines is to be accomplished, warning orders are issued by the commander of the next higher headquarters and the commanders of the relieving unit and the unit being relieved. The warning orders should include the time of the movement, road priority, zone of action of the relieving unit, the time that the fire support responsibilities are to pass to the relieving unit, and any control measures required to maintain secrecy.

b. Responsibilities. The artillery unit being relieved is responsible for furnishing to the relieving artillery unit the following information as needed:

- (1) Friendly situation, to include unit and installation, locations of the no-fire line, 0-0 line, and observation posts.
- (2) All available information of the enemy.
- (3) Route information and, if needed, road guides.
- (4) Survey information.
- (5) Location of supply installations.
- (6) Location of other artillery within supporting range and means of communications.
- (7) Fire or movement restrictions.
- (8) Existing wire circuits and wire line route maps.
- (9) Information necessary for fire control, including fire plans and situation maps.
- (10) Locations of minefields.

c. Command. The principle of having only one commander responsible for a particular operation must be followed in the conduct of a relief in place.

- (1) When a relief in place is effected and both the artillery and the supported unit are relieved at the same time, the artillery command passes from the relieved artillery commander to the relieving artillery commander at the same time that command passes from the relieved supported unit commander to the relieving supported unit commander. When the artillery and the supported unit are relieved at separate times, the artillery command passes from the relieved artillery commander to the relieving artillery commander as determined by agreement between the two artillery commanders, unless otherwise directed by higher headquarters.
- (2) When a relief by passage of lines is effected, the artillery command passes to the relieving artillery commander before the passage of lines begins. The relieved artillery may be attached to the relieving artillery or may be ordered to reinforce from its original positions until the force supported by the relieving artillery passes beyond range.

48. Receiving Attached Artillery

a. General. The presence of additional artillery in a combat area could be an indication of more active operations. Therefore, artillery supporting a combat unit should move with utmost secrecy and during periods of reduced visibility.

b. Attachment to Other Artillery Headquarters. Artillery units may be attached to other artillery headquarters. The attached units are given orders similar to those given to assigned units, stating their mission, position areas, and routes.

c. Attachment to Division Artillery Battalions. When a non-divisional battalion is attached to a division artillery battalion, the

commander of the divisional artillery unit is normally designated the battalion group commander. He is responsible for insuring that complete preparations are made to receive the attached battalion. The battalion group commander is responsible for furnishing command guidance and control to the attached battalion to the same degree that he would furnish these for his own units.

49. Security

a. General. Initiative in the employment of security measures is necessary to maintain effective fire against an enemy strong in artillery and tactical air or skilled in infiltration and guerrilla tactics. Deception contributes to effective security.

b. Movements. Secrecy in moving artillery into position is gained by night marches and infiltration. Detailed staff planning, reconnaissance, and coordination are necessary to avoid confusion and delay.

c. Deception Measures. Deception measures are taken in accordance with tactical cover and deception plans and are designed to support tactical operations. Deception measures are strictly controlled and must conform to the mission of the supported force and that of higher headquarters.

- (1) Dummy positions are used to deceive the enemy as to the locations of artillery units. These positions are constructed to appear as realistic as possible.
- (2) Many other deception measures may be taken. Artillery may occupy a roving gun position, fire from it for a short period, and return to its primary position. Registration, interdiction, or harassing fires by roving guns from surveyed positions are effective. Simultaneous firing by several units increases the enemy's difficulty in locating individual positions. Reduction of fires, elimination of artillery preparations, restrictions on registrations, and radio and radar silence or other restrictions on electronic operations all help to conceal the presence and location of artillery.

d. Active and passive defense measures of artillery battalions and batteries in position and during the march are given in FM 6-20-2 and FM 6-140.

50. Auxiliary Weapons

a. When directed, the fires of auxiliary weapons are used to supplement artillery fires. Weapons which may be used as artillery are tanks and air defense artillery weapons having a surface-to-surface fire capability.

b. The employment of auxiliary weapons as artillery is facilitated by assigning the unit a mission of reinforcing an artillery unit.

- c.* The reinforcing unit will usually be responsible for—
- (1) Establishing communication and liaison with the reinforced artillery.
 - (2) Providing its own logistical support.

51. Army Aviation

a. Army aircraft serve to expedite and improve field artillery combat capabilities and logistics.

b. Army aircraft capabilities include, but are not limited to, performance of the following tasks:

- (1) Visual observation and target acquisition.
- (2) Adjustment of artillery fire.
- (3) Area reconnaissance.
- (4) Route reconnaissance.
- (5) Control of maneuver elements.
- (6) Radio relay.
- (7) Liaison with adjacent units.
- (8) Message, map, and photograph delivery.
- (9) Mapping and surveying.
- (10) Radiological monitoring.
- (11) Column control of ground vehicles.
- (12) Command and staff transportation.
- (13) Damage assessment.
- (14) Emergency medical evacuation.
- (15) Delivery of critical supplies.
- (16) Delivery of critical personnel.
- (17) Wire laying.
- (18) Aerial fire support.

c. A detailed discussion of Army aviation is given in FM 1-100.

CHAPTER 7

FIELD ARTILLERY OPERATIONS

Section I. SUPPORT OF THE OFFENSE

52. Missions and Requirements

a. Field artillery in support of offensive operations must be organized and deployed to provide supporting fires to the attack, furnish continuous support during the action, and protect the attacking force during reorganization. The weight of artillery firepower and priority of fires is normally given to the main attack. Prior to the attack, control is centralized. As the attack develops or the exploitation begins, however, control may be decentralized.

b. Artillery actions before the attack include—

- (1) Development of an organization for combat and preparation of fire plans.
- (2) Reconnaissance, selection, and occupation of firing positions.
- (3) Establishment of communications.
- (4) Provision of a common grid for firing units and target acquisition installations.
- (5) Organization and coordination of observation.
- (6) Assembly of supplies and equipment in forward areas.
- (7) Establishment of liaison.
- (8) Coordination of fire support.

53. Artillery Positions in the Offense

Artillery position areas in the offense are located—

a. As far forward as practicable to exploit the range of the weapons and to facilitate liaison and communications.

b. To avoid interference with other units.

c. To maintain adequate separation between units consistent with their mission.

54. Offensive Fires

a. Fire Planning. Fire planning is continuous. A thorough knowledge of fire planning is necessary to obtain maximum effects from available artillery support. An effective artillery fire plan must—

- (1) Provide adequate support for the plan of maneuver of the supported force.
- (2) Use weapons according to their capabilities for target defeat.

(3) Furnish massed fires throughout the zone of action of the supported force.

(4) Facilitate future operations.

b. Fires Before the Preparation. Fires before the preparation usually consist of registrations, fires on targets of opportunity, and fires covering the deployment and movement of the attacking troops into position. Interdiction fires may be employed to restrict enemy operations, disrupt communications, and prevent the movement of enemy reserves.

c. Registration.

(1) Registration increases the accuracy of artillery fires, permits placing unobserved fires close to friendly troops, and saves ammunition. However, unrestricted registration discloses artillery positions and thereby indicates strength and deployment, signifies the commander's intentions, and invites neutralization. These disadvantages can be minimized by—

(a) Using special registration positions.

(b) Limiting the number of batteries to register.

(c) Registering as late as possible before the attack.

(d) Registering several units simultaneously.

(e) Employing meteorology plus velocity error (VE) techniques to reduce the need for registration.

(f) Using common survey control and current meteorological data.

(2) The force artillery commander decides whether registration will be restricted, prohibited, or unlimited. When conditions indicate a need to restrict registration, the force artillery commander coordinates registration.

d. Preparation. The force commander decides whether a preparation is to be fired and, if so, its duration. The time length of the preparation may vary from a few minutes to several hours, depending on the degree of surprise required, the amount of ammunition available, and the number of confirmed (real) or suspect (possible) targets. The preparation may or may not be divided into phases. In general, any division of a preparation into phases should provide for gaining fire superiority over hostile artillery in the early phases, neutralization of hostile artillery throughout the preparation, and delivery of massed fires on enemy forward elements in the final phase. These phases allow the artillery to attack, in succession, various types of targets according to priority.

e. During the Attack. Fires during the attack are delivered to assist the advance of the supported unit. Successive concentrations on confirmed (real) or suspect (possible) enemy locations may be prearranged. Fires must be planned beyond the final objective, to

include likely avenues of approach, to protect the attacking unit during its reorganization.

55. Meeting Engagements

a. The artillery in support of a meeting engagement must be sufficiently far forward in the formation to support the action from the start. When the advance guard deploys, supporting artillery occupies positions at once to support it.

b. Artillery support is not limited to planned fires. The timely delivery of fire is given first consideration. The artillery moving to positions should be given road priority.

c. Medium and/or heavy artillery is dispersed throughout the advance guard and main body columns to provide supporting fires, when required.

56. Exploitation and Pursuit

Artillery with an exploiting or pursuing force is normally attached. The artillery attached to these forces requires a high degree of mobility.

Section II. SUPPORT OF THE DEFENSE

57. Missions and Requirements

Field artillery must be prepared to support all phases of defensive action. It must be capable of massing fires on critical localities beyond the range of other supporting weapons. The artillery must be prepared to fire in any area by rapidly shifting its direction of fire or by occupying alternate or supplementary positions. It augments the defensive fires of the supported force with barrages and other pre-arranged fires.

58. Artillery Positions in the Defense

a. General. Since the rapid concentration of artillery fire is essential to a successful defense, centralized control is desired. Every effort is made to meet the main attack with a mass of artillery fire. Deception is employed to mislead the enemy as to the amount of artillery and locations. Position areas are selected to provide continuous and effective artillery fire support throughout the action. Organization of position, target acquisition, survey, communication, and fire planning are as complete as time and the situation permit.

b. Position Areas. In the defense, the selection of position areas for the artillery is normally based on the following considerations:

- (1) Artillery is echeloned in depth to insure that continuous artillery fire support can be delivered within the battle area.
- (2) All division artillery is positioned so that it can fire immediately in front of the forward edge of the battle area (FEBA).

- (3) Some artillery units are placed in forward positions to provide counterbattery and longer range harassing and interdiction fires.
- (4) The advantage of defensive terrain features, incidental protection afforded by the reserve, and access to a route of withdrawal are all considered.
- (5) Priority of positions is given to units providing close support for elements in contact.
- (6) Whenever possible, position areas are selected in the zone or area of responsibility of the supported unit to avoid interference with other units.
- (7) Positions facilitate organization, future operations, and defense. All units prepare their positions for defense against ground and airborne attack. Camouflage is stressed.

c. Alternate and Supplementary Positions. All artillery commanders are responsible that the necessary alternate and supplementary positions are selected and prepared to the extent possible. Alternate positions are usually occupied only when the primary position becomes untenable. A supplementary position is usually occupied only after approval by the commander of the supported force.

59. Defensive Fires

a. Fire Planning. Detailed fire planning is essential to effective artillery support of defensive operations. Defensive fires are planned to—

- (1) Delay and disorganize the enemy's approach.
- (2) Disrupt the enemy's attack preparation by counter-preparation fire.
- (3) Impede the enemy's attack with close defensive fires in width and depth throughout the sector.
- (4) Break up the enemy's assault by final protective concentrations and barrages.
- (5) Limit penetration with on-call fires within and behind friendly lines.
- (6) Support the counterattack and associated limited offensive actions.

b. Fires Delivered Before the Enemy Forms for the Attack. Fires delivered before an enemy forms for the attack include interdiction and harassing fires, which will force the enemy into early deployment, and fires in support of security forces (covering and general outpost forces).

- (1) Harassing and interdiction fires are usually planned by division, corps, and army artilleries. Planning is based on studies of maps, terrain, road nets available to the enemy, and all other target intelligence. Targets suitable for harassing

fires are enemy batteries, assembly areas, observation posts, communication centers, command posts, and leading elements. Targets suitable for interdiction fires are harbors, road junctions, bridges, and crossroads. Harassing and interdiction fires are irregularly timed to prevent the enemy from determining their pattern.

- (2) Fires in support of a security force are usually planned by the highest artillery echelon with that force. Additional fires by the artillery with the security force and with the main defensive force are planned to cover the withdrawal of the security force.
- (3) Artillery supporting a general outpost force will usually fire from supplementary positions to avoid disclosing the artillery positions prepared for use in support of the battle area.
- (4) The time of opening fire is decided by the force commander. Premature firing which may expose the artillery to neutralization and reveal the plans of the defending force is avoided. Firing is usually confined to the attack of targets presenting the greatest danger to the defending force.

60. The Counterpreparation

a. Counterpreparation fire is intensive prearranged fire delivered just prior to the initiation of the enemy attack. It is designed to break up enemy formations; disorganize the enemy's systems of command, communication, and observation; decrease the effectiveness of his artillery preparation; and shatter his offensive spirit. A counterpreparation is delivered in a scheduled sequence only on order of the force commander.

b. Premature firing must be avoided, since it provides the enemy with counterfire data for his artillery preparation and indicates to him the areas to be avoided in forming for the attack.

Section III. COUNTERBATTERY

61. Definition

The term "counterbattery" includes fires on mortar, cannon, rocket, and missile positions.

62. Counterbattery Tactics

Counterbattery tactics is the artillery commander's expression of his plan for employing the artillery to attack hostile weapons in support of the force commander's mission and plan of maneuver or defense. It may include the type of counterbattery program to be executed, methods of attacking specific targets, and the artillery commander's criteria as to what should constitute a confirmed or suspect weapon location.

63. Considerations

Some considerations affecting the determination of counterbattery tactics are—

- a.* The mission of the supported force.
- b.* A knowledge of the tactics and techniques of employment of the enemy artillery.
- c.* The amount and types of enemy weapons and the degree of activity.
- d.* The capability to locate enemy weapons and deliver effective fire on them.

Section IV. RETROGRADE MOVEMENTS

64. General

Retrograde movements are classified as delaying actions, withdrawals, and retirements. Artillery units supporting retrograde operations should be highly mobile. Artillery fires are employed to deceive, disrupt, destroy, and delay the enemy advance, to neutralize enemy artillery, to assist the maneuver elements in disengagement, to support limited counterattacks and tank sweeps. Details of the maneuver aspects of a retrograde movement are given in FM 61-100.

65. Artillery Employment in Retrograde Operations

a. Usually a force engaged in a retrograde operation is weaker than the enemy. Therefore, the skillful and aggressive use of artillery firepower is critical to the successful accomplishment of the force mission. Artillery units are organized for combat so as to provide maximum flexibility and versatility of employment. Centralized control is retained to the maximum degree feasible. The assignment of tactical missions must provide for effective support to the committed maneuver elements and retention at the force artillery level of the capability to shift fires and units rapidly to meet unforeseen tactical contingencies.

b. Detailed planning for the employment of artillery is conducted at the force artillery level. Execution is decentralized to the artillery commanders at lower echelons to insure responsiveness to the artillery support requirements of the maneuver elements of the force.

c. Artillery is positioned initially well forward to exploit the range of its weapons. Positions to the rear are selected and occupied as required to provide continuous artillery fire support during withdrawals.

66. Fire Planning

Artillery fire support requirements are met through centralized planning and decentralized execution. Fires are planned on enemy avenues of approach, assembly areas, and troop concentrations and on and behind the friendly position to support disengagement and with-

drawal. The priority targets are enemy forward elements, fire support means, and local reserves. Fires may include high explosive, chemical, incendiary, biological, and nuclear fires with a variety of effects. Fire support plans are closely integrated with plans for the employment of the maneuver elements of the command.

67. Support of the Delaying Action

Artillery supports a delaying action by delivering long-range fires from positions well forward to inflict damage and to delay the advancing enemy. The artillery is echeloned in depth to permit maximum continuous artillery support as the enemy closes on the maneuver elements and forces them to yield ground. Artillery battalions displace by echelon to insure that some fire units are always in position to respond to calls for fire. Ground and air observation to the front and flanks is maintained to permit surveillance of fires and adjustment of fire on targets of opportunity and to provide continuous information concerning friendly and enemy activity.

68. Support of the Night Withdrawal

Artillery supports the night withdrawal by providing continuous artillery fires to the detachments left in contact. Artillery units of representative calibers, in strength proportionate to the strength of the detachments left in contact, remain in position to cover the withdrawal. The remainder of the artillery displaces with the main body to new positions to the rear. Close liaison and coordination is effected with these security detachments to insure the adequacy and timeliness of artillery fires and to coordinate displacement of the artillery remaining. The normal pattern of fires is maintained to enhance deception and to cover the noise of displacing vehicles. Detailed fire plans are prepared to counter, delay, disorganize, disrupt and/or deceive enemy attempts to interfere with the withdrawal operation.

69. Support of the Daylight Withdrawal

a. Artillery supports the daylight withdrawal by delivering fires to assist in disengagement and to delay, disorganize, and disrupt the enemy advance. Artillery units displace to the rear by echelon, in close coordination with the movement of the supported force. For purposes of deception, representation of all types of artillery with the force is maintained when appropriate. Timing is critical. General support artillery is employed to provide additional fire support. Massed fires are delivered against enemy forces threatening the success of the withdrawal. When the situation warrants, control of displacements is delegated to lower echelon commanders to facilitate timing and coordination with the disengaging elements. Multiple routes of withdrawal are used, whenever possible, to speed the withdrawal and avoid excessive concentration of troops and vehicles.

b. If enemy pressure prevents a friendly element from disengaging, a limited counterattack or tank sweep may be launched to relieve the pressure. Artillery supports the counterattack with all available fires, including smoke, if needed, to screen friendly movements. Detailed coordination of fires with maneuver is essential.

70. Retirement

Strong artillery support is provided the security forces. Artillery is positioned throughout the columns to support the main body or furnish additional support to the security force.

71. Rearward Passage of Lines

Retrograde operations frequently terminate in a rearward passage of lines. Liaison is established between the artillery commanders of the withdrawing force and the force which is being passed through. Information is exchanged, and plans are coordinated. Arrangements are made for the transfer of fire support responsibility for the sector. This transfer normally coincides with the passing of control of the sector from the withdrawing commander to the commander of the force being passed through. Fire plans are prepared and communication channels are established to permit the withdrawing force to receive artillery support from the force being passed through during the critical phases of the withdrawal.

Section V. ARTILLERY IN NUCLEAR ENGAGEMENTS

72. General

a. It can be anticipated that the battle for nuclear superiority will be waged through the combined efforts of all U.S. forces. This section discusses the role of the artillery as a part of this combined effort.

b. Even though the artillery tactical doctrine set forth thus far is considered generally applicable under all conditions of warfare, the introduction or the threat of the introduction of nuclear weapons may dictate certain limited modifications. This section sets forth these considerations.

c. Artillery deployed during a nonnuclear war, conducted under the imminent threat of the use of nuclear weapons, cannot suddenly, under appreciable change, redeploy the instant nuclear weapons are used. Since only limited maneuver will be possible during the initial phases of a nuclear exchange, artillery dispositions during conventional war, when the use of nuclear weapons is likely, must be such that units so disposed can accomplish their mission without appreciable displacement.

73. The Role of Artillery in Nuclear Engagements

a. Nuclear Superiority. The principal artillery task in nuclear combat is to gain fire superiority as rapidly as possible over the enemy's nuclear artillery throughout the area of influence of the supported force commander. Concurrently the artillery will provide continuous support to the maneuver elements, delivering either nuclear or nonnuclear fires as required.

b. Acquiring Nuclear Targets. The target acquisition effort will exploit fully all available means to locate nuclear targets. At division and corps level this effort will include ground and air observers, electronic and mechanical means, and reconnaissance and intelligence gathering agencies, such as patrols and stay-behind elements. The location of hostile nuclear artillery is of primary concern.

c. Deployment.

- (1) Although centralized control is desirable, distances and deployments may dictate some decentralization. In this case, artillery may be attached to maneuver elements.
- (2) Some artillery units may not be utilized in the delivery of nuclear fires; these units should be disposed in depth to—
 - (a) Support maneuver elements in action against enemy penetration or infiltration.
 - (b) Provide dispersion as a passive measure against nuclear attack.
 - (c) Provide for artillery unit replacement.
 - (d) Support maneuver elements in subsequent phases of the operation.

d. Army and Corps Artillery.

- (1) The bulk of the field artillery missile units are at army and corps artillery levels. These nuclear delivery means are employed to the maximum extent possible in the nuclear battle.
- (2) The ranges of certain nuclear artillery weapons and their employment over extended distances may dictate attachment of army artillery units to corps and some corps units to division.
- (3) Shorter range nuclear artillery units will require firing positions relatively near the forward edge of the battle area. In addition, these units will require assembly areas and firing positions deeper in the zone. Nuclear artillery delivery units in the forward area should be positioned so as not to present lucrative target complexes to the enemy.
- (4) Firing positions for missile units will be selected to facilitate accomplishment of their mission(s). Priority for occupation of these positions will be in accordance with the fire support plan.

- (5) Some cannon nonnuclear artillery units will be positioned in considerable depth for the purposes stated in c(2) above and may be out of range of the forward edge of the battle area (FEBA). These units will be positioned to support maneuver forces deployed at relatively great depths.

e. Division Artillery. Division artillery weapons consist of cannon and missiles. The general considerations outlined for corps artillery weapons apply equally to similar weapons at division artillery. Additional considerations concerning employment of the division artillery in nuclear combat are—

- (1) *Direct support battalions.* Direct support battalions may be attached to major combat elements. In such cases, their position areas will be determined by the deployment and mission of the supported force.
- (2) *Other artillery.* Division artillery units not assigned a mission of direct support are employed by the division commander in a manner to insure maximum participation in the nuclear battle consistent with the capabilities of the weapons. Missile units may prepare numerous firing positions in the forward area and, to a lesser degree, in depth. In general, nuclear cannon artillery will be employed throughout the depth of the zone.

74. Employment of Artillery Subsequent to Nuclear Engagements

a. Following a nuclear engagement, the artillery supports the maneuver elements with nonnuclear fires as required. The artillery continues to maintain nuclear superiority over enemy nuclear artillery throughout the area of influence of the supported force commander.

b. It can be expected that the battle for nuclear superiority will result in extensive losses in field artillery personnel and equipment. In order to provide artillery support under these adverse conditions, artillery commanders must be prepared to—

- (1) Decentralize control to the degree dictated by the situation.
- (2) Operate with limited logistical support.
- (3) Improvise command and administrative structures.
- (4) Replace or reconstitute ineffective units.

Section VI. ARTILLERY UNDER CHEMICAL AND BIOLOGICAL CONDITIONS

75. Employment

a. Chemical and biological agents may be employed tactically to assist the field commander in accomplishing his mission. Plans for

the employment of these agents to support tactical operations are integrated with the scheme of maneuver. In the fire support plan, chemical and biological fires are integrated with other fires.

b. In defensive operations, chemical and biological agents may be employed to produce casualties, slow down the enemy attack, canalize the enemy attack along avenues of approach favorable to the defender, and force the enemy into areas that facilitate friendly counterattack. Extreme care must be exercised in the use of these agents so as not to create hazards to friendly troops.

c. Details concerning the employment of artillery under chemical and biological conditions are given in FM 3-10 and FM 3-10A.

76. Capabilities

a. Field artillery units have a capability of delivering chemical and/or biological agents on enemy targets. The proper delivery of these agents offers the commander a means of target neutralization which may be employed alone or in conjunction with other weapons.

b. The capabilities of the weapons systems and the characteristics of the agents must be considered in the determination of the most suitable weapon for delivery of chemical and biological agents. Non-persistent agents require surprise fire to achieve maximum results; whereas persistent agents can be placed on the target over a period of time. In general, for nonpersistent agents, an attempt should be made to deliver all available fire on the target with a single volley TOT. Cannon units can deliver a volume of fire, but at short ranges; whereas, chemical and biological missile warheads can cover larger areas, at longer ranges, but at a low rate of supply.

Section VII. COUNTERINSURGENCY

77. Counterinsurgency Operations

Artillery units may be required to support counterinsurgency operations. In the initial phase of an insurgency, U.S. Army artillery personnel may be organized into mobile training teams (MTT's) to train host country artillery units. However, if the insurgency increases in scope and intensity, U.S. Army artillery units may provide assistance to the host force, and, if committed to action, will support the committed host force. The role and tactics of artillery units in counterinsurgency operations are generally the same as in counter-guerrilla operations, but there are additional considerations regarding the use of artillery fire support. Some of these are—

a. Particular importance is placed on the general limitation on the use of artillery into populated areas.

b. Additional fire direction requirements will be generated because

of the wide dispersal of artillery batteries or sections, and because poor terrain conditions will make observation of artillery fire difficult.

c. The positioning of artillery will be influenced by the requirement for defense against guerrilla attack, and by the necessity to maximize area coverage.

d. Requests for and adjustment of artillery fire should be simplified to allow indigenous personnel to request and direct fire.

e. The use of artillery fire may provide a psychological impact often greater than the actual damage caused by artillery fire.

f. Timely and accurate artillery fire delivered on a guerrilla force in a counterinsurgency operation may often be a two-pronged morale factor, one that is damaging to the guerrilla force, and one that is reassuring to the counterinsurgency force.

g. During counterinsurgency operations, artillery units will be closely concerned with civic action programs. These programs are designed to win the support of the people and also to insure security and assistance in population and resources control measures.

h. For further discussion of the role of artillery in counterinsurgency operations, see FM 6-20-2, FM 31-16 and FM 31-22.

78. Employment

In counterinsurgency operations, greater emphasis is placed on the employment of batteries and sections on independent missions with decentralized control. Employment of battalion-size units will seldom be practical because of the wide dispersion of counterinsurgency units, difficult terrain, and lack of mobility.

CHAPTER 8

SPECIAL TACTICAL OPERATIONS

79. Operations Under Special Conditions

Operations under special conditions are those operations in which the terrain, weather, or nature of the operation itself create the necessity for special measures to meet the situation. Operations under special conditions include amphibious, mountain, jungle, and desert operations; combat in fortified and built-up areas; river crossings; supporting friendly guerrillas; supporting counter guerrilla operations; airmobile artillery movements; and airborne operations. The discussion in this section is limited to special artillery tactics required in operations conducted under special conditions. The techniques pertinent to specific types of operations are discussed in FM 6-20-2.

80. Plans and Estimates

Artillery employment in support of special operations requires particular emphasis, beyond that previously discussed, in estimates, plans, and training. For example:

a. Information and intelligence on which estimates are based will often come from other than U.S. agencies. In some operations, it is impossible to verify the information received because of the distance to or the inaccessibility of the area of operation.

b. Plans developed from estimates based on the information discussed in *a* above must be extremely flexible in order that they may be adjusted to unforeseen situations in the combat area.

c. Artillery plans for operations under special conditions include considerations of—

- (1) Liaison and coordination with appropriate arms and services of the forces concerned.
- (2) Acquisition and analysis of targets.
- (3) Coordination of fire support.
- (4) Amounts and types of artillery and ammunition required during various stages of the operation.
- (5) Organization for combat.
- (6) Details of employment of artillery units, to include movement into selected position areas, registration, fire plans, and survey.
- (7) Special communication equipment and procedures.

d. Training is required in—

- (1) The use of special equipment.
- (2) The operation, care, and maintenance of equipment under expected terrain and weather conditions.
- (3) Special techniques required to apply the basic artillery combat doctrine.
- (4) Language and customs of the area of employment.

81. Amphibious Operations

α. The initial employment of artillery in an amphibious operation varies considerably from the employment of artillery in land warfare. Artillery normally does not engage in the preliminary preparation for the beach assault and may not enter action until after the infantry attack is initiated. As in land warfare, the amount, type, and organization of the artillery force must be suited to the needs of the operation. However, the types of ships and the characteristics of the landing area may prevent the landing of the quantity and caliber of artillery required by the strength of the enemy and the characteristics of the area. Initial positions are usually limited in area. Positioning on offshore islands may be desirable and even required.

β. Elements to be considered in formulating *the artillery plan* in amphibious operations are—

- (1) *Organization for combat.* The principles of organization for combat that apply to land operations apply also to amphibious operations. When combat elements land on widely dispersed beaches, it may be necessary to attach artillery to the assault element. Other artillery units may be given missions of general support or reinforcing.
- (2) *Organization for embarkation.* Artillery should normally be organized for embarkation as a separate embarkation unit. Artillery with a direct support mission will normally embark with the supported unit.
- (3) *Zones of fire.* Principles for establishing zones of fire in land operations are applicable to amphibious operations. However, in beachhead operations, artillery may have fields of fire greater than 3,200 mils; this may present difficulties in massing the available artillery.
- (4) *Position areas.* The force artillery commander must coordinate the assignment of position areas for artillery units with the force.
- (5) *Target information and survey control.* Artillery intelligence agencies must exploit every available source to locate targets and to determine the amount of survey control existing on or near the beachhead.
- (6) *Communications.* The control and coordination of artillery

units of the landing force during the ship-to-shore movement make it imperative that simple, reliable, and flexible communications be available. Communication is required between the force artillery commander, all subordinate artillery elements, and the logistic elements, whether afloat or ashore.

- (7) *Ammunition supply.* The artillery commander at each echelon must have a detailed ammunition plan. The plan should provide for the rapid unloading and delivery of artillery ammunition to firing positions ashore.
- (8) *Time of landing.* The time of landing of artillery depends on such factors as the need for artillery ashore, available position areas, conditions of beach entrances and exists, and the ability of the shore party to effect the landing.
- (9) *Reconnaissance.* Continuous reconnaissance is made of the objective area, utilizing every means available. An air or seaborne reconnaissance should be made of the beach area and immediate terrain inland to select the best landing beaches, position areas, routes, and observation facilities.
- (10) *Ship-to-shore movement.* Planning the ship-to-shore movement consists of determining the procedures for landing the artillery after the factors listed in (1) through (9) above have been considered.
- (11) *Artillery support of the beach assault.* When possible, artillery is employed to support the beach assault. Advantage accrues to the maneuver force when artillery is positioned to give continuous artillery support throughout the beach assault. The artillery plan must provide for supporting fires.

c. The details of amphibious operations are discussed in FM 6-20-2, FM 31-12, and FM 100-5.

82. Mountain Operations

Artillery units can operate successfully in mountains, although mountain warfare imposes special problems concerning mobility, fires, communications, and tactical employment. Personnel working in high altitudes perform their duties with less efficiency because there is less oxygen, and, therefore, more frequent rest periods are required. This additional time factor must be considered when planning mountain operations.

a. Areas requiring particular attention by the artillery commander in support of mountain operations are—

- (1) *Mobility.* Movements of artillery are restricted to roads and improved trails or by limited aerial means. The lack of roads and trails limits the choice of avenues of approach and canal-

izes the movement of artillery. Ammunition supply and storage require constant effort and attention.

- (2) *Fires.* The inherent flexibility of artillery fires may be restricted by a lack of suitable position areas and by high masks. High-angle fires are employed frequently to reach over masks, behind crests, and into deep valleys.
- (3) *Targets and target locations.* Direct observation by ground or aerial observers is the most reliable means of locating targets in the mountains. Ground observers may be restricted in observation by the next hill mask. In locating enemy artillery, much reliance must be placed on shell reports and studies of map and aerial photographs, since the effectiveness of radar and sound ranging is reduced in the mountains.
- (4) *Control.* Decentralized control of artillery may be required to provide support for units separated by terrain features. Communications become difficult in such an operation.

b. The techniques concerning mountain operations are discussed in FM 6-20-2, FM 31-71, and FM 31-72.

83. Jungle Operations

Jungle combat is designated a special operation primarily because the inherent difficulties of terrain, climate, and visibility complicate artillery problems of command, control, movement, communication, target acquisition, and supply.

a. Areas requiring particular attention by the artillery commander in support of jungle operations are—

- (1) *Mobility.* Movement of artillery in the jungle is restricted since there are no roads or trails beyond the populated areas. Roads must be constructed and continually maintained.
- (2) *Fires.* As in mountain operations, the inherent flexibility of artillery fires in jungle operations may be restricted by excessive masks and a lack of suitable position areas, accurate maps, and survey control.
- (3) *Targets and target locations.* Observation is extremely restricted by jungle growth and is often limited to the immediate vicinity of the observer. Army aircraft can be used profitably in the jungle. Sound and flash ranging and radar may be used to locate targets, but their use is normally restricted.
- (4) *Logistics.* Supply and storage of ammunition in the jungle require constant effort and attention. Ammunition must be stored with care to protect it from moisture and to prevent rapid deterioration.

b. The techniques concerning jungle operations are discussed in FM 6-20-2 and FM 31-30.

84. Desert Operations

Artillery tactics and plans must be varied to suit the conditions of terrain and climate in desert areas. Desert terrain varies widely from low, flat, sandy plains to high, rocky, mountainous areas. Temperatures also vary from torrid to subzero according to the latitude and altitude. Arid climate and a lack of vegetation are the only characteristics common to all desert areas.

a. Areas requiring particular attention by the artillery commander in support of desert operations are—

- (1) *Targets and target locations.* Ground observation is difficult because of heat waves, mirages, and lack of elevated positions. Distances may be deceiving, and the absence of identifiable landmarks reduces the value of maps. Army aircraft can be used to locate targets, but the locations may not be accurate because of the above-mentioned factors.
- (2) *Maintenance.* An intensive maintenance program is required to protect all material from the abrasive action of dust and sand. The combat readiness of artillery units in support of a desert operation depends on the effectiveness of this program.

b. The techniques concerning desert operations are discussed in FM 6-20-2 and FM 31-25.

85. Combat in Fortified and Built-Up Areas

When practical, fortified and built-up areas are bypassed and isolated; only those towns or settlements that provide critical communication facilities, occupy key terrain, or constitute islands of resistance so large as to be serious threats to future operations will normally be attacked by artillery in support of offensive or defensive operations. The techniques concerning combat in fortified and built-up areas are discussed in FM 6-20-2 and FM 31-50.

86. River Crossings

Wide unfordable rivers have considerable influence on artillery in support of river-crossing operations because they impose restrictions on ground movements and maneuver. Additionally, they constitute obstacles to attack and afford natural lines of resistance for defense.

a. *Offense.* Artillery supports river-crossing operations from positions as far forward as secrecy permits. Positioning must be such that large vulnerable targets are not presented to the enemy. Movement across the river requires adherence to detailed planning, critical timing, and rapid execution. Artillery in direct support may displace to the far bank when the first phase objective has been seized. General support and reinforcing artillery must be prepared to provide direct

support for the maneuver forces while the direct support artillery unit displaces.

b. Defense. A river obstacle may allow the assignment of a relatively wide frontage. The artillery is deployed in depth, giving it space for movement and dispersion, so that it can effectively organize for the defense. Additionally, the artillery is employed to cover all possible crossing sites and yet retain its capability of massing fires on critical targets.

c. Techniques. The techniques concerning river-crossing operations are discussed in FM 6-20-2 and FM 31-60.

87. Supporting Friendly Guerrillas

In general, friendly guerrilla operations are coordinated or supervised by detachments from U.S. Army special forces units. In such cases, the special forces elements provide liaison to the Army force that is cooperating with the guerrilla force. Artillery requirements are submitted through normal force-to-artillery channels. Further details on friendly guerrilla operations are contained in FM 6-20-2.

88. Supporting Counter guerrilla Operations

A general discussion of the employment of artillery in support of counter guerrilla operations in a counterinsurgency environment is contained in paragraph 77. Counter guerrilla operations may also be conducted in rear areas during limited and general war. A major concern of an artillery commander in support of counter guerrilla operations is the security of the command, both on the march and in position. He must keep in mind that he is fighting an unconventional enemy, and that conventional tactics will require unconventional application because of the type of enemy, terrain, and situation. Consideration for the employment of artillery in support of counter guerrilla operations are discussed below:

a. Guerrilla forces do not operate in a conventional manner; they are elusive in their operations, presenting artillery targets that are fleeting and temporary. Such tactics will lessen, and may eliminate, the need for massed fires and require additional emphasis on rapid precision fire.

b. Operations launched against guerrilla forces seek to destroy not only the guerrillas themselves but also their sources of supply and communications. The requirements for artillery support in the earlier phases of an operation may be limited. The fluidity of operations and rapid changes in the tactical situation demand that the artillery commander be constantly ready to support any part of the operation. Artillery may be the only source of fire support available to the force, and its effective employment has a demoralizing effect on the enemy force.

c. Timely and accurate artillery fire support must be provided to support offensive operations against guerrillas, such as raids on guerrilla bases, and also support of friendly patrol action. Aerial artillery may be used as supporting artillery.

d. Artillery fire support is effective in defensive operations against guerrilla attacks since it provides essential assistance to the defense of fixed installations, generally located in rear areas, and to other installations which may be potential targets.

e. Artillery fire is effective in providing a defense for convoys against an ambush.

f. The control of artillery fire in counter guerrilla operations is most important because of the general limitation on the use of artillery in populated areas. Indiscriminate use of artillery fire can quickly alienate a population.

g. The techniques concerning counter guerrilla operations are discussed in FM 6-20-2 and FM 31-16.

89. Airmobile Operations

Artillery movements using aircraft as the primary means of mobility are conducted as tactical moves and may be executed under night and day conditions. The airmobile artillery is used to rapidly displace artillery units into battle in support of airlanded assaults, to overcome enemy and natural obstacles, to facilitate rapid displacements, and to bypass enemy troop concentrations.

a. The airmobile movement of artillery is characterized by detailed planning and coordination, aggressive execution, speed of displacement, and operation with minimum personnel and equipment for periods of short duration.

b. Airmobile movements are conducted in four phases—planning, marshaling, movement, and occupation of position. The planning phase encompasses coordination with supported and supporting units, reconnaissance and selection of positions, preparation and issuance of forms and orders, and—time permitting—rehearsals. The marshaling phase consists of ground movement to appropriate areas; preparation of the aircraft loading area; preparation of troops, equipment, and supplies for airmobile operations; and loading of aircraft preparatory to actual movement. The movement phase encompasses the actual move from the loading area to the landing site; this phase commences with takeoff of the first aircraft and ends with arrival of the last aircraft at the landing site. The occupation phase of the airmobile movement consists of the unloading of personnel and equipment, organization of the landing site, and occupation of position.

c. The depth of the objective is a major factor in the determination of the amount, type, and positioning of the artillery to support the operation.

d. Details concerning artillery employment in airmobile operations are given in FM 6-20-2, FM 57-35, and FM 6-140.

90. Airborne Operations

Airborne operations consist of the movement and delivery by air of combat forces and their logistical support into an objective area for the execution of a tactical or a strategic mission. These forces may consist of airborne, infantry, and mechanized infantry divisions and air transportable units with supporting artillery. Airborne operations may be a joint effort, using U. S. Air Force, Navy, and Army transport aircraft.

a. Preliminary plans and estimates for airborne operations normally originate at theater level with the selection of missions for airborne units. The airborne force develops, or has subordinate airborne task forces develop, detailed operational plans for specific units. With the announcement of the complete planning directive, concurrent and continued planning is undertaken at all echelons of the affected units. Some of the factors to be considered in planning for artillery employment in support of airborne operations are—

- (1) The capability of artillery to prepare equipment for heavy drop parachute delivery.
- (2) Refresher training required in air transportable techniques.
- (3) The lack of ground reconnaissance of position areas in the assault objective area.
- (4) The determination of declination constants, survey data, and target intelligence.
- (5) Communications between the airhead artillery commander and the commander of the link-up or supporting forces.
- (6) Early establishment of centralized control of artillery in the assault phase.
- (7) Fire coordination lines between the airborne assault and link-up forces.

b. The techniques concerning airborne operations are discussed in FM 6-20-2, FM 57-10, and TM 57-210.

91. Supporting Psychological Operations

Artillery is a means and a common method used in the tactical dissemination of psychological operation leaflets and other printed media. Artillery fire permits accurate dissemination of this material regardless of weather conditions. The techniques and tactics concerning psychological operations are discussed in FM 33-5.

CHAPTER 9

TARGET ACQUISITION, INTELLIGENCE, AND ANALYSIS

92. Scope

In this chapter, target intelligence, target acquisition, and target analysis are explained in general terms, more detailed guidance is given in FM 6-121.

93. Collection of Target Intelligence

The combat intelligence function of the field army results in two basic intelligence products: decision-oriented intelligence and target intelligence. The force commander employs decision-oriented intelligence in the design and execution of maneuver, and target intelligence in the application of firepower. Both types of intelligence emerge from the same broad collection effort of the combat intelligence function, but target intelligence poses more exacting requirements for accuracy and timeliness. Some considerations are—

a. Target acquisition is that part of intelligence activity which involves accurate and timely detection, identification, and location of ground targets for the purpose of target analysis and the effective employment of supporting weapons. Target acquisition results from applying information collected from all sources and agencies to a special purpose.

b. Detection determines the existence or presence of a target. Identification determines the nature, composition, and size of the target. Location consists of determining the three dimensional coordinates of the target with respect to known points or weapons, i.e., with respect to a common grid. Location requires greater accuracy for target acquisition purposes than for general intelligence usage.

c. Target intelligence must be sufficiently detailed to permit an evaluation of the target's importance in relation to the mission of the command.

d. Target intelligence must be sufficiently detailed to permit analysis to determine the most effective weapon or warhead for use against the target.

e. Direct target acquisition refers to data obtained from collection agencies; indirect target acquisition is developed from information supplied by two or more means. The principal objective of the target acquisition effort is to achieve predicted fire capabilities for first round effectiveness.

f. The effectiveness of the fire on a target will depend largely upon the accuracy, completeness, and timeliness of target acquisition.

g. Collection agencies must be impressed with the requirement to

provide complete and accurate target information in order to satisfy the needs of specific users.

h. Timeliness in acquiring targets is absolutely essential since the enemy will try to avoid presenting lucrative targets, and those presented will be made as transitory as possible.

94. Coordination and Processing of Target Acquisition

a. Artillery target acquisition agencies are part of the intelligence-gathering agencies of the force and, as such, are a major component of the combat intelligence system at all echelons. The force G2 (or S2), in developing his collection plan, makes full use of artillery agencies in collecting combat intelligence. The discharge of this responsibility is furthered by the artillery's extensive communication system, target acquisition equipment, and ability to coordinate numerous observers. The primary function of the artillery target acquisition means is the gathering and reporting of target information of importance to artillery operations in support of the combat force.

b. Environmental conditions impose a wide and varying range of limitations which has a particular effect on every target acquisition means employed. In order to insure continuity of the target acquisition effort, there must always be supplemental target acquisition means available in case other means are degraded because of the predominance of certain environmental conditions.

c. The techniques involved in the processing of target acquisition data are extremely important in establishing the degree of responsiveness with which targets can be engaged. Targets capable of displacing rapidly and/or imposing a serious and immediate threat to the security of friendly forces must be engaged as soon as possible after they have been acquired. Target acquisition means are limited in the time they can locate targets by the operational characteristics of each device employed. Normally, these time factors do not constitute a responsiveness problem in themselves. Degradation of responsiveness is caused by the time consumed in the transmission and processing of target acquisition data between the acquisition source and the unit selected to engage the target. All possible measures must be instituted to reduce to a minimum the time required to transmit and process target acquisition data.

95. Target Analysis

The force commander provides guidance for the accomplishment of target analysis by announcing the priority of targets to be attacked, the desired level of damage or casualties to be obtained, and the degree of risk to be assumed. The priorities for target intelligence in the target acquisition plan should be in accordance with the force commander's guidance for target analysis.

CHAPTER 10

AMMUNITION SERVICE

96. General

This chapter includes a discussion on the interrelationships of tactics and ammunition service, the factors which govern the establishment and adjustment of ammunition supply levels, and basic information on ammunition supply procedures. It is intended to provide an insight into ammunition service and to promote understanding among tactical and ammunition service commanders. No amount of written doctrine, however, can replace the value and importance of effective liaison and cooperation between these commanders.

97. Interrelationships of Tactics and Ammunition Service

Ammunition directly influences tactical operations. For this reason, tactical commanders must plan their operations and commit their forces with full awareness of the support capabilities of the ammunition service support structure. Likewise, logistical commanders must establish, stock, and employ ammunition service units with full awareness of the operational plans of the tactical commanders. An imbalance of either tactics or ammunition service may decisively influence operations. Therefore, they must not be considered as individual entities, but as an inseparable unity—requiring maximum attention and coordination.

98. Ammunition Supply Levels

Ammunition supply levels are normally expressed in terms of days of supply for each theater of operations and for major commands within each theater. These supply levels will be established initially in accordance with available experience on the amount of ammunition consumed per average day. Available ammunition assets will then be announced, expressed in terms of these average days. A day of supply will be recomputed as additional consumption experience is gained. The logistical system will attempt to match the receipt of ammunition to the consumption so that the desired balance of reserves on hand can be maintained. Therefore, above average consumption by one part of the force tends to be balanced by limiting the consumption of another part of the force. Major commanders will desire to maintain this level of supply as being the minimum acceptable level of reserves. To change this level of supply by increasing the rate of receipts re-

quires a planning lead time far exceeding the lead time for tactical and operational planning. Factors which cause this long lead time are procurement and production, order and shipping time, type and quantity of transportation available, amount of storage space in the theater, physical security forces available to protect shipments and storage areas, and the degree of control over the tactical situation.

99. The Conventional Ammunition Supply System

Ammunition directly influences tactical operations and is controlled by each commander in the tactical chain of command. The conventional ammunition supply system is designed for fast resupply. This system, known as the continuous refill system, is based on possession by the using units of a fixed basic load of ammunition which will be replenished as used. Resupply of artillery ammunition is critical since it represents the largest percent of the ammunition resupply tonnage.

a. Units replenish their basic loads from designated ammunition supply points (ASP). Replenishing the basic load in an active situation may be done at the time of, in expectation of, or after its expenditure.

b. A unit preparing to defend against an attack may stockpile ammunition at weapon positions and draw ammunition from the ammunition supply point on the basis that it is needed for immediate use. A unit may draw, in excess of its basic loads, ammunition "required for immediate consumption". Immediate consumption is interpreted to mean that the ammunition will be expended within 24 hours.

c. The amount of ammunition in a unit's possession may exceed the basic load for a short time. A unit drawing ammunition on the basis that it is needed for immediate use is, in effect, drawing ammunition in expectation of a future requirement. This temporary overage may be frequent and normal during continued fighting. Commanders must prevent ammunition overages from becoming excessive or prolonged.

100. Conventional Ammunition Supply Procedures

a. General. The procedures for supply and stock control of conventional ammunition involve the basic load, the required supply rate, the available supply rate, and the functions of major command ammunition officers as well as the staff responsibilities of the G3 (S3) and G4 (S4).

b. Basic load. A basic load of artillery ammunition is the quantity of ammunition which a unit is authorized to have in its possession based on rounds per weapon. It is carried by organic equipment and personnel. Each commander must insure that his basic load is maintained at the prescribed level.

c. Required supply rate (RSR). The RSR is the amount of ammu-

dition for each type of weapon, expressed in rounds per weapon per day, required to sustain unrestricted operations of a force. Artillery commanders at division, corps, and army, working jointly with the force G3 and G4, recommend to the force commander the quantity of artillery ammunition needed to support tactical operations. These estimates are based on the mission, experience data, the theater, knowledge of the enemy, and the plan of operation. The quantity of ammunition requested by each echelon is reviewed, evaluated, and consolidated at the next higher echelon. Final determination of ammunition distribution is made at theater level. When determining the RSR, consideration is given to the mission, plan of operation, available weapons and units, and other fire support means.

d. Available supply rate (ASR). The ASR for artillery weapons is the rate of consumption of ammunition expressed in rounds per weapon per day that can be sustained with available supplies for a specific period. This rate is based on credit allocations from higher headquarters and the tactical requirement of corps and other elements of the Army. The corps commander announces an allocation of artillery ammunition to the corps artillery units and the divisions of the corps, based on recommendations of the corps artillery commander. Ammunition at division level is similarly allocated. The ASR among units of the same type often varies with the mission, available targets, and plan of the supported unit. Authority from the next higher commander is required before a unit may exceed its ASR. The ASR is published in the administrative order and paragraph 4 of the fire support plan annex to the operation order or as a fragmentary order.

e. Tactical savings. Within the ASR set by a higher headquarters, subordinate headquarters may establish ammunition rates for their units to meet particular tactical situations. In this manner, they may acquire tactical savings of ammunition by reducing the allocations to their units. Division is the lowest echelon which may develop a tactical saving of ammunition.

101. Special Ammunition Supply Procedures

The basic load and automatic resupply system which applies to conventional ammunition does not apply to special ammunition. Basic procedures applicable to special ammunition are as follows:

a. Control. The control of special ammunition is a command function. The G3 has primary general staff responsibility for controlling special ammunition expenditures. Control of special ammunition issues to support tactical plans and operations is a primary staff responsibility of the G4. The G4 will accomplish logistical movement and positioning of special ammunition based on operational plans of the G3. Control of special ammunition expenditures or issues may be accomplished in a fire support coordination center or a tactical opera-

tions center. SOP's must provide for communication and liaison between tactical headquarters and SASP's to allow commanders at division and higher level to discuss the expenditures and issue of weapons allocated to them. See FM 101-31-1 for a detailed discussion of the control of nuclear ammunition.

b. Special Ammunition Load (SAL). The SAL is a specific quantity of special ammunition to be carried by a delivery (firing) unit. The establishment and replenishment of this load are command decisions of the senior tactical commander (normally the field army commander) and depend upon the mission, the tactical and logistical situation, and the capability of the delivery unit to transport and utilize the load. The SAL may vary from day to day and among similar delivery units.

c. Special ammunition allocation. Allocation is the designation of numbers and types of special ammunition which a commander may expend when use of such ammunition is authorized. It does not necessarily connote physical possession or custody. Allocations to a commander may include special ammunition for delivery by units not under his command, such as the supporting Air Force or higher echelon artillery.

CHAPTER 11

FIELD ARTILLERY COMMUNICATIONS

102. General

The ability of artillery to render effective artillery support depends on efficient communications. The artillery commander must rely on his communication systems in controlling elements of his command, in gathering information and distributing intelligence, and in coordinating the fires of his unit. Responsibility for communication rests with the commander at each echelon.

103. Area Communication System

The area communication system is used to augment artillery communication systems and to provide an alternate means of communications. The area system offers a means for expeditiously establishing a wire network between artillery elements when the installation and maintenance of long lines is beyond the capabilities of the unit. Artillery units sometimes use the area system on a common-user basis; however, when artillery uses the area system for transmitting fire control traffic, sole-user circuits must be provided.

104. Priority of Installation

In the establishment of artillery communication systems, priority of installation is given to elements concerned with fire support and fire direction.

105. Communication Planning

Communication planning is a continuous operation which begins with the commander's estimate of the situation. Artillery communication plans include all details necessary to clarify and coordinate signal activities such as wire installation and recovery, radio transmission and retransmissions, and common and sole-user circuits of an area system. The techniques concerning field artillery communications are discussed in FM 6-10.

APPENDIX I

REFERENCES

FM 1-100.....	Army Aviation.
FM 3-5.....	Chemical, Biological, and Radiological (CBR) Operations.
FM 3-10.....	Chemical and Biological Weapons Employment.
(S) FM 3-10A.....	Chemical and Biological Weapons Employment (U).
FM 6-10.....	Field Artillery Communications.
FM 6-20-2.....	Field Artillery Techniques.
FM 6-121.....	Field Artillery Target Acquisition.
FM 6-140.....	The Field Artillery Battery.
FM 30-5.....	Combat Intelligence.
FM 31-12.....	Army Forces in Amphibious Operations.
FM 31-15.....	Operations Against Irregular Forces.
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FM 33-5.....	Psychological Operations.
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FM 100-5.....	Field Service Regulations—Operations.
FM 101-5.....	Staff Officers' Field Manual: Staff Organization and Procedure.

- FM 101-10, Part I----- Staff Officers' Field Manual: Organizational, Technical, and Logistical Data. Part I—Unclassified Data.
- (S) FM 101-10-3----- Staff Officers' Field Manual: Organizational, Technical, and Logistical Data. Part III—Classified Data (U).
- FM 101-31-1----- Staff Officers' Field Manual: Nuclear Weapons Employment.
- (C) TM 23-200----- Capabilities of Atomic Weapons (U).
- TM 57-210----- Air Movement of Troops and Equipment.
- AR 320-5----- Dictionary of United States Army Terms.
- AR 705-35----- Criteria for Air Portability and Air Drop of Materiel.
- (C) DA Pamphlet 381-1---- Combat Intelligence Field Army 1965-1975 (U).

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A field artillery unit with a mission of—	Answers calls for fire from—	Establishes liaison with—	Establishes communication with—	Has as its zone of fire—	Furnishes forward observer	Displaces when*—	Has its fires planned by—
General support.	Force artillery headquarters. Own observers.	No inherent requirement.	No inherent requirement (internal communication only).	Zone of supported unit.	No inherent requirement.	Ordered by force headquarters. Ordered by higher artillery headquarters.	Force artillery headquarters.
General support-reinforcing.	Force artillery headquarters. Reinforced artillery unit. Own observers.	Reinforced artillery unit.	Reinforced artillery unit.	Zone of supported unit to include zone of fire of reinforced artillery unit.	Upon request of reinforced artillery unit subject to prior approval of force artillery headquarters.	Ordered by force artillery headquarters, or upon request of reinforced artillery unit subject to prior approval of force artillery headquarters.	Force artillery headquarters.

Reinforcing-----	Reinforced artillery unit. Own observers. Force artillery headquarters.	Reinforced artillery unit.	Zone of fire of reinforced artillery unit.	Upon request of reinforced artillery unit.	Requested by reinforced artillery unit, or ordered by force artillery headquarters.	Reinforced artillery unit.
Direct support--	Supported unit. Own observers. Force artillery headquarters.	Supported unit (down to battalion level).	Zone of supported unit.	To each company sized maneuver element of supported unit.	Unit commander deems necessary or ordered by force artillery headquarters.	Develops own fire plan.

*Notifies the force artillery headquarters of time, position, and fire capabilities.

Figure 1. Field artillery tactical missions. (*Inherent responsibilities*)

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
*General, United States Army,
Chief of Staff.*

Official:

J. C. LAMBERT,
*Major General, United States Army,
The Adjutant General.*

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NG: State AG (3); Units—same as Active Army except allowance is two (2) copies to each unit.

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For explanation of abbreviations used, see AR 320-50.