night combat can be conducted only when there is time to prepare and distribute a well-conceived plan.

In many respects, a fog produces conditions of combat similar to darkness; the same principles therefore apply. Because of the uncertain duration of a fog, every operation based on the utilization of the concealment provided by fog calls for a rapid execution. This also applies to artificial fogs created by chemicals.

■ 590. In night combat, the influence of all unit commanders on their troops is greatly diminished. Tactical operations and troop leading are surrounded with greater difficulties; the frictions and accidents of combat exercise a greater influence than in daylight operations.

■ 591. ATTACK.—Night attacks are made to complete or exploit a success, to gain important terrain for further operations, or to attract hostile reserves. They always involve an element of chance because of loss of control, interference with friendly troops, and vulnerability to counterattack. The best available troops should be employed.

The difficulties of night attacks increase with the size of the command. They are therefore usually undertaken only on a limited scale and with limited objectives. In connection with major atacks, the night is utilized chiefly for the execution of preparatory measures and the placing of the troops in their assembly positions; the attack is usually launched at or shortly after daybreak.

Simplicity of plan, surprise, and careful preparation are prerequisites for a successful night attack; these conditions apply also to raids, forays, and reconnaissances in force conducted at night.

Night attacks are often the manifestation of an aggressive leadership, which, undismayed by foreseen difficulties, is determined to bring about a conclusion without delay. The morale of the troops and the quality of the leadership, especially in the lower grades, rather than numbers, are likely to measure the success attained.

■ 592. The hour at which a night attack is to be made depends upon the object sought. The exact hour of attack is kept secret as long as possible.

An attack launched during the first hours of darkness frequently strikes the enemy before he has had time to organize his position or his artillery support. It may also anticipate possible night operations on the part of the enemy. It may be delivered after victorious combat in order to frustrate the enemy's attempts to organize a withdrawal at nightfall.

An attack during the last hours of darkness may be advantageous as a preliminary operation to a general attack at daybreak because it gives the defender no time to reorganize.

■ 593. The decision to attack should be made while there is still sufficient daylight to make all preliminary *reconnaissances* and necessary *preparations*. A thorough knowledge of the terrain and of the enemy's position is necessary for subordinate commanders. The orders for a night attack must therefore be issued in ample time. The most favorable time for beginning the reconnaissance is shortly before dusk, so that both the day and night aspects of the terrain may be studied. Easily identified direction points are located and provision is made for guides.

■ 594. Night attacks are made preferably by fresh troops or by reserves of troops in contact with the enemy. When made by troops already in contact with the enemy, many details of execution are left to the commanders of front line units.

When fresh troops are designated to make a night attack their approach march is protected by troops already in contact with the enemy.

Subordinate commanders must be carefully instructed concerning the terrain, the objective, and the direction of attack. Routes of approach are carefully marked, guides are provided, and compass directions are given.

■ 595. *Orders* for night attacks are formulated with more than usual detail. Routes of approach, assembly positions, and objectives are designated with the utmost exactness; the bounds of movement in approach, the occupation of assembly positions, and the delivery of the assault are regulated in accordance with precise time tables. The assault may be launched by prearranged signals.

In the conduct of night attacks, only the simplest *formations* are employed. The smaller units normally advance in

column until close to their objectives, when dense skirmish lines are formed and the enemy rushed with the bayonet without firing. The assaulting lines are followed closely by their supports and local reserves, formed in small columns. All vehicles and animals are left at the assembly positions.

The heavy infantry weapons of the assault echelon are placed in position for flank protection and then advance with the reserves. When the terrain is favorable for overhead fire, they may be emplaced in a rearward position to support the attack, precautions being taken not to endanger the attacking troops.

The larger tactical units are formed in assault columns, and each column is given a definite direction and objective. Communication is maintained between columns, and every precaution is taken to avoid their colliding with one another.

Silence, secrecy in preparation, and cohesion in execution are essential to success. Lights are forbidden; bayonets are fixed; rifles are unloaded, especially for supports and reserves. Measures are taken for mutual identification of the troops in the dark.

■ 596. The particular circumstances attending each situation will usually indicate whether the infantry assault should be prepared by artillery fire. Where *artillery support* is indicated, a short but violent preparation will generally suffice. This preparation is lifted in accordance with a time schedule. In any case, the artillery holds itself in readiness to intervene promptly and energetically in accordance with a plan of fire prepared during the hours of daylight to box off the zone of attack. In addition the artillery neutralizes located hostile artillery.

■ 597. On capturing their objectives, units are at once reorganized and promptly disposed to meet a counterattack. Their further detailed conduct is prescribed in the orders for attack.

■ 598. DEFENSE.—In night combat, the defense has the advantage of better knowledge of the terrain and an organized plan of defensive fires covering the principal avenues of hostile approach.

599. Vigilant outguards, active patrolling well to the front, and illumination of the foreground must be relied upon to give timely warning of attacks. Front line strong points are usually occupied in greater density than by day. When a hostile attack is suspected or known to be in progress, supports and local reserves are brought closer to the main line of resistance.

600. Obstacles and the fire of fixed weapons are the principal means used in breaking up the assault. Infantry does not open fire until the enemy is close enough to offer an unmistakable and profitable target. Local supports and reserves, using the bayonet only, counterattack, preferably against the enemy's flanks.

601. As a rule, delaying action at night can be executed only by small units or detachments which operate and retire along well-defined routes. Rearward movements are carefully regulated to avoid losses by fire from friendly troops in rear.

RIVER CROSSINGS

602. GENERAL.—Owing to the restrictions which they impose upon movement and maneuver, river lines exercise considerable influence on military operations. They constitute obstacles to an attack and natural lines of resistance for a defense; they assist in screening against hostile ground reconnaissance and in providing security against hostile mechanized attack.

603. The attack and defense of river lines require *special preparations,* both technical and tactical, proportionate to the size of the river and the strength of the command. Data relative to rivers in the theater of operations are contained in maps, air photographs, and terrain studies furnished to the commander of the field forces on the outbreak of hostilities. These data are supplemented by research conducted throughout operations.

604. *Reconnaissance* of a river line is essential both in attack and defense. The strength of a river line increases with the width and depth of the river and the velocity of the current. Other considerations which have a tactical and

technical bearing are the condition of the banks, the topography of the terrain adjacent to the river line, the presence of islands and tributaries, the nature of the river bottom, the character of the approaches to the river bank, the practicability of fords, and the danger to be apprehended from ice floes, freshets, etc.

Stream lines which ordinarily are of little tactical significance may become formidable obstacles as the result of freshets, high water or artificial damming. In winter, troops may cross on ice of sufficient thickness; on the other hand, ice conditions may greatly increase the difficulty of crossing.

Streams with soft bottoms and steep banks are effective obstacles against tanks and mechanized units.

■ 605. ATTACK.—The defenses of a river line can sometimes be turned. By demonstrations carried out at various points on the river line, an attempt is made to deceive the enemy as to the projected point of crossing while a strong mobile force makes an unopposed crossing elsewhere, turns the hostile flank, and launches an attack before the enemy can readjust his dispositions.

When the enemy is near but not actually holding a river line, an effort is made to anticipate him in the possession of the necessary crossing. Mobile forces are advanced as quickly as possible on a broad front to seize the desired crossings and occupy the dominating terrain on the far side in order to protect the crossing of the main body.

When, however, the enemy is already in possession of a river line which cannot be turned, the crossing must be forced. Hostile troops are promptly driven across the river, and preparations to force a crossing are initiated systematically. Secrecy, feint attacks, speed of movement, and concealment of preparations are then important in order to deceive the enemy as to the front on which the actual crossing will be made.

■ 606. *Reconnaissance* of river lines across the routes of advance is begun by staff and engineer officers with covering forces at an early stage of the operations. Air photographs showing the nature of the river and the bridge destructions effected by the enemy enable the high command to make an early estimate as to the possibilities of crossing and the

means required. Ordinarily, ground reconnaissance of the river line can be executed only after hostile covering forces on the near side of the river have been driven across the river.

Reconnaissance by staff and engineer officers provides more detailed information and furnishes the basis for the selection of the crossing points and the execution of the necessary preparatory measures. Based on the results of these reconnaissances and the tactical situation, decision is made as to the front or fronts on which the crossing will be forced.

607. In the selection of *fronts* and *points of crossing*, consideration is given to both tactical and technical requirements.

The existence of a good bridgehead position on the far side of the river enables the first troops across to execute more effectively their mission of covering the bridge construction and the passage of the main body. Sites that permit a covered approach favor surprise effects. Connection with the road net on the far side of the river facilitates the progression of troops and transportation after the crossing has been effected; for this reason, old bridge sites are frequently advantageous.

Ground dominating the opposite bank permits the support of the crossing by overhead fire. Observation points on the near side which give an extended view of terrain on the far side of the river greatly facilitate artillery support.

Places where the river forms a salient toward the attacking forces favor concentration of fire effect and the delivery of flanking fire against hostile troops occupying the salient; such salients also enable the first troops crossing to secure their flanks by resting them on the river. Locations which minimize the possibility of interruption of the crossing by means of mines, logs, fire-brands, etc., floated downstream by the enemy, are desirable.

608. In a river crossing the principal objective is to gain the far side of the river as quickly as possible and establish a *bridgehead* which will protect the bridging operations and the crossing of the remainder of the command. A sufficient

force for the establishment of a bridgehead is first ferried across.

Since the initial ferrying operations require much time, and place a heavy demand on engineer troops and matériel, the early capture of any existing bridges by advanced detachments of the command is of great importance; engineers are attached to repair any damaged bridges which have been seized.

■ 609. Having selected the front or fronts on which the crossing is to be made, the higher commander decides on his plan of action for the crossing and directs the preparation of the necessary preliminary measures. Troops are distributed into bridgehead troops, supporting troops, reserve and engineers, each under a designated commander.

■ 610. As a rule, the *bridgehead troops* are composed of several tactical groupings to each of which a zone for reconnaissance and crossing is assigned. These tactical groupings consist chiefly of infantry to which accompanying artillery and engineer troops with the necessary material for ferrying are attached. The crossing zones are selected with a view to utilizing favorable terrain, making the initial crossing on a broad front by ferrying, and deceiving the enemy as to the front of the main crossing.

■ 611. The supporting troops consist chiefly of artillery, combat aviation, and the heavy infantry weapons of units in reserve. It is their mission to protect the crossing and hold down the fire of hostile artillery and of hostile infantry holding the river line. The artillery is so emplaced that it can, without change of position, furnish protective fire to the bridgehead troops during their crossing and occupation of a bridgehead position. Heavy infantry weapons deal chiefly with hostile infantry holding the river bank. Early provision is made for antiaircraft defense on the front of the crossing; pursuit protection is provided by the combat aviation at the disposal of the higher commander.

■ 612. The *reserve* usually comprises a major portion of the command; it usually crosses by bridges except when the crossing of the entire command is to be effected by ferry.

It also serves the usual purposes of a reserve. When crossings at several points are attempted, reserve troops are crossed at the points where success has been attained.

■ 613. A strong reserve of *engineer troops* and *material* is made available from the beginning of the operation and held in readiness in a covered position. This engineer reserve serves the purpose of providing an adequate force for the bridging operations, replacing engineer losses in men and matériel, and of reinforcing the means of crossing at decisive places or at crossing points where success has been attained. The movement and secret assembly of engineer matériel for the crossing usually must be done at night and requires careful preparation.

■ 614. The engineer commander is charged with all preparatory measures for the crossing and for the distribution of engineer troops and matériel, the construction and guarding of bridges, and the regulation of traffic thereon. (See pars. 380–382.)

Based on the recommendations of the engineer commander, engineer troops and matériel are attached to the tactical groupings of the bridgehead troops for the ferrying operations. These troops revert to the control of the engineer commander upon the completion of the ferrying operations and are then available for the bridging operations.

The command post of the engineer commander is connected by signal troops with the command posts of the superior commander and the larger tactical groupings constituting the bridgehead troops.

■ 615. The commander of each tactical grouping and of the supporting troops assigns *reconnaissance missions* to his staff and subordinate commanders. This reconnaissance bears not only on the crossing places of the bridgehead troops and the positions and preparation of fire of the supporting troops but also on the routes of approach, assembly positions of units, concealed distributing points of engineer matériel, and all preparatory measures preliminary to the execution of the crossing.

Signal officers reconnoiter the front of crossing to locate all existing wire lines on the near side of the river and

additional wire lines to be established, and determine the possibilities of their extension on the far side. Radio traffic is suppressed or reduced to the minimum in order to preserve the element of surprise.

The results of reconnaissance are coordinated and evaluated at the headquarters of the commander concerned.

■ 616. When the necessary preparations have been made, the superior commander gives the order for the *execution of the crossing*. Secrecy in preparation and deception of the enemy as to the time and place of crossing are essential.

The occupation of positions preparatory to forcing a crossing usually takes places at night. The various elements of the command are so distributed laterally and in depth that when the first troops have crossed, an orderly progression of the required troops and matériel will follow. The successive movements of elements of bridgehead troops from their assembly positions to the boats are so regulated as to avoid lateral movements and the massing of troops on the river bank. Measures for the regulation of traffic and the suppression of noises during the approach are of great importance.

■ 617. In close proximity to the enemy, the situation usually restricts the crossing of the first troops to the hours of darkness; in order to facilitate the advance to the bridgehead position, it is usually best to commence the crossing shortly before dawn.

The bridgehead troops effect their crossing on a broad front; the first waves cross simultaneously in assault boats to selected points on the farther bank and push forward to positions from which they can cover the crossing of succeeding waves. Over narrow streams foot bridges are used.

Heavy infantry weapons, accompanying artillery, ammunition, means of signal communication, and combat vehicles follow on ferries as soon as they are constructed and launched. After ferrying operations have begun the general use of foot bridges and assault boats may be suspended.

Feints or secondary crossings and *demonstrations* are frequently employed to divert the enemy's attention from the

place where the principal crossing is to be effected and to induce him to divide his forces.

Smoke can conceal ferrying and bridging operations from ground observation but ordinarily not from air observation. It is frequently used during daylight hours in connection with feints and to screen the initial ferrying operations. When smoke is used, special measures must be taken to mark plainly the ferry landings and bridge sites, and the routes leading thereto.

618. The supporting troops make the necessary provision for the *antiaircraft defense* of the ferrying operations and the subsequent construction of the bridges. Every effort is made to place a portion of the antiaircraft artillery on the far bank before the bridging operations are begun. The displacement of the antiaircraft artillery is made in such a manner that an effective protection will be established for the bridges as long as required.

When the enemy holds the opposite bank in force and has organized it defensively, an *artillery preparation and support* similar to that required in the attack of a defensive position are usually necessary. Provision is made for the early displacement of a portion of the artillery to the opposite bank.

619. When sufficient forces have been assembled, the bridgehead troops push forward, supported when necessary by the fire of the artillery, to their bridgehead positions. The first objective of their attack must be visible from the artillery observation posts on the near side of the river. Liaison observers of the artillery, with the necessary means of signal communication, accompany the assault waves of the infantry to insure continuity of artillery support during the advance to the bridgehead positions.

620. The position finally occupied as a *bridgehead* is established at a distance from the river sufficient to protect the bridging operations from hostile ground observation, and the crossing of the remainder of the command from undue interruptions and losses from hostile artillery fire. As soon as the infantry assault waves advance from their first objective, the artillery begins the displacement of indi-

vidual batteries across the river to provide close support for the infantry. Later the mass of the artillery is advanced, the displacement being begun by the rearmost batteries and in such a manner as to provide continuity of artillery fire support. In this connection provision must be made for adequate ammunition supply and reliable signal communications.

■ 621. Initially, communication between forces on opposite sides of the river is established by radio. Measures are taken as soon as practicable to establish *signal communication* between adjacent bridgeheads and between the advanced message center of the command and elements of the command across the river.

■ 622. When the bridgehead troops have advanced sufficiently to seize the terrain on the far bank dominating the bridge sites, the superior commander issues his orders for the engineers to commence the *bridging operations*. Ferrying is continued until the ponton equipment is needed for bridge construction.

The greater the number of bridges made available, the quicker the crossing. The construction of bridges from local materials requires much time, labor, and technical experience. Quicker results are obtained with ponton bridge equipment (light and heavy) and fabricated military bridges.

In major operations, the construction of bridges adequate for the passage of tanks, artillery, and motor transportation will ultimately be necessary.

As a rule, the construction of bridges during daylight hours cannot be accomplished without strong antiaircraft protection. Hostile artillery fire and air attack may make it necessary to effect the entire operation by ferrying.

Air attack may compel the temporary suspension of ferrying and bridging operations. Whenever the enemy takes a bridge under effective fire, bridging operations generally must be suspended until the hostile fire can be neutralized. The decision to resume bridging operations at the same site or to transfer operations to another bridge site depends upon the damage done by the hostile fire, the availability of suitable auxiliary bridge sites, and the time required to make the change. The removal of a bridge, its transfer to another

bridge site, the construction of new approaches, and the detouring of traffic will ordinarily take considerable time. Whenever practicable, auxiliary bridge sites are reconnoitered and prepared.

■ 623. DEFENSE.—A river line may be employed as an obstacle in front of a defensive or delaying position, or as an aid to counteroffensive action which seeks to strike the enemy while his forces are astride the river. In the first case a river line loses much of the value as an obstacle if the enemy is not forced to make a direct attack; in the second case it becomes an obstacle to our own troops if successful counteroffensive action is to be followed by an exploitation.

Holding a river line in such force as to leave available insufficient *reserves* destroys the flexibility of the defense and exposes it to immediate defeat as soon as the river line has been pierced. Holding the river line with inadequate forces leads to general overextension with consequent weakness along the entire line. In general, the river line itself is not employed as a main line of resistance unless sufficient forces are available to provide for a strong defense at the river's edge and at the same time leave available sufficient forces in reserve.

■ 624. When the *river line* is used *as an obstacle* in front of a position, the main line of resistance is placed on or near the river bank. Defenses are so located that the opposite bank and its approaches are held under fire and the enemy's attempts to cross are frustrated in their beginning. Salients in the river line and open terrain dominated by the enemy's observation posts are lightly held and covered by the concentrated fire of weapons in rear positions.

Covering forces and *reconnaissance detachments* remain on the enemy's side of the river to maintain contact with the enemy and determine his assembly positions and probable crossing places. When forced to retire, these leading elements withdraw across the river to positions on the flank or to areas protected from hostile fire. Timely measures are taken to prepare the crossings for destruction after the last elements have withdrawn across the river. On wide rivers

the *outpost* keeps contact with the enemy by use of patrol boats.

Engineers block the hostile avenues of approach and crossing places with obstacles and mines. Floating mines, rafts, and firebrands are prepared and held in readiness upstream. Preparations are made for illuminating the water area at night.

■ 625. A part of the artillery is placed in position in rear of the outpost to cover the most likely crossing places and the enemy's probable assembly positions and avenues of approach. The remainder of the artillery is held in readiness for movement to prepared positions to support the defense when the main crossing is discovered.

The principal mission of the antiaircraft defense is to prevent hostile air reconnaissance, especially in those sectors which are favorable for crossing. Preparations are made to reinforce the antiaircraft defense in the critical sectors so that hostile air reconnaissance can be effectively combatted as far forward as practicable.

■ 626. Signal communications are established so as to insure rapid communication with the outpost and covering forces and the quick transmission of orders to the reserve and the artillery.

The mobility of the troops held in reserve is increased by the assignment of motor transportation. When the enemy's main crossing is discovered, these reserves are moved to the threatened sector and employed in a general counterattack as required by the situation.

Support aviation operates against the enemy's ferries and bridges, and troops assembled for crossing.

■ 627. When the *river line* is to be held *as a delaying position* in a retrograde movement, the withdrawing columns are directed to cross at the available bridges which are not under hostile artillery fire. If the crossing places are insufficient, the construction of additional bridges or ferries may be necessary. Antiaircraft defense is established on both banks of the river line to protect the bridges and crossing places.

Trains, motorized columns, and a part of the artillery are moved across first. Routes leading to and from the bridge

approaches and crossing places are plainly marked; staff officers with detailed instructions for march sequence and future action direct units to their destination; strict measures are taken to regulate traffic during the retirement across the river.

As soon as it has moved across the river, a part of the artillery is placed in position to protect the crossing places and cover the retirement of the remainder of the command. This echelon is later reinforced by the remainder of the artillery when it displaces to the rear. At the earliest practicable moment, a plan of artillery defensive fires is prepared which will take advantage of the long range and flexibility of artillery fire to lay down interdiction and counterpreparation fires on the hostile routes of advance and assembly positions. For conduct of delaying action see paragraphs 573 to 587, inclusive.

628. Unless the situation and the strength of the available forces indicate the advisability of holding the *river line as a line of resistance*, it is usually best to hold the mass of the forces in readiness at such distance to the rear that they can intervene promptly at any point where a crossing may be attempted. The river line is then held by relatively weak detachments; stronger detachments with reserves are posted at the most probable points of crossing. The operations of the advanced detachments are organized in accordance with the principles governing outposts. It is their mission to force the enemy to disclose the full power of his supporting fires, to discover hostile crossings, and to prevent hostile troops from establishing themselves in bridgehead positions before the arrival of the main reserves.

The advance of the main reserves to the attack is made as soon as the hostile main crossing is recognized. The plan for counteroffensive action is prepared beforehand; success depends upon the commander's ability to launch the attack at the proper time and in the decisive direction; it must be launched before the enemy has established himself in a bridgehead position. To this end, efficient signal communications must be assured and reserves must be prepared to move promptly and rapidly.

The mass of the artillery is so emplaced that it can concentrate its fire in the critical area and support the attack in the decisive direction. Since the mass of the hostile artillery will still be on the far side of the river, much importance attaches to the neutralization of hostile air and ground observation regulating the enemy's artillery fire. Decisive results are promised by the employment of tanks and mechanized units against hostile units already in the bridgehead and by air attack of bridges and of troops engaged in ferrying operations.

COMBAT IN WOODS AND TOWNS

■ 629. GENERAL.—Combat in woods and towns presents certain common characteristics similar to those of night combat, among them reduced effectiveness of fire and observation, increased importance of close combat, and difficulty in control of troops. Fighting is at close range, and the outcome depends largely upon the initiative and independent action of subordinate leaders. Combat is usually so strenuous that the effective strength of units is soon used up.

■ 630. Woods and towns constitute natural strong points and offer concealment against air and ground observation and protection against tanks and mechanized attack; they facilitate the construction of obstacles, barricades, and traps, and, therefore, have a strong defensive value. On the other hand, they attract artillery fire and air bombardment and prolong the contaminating effect of chemicals; they exert a baneful attraction for troops which can easily lead to the dissipation of a command unless energetic countermeasures are taken by subordinate commanders.

■ 631. Woods and towns are especially favorable to delaying action as they keep the attacker in ignorance of the strength of the forces confronting him and provide desirable cover for screening the withdrawal.

■ 632. Against towns and villages, the massed fire of artillery produces great moral, material, and incendiary effect; the fire hazard is very great and must be guarded against. Against woods, the fire of artillery, except for chemicals, is employed most effectively against the salients and edges.

The outcome of the action is usually decided by the close combat of foot troops. The hand grenade, mortar, and the rifle with bayonet are the most effective weapons. Machine guns are effective, but ordinarily can fire only at short range. Because of the difficulty of placing artillery fire where needed, infantry must depend largely upon its own heavy weapons.

633. TOWNS.—In the *attack* of a town, the attacker seeks to avoid the populated area with his main forces by advancing on one or both sides and to gain the exits on the far side. The enemy within the town is blinded with smoke and neutralized with high explosives and chemicals. When a frontal attack of a town cannot be avoided, the attacker concentrates on capturing the near side, pushes rapidly through the town, and captures the exits on the far side. The town is then mopped up.

634. The larger the town and the longer it has been held by the enemy, the more thorough must be the preparations for attack. Early visual and photographic reconnaissance is made to determine the defensive organization of the area and the nature of defensive works and to furnish the artillery with suitable firing charts for selection of targets and conduct of fire.

635. When the enemy has organized the town into a strongly fortified area which cannot be turned or outflanked, the advance may have to be made frontally by bounds, each organized locality being systematically bombarded by the mass of the artillery and heavy infantry weapons before the infantry launches its assault. The density of the assault echelon is reduced to prevent crowding; reserves are held well to the rear prepared to intervene should the assault be repulsed. When the fire of the supporting artillery and heavy infantry weapons is lifted, the assault echelon pushes through to the far side of the organized area; supports and reserves mop up and organize the area for defense against hostile counterattack. The attack is continued through the town to the far side in a similar manner.

■ 636. On the *defensive*, towns are often included in the organization of the defensive position, especially when there is danger of a tank or mechanized attack.

In organizing a town for defense, the main line of resistance is established either within or in front of the town. After clearing the fields of fire, its defensive capabilities are developed by systematically organizing first the outlying buildings and enclosures so as to form salients from which the front and the flanks of the town can be covered by flanking fire. Obstacles are then constructed within the town and groups of buildings are organized defensively to oppose any effort to penetrate.

■ 637. In order to prevent the enemy from passing by on either side of the town and effecting capture by attack against the flank and rear, a *mobile reserve* is held outside the town in a concealed position in readiness, prepared to break up the enemy's outflanking maneuver and stop his advance on one or both flanks.

■ 638. Woods.—The attacker usually seeks to turn isolated wooded areas included in the enemy's defensive position by passing them on either or both flanks while neutralizing their edges by fire or smoke. The artillery blinds the enemy's observation by smoke and neutralizes the hostile weapons that are capable of delivering flanking fire against the enveloping attack. Small wooded areas may be neutralized with chemicals; our own troops must then avoid them during the advance.

■ 639. When enveloping action is inexpedient, the woods must be attacked frontally. The attack is directed first against the salients which are neutralized by the fire of heavy infantry weapons and the artillery. This supporting fire is maintained until the assault echelon is ready to rush the salients, when it is lifted to the reentrants of the woods, or to suitable objectives within or on the far side of the woods.

The near edge of the woods is carried like any other position and is then used as a line of departure for the *advance through the woods*. The dispositions to be taken for this second phase of the attack depend largely upon the character of the woods. In sparse woods, formations are employed re-

sembling those on open ground, but with greater density in the leading echelon. In dense woods, small columns are more effective in the leading echelon. Special measures are taken to insure the maintenance of direction, cohesion, and intercommunication between the columns. Supports are formed in column and closely follow the assault units. The vulnerability of the flanks to counterattack requires special measures for their protection.

640. All commanders must be watchful to prevent combat groups from assembling on or near roads and trails since these will be covered by the enemy's system of defensive fires. The enemy's strong points are outflanked by an advance straight through the woods off the roads and trails. To avoid confusion and prevent friendly troops from firing into each other, it may be necessary to regulate the advance by bounds. Reserves are held well back so that they will not become involved in the fighting of the assault echelon and can be engaged where the greatest progress is being made.

641. Before *debouching* from the woods and while still far enough from the edge to be concealed from the enemy's view, dispositions adapted to fighting on open ground are taken, and arrangements are made for support by heavy infantry weapons and artillery. As the edge of the woods presents a well-marked target for hostile fire, the attacking forces in making their egress quickly vacate the edge of the woods and establish themselves promptly in a selected position farther to the front.

The movement of combat vehicles must be carefully regulated so as not to block the routes of advance through the woods. If the woods are not too extensive, vehicles can be held on the near side until the assault echelon has reached the far side.

642. As a *defensive position*, the edge of the wood has the objection of presenting a clearly defined target to the attacking forces. The main line of resistance is therefore established either well in front of the edge or deep within the woods. Since a position in the interior of the woods has the disadvantages of restricted view and limited field of fire, the observation elements of the outpost are advanced close to the

edge of the woods. The routes forward and to all positions in rear are reconnoitered and made known to all concerned.

While holding up the attacking units in front by means of obstacles, the *defense* seeks to break up the cohesion of the attacker's dispositions, lead him into false directions, and take the attacking troops under flanking fire. The use of natural or cleared lanes through the woods assists greatly in the development of flanking machine gun fire and in detecting and holding up a hostile advance. Supports and local reserves are posted with this latter use in view. Full advantage is taken of the opportunities for ambush, surprise, and counterattack against the flanks.

In wooded areas, close support by artillery becomes difficult. Fields of fire of all flat-trajectory weapons are seriously impaired. The fire of high-angle weapons is not equally affected; a little clearing will always permit howitzers and mortars to be used.

■ 643. When there is a possibility that the enemy may launch his attack on either side of a wooded area, preparations are made to repel the hostile groups with flanking fire from the flanks and salients. Combat groups are located in the area outside the woods to oppose the enemy's outflanking maneuver and hold up his advance. Tanks held concealed in the woods, with routes reconnoitered and prepared, will provide power to the counterattack of the defender.

■ 644. Numerical superiority is of little advantage in the close combat which usually develops in fighting in woods. When close contact is imminent, bayonets are fixed and preparations made to engage the enemy with rifle and machine-gun fire and to meet him in hand to hand combat with hand grenades and the bayonet.

COMBAT IN MONTAINOUS TERRAIN

■ 645. GENERAL.—Mountainous terrain offers no insuperable obstacles to the conduct of military operations even in cold weather if the troops are properly equipped and clothed, and are inured by previous training. In general, mobility is retarded, movement is restricted, fire power and effect are re-

duced, and communications and supply are made more difficult.

The direction of movement is determined in general by the courses of the valleys. The mountain passes which connect these valleys become important terrain objectives. Whereas the principal routes of movement usually are in the valleys, most of the fighting takes place on the adjacent heights and connecting saddles which dominate the valleys.

■ 646. Because of the rugged nature of the terrain, displacement of weapons and reserves is usually very difficult. Adjacent units and columns are often unable to render mutual support. Units on opposite sides of a valley may, however, be in a favorable position to observe, and to keep each other informed of the dispositions and movements of the enemy opposite the adjacent unit.

Restrictions of terrain and difficulties of deployment place a limitation on the strength and composition of forces that can be employed. Wide separation of columns and the insufficiency or failure of communications require commanders of tactical groupings to be well forward. The broken nature of the terrain offers opportunities for surprise action by small combat units.

When formulating plans for operations in mountainous terrain, the possibility of sudden changes of weather must always be considered. Fogs develop quickly and low clouds may suddenly obscure observation. Special arrangements are therefore made for periodic weather reports. Once decided upon, a plan of operations is executed promptly, or measures are taken to adapt the operations to the probable changes in weather.

■ 647. *Close reconnaissance* is conducted principally by patrols equipped with portable radio and visual means of communication. Reconnaissance is tedious and fatiguing; it must be initiated early and pushed well to the front. Unless this is done much valuable time may be lost by units in circuitous and fatiguing marching as the result of taking the wrong direction. Local guides may be advantageously employed. Air reconnaissance is difficult but of great importance.

■ 648. The sparse settlement of mountainous regions is usually a reliable index of the scarcity of local facilities and supplies. Careful arrangements must therefore be made for supply and evacuation, both of which may present great difficulties. The supply of small isolated columns may in an emergency be effected by transport aviation.

■ 649. *Foot troops* equipped with pack transport are the most reliable combat means in mountain warfare. Great dependence is placed upon the individual rifleman and his ability to overcome the most difficult obstacles. The rugged nature of the terrain offers favorable opportunities for overhead and flanking fire of machine guns without frequent change of position.

Both in the attack and the defense, the bulk of the heavy infantry weapons is located well forward. Since good observation posts are usually available, supporting weapons avoid positions on or near the skyline.

■ 650. The cannon best adapted for *artillery support* in mountainous terrain is the howitzer. In order to obtain angles of elevation and fall sufficiently large to clear masks and reach objectives defiladed by steep slopes, flat-trajectory cannon can be used only at long ranges. Horse-drawn and motorized artillery units are emplaced near the roads; pack artillery is capable of following infantry and taking defiladed positions in the more difficult terrain overlooking the valleys.

Control of artillery is decentralized. Because of the difficulties in the conduct of artillery fire with air observation, greater dependence is placed on ground observation in mountainous terrain. Observation posts must be reconnoitered and established early and provision made for liaison observers with the infantry to assure close and timely support.

■ 651. The hazards of flying in mountainous regions place a great restriction on the use of low-flying *combat aviation*. The restricted road net offers a favorable opportunity for blocking critical road junctions by bombardment aviation. Reconnaissance and liaison aviation is of particular value because of the difficulty of performing these missions by ground agencies.

The restricted field of observation and fire and the difficulty of occupying positions off the main roads limit the employment of *antiaircraft artillery* to the defense of the intersections and exits of the principal valleys.

652. *Tanks and mechanized units* suffer so many restrictions in mountainous terrain that their effective employment is generally very limited. Furthermore, measures for antimechanized defense and for blocking vehicular movement are relatively simple in mountainous terrain. The numerous draws and valleys present many opportunities for contamination by chemicals.

653. In mountainous terrain, the radio provides the quickest and most reliable means of *signal communication*. The establishment and maintenance of wire communication outside the axis of movement in the valleys ordinarily require so much time and effort that reliance must be placed on visual means and messengers.

654. In general, the same combat principles for the employment of the combined arms in lowland operations apply also to mountain warfare.

655. MARCH AND SECURITY.—On the march, security detachments are stronger and distances between subdivisions of a command are greater than in ordinary terrain. Since displacements within a march column are difficult during the march, the column is organized into suitable tactical groupings before the beginning of the march. All available roads and trails are used for movement.

Because of the difficult routes followed by flank security detachments and the fatiguing nature of their operations, it is usually necessary to provide relieving detachments at lateral or branch valleys. Consideration must be given to the fact that such detachments are ordinarily unable to rejoin their units until after the completion of the march.

The main body as a rule moves by bounds. On long marches and after steep climbs, short rests are taken in addition to the regular scheduled halts. In bivouac, security is provided by posting outguards on all roads and trails.

■ 656. ATTACK.—Since the defense will find difficulty in shifting its reserves in mountainous terrain, an attack based on an envelopment holds the best prospects of success. If this is impracticable, the task of the attacker ordinarily resolves itself into forcing one of several mountain defiles. The successful forcing of one defile usually opens the way for flanking action against the other defiles and for blocking the enemy's withdrawal and retreat.

■ 657. In difficult mountainous terrain, the reinforced infantry battalion is ordinarily the largest combat unit that can be employed as a whole in the attack. The attack usually breaks up into a series of separate combats of the leading smaller units. These units advance by bounds and by infiltration and enveloping action seek to outflank and capture the hostile strong points on the successive spurs and ridges. They are supported by the heavy infantry weapons and the artillery which direct their fire to neutralize the enemy's observation and strong points. Full use is made of the protection afforded by the dead spaces in front of the hostile position and the cover offered by the draws in the gaps between adjacent strong points.

■ 658. The objectives of the attack are the critical terrain features which dominate the exits into the lowland, or the passes or divides which separate the important watersheds. Depending upon the mission, the commander may be more concerned with cutting off the enemy's withdrawal and retreat than in simply inflicting a defeat and driving the enemy back. In this case combat action is directed toward blocking those valleys which constitute the enemy's principal routes of withdrawal and retreat.

■ 659. DEFENSE.—On the defense, greater infantry combat strength is required in mountainous terrain than in ordinary terrain. The danger of envelopment requires the defense to cover a broad front; the tactical consequences of a penetration require this front to be held in greater strength. The requirements of decentralization resulting from deficient communications and the rugged nature of the terrain (see par. 646) prevent the defense from developing the maximum fire power through concentration in time and place.

It is important to delay the enemy as far in front of the position as possible. The more difficult the prospect of the defense of the battle position, the more important becomes this delay. Covering detachments or outposts are pushed well to the front to force the enemy to an early deployment, to delay his advance in the valleys by obstacles and chemical contaminations, and to deceive him as to the location of the battle position.

¶ 660. The battle position is held by combat groups defending the strong points in each terrain compartment. All strong points are organized for all-around defense. The gaps between adjacent strong points are closed by connecting groups armed with machine guns, and are covered by other strong points on dominating terrain in rear.

¶ 661. The artillery, from positions in rear of the main line of resistance, supports the action of the covering detachments and covers their subsequent withdrawal by interdiction fires on the defiles of the hostile routes of advance and counterpreparation fires on the open areas of the valleys into which the enemy endeavors to develop his columns. In the defense of the battle position, the artillery concentrates its fire primarily on the critical localities in the gaps between adjacent strong points, leaving the supporting fires in close defense of these strong points to the heavy infantry weapons. The observation and liaison service of the artillery must be well distributed and so organized that it can keep under surveillance the withdrawal of our advanced covering detachments and the movements of the enemy.

¶ 662. From the beginning of the action, the defense must plan to maintain the integrity of its position by local counterattacks in case the enemy penetrates between adjacent strong points. These counterattacks are prearranged as to direction, objective, and supporting fire so that they can be launched on short notice when the enemy is exhausted and spent in his attack. Because of the local nature of combat, a general counterattack is seldom possible. The reserves will ordinarily be held well forward.

GUERRILLA WARFARE

663. *Guerrilla warfare*, as a type of warfare practiced by recognized belligerents, has its principal application to partisan forces operating against a greatly superior enemy, or to the operations of large forces engaged in suppressing an organized uprising. The partisan operations are conducted for the purpose of harassing or delaying larger forces, causing losses through attrition, interdicting communications, or making incursions on the enemy's lines of communication and supply. The operations of larger forces against an organized uprising are conducted for the purpose of suppressing resistance, occupying the disaffected territory, and reestablishing constituted authority.

664. In the conduct of guerrilla warfare the mobility, enterprise, and reliability of the troops employed are more important than their numerical strength. In general, the best results are obtained by the employment of numerous small detachments under capable and versatile subordinate leaders, all operating under the direction of an experienced superior commander.

665. In planning the guerrilla operations, the essential requirements are good intelligence of the enemy's columns or dispositions and a thorough knowledge of the terrain and road net. Good maps, air photographs, and trustworthy local guides facilitate the terrain reconnaissance. The enemy is kept under constant observation and surveillance to determine his dispositions and to obtain information as to his capabilities.

666. The *attack* on the enemy is made by surprise obtained by deception and ambush. An attempt is made to cut off and surround some part or element of the hostile command; a general engagement is, as a rule, avoided.

After the execution of the attack, all detachments and raiding parties repair without delay by different routes to a prearranged rendezvous or assembly position known to all. The information obtained from prisoners often leads to an estimate of the situation on which the next enterprise is based.

667. The action of all detachments must be coordinated as to time and space. In the case of raiding parties operating against the enemy's rear, arrangements must be made to provide them with the supplies and equipment essential for an absence of several days.

The plan of the commander must provide for assembling the bulk of his command after each enterprise in order to prevent its dispersion and to insure proper direction in the conduct of the subsequent operations. To uphold his leadership and to promote a high morale in his troops, an able commander will avoid decisive action unless assured of a commensurate success in each enterprise he undertakes.

668. In the conduct of operations, full use is made of obstacles to delay the enemy in front while attacking him in flank and rear. Raiding parties operating in the enemy's rear may seriously interrupt the enemy's system of supply by destroying bridges and attacking supply trains. Every effort is made to keep in communication with these raiding parties so that their subsequent activities may be properly directed.

669. By feint and demonstration, by changing methods of combat, and by spreading false information, the attacker attempts to mislead the enemy and create the conditions which favor surprise. An active counterreconnaissance is conducted to defeat the enemy's reconnaissance detachments; his main body is harassed and held in suspense by repeated threats and raids. Whenever practicable, movements and attacks are made at night; during daylight hours, the main forces remain concealed, leaving only reconnaissance patrols in contact with the enemy.

670. In *combatting guerrilla warfare* the factors which usually present the greatest difficulties are deficient communications, scarcity of local resources, and the lack of information.

When roads and trails are few and poor, movement of troops off the principal routes will be difficult. Provision must then be made for pack transport for some parts of the command. The construction and improvement of roads and trails are major tasks of immediate importance.

Scarcity of local resources may impose serious administrative and supply difficulties on the command. A scarcity of water may limit the number and size of troop units that can be employed. Special attention must be given to sanitation and medical aid. Success depends in large measure on the initiative and self-reliance of subordinate leaders.

■ 671. The lack of reliable information requires the early organization of an efficient intelligence service. When maps are unreliable or unavailable, great reliance must be placed on air photographs. Through engineer reconnaissance accurate information is obtained of routes, resources, water supply, terrain, and topography. Reconnaissance detachments obtain information concerning armament, strength, and distribution of the enemy. When operating in foreign territory, special intelligence agents are employed to study the national characteristics of the people, their leaders, their political attitude, and religious practices.

■ 672. As a rule, the enemy will avoid any operations on a large scale and base his tactics on striking a quick blow with surprise against isolated detachments and unprotected columns or convoys. In general, the enemy has the advantage of mobility, better knowledge of the terrain, and relative freedom from a line of communications and supply. While he may be well supplied with small arms he is unlikely to be equipped with aircraft, artillery, and mechanized vehicles.

■ 673. Larger forces engaged in the suppression of guerrilla warfare have the advantage of superior organization, armament, and equipment but are handicapped by lack of reliable information, by dependence on a complex system of supply, and difficulty in bringing the enemy to a pitched battle.

Vigorous and bold action by mobile forces is ordinarily the quickest and surest way of defeating the enemy bands. The greatest difficulty lies in bringing the enemy's principal forces to decisive battle. Usually, this can be accomplished only by an advance along all available routes against the enemy's principal villages and strongholds. Since the attacker is greatly superior in strength and means of combat, encirclement by double envelopment should always be attempted in order to bring about a decisive result.

674. Until the enemy's principal forces are located, only *reconnaissance* and *liaison aviation* are employed for tactical reconnaissance, for mapping by air photography, and for liaison and communication between separated columns. Transport aviation may be employed for evacuation and for supply of isolated columns. Premature air attack by combat aviation may cause dispersion of the hostile forces, thereby protracting the operations and postponing decisive battle.

Mechanized cavalry is valuable whenever terrain is suitable for its employment. In arid country, entire dependence may be placed on mechanized cavalry supported by combat aviation. The principal objective then is the seizure and control of the sources of water upon which the enemy is dependent.

675. The defense against the forays and raids of guerrilla bands is the responsibility of each column commander. Constant vigilance and adequate measures for security are necessary. If hostile raiding parties penetrate into the rear area of the command, an effort is made to cut them off and surround them. For this purpose it may be necessary to detail a special security detachment and hold it in readiness at some convenient road center in rear for rapid movement to intercept and destroy the enemy before he makes good his escape. To insure the prompt transmission of information, arrangements are made for rapid means of communication with the security detachment.

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