HISTORICAL STUDY

COMBAT IN RUSSIAN FORESTS AND SWAMPS



*CMH Pub 104-2

COMBAT IN RUSSIAN FORESTS AND SWAMPS

*This publication replaces DA Pam 20-231, July 1951.

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, DC 20402

Facsimile Edition, 1982, 1986

Center of Military History
United States Army
Washington, D.C.

PREFACE

Combat in Russian Forests and Swamps, prepared for the Historical Division, EUCOM, by a committee of former German generals and general staff officers, deals with the principles of combat in the vast woodlands and swamps of European Russia. The main author and all other contributors have drawn upon their own extensive experience on the Eastern Front and that of their allies, especially the Finns, to present the actual lessons learned from the events of the war. When the study was translated and prepared for publication, every effort was made to retain the point of view, the expressions, and even the prejudices of the original authors.

The reader is reminded that publications in the GERMAN REPORT SERIES were written by Germans from the German point of view. Throughout this study, any mention of "normal methods" or standard infantry tactics refers to German combat doctrines, and applies to units organized and equipped in accordance with German regulations. Similarly, the recommendations contained in the final section are made against the background of German methods of individual and unit training before and during World War II.

FOREWORD*

In conformance with the assignment, this study had to be confined to a discussion of tactical principles. The author's lucid and methodical presentation fully corresponds with the experiences reported to me by our combat forces during the Russian campaign.

Apart from tactical principles, however, another problem calls for serious consideration: The problem of education and training, of teaching self-confidence to young men of military age and of training them in the art of improvisation. The need for this training is pointed out in the final section of this study.

Furthermore the presence of vast forest and swamp regions, as encountered in eastern Europe, must be taken into consideration in the planning of military operations. Future planners will have to make certain that extensive areas of woodlands and swamps are not permitted to assume more than tactical importance. The German command in Russia was not always successful in this respect, partly because it did not see clearly all the elements involved and partly because it did not succeed in driving the enemy away from the large wooded and swampy areas. On the contrary, there were numerous occasions when we deliberately drove the Russians into the swamp, assuming that this would prevent them from interfering with the further course of operations. That proved to be a fatal error.

When the enemy has been maneuvered into a large forest and swamp region, the area cannot be sealed off by the same methods as a beleaguered fortress. Even a force with great numerical superiority will never have enough men available for such a task. It was also our experience that Russian forces, once they were driven into wooded and swampy areas, were extremely difficult to attack by normal means and could hardly ever be completely destroyed. On countless occasions, we were confronted with the fact that the Russian was able to move about in these impenetrable forests and treacherous swamps with the certain instinct and sense of security of an animal, whereas any soldier reared and trained in a civilized country of the West was severely restricted in his movements and thereby placed at a dis-

*By General Franz Halder, Chief of the General Staff of the German Army, 1938–1942.

advantage. There are no effective tactical remedies to compensate for this disadvantage. Even the most thorough training applied to troops from the West cannot replace the natural instinct peculiar to eastern Europeans who were born and raised in a region of forests and swamps. In the course of several generations the Soviet policy of concentrating masses of workers in large industrial areas will certainly have the effect of eliminating these natural instincts, even among people of the eastern type, but this is still far in the future. Until that time arrives, I am convinced that there is only one really effective method to use against the dangers of Russian forests and swamps, namely, to plan and conduct operations in a manner which will drive the Soviet forces from those areas where—for the time being—they enjoy a natural advantage, and force them to give battle in open terrain where western soldiers have an even chance in the tactical sense and superiority in terms of matériel. It is entirely conceivable that even the most modern weapon, the atom bomb, might serve as an effective instrument in support of such a strategy.

CONTENTS

	Page
FOREWORD	v
SECTION I. MILITARY ASPECTS OF RUSSIAN FORESTS AND SWAMPS	1
II. GENERAL TACTICAL PRINCIPLES	4
III. COMBAT INTELLIGENCE, RECONNAISSANCE, AND OBSERVATION	10
IV. TROOP MOVEMENTS	13
V. DEVELOPMENT AND DEPLOYMENT	18
VI. ATTACK	21
VII. DEFENSE	25
VIII. RETROGRADE MOVEMENTS	29
IX. COMBAT UNDER SPECIAL CONDITIONS	32
X. CONCLUSIONS	36
REFERENCE MAP	Frontispiece

SECTION I

MILITARY ASPECTS OF RUSSIAN FORESTS AND SWAMPS

Aside from their tremendous expanse, the forests and swamps of European Russia are of military significance because of their almost impassable and practically featureless terrain. Vast areas are left entirely in their primeval state and differ distinctly from the cultivated regions of western and central Europe. By far the greatest part of the extensive woodlands in European Russia is the result of undisturbed natural growth. Modern forestry methods, such as selective cutting and systematic reforestation, are virtually unknown to the Russians. As a result, very little progress has been made, even in recent years, in exploiting these forests or in making them more accessible, except in the immediate vicinity of major highways.

Inhabited places are few and far between; they are located in man-made forest clearings and particularly along the river courses. Since most Russian rivers flow from north to south or vice versa, the natural road network also developed in these directions. Lines of communication running east and west are extremely rare.

During any season of the year the small number and the doubtful condition of traffic arteries in Russia was the chief source of anxiety to all German field commanders. By far the majority of roads and trails proved to have no more than local significance as connections between villages, as logging roads, or simply as cleared lanes through the forest. They were built accordingly. In critical periods, particularly during the muddy season, they proved completely useless. They were replaced, once the ground was solidly frozen, by so-called winter roads. Wherever bridges had to be crossed, their load capacity and their strength against floods or drifting ice had to be estimated with extreme caution.

In view of the fact that the Russian river systems are rarely regulated, inland water transportation, except on lakes, played only a minor role. The so-called *Rollbahnen* (highways reserved for motor vehicles), which were built and maintained on a large scale by German construction units using as a foundation such stretches of hard-sur-

This publication replaces DA Pam 20-231, July 1951.

faced roads as were already available, proved invaluable. Wherever they existed, they provided the starting points for tactical operations and served as the lifelines of the German supply system.

The great wooded areas of European Russia actually begin in Poland and grow denser as one advances east. The forest of Byalovizh, 40 miles north of Brest Litovsk, at one time the game preserve of the czars and later of the Polish Government, does not quite fit into the general picture because, to serve its specific purpose, it has been better provided with roads. East of Brest Litovsk, however, extend the broad marshes and forests of the Pripyat region. Adjoining them, the huge tracts of forest around Gomel, Minsk, Bryansk, Borisov, Orsha, and Vyazma dominate the landscape. They are continued north of the low ridge of Orsha in the forests of Polotsk and Velikiye Luki and in the marshy lowlands along the course of the Lovat and the Volkhov, all of which were scenes of bloody fighting during World War II.

It is typical of the large Russian forest areas that nearly all of them harbor extensive swamps. Whatever general rules are applied in this study to combat in forests or in swamps are therefore interrelated in many respects.

Southern Russia, especially the Ukraine, is nearly devoid of woodlands; some parts are highly cultivated, others consist of steppes. Since ancient times Southern Russia has been the favorite scene for the operations of large armies.

Except for the rolling terrain of the Valdai Hills, all wooded areas of western Russia extend over flat land. The only mountain forests are in the extreme south: in the Yaila mountains on the Crimea, in the Carpathians, and in the Caucasus where, in addition, treacherous swamps are found in the western foothills.

Toward the extreme north the woods become thinner and are gradually replaced by underbrush and swamp vegetation. The landscape appears more and more desolate the farther one advances in the direction of the White Sea. Economic and military objectives, of necessity, take second place to bare survival in the face of the bleakness of nature. Here some fishermen, hunters, and lumbermen eke out their precarious existence in a constant struggle against the rigors of nature. North of the Arctic Circle only Lapp nomads and their herds of reindeer are to be found. Farther to the east, beyond the Ural Mountains, tundra and taiga (northern coniferous forests) extend over the vast expanse of northern Asia.

The swampy forest areas of European Russia defy any uniform description. Conditions vary too greatly, depending on weather, sea-

son, and geographic location. The woods and marshes of the Pripyat, the only large river which flows from west to east and clearly divides western Russia in reality as well as on the map into two parts, offer a typical example of the great variety of terrain that may be encountered. Even this region has sandy plains with high forests, cultivated farm land and pastures, localities with a comparatively dense population, river branches that have been converted into canals, and paved roads on causeways. But its predominant features are extensive swamp areas with luxuriant weed-covered moors, countless ponds and lakes full of sedge islands and bordered by treacherous, meadow-like ground, a type of terrain which is definitely impassable except during winter. There are birch and alder forests which, according to the season of the year, may have a dry and firm ground surface or may turn out to be a bottomless morass. A constantly changing maze of floodwater streams and tributaries makes any troop movement off the paved roads a dangerous undertaking.

Despite all these difficulties the Pripyat marshes, taken as a whole, are considerably more accessible and better adapted to military use than other Russian forest areas. During World War II, therefore, even this region, which had been viewed with apprehension by many military men, became the scene of tactical movements and engagements in which the principal role, to be sure, fell to the infantry and the horse cavalry.

In southern Russia there are no large and continuous swamp regions like that of the Pripyat river system. The only swampy areas that might be of tactical importance are the marshy tracts in the partly wooded lowlands along the Dnepr River and the treeless lagoons near the mouths of the Kuban, the Don, the Terek, and in the lower course of the Volga.

Finally, in considering the military peculiarities of Russian forests and swamps, one must refer to the great variations in climate that are encountered in the vast expanse between the Black Sea and the Arctic Ocean. Over any extended period of time the physical constitution of the average European is unable to stand the humid, sultry weather in the marshy regions of the south, the icy dampness of the ground in the forests of central and northern Russia, or the sudden storms and rapid changes in temperature in all parts of the country. Contaminated drinking water, mosquitoes and other harmful insects, extremely cold weather, and other unusual natural phenomena caused sicknesses of many kinds. The casualties resulting from frostbite, rheumatic fever, intestinal disease, malaria, and swamp fever equalled, in many instances, the number of men killed or wounded in combat.

SECTION II

GENERAL TACTICAL PRINCIPLES

Command

Combat in forests and swamps requires firm, farsighted, energetic leadership by commanders who are able to cope with the peculiarities of this type of warfare and avoid unnecessary crises and reverses. During initial engagements uncertainty about the enemy and terrain is far greater than in the open. Unpleasant surprises may occur at any moment—in dense forests because of lack of observation and in swampy areas because of the difficulty in obtaining an accurate terrain estimate. In such situations, ignorance on the part of the staffs, defective organization, or lack of advance planning will have an immediate effect on the physical condition and the morale of the troops and may cause a loss of human lives which could have been avoided.

In forest fighting, commanders easily lose control over their troops. In the forward area their direct influence is confined to the men in their immediate vicinity. Limited observation, the intensified noise of combat, and the excitement created by fighting at close quarters make it difficult to distinguish between friend and foe, increase the danger of overestimating purely local events, and the danger of panic is thereby aggravated. Combat of this type will always prove to be a heavy strain on troops. Units which have been engaged in serious forest fighting frequently are unfit for action for a considerable time thereafter. Any unit that no longer is able to provide adequate reserves for its combat missions should be temporarily relieved or rehabilitated before it is completely battle-worn.

The general principles of tactics in open terrain—the teamwork of mutually supporting arms and services, culminating in a main effort at the decisive point or points—also apply to combat in large forest and swamp areas. Only the outward forms are changed insofar as they must be adapted to the conditions created by nature, specifically to the lack of observation and the absence of suitable roads. The objectives remain the same.

The place of the small unit commander is within view or earshot of his men, where he is able to exercise direct control and take charge of critical situations. Command posts of larger units are protected by the forest and rarely exposed to enemy reconnaissance. Their locations, therefore, are selected less for reasons of concealment than for

good communications with friendly troops. Approaches must be marked by unmistakable day and night road signs to aid messengers and subordinate commanders in finding their way.

Large wooded areas provide an abundance of concealment for movement and troop concentrations, even against an enemy with superior air forces. Furthermore, they offer distinct advantages in the conduct of delaying actions, blocking maneuvers, and diversionary attacks. They are not, however, suitable as a battleground for major decisions. This is true not only for large forests but also applies in even greater degree to extensive swamp areas. The attacker, if at all possible, must therefore seek to avoid large, continuous forests and swamps by passing them at both flanks, particularly with mechanized and motorized units. Only if the enemy is firmly entrenched in such areas and appears determined to fight, despite the danger of being outflanked and enveloped, must he be attacked or at least effectively contained. Otherwise, the successful conduct of subsequent operations might be jeopardized.

In the defense, on the other hand, or for the purpose of blocking the enemy's maneuver, it may be advisable to exploit extensive forest and swamp areas, even by occupying them with one's own forces. This will seriously interfere with the adversary's plans, force him to use his troops on time-consuming missions, slow down his movements, and hamper his supply operations. Moreover, forests and swamps often provide favorable opportunities for raids and attacks on the aggressor's flanks and rear.

The inhabitants of the eastern European forest and swamp areas are generally agreed—and this is borne out by the German experiences of World War II—that midwinter is the most suitable season for offensive operations in that type of terrain. When the streams, lakes, and marshes are frozen, so that wide stretches off the roads become passable, the so-called winter roads are established. Running across the frozen surface of open moors and swampy tracts of woodland, such winter roads constitute the natural lines of communication during the long Russian winter and thus make it possible to utilize the terrain for military purposes. The proper equipment must, of course, be available to operate under such circumstances.

Since the many items of technical equipment necessary for living and fighting in almost inaccessible forest and swamp areas cannot be available everywhere at the right time and in sufficient quantity, commanders of all echelons must apply themselves to the art of improvisation. The Russians proved to be past masters of that art and obtained

amazing results by using the most primitive expedients, particularly by the ruthless employment of civilians present in such areas.

As a means of orientation in the interior of extensive Russian forests and swamps, maps alone are inadequate and unreliable. The picture presented by the landscape is subject to constant change brought about by natural growth and the varying effects of water in every form, and every commander should use his maps only with the greatest caution. Any map information must be supplemented by aerial photographs and by interrogation of local inhabitants, as well as by the evaluation of captured documents. Foreign place names may have to be overprinted in one's own alphabet. A uniform map with a standard grid system is an indispensable prerequisite for the proper coordination of all arms.

In such areas, more than in any other type of terrain, commanders must be seriously concerned about providing adequate medical and sanitary facilities and individual equipment in order to make life bearable under the most adverse conditions.

The conduct of operations in forests and swamps requires the most meticulous preparation in every respect. This is true not only for reconnaissance and security but also for the composition and commitment of units, their equipment, the organization of communication and command channels, the training of the various arms, and last but not least for the utilization of local resources.

Operations in forests and swamps are further characterized by the methodical execution of all measures. This, of necessity, involves a loss of time and requires an increased number of service troops. In many respect it constitutes a departure from the conventional German principles of combat in open terrain, which emphasize initiative and independent action on the part of all command echelons.

Arms and Services

The task of conducting a successful campaign against a tough and primitive opponent who is able to take advantage of the peculiar conditions of forests and swamps calls for well-trained troops of high morale and unusual physical endurance. It is in that type of terrain that the infantry regains its time-honored reputation as the "Queen of Battle." Here the individual fighting man assumes even greater importance than during combat in open terrain. Fighting at close quarters plays a major role and numerical superiority is less significant than personal courage. Light and heavy infantry weapons, sub-machine-guns, machine pistols, hand grenades, bayonets, the long

hunting knife, and flame throwers are the most suitable weapons for this type of combat.

The Russian campaign demonstrated that the cavalry, regarded as obsolete in central and western Europe, still had many tasks to perform. It was successfully employed in envelopments and flank attacks, pursuits and long-range missions—admittedly not in the sense of the cavalry of former times but rather as a highly mobile mounted infantry with great powers of endurance. Also, the man on horseback was often indispensable in maintaining liaison and carrying messages.

Composition and employment of the artillery must be adapted to the peculiarities of woods and swamps. Lack of observation, especially from the flanks, and unusual difficulties in selecting suitable positions are the main handicaps of artillery commitment in this type of terrain. In the dense forests of Russia it was never easy to identify even the foremost enemy line. Unobserved fire on rear area targets proved even more uncertain. Finally, the artillery faced a downright impossible task whenever the front line fluctuated in attacks and counterattacks and when observation, even at close range, failed to provide a reliable picture.

In forest fighting the psychological effect of artillery fire is greatly amplified while that of small arms fire is generally reduced. Prepared concentrations, if laid down to block the enemy's main route of approach, can be highly effective. Only in exceptional cases, however, is mass employment of artillery possible in direct support of attacking or defending forces. The most suitable solution, in the German experience, was to attach one artillery battalion to one infantry regiment. Frequently a further subdivision was necessary and individual batteries were attached to infantry battalions. Thus, during combat in woods and swamps the artillery found its main function in the close support of front-line infantry.

The number of forward observers equipped with voice-radio sets can never be too large; several are necessary to direct the fire of each battery.

Massed fire on important targets must be planned with extraordinary care. Systematic area fire from map data has little promise of success and, in most instances, merely constitutes a waste of ammunition. In swamp areas, furthermore, a considerable part of the fragmentation effect is lost unless time fuzes are available.

The artillery must use high angle fire in direct support, especially in tall forests, once the advancing infantry is separated from the enemy by only a few hand grenade throws. The use of infantry heavy weapons, particularly mortars, is subject to similar principles.

In densely overgrown terrain, rocket launchers have a considerable effect on morale, particularly at night. Even if little accuracy can be achieved, the enemy frequently is forced to evacuate because of grass and brush fires started in the impact area.

Engineer troops are called upon for a great variety of tasks in swampy and wooded terrain. A large number of well-equipped engineer detachments must be available not only for combat missions and construction of obstacles but also for mine laying and mine detecting, clearing roads and fire lanes, constructing bridges, corduroy roads, and fascine mats, and for building observation towers and abatis. Particularly great during the entire German campaign in Russia was the need for bridge and road construction units. Native labor proved to be valuable because the Russian peasant and inhabitant of forest regions has considerable experience in wood construction and is not dependent on the use of iron and steel.

German experiences demonstrated that even armored units can be employed in the forests of Eastern Europe, particularly in those areas that have a fairly adequate road net and are not too densely overgrown. Despite all technical advances, however, the difficulties imposed by the peculiarities of terrain remain enormous. They are further aggravated by greater density of tree growth and deep snow and, during the muddy season or after extensive rainfall, become insurmountable in swamp areas. In continuous forests and swamps, therefore, the employment of entire mechanized or motorized divisions should be avoided. If this is impossible, the tanks should be held in reserve and only motorized infantry and combat engineers should be committed at first. Utilizing the existing road net and considerably echeloned in depth, the armor should then move up on a narrow frontage. Much greater opportunities present themselves for the employment of individual tanks, sometimes in small groups up to platoon strength, and of assault guns and tank destroyers. Of course, they too are hampered by difficulties of terrain and lack of observation. So long as the ground is reasonably firm, however, their commitment appears justified since the infantry cannot expect too much support from any of the other arms.

In signal communications the greatest emphasis must be placed on the use of radio. The wild, uncultivated forests of European Russia present unusual obstacles to the construction and maintenance of telephone lines. Radio, therefore, is the proper means of communication not only for higher echelons but particularly for front-line units. Blinker communications are suitable in the more open marshes but

not in dense forests. Other visual signals, as well as messenger dogs, may be used over short distances and, at times, it may be necessary to resort to relay systems of mounted messengers and runners.

Tactical air support in forest areas is subject to restrictions similar to those present in the employment of artillery. Lack of observation and the absence of distinct features in the terrain such as crossroads, railroad tracks, and inhabited places, often lead to serious errors in the commitment of planes. Dive bomber attacks in forest areas have a strong psychological effect. The screaming of diving planes, the detonation of bombs, and the crashing of falling trees wreak havoc on the nerves of all but the most seasoned troops. On the other hand, the employment of dive bombers requires the most methodical coordination, perfect timing, and the greatest possible accuracy in the designation of targets, all of which can be achieved only under the most favorable conditions. Although less effective in close support of forest fighting than under ordinary circumstances, the air force can render invaluable assistance to ground forces engaged in that type of combat. It is capable of keeping vast combat areas under constant surveillance and of providing through aerial photography a prompt and reliable supplement to ground reconnaisance.

In support of an advance over terrain that offers practically no ground observation, air reconnaissance has the additional task of reporting the location of forward elements and of indicating points where major road congestions have occurred. Equipped with infrared devices, air observers are able to produce usable photographs at any time of the day or night, in fog, or in rain.

Heavy supply vehicles, whether motorized or horse-drawn, are a cumbersome hindrance in any operation in woods and swamps. The troops must be forced to limit themselves to the few items absolutely essential for combat and to leave behind everything that is not of vital importance. At the outbreak of the Russian campaign in 1941 the German divisions were equipped with native horse carts, the so-called *Panje* wagons, drawn by small but extremely hardy native horses. Another organizational expedient typical of the campaign in Russia was the formation of light infantry divisions after the Germans discovered that their mountain divisions were the most effective type of unit for sustained combat in forests and swamps.

155-676 O - 86 - 3

SECTION III

COMBAT INTELLIGENCE, RECONNAISSANCE, AND OBSERVATION

When an attacking force approaches a large forest and swamp area it is usually provided with intelligence estimates indicating whether or not the area is occupied by strong enemy forces. But since intelligence estimates furnished by higher headquarters cannot always provide conclusive data, it is the responsibility of every commander to obtain more specific information about the enemy and terrain in his zone of advance. This is accomplished by distant, close, and battle reconnaissance through the combined efforts of all arms. If distant reconnaissance missions fail to obtain adequate results, improper employment of forces can hardly be avoided. Failure to carry out adequate close and battle reconnaissance may involve the danger of falling into an ambush or encountering unexpected enemy resistance. This applies in an immeasurably higher degree to wooded and marshy areas than to any other type of terrain.

All items of information concerning the road net in the area of advance must be entered on road maps which are distributed before going into action. Numbers or names must be assigned to all roads and prominent terrain features that are not so marked on the maps. Such designations proved invaluable in simplifying orientation and communications in the Eastern Campaign.

At the beginning of the Russian campaign German panzer divisions still had air squadrons attached for close support and observation. Because of excellent Russian camouflage, however, air reconnaissance over vast forest regions was at first not too effective. Somewhat better results were achieved over large swamp areas. In time and after experience German air observers realized that the most inconspicuous signs were likely to offer valuable information. For example, the presence of horses at rest, stacks of straw and hay that should long have been stored, or fresh tracks in the mud led to important conclusions. These air reconnaissance activities were mainly concentrated on the route of advance with special emphasis on detecting enemy battery positions and tank movements. In addition, each squadron had to protect the advancing columns of the panzer division to which it was attached. The planes were also used

for artillery observation and at times were the only means of directing effective counterbattery fire. Flight for reconnaissance was usually carried out at low altitude, a most suitable technique over dense forests and overgrown swamps since the enemy caught no more than a glimpse of the aircraft as it passed overhead.

Apart from air reconnaissance and aerial photography, strong combat patrols are still the primary means of obtaining vital information. Wherever the terrain is suitable and affords adequate observation, single tanks or armored reconnaissance cars may be employed, provided they can be accompanied by security and mine-detecting squads.

In conjunction with continuous reconnaissance to the front the security of both flanks must be assured. Any commander who neglects to provide for all around security, particularly in forests and swamps, has but himself to blame if his troops sustain heavy casualties from enemy surprise attacks or are caught in a prepared ambush which was not recognized in time. The more difficult the terrain, the greater is the need for continuous and intensive reconnaissance. In contrast to operations in open terrain, reconnaissance and security patrols must be held close to the main force. Advancing by bounds, they must work their way through forest and swamp and must never lose contact with their units. Prearranged signals, such as rockets, signal flares, warning shots, and colored smoke, are suitable means of communication even in woods with dense underbrush. Whenever possible, observation posts should be established on high ground, in treetops hunting lookouts, and observation towers. Climbing irons and rope are indispensable items of equipment in terrain of this type.

Similar principles apply to a defensive situation in forests and swamps. Forward of the main line of resistance the defender must attempt to establish a closely knit security and reconnaissance network, a task that is greatly facilitated since the forces are familiar with the terrain. Reconnaissance units in contact with the enemy have the additional mission of deceiving the attacker as long as possible as to the actual location of the main line of resistance.

In exceptional cases, for instance when contact with the enemy has been frequently broken or lost altogether, the employment of so-called raiding detachments may become necessary. These are long-range combat patrols with the mission of collecting specific information, harassing the enemy rear area, and creating unrest behind the enemy lines. Their success will depend entirely on the proper selection of personnel, notably the leader, and on the suitability of their equip-

ment. They must be led by a man of unusual abilities who combines the best qualities of a trained soldier with the natural instincts of an experienced hunter. Every man in the patrol should carry his own rations, weapons, protection against inclement weather, and any items that might be needed to care for the wounded.

On missions of this type vehicles are likely to be a hindrance rather than a help. During the Russian winter, however, small boat-type Finnish sleds, called *akjas*, proved very useful for transporting weapons, ammunition, equipment, and occasionally for evacuating casualties. These sleds could be drawn by one man and, in the far northern regions, were pulled through the most difficult terrain by reindeer. At times when the ground was fairly solid, the raiding detachments were furnished small two-wheeled carts drawn by hand or by native horses.

SECTION IV

TROOP MOVEMENTS

An advance through a large forest region traversed by several hard-surfaced roads will generally follow the same principles that are observed in any other type of terrain, except that the units involved are echeloned in greater depth than usual. Strong advance guards must push well ahead of the main body. Moving along the roads, they should advance through the forest and swamp areas as quickly as possible with the primary objective of gaining open terrain and securing it for succeeding elements. These advance guards must be strong enough to overcome the resistance of small enemy forces in the woods and, in cooperation with friendly air units, must be able to hold newly gained open terrain until reinforcements arrive.

During the German campaign in Russia road conditions permitting such an advance proved to be the exception rather than the rule. Road nets, or what appeared as such on the map, consisted mainly of unimproved, sandy, or swampy country roads, frequently no more than beaten tracks through the wilderness. In these circumstances the advance of large units had to be carefully planned and organized in every detail. For example, with no more than one through road available, as was often the case, the movement of a division would be carried out as follows:

Each element of the advancing column was, as a rule, preceded by its own advance guard. This unit, in addition to its usual tactical functions, had to report the presence of mines and roadblocks along the route of advance and to indicate the time required for their removal. It was also responsible for reconnoitering all possible detours around obstructed or impassable stretches of the road.

The order of march, especially with respect to forward components of the column, had to be so prescribed as to eliminate any need for subsequent changes. On narrow roads it proved virtually impossible to move any unit from the rear of the column to the front without causing considerable difficulties.

All advance detachments were accompanied by engineer details which repaired the worst stretches of the road and placed road and terrain markers to aid in the orientation of previously issued road maps. At an early stage of the movement, construction units were put to work along the entire route of advance. When movement was

interrupted by rest periods or at night, these units performed road maintenance, constructed bypasses, and built bridges and corduroy roads. In addition, a highly mobile engineer unit was held in reserve to cope with special emergencies.

Traffic control also required careful organization and more personnel than in other types of terrain. The traffic control officer was responsible for the even and uninterrupted flow of the movement. In order to enforce strict traffic discipline and to prevent any column or single vehicle from moving in the opposite direction, he was necessarily given special authority within the scope of his assignment. Even officers of higher rank had to follow his instructions.

On many occasions the poor condition of the only available route of advance made it necessary to provide towing facilities at particularly difficult points along the road. The regulation of supply operations so as to keep them from interfering with troop movements had to be planned in every detail. One item of major importance in moving through Russian forests and swamps was the procurement and transportation of safe drinking water.

Along the route of advance effective antiaircraft protection and adequate telephone communications had to be provided, the latter connected with branch lines, traffic control, and towing details.

Immediate local security measures had to be taken by every unit during rest periods or extended halts in the forest. At night it was found advisable to provide for all around defense by forming concentric security and defense belts around individual elements of the column.

In any advancing column the location of the commander is of great importance. This is particularly true of movements through forests and swamps which, far from being mere road marches, might at any time turn into meeting engagements. In the German experience the best location for the division commander in a movement through wooded and swampy terrain was with the reconnaissance battalion or, when such a battalion was not organic, with the foremost elements of the combat team. In the case of two combat teams the commander placed himself with the one that, according to the situation, was of greater importance. He had his own radio with him and was usually accompanied by the combat team commander. The forward echelon of the division staff was under the command of the operations officer. It did not move with the column but was established in a suitable location along the route of march. It included the divisional radio communications center, where all radio messages were received, including those from aircraft reporting on the progress of the column.

The operations officer transmitted all important information to the division commander on a radio frequency reserved for that purpose. Thus, the division commander had the complete picture not only of the situation at the head of the column where he himself was located, but also of anything that occurred behind him.

Even the most careful regulation and supervision of movements through difficult terrain cannot altogether prevent traffic congestions if the troops fail to observe proper march discipline. Since strict central control is an absolute necessity, all movement through forests and swamps follow a more rigid pattern than those in open terrain and are generally executed at a lower rate of speed. Whenever German units attempted to penetrate large, continuous forest and swamp areas recklessly and without adequate preparation they were doomed to failure. The proper procedure, whenever contact with strong enemy elements in forests appeared probable, proved to be an advance by bounds. This procedure assured firm control of the troops at all times. Even in approaching a large forest area the Germans often used the same procedure, depending, of course, on what information had been obtained about the enemy situation.

When the leading echelons of the column were about to enter the woods, the commander had to decide whether his force should deploy or continue to advance in column. His dispositions for this phase depended to a high degree on the adaptability of his troops to the difficulties of the terrain.

Densely overgrown and swampy areas always present considerable problems of orientation. Under the conditions existing in Russian forests and swamps it was found to be most important that every officer and man be able to orient himself on the terrain. Otherwise, any action was likely to end in confusion with the troops losing their bearings, deviating from their march objective, and eventually firing on friendly forces. In many situations the compass proved the only means of orientation, but it was always difficult to determine the exact distance from the starting point because of the many detours involved in an advance through terrain of that type. Serious mistakes could be prevented only after considerable experience had been gained by officers and men alike.

To aid succeeding units in finding their way, directions were indicated by the use of marking tape, luminous paint, and tree and road markers. To provide orientation at night, vertical searchlight beams and the firing of tracer ammunition proved satisfactory.

Undoubtedly, the average European does not possess a well-developed sense of direction. Nor is he capable of moving swiftly and

noiselessly through the compact wilderness of primeval forests. The inhabitants of the Russian and Finnish forest regions, on the other hand, have a native instinct for the lay of the land and an astounding ability for self-orientation. Therefore, the German forces in Russia often found it advisable to use intelligent local inhabitants under close supervision as guides for marching columns and even for leading elements in the attack.

Columns equipped with horse-drawn vehicles had to be instructed to leave behind all baggage, equipment, and supplies that were not absolutely essential. For this purpose, vehicle collection points were established, and the horse teams which thereby became available could then be employed as pack animals, for the transportation of fascine mats, or as additional teams for vehicles that had to be taken along. If suitable pack saddles had not been procured beforehand, they had to be improvised. Any vehicle that broke down and obstructed the road was blasted out of the way without hesitation.

Marches of armored or motorized columns through forests and swamps called for the most careful preparation. All elements, not only the divisional units, had to proceed in close formation under strict observance of road space and rate of march. Thus, as a rule, corps headquarters did not order its nondivisional units to move forward until the last elements of the division had cleared a certain phase line. Constant air observation of such movements was of the greatest importance. Air observers reported the location of traffic congestions or unusually prolonged halts, as well as the phase lines crossed by the various units and the over-all progress of the movement.

In any daylight advance of armored or motorized columns through the Russian forests and swamps, effective air cover was an absolute necessity. Under attack from the air, armored or motorized units were unable to disperse, or even to move 1 inch off the narrow roads, and were therefore infinitely more vulnerable than in any other terrain under similar tactical conditions. To carry out any large-scale movement of such units at night, however, proved to be impossible.

As the Russian roads deteriorated, wheeled motor vehicles were the first to become useless, especially the personnel carriers of armored and motorized units. Unaccustomed to long foot marches, the armored infantry, laboring through swamps, mud, and snow with its heavy weapons and all its abundant equipment, could not stand up under the considerable strain. Foot ailments and similar causes were soon responsible for a large number of casualties.

As a result of these experiences wheeled vehicles were eventually dispensed with and each company of armored infantry was issued

two or three track-laying vehicles for the transportation of heavy weapons, ammunition, and rations. Where such a change-over was impossible, as in the case of radio cars, track-laying prime movers were employed to tow several wheeled vehicles at a time. As a rule this was done at the expense of units normally equipped with track-laying vehicles, such as artillery, antitank, and flak.

SECTION V

DEVELOPMENT AND DEPLOYMENT

Generally, the development of a column in wooded terrain in Russia became necessary as the troops approached close contact with the enemy. Individual units continued to advance in a broad formation behind a screen of strong reconnaissance forces and with adequate flank protection. Frontage and depth of the formation depended largely on the type of terrain to be crossed, but the primary consideration was always the possibility of exercising effective control over all elements of the command. Furthermore, every unit had to be ready to meet the enemy at any moment and therefore had to adopt the formation most suitable for close combat under the prevailing terrain conditions.

Equipped with close combat weapons, automatic rifles, and hand axes, the advance guard followed the reconnaissance force. Several heavy weapons were held ready for action. The rifle companies, in wedge formation and advancing by bounds, followed the advance guard at a distance. Battalion reserves and additional heavy weapons were brought up close behind the main body.

If the terrain was densely overgrown or if darkness or fog made it difficult to maintain contact, the advance of each separate column was controlled by so-called center guide lines and phase lines. A center guide line is a prescribed line along which the center of a unit is ordered to advance. In the absence of visible reference points in the terrain, the compass is usually the only reliable means of maintaining direction. Phase lines run perpendicular to the direction of march and divide the zone of advance into several parts. Conspicuous terrain features, such as fire breaks, trails, clearings, streams, peat banks, and villages or several individual houses, were usually designated as phase lines. They were entered on maps or aerial photographs and announced to the troops either verbally or by the distribution of sketches. Each advancing unit had instructions to halt as soon as its leading elements reached the next phase line and to establish contact with the units on its left and right. This procedure enabled the leading elements of all units to keep abreast and assured the maintenance of order and contact in the advance, even over difficult terrain. If there were no conspicuous features that could be indicated on the

map or identified in the terrain, the halts were arranged according to a time schedule. During darkness it was sometimes possible to establish contact with adjacent units by the use of blinker lights shielded from the enemy.

Of course, this method of advance, interrupted as it is by scheduled halts, will slow down the forward movement of the entire force. But even at the risk of losing time, it is far better to maintain full control and to conserve the strength of the troops than to expose entire units to the danger of losing contact and straying from their route of advance with all the serious consequences involved.

In many situations during the German campaign in Russia, the very nature of the forests and swamps precluded the possibility of deployment and development prior to close contact with the enemy. As far back as the old Russian border no more than one route was usually available for the approach march of any German unit. On a few occasions the unusual width of the zone of advance assigned to a division offered some opportunity for deployment, although that was hardly deployment in the ordinary sense of the term. It took the form merely of another march unit, normally organized as a combat team, following an alternate route, far separated from and at best in loose contact with the main force. But even that form of deployment was largely an involuntary measure adopted to counter an enemy attack from an unexpected direction.

Contact with the enemy was often established under the following circumstances: The Russians were dug in around a village, at the edge of a forest, in a large clearing, or in any other strip of solid ground. Their position was hastily fortified and usually protected by mines. Well deployed in width, they were able to concentrate considerable fire power on the narrow exist through which the Germans were expected to emerge. The attacker, after trying by reconnaissance and observation to obtain a clear picture of the enemy situation, usually had to fight his way from the narrow approaches into the open spaces where he could develop his forces. Facing the enemy on a narrow road, the German commander could apply but a small portion of his fire power and was unable to make effective use of his heavy weapons. He had to develop his forces toward both flanks in a desperate struggle through the swampy terrain, trying to form a small bridgehead on firm ground and to gain sufficient space for the employment of his heavy weapons, tanks, and rocket launchers. Rocket launchers particularly proved to be most suitable for this type of combat. Frequently, the defender also had no more than one nar-

row route to the rear through the woods and swamps. If that road could be taken under effective artillery fire, it was sometimes possible to block the route of withdrawal and to capture the entire enemy force.

On many occasions, however, when the Germans faced a strong Russian force supported by accurate artillery fire, any development from the narrow route of advance proved to be impossible. Then the German commander had to resort to the time-consuming procedure of rerouting his entire unit in order to launch an attack from a different direction. Even without interference from the enemy, reversing an entire column on a narrow, swampy road or on a corduroy road, where the slightest departure from the right-of-way would mean sinking into the mud, was certain to involve tremendous difficulties.

SECTION VI

ATTACK

The attacker usually seeks to capture small woods by enveloping action, making certain that any protruding salients are attacked and occupied in the course of the envelopment. The artillery blinds the enemy's observation by smoke and neutralizes the hostile weapons capable of delivering flanking fire against the attack.

If wooded areas of moderate depth are to be crossed, special care must be taken to prevent any substantial body of troops from advancing beyond the far edge of the woods without adequate fire support. In such situations there is always the danger of running into a counterattack by enemy tanks.

Any offensive action in large forest regions or in swamp areas without adequate observation calls for a considerable expenditure of time and the most painstaking preparations. This seemingly obvious requirement cannot be overemphasized and should be fully understood by all officers and noncommissioned officers. Swift and bold action and close-range assaults are indicated only in the case of a meeting engagement or for the elimination of minor enemy pockets. In all other instances the attack must be carefully planned and developed. Much time and effort will be saved if the troops are deployed in proper formation and have gained the necessary width and depth during the advance. All such preparations must be made in strict conformity with the general plan of attack, and the expected location of main efforts must be taken into consideration. Maps alone are of limited value for this purpose, and every commander will first have to conduct a thorough reconnaissance on the ground.

Quick success may sometimes be achieved by an advance and breakthrough off the main road, but only if the enemy has committed the obvious error of neglecting to secure the intermediate terrain.

Under the conditions peculiar to combat in forests and swamps the selection of objectives is always one of the most difficult tasks. As a rule, commanders have a tendency to assign objectives as distant as possible. German experience has shown, however, that units engaged in prolonged forest fighting soon become intermingled, are then extremely difficult to control, and lose much of their striking power. Assigning too distant an objective may have the effect of jeopardiz-

ing, if not completely precluding, any chance of success. Flank threats and the disruption of communications between the attacking elements and their supporting heavy weapons and artillery are some of the immediate consequences. Assigning too close an objective, on the other hand, prevents the full exploitation of gains made in the attack.

It is clear that this problem cannot be solved by any rule of uniform applicability. In view of the difficulties of observation and orientation in large forest and swamp areas, the troops need distinct terrain features which are easily recognizable as objectives, such as rivers and streams, ridges, clearings, crosscuts, trails, or the edge of swamps. Generally, if only for reasons of proper control and cohesion within the units, major objectives in forests and swamps will be selected at closer range than in open terrain. Intermediate objectives in the form of successive phase lines are required particularly in dense woods.

The attack itself will not be carried out by a single assault wave of great width and density, but rather by separate assault detachments and assault columns which must be properly organized and equipped. Success will be assured not by the number of men but by the combined effect of all arms and by the constantly renewed cooperation of all elements participating in the attack. The composition of these assault detachments cannot be determined by any standard rule. Decisive factors, apart from the enemy situation, will be the density of trees and undergrowth and the general passability of the terrain.

The Germans established special antitank teams composed of infantry, antitank, and combat engineer units attached to the leading elements. They were used for close-range antitank combat and proved extremely valuable in the Russian forests where the dense vegetation facilitated their unobserved approach. Generally, these teams advanced on foot with the infantry, carried their antitank weapons, such as Molotov cocktails, demolition charges, or antitank rocket launchers, and were equal to any tank attacking without infantry support.

Even in forests and swamps commanders should strive to use artillery and air support under principles similar to those for combat in open terrain. Since observed fire in densely overgrown areas is often impossible, it follows that such support cannot always be obtained. It should also be noted that according to German experience the actual damage inflicted by artillery and air bombardment on enemy positions in the woods is not as great as the psychological effect on enemy personnel. Dropping incendiary bombs on identified or suspected centers of resistance may facilitate the mission of the at-

tacking infantry. Because of the danger to friendly troops from resulting forest fires, the wind direction must be carefully observed. Since all traffic is of necessity channelized, harassing fire on bivouac areas, frequently used roads, and defilades has a considerable effect on the enemy's dispositions.

If the enemy has established himself in a continuous line through a wooded and swampy area, each individual strong point must be reduced separately, either by envelopment or by frontal attacks.

For any advance in this type of terrain squad columns are better suited than skirmish lines. Also, the troops must not be permitted to bunch up in the immediate vicinity of roads and trails, where they are more likely to encounter strong enemy ambush parties.

Local reserves are held close by. They are immediately used to exploit any break in the enemy line or to restore the situation in case of unexpected reverses. Larger reserves follow at the usual distance. Prior to an attack, artillery observers should be attached not only to forward elements but also to the reserves, because under conditions peculiar to forests and swamps it may not be possible to do so later on.

Enemy counterattacks or flare-ups of enemy resistance behind the front must be expected at all times. Particularly in such situations is it the foremost duty of junior and noncommissioned officers to maintain strict control within their sectors, since the means available in the field cannot assure the clear identification of front lines in that type of terrain.

The terrain features usually designated as objectives in swamp fighting are stretches of road over high ground, railroad embankments, dikes, or islands in the swamps. Whereas the protection and support of heavy weapons and low-flying aircraft are here more easily obtained, the attacking infantry finds its greatest difficulties in approaching such objectives over the surrounding swampy and open areas. Even without effective enemy interference the infantry may have to resort to various expedients in order to accomplish its mission over soft ground. On many occasions the Germans used so-called swamp bridges for closing in on the enemy. They were constructed in the rear areas and brought forward in sections under the cover of fire. Swamps that were not too soft often could be crossed with the aid of planks or fascines. In overgrown swamp areas where the surface vegetation was densely intertwined and formed small, firm islands, it usually was sufficient to take along duckboards and snowshoes. Furthermore, some of the brush was cut down and used to cover the soft ground between these islands.

The vast forest and swamp regions of European Russia offer little opportunity for the employment of airborne forces. Small paratroop units might perhaps be dropped over clearings or some of the few open stretches of firm ground, but even then it is imperative that these airborne units operate in close coordination with forward elements because they will not be able to hold out on their own behind the enemy lines for any length of time.

In the Russian forests and swamps even the successful breakthrough of an enemy position usually did not mean that the struggle for that position was over. Only on rare occasions did the enemy withdraw his forces completely from such areas. As a rule he reestablished himself quickly and forced the attacker to dislodge him again from his new hide-outs and strong points. Even a victorious force must therefore take full precautions in the form of reconnaissance and security measures and continue to patrol the area for dispersed enemy units. For days and even for weeks remnants of Russian units and individual Red soldiers held out behind the German lines in completely hopeless situations, harassing and disrupting German rear communications.

SECTION VII

DEFENSE

In wooded and swampy areas, where the attacker is usually less familiar with the terrain, the defending force will make every effort to increase this natural element of uncertainty and to keep the enemy in the dark about the situation. This may be accomplished by outpost action, raids and ambushes, aggressive patrol activity, effective camouflage, mines and booby traps planted on the enemy's natural avenues of approach, and the construction of tank traps.

In forests of moderate depth the location of the main line of resistance will depend upon the possibilities of observation available to the supporting artillery. The edge of the forest must be avoided because it serves as a reference for hostile artillery observation. Even if the defender withdraws into the forest for only a short distance, he will hardly eliminate this disadvantage. Therefore, the most advanced defenses are preferably located either far outside or at a safe distance inside the woods. In the latter case, combat outposts must be placed at the edge of the forest where some rifles and automatic weapons can be very effectively employed from trees.

Positions located outside the woods have the advantage of better command and control facilities and are also more easily provided with effective fire support. Their main disadvantage lies in the difficulty of obtaining proper cover and concealment.

In large forest areas the main line of resistance runs across woods and swamps far from the edge of the forest. It is irregular in trace and well concealed from ground and air observation. Many principles otherwise applied to the defense, such as the use of flanking fire and the need for good artillery observation, are of secondary importance here. The primary requirement is to keep the attacker from discovering whether he has actually hit the main line of resistance, an outpost line, or a strong point, or what relation the resistance encountered locally may have to the general plan of defense.

It was one of the characteristics of combat in Russian forest regions that, upon transition from mobile to static warfare, defense positions established during an engagement did not form a continuous line. Furthermore, lakes and moors, impenetrable stretches of forest wilderness, and other natural obstacles in many places prevented the usual close contact between the opposing forces.

In the forest an effective battle position capable of meeting any form of attack should be a fortified zone comprising all types of defensive installations. Its main strength lies in a well-prepared fire plan for all weapons and in the extensive but inconspicuous use of tactical wire and mines in the outpost area. The Russians preferred mass employment of mines ahead of their main line of resistance and planted antipersonnel, antitank, and wooden mines in their main battle area.

A cleverly devised system of obstacles, in addition to holding up the enemy, should also have the effect of leading him into false directions and of exposing the attacking troops to flanking fire. All obstacles must be in sight of well-concealed outguards or sniper positions. Abatis may increase the value of obstacles but should not be permitted to obstruct the field of fire. Dug-in tanks may be used to form key points of the defense. In many situations decisive results can be obtained by weapons which hold their fire until the last moment and then hit the enemy with devastating effect. All these defensive measures call for time-consuming preparations made in conformity with a carefully devised plan and executed in proper order of priority. The location of mines must be entered on maps to prevent accidents to friendly troops.

Obviously, the greatest possible concentration of artillery should be used to meet an attack. But the number and employment of artillery units will depend chiefly on the nature of the terrain. Furthermore, every battery position must be organized as a strong point capable of all around defense.

Numerous small reserve units are placed throughout and closely behind the main battle position to repulse by prompt local counterthrusts any hostile forces that may succeed in passing through the defensive line. Individual tanks are of great value for that purpose if the possibilities for their commitment have been carefully reconnoitered and prepared. Not too much reliance, however, should be placed on organized counterattacks. German experience has shown that they are never executed in time.

The question whether a position is safe from armored attack requires careful examination. This can never be determined on the basis of map information alone but must be thoroughly checked by ground reconnaissance. The Russian proved to be a past master of infiltration over the most difficult type of terrain and was capable of stubbornly pursuing his objective under almost incredibly adverse conditions.

Clearing of fire lanes is usually a difficult task and may involve the risk of disclosing the location of positions. In many cases, the careful removal of underbrush will suffice to assure defensive fires at effective range. For this purpose large clearings, often the result of forest fires, should be integrated into the defensive system. Large open areas behind the front, which might be used by the enemy for the landing of airborne troops, should be carefully guarded and adequately protected.

The efficient exercise of command in a defensive situation, as in the offense, requires the establishment and maintenance of a well-functioning messenger and signal communication system. In an area of forests and swamps not much can be expected for this purpose from aircraft alone. In addition to radio the most primitive means of sending messages, such as runners, mounted messengers, and visual signals, might prove to be the most reliable. Listening-in stations for the purpose of intercepting enemy wire communications are more easily established in forests than in open terrain. With adequate concealment provided by dense vegetation, it is often possible to place ground rods close to the enemy and, under particularly favorable conditions, even behind the enemy lines. Deeply rooted, hardwood trees in wet ground often can be used to pick up currents from enemy ground return circuits.

In heavily forested mountains the main defensive effort is directed toward the blocking of passes and roads. The selection of defensive positions should be made on the basis of a thorough terrain reconnaissance, and special consideration should be given to the danger of being outflanked by the enemy. Particularly in dense woods, this possibility is all too frequently overlooked. Obstacles can be constructed quickly with the use of tactical wire, mines, and felled trees. They are of value only if they can be covered by fire to hinder their removal by the enemy.

Lateral communications behind the front must be reconnoitered and improved to permit the shifting of counterattacking forces and other reserves at any time even through dense and pathless woods. When corduroy roads are constructed for that purpose, the fact should not be overlooked that through continuous use they will gradually sink into the swamp.

Should the enemy succeed in penetrating a position in forests and swamps, those units that have not been dislodged must protect their flanks and stand their ground. Individual strong points must provide for all around defense and hold out until counterattacks by reserves have restored the situation. On principle, groups of buildings

present in the area should be organized into strong points. The Germans found that Russian blockhouses, usually of very low construction, were well-suited for that purpose. As a rule, these buildings commanded the few routes of communication and had facilities for drinking water.

In swamps and marshes the defending force clings to islands, dunes, farm houses, clumps of trees, and any natural elevations in the terrain. Digging-in is frequently impossible because of the high ground-water level. In areas of this type a small but well-trained unit, familiar with the terrain and determined to take every possible advantage of impassable stretches, ponds, fallen trees, or peat pits, is often able to delay a far superior enemy for a long time. This was amply demonstrated by the effective resistance of the Finnish Army against the onslaught of the many times superior Russian forces during the winter campaign of 1941.

A system of defenses in the swamp may also include artificial islands, such as anchored rafts, stacks of wooden planks, or peat piles, provided they are adequately camouflaged. In the lagoons and reed flats of the Taman Peninsula, which separates the Black Sea from the Sea of Azov, German and Russian lines faced each other for weeks with observation and fields of fire reduced to very short distances. Their positions were mainly artificial islands constructed of reeds and logs and connected by narrow channels. In such areas, where the nature of the terrain severely restricted the usefulness of all types of vehicles including tractors, the problem of supplying the German front-line troops could only be solved with the aid of various expedients. All vehicles and self-propelled guns carried short fascine mats about 4 feet wider than their tracks. In most instances, however, supplies were moved by pack animals, pack bearer columns, on swamp sleds, or even in improvised boats; sometimes supply operations on the ground had to be supplemented by air drops.

SECTION VIII

RETROGRADE MOVEMENTS

In retrograde movements through forests and swamps there is always the danger that the enemy, by concentrating against a few selected places, might break through or overtake the withdrawing force. The defender who wants to break contact with the enemy and withdraw his troops takes advantage of the vastness of woods and swamps to obscure the movement of the main body, to cause successive delays to the pursuing forces, and inflict the greatest possible losses on them. For this purpose covering forces must maintain contact with the enemy and prevent him from conducting a rapid pursuit. All elements that are no longer needed for actual combat, especially supply trains and units of limited mobility, must be withdrawn at an early stage, at the cost of whatever comforts these units normally provide to the troops.

Especially at night and during the extended periods of morning and evening fog that are characteristic of damp forests and swamps, the evacuation of a position cannot be observed from the air or ground. Information on such a withdrawal can be obtained only through the continuous activity of combat patrols and from the statements of captured enemy personnel. Units engaged in rapid pursuit, on the other hand, must not permit themselves to be lured into a trap, which the enemy had ample opportunity to prepare, and thus be cut off entirely from their main force.

In the execution of German retrograde movements in Russian forests, proper timing was of paramount importance. As a rule, a body of troops was not withdrawn alone but in connection with similar movements on adjacent fronts. Higher headquarters would prescribe the time for the beginning and completion of the movement and designate intermediate lines of resistance as well as the ultimate defense positions. Pertinent orders were issued as early as possible to lower echelon commanders who then proceeded to make the necessary preparations for the withdrawal.

Subordinate unit commanders were first briefed about the mission, the disposition of forces, and the time available for the entire operation. Unit boundaries were announced in accordance with the existing road net. Successive lines of resistance based on natural compart-

ments in the woods and swamps were designated on the map. The requirement that the enemy, after taking one line of resistance, should be forced to displace his artillery before attacking the next line determined the proper distance between successive lines.

Construction units were attached to the forward elements of the command according to the importance of their tactical missions. The Germans did not find it advisable to have higher headquarters direct the fortification of lines, much as it may seem desirable to take this burden from subordinate units who are still engaged in combat. Experience proved beyond doubt that a unit which planned and fortified its own line defended it with greater obstinacy. Therefore, the preparation of lines of resistance in a retrograde movement was the definite responsibility of lower echelons (division, brigade, combat team) within their respective sectors.

Whenever sufficient time and adequate construction forces are available, the fortification of several successive lines of resistance should be started simultaneously. Viewed in the perspective of subsequent withdrawal actions, it is a tactical error to waste time and labor on the line of resistance closest to the enemy. As a result positions farther to the rear will be inadequately prepared or not prepared at all. Particularly in the closeness of woods and swamps a unit engaged in a retrograde movement for any length of time must be able to fall back on prepared positions. If such positions do not exist, the battle will assume the characteristics of a war of movement in which the advantage is clearly on the side of the stronger attacking force.

When any retrograde movement is begun, demolition measures acquire increased importance. Such measures include burning or blowing up all bridges, demolishing roadbeds, destroying wells, flooding fords, and mining all narrow passages. A detailed demolition plan—depending on the time and the number of engineer troops available—must be prepared for every sector. Much more effective than a large number of demolitions can be a few large scale demolitions at points of tactical importance where repair work is difficult and few bypasses, if any, exist. (Such places may later be turned into permanent obstacles to the enemy by subjecting his repair efforts to constant interference from the air.) All bypasses, of course, must be heavily mined.

The Russians invariably planted time bombs and booby traps by the thousands in areas they were forced to evacuate. They also used

demolitions on the largest scale, often carried out in chains of great density, to tear up the few available hard-surfaced roads.

Retrograde movements are not necessarily damaging to the morale of the soldier. If the commander succeeds in maintaining proper control and achieves some striking successes in the conduct of the defense and if he does everything possible to care for the combat troops, their fighting spirit will remain unimpaired.

SECTION IX

COMBAT UNDER SPECIAL CONDITIONS

At night or in fog most of the difficulties normally encountered in forests and swamps are greatly intensified. In terrain of that type, therefore, large scale engagements at night should be avoided. The attack bogs down in most cases, friendly troops fire on each other, the danger of confusion and panic increases, and the result is failure.

Activities during night and in fog will be restricted, as a rule, to reconnaissance and raids on well-defined, nearby objectives. Even after a successful break-through, a night advance through the woods will usually fail to produce the desired results. It is far better to let the troops rest, reorganize, and not continue the advance over wooded and swampy terrain until daybreak.

If the situation is such that a tactical movement at night cannot be avoided or if conditions appear unusually favorable, only small task forces should carry out the advance during darkness, the remainder of the main force following at daybreak. It is clear that at night any movement through woods and swamps will take much longer than during the day. Bright moonlight may reduce many difficulties, but it will at the same time aid the enemy in his defense.

Heavy frosts create favorable conditions for movements and offensive action in wet forests and particularly in swamps, because the hardened surface of the ground permits far better utilization of the terrain for tactical purposes. On the other hand, the rapid construction of earthworks in deeply frozen soil of high moisture content will be extremely difficult.

In cold weather the numerous lakes and ponds characteristic of northern European Russia, Karelia, and the Pripyat River basin lose their value as military obstacles. At the same time they offer excellent opportunities for the take-off of aircraft equipped with sledge runners.

Snow, particularly large snowdrifts, will constitute a considerable hindrance to all movements. It may require extensive snow clearing operations and the construction of special winter roads. Furthermore, a single heavy snowfall can neutralize the effect of all minefields in the area. But it will also create favorable conditions for the employment of properly equipped ski troops, which are ideally suited for

the rapid execution of long-range reconnaissance and combat missions in forests and swamps. For such purposes a supply of sleds, protective winter clothing, snow goggles, and white camouflage suits must be held in readiness. In an area blanketed by snow effective concealment is very difficult to obtain. Footprints and ski tracks in the forest are easily detected by the enemy.

Thaw and masses of melting snow will slow military operations in every type of terrain. In forests and swamps such conditions can have the effect of virtually immobilizing a substantial force for some time. All maneuver is limited to the movement of foot troops, cavalry, and the lighest type of vehicles. Small unit actions take the place of large scale operations.

Twice each year, during the spring and fall muddy seasons, the terrain difficulties normally encountered in Russian forests and swamps become insurmountable, and large areas turn into formidable natural obstacles in the path of any military advance. Heavy floods are not infrequent and impose serious restrictions on all military operations. On such occasions the construction and maintenance of even the smallest airfield or landing strip will be a difficult problem.

Entire sections of tall forests are sometimes knocked down overnight by violent windstorms, with the effect of blocking any passage. Also, the occurrence of extensive forest fires, often the result of long periods of drought, may force the military command to alter its plans of operation.

In World War II the large forest and swamp regions of European Russia were the natural sanctuaries for growing partisan cells and provided ideal conditions for their purposes. Remnants of Red Army units, having escaped capture or annihilation in earlier engagements, were able to hide in almost inaccessible places and often formed the nuclei around which the partisans rallied. Bands of hardy individuals, well acquainted with the terrain and controlled by fanatical leaders, were combined into a substantial fighting organization and conducted ruthless guerrilla warfare against the German forces in the woods and swamps within and behind the combat zone.

It should be pointed out, however, that while things are going well the effect of partisan activities on the course of major military operations is not quite so serious as one might believe or anticipate on the basis of some reports. The danger grows considerably as soon as an advance is halted, the occupying forces suffer reverses, or the attackers fail to take effective countermeasures at an early stage. Then the partisans will rapidly increase their efforts against railroads, high-

ways, and communication lines which, in woods and swamps, are as scarce as they are vulnerable.

During World War II Russian partisan raids on German rear installations eventually assumed serious proportions and forced the occupation troops to resort to complicated protective measures and police actions. Toward the end of the war the vast Russian forest areas were becoming so insecure that a special warning radio channel had to be included in the signal operation instructions of higher headquarters, to be used exclusively for urgent calls for assistance in case a unit or strong point was attacked or threatened by partisans.

Ordinary combat units are not particularly well-suited for partisan warfare. As a rule, they lack the necessary flexibility and thus are not equal to the combat methods of a tough and ruthless enemy who is usually invisible, difficult to apprehend, and who attacks without warning. Partisan combat calls for special units which are properly equipped and thoroughly trained in forest fighting. Local inhabitants may be used as valuable reinforcements, but only if their loyalty has been assured beyond doubt.

The key to success against partisans operating in wooded and swampy areas where ordinary means of intelligence fail is a smoothly functioning network of agents and informants. This alone will make it possible to identify and apprehend the more important leaders and to locate and seize main supply bases. Following the pattern of large-scale police raids, such antipartisan actions must converge on a definite objective, achieve complete surprise, and be executed with the utmost thoroughness. Merely combing through a vast forest and swamp area for partisans or trying to seal it off will require the use of inordinately large forces and perhaps, may have the effect of pacifying the area temporarily. But the result in the long run will hardly justify the means employed.

Under German occupation in World War II the villages in the Russian forests and swamps required constant surveillance. Their inhabitants—some voluntarily, some under pressure—cooperated with the partisans and gave them valuable support, not so much as combatants but, at the least, as agents and informers. The use of force on the part of the German occupation troops (evacuation, taking of hostages, punitive expeditions) fell far short of producing the desired results. Since the Russian partisans hardly adhered to the rules of civilized warfare, such measures were most likely to provoke reprisals against German troops and against the friendly elements among the local population.

Railroads and highways leading through partisan-infested areas had to be protected in two ways. First, it was necessary to establish an effective network of strong points and fortified blockhouses, and then highly mobile patrols had to operate at irregular intervals along the threatened routes. Through many areas vehicles could only move in convoy and, on numerous occasions, the Germans had to use tanks, armored cars, or armored railroad trains to avoid heavy casualties from partisan attacks.

As the war progressed, the Russians employed aircraft in the logistical support of their partisan forces. To an ever-increasing degree, leaders, specialists, weapons, rations, and equipment were flown to the partisan centers. Shielded by large forests and virtually impassable swamp areas, such operations could hardly be prevented by German measures taken on the ground. Only through intensive aerial reconnaissance by day and night and by intercepting enemy radio communications was it at all possible for the Germans to identify the location of probable landing areas. Since even the Russian fliers had great difficulty in orienting themselves at night over large wooded areas, the Germans occasionally, through the use of deceptive devices, succeeded in inducing enemy pilots to drop their loads or land their planes on German-held air strips.

SECTION X

CONCLUSIONS

Combat in woods and swamps calls for great endurance and unusual resourcefulness. The German soldier fighting in Russia would have been in a much better position to stand the physical and psychological strain involved if he had been previously subjected to a thorough training program in that specialized type of warfare. The following is a list of subjects that should be included in such a program:

1. Instruction in the peculiarities of forest and swamp fighting.
   a. Training in endurance of hardships imposed by unusual climatic conditions such as excessive humidity, subzero temperatures, extended periods of darkness, and violent storms.
   b. Effect of these peculiarities on the individual and the unit.
2. Adjustment to the natural conditions encountered during a lengthy stay in wooded and swampy regions.
   a. Training the eye and ear for the sights and sounds characteristic of forests and swamps; recognition of tracks; woodcraft.
   b. Practice in pathfinding and orientation in densely overgrown terrain by day and night and during all seasons of the year, with or without the help of technical aids.
   c. Practice in moving swiftly and noiselessly through high forests, second growth, thickets, and morass, with particular emphasis on continuous observation, effective use of cover and concealment, and constant readiness for action.
3. Special instruction in close combat, using the most suitable weapons and techniques.
   a. Practice in rapid fire on close targets; training as tree-snipers, using telescopic sights.
   b. Preparing ambushes and organizing raids.
   c. Close cooperation of separate assault detachments with each other and with special antitank detachments.
   d. Construction and defense of block houses, strong points, and artificial islands in swamps.
   e. Ski training and the use of winter camouflage.

4. Preparation of earthworks and other defense installations.
   a. Use of whatever materials may be available such as felled trees, bushes, and reeds, with emphasis on proper concealment to blend with the surrounding foliage.
   b. Construction of cover and foxholes in spite of high groundwater levels.
5. Promotion of personal resourcefulness in case of separation from the unit.
   a. Construction of primitive shelters made of logs, brushwood, reed, or snow.
   b. Building of fires with wind protection for heating or cooking.
   c. Training in first aid in case of accidents or snakebite; protection against vermin.
   d. Recognition of edible fruits, berries, or mushrooms.
   e. Observation from trees; use of pole climbers.
   f. Instruction in the most important phrases and written characters of the enemy's language.

Unit training also must be adjusted to the unusual requirements of combat in forests and swamps. Such a program, which would presuppose the completion of individual training, would have to include the following:

1. Exercises for troop commanders with the use of maps and sand tables for the solution of difficult problems of movement, particularly designed to promote efficiency in the assembly and movement of supplies as required for combat in wooded terrain.
2. Command post exercises extending over several days, for the purpose of training staffs and communications personnel in guiding columns through woods and swamps with the aid of maps, compasses, stars, and other references.
3. Exercises in the assembly and movement of entire units, including their rear echelons.
   a. Movement at night and under other conditions of poor visibility.
   b. Rapid construction of short stretches of corduroy road.
   c. Training entire march units in turning around on corduroy roads and on narrow, swampy forest trails.
   d. Preparation by each unit of all around defense at halts in forests and swamps.

e. Training suitable officers and noncommissioned officers as leaders of raiding parties.

4. Thorough preparation of the various arms and services for their special missions in woods and swamps.
   a. Training engineers in repair of swampy roads and in the technique of removing mines and obstacles.
   b. Training tank commanders in the tactics and techniques of armored combat in woods.
   c. Training the artillery in observation and fire direction in densely overgrown terrain.
   d. Training service troops in the use of pack animals when moving through underbrush, ravines, and swampy areas.
   e. Training air observers in recognition and photographic reconnaissance over dense forests.
5. Checking conditions and loading plans of all vehicles with a view toward their increased use.
6. Training in service and maintenance of motor vehicles exposed to excessive wear and tear in difficult terrain.
7. Special sanitation courses in the prevention of epidemics, frostbite, and diseases likely to occur as a result of living on damp ground.

The experienced instructor will find many additional possibilities to prepare his unit technically and tactically for commitment in forests and swamps. (Under expert guidance even premilitary training and Boy Scout exercises can bring out—in the form of play—many of the important attributes required for combat in wooded and swampy terrain.) Never should this type of training be permitted to lose its close relation to actual combat. The techniques of war are subject to change. Therefore, every new experience must become the knowledge of each person concerned, and that as rapidly as possible.

During World War II, in adherence to this principle, it was part of the mission of the Training Branch of the German Army High Command to evaluate and disseminate new combat experiences in the shortest time possible. Combat-experienced officers and specialists were assigned as temporary observers to critical combat areas, and field commanders were required to submit brief reports on combat experiences after each major engagement. The knowledge gained in this manner was then made available to the service school, sometimes even to the smallest units, in the form of circulars, training manuals, booklets, and pamphlets.

All these measures, however, will solve only part of the problem. To assure maximum performance, not only the instruction and training of individuals and entire units but also clothing and rations, equipment of men and horses, weapons and vehicles must be adjusted according to climate and geography to the varying requirements of combat in forests and swamps. Still, even the best and most complete preparations will not rule out the possibility that some units or individuals might find themselves in situations in which all available means are inadequate. In addition to thorough training and the best type of equipment, therefore, the soldier will need self-confidence and the ability to make use of improvisations and field expedients.

U.S. GOVERNMENT PRINTING OFFICE : 1986 O - 155-676

155-676 O-86 (Face Title p.)

