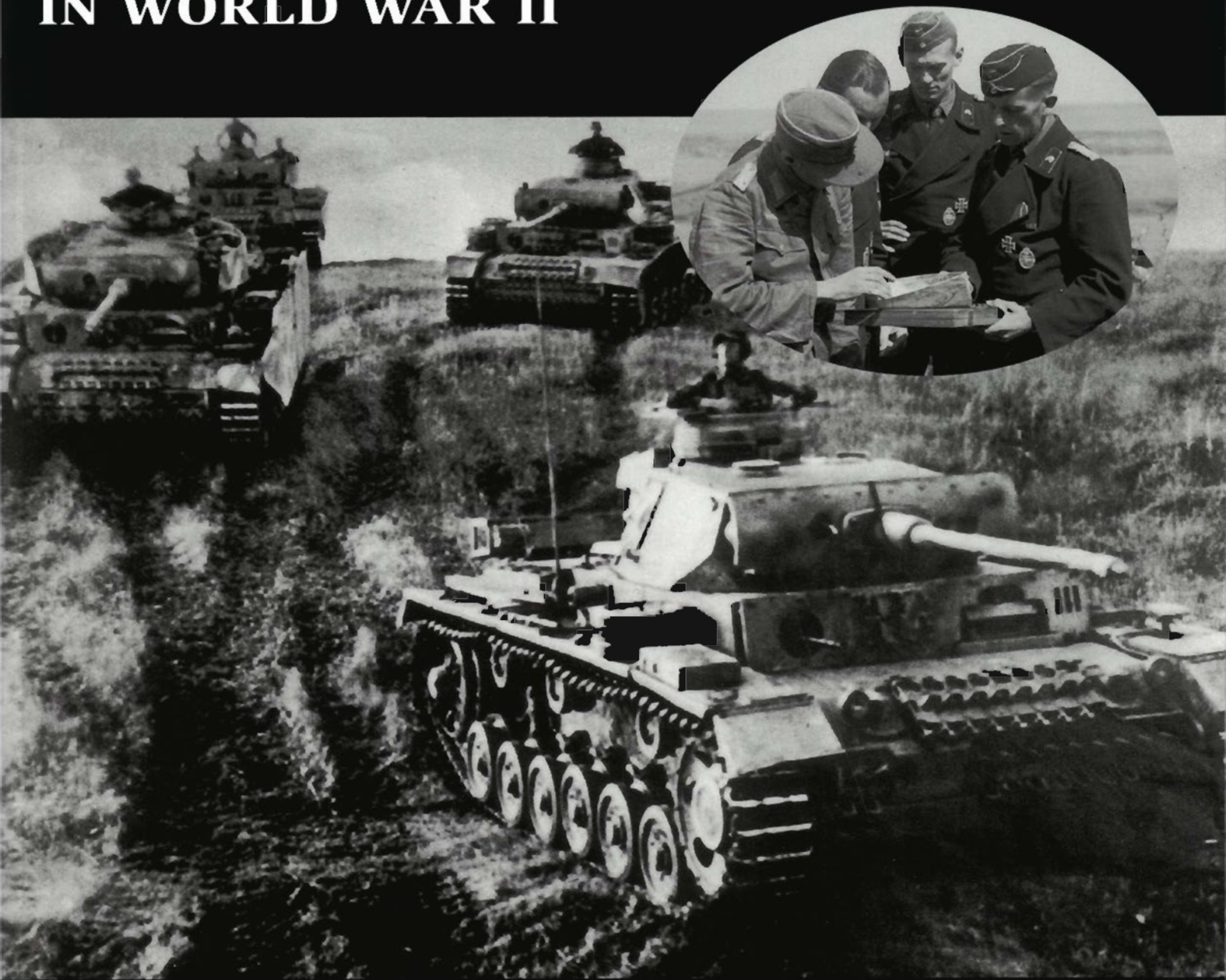


# PANZER TACTICS

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GERMAN SMALL-UNIT ARMOR TACTICS  
IN WORLD WAR II



⚡ WOLFGANG SCHNEIDER ⚡

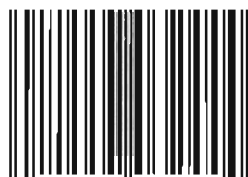
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IN WORLD WAR II

+ WOLFGANG SCHNEIDER +

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Published in 2005 by  
STACKPOLE BOOKS  
5067 Ritter Road  
Mechanicsburg, PA 17055  
www.stackpolebooks.com

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www.jjtpub.mb.ca

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

FIRST EDITION

#### Library of Congress Cataloging-in-Publication Data

Schneider, Wolfgang, Oberleutnant.

[Panzertaktik English]

Panzer tactics : German small-unit armor tactics in World War II / Wolfgang Schneider.— 1st ed.  
p. cm.

ISBN-13: 978-0-8117-3244-4

ISBN-10: 0-8117-3244-4

1. Tank warfare. 2. Tanks (Military science)—Germany. 3. World War, 1939-1945—Tank warfare. I. Title.

UG446.5.S32825613 2005

940.54'1343—dc22

2005012301

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## *PUBLISHERS' ACKNOWLEDGEMENTS*

**S**pecial thanks to Fred Steinhardt for his excellent work in translating the text from the original German.

We are also grateful to the indefatigable Jean Restayn and Karl-Heinz Münch for providing many photographs which enriched the text entries immeasurably.

We also wish to thank you, the reader, for purchasing this book and all of you who have written us

with kind words of praise and encouragement. It gives us the impetus to continue translating the best available German-language books and produce original titles. Our catalog of books can be viewed on our web site at [www.jjfpub.mb.ca](http://www.jjfpub.mb.ca).

We look forward to your continued comments and constructive criticism.

John Fedorowicz,  
Mike Olive and Bob Edwards



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## EDITORS' NOTES

In general, where the author uses the present tense, he means that the armor tactics described are still in use with the modern day German Panzertruppe. If something is described in the past tense, then that activity only took place during World War II.

To avoid confusion and unless noted otherwise, the term "operational" in this book refers to the operations/activities of units at the small-unit level. It does not refer to operations at a level between the small unit (tactical) and the theater (strategic). Division or corps operations are generally referred to specifically in such terms.

Modern American Army terminology is generally used wherever an equivalent term is applicable. In cases where there may be nuances where we think the reader might enjoy learning the German term, we have included it parenthetically.

In cases where the German term is commonly understood or there is no good, direct English equivalent, we have tended to retain the German term, e.g., Schwerpunkt (point of main effort), Auftragsstaktik (mission-type orders) etc. Since most of the terms are repeated several times, we have not included a glossary. Since we assume the reader will

already have a basic understanding of German rank terms and the terminology used for vehicles, we have likewise not included any separate annexes to the book to explain them.

J. J. Fedorowicz Publishing

J. J. Fedorowicz Publishing have a well earned reputation for publishing exceptionally high-quality books on German World War II subjects, and *Panzer Tactics* is a prime example. I've been a huge fan of their books for years, and so I jumped at the chance to introduce this book to a whole new audience of readers in an attractive and very affordable edition. Those familiar with the original will note that some changes have been made due to the exigencies of publishing in a new format, but always with a mind to maintaining the same high standards to create a comprehensive photographic survey and detailed historical record of German tank warfare.

Chris Evans  
History Editor  
Stackpole Books

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# INTRODUCTION

As everyone knows, theory and practice do not always coincide. That is exactly how it was with the German philosophy of the employment of armored formations in World War II. Although Germany was well ahead of all other armies in the fundamentals of commitment and in the art of operational command from the mid-thirties, within the Wehrmacht there were abundant violations of those fundamentals when it came to putting them into practice on the operational and tactical levels. Thus a study of German armored operations cannot have the goal of documenting the many violations of principle. Instead, I intend to make clear how the German fundamentals of employing armor formations differ from those of other nations even to the present day. Those tactically effective doctrines were one of the ultimate reasons for the success of German troops on a local level until the final weeks of the war.

The technical literature includes countless competent presentations at the level of operational/strategic command (army and higher). That also holds true at the tactical/operational level of army corps and division. Totally underrepresented are factually correct descriptions of the level of command that bears the actual burden and rigor of the battle, that of the regiment—generally, the brigade in modern usage—and the battalion. With appropriate reinforcements for combat and employment, they generally form the heart of the operation in that they become the battle groups (*Kampfgruppen*) or combat formations, frequently approaching divisional strength.

The reasons for the gaps in the literature are manifold. The interested reader usually wants an overview of a battle or a military theater without getting lost in the details of individual fighting. Also, most of the war literature inevitably comes from generals, some of whom have no knowledge at all regarding situations so far under them.

An additional aspect is that operational command in action at lower levels is, in part, more difficult than that of the larger formations, which an intelligent general staff officer can learn in a few years of ongoing training, regardless of what branch of service he belongs to. Command skills at the lower tactical level do not come from theoretical studies or sheer talent. One has to work long years at all levels to gain that experience. It was no accident that, by the end of the war, officers ranging from the level of divisional command to that of commanding general of an army corps were predominately men who had started the war as small-unit commanders and risen through command of small formations to command of large organizations. In the process, reserve officers were in the majority.

By using the classical weapon employed at the point of main effort (*Schwerpunktwaaffe*)—the armor formation—I will familiarize the reader with the different types of operational roles and other missions that exist during operations.

Right at the beginning, an essential fundamental principle must be taken to heart: tanks achieve their success primarily and predominately through offensive action. That is true whether the tactical/operational situation is offensive or defensive. As a



The Panther of SS-Obersturmführer Nikolussi-Leck covers the advance of dismounted infantry during the fighting for Kowel from 24 March to 15 May 1944. In this picture, taken on 27 March 1944 at 1530 hours, the tanks begin to assemble, accompanied by the infantry. A combined arms team, preferably with Panzergrenadiere, was the key to success in mechanized combat.





**As the war developed, parade-ground-like formations would be the exception, rather than the rule under the threat of Allied airpower.**

commander of armies von Manstein masterfully demonstrated how German armor formations could achieve remarkable successes when they were committed in (counter-) attacks, even within the context of overall retreat.

The tank, therefore, must constantly remain the sword in the hand of the tactical commander. He must use it offensively against the enemy, even in hopeless situations. If he forgoes this advantage by committing tanks to stationary positions or, even worse, digs them in and allows them to degenerate into a direct-support weapon for the infantry, then he is like a knight of old who has been reduced to the dubious protection of his shield. The initiative an armor leader insubinctively seeks then passes over to the enemy.

Misunderstandings regarding the combat value of tanks continually arose when they were assigned roles beyond their capabilities or which they could only perform in quite limited fashion. These misunderstandings arose when the tank was considered as the sole ruler of the battlefield. Such high-flown expectations in turn assume that the tank can withstand any threat, even though an abundance of such threats may be directed against it. In addition to direct-fire weapons of all calibers, there are indirect fire systems, mines, obstacles, close-quarters combat systems with hollow-charge or simple incendiary devices and an increasing number of missiles that can be used at minimal distances from cover by

individual riflemen. There is always great disillusionment when the tank formation, stressed beyond its capabilities, suffers hair-raising losses. It is hardly surprising to hear in many circles that the tank has become obsolete as an effective combat weapon.

Such conclusions fail to recognize that it is always necessary to employ the best weapon for the intended objective at the correct time and commit it in terrain that does not grant the enemy an advantage before the operation even begins. The troop leader must continuously attend to the prerequisites for the operation, not only through choice of terrain and correct timing, but also through proper force ratios and effective combat support, particularly from the air.

The main battle tank (*Kampfpanzer*) is limited by technical requirements and does not have unlimited capabilities (protection against all possible threats). It requires a precise balance between a practical level of protection, on the one hand, and, in the final analysis, the far more important capability to function against the enemy. That combination is the ability to dominate the battlefield. It comes from the sum of the tank's capabilities and not from over-emphasis on a single characteristic. Only when firepower, mobility, protection and command and control capability are combined in a balanced whole can a tank function effectively as a system and be more effective than a system which was not conceived according to these principles. Other aspects

also contribute to effectiveness, such as good training of the crew, a high level of technical reliability, a large logistical operating range etc.

It is, in the final analysis, futile to argue whether the Tiger or some other tank was the best armored fighting vehicle of the Second World War. The mass-produced M4 Sherman stood no chance in a direct engagement with a Tiger. Nevertheless, it was a successful model because it was technically reliable and was provided to the troops in inexhaustible numbers. The Soviet T-34 was rugged and did not require a high-technology industrial base for its mass production.

What advantage did the Tiger provide the Wehrmacht if the enemy manufactured 20 tanks to every Tiger that left the factory? It was "acceptable" for an American crew to "consume" half a dozen or more Shermans between landing in France and arriving at Germany's borders.

A successful main battle tank thus depends on a series of factors. It was quite clear that the chances for survival for a tank crew in a Panzerkampfwagen IV were significantly lower than in a Tiger. It would not have been advantageous to the Wehrmacht if, instead of a Tiger, three or four Panzerkampfwagen IV's had been manufactured. Even the best weapons system must finally bow to quantitative threats. Although produced at considerably more cost, the Panther and Tiger contributed to delaying the unavoidable end of the war.

The comments made in the following book are based on two things. First, the content of the regulations will be explained. The regulations, however, contain only the bare essentials and include only general statements about the practice—about the "how" of armored operations.

By far the greatest portion of the text consists of the knowledge gained that was directly derived from actual experience in opera-

tions. That knowledge was collected through hours of discussion with former Panzer soldiers of all ranks, evaluation of combat reports and accounts of personal experiences along with, of course, the personal experience of the author as an armor officer and leader/commander in numerous combat exercises ranging from platoon leadership through command of tank and antitank (Panzerjäger) companies and, finally, an armor battalion.

In the formation of the post-war German army—the Bundeswehr—the majority of the principles of leadership and employment as practiced in the Wehrmacht were adopted wholesale. That was particularly the case with most of the officers in the 1950's, and even in the 1960's, many of whom had previously served in the Wehrmacht.

## DEVELOPMENT OF GERMAN ARMOR TACTICS

Given the great success of German armor formations in World War II, it is surprising that the formation of armor units and the doctrine for their employment did not proceed in a directly linear and purposeful manner. Just as in other countries, the majority of officers did not recognize the prom-



**Operational security—a part of which included the camouflaging of vehicles—was essential to the survival of a tank crew, whether in offense or defense. Here a late-model Panzer III. Out of context, it would appear to be an unsuccessful job of camouflage, since it would look like a moving tree to the enemy observer.**

ising possibilities of motorization. In spite of isolated significant successes with tanks, they were viewed primarily as support weapons for infantry in France and Great Britain. Only hesitantly were other directions tried (British experimental exercises in 1934 on Salisbury Plain and the formation of two armored divisions in France).

In Germany, too, the theoreticians who thought progressively ran up against the massive opposition of traditionalists. Forced to make up with quality for lack of quantity, a more intensive start was already being made with the formation of so-called mobile troops (*schnelle Truppen*) as early as the formation of the Reichswehr. These mobile troops built on the experience of the cavalry. The first step was the use of motor vehicles for reconnaissance and transport functions rather than weapons carriers. This might seem strange, considering the unhappy German experience with Allied tanks on the Western Front in the First World War. However, many had a false picture of the capabilities of tanks. They were seen as ponderous, mechanically unreliable systems with an extremely limited radius of action that were all too easy to stop when committed against a massed defensive system. Such an evaluation was indeed limited and naive, but it was predominant at the beginning of the Second World War and favored the initial success of the Germans.

Although he was progressive in his thinking about many things, the Chief of the General Staff, General Beck, opposed the formation of a so-called motorized combat troop (*Kraftfahrkampftruppe*). Most theoreticians traced their thinking back to the experience of the First World War. Based on the decrease in significance of cavalry, it was felt that airplanes and tanks could not in any way carry lead to the reintroduction of mobile operational principles. In turning away from the basic principle of "movement," the conduct of operations focused exclusively on the factor of "fire" (effect).

It is significant that as early as 1921 the Chief of the Army High Command (*Chef der Heeresleitung*), General von Seeckt, stated in a memorandum, "Fundamental Considerations for the Rebuilding of Our Armed Forces" (*Grundlegende Gedanken für den Wiederaufbau unserer Wehrmacht*): "... that less than ever does the salvation of the weaker lie in rigid defenses, but rather in mobile attack." Paradoxically, in a land that had been thoroughly demilitarized by the victors and was scarcely capable of defending itself, the principles of free-reigning operations and the offensive employment of armor was increasingly being recognized. With this thought, possibilities increased for a numerically inferior but better equipped and mobile operating force. The dreams of the infantry-



Later model Panzer IV's prepare to move out on the steppes of Russia. Keeping a mechanized force moving requires extraordinary efforts on the parts of the logistician and many an advance, on both sides, was held up due to lack of fuel or ammunition.



man, who had been pulverized by artillery in crushing positional warfare during the First War, also played a subliminal roll. It was important to seize the opportunity to penetrate the static elements of the operational thinking of the time!

The manifold opposition and hindrances to the formation of such troops were finally overcome in the mid-thirties, when Reichskanzler Hitler personally took an obvious interest in the matter. He, himself, was marked by the trauma of positional warfare and was promulgating expansionist ideas. It was especially obvious to him that the armored branch of the service (Panzerwaffe) had the potential to offer an especially effective instrument with which one could wager the step across the borders.

That also tipped the balance toward the establishment of armor formations with particular characteristics. In contrast to the armored battalions of other nations, the new armor battalions (Panzerabteilungen) were seen from the start as capable of carrying out independent operations, rather than just as support for the infantry. Among other things, the essential step in the right direction came in 1935 from a great demonstration and experimental exercise in North Germany near Munster, that was, at times, attended by Hitler in person. The formation of the new Panzerwaffe matched Hitler's political interests. Laughably, a number of generals later attributed their opposition to the mechanization of the army to having recognized this at that time! It was important then for the few creators of the German Panzertruppe to set about forming an effective army with the few resources available and making Germany capable of defending itself.

Certainly it cannot be their fault that false operational ideas were taken up in the neighboring countries! (France increasingly became the exception. It had effective tanks and, by the end of the 1930's, had started organizing armored divisions on the German pattern.)

### THE FIRST THREE PANZERDIVISIONEN

In spite of opposition from most quarters, the Kommando der Kraftfahrkampfgruppen was given the assignment of organizing three large armored formations (Panzergrößverbände). This started in 1935 and was, to a certain extent, a large-scale experiment. The 2. Panzerdivision, then in Würzburg, was turned over to (at that time) Oberst Guderian, one of the most ardent proponents of an operational

Panzerwaffe. Many had the thought that, in this way, he himself would have to see the senselessness of such measures.

The path to these organizational measures had already been laid over the course of years of secret activity in the Reichswehr, part of which took place in the late 1920's in the Soviet Union (at the KAMA facility). On 1 November 1933 a training unit was formed at Zossen with the cover-name of "Kraftfahrlehrkommando" (motor vehicle training command). Within a few months, additional company-sized formations were activated. Soon they were consolidated into battalions and regiments. In the rapid expansion after 1935, the accumulated experience paid off. The new German Panzertruppe could grow from within itself. It was imperative to avoid forming new units from untrained command personnel, as was done in other countries. In Germany that principle is called "Kalben" (calving).

The decision to form separate armor formations was not in itself a guarantee of future success. (Many countries had armor formations, after all.) In this connection it is important to note that from the beginning in Germany these formations were capable of operations as combined arms teams. They did not need the external attachment of other formations to do that. Among them were integral motorized riflemen (Schützen) who were initially only transported on trucks. They soon developed into mechanized infantry (Panzerschützen) and, in 1942, were given a special branch of service designation (Waffengattung) as "Panzergrenadiere." The Panzerdivision included correspondingly motorized artillery (later the Panzerartillerie), combat engineers (Panzerpioniere) and signals troops (Panzer-nachrichtentruppen). Air defense against aircraft (Flak) was also soon motorized.

The heart of the new Panzerdivision was the Panzerbrigade and the Schützenbrigade. The Panzerbrigade originally included two Panzerregimenter, each consisting of two Panzerabteilungen (corresponding to an American armored battalion) containing one medium and three light tank companies. The Schützenbrigade originally contained a motorized Schützenregiment, a battalion of Kradschützen (riflemen on motorcycles) and a Panzer-Abwehr-Abteilung (antitank battalion). Divisional troops included a Panzeraufklärungsabteilung (armored reconnaissance battalion), a



Infantry and tanks in a provisional assembly area/attack position, in this case soldiers of the 1. SS-Panzer-Division "Leibstandarte SS Adolf Hitler." Continuous exposure to the elements and fighting takes its toll on soldiers and the military leader must ensure that the men are cared for as much as the mission will allow.

motorized artillery battalion within the divisional artillery regiment, a Pionierbataillon and a Nachrichtenabteilung, as well as logistic formations. The inadequate production of tanks, especially the medium Panzer III's and IV's, prevented a uniform outfitting of the units. The concept of the Panzerdivision was not entirely proven, because three so-called "leichte Divisionen" (light divisions) were also formed. They only included a single Panzerabteilung and, in the Polish campaign, proved to have inadequate striking power.

During the pre-war years, the tables of organization and equipment changed relatively often. It would pass beyond the intent of this book to go into the details. At the end of 1938 two additional Panzerdivisionen and one more leichte Division were created. In April of 1939 another two Panzerdivisionen and another leichte Division followed. Starting at that point in time, only a single Panzerregiment was authorized in a Panzerdivision. The start of the war

came in the midst of these organizational measures so that the formation of the 6. through 9. Panzerdivisionen was postponed and two Panzerabteilungen were assigned directly to army districts.

#### **FIRST EXPERIENCE IN WAR**

In Poland and especially in France it became evident that the brigade organization was too ponderous and the Panzerdivision had to be pared down. The unarmored riflemen were also not powerful enough. The armor-weak Leichte Divisionen were reorganized into Panzerdivisionen immediately after the Polish campaign. Henceforth the Panzerdivisionen included only a single Panzerregiment. With the arrival of the first Schützenpanzerwagen (SPW) (armored personnel carriers) the first rifle battalion of the Schützenregiment was equipped with it and became the "gepanzertes Schützenbataillon" (armored infantry battalion), renamed "Panzergrenadier-bataillon" in 1942. The combat

engineers were also given armored vehicles and the artillery and air defense forces received self-propelled mounts (*Selbstfahrlafetten*).

### ARMORED BATTLE GROUPS

As the war continued, antitank defenses increased and it became increasingly important to react more flexibly to developing situations. Large maneuver elements were often not in a position to do that. Combat-ready tanks (at times without concern for what company they belonged to) were assembled into a "gepanzerter Gruppe" (armored group) and reinforced with SPW-Kompanien (armored-personnel carrier companies). These then formed so-called "Panzerkampfgruppen." Panzerpionier and artillery forces were generally assigned to support them. Depending on the situation, the Panzeraufklärungsabteilung might also be involved. In this case, however, it was frequently employed more in the role of a (light) Panzergrenadierbataillon than for reconnaissance purposes. Divisions that had two Panzerabteilungen could also form two Kampfgruppen, though one of the battalions would have to work with a towed artillery battalion supporting it.

This combination of armored forces proved to be the most successful organization of troops. Only the "purebred" combination that was the Panzerkampfgruppe constituted a team of combined arms. It could work together in ideal fashion due to its armor and comparable operational and tactical mobility. None of the different branches had to exert undue concern for the other or employ it in a situation that endangered it.

The non-armored portion of the division served as the reserve, guarded areas or acted as normal positional troops in defense. That often caused logistical problems, since the Schwerpunkt (point of main effort) usually had to be with the Panzerkampfgruppe. Additional problems arose because no staff for the Kampfgruppe was permanently organized. Instead, it had to be formed by arbitrarily taking people from the parent organization. It would have been more proficient to have a permanent personnel organized for it. Armored battalions were also not given the logistical capacity to operate separately.

The organization and equipment of the Panzeraufklärungsabteilung also did not prove successful. Rather, it left the regiments and battalions lacking their own efficient reconnaissance elements. As for

the Panzerjägerabteilung was concerned, it was increasingly proposed to integrate it by companies into the infantry regiments or even into the Panzergrenadierbataillone, since the antitank battalion was only suitable for limited separate employment anyway.

The Panzerkampfgruppe as an organization was not officially introduced during the war. Instead existing organizations were improved incrementally, such as by the formation of supply companies. Inadequate to the end were the numbers and the outfitting of the Panzergrenadiere, the latter due to the lack of adequate production of SPW's. Most were only motorized and, in fact, really only infantry, since they had to perform all assignments dismounted.

### THE PANZERBRIGADE IN 1944

The activation of separate Panzerbrigaden was a half-hearted attempt to form streamlined armored maneuver formations (thirteen were planned altogether). Certainly the intent in forming them was to create organic Panzerkampfgruppen. The main deficiency, however, was in the totally inadequate logistics elements. The result was that these formations were "out of gas" within a few days. They were insufficiently capable of sustaining themselves as a separate formation.

### REORGANIZATION AFTER THE SECOND WORLD WAR

The new Bundeswehr was, it is true, primarily created by former Wehrmacht officers. However, wartime experiences were not always adopted in a consistent fashion. Of course, many aspects appeared again in the training. After a good beginning in 1956, however, much too large and ponderous divisions on the US pattern began to be formed. Introduced again was a situation where the lowest command level that was capable of combat with combined arms was at the level of the brigade, with similarly unwieldy Panzer- or Panzergrenadierbataillone.

During the 1970's there were several reorganizations, such as the formation of a fourth Panzer-/Panzergrenadierbataillon in the brigade. Nevertheless, the brigade was increasingly deprived of its logistical independence so that it was increasingly dependant upon the division or even the corps for command and control of combined arms operations.





Unit cohesiveness was responsible for the German soldier continuing to fight to the end despite overwhelming superiority on the Allied side. German infantry prepares to move out under the commanding presence of the 88 mm main gun on the Tiger.

The main reason for that, of course, was primarily the fact that the primary mission at the operational level—given the strategic framework at the time—was the defense of the national borders that were very close at hand. The Panzergrenadiere suffered a lot as a result. The unfortunate separation of the rifle squad from its armored personnel carriers and its commitment to digging into field fortifications was obligatory. Only the tanks were committed in mobile operations, but even they were often cooped up in the context of small battle positions in a stationary role. They assumed the role of mobile bunkers. The primary objective was not the defeat of the enemy but to hold onto terrain.

Entire generations of officers matured in that erroneous thought pattern. After the decline of the direct East-West confrontation, it required significant efforts to bring the setting of operational

objectives back to Panzer-type basics. There again, as in the 1920's and 1930's, the followers of the "pure theory" were confronted with the narrow-mindedness and provinciality of ignoramuses in operational theory.

Nevertheless, in Germany today, as earlier, the tactical/operational fundamentals for the commitment of Panzertuppen are used in a manner similar to the way they crystallized during the Second World War, even if obviously influenced by the present-day technological setting, the essentially greater significance of combat-support requirements and the increased effectiveness of all weapons against armor.

After this short historical overview let us have a close look at the German principles of armor warfare. I would like to start with the main types of combat (*Gefechtsarten*): offensive operations, defensive operations and delaying actions.

# CHAPTER 1

---

## *Offensive Operations (Der Angriff)*

The attack represents the main form of combat for the armor formation, just as it did for its direct predecessor, the cavalry. Combining surprise and high speed, it can best take advantage of armor's particular strengths. Armor has the ability to:

- Carry out movements under heavy enemy fire
- Employ accurate, armor-destroying fire power and
- React rapidly in changing direction and the Schwerpunkt.

Thanks to mobility and armor protection, the armor formation can avoid remaining too long in an area and reduce the possibilities for the enemy to react and engage targets. The German art of operational command, particularly at the lower levels, consists in merely giving the *Auftrag* (mission) and the leader's intention. It leaves the commander great latitude in determining how to execute the mission and particularly favors offensive armored action. Favorably developing situations can be taken advantage of with the speed of thought. Strengthening enemy resistance can be energetically broken through concentration of force, or temporarily avoided by outflanking it. It is no accident that a particularly large number of successful leaders of troops come from the *Panzerwaffe* (armor branch). It has been drummed into their heads to constantly direct the next blow—not to hesitate or husband their forces for the next opera-

tion. Additional precepts (beyond that particular tactical understanding) are maintaining continual contact, ongoing permanent observation of the battlefield, functionally effective means of communication and a high level of training for the crews.

The latter begins with training in tank gunnery, practical utilization of terrain during movements and in choice of positions, and on the mastery of the general tasks of combat such as security, march discipline and reconnaissance. For a crew that masters all of those, the overall tactical situation is, broadly speaking, of minor significance. It is not until one reaches the platoon-leader level and, to a greater extent, the company-commander level, that great thought is given to the tactical mission of the battalion.

This principle of command, termed "*Auftragstaktik*" (mission-oriented or mission-type orders), is also, in many cases, the deeper reason for the frequent success of German troops against vastly superior enemy forces. If one considers that an armor force, on the basis of its rapidity of fire and the range of its weapons, is often in a position to decimate (and often, by so doing, to demoralize) a concentration of enemy forces within a few moments, then it becomes evident that an enemy advancing according to rigid norms will already be at a disadvantage because he requires too much time to react, having to wait for orders instead of operating separately.



The first, and not-uncritical, phase of the attack is concentration in an assembly area. This kind of assembly area could only have been permitted in 1940 under conditions of German air superiority! Note the bunched up support vehicles in the rear.



An assembly area in open terrain also enables the enemy to spot it in good time. PETZ

## WHY IS THE OFFENSE THE MAIN TYPE OF COMBAT OPERATIONS?

In predominantly static types of combat—security or defense—the tank force only has an advantage in the opening phase, if it blocks the enemy and opens fire by surprise. The longer the battle continues, the more possibilities accrue to the enemy. The tank gives away its position with the first shot, no matter how well it was concealed. Room for movement is primarily to the rear. The attacking enemy, on the other hand, takes the initiative. The enemy accrues all the possibilities that go to the active party. He chooses the location and the time to start the action and his array of forces.

It follows from the above that stubborn control of a sector of terrain for tanks can only be a prerequisite for the subsequent maneuver-oriented type of combat typical of armor. An enemy who has run into a defensive position often only loses a few leading tanks, rapidly pulls back beyond the range of dangerous fire and quickly gains a good understanding of the situation of the opposing positions.

In this phase, the attacker can, without delay, commit the entire array of combat support available to him, including air support. While this may not destroy the enemy, it prevents a withdrawal of forces. At that point, the attacking forces can outflank the defender and deliver the decisive blow at another location. After the first shots, the initiative goes to the aggressively operating attacker. An armor force that remains in a position stays in the role of the one who has to wait for the next blow.

The main reason that a few tanks covering the withdrawal of the main forces were so frequently able to stop numerically superior attackers was the declining vigor of the pursuit and the attacker waiting for additional combat support—aircraft, high-angle fire, etc. Decision in battle almost always comes in the attack,

the defensive is often only an essential preparation, seldom more than that.

The commitment of tanks offensively whenever possible is reflected in the German doctrine for command. In Heeres-Dienstvorschrift (Army Regulation) 470/7, "Die mittlere Panzerkompanie" (The Medium Tank Company)—which was also applicable for the Panzerkampfwagen Tiger—there are no types of combat presented other than attack. In Heeres-Dienstvorschrift 470/10 "Panzerregiment und Panzerabteilung" the extremely brief section on "Verteidigung" (Defense) merely stresses that, after allowing the enemy to approach, it is necessary to immediately counterattack.

## FORMS OF ATTACK

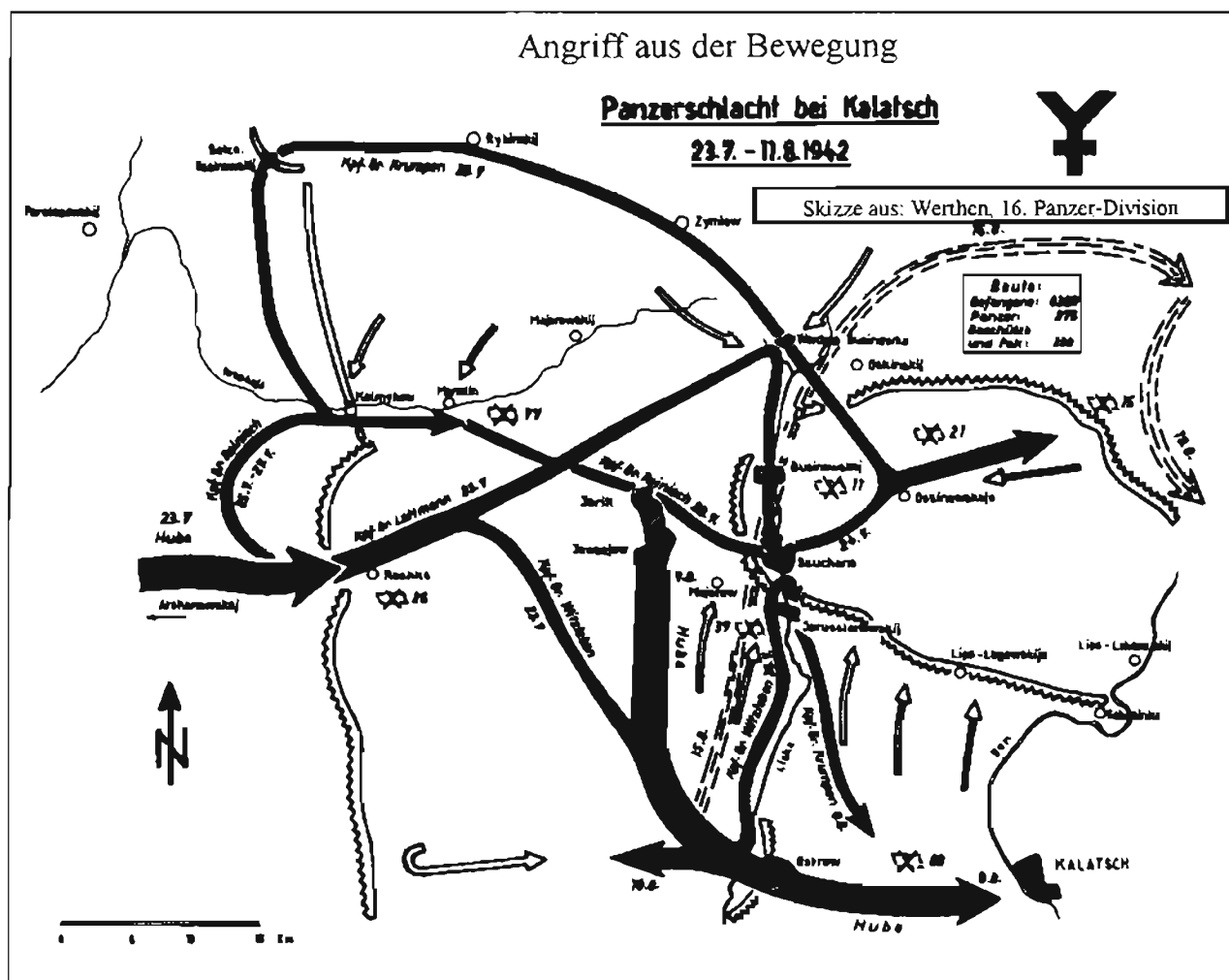
The various forms of attack are differentiated into a meeting engagement as advance guard (Vorhut), hasty attack (Sofortangriffe) or deliberate attack (Angriff nach Vorbereitung).

An advance guard is committed to a meeting engagement in order to strike an enemy by surprise when he is not yet ready to defend or to take possession of terrain that will be decisive for further conduct of the battle without loss of time. The attack



Offering better concealment, but still problematical, is concentration in villages. The tanks are forced close together and frequently there are only a few streets. This is demonstrated at St. Vith during the French Campaign in 1940 where such concentrations were not of as much concern under conditions of German air superiority. Note the early-model Panzer III's and almost universal wear of the Panzer beret among the tank crews.

DR. KONTZ



### IMMEDIATE ATTACK (ON THE MOVE)

Kampfgruppen of the XIV. Panzerkorps attack in the direction of the DON bend at KALATSCH and form several arms of a pincer attack, 23 July-11 August 1942.

**Situation:** The enemy retreats toward the east with weak covering troops, trying to prevent German forces from reaching the Don using two defensive lines. Friendly forces thrust swiftly east with armor and break all enemy opposition.

**Mission:** 16. Panzerdivision, on the north wing of the corps, is to form two Panzerkampfgruppen and thrust rapidly forward to the DON.

*Execution:* All tanks are concentrated in two Kampfgruppen. Continuous outflanking and encirclement of the enemy. Only brief halts for dismounted infantry to catch up. Continuing commitment of wide-ranging reconnaissance. Enemy counterattacks are destroyed by envelopment in depth. Close coordination with low-level aerial reconnaissance. Maneuvering closely resembles warfare at sea.

**Booty: Prisoners: 8300; Tanks: 275; Cannon and antitank guns: 298**

Sketch from Werthen, *Geschichte der 16. Panzer-Division.*

can be in the strength of a reinforced company but, if possible, with the entire battalion.

An immediate attack—often done on the initiative of the battalion commander—occurs when the concentration of the follow-on forces cannot be awaited or in order to take advantage of a favorable situation. The result is that the enemy is rapidly engaged by surprise without splitting one's own forces. The attack formation can usually be accomplished with a short halt in the march. If possible, it should be protected from enemy observation and effects of fire. It must take place rapidly in order to deny the enemy time for preparation of his antitank defenses. The higher the level of combat readiness while deploying, the shorter the time needed for the march halt.

Surprise encounters with the enemy and conditions of terrain (for example, exiting a defile) can force the start of the attack out of a march column or a narrow combat formation. As soon as the attack by the leading tanks gains room for deployment of those that follow, and the enemy situation and terrain permit, combat formation must be established.

The battalion most frequently conducts a hasty attack in the *Breitkeil* ("V"-formation or inverted wedge). During the attack, covering fire for the further advance of the company must be established. Additionally, the center company moves forward from sector to sector. The continuity between the first and the second elements must not be broken.

A deliberate attack is usually directed against a strong, prepared defense. The battalion then has a separate mission or fights within the framework of a armored battle group (*gepanzerter Kampfgruppe*).

Before moving into the assembly area, the approach routes and the area itself must be reconnoitered. They should provide cover against enemy ground and aerial observation. If possible, the assembly area should be able to be reached by wheeled vehicles.

In the assembly area the formation organizes itself for the attack, to the extent that space and terrain permit. It makes itself ready for combat. All preparations required to execute the attack are carried out. They include:

- Thorough reconnaissance of the terrain of the attack
- Clearing of barriers and obstacles in front of the enemy battle lines.

- Acquisition of all necessary data for carrying out the attack through combat reconnaissance
- Establishing contact with the leaders of the combat-support branches supporting and accompanying the attack and
- Liaison with the leaders of infantry and rifle formations that are attacking ahead of the tanks

The results of reconnaissance by all elements participating in and supporting the attack with regard to terrain, identified nests of enemy resistance—especially antitank weapons and artillery—are evaluated.

Personal briefing of the company commanders and as many subordinate leaders as possible should be carried out in the area of the attack as far possible without betraying the intended attack.

Radio silence must be enforced in the assembly area to prevent the enemy from drawing conclusions about an impending attack from radio traffic.

It is desirable that the tanks depart the assembly area in combat formation. If the terrain does not permit that, a short halt during the march out will be required even during a deliberate attack.

## PREREQUISITES FOR THE ATTACK

There are many causes for the failure of an attack. Frequently the force ratio in itself is a critical disadvantage for the numerically weaker party. There is good reason why the attacker should have a twofold—if possible, threefold—numerical superiority. However, there are other means by which the attacker can make his assault effective. A numerical superiority of the defender can rapidly be neutralized if the attack against his position is closely coordinated with the available means of combat support as well as the operations of neighboring forces. On the one hand, that keeps the enemy down so that aimed fire is impossible and, on the other, prevents the enemy from massing fire.

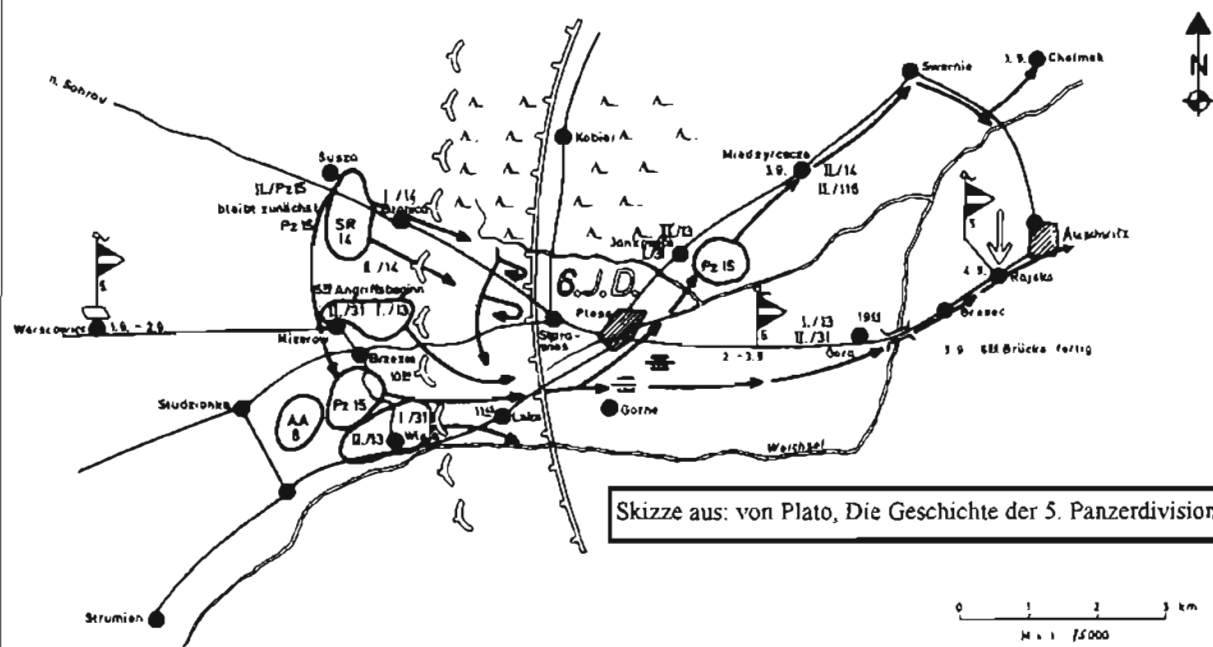
The essential objective in attack—besides the destruction of as many targets as possible—is to piecemeal the enemy, eliminate his combat support elements and minimize his command and control capability. Among other things, disruption of command and control results from maintaining constant pressure, multi-directional operations, concealment, disruption of communications links and use of smoke. It is so advantageous to the attacker to have



## Durchbruch durch die Bunkerstellung bei Pless am 2.9.1939

### Angriff gegen eine befestigte Stellung

 Polnische  
Feldstellungen  
 Bunkerstellungen  
 Panzerschlacht bei Pless



### ATTACK ON A FORTIFIED POSITION

**Panzerregiment 15 assaults through an enemy bunker position on 2 September 1939**

**Situation:** Enemy defends west of PLESS from strongly fortified positions. The first attack of Schützenregimenter 13 and 14 (rifle regiments) are unsuccessful.

**Mission:** Panzerregiment 15 attacks after making a breach in the enemy fortifications and takes the WEICHSEL sector east of SWERNIE.

**Execution:** All forces are concentrated in one sector. Artillery suppresses the enemy. Engineers and riflemen advance, taking advantage of gaps. The attack penetrates the enemy defensive area. The further assault to the attack objective takes place with no loss of time.

Sketch from von Plato, *Die Geschichte der 5. Panzerdivision*.

the initiative on his own side that he must be concerned about maintaining that advantage.

Many attacks fail terribly in the initial phase because decisive mistakes have been made. These can include:

- Incorrect choice of terrain (and timing)
- Inadequate knowledge of the enemy situation
- Ineffective or inadequate coordination of the support elements and
- Incorrect commitment of forces.

Arrival in the assembly area must be as quiet as possible (low engine rpm). Camouflage against ground and aerial observation is especially important. Track patterns, as created by tracked vehicle turning movements, must be removed to conceal signs of the presence of tanks from aerial observation. Traces of movement must be concealed or intentionally point back out of the area. As a rule, the area is reconnoitered by the reconnaissance platoon, the route marked with signs and the places for individual tanks indicated with unit-prepared signs (for example, turret numbers or tables of numbers in different platoon colors). The tanks drive to their places and back in, if possible under trees. The tur-

ret is traversed to the side so the barrel does not stick out into the way and the driver and radio operator can conveniently climb out through their hatches. The track marks are removed and the tank concealed with natural vegetation or a net. Each tank immediately provides its own security. The platoon leader checks out his sector and coordinates the security measures. Anti-aircraft spotters are assigned. If the situation allows, individual machine guns are dismounted and used as anti-aircraft defense.

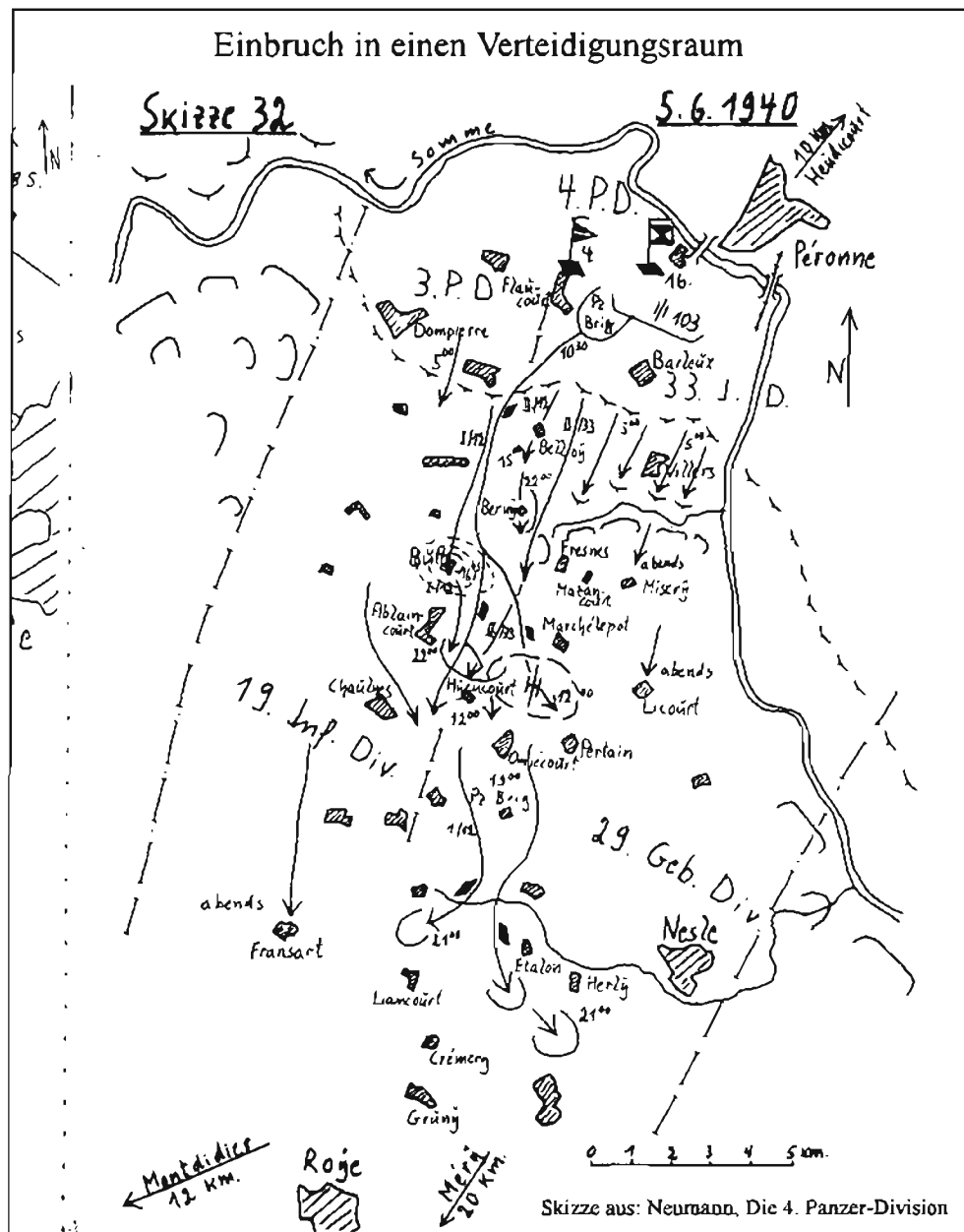
The sentinels and air-defense lookouts give the alarm through calls and signals or, if need be, by opening fire or using flare-pistols. They should all be relieved every two hours; sooner if it is cold. All tank crews are to have their individual weapons on them and steel helmets available when they dismount in the event of a surprise artillery barrage.

A series of logistical measures are conducted in the assembly area and the required tactical orders are given.

All vehicles are completely topped off and supplied with ammunition. To accomplish that, the supply vehicles drive to a central point for the platoon or company or unload the supplies for each



Vehicular concentrations like this could only be allowed on rare occasions later in the war. Here we see a crewman adjusting equipment storage on his winter camouflaged Panther.



### PENETRATION OF A DEFENSIVE AREA

Panzerbrigade 4 breaks into the enemy defensive area after crossing the SOMME.

**Situation:** The enemy could not prevent the river crossing and defends from changing positions. German forces used the bridges at PERONNE to cross and continue the attack while on the move (aus der Bewegung).

**Mission:** Panzerbrigade 4 forms the Schwerpunkt of the 4. Panzerdivision and attacks astride the enemy division boundary.

**Execution:** Taking advantage of the uncoordinated enemy command and control (The 19th French Infantry Division pulled back more rapidly into a position to the rear than the 29th French Mountain Division!), the concentrated armored units attack with open flanks. The enemy is thus prevented from taking up new positions. The area of the enemy artillery positions is overrun. The assault carries through the rear boundary of the French defensive area.

Sketch from Neumann, *Die 4. Panzer-Division*.



Towns, however, offered access to the road networks, critical for rapid advance of armored forces, particularly in the pursuit. These early-model Panzer IV's are deployed somewhere in Russia. KARL HEINZ MÜNCH

tank (cans, barrels, boxes, etc.) at the side of the road. The supply vehicles then retrace their route and pick up the empty containers. Possible technical/mechanical deficiencies are corrected with the help of contact teams from the maintenance personnel. The maintenance status is checked. The crews conduct maintenance prior to going into action.

The assembly area should be far enough from the main line of battle (*Hauptkampflinie* = HKL) so as to be beyond the range of enemy artillery. Usually it is located in a wooded area with a road network in it. The tanks are drawn up along both sides of the road network so they can move out again without delay. A few tanks reconnoiter alert positions on the edge of the woods so they can be occupied in the event the assembly area is attacked. The crews rest, either on the rear deck of the tank or in a foxhole under the vehicle.

During the halt the leaders must reconnoiter the route to the main lines and coordinate with the troops holding the positions in the line. Link up with the supporting elements takes place in the assembly area. Their leaders also take part in all reconnaissance and issuing of orders.

The routes to the line of departure (*Ablauflinie*) must be reconnoitered and the precise march time to reach it noted.

#### THE START OF THE ATTACK

In the initial phase of the attack the organization is still widely dispersed, allowing as many gun tubes as possible to engage the enemy at any given time. Combat reconnaissance has gone ahead and finds obstacles as well as the forward edge of the enemy lines, if that has not already been done by dismounted patrols earlier.

It is extremely important during this critical phase of the attack that the enemy is prevented from aimed fire of his weapons through indirect fire of friendly forces, either in the form of preparatory fires or on-call ones. Forward observers (*Vorgeschobene Beobachter*) in their SPW's should be positioned far enough forward in the organization that, driving from one observation point to the next, they can maintain continuous observation of the battlefield. If possible, each lead company should be directed to coordinate with a forward observer. The tactical leaders call for artillery support. The permission to fire is obtained from the commander of the formation (*Gefechtsverband*: e.g., battalion or regiment).

In general, the foremost units have the mission of rapidly thrusting through the depth of the enemy main lines and destroying the enemy artillery. The follow-on tanks of the second echelon fight in close cooperation with their own infantry, overcome the



## ATTACK AFTER A CHANGE OF FLANKS

**Reinforced Gepanzerte Gruppe "Großdeutschland" reinforces relief operation at RIGA on 21 August 1944.**

**Situation:** XXXIX. Panzerkorps carries out Operation "Doppelkopf" with the objective of breaking the encirclement of RIGA. The attack slowly gains ground against the deeply echeloned enemy.

**Mission:** Gepanzerte Gruppe "Großdeutschland" moves to the north at all possible speed and attack the retreating enemy in the flank.

**Execution:** The Gepanzerte Gruppe moves as rapidly as possible in individual march serials to an assembly area northeast of MOSCHEIKEN. It uses scouts to mark the route as well as aerial reconnaissance. Patrols with combat power capability reconnoiter and maintain contact with the enemy. The Gepanzerte Gruppe fuels up, sets out in wedge formation and scatters the enemy. Continuous advance on DOBLEN. Establish contact with friendly formations attacking from the north.

**Sketch from Niepold, *Panzeroperationen Sommer '44*.**

enemy infantry and those heavy weapons that were not destroyed by the first echelon. In this fashion the kind of massing that prevents the attack from gaining ground is avoided.

After successfully braking through, the assault is to be carried forward into the enemy rear area. That is the fastest and surest method of breaking enemy resistance.

After the objectives of the attack have been attained, the commander must immediately reorganize the battalion as required for the next operation. The battalion must be continually prepared to parry enemy counterattacks.

### COURSE OF THE ATTACK

The attack must proceed strictly according to the most important fundamental of armor commitment: fire and movement (Feuer und Bewegung). If the attack rapidly gains ground, the tank platoons move as a unit and are covered by other platoons. Fire and movement is coordinated within the company by the company commander. The battalion commander does this on his level. The battalion commander, however, concentrates less on controlling the fire of his tanks and more on steering the maneuver of the companies and requesting the fire support of the artillery.

The coordination of the movement within the company goes more deeply into detail than at battalion level and concerns itself with the movement of platoons and individual tanks. The company commander gives linear as well as directional orientations. A readily identifiable terrain feature on the horizon gives the approximate direction. That point can be at the limit of visual acquiring range. Check points should be given out for the sector of terrain that will be traversed to that point. They should be chosen in a way that they are close enough that the entire actual route to be driven is visible.

Regarding linear direction, the company commander directs the platoon that is in the lead to the next position from which it can cover the movement of the following elements. The next platoon or the following platoons move even with the covering platoon or pass the tanks that are providing cover there. That form of advance is referred to as *raupenartig* (caterpillar-like) when the elements move even with one another or *überschlagend* (leapfrog) when they advance past one another. The process is steadily repeated. The rule of thumb for a "leap": half the effective distance of the fire

(Hauptkampfenfernung). That is important, since effective fire by the tanks in position cannot be guaranteed when the forward tanks are beyond firing range. The caterpillar method is used in the face of strong enemy resistance in order to bring better-aimed fire on the enemy. A leapfrog technique covers terrain considerably faster but the moving tanks are forced to fire from the move. The leapfrog technique requires no further orders during the process. The platoon that is covering follows immediately when the tanks that are in front of it are in position.

Within the context of the battalion, the orientation is almost entirely directional, with less use of specific axes of advance. More of the emphasis is on sectors of terrain to be taken with time phasing and follow-on assignments.

For example: "One o'clock, 3000 (meters), corn field, 3rd Company proceeds to a position at western edge, engaging town beyond it. 2nd Company then moves past on the left to the woods, position 1000 (meters) southwest of the woods facing west. Cover 1st Company closing up to the position. 3rd Company, move out now! Forward Observer, immediate suppressive fires on town now! Panzergrenadier company follows right behind 3rd Company." Linear directional assignments at the company level are the exception. After reconnoitering the new area of operations, terrain features should be given nicknames (a so-called "Geländetaufe" or christening of the terrain) to avoid the necessity for excessively wordy descriptions of terrain or the giving of map locations.

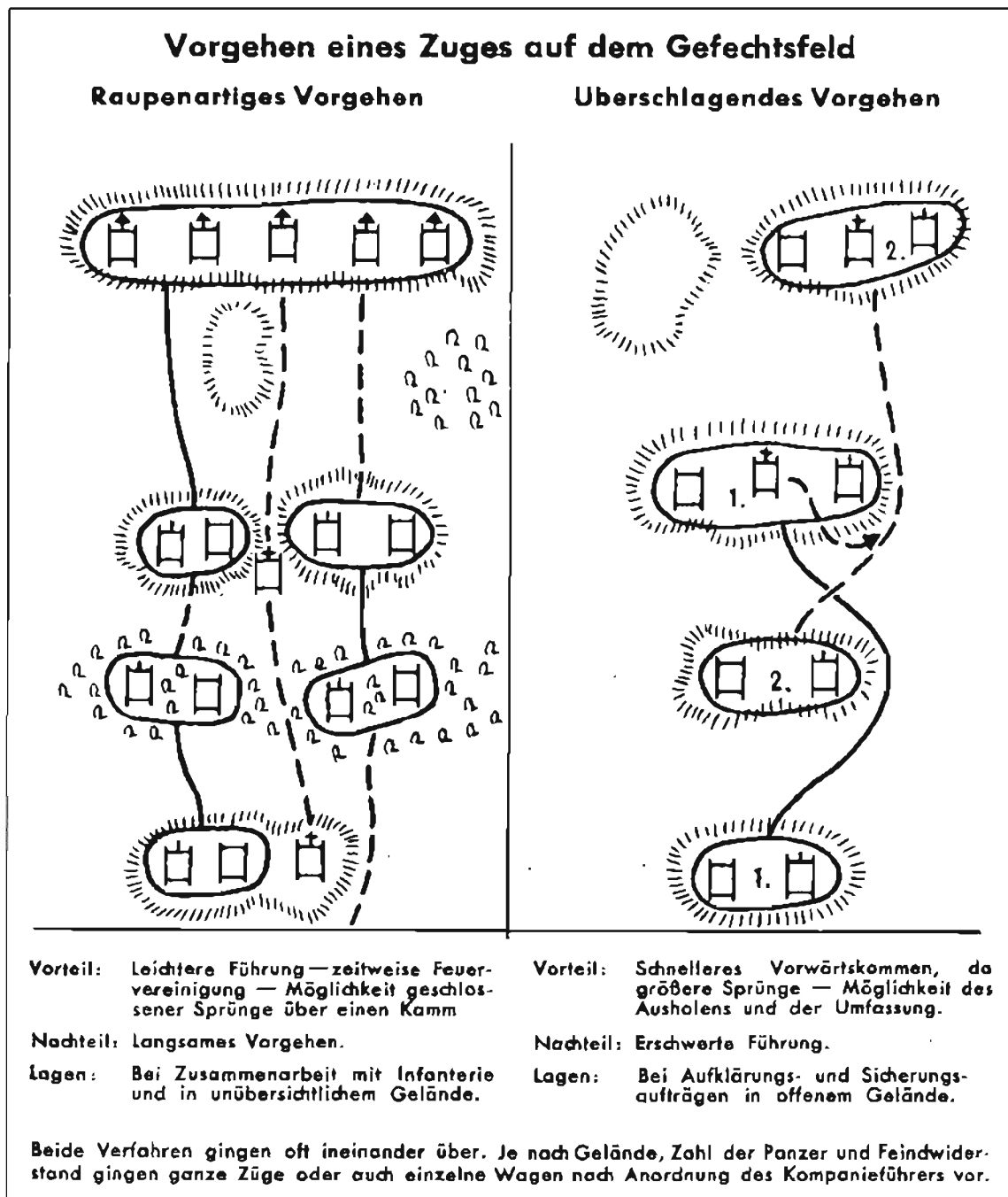
### MEETING ENGAGEMENT (BEGEGNUNGSGEFECHT)

If the tank company meets the enemy unexpectedly while marching or advancing while deployed, and the enemy is similarly on the move, the leading unit of the force must open fire immediately, regardless of whether it is stationary or on the move. The immediate result will be that the:

- Enemy will be brought to a halt as a result of the surprise opening of fire,
- Enemy will suffer the highest possible losses, and
- Position already reached will be held or, depending on enemy strength, more favorable positions will be gained.

After opening fire separately, the platoon leaders and company commanders immediately take





### THE PLATOON ADVANCES ON THE BATTLEFIELD

Left side: "Caterpillar" Advance (raupenartig). *Advantages:* Easier command—at times combined firepower—possibility of a bound over a ridge with all tanks together. *Disadvantages:* Slowness of advance. *Situations:* In cooperation with infantry and in terrain that does not permit observation.

Right side: "Leapfrog" Advance (überschlagend). *Advantages:* More rapid advance, due to greater bounds—possibility of lunges and envelopment. *Disadvantages:* More difficult to command. *Situations:* In reconnaissance and security assignments in open terrain.

Both types of advance often alternate. Depending on the terrain, the number of tanks and enemy opposition, either the entire platoon or individual vehicles advance, according to the company commander's directives.



This imposing picture illustrates one ideal form of the assembly position. As if crouched for the spring, the tanks stand on the reverse slope and can start off closed up. HAGELÜCKEN

over fire control, allocate targets and assign positions.

It may also be necessary to pull back to positions further to the rear if that is the only way that the tanks can avoid superior enemy fire and carry out the conduct of fire successfully.

As a result of the rapid report(s) of the platoon leader with respect to location, nature and strength of the identified enemy, the company commander will get his first overview of the situation. The company commander must reinforce the fire as quickly as possible with the other units of the company in order to:

- Take advantage of the surprise and
- Throw back the enemy while he is still at an operational disadvantage and before he has a chance to reinforce himself.

In an initial situation report to the battalion, the company commander reports:

- Type and strength of enemy
- Disposition and
- Presumable intention(s) of the identified enemy.

If the enemy forces are successfully defeated then local zone reconnaissance is carried out and movement resumed. If the enemy turns out to be

superior in strength, then the firefight should be carried on from favorable positions so that:

- Further advance of the enemy is stopped
- Maximum losses are exacted from the enemy and
- Time is gained for the battalion to take further actions.

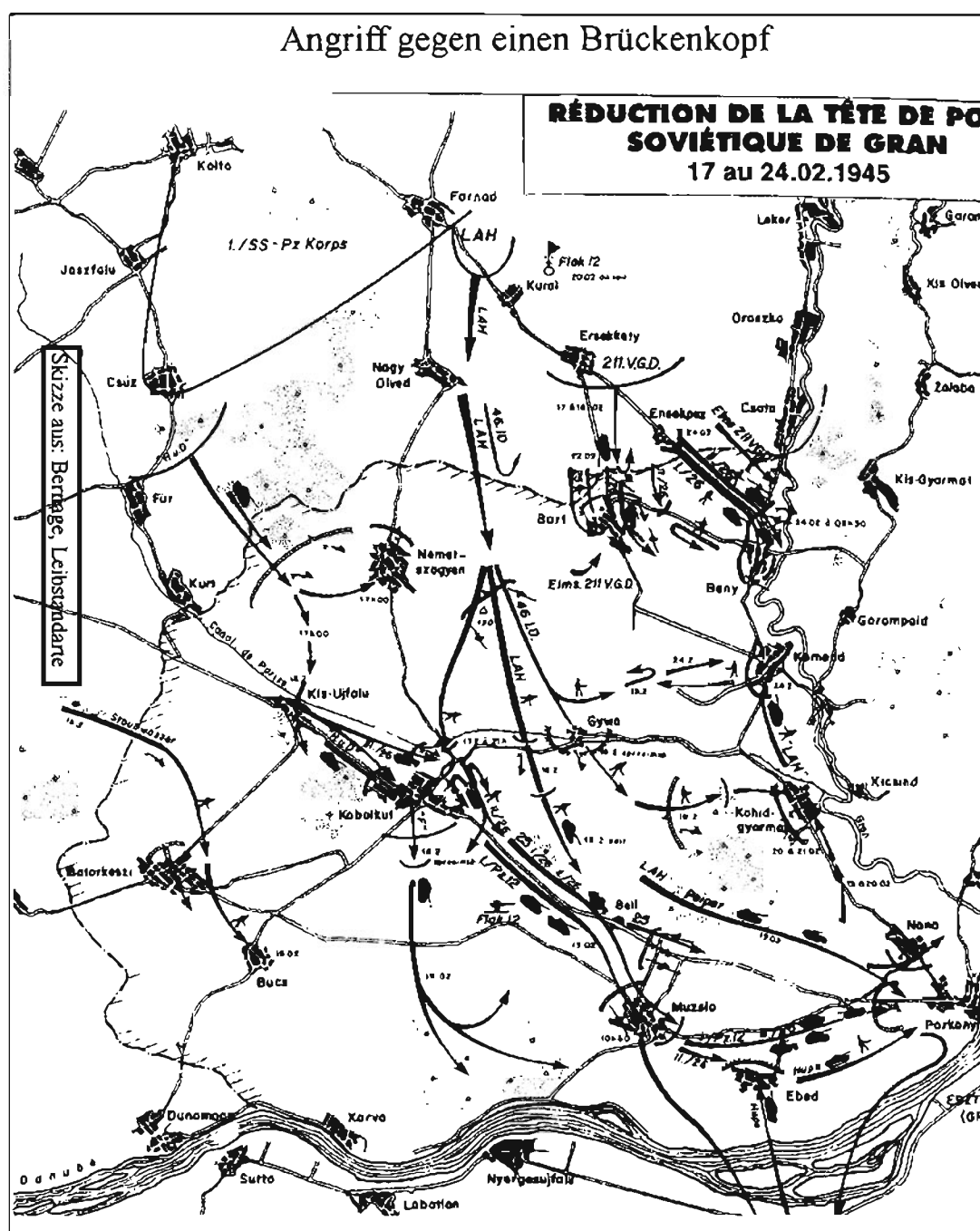
It may be also necessary to move back somewhat to more favorable positions.

Regardless of the arrival of his own forces, the tactical commander should rapidly take advantage of any opportunity. He must not lose sight of his mission nor of the intent of the higher command.

#### **ATTACKS AT NIGHT OR IN CONDITIONS OF LIMITED VISIBILITY**

Offensive operations in fog or darkness can be necessary if it serves to destroy an already shaken enemy and cause him to disintegrate completely.

Within the company, intervals and distances between vehicles need to be limited so that visual contact can be maintained between tanks. Direction must be controlled by the gyrocompass. It will simplify orientation if the route to the objective involves clearly recognizable routes and terrain.



### ATTACK AGAINST A BRIDGEHEAD

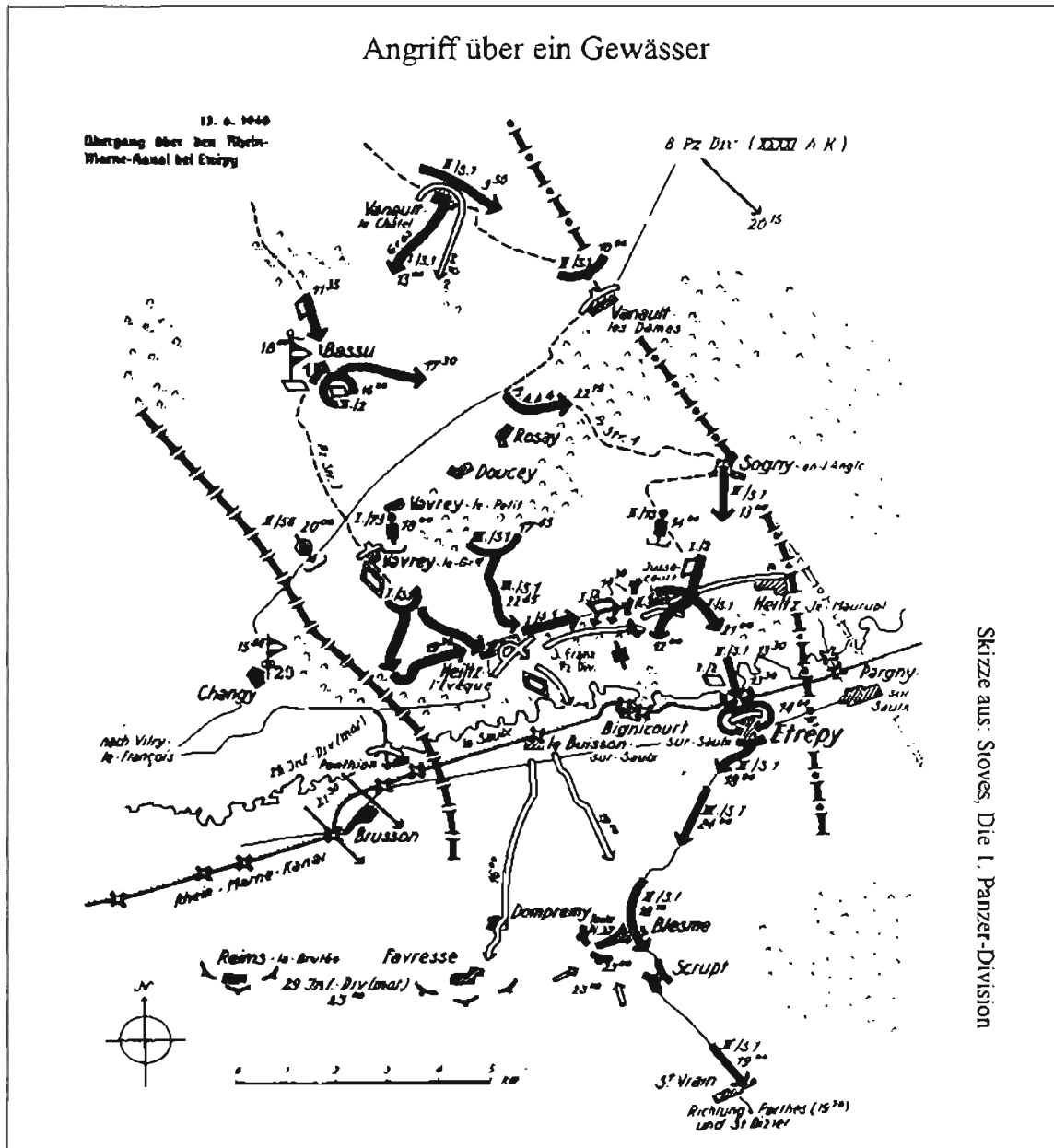
Kampfgruppe Peiper breaks into the Soviet GRAN-Bridgehead on 18 February 1945.

**Situation:** The enemy has formed a bridgehead and immediately moved riflemen and antitank cannon forward. Friendly forces are brought forward as rapidly as possible and deploy after short preparations.

**Mission:** 1. SS-Panzerdivision "Leibstandarte," together with the 44. Infanteriedivision, takes the northern bank of the DANUBE in a rapid assault and clears out the bridgehead

**Execution:** Gepanzerte Gruppe "Peiper" forms the spearhead. Commitment on a very narrow front rapidly punctures the blister (the bridgehead)! A ruthless assault deep into the depths of the enemy fans out sideways near the river bank. Units that follow guard the flanks.

Sketch from Bernage, *Leibstandarte*.



## ATTACK ACROSS A WATER OBSTACLE

**Panzerregiment 1 establishes prerequisites for crossing the RHINE-MARNE Canal on 13 June 1940.**

**Situation:** The decimated enemy has organized defenses on both sides of the canal. Friendly forces approach the canal in dispersed formations. Combat patrols committed in advance were unable to capture an undamaged bridge.

**Mission:** Reinforced Panzerregiment 1 forces the enemy north of the canal across it and guards the crossing of Schützenregiment 1 from favorable positions.

**Execution:** Panzerregiment 1 smashes the enemy on the near bank of the canal and moves forward in wide formation so that covering fire can be developed in conjunction with friendly artillery. Tanks cover the bringing up of crossing means by combat engineers. With the start of the crossing by the Schützen (riflemen), effective action is taken against every enemy weapon on the far bank until the friendly bridgehead has been formed. Panzerregiment 1 crosses on an engineer bridge at ETREPY.

Sketch from Stoves, *Die 1. Panzer-Division*.

In fog, dusk or darkness, the company can only conduct the attack from terrain sector to sector in order to maintain the cohesion of the force on a continuous basis. Signal flares, parachute flares from aircraft or haystacks set on fire by gunfire will assist the tanks in locating the objective.

When driving through artificial smoke one must be careful since the tanks offer an especially good target to the enemy after breaking out of the wall of smoke. Therefore it is important to rapidly speed up on leaving the cloud and increase the distances between vehicles.

### **ATTACKS ACROSS WATER OBSTACLES**

In an assault crossing of a river the predominant mission of the tanks is to provide covering fire for the crossing and to then assume the attack on the other side of the river for the force that has already made the crossing. The individual platoons need to occupy semi-concealed positions on the near side of the river so they can quickly lay down concentrated fire on nests of enemy resistance. Rapid changes of position are required to deny the enemy on the far bank time for effective countermeasures against the individual tanks.

### **BREACHING OBSTACLES**

Mine obstacles are often only recognized after the lead tank has driven onto the mines. In that case it

is important to prevent additional tanks from doing the same. For that purpose every radio-equipped vehicle, upon noticing the stopping of a friendly tank by mines, should broadcast: "Mines!—Halt!—Mines!—Halt!—Mines!—Halt!" followed by description of the location.

Forward movement is then stopped for a time. The lead vehicles, which may already have entered the minefield, back up in their own tracks. The company commander reports to the battalion and receives orders from it for assembly to the rear or movement in another direction. If enemy antitank defenses come into action at the same time that the minefield is encountered, the fire must immediately be returned and, if available, the lead tanks lay down smoke.

After the extent of the minefield has been determined or other possibilities for avoidance of the mines or other obstacles has been reconnoitered, they should be bypassed. Where that is not possible, infantry must take the obstacle and engineers clear and mark a path. In the meantime, the tanks cover the obstacle from covered positions.

### **PURSUIT**

If the enemy withdraws, then there must be indefatigable pursuit, even at night, to bring about complete dissolution and destruction. Only shortage of fuel and ammunition may temporarily bring a halt to the forward movement. Effective pursuit takes advantage of the success of the attack and makes the following fighting easier. Correctly executed, it causes particularly severe losses to the enemy and prevents him from reorganizing and rapidly going over to the defense.

In order to carry out the pursuit on a broad front or allow commitment of units in encircling movement while pursuing (*überholende Verfolgung*), Kampfgruppen are frequently formed. The tanks will, as a rule, be committed in advance of the other



Another view of the company column (*Reihe*), as used during the phase of approach march to the line of departure and also for the units following after the fighting lead elements.

forces. It is especially important to maintain cohesion of forces during pursuit. If the enemy resistance stiffens, the forces must be assembled again for renewed attack. Special emphasis is placed on maintenance of communications. There must be extensive reports over the area covered and cases where beaten enemy forces have been bypassed.

If the pursuit is continued at night, the pursuing elements usually form up along the road network. It can be necessary to continue the pursuit in short bounds, terrain feature by terrain feature.

If the pursuit is halted during the night, the units rest, where possible, behind sectors that are defensible against tanks. The tanks must be positioned so they can fire in all directions without any gaps (forming an Igel or hedgehog). The weakest armored vehicles and the wheeled vehicles are placed in the center. Patrols on foot take over the close security and, on an agreed signal, the tanks promptly deliver defensive fire.

### ACTIONS AT THE OBJECTIVE

Until the infantry closes up, it is often necessary for a limited time after the objective of the attack has been reached for the armored formation to defend it. In such a case the mass of the armor should be pulled back and use cover in a dispersed formation as protection from the effects of enemy artillery. When the enemy attacks, it then occupies its battle positions.

The unit protects itself against enemy surprise attack by means of careful combat reconnaissance, conducted in terrain where enemy observation is poor. Enemy reconnaissance is prevented by fire from individual tanks with long-range weapons. The tanks frequently change their positions.

If the enemy attacks, he must be held down by concentrated, rapidly initiated fire in order to prevent the lines from becoming intermeshed. The tanks that have been held in reserve should counterattack, preferably against the enemy's flank.

### ISSUING ORDERS

According to Heeres-Dienstvorschrift 470/7, the order for the attack must include:

- Enemy Situation
- Friendly Situation
- Neighboring Friendly Forces
- Battalion (regimental) Intent
- Mission Objective

- Organization of the battalion (company)
- Battalion (company) mission
- Mission for subordinate elements (e.g., platoons)
- Coordinating instructions for supporting elements, liaison requirements, unit boundaries and axes of advance
- Information on the terrain and obstacles
- Assignments for the combat trains (Gefechtsstoß) and wheeled vehicles, the maintenance section (I-Gruppe or Instandsetzungs-Gruppe) and the medical personnel (S-Trupp or Sanitätstrupp)
- Signal Instructions (Nachrichtenverbindungen)
- Stoßlinie (see explanation below),
- Location of the commander

A hasty attack is often carried out spontaneously to take advantage of a favorable opportunity with little time for extensive issuing of orders. It is different in a deliberate attack where a painstakingly detailed order is necessary to avoid serious friction in the critical initial phase, where loss of surprise to the enemy can occur or forces or combat support are dissipated.

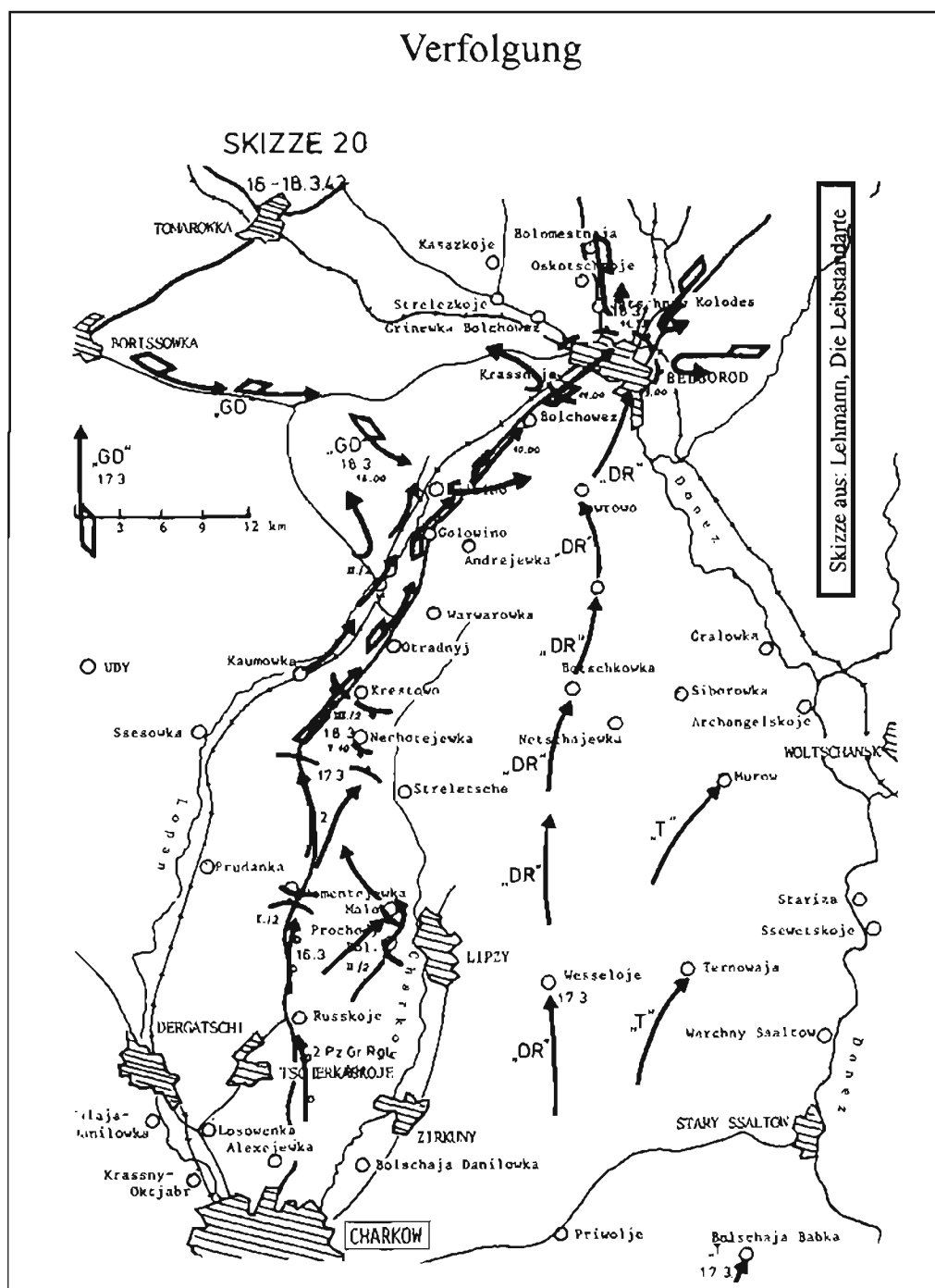
Critical situations that can arise at the start of the attack include:

- Delays in the approach
- Commitment of forces in an uncoordinated fashion and
- Important reconnaissance information missing.

Thus the issuing of a warning or preparatory order assumes an essential significance.

In the first step, the commanding officer who orders the attack must evaluate the terrain. To the extent that observation is possible he does this by personally examining the terrain. Additionally, he makes use of available reconnaissance results and aerial reconnaissance. Careful map study is critical. The more detailed the map scale the better. The large-scale maps that are used at the division and army level are unsuitable for planning action at the level of the reinforced battalion and below. The smallest scale map of the Wehrmacht was normally 1:100,000. That scale offered sufficient map detail. Wherever possible, however, smaller scales were preferred, and constant use was made of captured material or automobile road atlases (for example, in the Western Campaign in 1940). At the company





## PURSUIT

**Exploitation of Success Immediately after the Recapture of KHARKOV**

**Situation:** Defeated in the greater KHARKOV area, the enemy retreats in disorder. Friendly forces have suffered limited losses.

**Mission:** Gepanzerte Gruppe SS-Panzerdivision "LAH" pursues the withdrawing enemy and captures BELGOROD.

**Execution:** Concentration of all armored units. Advance forward along the highway. Maintain contact with right-hand neighbor (SS-Panzer-Grenadier-Division "Das Reich").

Sketch from Lehmann, *Die Leibstandarte*.



**The double column of twos (*Doppelreihe*) offers the advantage of high march speed and, in addition, good opportunities to react to changing situations. KARL-HEINZ MÜNCH**

level and below maps at a scale of 1:50,000 or less are desirable.

Map studies for the attack essentially concentrate on two areas:

1. What avenues favorable for movement lie in front of the attack formation?
2. Where do terrain features offer the enemy favorable opportunities for defense and creation of obstacles?

In that connection it is necessary to realize that the enemy also evaluates the terrain and acts accordingly so as to control exactly those avenues that are favorable for movement. For that reason it is often practical to also include in operational planning sectors of terrain that are less than ideal for movement. It is important for the attacker that he meets the enemy in a place where the attacker has the advantage.

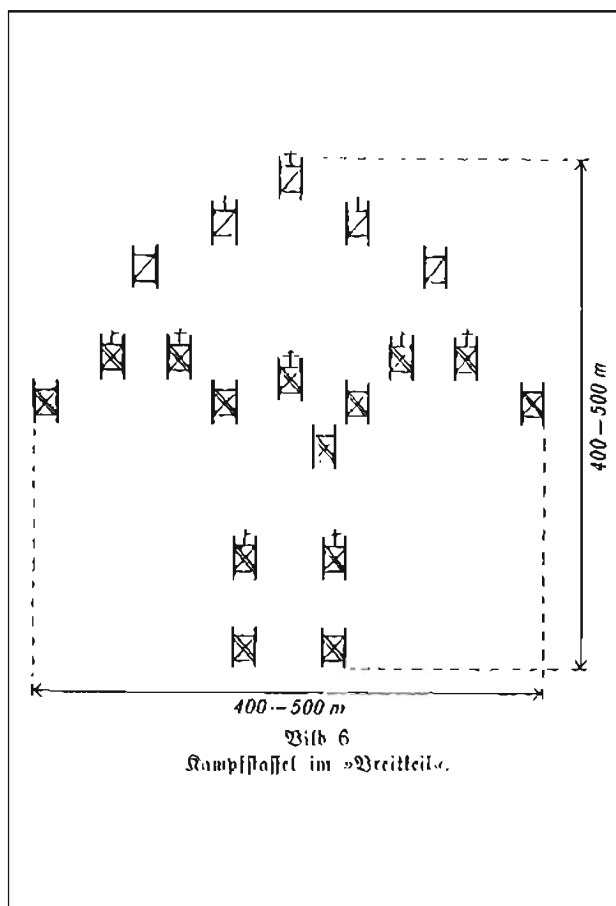
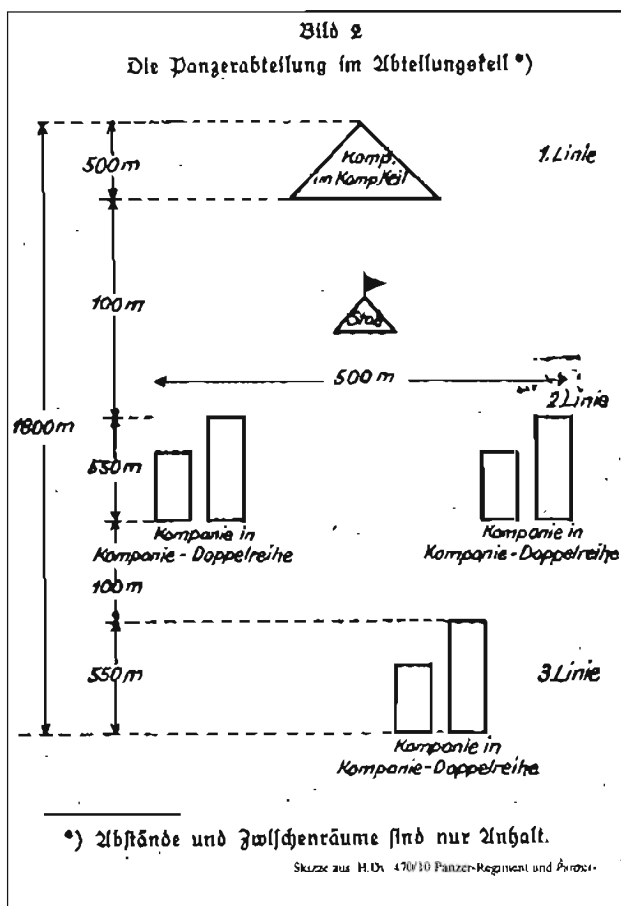
For the first phase it is important to specify the movements and routes as precisely as possible and to figure out operational alternatives to deal with possible contingencies. The farther one goes into the depth of the enemy's positions, the more flexible the planning of the operation must be. Otherwise, one falls into the mistake of making plans in advance that are based, to a large extent, on wishes

and hopes. When the inevitable problems then arise, one can only redirect the action with time consuming new orders.

For that reason German armor tactics almost never included the rigid combat sectors or the phase lines that were so beloved by the Allies. Such compartmentalized thinking conceals a whole series of problems: those units that arrive early at the phase-line have to wait for those that are slower and those whose boundaries are constricted can only move forward. The consequence of all that is a slower unfolding of the attack and loss of the ability to take advantage of favorable opportunities.

In Germany, on the other hand, objectives are given out and axes of attack (*Angriffsachsen*) are assigned.

An objective (*Angriffsziel*) is assigned for every attack. The distance to the objective depends on the level of command. At brigade or higher level, the distances are generally greater than 25 kilometers. For the reinforced battalion, the distances are generally between 15 and 25 kilometers. The tactical commander determines the intermediate objectives (*Zwischenziele*). That means that the battalion can have an attack objective that is an intermediate division or corps objective. The subsequent objectives,



The common attack formations of the company are the wedge (Keil) or inverted wedge/“vee” (Breitkeil). Here are the corresponding diagrams from the manuals current at the time.

depending on the circumstances, may then be attacked by the following forces. The determination of the objectives is not based on the enemy but normally on the terrain! A battalion sets intermediate objectives approximately every 5 to 10 kilometers. Companies only set separate objectives when so ordered.

Axes of attack (Angriffsachsen) are set up for lateral coordination. If possible, they are orientated in the terrain on easily identifiable features such as highways, railroads, rivers and the like. In establishing axes of attack the lowest level of command is usually the battalion. The formation attacks astride those axes (also called “Mittellinie” or centerline). That significantly simplifies combat organization but, at the same time, allows great freedom to the units.

The great advantage of that method of controlling the attack is that, in the event that lateral movements are forced by circumstances, every commander constantly knows the direction he must revert to. Whether to hold up for all the others at

the objective or an intermediate objective depends on pressure from the enemy. It is often sufficient to leave elements there in order to simplify closing up and to avoid breaking contact to the rear. The more uncertain the situation regarding the enemy, the better it is to have forces echeloned to the rear. In that case, if the leading element suddenly runs into something, it is easier to react because forces can be committed without delay or a Schwerpunkt can be formed by concentration of forces. If one is too broadly deployed in that situation when contact is made with the enemy everything is possibly engaged and the relief of individual elements is difficult. In addition, units advancing further to the rear help prevent the enemy from cutting off the lead elements. Therefore it is indispensable in the attack to constantly have combat patrols out to the flanks capable of promptly reporting enemy counterattacks.

If the tactical commander has evaluated maps, terrain and data from reconnaissance, he then gives



Tank commanders are trained to rapidly assume attack formations from the move. Here a Panther company develops from the column (*Reihe*). The leading platoon first moves into the platoon wedge (*Keil*) and then the chain (*Kette*) formation, thus forming the point of the company wedge.

the orders for the attack, preferably where there is a view of the terrain. The order includes clear reconnaissance assignments for the approach phase (*"Anmarsch"*). For linear coordination a so-called line of departure (*"Ablauflinie"*) is given. The attacking formation must assume its combat formation by the time it reaches the line of departure.

In accordance with higher levels of command, the attack order also contains missions for reconnaissance. Combat reconnaissance echeloned forward and, once the attack has begun, unceasing, is a decisive prerequisite to a successful attack. However, in this regard, it must be kept in mind that combat patrols that are set in march prior to the beginning of the attack alert the enemy. In general, wheeled or dismounted patrols are preferred. As a rule they remain at their reconnaissance objectives. They stay unnoticed, report and wait for their own troops to close up.

If speed is desired, a warning order for the attack is issued to the battalion or company in advance. That creates an advantage, as the crews

have sufficient time to prepare the tanks while the leaders reconnoiter.

After the orders for the attack have been issued by the battalion commander to the company commanders (and, if possible, also to the platoon leaders), they reconnoiter the route from the line of departure back to the assembly area on foot or with wheeled vehicles. So far as is possible, these routes are marked. Each leader works out the time required to cover that distance based on the conditions of the route and terrain. Correspondingly, he determines the starting time for the individual platoon. Thus, it may be that the more distant platoons have to start their approach march at an earlier time. For individual elements, halts in the march may also be practical in order to ensure the appointed march sequence or to better execute changes in subordination. This has the advantage of avoiding the disturbance caused when reinforcement forces assigned to battalions and companies join up in the area just before the beginning of the attack. In every case all leaders establish personal

contact with each other and discuss the task organization of their commands. The routes for the approach must be established in such fashion that the combat organization may be assumed as soon as possible to avoid being disturbed by enemy counter movements.

After completion of their reconnaissance, the company commanders report the results, clarify open questions and make final requests for changes. They then assemble their platoon leaders, who have checked the preparations of their crews and performed route reconnaissance in the meantime. The company commander then issues his company order for the attack. In so doing, he makes clear the contribution the company makes to the overall operation of the battalion. Specifically, he explains the interaction of the forces and the respective interdependencies. That is important so that during the attack each tank commander is clear as to why certain friendly forces are in front of him or beside him and what missions they have. If that is neglected then it is very easy to falsely evaluate the situation.

After receiving the company orders for the attack, the platoon leaders assemble all the crews and give them their platoon orders. At the company

and platoon level it is desirable when issuing the order to use sketches or a so-called sand table. Movements can be shown using those methods more clearly than on maps that have too large a scale.

In concluding, each platoon leader determines when all preparations must be completed. In all, three points in time define the attack for the tank crew.

- Start of the attack (Angriffsbeginn): That is the time the organization must cross the line of departure and combat-support activities must be initiated or finished.
- Move-out Time (Antreten): The individual departure time for the platoon.
- Start engines (Motoren an): The time all tanks are ready to move out and, if necessary, the engine can be started by external means (for example, at low temperatures). The tank moves up to the route and is ready to take its place in the column. At this phase engine noise is critical because it can alert the enemy. Therefore artillery fire is often deliberately used to mask the engine noise.



The tanks of the platoon that is following cover the lead platoon with their guns.

## COMBAT SUPPORT (KAMPFUNTERSTÜTZUNG)

Generally, an essential prerequisite for the success of an attack is the effective coordination of the combat support. An enemy in prepared defenses has many possibilities to deny the attacker a rapid advance. Reinforcement of the terrain, barriers and obstacles are also effective against armored vehicles. Slight damage to the running gear from the explosion of a mine can leave the agile, fearsome tank an immobile heap of steel, with only limited means for self defense.

Obstacles are often used by the enemy to delay or even break the momentum of the assault or to turn it into a terrain sector that favors the defender. It is a basic principle that obstacles are covered by fire. It is an unalterable rule, therefore, that engineers be committed to clear paths for the attack or, in an uncertain situation, to have them readily avail-

able far forward. Obstacles and defiles must often first be captured or opened up by infantry. Since any commitment of engineers and infantry forces is extremely time consuming, it calls for preplanned coordination. The primary objective must be to prevent stationary tanks from being forced into inactivity and turn into targets on a range.

When approaching or encountering obstacles and enemy in built-up positions, it becomes necessary to pin down the enemy through the use of indirect fire (artillery or mortar) for a period of time. This may not destroy the enemy but at least prevents him from employing weapons with aimed fire. For that purpose, and to the extent that the terrain is within observation, target reference points (Zielpunkte) are surveyed before the start of the attack and respectively assigned as fire missions (Feueraufträge). Fire missions are executed most rapidly with the help of the forward observers who



As a guide for the distance to use in covering vehicles or other units advancing ahead, the rule of thumb is half the distance of the effective range of the main gun (Hauptkauptkampffentfernung). At that point, the element bounding ahead should go into position to allow the covering tanks to advance. Note the extra storage box mounted on this late-model Panzer IV as well as the side skirts on both the turret and the hull, used to prematurely detonate chemical energy explosives and dissipate the force of kinetic energy rounds. The turret skirting also appears to have Zimmerit anti-magnetic paste applied to ward against magnetic mines.



can be reached by radio and direct the fire. Where several artillery units are committed, then one observer controls the fire of several batteries.

### **COMMAND AND CONTROL (FÜHRUNG)**

The art of armored fighting is demonstrated whenever a leader at any level conducts an attack. At the preliminary issuing of orders he has, as a rule, sufficient time so that if others draw his attention to anything that has been forgotten, he can still correct the deficiency. All of that is different when an attack is underway.

How does the process of command and control work during the attack? The first comparison is with fencing or boxing. Like those combatants, the armor commander ponders and lunges, weighs the prospects and makes the venture. He must choose the right moment to strike without rashly neglecting his cover. In an attacking armor formation it is usually the company that is used for the individual blows, rarely the platoon. At times an entire battalion may be massed. Therefore it is usually the commander of a (reinforced) battalion who is responsible for the success of an attack.

Once the attack has begun, he must continually evaluate the situation with respect to the terrain in order to be able to issue timely and prescient orders. He accomplishes that with his own observations, the results of ongoing reconnaissance as well as analyzing reports from his company commanders. Almost without exception, the decision to open fire is made at the company or platoon level. Those officers rely on the fact that at the proper time they will be given the necessary missions and orders for follow-on activities.

In the midst of this network of relationships one must be clearly aware that different processes must mesh at the same time and that there are various levels of responsibility. If a commander busies himself (too long) with subordinate tasks that would better be left to others, he neglects his primary mission.

Subordinates who send reports and requests by radio often are unable to evaluate how urgent their concern really is. A flood of impressions constantly pours in to the higher commander which he has to classify with the speed of thought as to their importance. Since every commander simultaneously receives information on two or even three radio nets, makes his own observations and has to think several steps ahead, there is always the problem of

what is most important task at any given time. Therefore, it is important to be rapid and precise, to make use of others and not to forget matters later that have been deferred. The interests of the commander's superiors compete with what the individual commander is currently doing. How can that be?

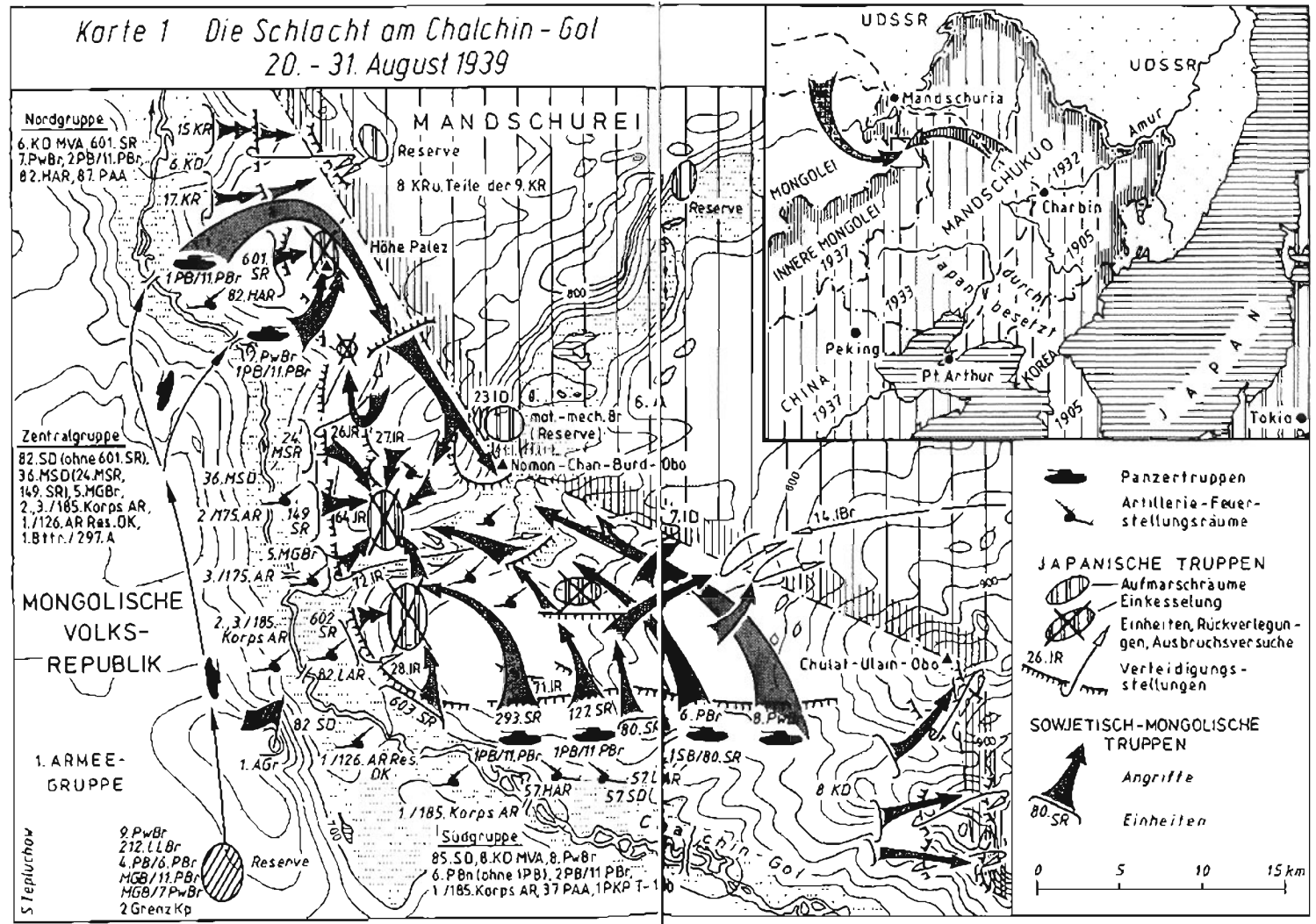
The tactical commander is, in large measure, dependent on precise and, above all, timely reports for a correct evaluation of the situation, especially if he cannot himself observe the terrain. However, for the commander who is directly in a firefight with the enemy, transmission of reports is (at that very moment) the most unimportant thing in the entire world. Also, information as to the force requirements for the next assault is only marginal to his interests. These conflicting and contradictory interests need to be brought into harmony. How does that happen?

The information that arrives on the radio nets must be received and processed by assistants. That consists of simple documentation on the one hand, but it also involves filtering according to importance. That gave an automatic advantage to the five-man tank crew with a separate radio operator. However, based on their tactical background, most of the radio operators were only in a position to receive messages. Often the significance of the message for the operation was not clear to them. The commander, accordingly, needs specially qualified help independent of the authorized organization of the command group (Führungsgruppe). At the company level it is the company headquarters section leader (Kompanietruppführer) who provides that help. He is either located in a second tank or replaces the radio operator or the loader in the command tank.

The battalion commander requires just that kind of help in his immediate vicinity; he also requires a command post. In his own or in a neighboring tank he has an Ordonnanzoffizier (similar to an aide-de-camp for a general officer). In the battalion command post is the communications officer (Nachrichtenoffizier). In addition, all of the other crew members in the command tank are, as a rule, experienced noncommissioned officers who do not need continual instructions.

Such assistants to the commander keep him free to devote his attention to his primary duties. Incoming reports will be accumulated and held, and then passed on if it is necessary or when the commander is ready to deal with them. Since the

Karte 1 Die Schlacht am Chalchin-Gol  
20. - 31. August 1939



Skizze aus: Post, Unternehmen Barbarossa

### THE BATTLE OF CHALCHIN-GOL, 20-31 AUGUST 1939: "REVOLVING-DOOR EFFECT"

Although not an example of German armor tactics, the victory of the future Marshal Zhukov over the Japanese on the border of Manchuria was entirely in accord with their fundamental principles. It is presented here as one of the most significant battles on the threshold of the Second World War. That defeat eliminated any desire of the Japanese for further battles with the Red Army and led directly to the decisive Japanese non-aggression pact with the Soviet Union.

The commitment of the Soviet troops exemplifies the so-called "revolving-door effect," in which the enemy is frontally pinned by a fixed defense and the mobile armored force in its entirety (here forming the right wing) falls on the flank and rear of the stacked-up enemy.

Reserves that have been held ready (11th Armored Brigade) are moved to the north, following a favorable development of the situation, and also carry out a pincers movement on the left.

Sketch from Post, *Unternehmen Barbarossa*.



The spacing between the tanks should not be less than 100 meters. These Panzer III's are too close together.

soldiers of the command post continually listen to the communications on the battalion command net and follow along with the movements on the map, they are pretty well informed regarding the situation. The officer-in-charge at the command post routinely keeps the higher command current on how the situation is developing. He pays close attention when the higher commander queries the battalion commander on the radio to see whether the battalion commander replies promptly. If he does not, then the officer assumes that he is tied up with more important things. He then takes the initiative and replies instead. If the message is not time critical, he coordinates a return call. If the arriving reports or orders are important, he immediately brings them to the commander's attention. Generally that can only be accomplished by calling back to someone riding in the same tank with the commander.

This delicate filigreed system collapses of course if the command tank is knocked out. On those grounds, the choice of location or movement route gains great significance. In that instance the commander stands in an apparent contradiction to the fundamental precept of "Lead from the front."

Leading from the front does not mean that the commander is continually and always in front. Completely aside from threats from the enemy, this is to

be avoided because the commander would not be able to have situational awareness of his own forces. This principle is best made clear by its opposite. Some battalion commanders chose to command from a command post vehicle (*Gefechtsstandfahrzeug*), a variant of a SPW (*Sd. Kfz. 251*), which offered a more comfortable environment. A command post vehicle eliminated the need to fold maps up into an impossibly small piece and the assistants could switch the various radio nets over to the commander (for example, by hand signal). While on the move the commander is not constricted, etc. Aside from the fact that the command post has claimed the use of an important vehicle, the result of such a decision is that the commander is forced to drive significantly farther from his troops. Only the tank offers enough protection to allow the commander to be far enough forward during intense contact with the enemy. Unless he has visual contact with his forward most forces, he lacks contact with the ongoing fighting. He can no longer give far-sighted orders, is exclusively dependent on more or less imprecise reports for his understanding of the enemy situation and is too late in seeing the terrain. Worse yet, all the soldiers know that the "Old Man" is most concerned about his own safety. Finally, one cannot lead and motivate from the rear; one can only "administer" the fight.

## ATTACK AGAINST A THREAT TO THE FLANK

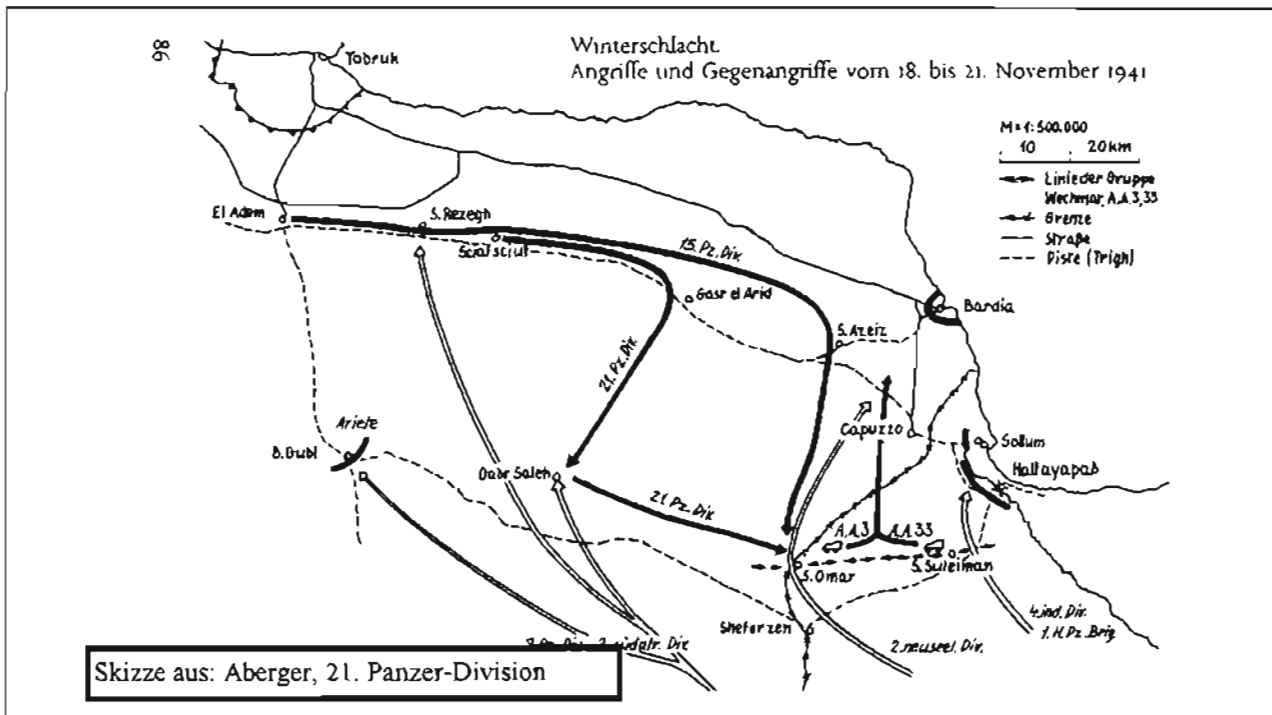
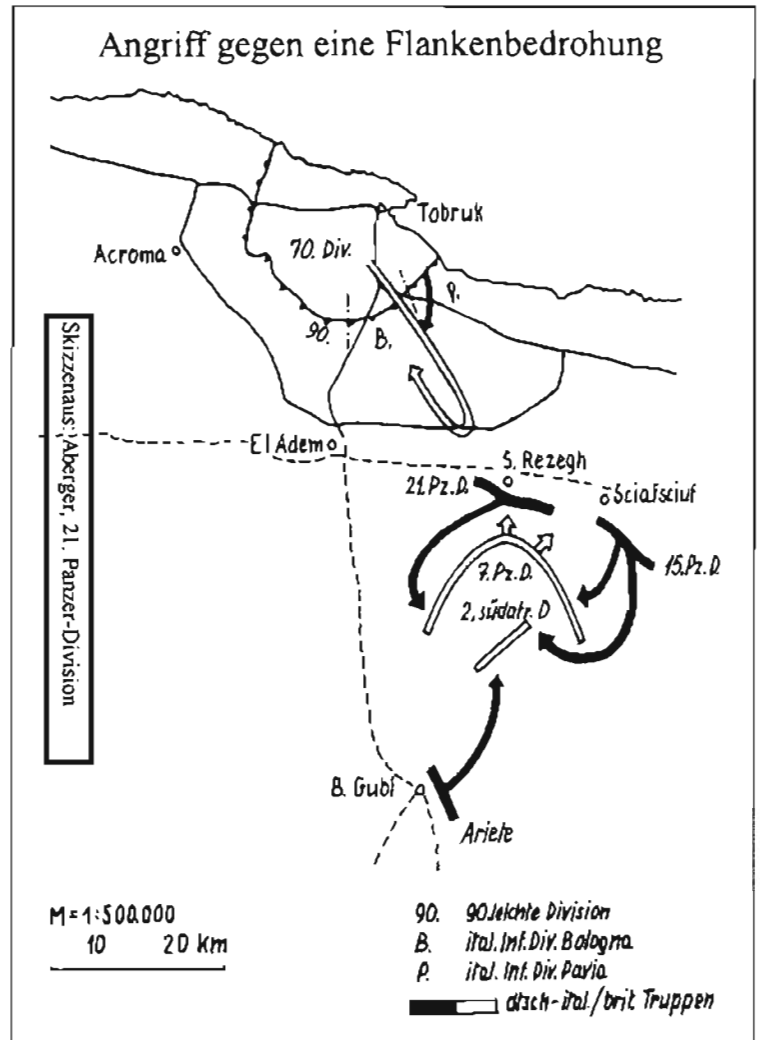
15. and 21. Panzerdivisionen defend against a dangerous threat to the flank at SIDI REZEGH on 21–23 November 1941.

**Situation:** 7th Armoured Division (UK) and 2nd South African Division have attacked in the deep right flank of the Deutsches Afrikakorps. Friendly forces advancing on SOLLUM have recognized the threat to their flanks in good time and turn south and southwest with armored forces as soon as possible.

**Mission:** Gepanzerte Gruppen of the 15. and 21. Panzer-divisionen interdict and destroy the enemy south of the desert track EL ADEM-SOLLUM.

**Execution:** Unarmored forces maintain contact with the enemy. Available armor is concentrated in two Kampfgruppen. Kampfgruppe 21. Panzer-Division takes the desert track and throws the enemy out of SIDI REZEGH. Kampfgruppe 15. Panzerdivision swings to the south and smashes the eastern enemy units. Following that, the enemy who has been blocked is destroyed by both Kampfgruppen swinging in from the left and right, respectively.

Sketch from Aberger, 21. Panzer-Division.



It is necessary to be quite clear about the fact that command in combat is "organized chaos." In spite of the enemy, inclement weather, one's own losses, desperate calls on the radio and, at times, ignorance of the situation, the commander must force himself to maintain his situational awareness and remain calm. If he fails, then he leaves his troops in the lurch. Such composure cannot be imparted in training, nor can it be expected of everyone in every situation. Certain important fundamental principles must be observed.

First of all, it is essential that all soldiers at every level have the highest possible state of training so that they can perform the duties of their position in the crew in their sleep. The leaders must have learned to formulate reports and orders according to certain formats. At first those formats may seem rigid and formulaic, but in situations of anxiety and stress they mean sureness in operation. As a result, radio reports—just as with movement or fire commands—must regularly follow one and the same format:

1. Enemy (with location/direction specified),
2. Friendly situation/decision,
3. Action being executed/follow-on measures/requests.

If every commander at every level knows this in his sleep, he will also use it in combat and run no danger of being longwinded or forgetting something important. Only that way is it guaranteed that maximum time remains for the actual process of commanding, the constant evaluation of the situation and the making of (hopefully correct) decisions.

The commander must always wait for the expedient moment to give out tasks and orders so as to assure the continuous flow of movement. As explained earlier, only the first phase of the attack can be planned in advance, if for no other reason than the ability to observe the terrain.

Whenever the terrain features change, the movements must immediately be coordinated anew. The leaders rapidly evaluate the terrain with respect to its suitability for movement. In a short radio message he sets the route for the attack's continuation, in which he lays down new points of direction and lines of movement for the companies. In such fashion he ensures that even if something prevents issuance of orders (such as failure of radio communications), everyone knows how to continue. That also takes place in more detailed fashion at the com-

pany level. If directions and routes are known, then each unit can concentrate on objectives and obstacles.

Upon running into enemy positions, the tactical leaders then have the job of coordinating the fires of his own unit and of the supporting artillery and assessing whether he can make further progress in sector with available forces. The company commander builds *Schwerpunkte*, as a rule, with orders distributing fires (for example, supporting an adjoining platoon). The battalion commander weights the strength of an attack that has lost momentum when, for example, he commits a previously unengaged company or when he asks for indirect fire support. If the frontal attack does not make rapid progress, he then commits forces that are not tied down to make an enveloping movement. Limited delays and detours must be taken in stride, if, in the process, frontal advances over terrain without cover can be avoided. In any case, a ruthless penetration of enemy positions in high gear is recommended. Lengthy delays or a hesitant advance increase the probability that the enemy will be able to engage targets and transfer forces. The company commander makes sure that his forces do not bunch up after meeting the enemy.

If a rapid forward thrust is not possible, or if elements of the company run into obstacles, the company commander checks out the possibilities of bypassing them. He also checks whether it will be probable that the attack can be renewed. He is frugal with time in dealing with problems and, when the need arises, he can react swiftly. If the enemy shows signs of softening, he does not wait for orders, but rather advances on his own initiative. He merely reports what is happening and goes on. Concerning the commitment of *Panzergranadiere* and engineers, he keeps in mind that using them costs time. Bypassing an obstacle is therefore absolutely preferable to its elimination. However, if obstacles must be cleared, he suppresses the enemy security. The engineers prepare several passages, if possible. If that is not successful and the tank company has to traverse the obstacle at a single location, then the element that advances first thrusts far enough forward so that it can cover the obstacle from a favorable position and ward off counterattacks on it.

When considering a bypass, consideration must be made that the enemy may want you to take precisely that route. Therefore circumspection is advised. Passages should be marked for forces that



As shown in the previous photograph, the spacing between the tanks should not be less than 100 meters. These late-model Panzer IV's have deployed properly. KARL-HEINZ MÜNCH

are following and security elements remain on site when so ordered. Centers of enemy resistance and enemy in prepared positions must not halt the momentum of the attack for the main body of the formation. If necessary, weak elements remain on site until follow-on forces close up. Those forces then seek to regain contact with their parent element as soon as possible.

Experience shows that enemy forces that have been bypassed or surrounded frequently become demoralized and surrender or, at the least, can be controlled with little expenditure of resources. On the way to the attack objective the battalion commander must determine whether to clear out enemy positions completely or advance forward undeterred. The cohesiveness of the command and control of operations at the division level is decisive. In most cases command and control is coordinated from the higher command level. The paramount maxims must constantly be: Maintain the momentum of the attack; do not allow the attack to be diverted from its direction; and, take the objective with maximum combat power. The tank's best protection is movement; enemy countermeasures frequently come too late or strike thin air.

#### TRANSITION TO THE NEXT OPERATION

When the objective of the attack has been taken, it is important to take advantage of the success. If offensive operations are stopped too abruptly, they may often put the enemy, who has only been struck by a blow, in a situation where he can react effectively. Therefore, it is important to plan follow-on operations. If the attack was merely to gain breathing room for one's own troops, then the attack formation must be pulled back if the situation calls for it in such fashion that it cannot be cut off. If contact has been lost, then the pullback must be conducted as a renewed attack. If the attacker has the overall operational initiative, then it is imperative to take advantage of the success. The enemy must not be allowed to rest. Otherwise he may be capable of putting together an effective defense.

In order to keep the enemy on the run, forces echeloned further to the rear should be put into the fight and carry on the attack, since they have not yet been used and are still fully supplied with ammunition. The formation that has carried the attack to that point reorganizes and resupplies itself. It occupies its attack objective in order to pin the enemy and cover the area. Upon receiving fur-



Tanks providing cover take advantage of the terrain and, where possible, take hull-down positions. This Panther, from SS-Panzer-Regiment 5 "Wiking," was involved in the fighting between the Bug and the Narew. BAUMAN

ther orders, it follows the lead formation and takes on subsequent missions, such as guarding flanks, destroying enemy forces that have been outflanked or being re-integrated into the organization of the attack.

### LOGISTICS

With regard to logistics, the attack is the most demanding form of combat. The consumption of ammunition and fuel is high. Great distances yawn between the attacking forces and their own troops and movement is through territory that is threatened by the enemy. In the defense one expects high expenditure of ammunition and can build up corresponding reserves and conceal them. Engineer supplies for construction of obstacles and barriers can be placed at the ready in adequate quantity and with less time pressure. Additional artillery ammunition can be held in reserve in firing positions. None of that is possible in the attack. The only simpler logistical operation is the recovery of out-of-action vehicles that have been left behind. Attempting to

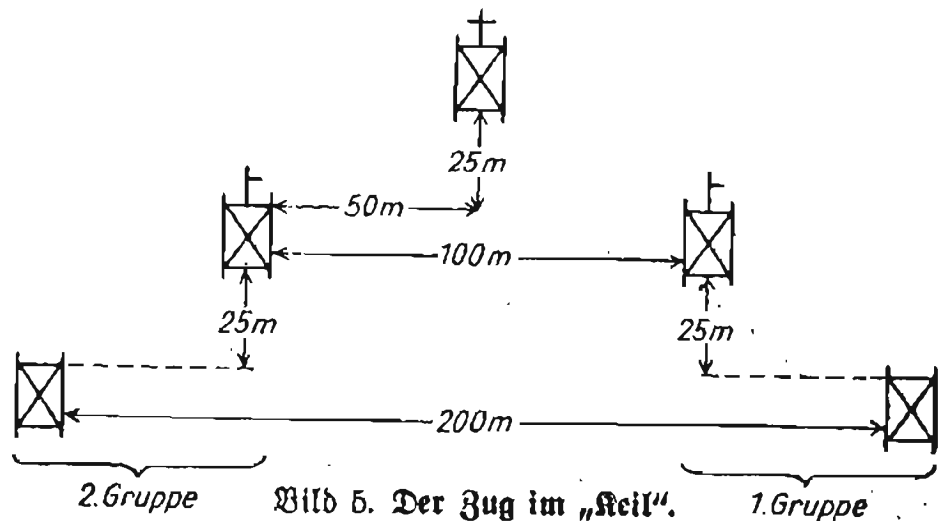
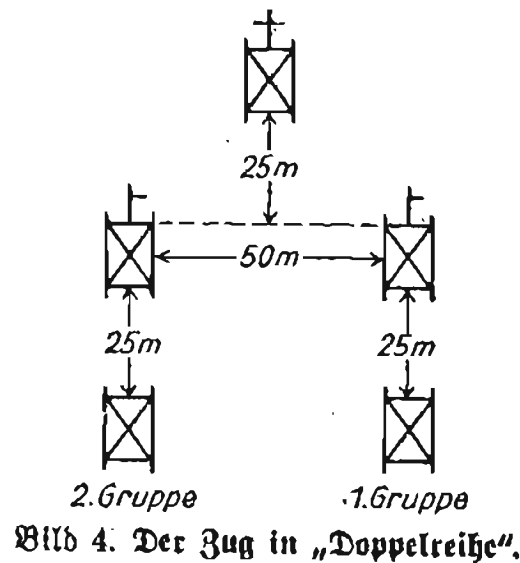
recover vehicles during a delaying operation or a withdrawal is obviously much more difficult.

In armored combat logistical planning is of paramount importance and should be viewed as having a priority equivalent to planning the tactical commitment. In light of the short operating range of the vehicles, fuel supply is especially difficult. It is often necessary to have a brief refueling halt after completion of the approach march to the line of departure immediately before the attack. Considering the threat posed by artillery, that is anything but an easy decision!

During the course of the attack, refueling must come at timely intervals before consumption reduces vehicular fuel supplies to a level where movements have to be stopped. One strives to refuel when about 50 percent of the on-board fuel has been consumed. That was frequently possible during the night, since movements were generally halted in unknown territory during the hours of darkness. The company leaders need to report promptly and establish contact points on the



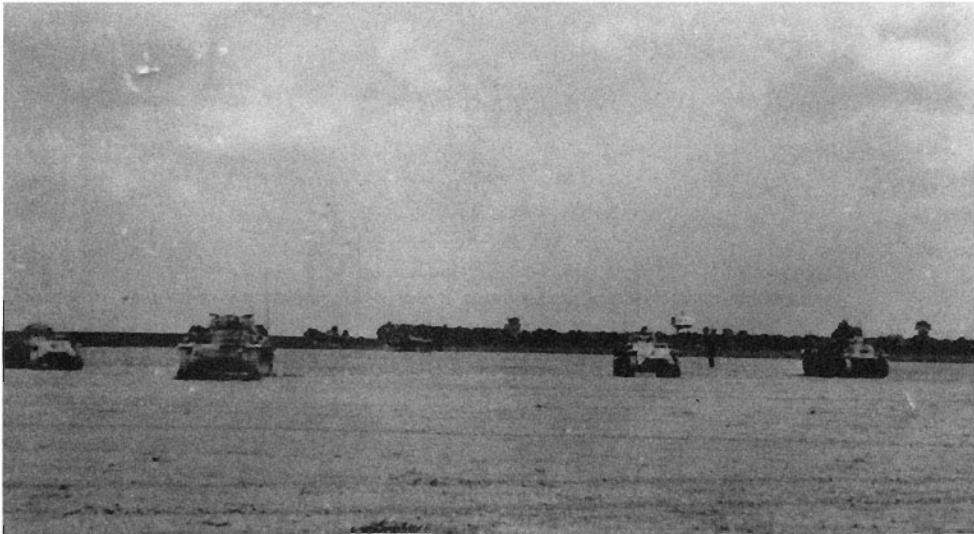
This illustration from the manual shows the initial two forms of development of a platoon: double column (Doppelreihe) and platoon wedge (Zugkeil). With the introduction of the 4-tank platoon, of the platoon wedge changed to the Kette (chain).



Skizze aus: H. Dv. 470/6 "Die leichte Panzerkompanie"

ground for rendezvous with supply vehicles. After having made the link up they should remain in the combat zone no longer than necessary and must be sent back immediately. Since the distance to the supply points are often great, the practice of partially emptying and then hanging onto supply vehicles for later availability would be fatal. The drivers of the supply vehicles have a hard time during offensive operations. Often they are on the road day in and day out and sleep is only possible for a few hours during the drive when the assistant driver takes the wheel. Supply of the leading formations is

especially critical. Since those formations have to operate without contact with the following troops, they have to integrate their logistical vehicles in their own organization and continuously protect them against enemy action with combat vehicles. Any opportunity to drain the tanks of broken-down friendly vehicles or abandoned enemy vehicles and refuel from them must be used. Phased supply from the air may also be used. In Belgium and northern France, Panzergruppe Kleist was only able to advance so rapidly in 1940 because the local network of gas stations was well established.



When there is limited enemy resistance, the platoons move forward closed up, increasing the speed of the attacking company. KONTIG



With stiffer enemy opposition, one of the two tank sections moves while the other remains in position and provides cover.



The tank platoons need to return to the column formation in order to bypass obstacles and narrow places.

How did the leader maintain the direction of the attack in open terrain with only a few points of orientation?



The answer to the question just posed: Wehrmacht tanks had a directional gyro (Kurskreisel) whose use is explained here in the Pantherfibel (tank primer).

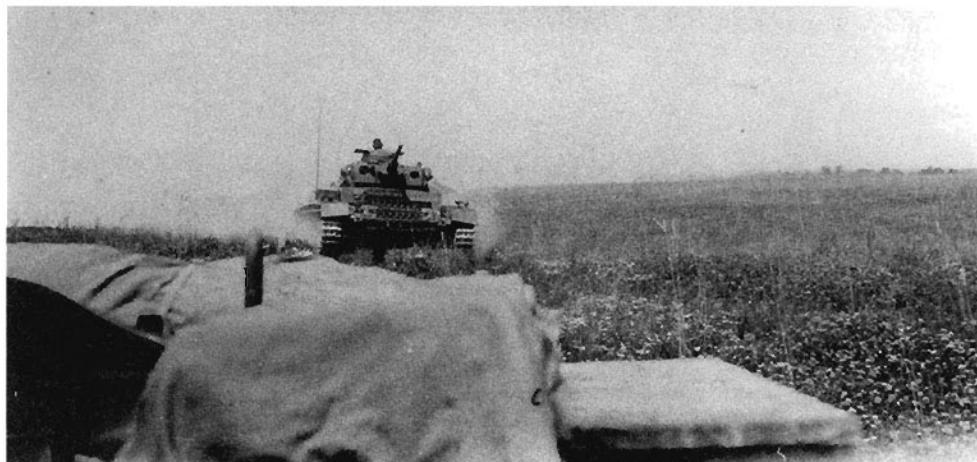


The imposing picture of a reinforced Panther battalion fully deployed into the wedge (Breitkeil).





Forces of the next echelon follow close behind so that they can be committed without delay if needed. KARL HEINZ MÜNCH



High-speed movement on the battlefield makes enemy target acquisition difficult.



The moment of greatest danger occurs when massing in view of an enemy in positions. In this case, an attack has bogged down in front of a village. The tanks are stationary and can be engaged easily. KONIG

Highest priority behind all movements is to take best possible advantage of the terrain. For example: use reverse-slope positions.



Use caution in approaching hills.  
LOCHMANN



“Drive as the water flows!”







Constantly use the combat support available. This photograph shows an exercise conducted by schwere Panzer-Abteilung 503 where it employs smoke to cover its movements.

VON ROSEN

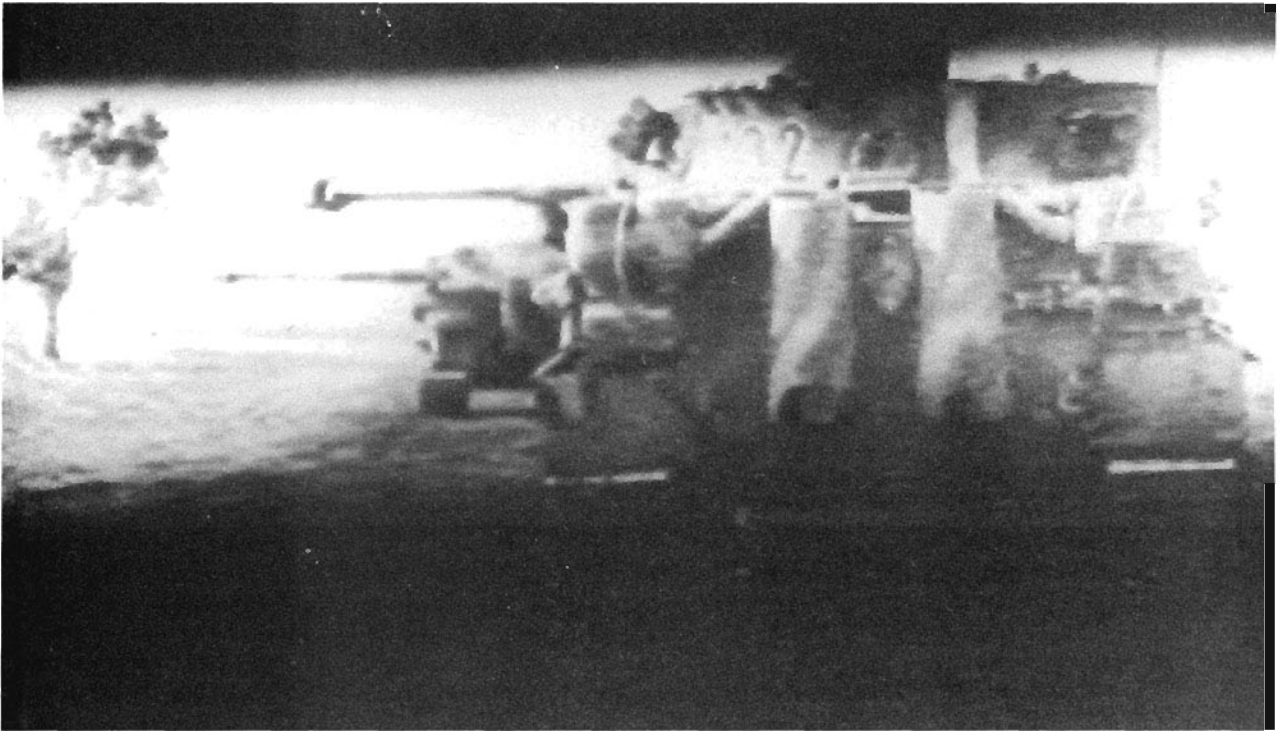


Close cooperation with those who are fighting dismounted is difficult from within the confines of a tank. These infantry are moving with elements of Panzer-Regiment 7.

KARL-HEINZ MÜNCH



If the enemy suddenly opens fire from the flank, continue moving!



**Immediate-action drills require a formation to keep moving if attacked from the flank.**



**By order of the battalion, individual platoons were detailed to provide flank security. Ammunition was often cross-leveled between vehicles to ensure all tanks had roughly the same amount of rounds. KARL HEINZ MÜNCH**





These Panthers are also providing security. The top photograph shows Panther 501 of SS-Untersturmführer Neven du Mont in a firefight during the fighting for Maciejewo (Russia) in the Summer of 1944. The Panthers below occupy reverse-slope positions near Ljubotin (Russia).



KÖNIG

In the attack, caution is advised in approaching villages. Tanks have no business there!



Driving through villages is always ticklish, since the tanks can be fired on from all sides and also from above. Ruins can be a serious hindrance to getting off the streets. Contrary to popular belief, a house is a considerable obstacle to a tank. Driving through them can result in the vehicle being lodged in the collapsing framework of the building or winding up in the basement!





Fighting in such close quarters is a waste of the long-range firepower of the 88 mm main gun of the Tiger.

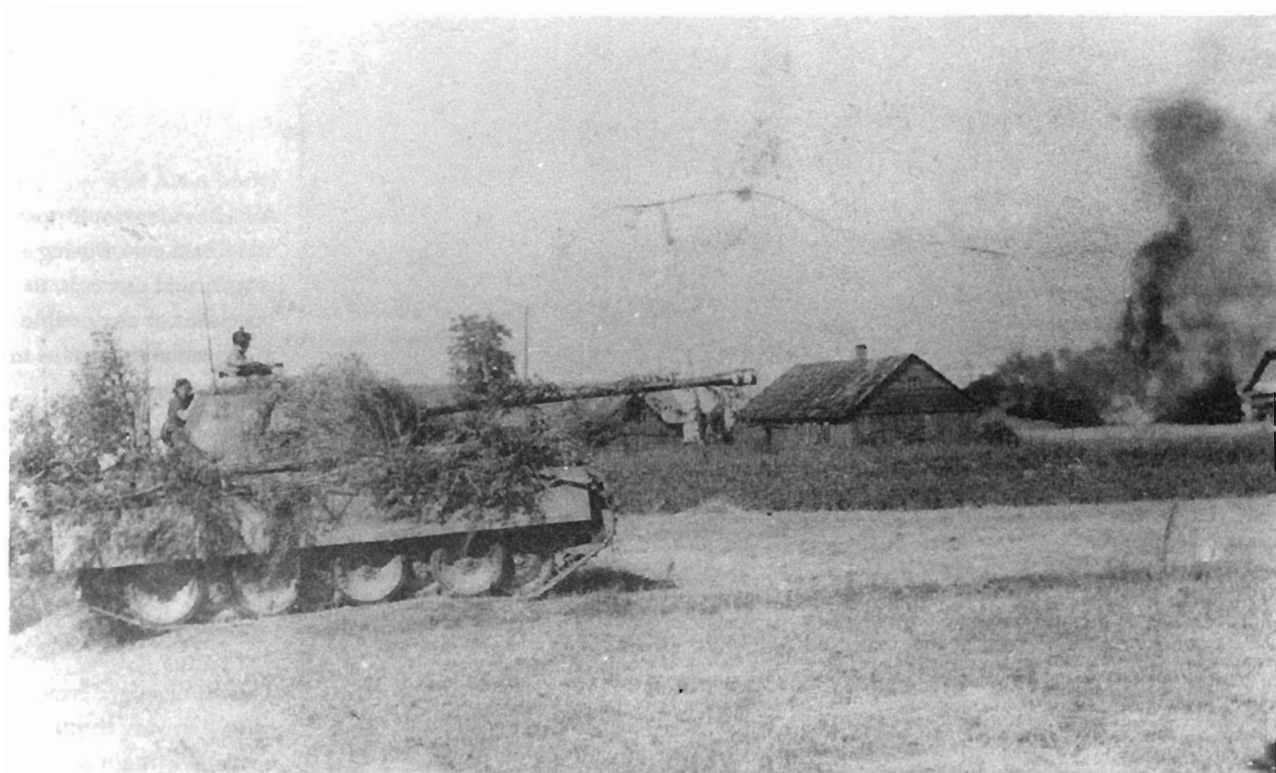


KARL-HEINZ MÜNCH





Despite infantry cover, even a Tiger is vulnerable to determined antitank hunter-killer teams in built-up areas such as this.



KARL-HEINZ MÜNCH



KRIPCENS

It is always a better alternative to bypass a village at the greatest possible distance. The use of fire and smoke—whether intentionally set or not—can provide great benefits to both the attacker and defender if used skillfully.



A basic rule was, if possible, instead of using a single road through, to use as many as possible at the same time so as to divide enemy fire.



This Königstiger crew, caught driving through a village without adequate security, should serve as a warning! This photo was allegedly taken during the fighting for Dorholzhausen on 12 April 1945. It shows a Königstiger with a Porsche turret from the schwere Panzer-Abteilung 507. DE MEYER



If enemy occupied villages have to be left behind, tank elements are occasionally left behind for a short period to pin the enemy to the place.



The main body, however, continues the attack without abatement. This photograph shows tanks of Panzer-Regiment 7.

KARL HEINZ MÜNCH



Just as critical is the approach to an extensive area of enemy-occupied woodland. KONIG



It also pays to keep ones eyes open in relatively open terrain, since the smallest relief in the terrain give cover to antitank combatants.

DE MEYER





Dirt and dust thrown up by artillery near misses interfere greatly with vision.



Sometimes, however, smoke and fumes can aid in protecting one from observation. This has been traced to schwere Panzer-Abteilung 502 in support of Infanterie-Regiment 83 north of Mga (Russia) in 1944.

JEAN RESTAYN



In addition to slowing down an attack, an obstacle may also present the enemy with an inviting target while a tank attempts to negotiate it. KARL-HEINZ MÜNCH

Consideration can also be given to planned use of artificial smoke created by artillery or on-board smoke generating equipment to screen against observation.



A wide variety of obstacles oppose an armored attack. If possible, ditches have to be traversed on a broad front. They should be taken head-on rather than at an angle.

KARL-HEINZ MÜNCH



Swampy sectors are to be avoided. That requires the trained eye of the experienced commander to spot soggy flats and swamp vegetation (reeds, etc) in a timely fashion. Despite tremendous cross-country mobility, soft ground is the tank's nemesis. Mud will often form a bond to the hull that is almost impossible to break. This crew is using a field-expedient method to break loose—unditching beams.

KARL-HEINZ MÜNCH





If water ditches and the like have to be crossed, the tanks can be prepared ahead of time by bringing along bridging expedients, such as fascines. KARL HEINZ MUNCH



Craters and sections of roadway that had been blown up require makeshift preparation of the crossing place if scouting does not reveal a bypass. Here we see elements of the 3. Panzer-Division crossing a destroyed bridge.

ZIMMERMAN



The danger of mines is ubiquitous! Damage by mines can only be repaired after one's own attack had gained additional ground. In this photograph, repair crews have to remove several layers of running gear on this Tiger in order to get at the problem. Note the road-wheel arm in the foreground.





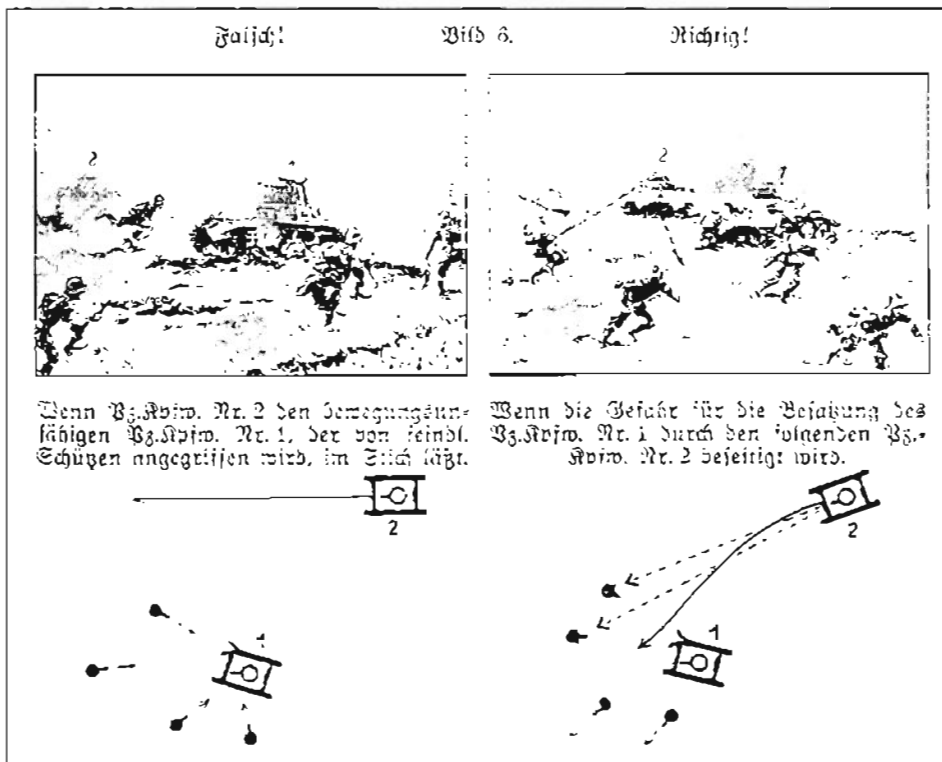
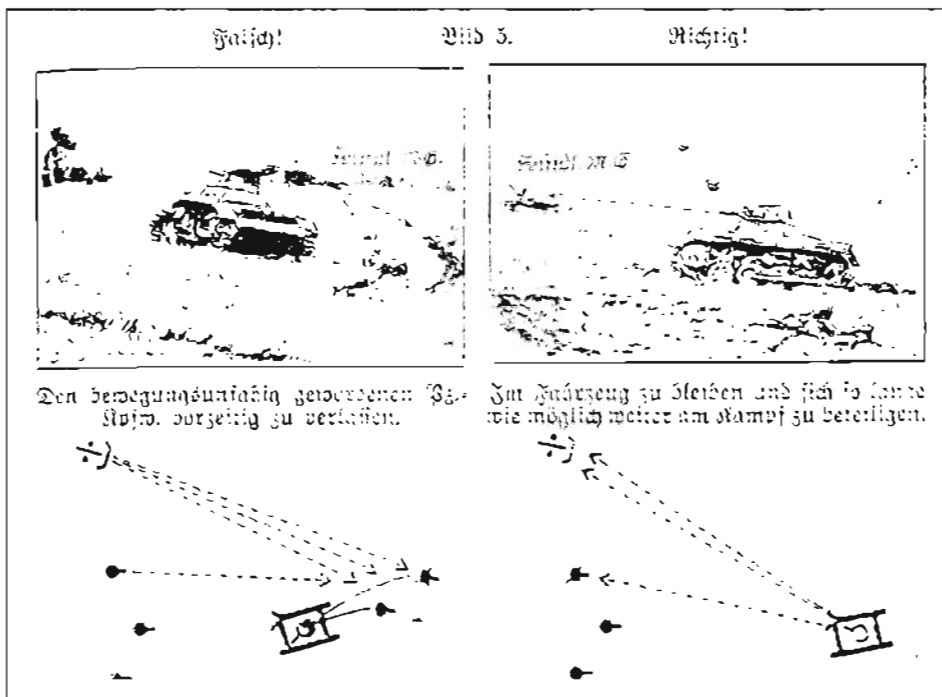
Tanks that have been immobilized by mines are then exposed to danger from gunfire. The tank commander decides whether to bail out and temporarily abandon the tank. Not a single tank is destroyed by its own side without a compelling reason.



If the damaged tank can still drive to cover, it is camouflaged and the crew provides security. HUHLE



If damaged tanks block a narrow place, they are shoved aside and recovered later. KARL-HEINZ MÜNCH



#### ADDITIONAL RULES OF BEHAVIOR IN CASES OF VEHICLE BREAKDOWNS

*Illustration 5:* Wrong! Leave the immobile tank prematurely.

Correct! Remain in the vehicle and attempt to stay in the fight as long as possible.

*Illustration 6:* Wrong! If Tank 2 leaves immobile tank 1 in the lurch when it is being attacked by enemy infantry.

Correct! Tank 2 eliminates the danger for the crew of tank 1.





The Wehrmacht had demolition-carriers and radio-controlled demolition tanks for blowing up obstacles under enemy fire. In these two photographs we see the Ladungsleger auf Fahrgestell Pz.Kpfw. I which was only used to mixed effect early in the war.



KARL HEINZ MÜNCH



Bridging major bodies of water calls for advanced operational planning. The crossings shown here could only be done after a bridgehead had been established.



Buildings, haystacks and other objects that have been set ablaze by gunfire can provide at least some illumination. This photograph, taken in November 1943, was taken during the link-up of the 1. Panzer-Division and the 1. SS-Panzer-Division (Leibstandarte) after the enveloping attack at Shitomir.



Obstacles that would have been readily spotted by day could offer great surprises at night.  
KARL HEINZ MÜNCH



Silhouetting yourself against the skyline can make enemy target acquisition easier.



Early beginnings were made with infrared target acquisition to reduce the “blindness” of tank crews at night. The device worked at combat ranges up to 400–500 meters.



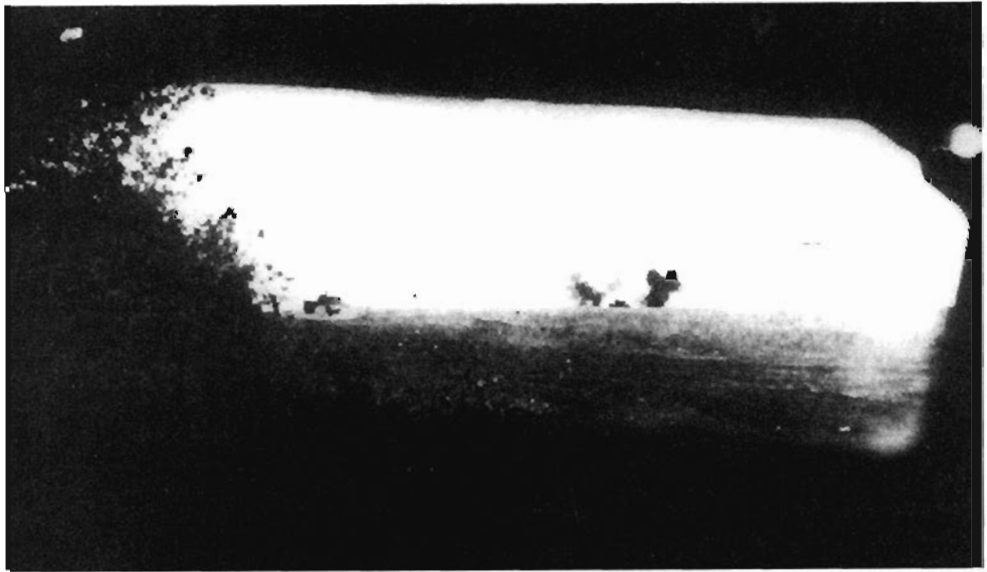
On making contact with the enemy, tanks fire at their highest possible rate of fire to gain local fire superiority as rapidly as possible. Tank fights, particularly meeting engagements, take place at very short ranges. This Panther belongs to 3./Panzer-Regiment 1 of the 1. Panzer-Division. It was filmed outside of Shitomir on 20 November 1943.





Additional examples of the firefight at close range.

Additional examples  
of the firefight at  
close range.



During a firefight,  
muzzle flashes and  
smoke interfere with  
vision. The cordite  
fumes and the smoke of  
a discharged round in  
the turret can also  
interfere with the crew's  
ability to acquire and  
engage targets. The  
bottom photo shows  
Panzer IV's fighting at  
Goldap (East Prussia) in  
November 1944.





Enemy columns are shot  
to pieces and passed . . .  
KARL-HEINZ MÜNCH



. . . anti-tank guns run  
over . . . KÖNIG





... artillery firing positions wiped out ...



... anti-aircraft positions neutralized ... KARL-HEINZ MÜNCH



... villages from which the enemy had been cleaned out are secured ... BAUMANN



... the forward-most point of advance is clearly marked for fliers. Note the captured British Matilda in the background.



The attack objective is then prepared against enemy attack according to the fundamentals of defense. KARL-HEINZ MÜNCH

Verlag „Die Wehrmacht“ K. G.  
Berlin-W 68, Schützengasse 18/25.  
Abdruckverbot u. Ausgabever-  
weigerung. Berliner Verlagsanstalt  
G. m. b. H., Berlin SW 68. Preisliste  
Nr. 1 vom 1. 11. 1941. Druck: Rump-  
feger Berlin. Printed in Germany

# DIE WEHRMACHT

Hauptredakteur: Bernd E. H. Over-  
haus (im Wehrdienst), Stellvertreter:  
Karl Fischer, Berlin. Graphische Ge-  
staltung: Herbert Dossel, Berlin.  
Verantwortlich für Auslagen: Dr.  
Kurt Harß (im Felde), in Vertretung  
Hans Putz, Neuenhagen bei Berlin

HERAUSGEGEBEN VOM OBERKOMMANDO DER WEHRMACHT



**Panzer am Fuße des Kaukasus.** Am 29. September meldete das Oberkommando der Wehrmacht: Im Kaukasus und südlich des Terek nahmen deutsche Truppen in schwer gangbarem, bewaldetem Berggelände stark ausgebaute und zäh verteidigte feindliche Stellungen

In movies and in the press, the tank often represented the steel embodiment of the attacking might of the Wehrmacht.



## CHAPTER 2

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# *Defensive Operations* *(Die Verteidigung)*

**D**efensive operations are very frequent. For the armor formation, however, the defense merely provides the framework for the operational situation. How can that be understood?

In the defense the armor commander also operates by attacking (if necessary, with a part of his forces) to achieve the decision! That requires:

- Holding back a portion of his forces
- Steering the enemy into terrain that is unfavorable to him
- Painstaking reconnaissance of the terrain and
- Foresighted issuing of orders.

Prerequisites for leading one's own counterattack are:

- Blocking, wearing down and delaying the enemy
- Holding important sectors of the terrain (preferably by other troops)
- Preserving one's own combat strength and
- Local superiority.

### COMMITMENT OF FORCES

The fewer the forces that are in actual static commitment—meaning in blocking positions or in defensive areas—the greater will be the opportunities for operating with those forces that are not engaged but are held ready in concealed positions. The usual goal is to keep at least a third of the tanks mobile and available.

### PREPARING FOR COMBAT

Since the initiative is initially with the enemy, it is necessary to employ the defending forces in a far-sighted fashion. To that end it is desirable to avoid letting the enemy prematurely discover the disposition of one's own forces through aerial or ground reconnaissance or through radio intelligence. The defender fights from (blocking) positions and defensive areas or conducts counterattacks with mobile forces that have been held back.

In order to avoid points on the ground that may remain undefended due to different missions by neighboring formations, so-called coordination points (Anschlusspunkte) are designated. The elements there can consist of individual tanks or attached Panzergrenadiere, usually in squad strength or, in exceptional cases, in platoon strength.

Duties at the coordination point are:

- Maintaining contact with forces in neighboring sectors
- Keeping neighbors informed about the situation in its own sector and
- Observing and reporting changes near the boundary with the neighbor.

They can also perform the mission of guarding gaps or the area between the adjoining troop units. Coordination points are defended. If specific orders are not issued, the basic rule is that the troop unit committed on the left is responsible for occupying

the coordination point. If possible, there should be wire communications with the other forces. Signals operating instructions and frequencies are exchanged.

### **BLOCKING POSITIONS**

Armored fighting vehicles fight from a blocking position if key terrain must be held in order to break the weight of an attack by superior forces or to establish the prerequisites for a subsequent operation. In contrast to area defense, it has only a limited depth. The tanks are mostly in static commitment, which diminishes their striking power. Since they will be the target of considerable enemy fire, especially indirect fire, the positions must be improved. For that purpose so-called hull-down positions (Panzerstände) are excavated that give the tank extensive protection to the front and sides against direct fire and against shrapnel from indirect fire. The height of the earthen side walls allows the turret to traverse freely. The tank must be able to leave the position to the rear rapidly and concealed. The concept of positioning includes the placement of the individual tank just as properly as that of a platoon or even the entire company. In exceptional situations the entire battalion may be in a linear position. In that case the additional concept of massed fire (Feuerfront) applies. As far as command and control goes, each tank fights within one of several platoon positions. The company coordinates the action of its subordinate platoons. It includes the platoon positions, concealed positions, security and the company command post. A platoon position should have a minimum width of about 200 meters. Company positions range in width from about 1,000 to 1,500 meters and have a depth of about 500 meters.

### **DEFENSIVE AREA (VERTEIDIGUNGSRAUM)**

The term indicates that the defense will be conducted flexibly and in depth. The front of the defensive area is bounded by the forward edge of the battle area or by the main battle line (Hauptkampflinie). Security forces (Sicherungskräfte) are positioned forward of the defense area. Doctrinally a reinforced battalion can occupy a defensive area with a width of about 5,000 meters and a depth of at least 3,000 meters. The defensive area comprises the company positions, an area for the reserve, the location of the combat trains (Gefechtsstroß) and the battalion command post. If the company posi-

tion has depth (500 meters or more), then it is also known as a defensive position (Stellungsraum).

The routes from the reserve position to the company positions are carefully reconnoitered in case reinforcement is required. Prepared positions in the rear (Auffangstellungen) can be determined in the depth of the defense area as well as areas into which counterattacks could be conducted. A company is usually held in reserve. Within the platoon position every tank position and alternate position is arranged so that the fields of fire overlap and complement each other. The tank commanders and the tank drivers know the routes from the hide position (gedeckte Aufstellung) to the fighting positions.

### **THE INDIVIDUAL TANK FIGHTING POSITION**

There are three basic kinds of positions:

- Open (exposed)
- Hull-down (teilgedeckt)
- Concealed (versteckt)

As the name suggests, the exposed position is the least favorable because the tank is not protected against either observation or fire. From such a position the firefight is only taken up if no cover is at hand or if the enemy forces one to open fire immediately from the halt because of the danger he presents.

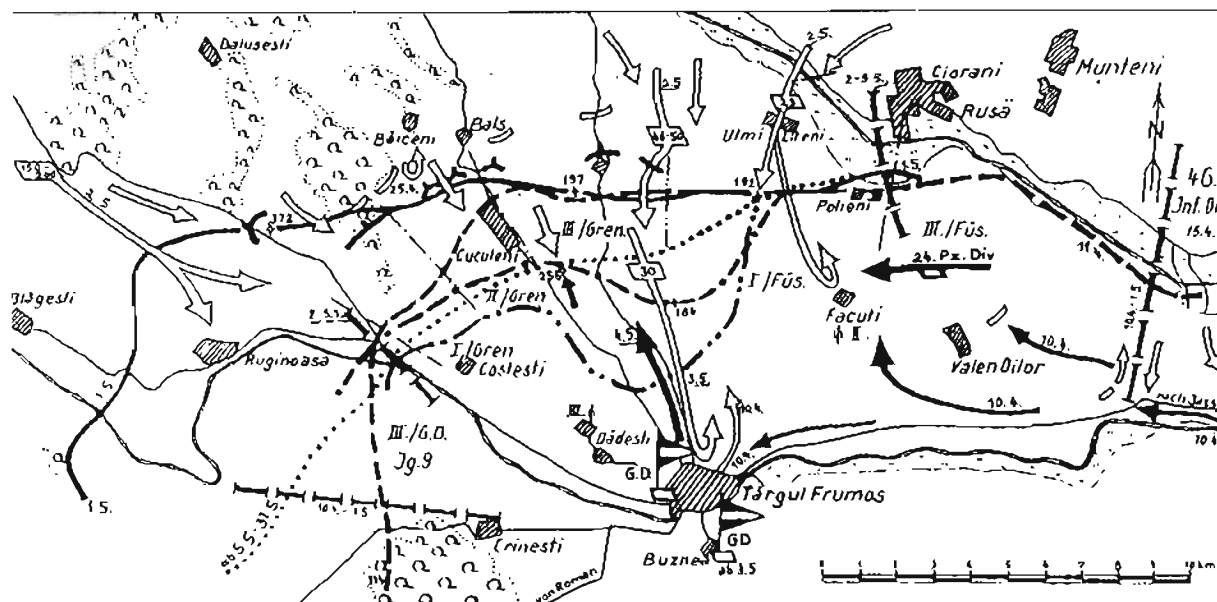
The tank fights from a concealed position in order to take advantage of cover that the terrain offers and to escape enemy observation through camouflage. Branches and such cannot interfere with the action of the tank's weapons. Concealed positions may lie at the edge of woods, in vegetation and at the outskirts of a village or town (for example, in barns and large sheds). The tank is not protected against enemy fire in a concealed position.

The hull-down position is generally the most favorable for the tank, since it is protected up to its main gun. It is ideal if additional brush or similar obscuring material can offer concealment as well. Hull-down positions generally are found:

- On the crest of a hill, if it is not elevated against the horizon
- Behind railroad and road embankments and wall and
- Behind manmade cover.

It is advantageous if the tank can enter the position under cover, without dust clouds and with little engine noise.

## Einsatz im Verteidigungsraum



Skizze aus: Spaeter, Panzerkorps Großdeutschland

### OPERATIONS IN A DEFENSIVE AREA

Panzergrenadierdivision "Großdeutschland" halts a major offensive at TARGUL FRUMOS from 2 to 5 May 1944.

**Situation:** After a lengthy preparation, a superior enemy attacks with his main effort in the sector of Panzer-Grenadier-Division "Großdeutschland." German forces have established themselves in a deeply echeloned defense.

**Mission:** Panzer-Grenadier-Division "Großdeutschland" holds the defensive area of TARGUL FRUMOS and commits the main body of Panzer-Regiment "Großdeutschland" in a counterattack.

**Execution:** The exhausted enemy is blocked and then split up by the Gepanzerte Gruppe "Großdeutschland," which has been held in reserve. Panzer-Regiment "Großdeutschland" ensures the cohesion of the defensive area and prevents enemy forces from bringing up forces after capturing former positions. Separated enemy units are wiped out with attacks from the flanks of the defense area.

Sketch from Spaeter, Panzerkorps Großdeutschland

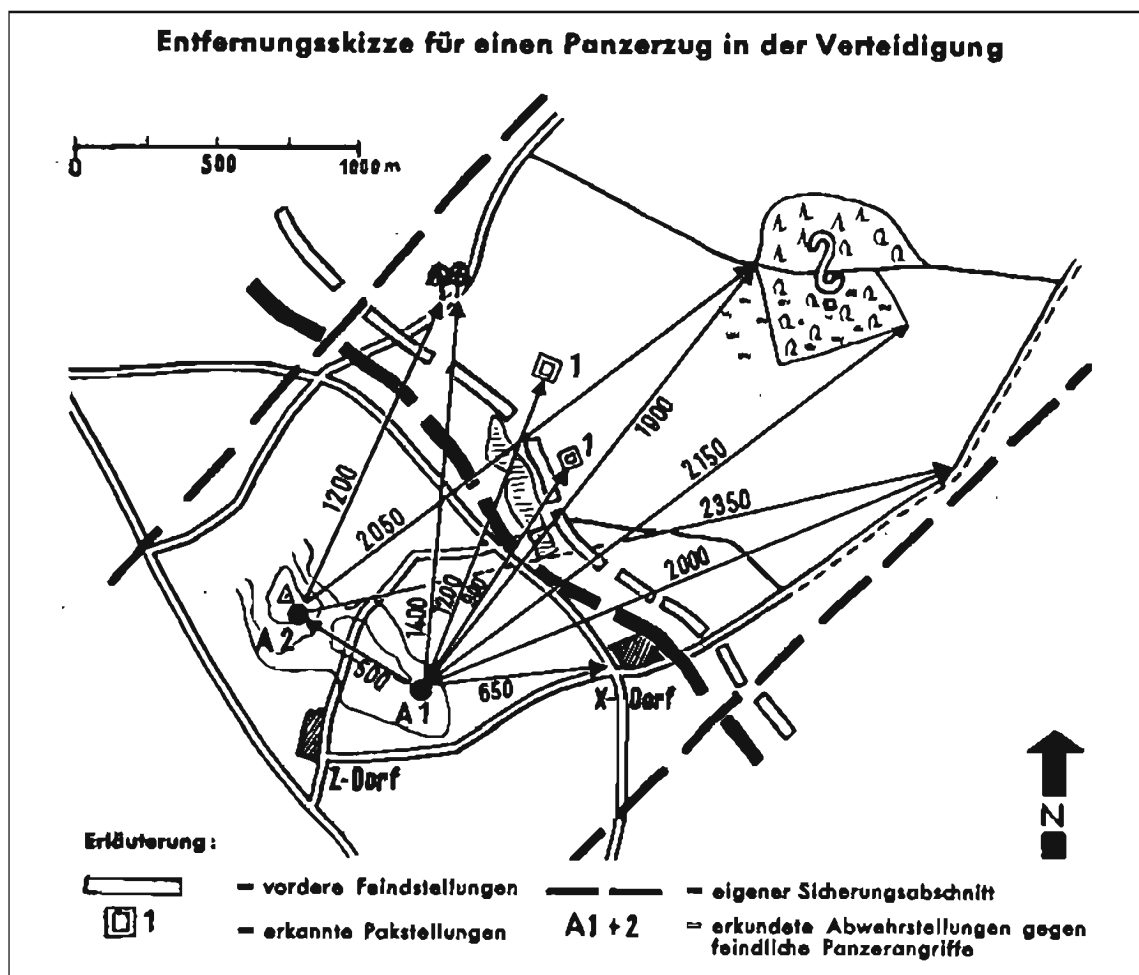
On occupying a position the crew work closely together so that:

- The tank is not on a cant, if that is possible, and
- It initially only drives close enough to the edge of the cover so that the tank commander can observe the terrain with on-board optics, binoculars or the naked eye. (Such a position can also be called an observation halt or Beobachtungshalt.)

If action is required from that position, the tank moves further forward until the gunner has a clear field of view through his telescopic sight. He tells the driver when to halt. Since the telescopic sight is even with the cannon, that ensures the muzzle of the cannon is clear of the cover and will not fire into it.

If the tank remains in a position for a longer period of time, or if it occupies the position from a concealed position after it is alerted, the position





**RANGE CARD (ENTFERNUNGSSPINNE) FOR A TANK PLATOON IN DEFENSE**

**Practical execution:** From each platoon position the individual tanks sight on conspicuous target reference points—intersections, hills, edges of woods, outer limits of villages etc.—and ascertain their ranges.

The target reference points are each connected to one's own position with a line with the range entered on it. The target reference points may also be identified with numbers. The exact deflection is noted for night engagements. That value is read off the deflection indicator and also entered beneath the target reference point line. If the tank has no turret position indicator, markings that correspond to the deflections can be placed on the turret ring covering. The loader then reads the marks with his flashlight and reports the azimuth readings to the gunner.

A prerequisite for aiming to the side is that the tank's position at the front and on one side of the vehicle is marked with wooden stakes and the vehicle takes up the same precise position on reoccupying the position.

should be marked with stakes both in front of the tank and on one side. This has the advantage of ensuring the position can be occupied without a problem, even during darkness. The commander prepares a range card (Entfernungsspinne). For that he takes bearings on conspicuous terrain features in the area (e.g., buildings, intersections, isolated trees) that he has been ordered to operate in

and observe. With the reticule in his binoculars or a scissors telescope (Scherenfernrohr) and the help of a map, he works out the distances to those points. He enters them on the sketch and also enters the turret deflection readings from the turret position pointer. If the tank also has a gunner's quadrant available, then the elevation of the gun is also entered. The range card is advantageous in that

whenever the enemy is located in the vicinity of one of the designated terrain features he can be acquired more rapidly and with the correct range setting. If the elevation and deflection are determined and if the enemy is located in the precise area that has been plotted, then the gun can be directed exactly at those target points, even at night. On a clear, bright night (or with fires in the target area) targets can be taken under fire.

### THE TANK PLATOON POSITION

The platoon leader establishes primary and alternate fighting positions so that:

- If possible, the tanks are able to fight from hull-down positions
- Positions can be occupied and changed without being observed by the enemy
- Good observation and fields of fire are possible and
- Overlapping fires are possible with the adjoining platoons

If possible, alternate positions are reconnoitered. They are occupied if the firefight can no longer be carried on from the previous position or if ground is captured or has to be given up. Alternate positions must be chosen so that the tank can escape enemy fire and renew the firefight using sur-

prise from the new position. The company commander orders changes in position for entire platoons. The platoon leader determines changes in position for individual tanks within the assigned sector of terrain so that the maximum number of barrels are always engaging the enemy and a mission-oriented use of the area is assured. Individual tanks change position on their own if:

- They can no longer effectively engage the enemy or
  - If they are threatened with destruction.
- Change of position must always be reported.

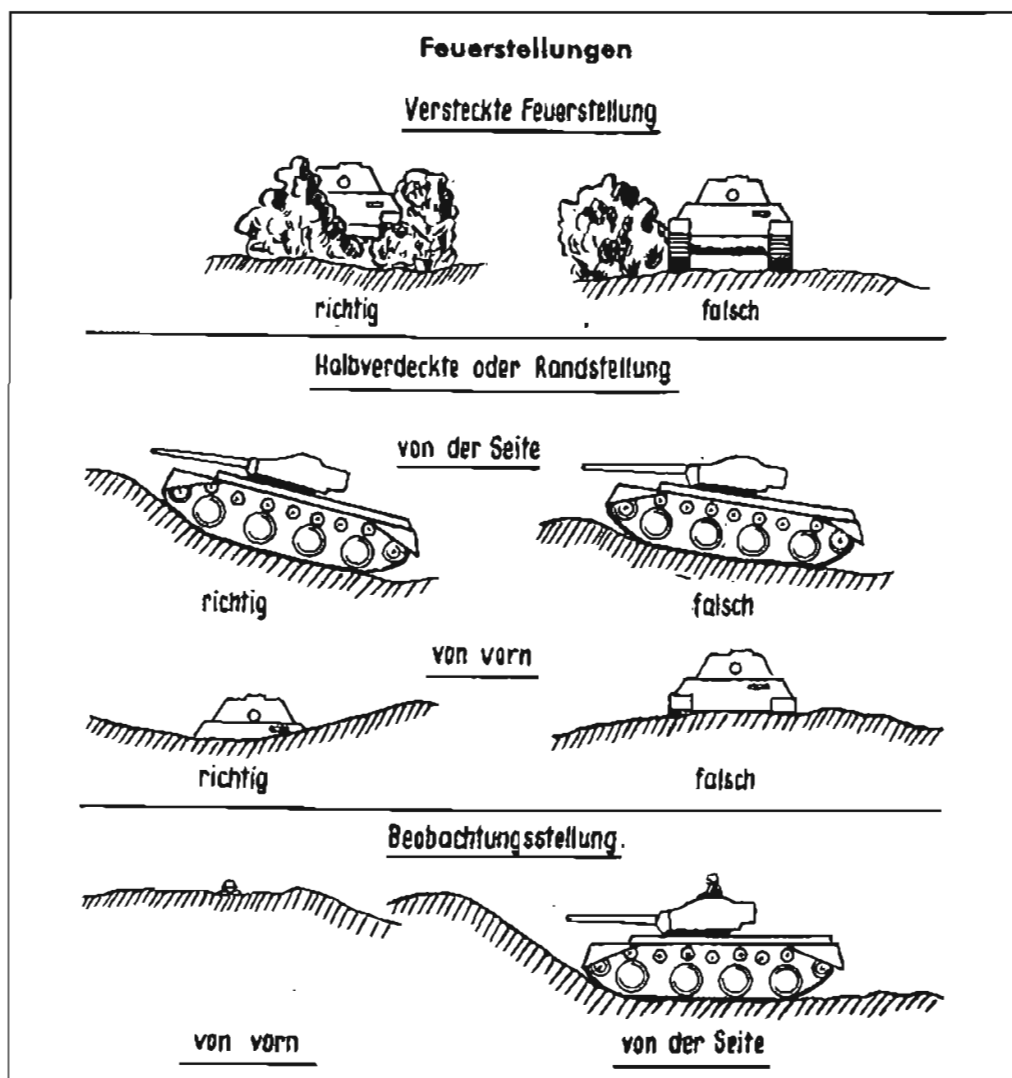
### COMPANY FIGHTING POSITIONS OR DEFENSIVE AREAS

The company commander decides what forces he will employ in the firefight from the forward positions and what forces he will keep concealed. In so doing he preserves freedom of action and prevents his forces from being prematurely attrited. Forces in covered positions occupy their positions when ordered if they are to join the firefight. According to doctrine, the tank platoon is then committed as a unit. The company commander orders his forces to occupy the reconnoitered positions in such a manner that local fire superiority can be attained and the enemy can be engaged with rapid fire.



Hide positions in villages can limit freedom of maneuver, especially if buildings are set ablaze by gunfire.

KARL-HEINZ MÜNCH



## FIRING POSITIONS

### SELECTION OF POSITIONS

Decisive mistakes can be made in the selection of the positions. Basically, one's own mission must first be evaluated and the enemy's probable courses of action considered. First consideration does not go to favorable disposition and finding cover. Instead, first consideration must go to the best opportunities for effective action. A position with good potential observation for several kilometers forward permits opening fire over an extensive distance but also permits the enemy to reconnoiter his objective from far beyond the range of friendly weapons. As a result, the field of fire in front of friendly positions should not exceed the range of one's weapons (1,000-2,000 meters and correspondingly less at night). It was

especially common among Soviet attack formations that they held their artillery forces close up for immediate support and started taking enemy tanks under fire at distances of 4,000 to 5,000 meters.

Positions at the edges of a wood line, the outskirts of a town or on hills are similarly problematical. Tanks positioned there are very easily spotted by reconnaissance and can be suppressed with artillery fire. During that time they are limited in their effectiveness and can be bypassed easily. It is always desirable that the enemy runs into positions and is shot up with a high probability of hits within the effective range of the guns. If the enemy bunches up and directs all his attention in one direction, then fire called in from a flanking position with a well-timed

delay can cause great confusion or even panic. It is clear from that example that success largely depends on opening fire at the right time. If it comes too soon or is uncoordinated, then the enemy will be left with ways to escape the critical situation. It follows that positions must be chosen so that the enemy's approach and exit routes can be covered with fire. Errors in selection of the position that were discussed earlier will be avoided if every combat mission in the position is also constantly linked in the orders with a selected objective (for example: "First platoon occupies a position south of the hollow so that the enemy can be destroyed before reaching the intersection.")

In a certain phase of the firefight the company commander puts his entire emphasis on the fastest possible destruction of the enemy who has arrived at the position. In so doing he ensures the enemy cannot pass on any accurate reconnaissance and renew the assault after taking minimal losses. It costs less in overall casualties to hold positions, then retaking them in a counterattack. If the enemy pressure becomes too great or threatens a penetration, the company commander uses the depth of the area assigned to him to surprise the enemy with fire from more favorable positions. In order to take advantage of favorable situations, the company commander launches fast, powerful counterassaults in order to:

- Destroy enemy units that have advanced
- Surprise enemy units that have penetrated in the flank or
- Recapture positions that have been lost.

A tank platoon carries out counterattacks on its own initiative if, for example, the enemy has already been battered or can be surprised. Such counterattacks are usually only launched over limited distances (500 to 2,000 meters).

### COUNTERATTACKS (GEGENANGRIFFE)

The preeminent role of tanks in the defense is in counterattack. When possible, counterattacks should be planned in advance and launched when the situation develops favorably. Such counterattacks must be painstakingly planned and reconnoitered so that they can be carried out within a matter of minutes. The various counterattack courses of action are identified with code names and can be initiated over the radio. Such counterattacks have limited objectives and do not, ordinarily, extend beyond the

boundaries of one's own positional areas. The execution follows the fundamentals of the hasty attack (*Sofortangriff*), as described above under the meeting engagement (*Begegnungsgefecht*).

The counterassault (*Gegenstoß*) offers a contrast to the counterattack (*Gegenangriff*). It differs from the counterattack in that it is not planned ahead. It is, instead, frequently carried out with available forces on the initiative of the local commander in response to a critical development of the situation in order to repulse an enemy who has penetrated. The use of the *Gegenstoß* in defense was always a particular strength of German troops in combat and often made it possible to turn the tables in an almost hopeless situation against vastly superior enemy forces.

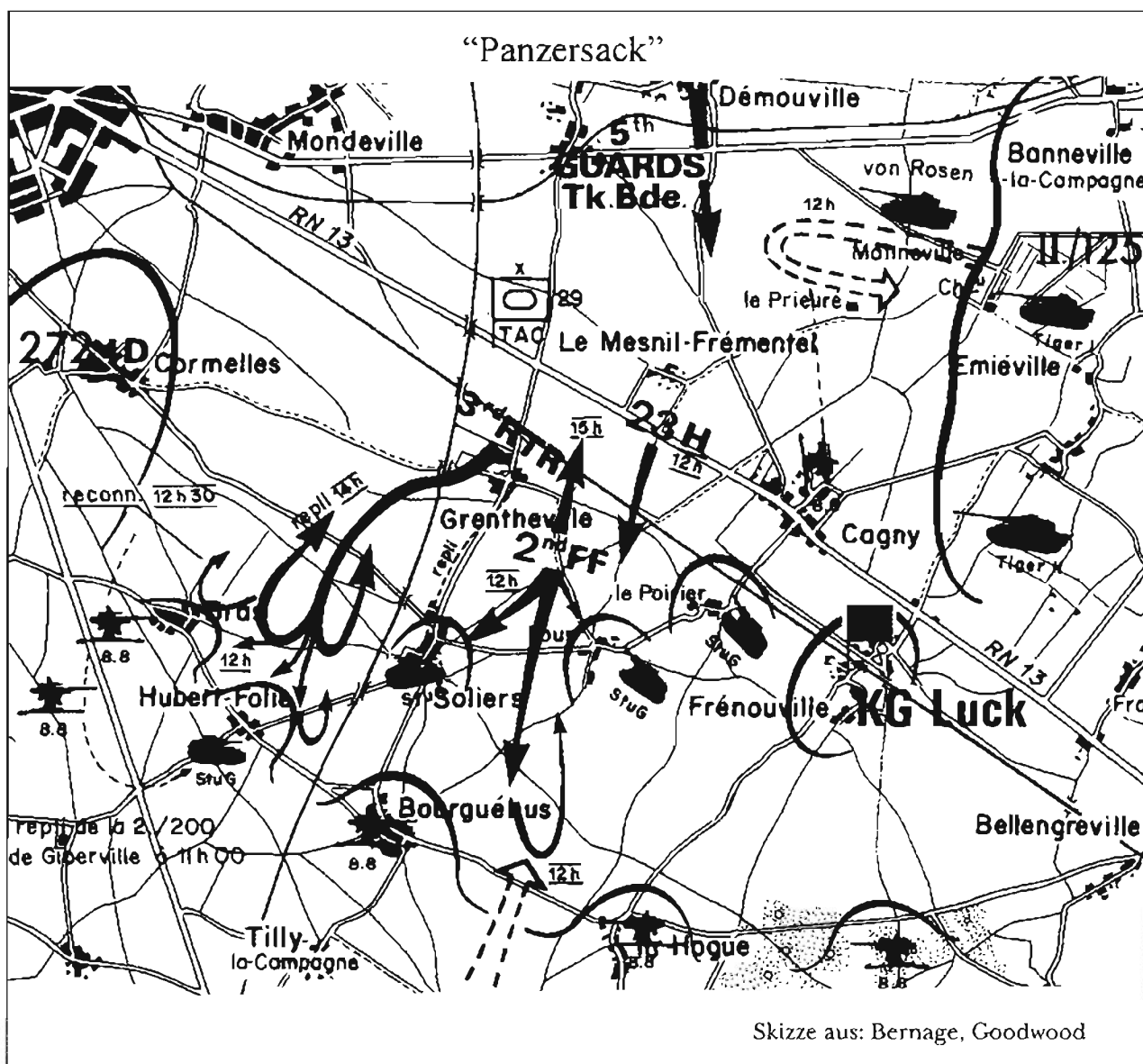
### RELIEF (ABLÖSUNG)

The tank company relieves other forces on order or is, itself, relieved. Careful preparation is the prerequisite for a rapid relief that is not noticed by the enemy. Restricted conditions of visibility favor the relief. The relieving troops are attached to the commander of the troops being relieved until the relief is completed.

After receiving the order for relief, exchanging radio signals instructions and handing over obstacle plans, the tactical commander controls the details necessary for the relief, such as:

- Liaison
- Relief sequence
- Start and end of the relief
- Sequence of movement
- Mission after successful completion of the relief
- Chain of command
- Measures for security, support and logistics and
- Time for issuing the order

During the course of the relief in a position, the nature and scope of the measures depend on whether the relieving unit is replacing a unit similar in ground organization and troop composition to itself. Relief usually takes place by companies. The company commanders establish contact using an advance party (*Vorkommando*). If possible this is done when visibility is sufficient. Depending on the situation and previous mission, the platoon leaders accompany the advance party. After coordinating with the troops to be relieved, the company com-



### "PANZERSACK"

Kampfgruppe Luck stops a massed armored attack north of BOURGUEBUS on 8 July 1944.

**Situation:** After a massed bombing attack, the 3rd Royal Tank Regiment, as the spearhead of the 7th Armored Division, thrusts through the positions of the 16. Luftwaffenfelddivision and attacks BOURGUEBUS. The Kampfgruppe Luck (reinforce) is held ready as a reserve in the FRENOUVILLE area.

**Mission:** Kampfgruppe Luck intercepts the enemy armored attack, in coordination with schwere Panzerabteilung 503, and prevents the enemy from capturing the BOURGUEBUS hills.

**Execution:** Attached Panzerjägerabteilung 200 and armor of the Kampfgruppe occupy blocking positions in the rear area. Flak battery of the Luftwaffe (88 mm) at CAGNY is attached and engages enemy armor with direct fire. Schwere Panzerabteilung 503 launches an attack from the flank. The enemy lacks depth and is forced to bunch up, suffering substantial losses.

Sketch from Bernage, Goodwood.

mander determines a point on the ground at which his company will be met by guides. The company is guided in from there. Following that, he has the local commander brief him regarding:

- Terrain
- Defensive plans
- Enemy situation
- Obstacles and
- Other details (e.g., alert arrangements, wire communications, supply points)

He continually monitors the:

- Condition of the fighting and hide positions
- Location and mission of the security forces
- Sectors of observation and fields of fire
- Combat support availability and
- Location and extent of obstacles.

After that, along with the commander of the troops that are being relieved, he regulates:

- Sequence of the relief
- Route for the arrival at and departure from the positions
- Which platoons are relieving and in what place
- Time at which all units are to switch to the new frequencies and
- Actions to be taken in conjunction with the troops that are being relieved in case the enemy attacks during the relief.

If there is insufficient time to coordinate everything, the troops that are being relieved can leave a rear party (Nachkommando). The rear party remains at the disposal of the relieving troops to brief them. If there is enough time and if the enemy situation permits, a timely, phased relief that maintains the highest possible readiness for combat is the desired goal.

A nearby assembly area is established for the arriving tank company from which the platoons can be individually called up. If time is pressing, a relief can be carried out with all platoons simultaneously.

The company commander passes on the results of the agreement between the commanders and gives the order for the relief. Each platoon leader gets together with the platoon leader whom he relieves. From a location where he has a view of the terrain he has himself briefed on the:

- Hide position
- Location and fields of fire of the positions and the routes to them

- Location of the security forces and how the alarm is given
- Low-visibility position (Nachtaufstellung)
- Details for the conduct of fire, as well as
- Obstacles to be handed over or covered.

He takes over his predecessor's system of naming terrain features, reference points (Richtungspunkte), markings and signals. The platoon leader usually briefs his tank commanders with respect to the mission and course of the relief in the nearby assembly area. Then he leads the platoon by a covered route to the area of the position.

The individual tank commanders get together on foot with the tank commanders they are relieving. They discuss the relief with them or the platoon leader himself briefs them on the position.

In the course of those discussions it is especially important they should be briefed on:

- Terrain
- Fields of fire and observation
- Control of the conduct of fire as well as
- Missions and positions of adjoining units

Normally the platoon leader first orders the relief of the forces in the hide position, then those in the fighting positions and, finally, the elements in outposts.

If there are demolition guards (Sprengsicherungskommandos), their orders and target folders are assumed by the relieving force.

The completion of the relief is always reported to the next highest commander.

If the relief is achieved through offensive action, personal contact with the battalion and company commander is often impossible. Details of the plans for the operation must be exchanged by radio with the troops that are to be relieved. Shortly before approaching the forces to be relieved, radio contact must be established on their radio net. The company commanders discuss the approach routes as well as the support that will be provided by the troops in position.

The troops that have been relieved withdraw along the allotted march routes or assemble in an assembly area for the time being.

During the relief fighting continues. The company commander remains at his former position and is among the last to leave. Platoons that have already been relieved ready themselves for renewed forward commitment in the event of an enemy





With suitable opportunities for cover, tanks can also remain hiding in position. KARL-HEINZ MÜNCH

attack. If necessary, a rear party remains behind for a limited time period.

#### THE MISSIONS OF THE RESERVE

Those forces that are held ready in a concealed area—if possible, beyond the range of direct-fire weapons—constitute the so-called reserves. They must be under unified command, maintain a high degree of combat readiness and, within a few moments, be able to carry out the following tasks:

- Conduct local immediate counterassaults (Gegenstöße)
- Interdict enemy elements which have broken through
- Block threatened penetrations
- Reinforce/relieve the elements holding fighting position and
- Conduct planned and/or reconnoitered counterattacks

In so doing they must avoid fragmented commitment of forces. In most instances a unified commitment is faster and harder hitting. The reserve is tied up for less time and more rapidly available.

If reserves are committed, then it must be the objective of the formation commander to form a new reserve by withdrawing troops from other locations. Generally, no reserve is formed at the company level.

The reinforcement of a fighting position, however, is often only a limited reaction to an opponent who has already been successful. In most cases containment also results in intermeshing of the lines. In most situations, reserves become tied up for an unforeseeable period of time and, possibly, attrited. Only the counterattack, with its higher degree of planning, ensures that the reserve is only tied up for a short period of time. In addition, it usually suffers fewer casualties.

#### COURSE OF THE DEFENSIVE OPERATION

At first the leading enemy forces run into the forces of the security troops. They report the enemy in a timely manner and also take up the firefight, if they do not have orders to immediately pull back.

The initial encounter is extremely delicate, since an intermeshing with a vastly superior enemy

conceals in itself the danger that the security force may not be able to disengage from the enemy in a timely manner and may be destroyed. Conversely, the enemy desires to locate the fighting positions of the troops quickly so as to effectively direct his fire support. The security force must therefore repulse the enemy reconnaissance so it does not run into the actual defense positions and thus gain valuable information. It would be ideal if one could meet the enemy in the security line (*Sicherungslinie*) with determined resistance so that the brakes are put on the momentum of his attack and he is forced to broad deployment. One can also achieve that with obstacles laid well forward and through the use of artillery. As a result, forward observers are assigned to the security forces, after which they then go back to the troops in the fighting positions.

Since fighting in the security line may become quite intense, reserves may be assigned that mission. They then can have a certain amount of time to recover in their assembly area after they are pulled back.

Fighting in the security line can also take place with elements heavy in combat power in so-called forward defensive positions (*vorgeschobene Stellungen*). In that case, larger elements, sometimes even entire companies, may be committed which are in a position to hold the enemy for a longer period of time.

That tactic is also the reason why the Soviets regularly carried out feints with as much as a battalion. Even if they could not force the security forces back, they could at least determine their positions so that the follow-on attack with the main body could be more effective.

As the war continued and Soviet superiority increased, especially in indirect fire, the German defense had to evacuate forward positions immediately before the onset of preparatory fire. If the enemy artillery fire then adjusted to the depths of the defensive area too soon, it was possible to reoccupy the forward positions before the enemy reached them. At the division level and above, that kind of defensive operation was called fighting in major battle positions (*Kampf aus Großkampfstellungen*).

After the security forces committed in front of the defensive area have been pulled back, the objective is to seriously weaken the enemy when he runs into the forward positions. German experience thoroughly supports the validity of that principle. If

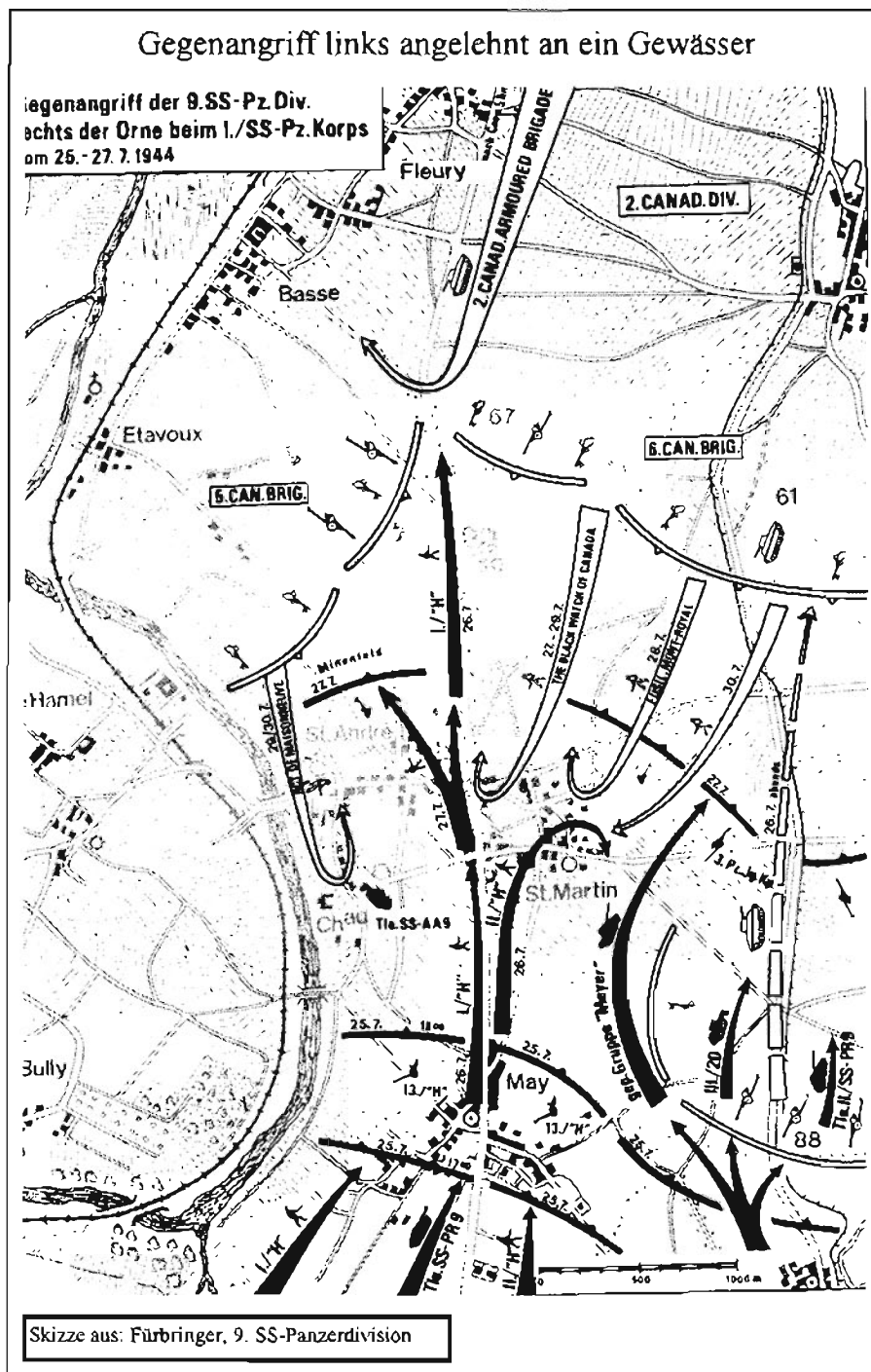
the forward positions were abandoned too quickly, the attacker kept his momentum and often what could have been an orderly withdrawal was turned into a hasty flight. Once the defense reacts in such a fashion under pressure then there is usually no holding the rear positions.

On the contrary, the withdrawal to subsequent positions should take place at a moment when the enemy has been successfully repulsed and has to regroup or bring up fresh forces. If the withdrawal takes place unnoticed, then when the enemy renews the attack, it falls on thin air—particularly the artillery preparation. The moment when the enemy is brought to a halt in front of friendly positions can also be particularly good for a counterassault (*Gegenstoß*).

If friendly forces are forced back into the depth of the defense area (*Verteidigungsraum*), then the objective must be to force the worn-down enemy back before he gains control over the entire area. Otherwise, the objective of the defense fails and one has merely delayed the enemy attack. If the enemy is able to assault through the rear boundary of the defense area, he can only be intercepted with operational reserves. For that reason, during the course of the war the defensive areas became ever deeper in order to be able to withstand the greatly superior enemy.

It may also be necessary to defend so-called key terrain (*Schlüsselgelände*) by every means, including the risk of encirclement. In such a situation the defender hopes to deny the enemy control over the area, pin strong forces and have favorable opportunities for launching counterattacks.

In the individual positions, fire should be opened at the most opportune moment. If obstacles have been emplaced in front of the position, it is best to wait until the first tank runs on the mines and the rest halt. Massed fire at that moment reinforces the feeling of insecurity that has been awakened in the enemy. If flanking obstacles have been laid, then it is best to open fire before the enemy runs on to them in order to achieve the blocking effect when the enemy changes direction. Obstacles, therefore, are not primarily to stop the enemy. Rather they should direct him into areas where one can be especially effective with fire. For that reason many defense areas are also developed into a so-called *Panzersack* (an engagement area in modern terminology). In the center of the defensive area ground is freely given up for a time (and, hopefully,



#### COUNTERATTACK WITH LEFT-FLANK AGAINST A BODY OF WATER

9. SS-Panzerdivision repulses the 2nd Canadian Division in a counterattack south of FLEURY on 25–27 July 1944.

**Situation:** Massed forces of the Canadian II Corps have gained ground in the direction of FALAISE. Friendly troops in positions are forced to conduct a fighting withdrawal with heavy losses.

**Mission:** 9. SS-Panzerdivision reestablishes former main line (Hauptkampflinie) through counterattack.

**Execution:** Gepanzerte Gruppe "Meyer" forms a Schwerpunkt. SS-Panzergrenadierregiment "Hohenstaufen" deploys into a built-up area on the left and guards the left flank. The Gepanzerte Gruppe takes advantage of terrain that favors movement of armor along the highway toward CAEN. An attack in wedge formation (Breitkeil) on both sides of the highway forces the enemy to retreat from ROCQUANCOURT. After the Gepanzerte Gruppe runs into entrenched enemy it assumes reverse slope positions and friendly infantry is brought up.

Sketch from Fürbringer, 9. SS-Panzerdivision.

inconspicuously) in order to entice the enemy into a position where one will also have forces on his growing flanks. It is desirable that those flanking forces have not opened fire up to that point. If the enemy is deployed and proceeds to run frontally against the rearward positions, then fire is suddenly and massively opened from three sides with especially destructive effect.

Above all, the objective must be to establish fire superiority in the shortest possible time so as to be able to drive back into cover or change position. The enemy's follow-on indirect fire is then ineffective. For that reason it is especially important to open fire at the right moment. If fire is opened too early, at too great a distance and in penny-packet amounts, it has no crippling effect on the enemy and he has the opportunity to react. That is why the effective range (Hauptkampfenfernung) is discussed. At that distance the weapons are highly effective and have a high probability of hitting their targets. For tank guns that was, originally, about 600 to 800 meters. With the introduction of the Panther and Tiger it rose from 800 to 1,000 meters and beyond. Defensive fighting demands effective allocation of targets to avoid doubling up on the same one. Right from the initiation of fire some weapons select targets that have been identified farther back among the approaching enemy so as to prevent those from being able to provide cover, hit command vehicles and prevent a follow-up assault by the enemy.

If enemy superiority is too great, individual positions will be bypassed and forces will have to pull back. When that happens it is extremely important those movements be coordinated with adjoining troops. Otherwise forces holding positions that have been successful in their defense may be forced to withdraw for no other reason than that neighboring positions were abandoned too early and have become a threat to the flanks. Such situations also call for careful study to see whether they offer a situation favorable for one's own forces to make a flank attack and thus negate a withdrawal or allow the abandoned positions to be retaken. Enemy forces that advance too briskly or carelessly can be destroyed in this manner. Especially when fighting in the depths of the defense area, it is necessary to maintain continual close cooperation with other forces. Frequently it is impossible to withdraw all at once to the next position. The withdrawal can then be made in leapfrog fashion (*überschlagender*

Einsatz), according to a basic rule: "No movement without fire protection" ("Keine Bewegung ohne Überwachung.")

If an envelopment or encirclement threatens, it must be reported. Nevertheless, the current position must be held. That is especially important if other elements are supposed to be committed in a counterattack.

If destruction threatens and there is no contact with the battalion, then it may be necessary to break out on one's own initiative. In so doing it becomes a matter of keeping one's forces tightly concentrated and assaulting as a massed body decisively in a single direction.

### **SPECIAL CONDITIONS RELATING TO DEFENSE AT NIGHT**

Night and conditions of limited visibility offer the defender better opportunities, if he has planned his commitment with purpose and foresight. It is frequently worth considering different terrain for positions in such conditions and shifting the tank platoons from so-called day positions to night positions. During daytime, slightly elevated positions usually offer an advantage. However, it is different at night. Then it is often the low-lying position that enables one to observe the horizon, which is frequently somewhat lighter. Also, at night it is not always possible to effectively control road networks and highways that could have been covered from the same position during the day, positions which the enemy prefers to use for his movements. In that case, the tanks must be brought forward as close as possible to the road networks and intersections in question so that there are no gaps in observation.

Infantry forces are also frequently brought forward so as to eliminate the possibility of surprise, especially by enemy forces advancing dismounted. Signal flares can be used to illuminate enemy targets.

It is desirable to also make preparations to set fires, such as haystacks, wooden houses or locations prepared with gasoline, that can be ignited by gunfire and illuminate the enemy, preferably from behind.

Painstaking light and noise discipline is especially vital so as to avoid betraying one's own positions. The area in front of the positions should be strung with barbed-wire and other obstacles that will reveal the approach of the enemy in a timely man-

ner. The barbed wire can be supplemented with explosive charges and armed handgrenades using trip wires.

### **ISSUING ORDERS (BEFEHLSGEBUNG)**

The more thoroughgoing the preparation of the defense, the greater is the likelihood of success. Poor selection of positions and sloppy issuing of orders cannot, generally, be corrected at the beginning of an enemy attack. Usually the defender is in the role of reacting. The preparation of the defense then takes on decisive significance.

After a personal visual inspection of the terrain—including the enemy viewpoint!—the commander of the formation prepares a provisional course of action that serves as the basis for the intensive reconnaissance of the terrain. The leaders of the tank companies proceed in exactly the same fashion. The order for the reconnaissance is then issued from a point where there is a view of the terrain. It includes:

- Platoon positions
- Unit boundaries and fields of fire
- Commitment of the security forces
- Employment of engineers (obstacles, etc.) and
- Combat-support measures (such as artillery, among others)

The most important component of those orders for terrain reconnaissance is planning the conduct of fire.

The intensive reconnaissance of the terrain that follows is an indirect test of the provisional course of action. Terrain reconnaissance is carried out in the first phase after the issuing of orders by the battalion commander and then by the company commanders. While the commanders conduct their reconnaissance, the most senior officers remaining behind lead the companies.

After reconnaissance by the company commanders, they meet with the battalion commander at a previously agreed on point with good observation of the terrain and they report the results of their individual reconnaissance. At that time all of the opportunities, recommendations and assignments are made and all of the unsuitable commitments of forces and the like are corrected or altered. Immediately subsequent to this, the company commanders meet with their platoon leaders, as well as the leaders of any attached forces (platoon leaders of Panzergrenadiere and engineers, artillery forward

observers etc.). They also explain their preliminary courses of action with a view of the terrain and order reconnaissance by the subordinate leaders.

All leaders of the smaller units intensively reconnoiter the areas that have been assigned to them. If the tanks have already been assembled under cover, it has proven to be a good practice for the gunners and tank drivers also to take part in the reconnaissance.

The platoon leader travels on foot to all positions and along the routes to them. As documentation of the results of their reconnaissance, all of the leaders prepare sketches and/or make entries on maps. At the end of the detailed reconnaissance, the platoon leaders meet with the company commander and report their results. In principle, the final plan for the defense takes shape then during a discussion among all concerned.

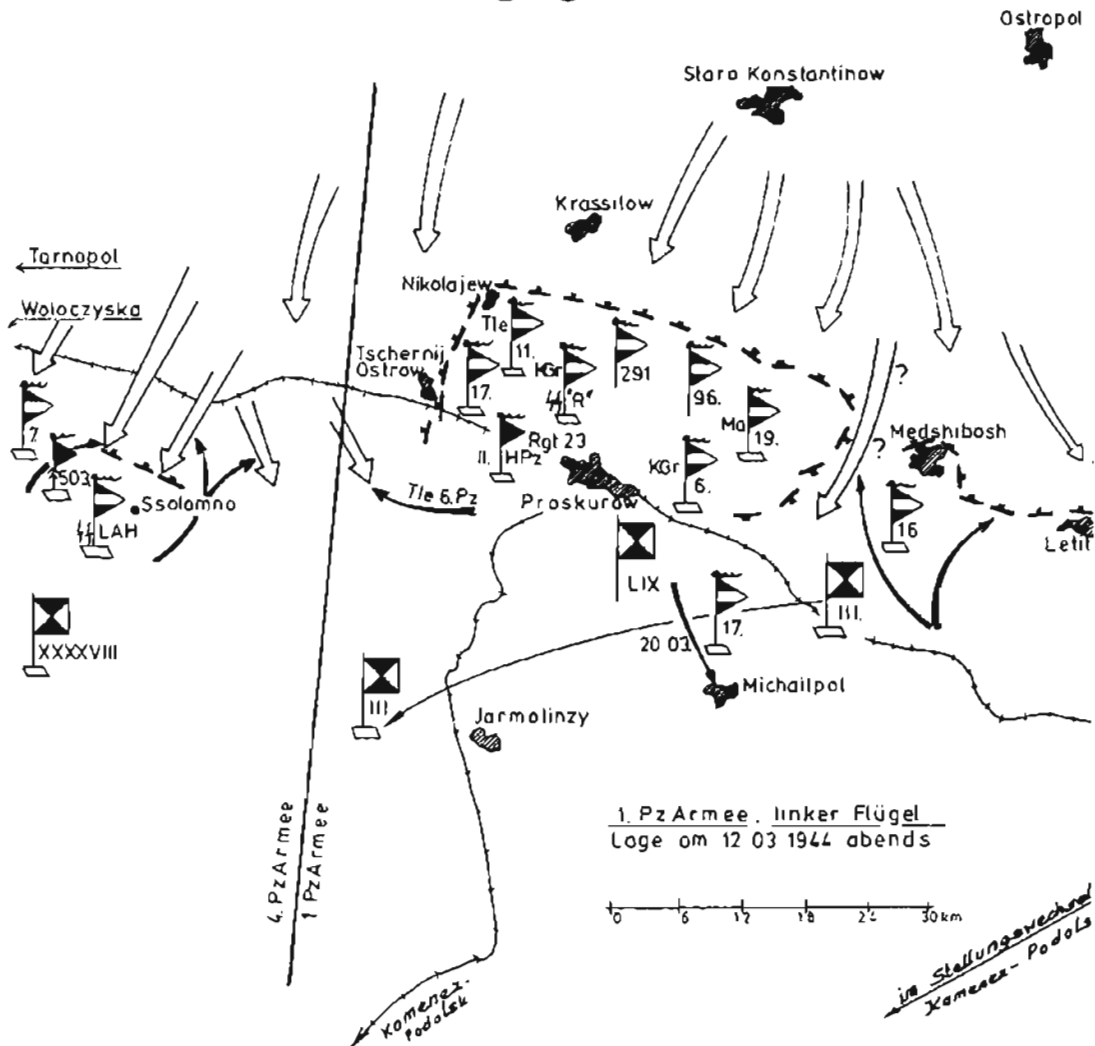
As a rule, the reconnaissance is already secured by means of sentries posted on watch and individual tanks in position or advanced outposts. If the reconnaissance party (Erkundungskommando) is in a new area, it maintains radio contact with the tanks that are closing up. The tanks must be received without any problems and led to a covered position.

With the results of the reconnaissance and the platoon leaders' deployment sketches in hand, the company commander checks over his provisional course of action and orders whatever changes are necessary. By permission of the battalion, he develops his plan for the defense and presents the main aspects of it to the battalion commander. The battalion commander then issues his (final) battalion order for the defense. The company commander, in turn, translates that into action when he issues the company order for the defense.

Then, at the latest, all of the tank commanders reconnoiter their positions, the routes to them and their location in the hide-position. After reporting the results of the reconnaissance, the platoon leaders are then in a position to issue their platoon orders for the defense. If there is little time available, the order for reconnaissance can be omitted. The reconnaissance only follows after giving out the respective individual missions. In that kind of situation it is also practical to reconnoiter only the forward positions first, the positions in the depth of the defense area being done later (if need be, only by the leaders).

Because there is no chapter in the manual for the tank company (Panzerkompanievorschrift) on

## Einsatz der Reserve im Gegengriff



Skizze aus: Hinze, Rückzugskämpfe in der Ukraine 1943/44

## COMMITMENT OF THE RESERVE IN A COUNTERATTACK

Corps reserves clean up a penetration on the left-hand army boundary west of PROSKUROW on 12 March 1944.

**Situation:** The enemy seeks to break through to the DNJESTR in offensive action along a broad front. Friendly forces hold over-extended combat sectors and continually intercept new penetrations.

**Mission:** Kampfgruppe 6. Panzerdivision stops enemy penetration west of PROSKUROW with a counter-attack and closes the gap to the 1. SS-Panzerdivision "Leibstandarte."

**Execution:** Move to the far side of PROSKUROW as soon as possible. Deploy into wedge formation (Keil) on crossing railroad line. Reconnoiter west until contact established with the enemy. The objective of the attack is determined after evaluation of reports on the enemy. Position is taken there so that the gap can be covered. Destruction of enemy forces that have broken through. Establish contact to the sides with patrols.

Sketch from Hinze, Rückzugskämpfe in der Ukraine 1943/44



defense, the format for issuing orders as followed by the Panzergrenadiere were generally used. According to Heeres-Dienstvorschrift 298/33a, Das Panzergrenadier-Bataillon (gepanzert), the order for defense includes the following details:

- Enemy situation
- Friendly situation
- Mission
- Front-line trace
- Organization, tasks and command of the combat outposts (Gefechtsvorposten), trace of their forward line and fire support
- Combat reconnaissance
- Missions of the companies located in the forward line
- Sector boundaries and depth
- Missions of the heavy weapons
- Type of support by artillery and weapons from other units (fremde Waffen)
- Fire control measures and requests for barrages (Sperrfeuer)
- Commitment and tasks of reserves
- Plans for construction of positions
- Missions for attached engineers
- Communications
- Location of the vehicles (Fahrzeugstaffeln) and the supply company (Versorgungskompanie)
- Logistical support
- Location of medical aid station and
- Location of the battalion command post (Bataillonsgefechtsstand).

After the issuing of orders by company and platoon commanders, the individual tanks take up their positions for defense. To accomplish that goal the company and platoon order also details the priority and time sequence of the individual measures (Arbeitsplan or work plan). That is useful in the event that the enemy attacks before anticipated and in the midst of the preparations.

## **COMBAT SUPPORT (KAMPFUNTERSTÜTZUNG)**

In spite of its great firepower, the tank is very limited in its suitability for defensive operations. The longer the tank remains stationary in a position that has been spotted, the more limited are its chances for survival. The enemy will use cover to make enveloping movements and commit artillery, mortars or aircraft. The greatest advantage of the tank—its mobility—cannot be brought to bear. It can only be

effective for a short period of time from any single position. The infantry have to carry the main burden of the defense. Other elements of combat support contribute substantially to defensive success. The engineers and the artillery are especially important in that respect.

During the preparatory reconnaissance, the engineer leader and the forward observers of the artillery have already been involved in the process. The forward observers reconnoiter their observation points so as to have good visibility into enemy territory. They will agree on target reference points (Zielpunkte) and target areas (Feuerräume) in conjunction with the combat troops so that fire can be rapidly called down on them. If possible, those points should also be registered. Called fire that is precisely on target is the foundation of a barrage. When the fire is precisely registered, the firing command can be immediately issued to the guns. It is also input during breaks in fire missions so that it is always "on call."

The engineers have numerous possibilities in providing support. Mine and timber obstacles are traditional. However, there are also numerous other possibilities. Concealed explosive charges can be installed in sectors of terrain that are hidden from observation, young stands of forest, ditches and the like. Bodies of water can also be mined. Signal flares and trip wires can give the alarm. Concertina and barbed wire, when properly laid, can even stop armored vehicles. Road networks, crossings and bridges can be blown. Hunter/killer teams (Nahbekämpfungstrupps) can be formed using satchel charges (geballte Ladungen) or "sticky" mines (Haftminen magnetically attached hollow charges). Engineers can help in the construction of positions with their construction machinery. In winter they can also help by blasting hard-frozen ground.

Weapons should always cover emplaced obstacles. This prevents the enemy from rapidly breaching or bypassing them.

## **COMMAND AND CONTROL (FÜHRUNG)**

There are various reasons that command of tanks is difficult in defense. First of all, it lies in the nature of the thing that the tanks are held in readiness in covered and camouflaged positions to postpone their discovery as late as possible. The platoon leader often has visual contact with no more than the immediately adjacent tank. The leader is more

# Kampf in der Einschließung

Kampf in der Einschließung

Lage der 1 u 4. Pz Armee vom 29.03 bis zum 03.04.1944

0 25 50 km

Die Divisionen sind auf noch mehr oder weniger starke Kampfgruppen fehlende Panzer, schwere Waffen, Geschütze und Zugmittel beeinträchtigen ihren Kampfkraft und ihre Beweglichkeit

Skizze aus: Hinze, Rückzugskämpfe in der Ukraine 1943/44

**Gepanzerte Gruppen in the "Hube" pocket seek contact with their own forces through offensive action from 29 March to 7 April 1944.**

**Mission:** Panzerdivisionen are to form Gepanzerte Gruppen and attack west ahead of friendly infantry forces in order to enable a fighting withdrawal.

Sketch from Hinze, *Rückzugskämpfe in der Ukraine 1943/44*.

dependent on the reports of his subordinates than in the attack and upon their independent initiative. Since enemy indirect fire often additionally interferes with observation or easily shears off the antenna with shrapnel, many problems arise in maintaining communications.

Thus, it pays to order "redundancy." That means that every single tank commander must not only know the specific mission in the present position, but also the times at which he should open fire for favorable effect. Normally, for every position a so-called trigger line (*Feueröffnungslinie*) is determined (if needed, distinguished into separate lines depending on the nature of the enemy that is approaching). That should be in easily observable terrain and ensures the action will be coordinated even if communications are broken. Specific signals (signal pistol flares) are also suitable.

As the enemy approaches, targets should be allotted over radio long before it is time to open fire. As a result, each gunner can concentrate early on his target and take good aim. If targets are not allotted, then each tank orientates itself according to its position in the platoon. That is simple if there are the same numbers of enemy targets as tanks in the platoon. However, when there are less of one's own tanks, it is not so easy. In that case the basic rule is: Targets are allotted from the outside toward the center. First the identified targets that are farthest from the center are engaged; after that firing is switched to those remaining toward the center. The platoon leader engages the most dangerous target in the middle.

The determination of what is the most dangerous target comes from different criteria. The type of target is most important. Tanks have higher priority than armored personnel carriers. The second essential criterion is the range to the target. Ordinarily, the more distant targets are engaged later, since the probability of hit for them is lower than for those tanks that have approached closer. An exception comes when the targets that are closer are moving rapidly and are unable to accurately aim their weapons. In that case, targets echeloned in position behind them may pose a greater threat. They have cover and can engage targets undisturbed.

Command tanks have top priority for engaging. They can be spotted because they sometimes drive by themselves, do not conform to all the movements and only occasionally take part in the firefight themselves. Often, they were identified because of

the number of antennae or as a result of special identification (such as a pennant). Unfortunately, the standardized turret numeral identification of the Wehrmacht often made such identification easier for the enemy.

During the firefight, the platoon leader is especially busy. He must, if possible, keep an eye on the entire target area and make lightning-fast assessments as to whether previously unidentified targets have surfaced, target hits on the enemy turn out to be ineffective or there prove to be gaps in fire control. He directs the fight with short fire commands. He directs his own gunner to targets that have not been engaged yet. All of the tanks mutually support each other in observing rounds. In the tank section (*Panzergruppe* or *Halbzug*), the individual pairs do the same. That is important, since the smoke from the discharge of the tank gun often prevents observation of the effect of one's own round for several seconds. In that situation, it is unnecessary to have a complete radio message with call and response. That would, quite simply, take too long. If the tank that fires simply hears "Target" or "High," then it knows that it is the recipient of the message. The driver, from his lower seat, can often observe the effects of a target hit sooner than the turret crew.

The platoon leaders and company commanders must evaluate the results of their own conduct of fire and order changes of position in a foresighted manner. Such changes must be coordinated. An independent change of position, therefore, is the exception. The subsequent positions must be designated with numbers, letters or code names, a process that abbreviates radio orders. The terrain in front of the positions is not only given code names but also surveyed by means of a range card (*Entfernungsspinne*).

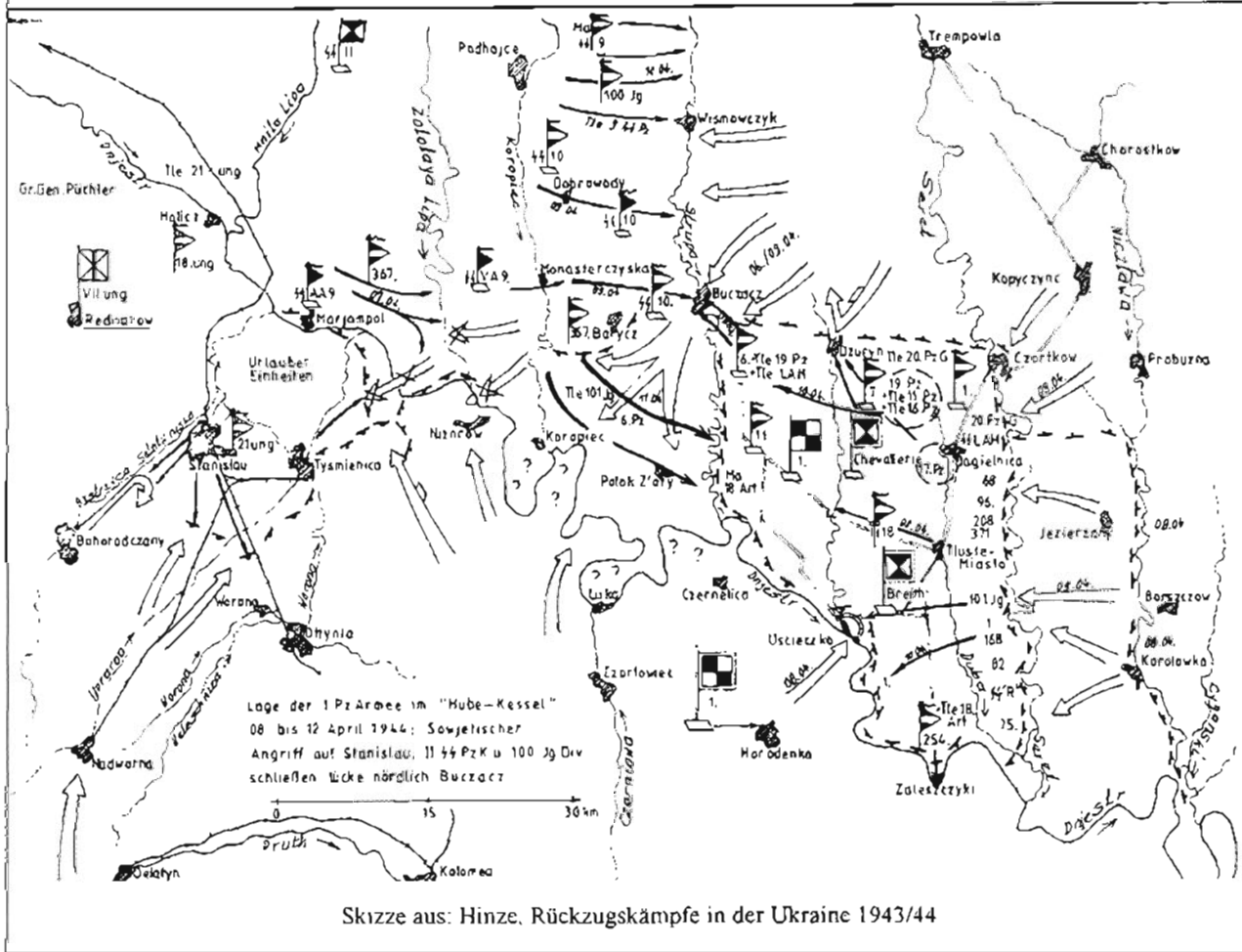
During the entire time of the defense the company commander makes good use of the artillery forward observer that has been attached to him.

The higher commander must receive frequent reports so he can evaluate the progress of the situation. Only then is it possible for him to commit forces in a foresighted fashion and avoid impending critical situations as they become evident.

## TRANSITION TO SUBSEQUENT OPERATIONS

Even more than in the attack or a delaying action, the transition to the subsequent operation is often a critical moment in defense. If the defense succeeds in repulsing the enemy with losses, the situation

## Ausbruch aus einer Einschließung



## BREAKOUT FROM ENCIRCLEMENT

Combat formation forms a breakout group from the "Hube" pocket on 8 April 1944.

**Situation:** The enemy has attempted to crush the pocket for days with massed attacks. Friendly forces fight as a "wandering pocket" moving west.

**Mission:** The combat formation (Gefechtsverband) of Korpsgruppe "Chevalerie" attacks toward the relieving forces and establishes contact with them in the BUCZACZ area.

**Execution:** All the remaining tanks are grouped under unified command. Narrow and deep organization. Enemy encirclement is pierced. Expand the gap and hold it open for the unarmored units. Commitment of reconnaissance patrols to establish contact. Continuous flank protection. After friendly troops have passed through assume mission as rear guard.

Sketch from Hinze, *Rückzugskämpfe in der Ukraine 1943/44*.

may offer favorable opportunities to reorganize one's own forces, root out the remnants of enemy units and again take possession of sectors that have been lost. If the enemy clears out of area in front of the positions, then it is time to maintain contact with patrols so as to avoid being surprised by a renewed assembly of enemy forces.

If enemy forces with significant combat power are able to hold fast in the defense area or, indeed, if enemy units break through, then the situation is critical. In the latter case, it is important to hold the current positions and, under no circumstances, pull back in disorder, since that will endanger neighboring forces with being outflanked. Even in the event of being encircled for a time, one can break out—in this case, in the opposite direction—if one has held the forces together. In a case where the enemy has occupied former friendly positions, the main objective is to pin him down if one is unable to dislodge the enemy with planned counterattacks (among other means, through blocking artillery fire). The highest maxim must always be that one is the master of the entire defensive area at the end of the operation.

If the enemy is too strong, then continual situation reports give the higher command the possibility of committing reserves or of bringing other forces that have not been engaged into suitable blocking positions (*Auffangstellungen*), i.e., prepared positions in the rear of the defense area. In most situations it turns out that local successes of weak enemy forces or, indeed, a penetration by them, is not necessarily threatening to the overall situation. Since troops in the rear are equipped with means for fighting armor—such as *Panzerfäuste* (hand-held antitank launchers of short-range, hollow-charge missiles), mines, shaped charges etc.—they, too, are able to destroy enemy armor.

If an enemy attack cannot be halted on a broad front, then the situation forces a continuous fighting withdrawal until the enemy is exhausted.

## LOGISTICS

In intense defensive fighting, ongoing supply is not possible occasionally since unarmored supply vehicles cannot be employed. Ammunition supply is especially critical, as is the recovery of damaged equipment. In order to insure the supply of ammunition, it can be stockpiled forward. Ammunition is stockpiled behind a position (or, looking ahead, in

a subsequent position). It must be protected from the elements and shellfire and, moreover, it must be camouflaged. Usually platoon or company allotments of ammunition are stockpiled. The responsible officer decides how many rounds each tank is allocated. If a platoon position develops an ammunition shortage, individual tanks may be sent back to re-supply with ammunition and return as quickly as possible.

Damaged tanks are not repaired in the position. Either they drive back under their own power under cover or are towed back in field-expedient fashion by a neighboring tank using tow cables. Recovery vehicles pre-positioned near the front receive the damaged tanks and tow them to repair facilities or to a collection point for damaged materiel at which heavy-duty transporters are standing by. Those reception points are located to the rear, beyond the range of enemy artillery. Tanks that are seriously damaged, where it appears that the repairs may take days, are passed over in favor of others or, if repair capacity is available, driven far to the rear. The tank platoon leader and the maintenance sergeant (*Schirrmeister*) of the company decide in combat when it is no longer rational to keep a vehicle in combat. In case of doubt, the speedy return of a tank that was out of service is more useful than hanging on to a tank that has only limited usability.

Platoon leaders and the company commander switch to another tank if their vehicles have to be withdrawn. In no case do they linger at the repair facility if there is fighting at the front! It is always critical that wounded be evacuated and cared for, particularly when crews are forced to bail out. First priority goes to the fastest possible transfer of wounded to the closest cover. Then life-saving measures, such as treatment for shock, control of bleeding and resuscitation, follow. Those first-aid measures determine survival in most cases! Mobile surgeons and medics (*Sanitäter*) take over the wounded soldier and transport him to the medical aid station (*Truppenverbandplatz*). The aid station may not be located in range of aimed gunfire. If the medical troops are unable to evacuate the wounded, tanks must be used temporarily. Soldiers will only be courageous and conscientious if they are certain that everything humanly possible will be done to save them if they are wounded. Training of every soldier in first aid is an essential part of that.

The medical forces from formations that have not yet been committed (the reserve, for example) can also be assigned to the defending troops in order to strengthen the net of care for the wounded.

Every crew immediately uses any pause in the fighting—without waiting for orders—for logistical and maintenance measures of every kind. That includes checking over the running gear, especially after being subjected to enemy artillery barrages. Otherwise, the surprise will certainly be great if a withdrawal becomes necessary and a track breaks or a road-wheel hub that has leaked from being hit runs dry and freezes up. Clearing off dirt that has been scattered, cleaning optics and replacing damaged vision blocks are part of the check up. Taking care of bodily functions in these situations also belongs to careful “planning.”

During longer pauses, consideration can be given to bringing up rations and giving some of the crews a break. When men are overtired, short periods of deep sleep can make them fit for an additional 3-5 hours. Under no circumstances, however, can security and observation of the battlefield be neglected.

#### **DELAYING ACTIONS (HINHALTENDER KAMPF)**

Delaying action is also an important form of combat. In contrast to the attack, the objective is not, in the short run, to force a decision. In contrast to defensive fighting, terrain is given up.

It follows, therefore, that the delaying action must soon be followed by offensive action that does seek a decision or the enemy must be stopped in a suitable location from continuing the attack for a significant time. Frequently, the delaying action is inserted as a preliminary to a defensive operation so as to prevent a superior enemy from hitting one's own positions with extreme force and speedily overwhelming them. This form of combat was not described in the Wehrmacht regulations. Instead it developed bit-by-bit during the second half of the war.

The delaying action is also extremely suitable as the preliminary phase for a subsequent attack by friendly forces, steering the enemy's movements and keeping him in the dark for a longer period about friendly intentions. If he believes that all that he has before him is a fleeing foe, then his concern is to maintain a steady tempo in the pursuit. Where-

ever possible, he is forced to use various routes and, in so doing, divide his forces. The pursuing enemy becomes arranged in great depth because, to maintain higher speed in the march, he is essentially limited to well-constructed road networks. If he then runs up against a well-echeloned defense with flanking fire, coupled with immediate counterattacks that cause him heavy losses, he often needs a great deal of time to regain local superiority.

In the end it is a command skill to appraise whether the enemy is making an orderly withdrawal or if he is beaten and falling back in disorder. This is also the main reason why one should employ units which have not been committed before in pursuit operations. Fresh, non-attributed forces are superior to the enemy in combat readiness and, especially, in combat power.

#### **COURSE OF THE DELAY**

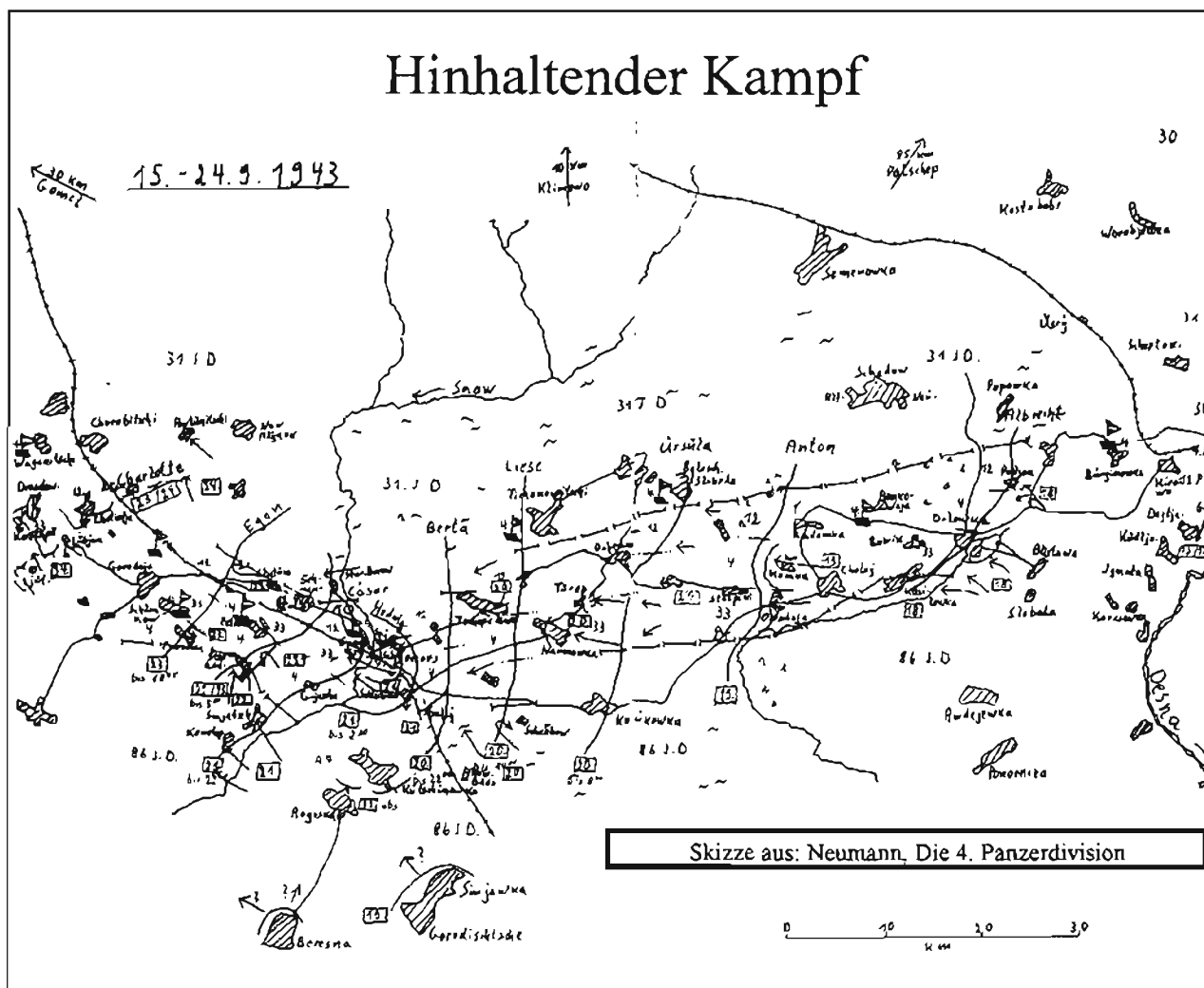
The delaying action should begin with a defensive phase that is limited in time but energetically conducted. That puts an effective brake on the enemy's progress, forces him to take time to deploy into assault positions and misleads him about friendly intentions. The enemy should be forced to go through all the preparations required to take a strong defensive position. That is the best time for friendly troops to break contact with the enemy and pull back.

The next phase is the constant withdrawal of part of the friendly forces and the constant occupation of suitable defensive positions. The withdrawal itself can take place in one move or with continuous fighting. The first method has the advantage that it runs its course without disruption by direct-fire weapons, can be carried out more rapidly and more time remains for getting set in the next position. The latter case includes the threat of becoming mixed in with the rapidly pursuing enemy and, necessarily, involves losses during the withdrawal movement.

When the opportunity presents itself, spontaneous or planned local counterattacks are carried out—preferably in the enemy's flank. They must be ended quickly or move right through the enemy.

The primary objective must be to maintain one's own combat power for the more important subsequent task. Very often it is the delaying force (*Verzögerungsverband*) that is then assigned as a reserve after being received by friendly troops hold-





## DELAYING ACTIONS

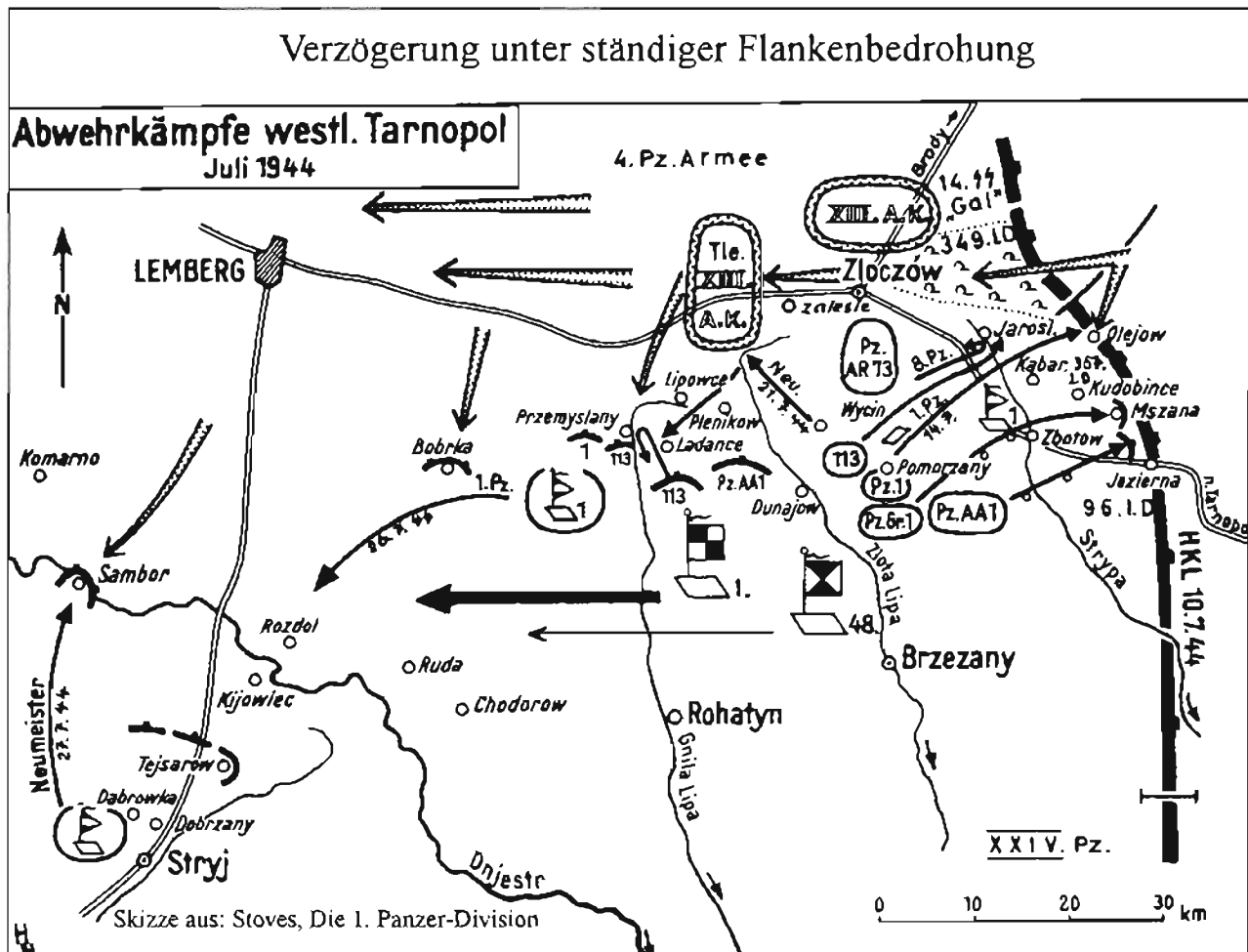
**Withdrawal of the 4. Panzerdivision east of GOMEL.**

**Situation:** Enemy pursues with mechanized forces but suffers heavy losses. Friendly forces carry out a fighting withdrawal to positions in the rear that are already prepared.

**Mission:** 4. Panzerdivision prevents a rapid advance to the DNJEPR by the enemy.

**Execution:** The position on the DESNA must be held until the evening of 17 September 1943. Operational control is preserved by establishment of delay lines in the depth of the area ("Albrecht, Anton" etc.). 4. Panzerdivision occupies "Delta" position 12 kilometers southeast of SOSCH and goes over to defense in that position.

Sketch from Neumann, *Die 4. Panzerdivision*.



#### DELAYING ACTION UNDER CONSTANT THREAT TO THE FLANKS

1. Panzerdivision prevents outflanking by means of a fighting withdrawal under constant threat to the flanks, west of TARNOPOL, 14-26 July 1944.

**Situation:** Strong mechanized enemy achieves a breakthrough in the direction of LEMBERG. 4 Panzer-armee is forced to withdraw under heavy pressure and thus creates a threat to the flank of the 1. Panzer-armee.

**Mission:** 1. Panzerdivision executes a continuous fighting withdrawal to the DNJESTR and repulses attacks against the left flank.

**Execution:** Formation of several armored formations to conduct the delay. Initially, energetic counterattacks stop the enemy frontally. Limited objective attacks are carried out toward the north to intercept enemy attacks aimed at the flank. Delaying formations are pulled back in leapfrog fashion. Continuous contact is maintained with the enemy. Both combat and zone reconnaissance on the flanks and in the direction of withdrawal. Timely movement of non-armored forces.

Sketch from Stoves, *Die 1. Panzer-Division*.

ing a position farther to the rear. As a reserve, it only has limited time to reorganize itself.

### **DEFENSE FOR A LIMITED TIME PERIOD**

The delaying action usually begins with an effective defense for a limited time. For that, positions must be chosen so that they are mutually supporting and offer the enemy no gaps for unseen infiltration. Since, generally, friendly infantry in well-constructed positions is not available, the attached Panzergrenadiere must be committed dismounted so that they can stop the approach of advancing enemy infantry for a limited time and then quickly remount in their SPW's that are kept nearby.

It is desirable that the enemy be halted and forced to deploy for attack again. Such an action is favorable to one's own orderly withdrawal to the next positions. An enduring defense for an extended period of time does not enter discussion, since it is important to maintain the combat strength of the troops fighting the delaying action for the subsequent fighting after their reception by the rearward forces.

### **WITHDRAWAL (AUSWEICHEN)**

If the armor formation has to break off the fight, it withdraws under covering fire of overwatching forces (*überwachende Kräfte*), supported by the fire of the artillery that was assigned to support it. As soon as the forward forces are no longer within the effective range of enemy antitank fire, the tanks that provided cover continue the withdrawal in leapfrog fashion. That means that individual platoons are in position and engage the enemy and the others pull back to the next hull-down position (driving in reverse if under enemy fire).

Combat engineers prevent speedy pursuit by enemy motorized forces by laying obstacles on the road network. If the armor formation covers the withdrawal of unarmored forces, then it must repeatedly launch attacks from unexpected directions and with short-term objectives against the pursuing enemy until the vulnerable troop units have separated sufficiently from the enemy. Broad attack formations are the rule.

Breaking off combat against superior enemy armored forces is facilitated if it is possible to provide strong covering fire from a position to the rear, preferably in a position that cannot be negotiated by armor.

Even when pulling back as a unit, the company maintains contact with the enemy through patrols to prevent unobserved flanking. Active reconnaissance on the flanks and timely commitment of forces—mainly attached antitank support and engineers as flank protection—are necessary to prevent encircling maneuver during the pursuit (*überholende Verfolgung*).

If it is not possible to shake off the enemy, the retreating armor formation must take advantage of the terrain and favorable situations to concentrate locally superior forces against individual units of the pursuer.

Artificial smoke eases breaking contact with the enemy and masks the direction of withdrawal.

Contact points with adjacent units (see chapter on the defense) are set up on order on the flanks. Those will be changed if the fighting moves to the rear. To the extent that is possible, the same forces should also occupy the points of contact farther to the rear.

### **COUNTERATTACKS (GEGENANGRIFFE)**

Counterattacks are to be carried out according to the fundamentals of the hasty attack (see above). They always have limited objectives of only a few kilometers. Often they are followed by a withdrawal in a single move. No intermediate objectives are set. The company remains close together. Often a prerequisite for launching a counterattack is when the enemy runs up against a position and bogs down.

### **ISSUING ORDERS (BEFEHLSGEBUNG)**

The operational planning for the delaying action must be as detailed as is necessary, but as flexible as possible. Frequent mistakes are:

- Rigid assignment of rearward positions and
- Detailed advance planning of the sequence to be followed in the withdrawal movements.

During the delaying action it is frequently necessary to depart from the preplanned course of action so as to take advantage of favorable opportunities or to prevent the enemy from developing too great a pressure at one point. The tactical commander evaluates what pieces of terrain offer possibilities for positions, based on continuous map study. He numbers those on the map and assigns them to individual companies for sequential reconnoitering. In closing he gives the order for reconnaissance as part of the explanation of his provisional course of

action. The latter is important so that all of the commanders are clear during the reconnaissance on what grounds a designated position will be selected and what task must be accomplished there.

The reconnaissance, as a rule, progresses away from the enemy. That means that first the positions for the time-phased defense (*zeitliche begrenzte Verteidigung*) are reconnoitered. If time is of the essence, those positions are also occupied before the positions lying farther to the rear can be reconnoitered. Organization in those positions has already been described in the chapter on defense.

Farther to the rear, it is desirable that all of the company commanders get an overview of the entire sector. They also briefly reconnoiter adjacent positions. That facilitates revision of plans that may be called for during ongoing fighting.

After the completion of the reconnaissance, the company commanders report the results, ask final questions and make final recommendations. The battalion commander marks the exact location of the positions and the withdrawal routes on his map and gives the order for the delaying action. The plan is then put into action by the company commanders. In the event that the enemy begins to attack, the company commander sends the company headquarters section leaders to do the reconnaissance. The leaders return and report the results or receive the withdrawing company in the next position. After briefing them, they then drive to the next position. That procedure presumes unbroken radio communication. In the event that positions have to be occupied in the course of the fighting that were not reconnoitered, the company assembles behind them under cover. The leaders briefly dismount and are briefed where there is a view of the field of fire. If there is no time for that—because the enemy is pressing hard—the company commander briefs his platoons by radio and gives a short order for the fight from the respective position.

If obstacles have been prepared farther to the rear, individual platoons can be assigned as demolition guards (*Sprengsicherungskommandos*). They guard passages through the obstacles or crossings that have been prepared for demolition and secure them until their own troops have passed. Mines for closing the gaps or detonation devices are taken from the withdrawing engineers so that the obstacles can be activated at the right time before the enemy approaches. If it is expected that further counterat-

tacks will be conducted in the delaying zone, patrols can also be ordered to remain behind, allow the enemy to pass and then report the results of their reconnaissance from concealed positions by radio.

## COMBAT SUPPORT AND LOGISTICS

The most important component of combat support in the delaying action is the self-propelled artillery that has reconnoitered several firing position areas in depth. During the withdrawal of the howitzers, usually 50 percent of them move, while the others remain in service. Every company must have at least one forward observer. If there are not enough forward observers, then observer elements from artillery formations that are not yet employed and are already set up for defense well to the rear should be used. Often those forward observers take over the loader's or radio operator's position in the company commander's tank so as to increase their mobility or improve their protection.

Engineers prepare obstacles and bridges and crossings for demolition according to a prioritized plan while working from the front to the rear. Other elements must support them with vehicles for transportation of obstacle materials. That is also true for logistics elements. Often, in the delaying action, advantage is taken of possibilities for stockpiling supplies in advance where they will be available during the withdrawal.

It is difficult to plan ahead to recover inoperable vehicles and the wounded. Both of those must take place rapidly, since the enemy usually follows closely. Recovery teams and medical troops are, therefore, distributed throughout the combat sector. As in the attack, maximum use should be made of evacuation of the wounded by air.

## COMMAND AND CONTROL

The delaying action is not conducted below the battalion level, since an array of reinforcements (artillery, engineers, anti-aircraft etc.) must be attached. The tank company fights within the framework of the battalion in which it either:

- Defends a position,
- Conducts a fighting withdrawal or withdraws in a bound or
- Conducts an attack within a limited objective

In contrast to the defense, the tank company must frequently fight without mutual support from other companies. In spite of the fact that the battal-



Dense vegetation provides concealment to tanks, but it also severely limits their effective fighting range and makes them easier targets for infantry. This photograph of an early-model Panther from an unidentified SS unit was taken near Tilly (France) in 1944.

ion covers unit gaps, the company commander carries out local zone reconnaissance into the open flanks. Defense in positions or attacks with limited objectives are carried out according to their respective fundamental rules. The company commander takes advantage of favorable opportunities for a counterassault (*Gegenstoß*) without waiting for orders. In doing so he must avoid becoming mixed in with the enemy. A withdrawal to the next position requires permission from the battalion commander, since he has to assure the cohesion of the operation. The individual company frequently lacks the overall perspective to be able to judge whether a withdrawal is necessary or useful. A premature withdrawal can evoke critical situations for others. Road networks take priority for a withdrawal, since cross-country movements normally take more time.

Having dealt with the main types of combat I would like to describe combat missions which are

commonly conducted in any situation during combat regardless of the overall category of combat.

#### **PASSAGE OF LINES (AUFNAHME)**

The passage of lines of the delaying formation at the end of the operation is an especially critical moment. If possible, a special, so-called covering force (*Aufnahmetruppe*) under unified command should be ordered in front of friendly positions. The covering force should:

- Cover and support the withdrawal,
- Repulse pursuing enemy and
- Hold open crossings, passages and narrows

The covering force uses the same radio net as the troops that are delaying.

Specific routes are set up for the withdrawing troops from which they should not deviate, if possible. Agreed on recognition signals are set up in the direction of friendly lines (such as flares at night).

Individual liaison officers (such as the leader of the company headquarters troop) or patrols establish contact with the covering force in a timely manner. On approaching their own troops, the tanks identify themselves and move directly to the rear to the assigned area, without stopping. If the enemy pursues closely, the covering force assumes command and the withdrawing tanks turn around and take up the fight from suitable positions. If the enemy has been repulsed, the passage of lines is immediately continued.

To aid in coordination, a passage line (Aufnahmelinie) can be set up along a clearly recognizable

terrain feature. That feature must be within the field of fire of friendly weapons. The covering force opens fire on the pursuing enemy—by surprise, if possible. The firefight must be conducted so as to separate the enemy from the troops that are being passed and prevent mixing together during the passage.

During the passage of lines, the company commander remains with the last of the withdrawing units. He reports the completion of the passage of lines for his forces to the battalion.



The route to the hide position has to be kept passable all the time. Swampy sections have to be reinforced. If not, the vehicle runs the risk of bogging down. KARL-HEINZ MÜNCH





Dispositions along side slopes and on reverse slopes are also suitable. KARL HEINZ MÜNCH



Individual tanks provide security for the hide position and are ready to open fire immediately. HAGELÜCKEN



If concealment is available, positions at the rim or on the reverse slope of a hill are suitable, since they are more difficult for artillery to combat.



The Igel, or hedgehog, is an all-round defense employed for a limited time. It was formed, for example, after capturing an attack objective. HÄGELÜCKEN



When it finally comes to driving into position and opening fire, the targets are to be destroyed in rapid succession, followed by a prompt change of position.

## CHAPTER 3

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# *Unit Movements (Der Marsch)*

**T**he march serves to bring the unit in a complete and orderly fashion to the next operational area. Due to the mechanical strain placed on the tanks, movements over long distances should be made by rail, if possible (according to regulations, more than 150 kilometers).

Tracked vehicles on improved road networks move at 20 kilometers an hour by day and 12 kilometers an hour by night. Tigers averaged about 10–15 kilometers an hour by day and 7–10 kilometers an hour by night. Tracked and wheeled vehicles should always be separated. That spares the equipment and makes it easier to maintain the flow of the march movements.

Those vehicles required for command and control, communications, repairs and medical service remain with the tracked vehicles. Additionally, the necessary fuel and supply vehicles of the combat trains and a portion of the recovery platoon (Bergezug) of the maintenance company (Werkstatkompanie) also accompany the tracked vehicles.

If the battalion forms one march serial (Marschgruppe) within a regimental or larger formation, then the commander is responsible for the speed and uniformity of the march movement and for freeing up of the road network in the time given to him in his orders. He directs halts and rests with security and camouflage and arranges the refueling and resupply of the march serial.

If the march serial moves separately on a route, then it may also have the responsibility for reconnaissance, security and marking of the march route.

Whenever the formation makes a halt, the units conceal themselves and maintain a readiness posture high enough so that the march can be renewed in the shortest possible time.

Attached engineers are placed far forward in the organization so that they can rapidly remove potential obstacles.

Communications during the march are maintained within the formation by motorcycle messengers (Kradmelder). Radio silence is only broken when in contact with the enemy.

If antiaircraft units are attached, their pre-planned commitment at locations which are possibly targeted, such as bridges and narrow stretches, is ensured.

### **ADVANCE GUARD (VORHUT) AND LEAD COMPANY (SPITZENKOMPANIE)**

It cannot always be assumed that the movement will take place without enemy interference. In such cases, combat forces are sent ahead with the mission to secure the pace of the march even in the event of enemy contact. That force is called the advance guard (Vorhut).

If a larger formation serves as an advance guard, a leading company (Spitzenkompanie) serves as an advance guard support. It is located about fifteen minutes ahead of the column. The lead company is always reinforced with attached engineers. Frequently it also has Panzergrenadiere and elements of the reconnaissance platoon. Supporting artillery on self-propelled mounts are placed toward the cen-



**Road Marches**—the never-ending routine of the troops. Despite appearing to be one of the easiest tasks, road marches always demand methodical preparations and tight organization. VON ROSEN

ter. The higher commander moves with the lead company.

If the battalion marches in a different location in the march column, then the battalion commander generally moves at the head of the battalion. Following him come the command and staff element (*Führungsstaffel*), the tank companies, the combat trains and the remainder of the headquarters company.

The anti-aircraft platoon of the battalion is usually assigned to the combat elements (*Kampfstaffel*) and the wheeled-vehicle elements (*Radfahrzeugstaffel*) to protect them from low-level aerial attacks.

The lead company commits a lead platoon (*Spitzenzug*), which operates like a reconnaissance element (*Spähtrupp*) when it is close to the enemy (see also following chapter on reconnaissance). When it is farther from the enemy it drives at a distinctly higher rate of march and takes occasional halts for listening and observation.

If the point (*Spitze*) runs into the enemy, the enemy is immediately forced back from the march

and reported. If it is not possible to continue the forward momentum, then the lead company takes up positions. The remainder of the formation commits to a meeting engagement (see chapter on offensive operations).

It is often possible—for example, when encountering obstacles—to continue the march after rapid reconnaissance of a detour. In that case the lead company assigns a new point platoon. The former lead platoon remains in contact with the enemy until the trail element passes and then follows at the rear.

#### **THE COMPANY MARCH**

Whenever the company moves by itself, the wheeled vehicles follow the combat elements by bounds. If there is no question of enemy contact, the wheeled element, with the exception of the repair and maintenance group (*Instandsetzungsgruppe*) and the fuel trucks, can be sent ahead to the next march halt.

Whenever the company marches in a battalion march formation, the combat and wheeled elements



of all the companies are generally placed by the battalion in two separate march serials.

The motor vehicle of the company commander, motorcycle messengers, maintenance contact team (I-Gruppe) and the medical troops move with the combat elements.

The company commander moves with the company headquarters element at the head of the company. The trail party consists of the maintenance sergeant moving with a motorcycle messenger and the medic.

If enemy contact is expected and the company marches by itself, one platoon and a motorcycle messenger move ahead as security for the continuity of the march.

Intervals between vehicles are normally 100 meters by day or, in uncertain situations, 50 meters. At night and during limited visibility, it depends on the distance at which the rear blackout-driving lights are visible. During night marches it can be useful to have one man of each crew on the forward outside edge of the track guard to direct the driver by calling to him through the open driver's hatch.

In general, the interval between march columns and march serials is 15 minutes (conditionally less).

### **TERRAIN RECONNAISSANCE (ERKUNDUNG)**

Marches must be reconnoitered. The commander is responsible for arranging the march reconnaissance. He orders the commitment of a reconnaissance parties (Erkundungskommandos) as far ahead of the march time as is possible. They march along the assigned route to the new area.

The reconnaissance leader evaluates the condition of the road network and route. If he learns of possible disadvantageous conditions, he decides whether to reconnoiter and mark a detour or whether a different route of march needs to be reconnoitered. He posts signs along the march route indicating halts and orders the posting of guides. The signs should reveal nothing about the marching formation. The signs are made by the troops. The symbols and colors must make it possible for them to be seen by moving vehicles in sufficient time, for example at points where the route turns off onto another road. Trail parties at the rear of the formation can have the assignment of retrieving the signs. Guides and traffic control points back up the signs at particularly critical orientation points. They are increased during darkness. The

guides either remain on station or leapfrog the column repeatedly, always going ahead to the next place they are needed. As a rule, those parties are made mobile with wheeled vehicles. In situations that are uncertain, however, they also need the security of armored vehicles.

In addition to reconnoitering the route, the reconnaissance party is also usually assigned the job of reconnoitering and marking out the assembly area. If ensuing operations have to be reconnoitered at the same time, then the tactical commanders join the reconnaissance party. The marching troops are then guided in by subordinates.

Usually a reconnaissance party is committed by the battalion. In that case, only one leader with a wheeled vehicle and a motorcycle messenger are needed from each company. The overall commander coordinates the reconnaissance in the new area, in which he rapidly gets an over-view and then assigns separate areas and routes to the units and elements. Those units then reconnoiter and mark out their areas separately. At the same time, the commander is then in a position to reconnoiter places for the command post and security forces. The subordinate commanders who have done the reconnaissance meet, with the results of the reconnaissance captured on sketch maps that are examined, corrected (if need be) and approved by the commander. In closing, the commander directs how the arriving columns are to be smoothly integrated into the new assembly area. To accomplish that it can be useful to pre-plan a point along the march highway at which to link up.

The subordinate commanders who have been engaged in the reconnaissance guide their element leaders to the respective unit place in the area and coordinate setting up security measures.

### **ISSUING ORDERS**

According to Heeres-Dienstvorschrift 470/7, the march order must include the following elements:

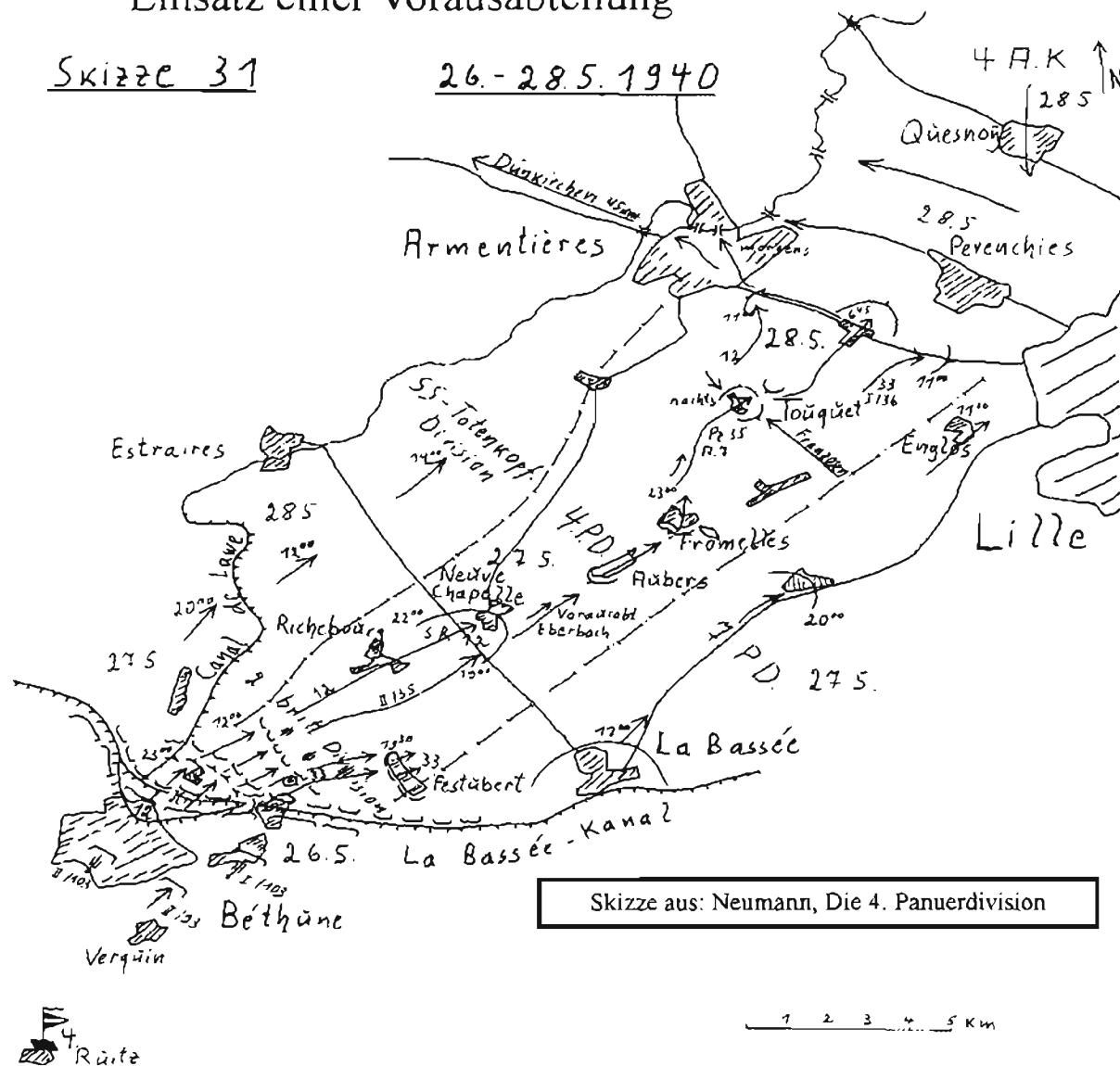
- Enemy situation
- March objective
- March route
- Departure time
- March organization
- Security
- Traffic control
- Special coordinating instructions (fuel and ration resupply, level of vehicular illumina-



## Einsatz einer Vorausabteilung

Skizze 31

26.-28.5.1940





When the march is far from the enemy, the company commander generally takes the lead in his wheeled vehicle. The tanks follow in the numerical sequence of their platoon numbers. VON ROSEN

tion, radio instructions, combat preparedness, measures for facilitation of the march etc.)

- Halts and rests
- Disposition of vehicles remaining behind and
- The commander's place in the column

#### COMMAND AND CONTROL

Marches call for painstaking preparation. Therefore, warning orders should be issued as early as possible so that the crews can complete all the work in a timely manner (checking over and stowing away equipment, removal of signs and of camouflage that interferes with movement, completion of logistical measures, putting on march camouflage and preparation of strip maps for the crews who do not have maps). Starting up engines must be coordinated in advance (for example, from the rear to the front), so that an engine can be started with outside means if necessary. Since the march has to start

punctually along the ordered march route, the vehicles move from their positions and form up along the departure route well before the departure time. All tank commanders maintain contact with the commander in front of them. In woods it may be necessary to reduce the intervals on curves to maintain contact. A lengthy delay on the approach march routes should be avoided, however, so as to reduce danger from aerial attacks and for reasons of noise discipline.

Strict radio silence governs the march so as not to betray the movement to enemy signals intelligence. The commanders give necessary commands with flag, hand or light signals. Each vehicle commander is responsible for immediately passing on signals he receives to the next vehicle. Vehicles equipped with radios must maintain a listening watch so that command can be exerted without delay (for example, if enemy contact occurs). During the march, all vehicles keep watch over their assigned observation sectors.



Whenever possible, maintenance halts were frequently called (about every 30 to 60 minutes), particularly to check the running gear for damage. Because of the limited driving range of the vehicles, these halts are also used to refuel.

### HALTS AND RESTS

Halts and rests should be chosen so that the march route is kept clear. Depending on the terrain, halts must be instituted for the well-being of vehicles and crews. The first halt must occur no later than one hour of marching. In general, halts for rests, rations and refueling are planned for every 3 to 4 hours.

The Tiger required more frequent maintenance halts. The first was intended to be after 5 kilometers, followed by additional halts every 10–15 kilometers. During the maintenance halt and rest stops, the crews check over the running gear and the engine, calling on the armored vehicle mechanic (Panzerwart) as needed, and carry out minor repairs and maintenance.

During halts, the road network must be kept open for other vehicles. Therefore the column should pull over to the right or drive under the trees on both sides of the highway—to take advantage of camouflage offered by vegetation—so the march can be resumed without delay. Normally, the road

network is left for rests and a nearby rest area occupied. Contact must be maintained with the road network (for example, through motorcycle messenger).

During halts each of the tanks provides local security with one guard either on the vehicle or dismounted. Platoon and company commanders designate aircraft spotters.

Crews inspect the condition of their vehicles, particularly the running gear. Defects or deficiencies that threaten continuation of the march are reported immediately. Oil, coolant and fuel levels are checked and, if necessary, replenished. All tank commanders communicate with their element leader, reporting the level of fuel, any incidents, their security measures and the conclusion of technical work and inspections.

### DEALING WITH BREAKDOWNS

If a vehicle breaks down, it drives to the right shoulder of the road or, better yet, drives off the road and under cover. The commander gives the “breakdown signal” to the commander of the tank that follows. That commander notes the location of the breakdown or enters it on his map and reports it to the platoon leader or company commander at the next halt. All tanks continue their march without interruption. If the disabled tank blocks the route of the march it is towed or pushed to the side of the road. The crew of the disabled vehicle camouflages the vehicle, displays the break-down flag and sets up security in all directions. The maintenance sergeant at the rear stops at the disabled vehicle, determines the cause of the problem and directs either recovery or repair. If repair is successful, then the tank joins up behind the next march column and carries on with the march. It then regains its proper place in its own column at the next halt. The position of the missing tank is kept open for it so that it can



In the combat zone, units following farther to the rear also carry out their movements according to the basics of the march. A high degree of combat readiness is required when the march leads through hostile territory. These vehicles are from the 2. SS-Panzer-Grenadier-Division "Das Reich" during the fighting for Kharkov. WEIDINGER

rejoin. If the disabled vehicle requires a tow, the towing party cannot interfere with the continuity of the entire march movement. It must allow the march column to pass unimpeded.

### MARCH DISCIPLINE

As a rule, the companies (with attached units) move together in a march unit. The company commander determines the sequence in the march. All vehicle crews must maintain good march discipline. Maintaining interval is of primary importance. It is detrimental to any march movement if individual vehicles fall behind without reason and then increase speed to catch up. As a result, the vehicles that are behind fear losing contact and also increase their speed. That leads to a so-called "accordion effect". Some vehicles drive too close to each other, others stay back, and the column loses its cohesion. As a rule, slower vehicles are placed forward in the column. During the march there are times when stoppages are unavoidable (for example, at tight curves, narrow places and steep climbs). If that leads to an increase in the interval to the vehicle

ahead, the gap should not be closed with major increase in speed, but with a slight increase that results in gradually drawing closer to the vehicle ahead. One thing is certain: By driving slightly faster all the vehicles can regain contact.

The march unit commander himself calculates the time required for the march after evaluating the march order. He enters arrival times at obvious terrain features on the map and is then in a situation to use those features and times to control the accuracy of his column's timing on the march. If he determines there has been a delay or too early an arrival at any of the control points, he can easily correct the pace with a moderate increase or decrease in speed. Because delays in the march are more probable, the experienced march unit commander accordingly selects a somewhat higher driving speed than the designated march speed.

No matter what disturbance may occur in the column, it cannot under any circumstances interfere with the orderly execution of the march by other march units. If, therefore, one column (or a part of it) slips out of the schedule of the march, it

cannot delay other columns by trying to regain its place in the march or by blocking narrow stretches, intersections etc.

### MARCH MOVEMENTS WHICH CROSS WATER

A high measure of coordination is called for when crossing water if military bridges or fords are used, even more so when ferries are employed. Normal road march management is not used in these situations. Since military bridges generally call for a greater interval between vehicles and a lower driving speed, and often only permit one-way traffic, it is unavoidable that the columns will be jammed up. The situation calls for a special form of command organization. A crossing area (Gewässerzone) is set

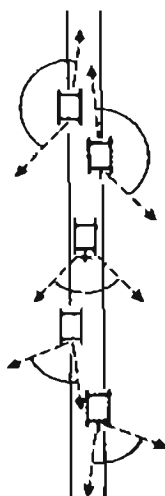
up under unified command (for example, under the commander of the engineers which operate the ferry). All vehicle operators have to obey the crossing area commander.

Such a crossing area must begin far enough from the water so that a column which is not yet prepared can have its individual vehicles assemble and wait (if possible, with concealment from aerial observation). Signs mark the start of such a zone. Traffic control posts immediately take in approaching vehicles. They have wire communication to the crossing and direct all driving into the crossing area. The march column commander (or his representative) drives ahead in advance of his unit. For such assignments he always has a motorcycle messenger or a wheeled vehicle with him. He establishes contact with the traffic control post and is shown the holding area. The approach is marked. He drives back to receive the approaching column. He drives at its point into the holding area. The vehicles draw up, prepared for immediate resumption of the march. At the end of the holding area there is a call-up post which orders vehicles to drive on when the water crossing is ready for them. When a ferry is employed, the call-up is in batches that are appropriate to the carrying capacity of the ferry. At the water crossing itself there are signs indicating vehicle intervals and driving speeds. Crews stay in their vehicles after driving onto the ferries. Antiaircraft weapons are manned.

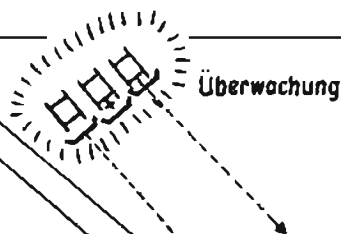
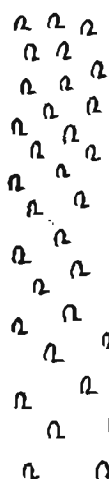
On the far bank, the analogous procedure is repeated. Only closed-up columns resume the march. At first, the point vehicles continue to maintain the driving speed that was ordered on the bridge. The motorcycle messenger at the bridge waits until the last vehicle has passed, then overtakes the column and reports to the column commander. An alternate possibility is to have a traffic control post at the exit from the crossing area. The post then reports the crossing by wire to the commander. Only then is the designated march speed resumed.

#### Actions of a Lead Platoon

**1. Phase:**  
Advancing in open terrain  
while observing to all sides



**2. Phase:**  
Advancing against a village



Dorf X





If ambushes threaten the march column, individual tanks are assigned as convoy protection. KARL-HEINZ MÜNCH

In the case of a ferry crossing or there is oncoming traffic, a holding area is also used on the far side. The vehicles wait there until all have closed up or until the lead column is assembled in order. An analogous procedure takes place if tanks have to cross water at a ford that requires "deep wading." All necessary technical preparations are completed in the holding area—caulking, setting up air-tubes etc.—and then removed on the far bank.

#### ACTIONS ON CONTACT

Crews must maintain constant combat readiness during the march. It must be possible to react immediately to any kind of interference or obstruction. If the march column runs into enemy armor or antitank guns, the tanks that have made contact open fire immediately. The following tanks immediately take positions alongside the march route. The commander personally gains an overview of the situation as rapidly as possible and commits uncommitted tank platoons to a flanking movement (*ausholender Angriff*), so as to force the enemy away from the roadway. Tanks that are in contact

with the enemy pull back as far as may be necessary to gain better positions. However they always maintain contact with the enemy to keep him pinned. In that situation the highest priority is the immediate reporting to the column following. Under no circumstances does it continue forward. Instead, it draws up under cover. Their leaders maintain permanent contact to the front. If the lead elements are unable to destroy the enemy in a few minutes, the march ends and the march column begins its mission according to the fundamentals of the hasty attack (*Sofortangriff*) (see the section on the meeting engagement).

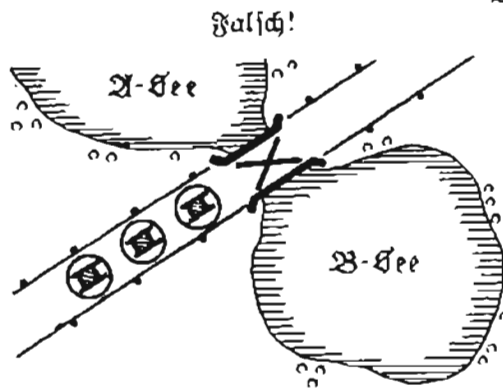
If the column is attacked by inferior forces or snipers, then the march is carried on with increased speed. That also holds true, as a rule, for attack from the air, since moving vehicles are considerably harder to hit.

An extremely dangerous situation arises if the column is ambushed. Often the lead vehicle runs into an obstacle or is disabled by gunfire and easy withdrawal into open country is complicated (e.g., by thick woods, roadside ditches and mines etc.)

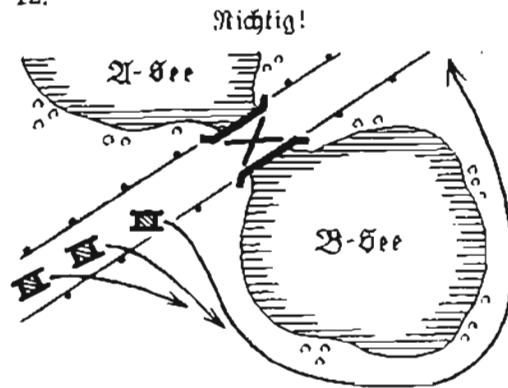


## Umgehen von Hindernissen

Bild 12.

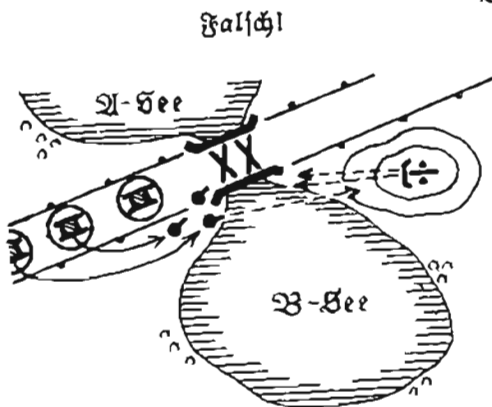


Vor dem zerstörten Übergang einer Seenge-  
enge tatenlos stehenzubleiben.

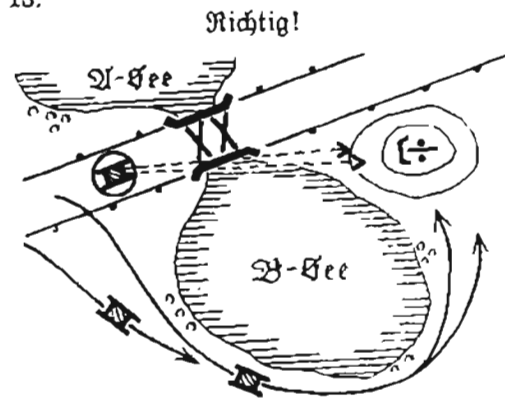


Die Zerstörung zu melden und sofort eine  
Erfundung einzuleiten, um einen Weiter-  
marsch zu ermöglichen.

Bild 13.



Zu versuchen, die gesperrte und durch  
M.G. gesicherte Sperrung frontal durch  
ausgebootete Besatzung anzugreifen.



Durch eine Gruppe Pz.Apfw. Feuerbeschuss  
geben lassen, um mit den anderen das  
Gewässer zu umfahren und die Sicherung  
zu vernichten.

Skizzen aus: Kauffmann, Panzerkampfwagenbuch

## BYPASSING OBSTACLES

**Top left:** False! Remain stationary and inactive in front of the destroyed crossing over a narrows between two lakes.

**Top right:** Correct! Report the obstacle and immediately initiate reconnaissance to enable the march to continue.

**Bottom left:** False! Attempt to attack the MG-covered obstacle from the front with dismounted crew members.

**Bottom right:** Correct! Leave one section of tanks to provide covering fire while the other drives around the body of water and destroys the enemy covering the obstacle.

Sketch from: Kauffmann, Panzerkampfwagenbuch.



Obviously it is easier to carry out a cross-country march since the situation does not ordinarily include traffic jams and most obstacles can easily be bypassed. This picture was taken in 1941 in the Minsk area. KONIG

while the enemy opens fire simultaneously from several directions. In such cases a rapid and ruthless reaction is called for. All available weapons must fire at their maximum rate. Sub-element leaders have to make their own evaluations of the terrain and decide, within seconds, in what direction to move out of the ambush. In so doing, trees, buildings and other obstacles are overrun. Disabled vehicles and casualties must be disregarded for the time being. Survival is the first priority. The tanks and soldiers who escape the ambush assemble, organize themselves rapidly into assault troops (*Stoßtrupps*) and immediately attack the enemy. That is a faster way of breaking up an ambush than remaining in close combat (*Nahkampf*). Depending on the enemy situation, it may be necessary to move to the rear and institute additional security measures.

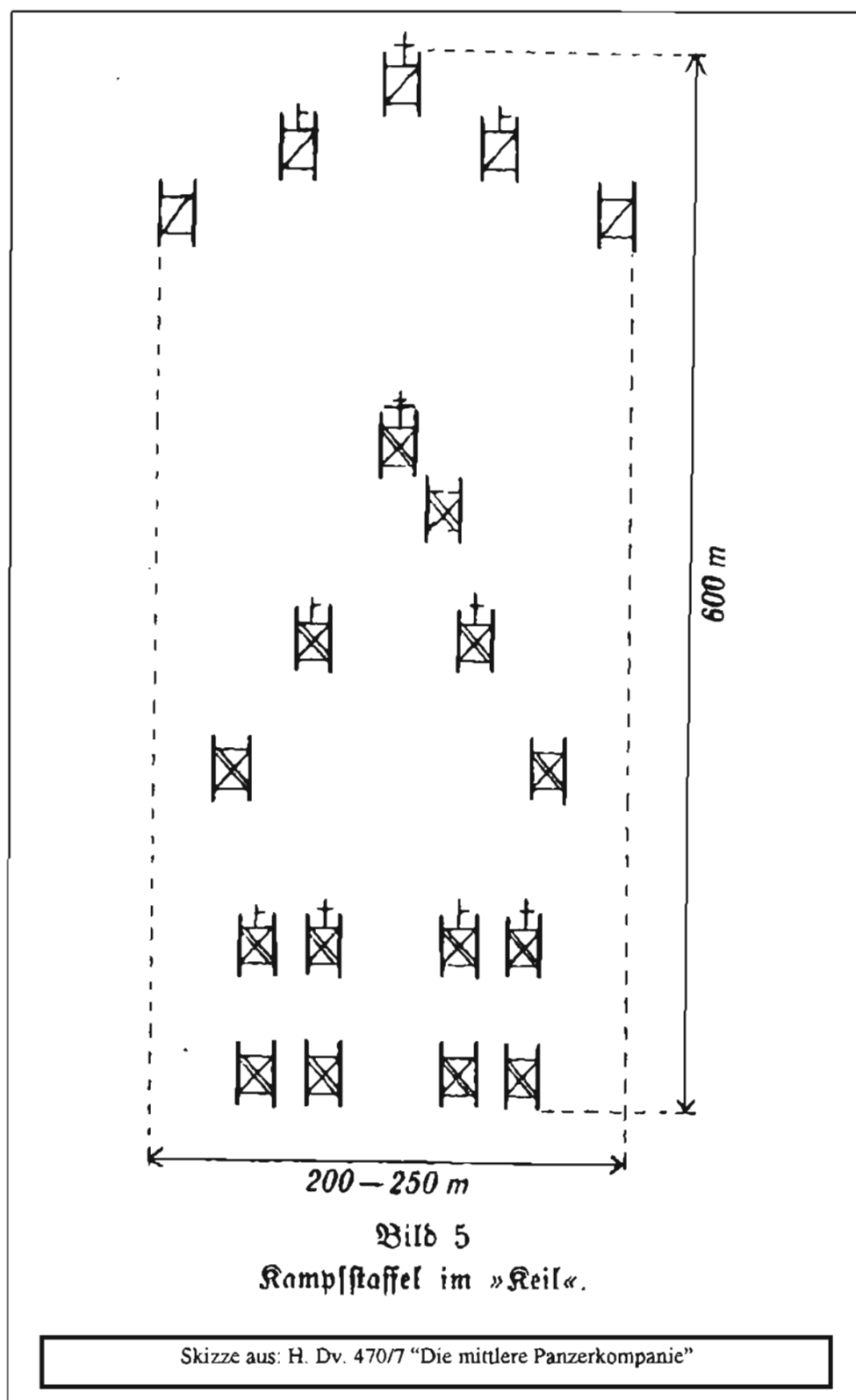
#### **EMPLOYMENT OF A REAR GUARD (NACHHUT)**

When there is danger of attack by the enemy from the rear, a rear guard (*Nachhut*) is employed in either platoon or company strength. The rear guard

follows the last march column at a sufficient distance so that the latter is in no danger from direct fire. In leapfrog fashion elements of the rear guard occupy positions in suitable terrain while the other elements push ahead at increased speed along the route to the next position. If the enemy pursues, it may be necessary for the rear guard to launch counterattacks with limited objectives so as to bring the enemy to a halt. Mixing with the enemy units must be avoided during the counterattacks. The use of obstacles—such as mines, tree barricades, demolitions etc.—is also effective. The rear guard makes continuous situation reports on the radio. To provide radio security, the commander gives no acknowledgement of receipt of traffic.

#### **TRANSFER TO RAIL TRANSPORT**

Road marches over long distances are extremely hard on the equipment. The armored formation arrives at the march objective with its equipment mechanically worn out. It immediately needs considerable time for repair and maintenance before it is again combat ready. Rail transport over long dis-



COMBAT ELEMENTS (KAMPFSTAFFEL) IN A WEDGE (KEIL)

Sketch from *Heeresdienstvorschrift 470/7 "Die mittlere Panzerkompanie"*

tances is also faster than a road march for tracked vehicles. For those reasons, movements from one sector of the front to another are made by rail. Shorter distances are also frequently covered by rail (from about 50 kilometers and up).

Rail movements require pre-planning, both by the troops being moved and also by the higher headquarters. That kind of transport is, as a rule, arranged by the higher headquarters. The higher headquarters also prescribes the time frames. The unit reports what transport assets are required and whatever special equipment will be needed (for example, rail-transportation tracks for the Tiger). Loading equipment—e.g., tie-down chains, loading ramps, spars and the like—are carried on the railroad cars. Wooden chock blocks are produced by the troops or carried in the field trains.

If possible, entraining and detraining railheads should be reconnoitered along with nearby assembly areas. If possible, those should be camouflaged against aerial observation. Entraining and detraining should only take place in darkness for reasons of concealment. If possible, approach and departure routes should be along highways that are protected from air attack. The unit is brought to the

railhead in small groups from the assembly areas, but only when the loading will actually take place. The loading and unloading times must be kept down to the absolute minimum. For reasons of camouflage, it can also be practical to do the loading and unloading on an open stretch of track. In that case, makeshift wooden loading ramps are used. Bales of straw are also suitable for unloading.

Calmness and concentration govern the actual loading and unloading. The tank commanders of each vehicle personally guide their vehicle drivers onto the flat car and supervise the securing of the vehicle on it. Extreme caution is needed regarding live overhead wires. Nobody may remain on top of the turret. Antennas must be removed ahead of time.

During the movement, the vehicle tie-downs must be inspected at halts. During winter movements the tanks must be carefully secured and covered with tarpaulins and/or straw. Openings for weapons and optics are closed or, as an expedient, covered with rags. Those measures are also appropriate for sea transport. There the tanks must also be protected against maritime corrosion by use of oil and grease.



When larger bodies of troops are on the move across country, several columns can move alongside each other. This photograph was taken in France in 1940.  
KÖNIG



Another example of march serials moving in multiple columns. KÖNIG



Vehicles with breakdowns, such as the Panzer IV with damaged steering brakes in this picture, are not allowed to block the march route. The trail officer at the end of the march column stops at the damaged tank, determines the cause of the breakdown and takes additional action.  
KARL HEINZ MÜNCH

Motorcycle messengers are important means of communication, since radio use is banned for reasons of operational security.



Of less vital concern to combat readiness was the carrying of additional equipment, such as fuel containers on the rear deck of the tank . . .

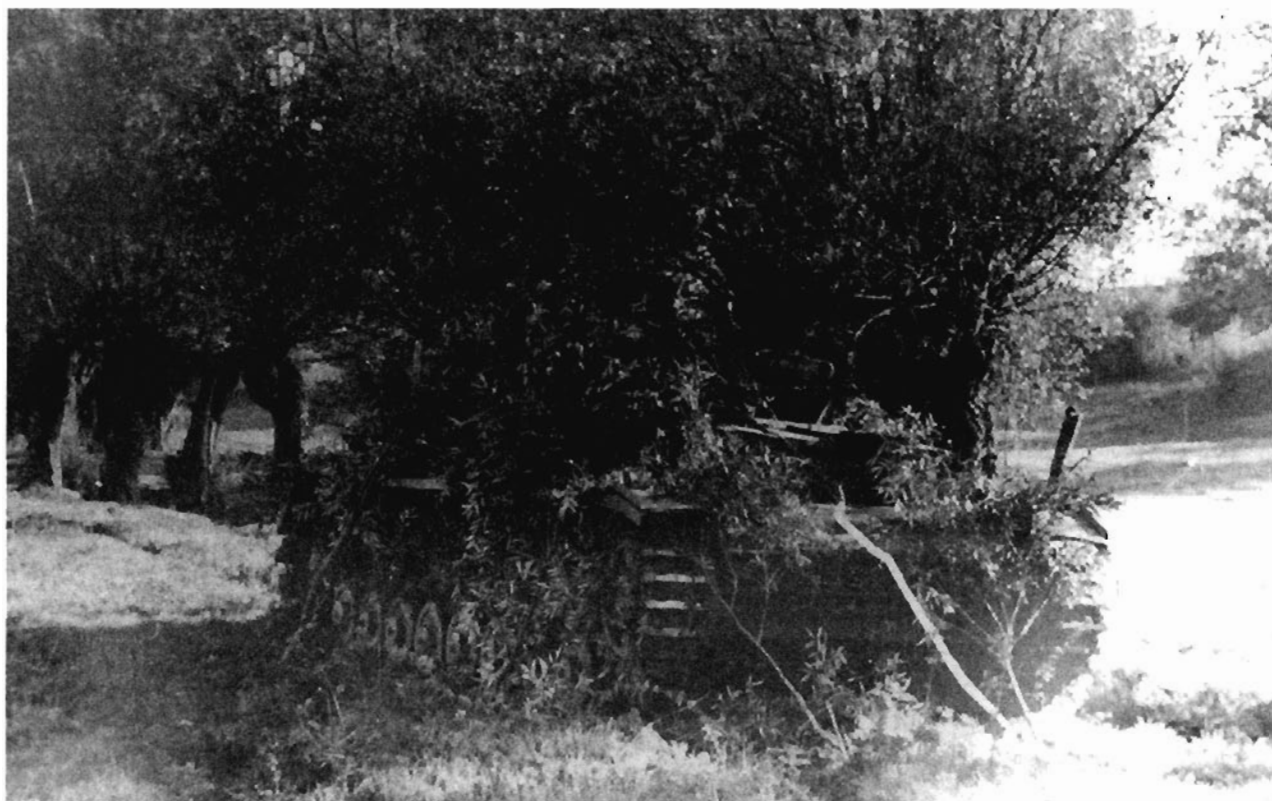


. . . or even bales of straw for building quarters. On the other hand, these measures often improved crew morale, since it was never known when the supply trains might catch up with the forward elements.

KARL-HEINZ MÜNCH







KARL HEINZ MUNCH



Moving under acute threat from enemy aircraft is particularly difficult. At every halt, without exception, the tanks have to drive off the sides of the road or use whatever possibilities were available for concealment. In the autumn or winter time, this was particularly difficult. The Panthers are shown during the fighting for Küstrin in March 1945.



In the Second World War, the limited driving range of the predominantly gasoline-fueled tanks was a particular problem. The practice of carrying additional cans of fuel on the rear deck or roof of the turret was risky but frequently necessary.



Wheeled vehicles are frequently particularly at risk since they are totally unprotected by armor and possess only limited cross country capabilities when off the road. If at all possible, they post permanent aircraft spotters.



Small trailers with two 200-liter barrels offered a practical solution. Fuel could be taken from them during the march. They could be easily unhitched just before entering combat, allowing the tank to enter action with full fuel tanks.



KARL-HEINZ MÜNCH

Everything became more difficult at obstacles. If the roads are mined, railroad rights of way are often used for movements of tracked vehicles. If the tracks are covered with planks (at bridges, for example), wheeled vehicles can also use them.





VON ROSEN



KÖNIG

Bridges are critical, since they need adequate load-bearing capacity. Thanks to efficient reconnaissance, the Wehrmacht had maps available showing the suitability of transportation routes in most of the European countries. Those maps included bridge capacities. If one could not otherwise rely on corresponding identification, it usually depended on the "knowing glance" of the scout . . . or the faith in God of the tank crew. Driving a 50-ton tank over a class-20 bridge is decidedly ticklish!

Again and again, whether in attack or withdrawal, military bridges or other crossings are used. Congestion of vehicles, as in this picture, are unavoidable. KÖNIC



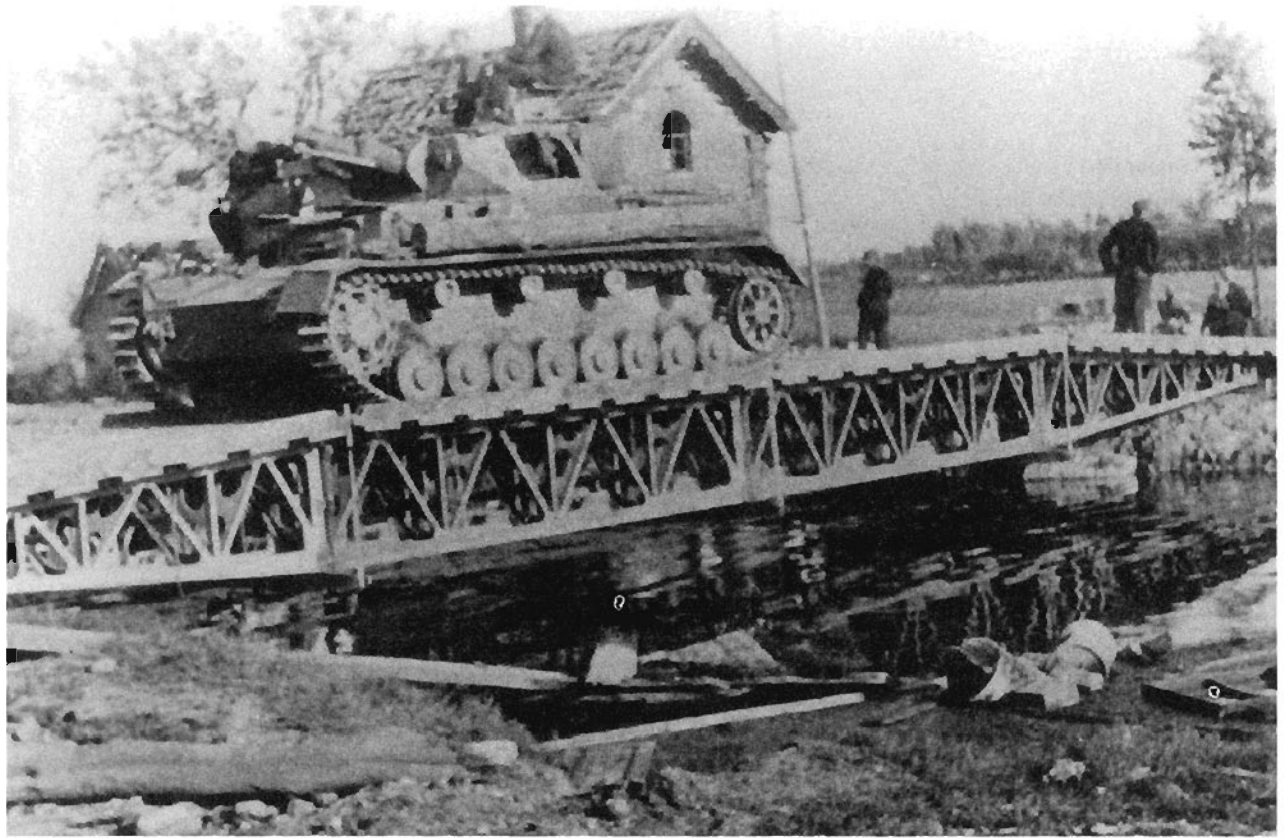
With a tightly run organization in the crossing zone—as shown here at the ferry crossing of the Meuse in May 1940—only a few vehicles are allowed in the immediate area of the river banks at the crossing site. KÖNIC



The crossing points for ferry traffic are particularly critical, since they are inviting targets for enemy artillery.





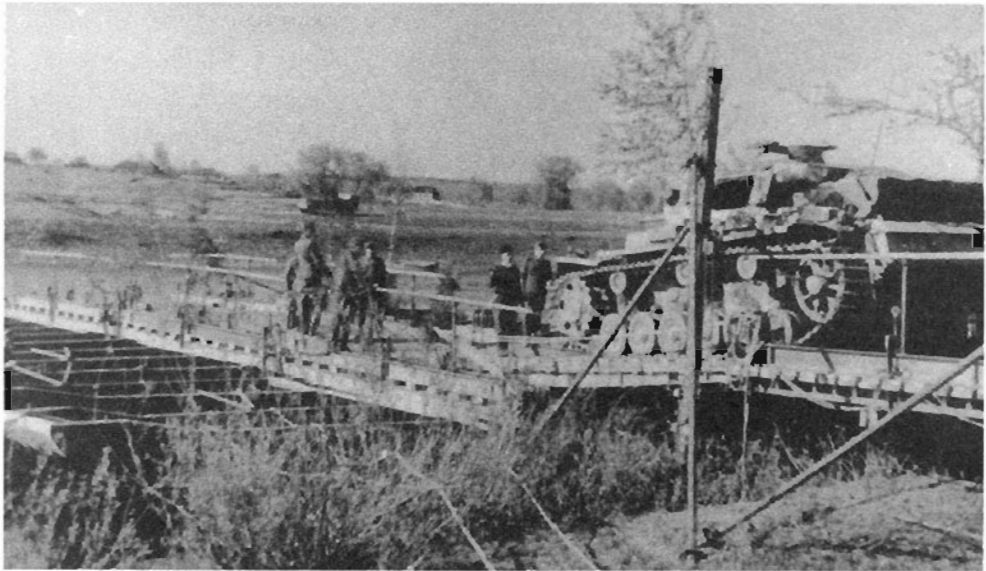


Small water courses and cuts can be crossed with provisional military bridges. They can be brought forward in minutes, particularly when transported on a bridge-laying tank.

Pontoon bridges are in widespread service. Sections that can be linked to each other are laid across pontoons or other boats and fastened together in several segments. The motors of the power boats can match strong river currents. When not in use, or under threat of an attack, pontoon bridges can rapidly be separated, camouflaged, and "parked" up stream.



Flexible ramp segments help reduce the slope to the bridge. The initial approach requires particular attention from the tank driver.



Makeshift bridges are always problematical, since they frequently fail to meet the demands placed upon them.





When crossings are to remain in service for longer periods of time, more permanent structures enter the picture. Engineers need many hours to build these . . . and a lot of wood. The Panzer III above belonged to Panzer-Regiment 5 and was photographed in 1943.



Additional views of field-expedient bridges.





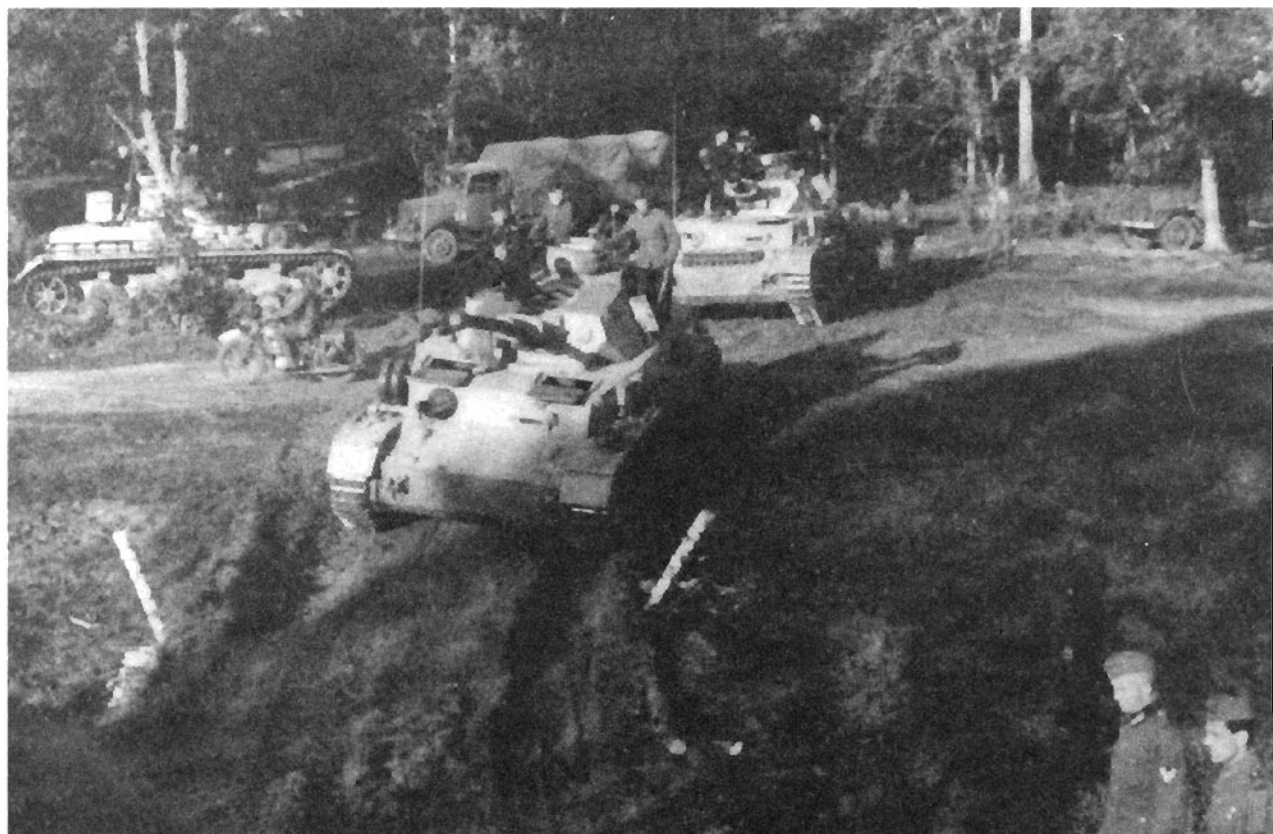
So-called infantry (assault) bridges are generally built next to the tank crossings.



Bodies of water are often crossed by wading, for example at fords. Such crossings require careful scouting. At the very least, a single vehicle would be sent ahead to test the waters. In no case should several tanks be in the water at the same time until the firmness of the river bed is determined. KARL HEINZ MÜNCH

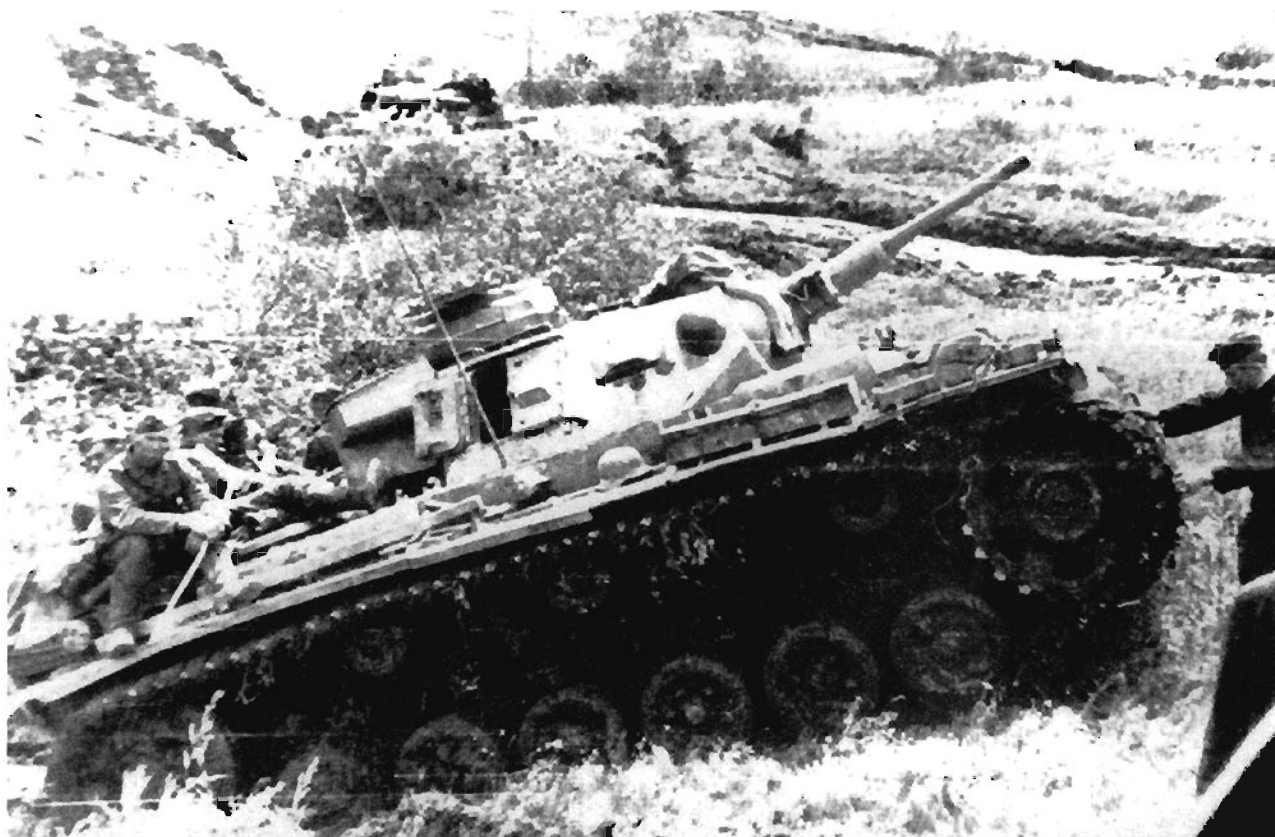


If the carrying capacity of the bridge proves inadequate, then a ford has to be reconnoitered.



Additional views of fording operations. KARL HEINZ MÜNCH





Trenches and creeks are even more common crossings. Frequently these offer no problems, but soft ground conditions hold the hidden danger of getting mired.



Failure in the attempt to cross such critical points is not unusual.



Road marches call for constant reconnaissance, for which purpose they are preceded by traffic control parties. Light wheeled vehicles are particularly suitable for that. KÖNIG



Passage through villages and towns with their narrow streets is always a problem. Sections might also be blocked with wreckage. KÖNIG



Intersections are especially critical. Lack of proper traffic control can lead to hopeless snarls.

Underpasses can also cause problems if the clearance is inadequate. Antennas, anti-aircraft weapons and other items can be sheared off.



Careless driving or driving when overly fatigued could result in fatalities to the crew.



Forced marches without maintenance halts can result in equipment failures due to wear, as in this case where the rubber banding came off several road wheels.







If the vehicle can be put back in service, it closes up at the next halt and again takes up its proper place in the column.



Obviously, serious breakdowns call for recovery! In this case, however, the vehicle may be awaiting evacuation to the rear for overhaul, since it already appears to have been stripped of its tracks and many other vehicle components.



Marches in a cultural setting were particularly popular among the troops. When would one otherwise have a chance to see the Arc de Triomphe in Paris?



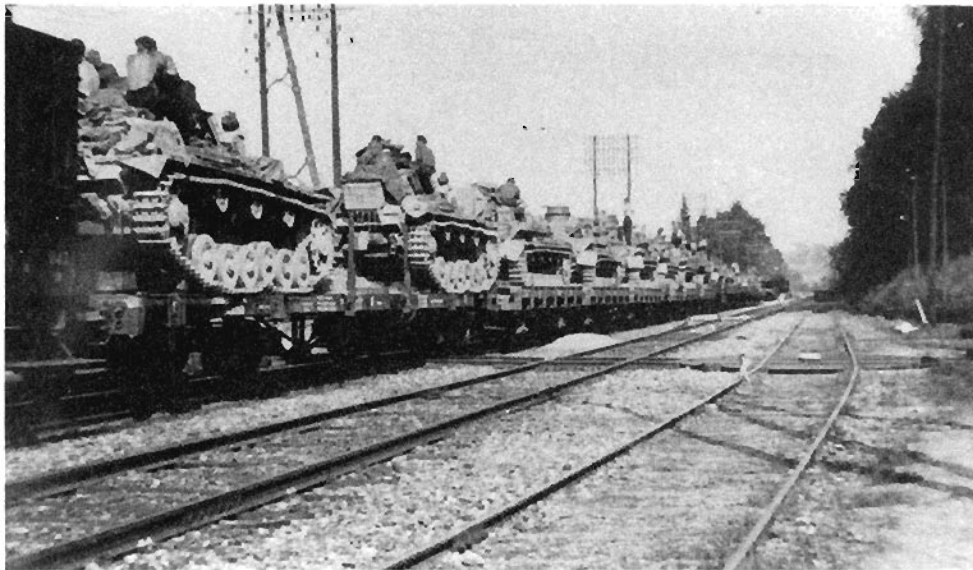
ZIMMERMAN



PANZERTRUPPENSCHULE

On marches, there is always enough to see!





Movement of tanks over longer distances is preferably carried out by rail. Considerable distances can be covered in relatively short times. The vehicles arrive at the intended destination ready for service.

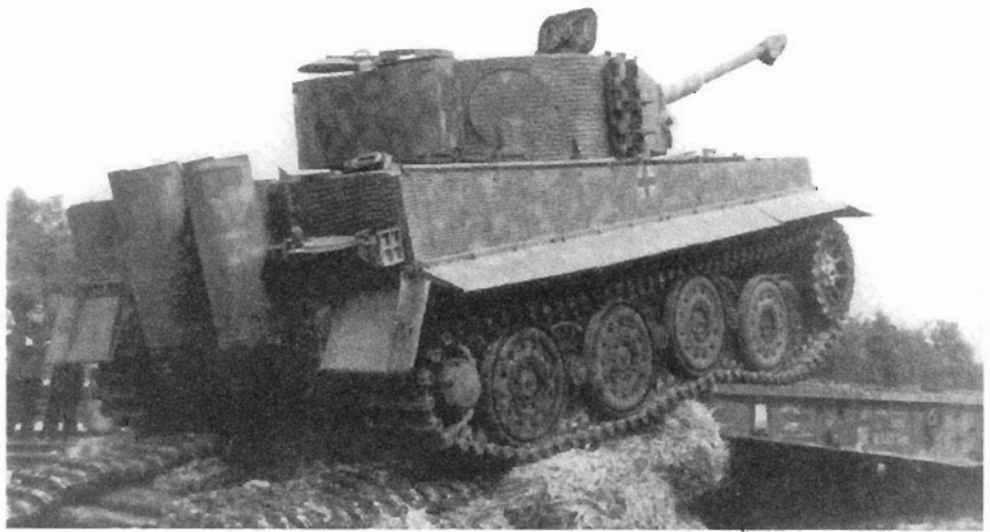


The crews arrive and are directed by the transport commander (as a rule, the company commander).



Loading and unloading is simplest if fixed side or end ramps are available. If all of the flat cars are lined up in a straight line with no curves in the rail line, the tanks can drive onto the cars without major steering movements.

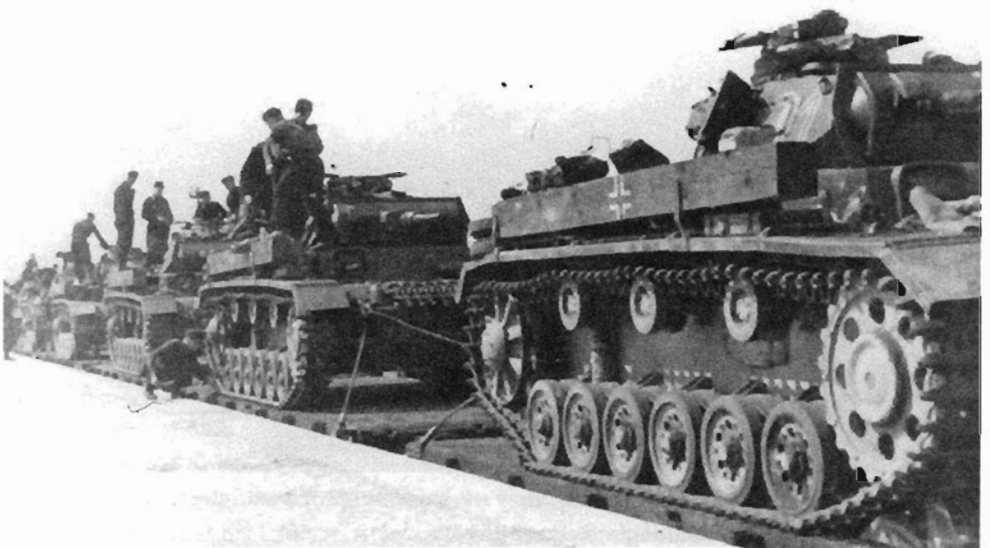
The loading is more difficult if the troops themselves have to build makeshift ramps—with gravel, rock, wood or, as here in the illustration, with tank tracks laid on a mass of straw.



The Lademeister (loading master) is responsible for distributing the load among the railroad cars. Heavy tanks were loaded with no more than one to a car at the most. Light tanks could be loaded with two on a flat car.



The tanks are lashed down with wire rope to their tow hooks. The wire rope is then crossed and tightened.





When tanks were new from the factory, they were accompanied with the basic-issue items packed in wooded boxes. This picture was taken at Fallinghostel training area.

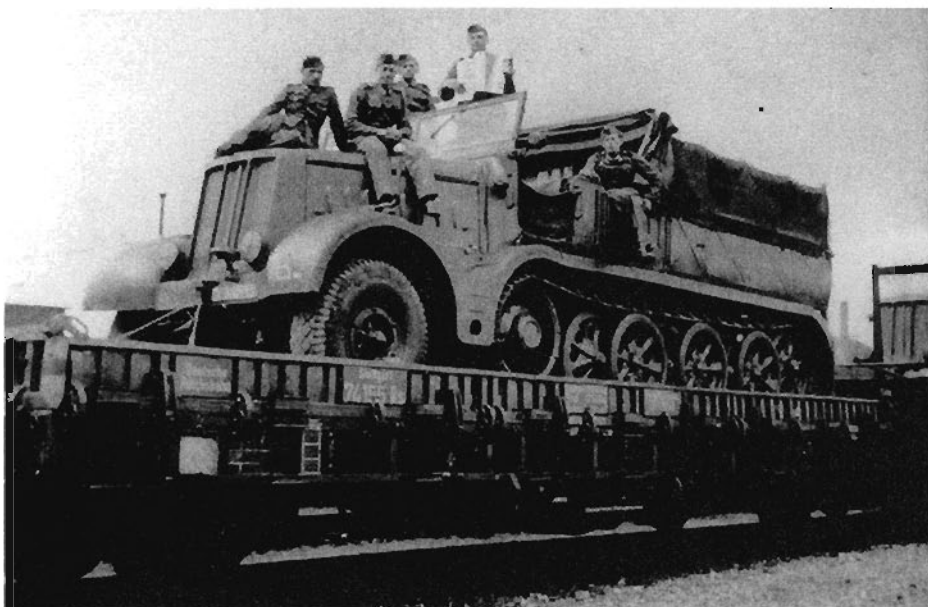


Normal-width tanks were loaded with their normal combat tracks. Tanks that exceeded the standard railroad width (for example, the Panzerkampfwagen Tiger) or tanks with "Ostketten" (winter track extensions) required different treatment. Tanks with tracks which extended over the edge of the rail car prevented traffic in the other direction on parallel tracks. The wide tracks or the track extenders had to be removed. In the case of the Tiger, narrow rail-movement tracks had to be added in addition to removing a row of the outer road wheels. Adequate time had to be allowed in planning for such transport. For short hauls in Russia, these precautions did not have to be met.





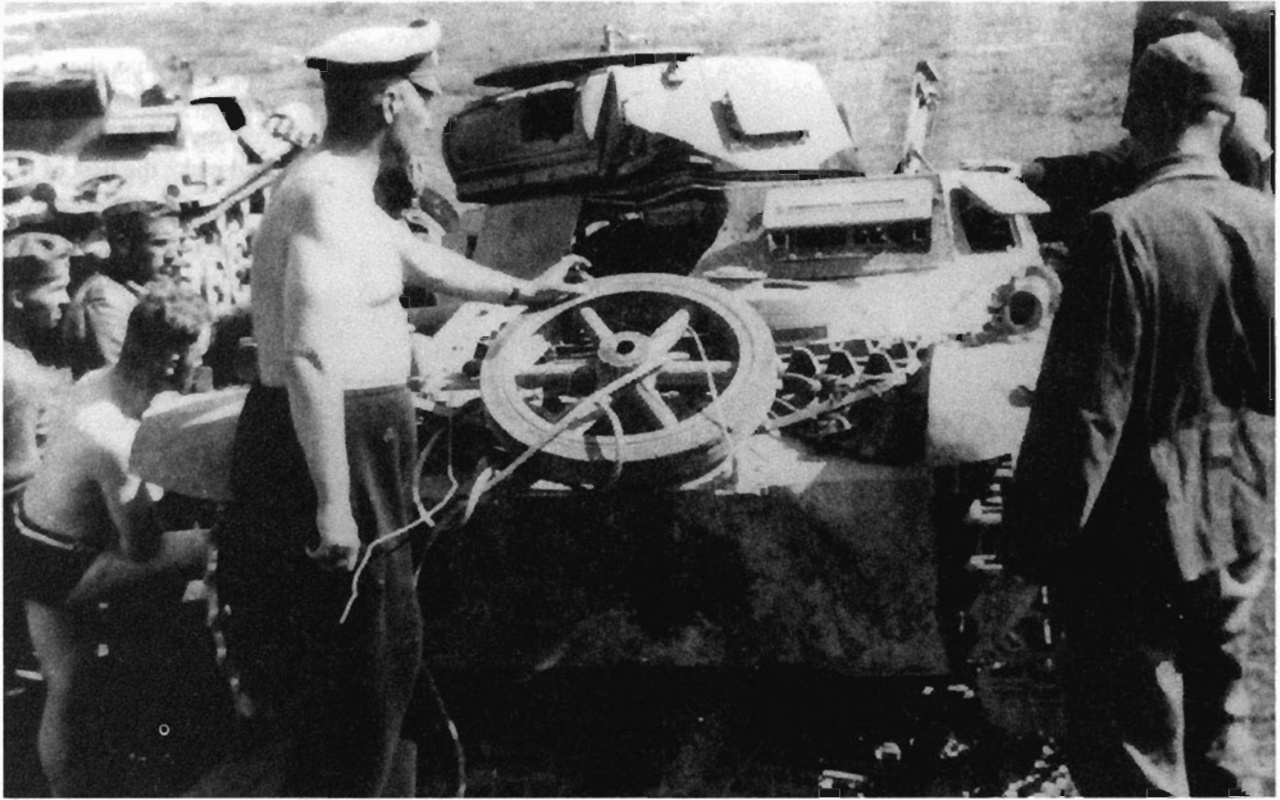
Camouflage against aerial observation and engagement was required under conditions where there was no air superiority or supremacy.



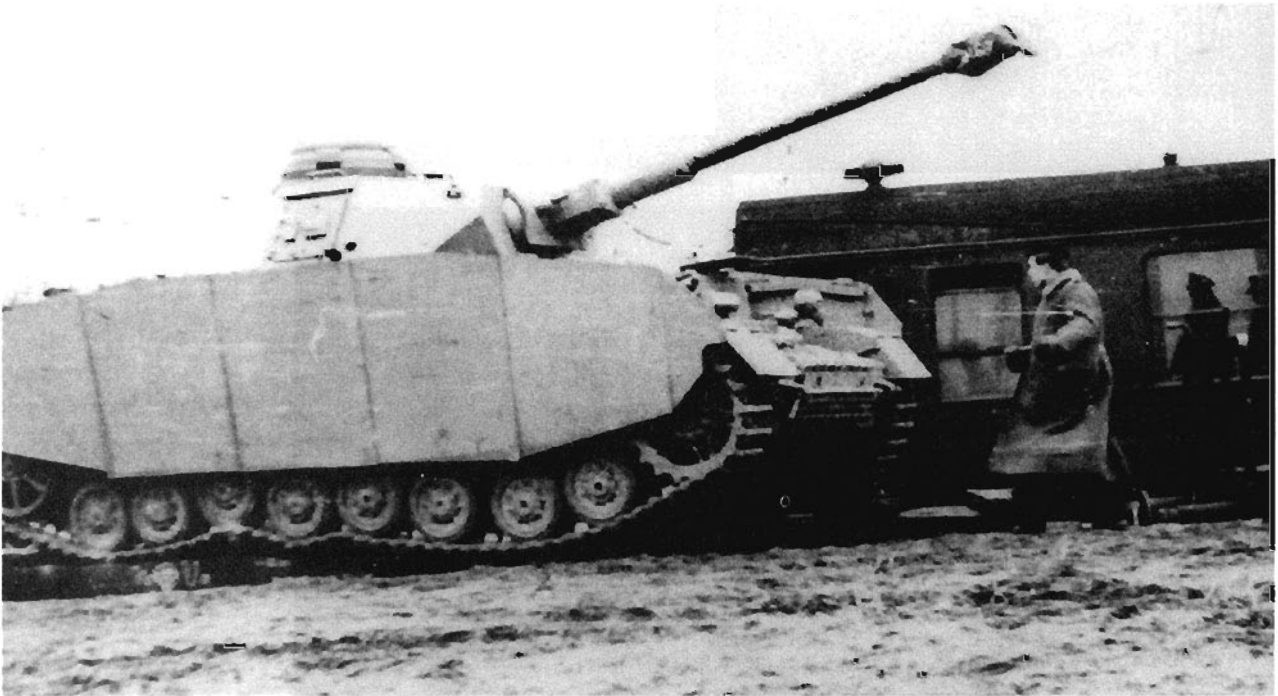
Lighter tracked vehicles as well as wheeled vehicles are loaded to the capacity of the train, since road travel causes them wear as well.



The recovery vehicles are loaded last on the train. If needed, they can tow tanks that are unable to move on their own onto the flat cars.



Loading of vehicles that had broken down or were severely damaged was often very difficult. However, they cannot be left behind! As a tanker, an officer cannot afford the luxury of not doing the dirty work on an occasional basis. Except for his old-style officer field cap, this officer is indistinguishable from the men attempting to load this battle-damaged Panzer I.



Below: Loading and unloading from the side is incomparably more difficult since it requires major steering maneuvers and it is relatively easy to dislodge the flat car from its trucks. KARL HEINZ MÜNCH





If no passenger cars were available, the crews were forced to remain with the tanks and make the best of it.



Unloading on an open stretch of track is quite difficult, since the railroad cars have a substantial height.

Provisionary ramps must be constructed.

Once on the car, the tank has to make a 180 degree turn in place and only then can it drive slowly in the direction of its assigned car.



This photo shows the transfer from rail transport to another form of strategic transport—shipment by sea.

KARL-HEINZ MÜNCH



When roll-on, roll-off ships are not available, the loading must be conducted with hoists—not exactly the simplest of tasks. HARTMANN



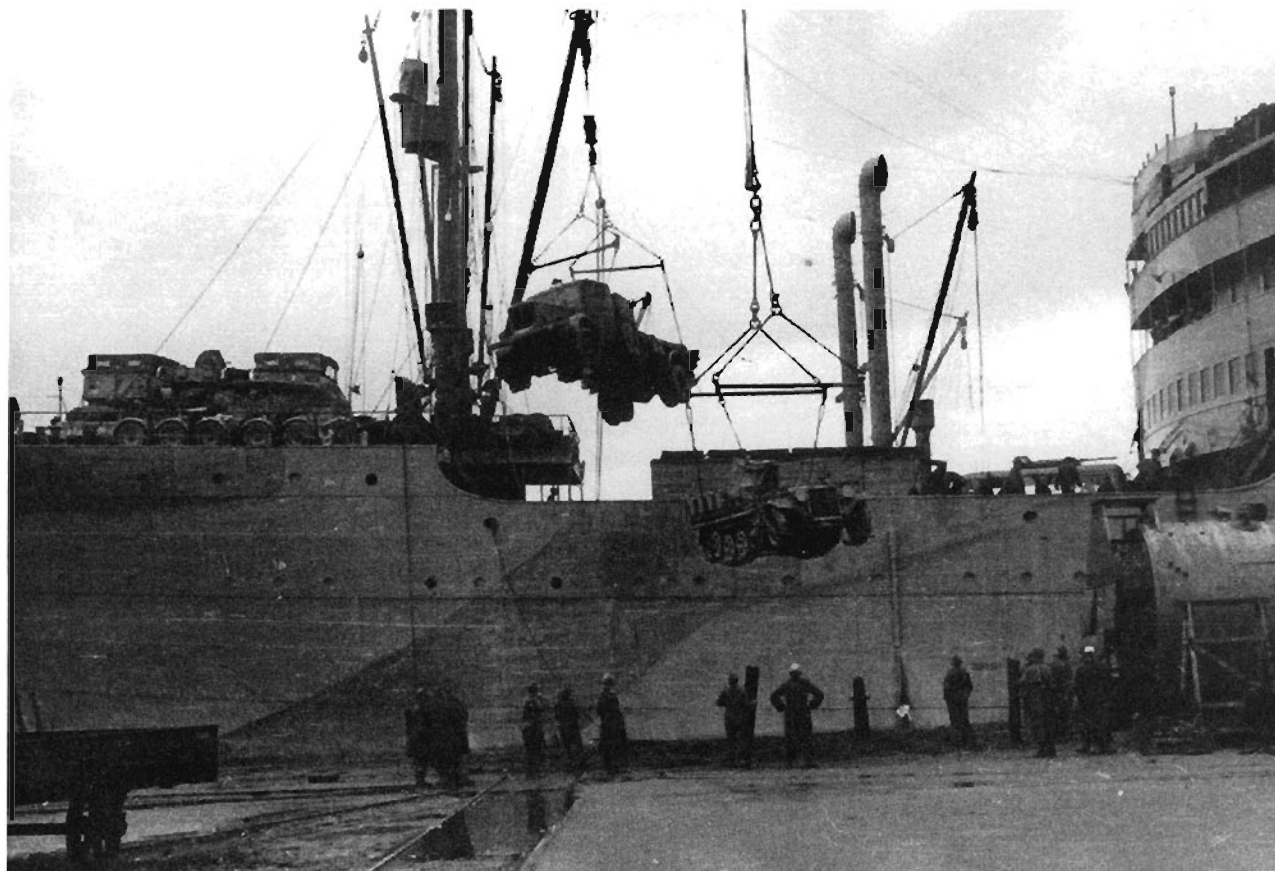


With a roll-on, roll-off ship, the unit vehicles drive on ramps under their own power directly into the holds. Securing and unloading them is also relatively simple, particularly if the trip is a short one. HARTMANN





Tanks are frequently loaded onto ferries. The space there is often very narrow and the distribution of weight also requires careful thought! HARTMANN



Using the ship's own cranes can raise problems with regard to their lifting capacity.

# *Reconnaissance (Die Aufklärung)*

**T**he essential prerequisite for all operations is the timely and most comprehensive possible acquisition of reconnaissance information. Reconnaissance is accomplished in various ways (for example, through aerial reconnaissance). In the final analysis, however, it must be carried out by the combat unit itself.

In this context, there is a difference between *Spähaufklärung* (roughly equal to area reconnaissance) and *Gefechtsaufklärung* (local zone reconnaissance). *Spähaufklärung* is carried out by the *Panzeraufklärungsabteilung* (armored reconnaissance battalion) of the division. The results of area reconnaissance are primarily of importance to the higher command. That means that, for carrying out its own operations, the tank battalion needs to reconnoiter with its own forces. That is done with so-called local zone reconnaissance. The main form is the employment of patrols (*Spähtrupps*). Those can be formed from the reconnaissance platoon (*Aufklärungszug*) of the battalion or may be done by the tank companies.

Local zone reconnaissance is the primary mission of the reconnaissance platoon. That is not the case with the company. In order to clarify this unequivocally: reconnaissance missions are the most demanding combat assignment for the squad or platoon leader. As a rule, that mission is only entrusted to particularly experienced personnel, for whom the statistical life-expectancy is only measured in hours. Local reconnaissance is particularly dangerous, but it is also especially important. Countless miscarriages in engagements, failed attacks and unneces-

sary losses stem, in most cases, from the improper or, indeed, total lack of reconnaissance. Successful operations are only assured through constant reconnaissance.

One form of reconnaissance is terrain reconnaissance (*Erkundung*). It consists of determining the trafficability or usefulness of roads and areas of operations. Combat reconnaissance (*Aufklärung*) includes constant terrain reconnaissance but consists primarily in determining the location, strength and activities of the enemy.

It is conspicuous that in the Wehrmacht regulations for the *Panzertruppe* there is no special chapter on *Aufklärung* at either the company level or higher. The main reason was that the tank was seen as less appropriate for that function. Brigade and larger formations had armored reconnaissance elements within the *Panzeraufklärungsabteilung* to use for reconnaissance (using 8 x 8 vehicles). The tank battalion had its reconnaissance platoon. A misleading conception was widespread until the end of the war that reconnaissance did not really belong to the tasks within the tank company and that whatever higher headquarters ordered the commitment of armor also had to arrange the necessary prior reconnaissance. The frequent result was that armor was committed without adequate combat reconnaissance with occasional substantial failures.

Combat experience, of course, soon forced a rethinking. There was no dispute about the fact that the tank had to continually observe the battlefield so as to avoid being surprised and to acquire targets. Within the platoon and the company, there-





One of the worst "jobs from hell" for tankers is the vital mission of reconnaissance—whether area, zone or route. Employment as a patrol is generally the mission of a tank platoon.



When not in contact with the enemy, the tanks generally advance along the road network which allows for better orientation. They drive in a staggered formation in order to cover each other better. These Panthers of the 19. Panzer-Division were photographed in September 1944. HAASLER

fore, observation sectors were allocated to make sure there were no gaps in the observation of the terrain.

In preparation for movements, however—particularly in the attack—reconnaissance missions oriented on the objective are a pressing requirement. That, in turn, leads to the employment of patrols. Those are formed from either an entire platoon or from a tank section. Reconnaissance elements are frequently reinforced with Panzergrenadiere and engineers in SPW's. Unless otherwise ordered, a reconnaissance mission is controlled at battalion level.

In contrast with the reconnaissance elements of the Aufklärungsabteilung, armored reconnaissance elements of the tank battalion are generally committed only a few kilometers forward. The tank company only reconnoiters for short distances on its own.

### THE RECONNAISSANCE PLATOON OF THE TANK BATTALION

At the beginning of the war, the reconnaissance platoon (Aufklärungszug) of the tank battalion was only equipped with unarmored wheeled vehicles; as a result, they were only called terrain reconnaissance platoons (Erkunderzüge). Later, they were outfitted with SPW's of the Sd.Kfz 250 variety. As the war progressed the Aufklärungszug was increasingly equipped with the Sd.Kfz. 251. It thus had a level of armored protection that, albeit limited, was nevertheless adequate for many assignments.

The reconnaissance platoon was generally used in the initial phases of commitment in order to reconnoiter the approach march, enemy obstacles and the forward-most enemy lines. In the defense, it was generally employed as a stehender Spähtrupp (standing outpost) or for covering missions. In delaying actions it was used to guard the flanks. As the situation developed, its utility was limited by the modest level of armored protection. Thus, it generally received the task of securing the battalion command post or important communications or supply routes. If withdrawal movements became necessary, it was sent back to reconnoiter routes and terrain.

### MISSIONS

Reconnaissance elements could be given the following missions:

- Establish and maintain contact with the enemy
- Reconnoiter the nature, strength, condition, location and activity of the enemy, as well as locate obstacles
- Determine the extent of the enemy, particularly his flanks, as well as locate gaps
- Determine suitability of the terrain for passage
- Cover open areas and gaps
- Establish and maintain contact with other troops and
- Screen one's own intentions and mislead the enemy

The reconnaissance patrol leader receives his mission directly from the superior who ordered the patrol. In addition to the situation, the mission contains:

- Superior's intention
- Objective of the reconnaissance. If there are several objectives, the order of their priority
- Route or direction of movement
- Times for reporting and turning back (phase lines, if necessary)
- Actions to be taken in event of enemy contact,
- Actions to be taken at the reconnaissance objective,
- Method of guarding or observing the objective,
- Coordinating instructions with other reconnaissance forces from higher headquarters and troops that are already in contact with the enemy and
- Passwords and recognition signals for day and night.
- Whenever possible, the reconnaissance patrol leader issues a warning order to his elements. He has the elements:
- Assume combat readiness
- Apply vehicle camouflage, if needed
- Review radio message tables and procedures
- Review completeness of weapons systems
- Conduct or complete logistic measures and
- Assemble at a pre-ordained time for issuing the order (vehicle commanders or, if needed, all the crews)

He discusses the reconnaissance organization in advance with any attached forces.

If enough time is available, the reconnaissance patrol leader establishes contact with friendly security forces or other elements in contact with the enemy. He exchanges information with them



If one side of the road is in direct sunlight, the vehicles drive on the shaded side.

regarding the present mission. The following is discussed:

- The most recent observations of the enemy
- Possibilities for covering the force
- The routes to and from the objective
- Times for starting and returning
- Recognition signals for the return, especially in conditions of limited visibility, and
- Radio communications (frequencies and code words)

The reconnaissance patrol leader next determines with the commanders of the attached forces how the mission will be carried out. He reviews preparations and provides sketches to all commanders who are not provided with maps.

In closing, he issues the patrol order to as many soldiers as possible.

As already mentioned, no details for small-unit reconnaissance operations were given in the tactical regulations for the Panzertruppe of the Wehrma-

cht. As a result, the order sequence for armored reconnaissance as used within the Panzeraufklärungsabteilung was borrowed from other sources. In Heeres-Dienstvorschrift 470/3a, "Die Panzer-spähkompanie," we find the following format:

Friendly situation, in general, as well as detailed information

#### Enemy situation:

- Where is contact with the enemy to be expected? What kind of enemy is expected (armored or cavalry patrols, motorcycle troops, wheeled vehicles, obstacles, stronger forces)?
- Characteristic of enemy armored vehicles
- Additionally, in enemy territory: attitude of civilians

#### Friendly troops:

- Operations of the Aufklärungsabteilung, friendly security forces, neighboring battalions, other patrols, aircraft

#### Mission:

- Prescribed route, reconnaissance objective, specific reconnaissance missions, conduct after reaching the objective

#### Coordinating instructions:

- Starting point and time
- Information on the condition of the terrain to be traversed
- Objective of the first phase (if needed, additional phases as well)
- Actions on reaching specified points, such as specific sectors of terrain
- Order of march within the reconnaissance element
- Designation of a second in command and his mission
- Intervals, speed, orders for maintaining contact within the patrol
- Establishment of special recognition signals
- Sectors of observation
- Level of combat-readiness
- Instructions for radio traffic
- Instructions for air defense measures
- Ration cycle
- Instructions for maintenance and recovery
- Instructions for medical support
- Additional material to be brought along, such as obstacle materials
- Use of headlights

- Mounting of tire chains or track cleats and
- Destruction or turning in of written material that could give valuable information to the enemy

If a patrol is committed during operations, there is usually no time for preparation. The patrol leader briefly informs the crews by radio.

In general, a "movement axis" (*Bewegungslinie*) is established in the orders for the patrol. It gives the patrol leader a guide for his route based on prominent terrain features such as highways, roads, stream beds, railroad lines, wood lines etc. The patrol is only tied to a specified route if follow-on troops are intended to use that specific route.

For movements, advantage should be taken of:

- Depressions and
- Sectors of terrain with trees, bushes or standing field crops that are tall enough to give cover, such as maize-corn or sunflowers

Prominent terrain features such as villages, wood lines, forward slopes, hills and open fields should be avoided or traversed rapidly. Advantage should be taken of shadows. During periods of limited visibility, intersections and road networks should only be used when absolutely unavoidable, since those are particularly watched by the enemy.

In selecting routes and speeds, the patrol leader takes into consideration the formation of dust clouds.

### COMMAND AND CONTROL

The reconnaissance patrol leader leads from the front with hand signals, by example or over the radio.

The movement technique can only be determined beforehand for the first phase of the advance (in territory covered by one's own troops). After leaving the area secured by its own forces, the patrol advances according to the enemy, the situation and the terrain, either

- Closed up (*geschlossen*),
- Leapfrogging (*überschlagend*) or
- "Caterpillar"-style (*raupenartig*)

Whenever possible, the patrol advances rapidly. On approaching a sector of terrain that cannot be observed and in conditions of limited visibility, the patrol leader orders observation halts. He decides where and for how long to observe. It may be necessary to have elements dismount and, especially in conditions of limited visibility, to shut off the engines and listen (a *Horchhalt* or listening halt).

The method of moving and position of the individual vehicles are determined by the local potential



Employment as advance guard platoon is a special form of local zone reconnaissance. The advance guard platoon drives well ahead on the same march route as the main body and thus provides security for those behind.

for observation. The patrol leader orders them so that there can be 360-degree observation with the primary emphasis forward. Vehicles in the lead observe to both sides of twelve o'clock. The vehicles that follow watch to the sides and rear unless they are covering the forward vehicles. An analogous procedure is used in maintaining an air watch.

#### **METHODS OF MOVING**

Vehicles move in a staggered formation on improved roads to better cover each other. If the lead vehicle changes sides on the road, the one following it moves to the other side. In rounding a blind curve, the first vehicle takes the outside with the next one on the inside. The inside curve is always to be avoided since it can limit the range of turret traverse.

The patrol avoids built-up areas. If the mission or the terrain forces it to drive through one, the patrol leader calls for an observation halt. The approaches to built-up areas are observed and it is determined which roads and paths can be used to enter. From favorable positions and from different directions, the area is then observed. If the situation remains uncertain, the patrol can initiate local zone reconnaissance, in which:

- It reconns by fire (to provoke an enemy reaction) or, while part of the unit provides cover,
- It penetrates into the built-up area and then rapidly advances through it in close order.

It has also proven effective to use the ruse of moving forward with weak elements and then suddenly pulling back at high speed. A concealed enemy, who is waiting for a favorable opportunity to open fire, presumes that he has been spotted and opens fire. The patrol recognizes that the built-up area is occupied by the enemy and makes a detour around it.

It may also be necessary at first to advance to the edge of the built-up area with dismounted units.

The patrol moves through the built-up area at high speed, closed up in tight formation. The tanks drive in staggered formation and direct their turret cannon so each is pointed toward the opposite side of the road from the one it is driving on. At intersections, the second tank frequently closes up in order to guarantee observation in both directions simultaneously. Obstacles and barriers must be expected, especially after sharp curves and turnoffs.

Where there is limited room for traversing the turret, the last tank drives with the turret in the six o'clock position so that it can act immediately.



The enemy might be anywhere. The tanks drive in a staggered formation with their guns pointing to the opposite side. КОМГ

At the far side of the built-up area, the patrol leader calls an observation halt to determine the next move. The tanks leave the built-up area by not using the road network and moving dispersed.

The fundamentals for passing through built-up areas are also analogous for passing through woods.

Immediate action drills in an ambush are explained in the chapter on "The March."

As the patrol approaches the reconnaissance objective, it usually takes an observation halt and only the patrol leader moves forward. The other vehicles cover him and only follow on his signal.

If the patrol has the mission—e.g., remaining at the reconnaissance objective during an attack by its parent formation—the patrol leader chooses his positions with elements of his force so that the enemy's principle approach routes can be covered.

Frequently it is not necessary to drive into the reconnaissance objective. In such cases it is sufficient to choose positions allowing the patrol's objective and the terrain in front of it to be covered.

## REPORTS

The patrol always reports the following by radio:

- At times specified in orders
- On crossing report-lines specified in orders
- On reaching the reconnaissance objective
- Observations of the enemy
- Obstacles and demolitions and
- Any (forced) departures from the mission

Reports are transmitted without a response so as not to reveal the party who would be answering.

The patrol avoids combat, since even the speedy destruction of inferior enemy forces can endanger the mission. The patrol leader reserves for himself the right to open fire. The patrol is given orders whether it should bypass enemy reconnaissance elements that are spotted or allow them to pass. If that is not possi-

ble, it allows the enemy reconnaissance elements to run into the patrol and destroys them.

If it suddenly runs into the enemy, the patrol opens fire with sudden, heavy and unexpected fire. When faced with a superior enemy force, it immediately withdraws.

If the patrol is scattered, the crews make their way to the rally point (*Sammelpunkt*) independently. The rally point is always the last observation halt beyond enemy flat-trajectory fire.

Immediate action drills when running into obstacles are dealt with in the chapter on the offense (*Der Angriff*).

If the patrol spots enemy forces of special significance, such as command centers or supply organizations, it may be given a sudden attack mission. If communications are lacking, the patrol leader decides on his own initiative whether to depart from the original mission.

Prisoners cannot be allowed to endanger the patrol's mission. The patrol leader decides whether



In critical situations on tight curves, the so-called "Kurventechnik" is conducted. The lead tank moves slowly along the outside of the curve until it can see the farther course of the road. While stationary, the driver shifts into reverse gear, standing by to move into reverse, if needed. *SUSENBETH*



prisoners are taken along or—after taking away or disabling their weapons and radios—they are left behind.

If a tank is disabled, the patrol does all that it can to repair it on its own. The patrol leader reports if that is not possible or will take too much time. If possible, the disabled tank is moved to aside and camouflaged, secured by its crew and prepared for recovery. Unless ordered otherwise, crews of destroyed tanks make their way back dismounted to friendly troops on their own. They carry their weapons and personal equipment. Maps, orders and radio operating instructions must be brought along.

Wounded are cared for and brought along if possible. If not, they are left in a medical collection point (Verwundetennest, literally a “nest” for the wounded). There they are either collected by the company or picked up on the patrol’s return.

If the patrol is ordered to return, and the route in is the same as the route out, the crews make note of conspicuous orientation points. In difficult terrain and conditions of limited visibility, an inconspicuous identification marker is often also useful.

On its return or after the completion of its mission at the reconnaissance objective, the patrol is passed back through the lines.

When approaching friendly troops, the patrol proceeds on the route that was established and gives the agreed upon recognition signs and signals in a timely fashion (flags, aircraft-identification panels, flares etc.). If possible, it also establishes contact on the radio net of the unit that is receiving it.

### **RECONNAISSANCE COMBAT MISSIONS**

Reconnaissance forces frequently also receive concrete combat missions such as:

- Penetrating enemy reconnaissance and security forces and establishing contact with the enemy’s main body
- Reconnoitering obstacles and gaps,
- Drawing enemy fire and
- Capturing enemy prisoners.

In so doing it is necessary to avoid becoming mixed with the enemy or becoming surrounded. In such situations it can be useful to include forward artillery observers in the patrol.



The next tank approaches on the inside. If no enemy is spotted, both tanks abruptly round the curve and accelerate. Two gun barrels face the enemy. The third tank can then occupy the outside of the curve and provide cover. SUSENBETH

### **SECURITY OF THE FORCE (SICHERUNG)**

Security of the force is an important task for all troops. It is a fundamental that the unit provides security at all times and in all places. That task must be carried out, completely independent of the tactical framework. Also, it does not require any standing orders from above. That means that every superior must continually and independently check on the extent to which he has ordered security measures. At all times, higher levels of command check over the resources that must be invested into security in their area of responsibility, coordinate the measures needed and concern themselves with a commitment of personnel that will be economical with the forces. It is a general rule that no more than a quarter of the soldiers should be engaged in security assignments, so as not to withdraw

them from their actual mission or to detract from rest time.

The following security measures are differentiated:

- (Battlefield) observation
- Sentries/Observation Posts (*Feldwachen/Alarm-posten*)
- Outposts (*Feldposten*)
- Covering Force (*Vorposten/Gefechtsvorposten*)
- Patrols (*Spähtruppen*)

Depending on the situation, entire units may be committed in covering-force positions for the security of major troop formations. Those forces fight according to the fundamentals of defense.

### BATTLEFIELD OBSERVATION

No matter what any soldier's immediate primary mission is, he must keep an eye on the terrain around him to guard against being surprised and enable him to complete his mission. That is especially necessary in the case of a tank commander, who moves with his tank in the terrain.

The first stage of battlefield observation for the tank commander is to review the entire terrain in front of him. He visually sweeps the landscape in the shortest possible time (about five seconds) when he drives into a position or, after traversing a sector of terrain, he takes an observation halt. The width of field is at least 140 to 160 degrees and should be made without increased magnification in the periscope. Better yet, it should be an observation with the naked eye. The experienced commander categorizes the terrain in that short time span into areas of greater and lesser danger and immediately notes all movement (moving targets, smoke, discharge of weapons and the like). Immediately thereafter, with the help of his binoculars (or a periscope), he carefully examines selected individual terrain sectors. If he decides to move on, since no enemy has been spotted, he evaluates the terrain in the immediate area (up to about 500 meters) as to possible threat from antitank weapons and mines, as well as with respect to possibilities for taking advantage of the terrain. In so doing, he does not lose sight of the terrain on the objective.

Even while moving into the observation halt, he has to maintain the best possible watch over the sector of airspace that was assigned to him. Depending on the situation, he may be able to assign that task to the loader.

During the move and especially before moving out, the tank commander maintains visual contact with his tactical commander and his neighboring tanks in order to receive visual signals, hold his position in the formation and maintain its cohesion. As soon as targets are spotted, battlefield observation shifts immediately over to target acquisition (see chapter on the firefight—"Feuerkampf").

### SENTRIES AND OBSERVATION POSTS

Individual soldiers (occasionally in pairs) are posted by every unit or by outposts to observe enemy approaches to threatened sectors of terrain. Those soldiers have no combat mission; instead they report observations promptly. They are generally posted within shouting distance and give the alarm with a shout, with signals or with a trip-wire etc. As a result, they are also known as *Alarmposten*.

Individual soldiers can also be assigned to maintain air watch or control traffic.

### OUTPOSTS (FELDPOSTEN)

As a rule, outposts consist of three soldiers and are committed as dug-in infantry. Important points are occupied with a machine gun. The outpost position is usually no more than 500 meters in front of its own troops. The soldiers in the outpost must have good observation of the terrain while remaining completely concealed from the enemy's sight. In contrast to defensive positions, outposts are generally on elevated points in the terrain. At night, on the other hand, they need to be located in lower-lying spots so as to be able to observe against the horizon, usually in conjunction with major axes of movement that the enemy is most likely to use for his own advance, such as the road network and linear agricultural features such as field-drainage ditches, hedgerows and depressions. The outposts are equipped with binoculars and means of signaling. They only fight if the position is attacked directly. If a silent alarm is called for, a pull wire may be used or one of the sentries is sent back. The others remain on the spot and continue to observe. One of the three soldiers rests. In normal weather, sentinels are relieved two or three times a day.

For security of an area or a dangerous approach route, tank battalions—as an exception, even tank companies—also set up armored outposts. Those consist of a tank platoon section or a complete tank platoon.

KARL-HEINZ MÜNCH



The advance guard platoon has to be attentive in driving through villages. If need be, it has to dismount to determine whether the village is clear of enemy so that the column that follows will not carelessly drive in.

KING



The armored outpost should be far enough from the safeguarded unit that it is beyond range of enemy direct fire. The tanks are usually positioned hull-down and camouflaged. Each tank has at least one primary position and several alternate positions. The routes to those positions are scouted and marked, if necessary. This type of armored outpost provides its own security with dismounted sentries. Depending on the terrain and the level of danger from the enemy, there may also be tanks already in observation halt behind the position.

Armored outposts always have a combat mission and should, in particular, prevent enemy patrols from advancing forward freely. In cooperation with neighboring outposts, it can have the mission of holding up attacking enemy until its own unit can attain full combat-readiness and take its positions. After that has been accomplished, the outpost moves back and takes its place, usually in the main defensive position.

#### **COVERING FORCE (VORPOSTEN/GEFECHTSVORPOSTEN)**

The strength and composition of the outposts depends on the level of threat from the enemy and the terrain. Usually a battalion is entrusted to a covering force sector. Based on the situation, the commander decides on the location and number of individual positions. In contrast to outposts the covering force position is, in principle, defended until the troops that it guards have achieved readiness for combat and taken their positions. After that has taken place it is decided whether the covering forces pull back. Very frequently they end up forming the formation's reserves.

A covering force position is generally occupied by a section of tanks, possibly even by a tank platoon. If possible, it remains in a sheltered hold position and only moves into the fighting position when the enemy approaches. The position and the route to it are scouted ahead of time. Each position provides its own security with dismounted observation posts. Each covering-force position scouts several positions as well as a so-called night fighting position (*Nachtaufstellung*). By day it is sufficient if important points in the terrain (a bridge, for example) are covered from positions with opportunities for direct fire. In darkness, on the other hand, it is necessary to take position on the enemy side of the object, that is, in a position forward of the site, so as to be able to stop an enemy attempt to seize it. In

the case of wooded terrain, the position is set back about 50 meters within the woods during the day. At night the covering force takes up positions out beyond the edge of the woods. The same holds true for covering built-up areas. The covering force is, as a rule, under unified command, usually an experienced platoon leader or company commander. It is desirable for communications wire to be laid to the outposts as well as to the covering force so that reports can be made over field telephone.

#### **RECONNAISSANCE PATROLS IN A GUARD MISSION**

When performing a guard mission, patrols change their locations within their security zone. That form of commitment is chosen when the sector to be safeguarded is very large or if the terrain is such that it is easy to cover it with few forces. In section or platoon strength, the patrol moves back and forth between the covering force or the main fighting positions, or it remains predominately in one position and occasionally commits elements to controlling particularly endangered sectors. Operations follow the fundamentals of the reconnaissance patrol.

One variant is the so-called "standing patrol" (*Stehender Spähtrupp*) that reconnoiters far forward for the approach of the enemy, then pulls back in "leapfrog" fashion, maintaining contact with the enemy—with or without engaging it—until it is received by friendly troops who have gone into position in the meantime.

Patrols performing a guard mission report over radio. Patrols can be committed several kilometers from the units it is guarding.

#### **RELIEF (ABLÖSUNG)**

The relief of security forces is a critical moment. Everyone must remain focused and noise and commotion must be avoided. One possibility, therefore, is that only the crews are exchanged, while the tanks remain in the covered positions.

If tanks are to be relieved, then the relief force takes covered positions and sets up local security. The new commander dismounts and makes contact. In the discussions that follow, observations of the enemy are passed on and the mission plan is taken over. The first step after the discussion about the relief is exchange of the dismounted sentries. Next the section/platoon vehicles are relieved, vehicle by vehicle. The relieved commander's vehicle remains in position and is the last one to be

relieved. The relief is then reported to the company commander.

### CAMOUFLAGE

Camouflage measures serve indirectly for protection and as a supporting measure for operational security. Each superior officer is independently responsible for ordering camouflage measures and overseeing their completion.

Along with the obligatory noise and light discipline, there is a special need with tanks for camouflage against aerial observation. The first step is utilization of natural vegetation which must, however, be combined with artificial camouflage. Special emphasis must be placed on hiding traces left by movement and the use of netting and natural camouflage materials with twigs and boughs. Use of

building shadows, narrow passages and the like also ensure success. It is crucial to make the tank conform to the ground beneath it and the background around it and thus make it inconspicuous. That includes covering external glass surfaces (periscopes) and turret numbers, etc.

While the tanks started out initially with the uniform Wehrmacht gray, some units field applied provisional multi-colored camouflage patterns to the vehicles. Later, some vehicles were delivered from the factory with them. For the most part in the beginning that was left up to the troops, but it was later standardized with patterns and standardized colors. Right up to the end, however, there were many individual solutions and also many violations of the standards. The application and coloring of the tactical numbers on the turret was also specified



Bild 36. Panzerkampfwagen verleißt keine Spur durch Hinterlassensein einer Lärche

Einfache Erweiterung des Tarnschutzes wird durch Spannen von weißen Tarnnetzen (Zeltbahnen usw. mit Schnee bedeckt) erzielt.

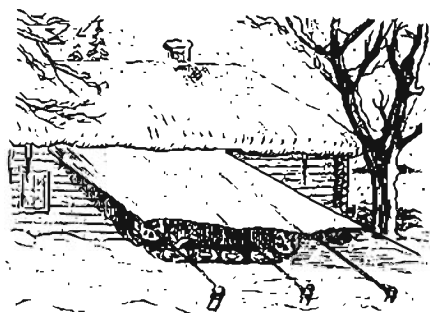


Bild 69. Erweiterung des Tarnschutzes eines Hauses durch weiße Tarnbede

Bei niedrigen Bauten kann der Schnee bis zum Dach aufgehäuft werden, so daß eine Schneewende vorgetäuscht wird.



Bild 68. Panzerkampfwagen durch mit Schnee bedeckte Plane gut getarnt

Ist weißes Leinen vorhanden, so ist die Tarnung schneller und leichter durchzuführen.

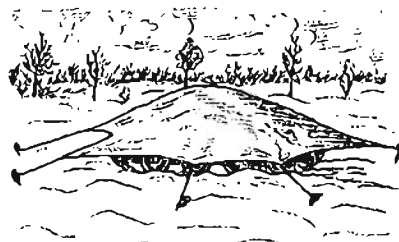


Bild 47. Panzerkampfwagen ist durch weißes Leinen schnell und gut getarnt

Buch Eingraben in den Schnee ist möglich. Tarnung erfolgt dann durch eine Plane, bedeckt mit Schnee. Die Fahrzeuggrube ist mit einer Rampe zu versehen.

Field manual suggestions for camouflaging vehicles. *Top left:* A tank avoids leaving track marks by dragging a pine tree behind it. *Top right:* Tank well concealed with a snow-covered canvas. If white cloth is available, the camouflage is faster and easier to accomplish. *Bottom left:* A simple extension of camouflage protection can be attained by stretching white camouflage covers (e.g., tent canvas covered with snow). Snow can be piled up to the roof level of a low building to make it look like a snow drift. Extending the camouflage protection of a house with a white camouflage cover. *Bottom right:* Tank rapidly and well concealed with white cloth. It is also possible to dig into the snow. Camouflage is then achieved with a canvas, covered with snow. The vehicle trench is provided with a ramp.

by regulation. Nevertheless, there were always departures from the regulations. The tactical numbering was also too standardized and enabled the identification of command vehicles at a great distance.

One critical point was winter camouflage. The troops were given a chalk-water mixture. The idea was to produce irregular white surfaces. The tank was not to be uniformly whitened, since that spoiled the camouflage effect. Uniform spots or stripes also detracted from the camouflage effect.

## COVER

Increasingly as the end of the war approached, German tanks in defensive positions and assembly areas were subjected to massive enemy air and artillery attacks. The Panzertruppe therefore started digging in tanks in hull-down positions (Panz-

erdeckungslöcher: literally "tank protection holes" which were also called "Boxen"). If the tank was in a position from which it could also engage targets, it would be protected in front and on the sides with high earthen walls. It would have careful overhead camouflage applied and also overhead fragment protection that could be rapidly removed. If the tank were in a hide position, then the walls could be the full height of the vehicle. The tank positions were open at the rear so that the vehicles could drive out backwards.

With all of these measures, it was important that artificially applied natural camouflage material be continually replaced, since dead vegetation was a treacherous giveaway.

Similar care was required for makeshift quarters, especially in cold weather.

47. In niedrigem Gebüsch werden Fahrzeuge usw. mit Gras, Moos und Zweigen bedeckt. Frisch geschlagene Bäume, die 1 1/2 mal so hoch sind wie das Tarnobjekt, vollenden die Tarnung.



Bild 23. Panzerkampfwagen in niedrigem Gebüsch durch zwei gefällte Bäume getarnt

48. Steilhänge lassen sich durch leichte Dächer aus Zeltbahnen oder Tarnnetzen zur Tarnung von Fahrzeugen ausnutzen.

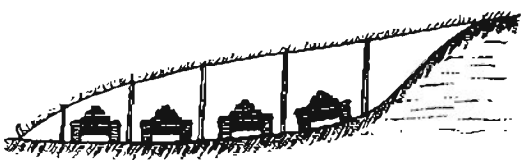


Bild 24. Panzerkampfwagen am Steilhang durch abgestütztes Tarnnetz der Sicht entzogen

49. Schluchten können überdeckt und so darin stehende Panzerkampfwagen usw. der Sicht entzogen werden.

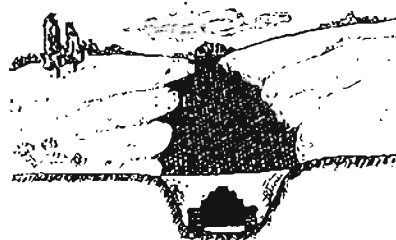


Bild 25. Mit Tarnmitteln überdeckte Schlucht tarnt Panzerkampfwagen

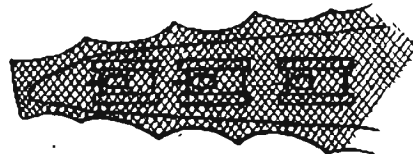


Bild 26. Dasselbe von oben vor Tarnung mit natürlichen Tarnmitteln

50. Auch durch Hege oder Tarndecken allein löst sich die Form des Tarngegenstandes zerstreuen und damit unerkennbar machen.



Bild 27. Formzerstreuung des Panzerkampfwagens durch Tarnnetz

**Upper left:** In low scrubby woods vehicles can be covered with grass, moss and twigs. Freshly cut trees that are about 1 1/2 times as tall as the object being camouflaged complete the cover. **Illustration 23.** Tank in low scrubby woods camouflaged with two trees. **Upper right:** Ravines can be covered over and tanks and the like stationary in them will be concealed from observation. **Illustration 25.** Covered ravine conceals tanks. **Lower left:** Steep slopes offer the opportunity for camouflage of vehicles with a light roof of tent canvas or camouflage netting. **Illustration 24.** Tanks by a steep slope concealed from sight with camouflage netting supported overhead. **Lower right:** A camouflage net or cover alone can break up the outline of the camouflaged object and prevent it from being recognized. **Illustration 27.** The outline of a tank is broken up with a cover of camouflage.



46. Unter Baumgruppen werden Fahrzeuge aller Art durch Herabziehen der Äste über den Lärmgegenstand schnell getarnt.



Bild 21. Panzerkampfwagen getarnt durch Zusammenbinden der Baumkronen

48. Tarnnetze können von Baum zu Baum gespannt und mit natürlichen Tarnmitteln belegt werden.



Bild 22. Panzerkampfwagen durch von Baum zu Baum gespannte Tarnnetze getarnt

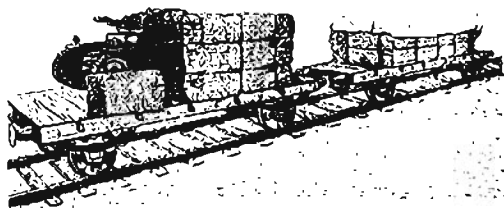
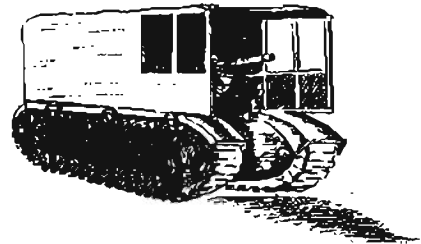


Bild 41. Panzerkampfwagen durch Strohballen als Strahlantgerüst getarnt.  
(Ein Teil der Tarnung ist beim ersten Wagen zur besseren Anschaulichkeit fortgelassen.)

51. Sonder-Abfertigung, z. B. Panzerkampfwagen, können durch Aufbauten so getarnt werden, daß ihr Bestimmungsgebiet nicht zu erkennen ist.



53. Um dem Feind Einblick in Straßen, wichtige Verkehrspunkte und Geländeteile zu verwehren und dadurch beobachtetes Feuer unmöglich zu machen, können Wälder errichtet werden.

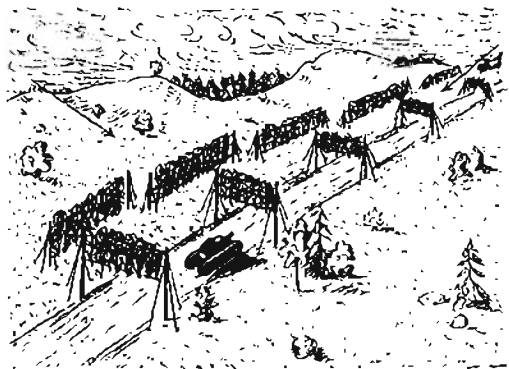


Bild 10. Wälder gegen Sicht von der Erde und vom Hefelballon

*Upper left:* Vehicles of all sorts can be rapidly concealed under groups of trees by bending the tops of the trees together over the location to be camouflaged. *Illustration 21.* Tanks camouflaged by tying together tree tops. *Upper right:* Special-purpose vehicles such as tanks can be camouflaged by placing superstructures on them so their special features cannot be recognized. *Middle left:* Camouflage nets can be stretched from tree to tree and covered with natural camouflage material. *Illustration 22.* Tanks concealed with camouflage netting stretched from tree to tree. *Bottom left:* *Illustration 41.* Tanks concealed as a shipment of straw. (A portion of the camouflage has been removed from the first railroad car for purposes of illustration.) *Bottom right:* Screens can be erected in order to prevent enemy observation of highways, important traffic points and pieces of terrain and thus make observed fire impossible. *Illustration 10.* Screens block observation from the ground and observation balloons.

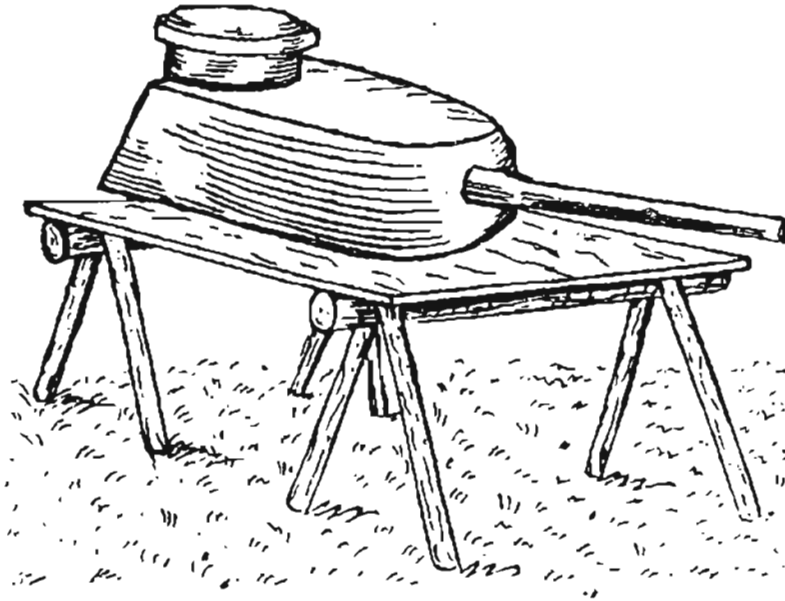


Bild 54. Einfache Panzerwagenattrappe, bei welcher nur der Turm dargestellt ist, ruhend auf einem Holzgestell



Bild 55. Panzerwagenattrappe im Gelände eingebaut

Skizzen aus: Anhang 2 zur H.Dv. 1a "Tarnung"

Illustration 54. Simple dummy tank, in which only the turret is represented, resting on a wooden platform. Illustration 55. Dummy tank set up in the terrain.

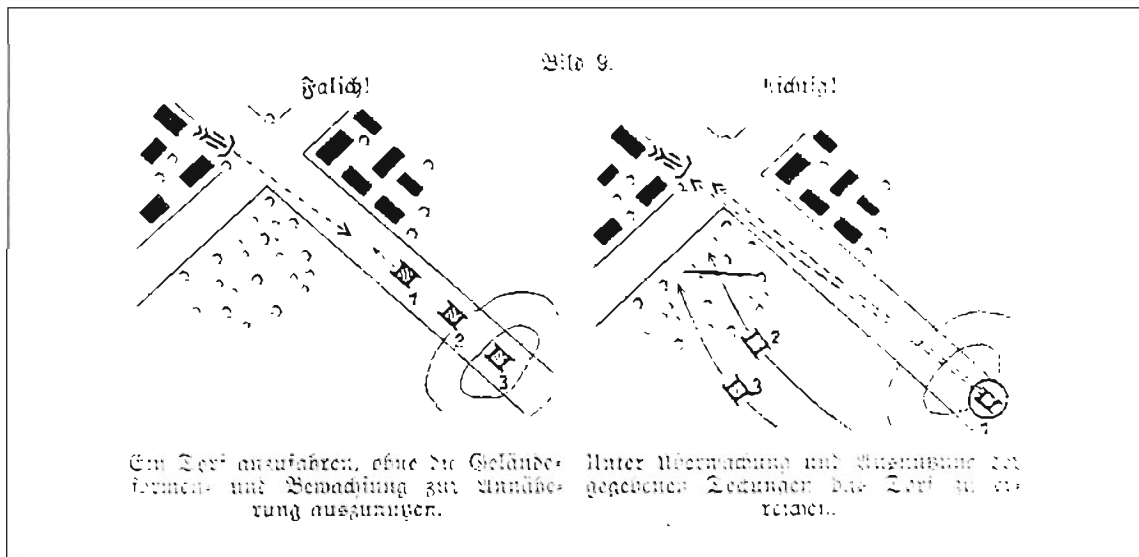
Sketches from Anhang 2 zur H.Dv. 1a "Tarnung".



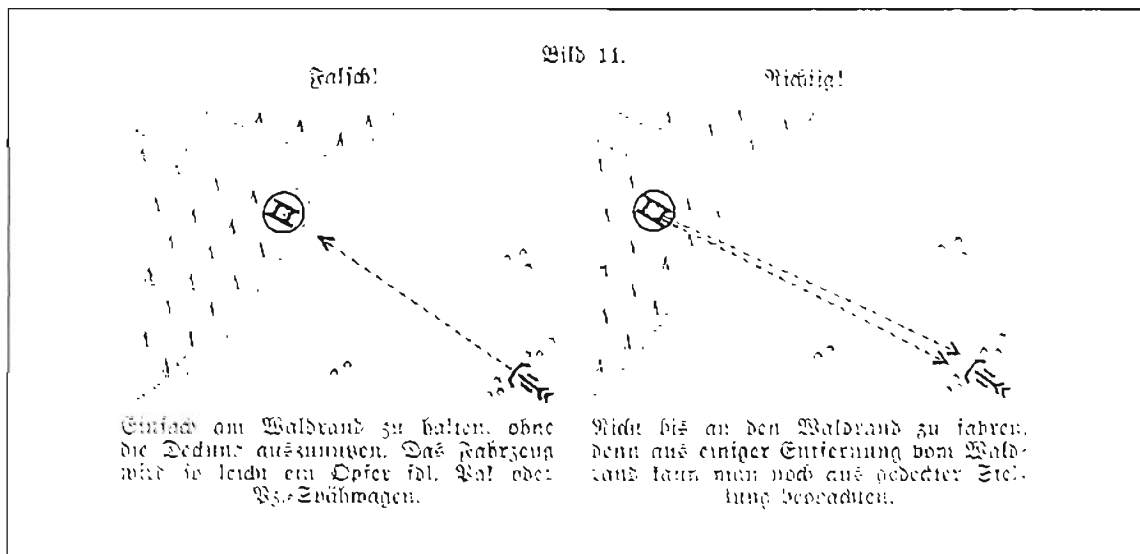
At a road junction, the lead tank covers the actual march route, while the next tank secures in the direction of the side street. BAUMANN



The advance guard platoon goes into position on both sides of the road and covers the change of direction for the forces to the rear.



Our right/wrong primer is equally concerned with fundamentals of movement through villages and woods. False: Approach a village without using the terrain and cover. Right: Reach the village using covering fire and exploitation of the given cover.



Wrong: Simply stop at the edge of the woods without using the available cover. By doing that, the vehicle easily falls prey to an enemy antitank gun or armored car. Right: Do not move quite up to the edge of the woods. Observe from a concealed position a short distance from the edge of the woods.



The patrol cannot burden itself with prisoners. Only in exceptional cases can they be brought along. If there is no room, they are disarmed and their weapons and radio equipment rendered useless.



When changing from one type of terrain to another, caution is advised. In this case, a large interval between vehicles is needed.



Frequently a patrol remains at the objective of the patrol and continues to observe.



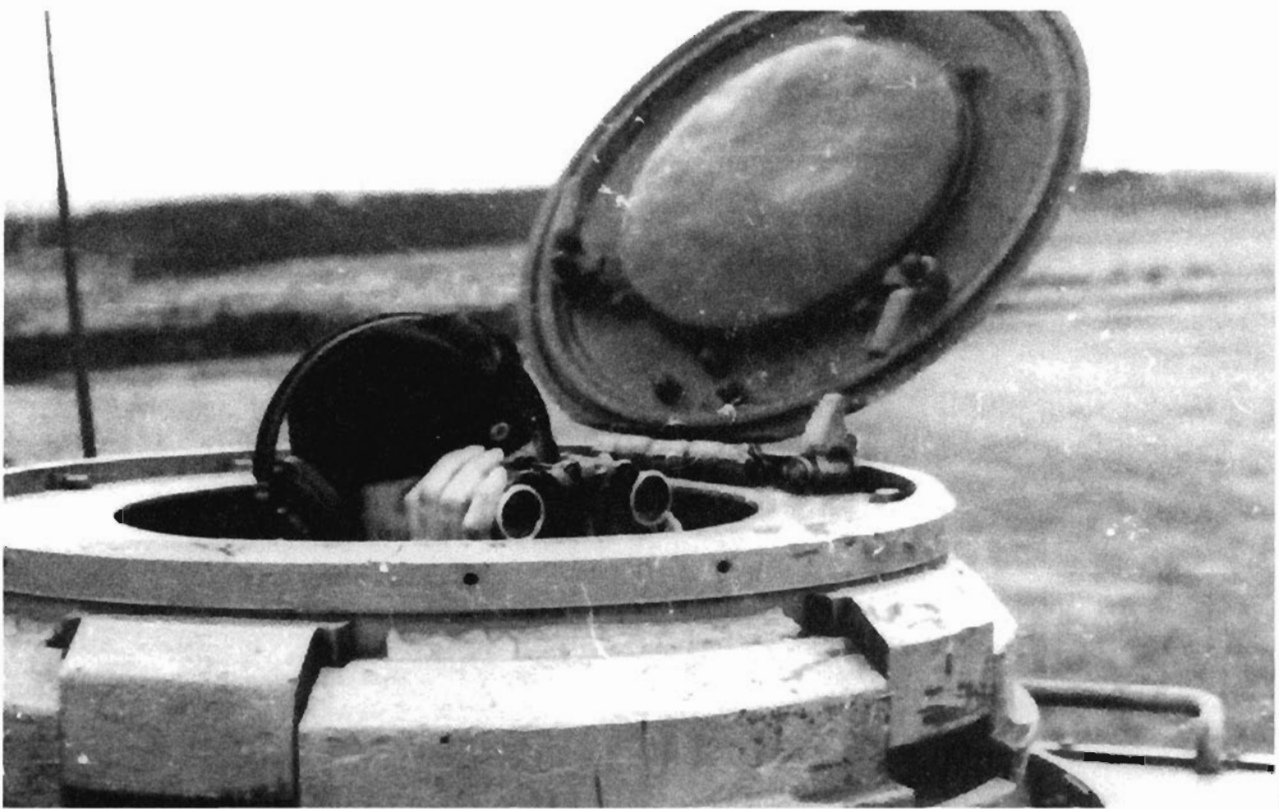
Sections of open terrain have to be crossed at high speed and with the vehicles closed up, so as to reduce the time that tanks are exposed to enemy fire. Open terrain is never crossed without other tanks providing cover. KÖNIG







On occasion the opportunity arises to search through abandoned enemy vehicles, looking for maps, signals instructions or other written material. War trophies and edible items were also in demand, if only unofficially. ELBINGER



KARL-HEINZ MUNCH



One of the most important opportunities to guarantee one's survival in combat is continuous, attentive observation of the battlefield. In spite of all optics and periscopes, the tank commander often observes with his naked eye over the rim of the open hatch. He scrutinizes particularly critical sectors of terrain with binoculars or the scissors telescope.



WILHELM



LUEDER

The highest level of attentiveness is required before crossing open terrain or covering friendly troops.



The tank is particularly vulnerable when cresting a hill, since it offers the enemy a shot at part of its significantly less protected lower hull. Since its weapons and optics are still pointing upward, they cannot be effective.





Above and below: Although it might offer no protection against gunfire, a good camouflage cover provides a concealed position (*versteckte Stellung*). For this, the tank uses artificial or natural camouflage. The optics have to remain clear so that they can work without hindrance.

When the tank has to operate in completely open terrain that offers little cover, so-called Panzerdeckungslöcher (tank foxholes) enters the picture. They should be camouflaged overhead against aerial observation, but that is obviously not possible in all environments when no natural vegetation or camouflage netting is present.

JEAN RESTAYN



Smoke and dust swirl high in front of the firing tank, immediately revealing its position! A longer halt in that position increases the danger of coming under fire. This Tiger was from the schwere Panzer-Abteilung 502.

The photograph was taken in February 1944.



A tank moving in a widely visible column of dust is easily spotted.

Whenever possible, unimproved roads with loose dirt surfaces are to be avoided in favor of grass-covered sectors.







It is far less conspicuous to follow in a pre-existing track for as long as possible . . .



. . . otherwise, it is advantageous during movement to deploy on a broad front. If the enemy opens fire—with artillery, for example—only a portion of the formation would be hit. These vehicles were from the 15. Panzer-Division. ELBINGER



The fundamentals of dispersal remain unchanged when waiting in assembly positions, staging areas or attack positions.

On arriving at his assigned position, the tank commander directs his tank as it is backed in.



The tanks are driven far enough into the undergrowth so that they are completely concealed but able to move out without problems if need be.



The tank commander orders all measures required for the security of the tank, including camouflage.





Lazy crews who do not camouflage their tanks or only do a sloppy job of camouflage need to be disciplined!



Cut branches are arranged so that the tank is covered as well as possible, and the crew can still mount and dismount unhindered.

The camouflage is renewed several times a day, since wilted foliage is a dead give away!

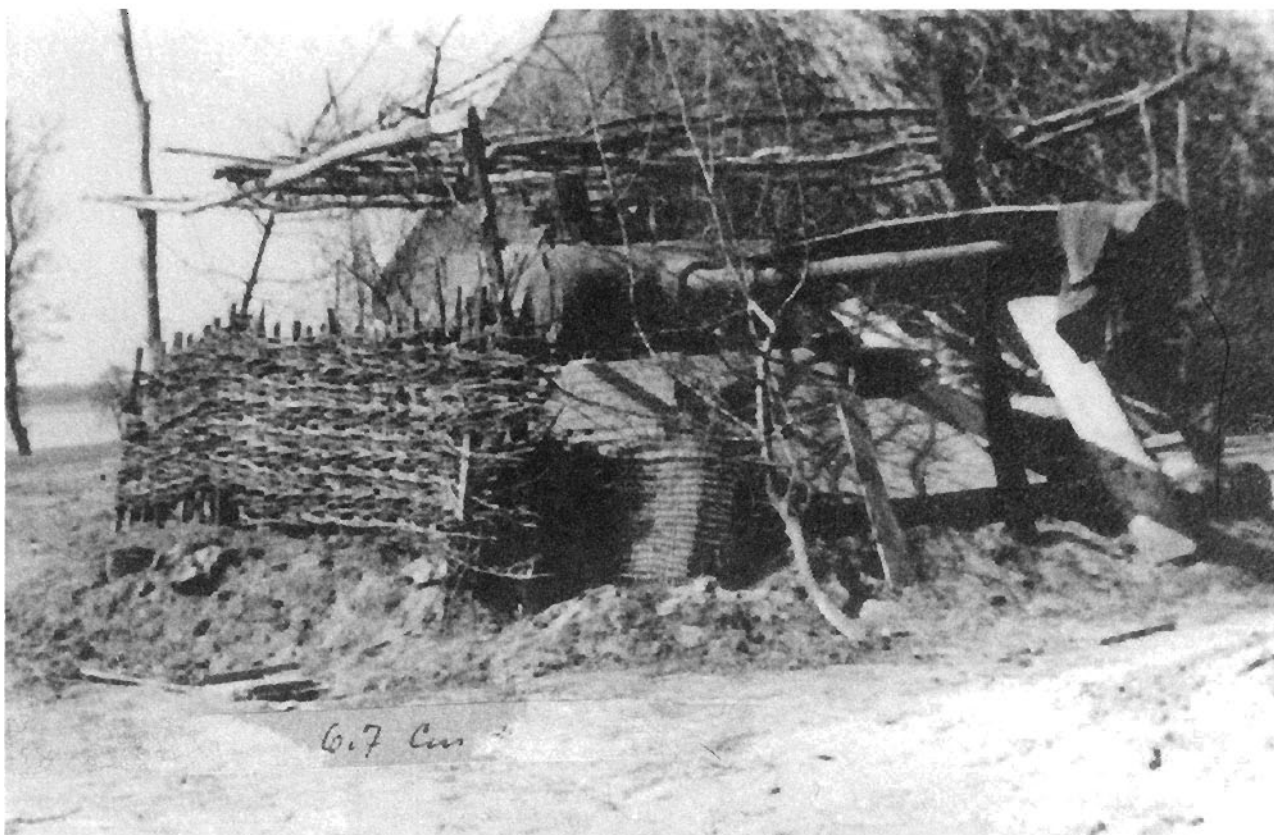


Damaged tanks which are not going to be worked on also have to be camouflaged immediately.



Another view of the infinite variety of camouflaging vehicles. This is a Tiger from schwere Panzer-Abteilung 502 in Russia.





The possibilities in making a tank (almost) disappear are manifold. There are no limits to the imagination!



Only those crews who have completed all their work and whose tanks are concealed from both aerial and ground observation can afford to relax.





Part of getting settled into the assembly area includes arranging protection from the elements. KÖNIG



The time spent in the assembly area is intensively utilized to make the tank ready for combat or to keep it that way.



KÖNIG



KARL-HEINZ MÜNCH

Individual tanks are positioned to observe around the perimeter of the assembly area to prevent a surprise approach by the enemy.

Newly arriving forces such as attached elements have to be guided immediately upon their arrival at the assembly area to their proper places to prevent the mixing of units. PRIEN



Quartering in a built-up area is a problem for tanks since there are often few opportunities for concealment.



Extensive areas without cover should not be used for assembly positions or only used briefly. Aircraft could easily spot these vehicles.

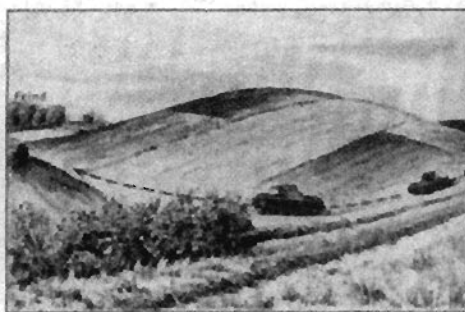




Falsch!

Bild 1.

Richtig!



Über eine Höhe fahren.

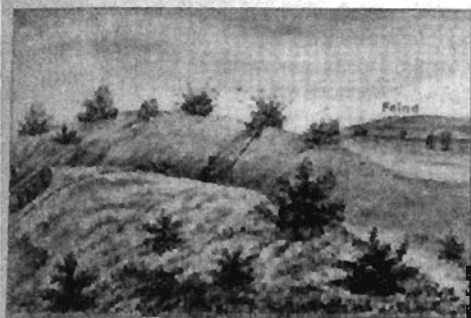
Höhe umfahren, im Grund bleiben.

False: Move over high ground. Correct: Bypass high ground and remain in the low ground.

Falsch!

Bild 2.

Richtig!



Eine Quermulde senkrecht durchfahren.

Quermulde zur Richtungsänderung ausnützen.

False: Cross defiles directly. Correct: Use a defile to exploit a change in direction.

Falsch!

Bild 3.

Richtig!



Über eine langgestreckte Höhe, die nicht umfahren werden kann, tief gestaffelt zu fahren, da so die Fahrzeuge dem Feind nacheinander sichtbar werden und einzeln vernichtet werden können.

In einer „Linie“ die Höhe geschlossen zu überwinden, da so der Zug gleichzeitig mit allen Wagen auf eine hinter der Höhe stehende Batterie oder Pak feuerbereit ist.

False: Cross extended high ground which cannot be avoided closely echeloned together so that the enemy can acquire you close together and destroy you individually. Correct: Cross the high ground in a line so that all vehicles are ready to engage an antitank gun or an artillery battery behind the crest.

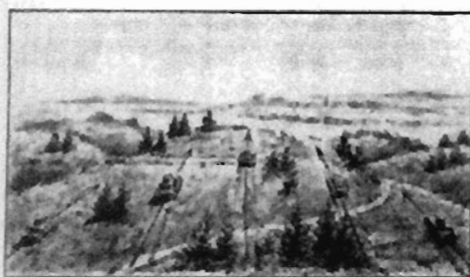


Falsch!

Bild 4.

Richtig!

False: Move in a perfect formation but without an understanding of how to exploit the terrain. Correct: Violate the rules of dispersion temporarily but advance covered.



In genauer Formation, aber ohne Verständnis für die Ausnutzung des Geländes fahren.

Zeitweise auf genaue Zwischenräume zu verzichten, dafür aber gedeckt vorwärts zu kommen.

Falsch!

Bild 11.

Richtig!

False: Cross open terrain in order to shorten the distance. Correct: Take detours but advance under cover.



Über freies Gelände fahren, um den Weg abzukürzen.

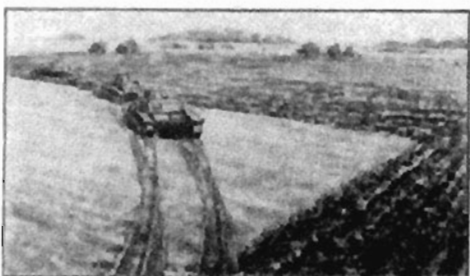
Umweg machen, aber gedeckt vorwärts kommen.

Falsch!

Bild 12.

Richtig!

False: In order to save time, move across unplowed fields. Aviators can follow the tracks for hours. Correct: Take a short detour and use the plow furrows to advance.



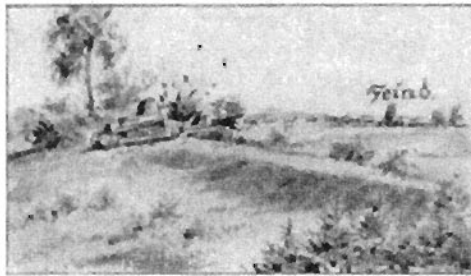
Aus Zeitersparnis quer über helle Ader zu fahren. Die Spur kann der Flieger noch nach Stunden auswerten.

Einen kleinen Umweg zu machen und den Schlagschatten des Feldraines für den Vormarsch ausnützen.

Falsch!

Bild 18.

Richtig!



Auf einer Höhe in Stellung fahren.

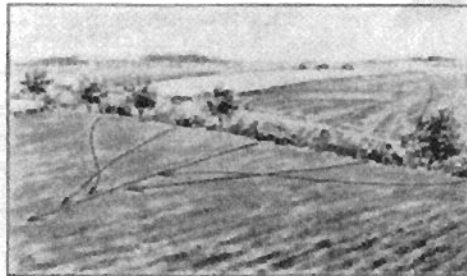
Gedeckt gegen Schuß am Hang in Stellung fahren.

False: Occupy a position on a crest. Correct: Occupy a position using the protection of the slope.

Falsch!

Bild 20.

Richtig!



Wenn ein Hindernis (Hohlweg) in Reihe überschritten wird, da so viel Zeit verloren geht, denn jedes Fahrzeug muß warten, bis der Vordermann das Hindernis überwunden hat.

Wenn der Zug in Reihe auf ein Hindernis stößt in breitere Form überzugehen, um es schnell und gleichzeitig zu überwinden und dann wieder die Reihe zu bilden.

False: Cross an obstacle (defile) in a column, whereby a lot of time is lost since each vehicle has to wait until the vehicle in front of it has crossed the obstacle. Correct: If the platoon encounters an obstacle while in a column formation, then shift temporarily to a line formation and assume the column formation after crossing the obstacle.



If the tank is employed in snow-covered terrain, the crew has to use a whitewash mixture to produce large, irregular blotches and stripes.



Painting in three or four colors worked to break up the outline of the tank. The original photograph, taken by war reporter Hermann, was captioned: "Goldap is once again in German hands. In a energetic attack, German armored formations have torn the East Prussian city of Goldap from the Soviets. In this picture a Panther has reached the edge of the city and covers against new Soviet attacks."



Ravines and their Russian equivalent—the Balka—provided protection against gunfire. When tanks remain there longer and had support from engineers, they could even be provided with camouflage roofs.

# *Command and Control* *(Die Führung)*

### **LIAISON/CONTACT (VERBINDUNG)**

All formations habitually maintain liaison/contact (Verbindung) with their higher headquarters. That also holds true for units with whom one closely works and with neighbors.

Two distinct kinds of subordination mark the relationship with other branches of the service (Waffengattungen). If the gaining formation receives complete power to issue orders and direct the unit, it is called attachment (Unterstellung). If one is responsible for the operational commitment of his unit but receives missions from another command, the concept of operational control comes into effect (auf Zusammenarbeit angewiesen or directed to cooperate). That, for example, is regularly the case with artillery. The forward observer who rides along with the tank company receives his fire missions from the commander of the tank company to whom he is placed under operational control, but the clearance to open fire comes from the artillery commander of the division. If an artillery battery moves with an advance guard formation (see chapter on the offense) and receives its orders from the commander, it is attached. That means that the commander of the armored formation issues direct, binding firing orders.

There are two basic rules of liaison/contact. Contact is maintained from lower to higher headquarters and from left to right. That means the subordinate is responsible for establishing and maintaining liaison/contact with the higher headquarters. If combat sectors are adjacent to one

another, then each establishes contact with his neighbor on the right.

Contact can be made through:

- Personal contact by the commanders,
- Use of liaison parties (Verbindungsorgane) and also
- Occupation of contact points (Anschlußpunkte).

### **ESTABLISHING CONTACT IN PERSON**

After occupying positions, after returning from separate missions and upon changes of subordination, every commander establishes contact without its having to be requested. The lack or loss of contact obligates every commander to institute whatever measures are necessary to ensure its restoration.

Upon reporting, the commander brings along a location/operational sketch (or map notations) as well as information relevant to the commitment of the formation (losses, state of ammunition and fuel supplies etc.).

### **LIAISON PARTIES (VERBINDUNGSORGANE)**

Generally, mounted or dismounted messengers are employed for the purpose of maintaining liaison. That is particularly important in situations where radio silence is imposed and there is no wire communication. Motorcycle messengers are commonly used. They are instructed in their mission and must know the routes in both directions, even in conditions of limited visibility. The tank platoon details messengers only when so ordered.





It is a controversial fact that—up to the battalion level—all commanders basically lead from their tanks in combat. However, during road marches, while approaching the enemy and while conducting a leader's reconnaissance, wheeled vehicles play an important roll. Prerequisite for that, however, is that there was no threat of direct enemy fire. Wheeled vehicles have the advantage that they are more mobile on roads and significantly quieter.

During a march, the battalion or company maintains contact with troops marching in advance through a march liaison team (*Anschlußkommando*). As a rule motorcycle messengers are also employed in that situation. The messengers move to the trail of the forward march column and immediately report halts, blockages in the march and unusual activities. That prevents the formation from running into the formation ahead of it.

For combat tasks that are adjoining, mounted or dismounted contact parties (*Verbindungsspähtruppen* or *Streifen*) can be ordered.

#### **CONTACT POINTS (ANSCHLUßPUNKTE)**

The battalion can order the company to occupy a contact point (see chapter on the defense).

#### **COMMAND AND CONTROL (FÜHRUNG)**

The leadership of an armored formation must be bold and agile. By their personal example, commanders motivate their soldiers to victory. Careful study of the terrain and maps must precede the commitment. Aerial photographs can provide valuable clues for the evaluation of the terrain of the attack. Constant, careful camouflage and swiftness of movement assure surprise of the enemy. Forces must be massed through unified, simultaneous employment. Any fragmentation of forces must be avoided.

Short and to the point, *Heeresdienstvorschrift 470/10, Richtlinien für die Führung und Kampf des Panzerregiments und der Panzerabteilung* (Guidelines for Command and Combat of the Armored Regiment and Armored Battalion), draws together the essential principles of command and control for armor commanders. In the final analysis, those principles were the basis for the tactical superiority of the German armor formations in the Second World War. The last sentence, in particular, is the key to success: The courageous massing of forces and ruthless drive to break through at a decisive location.

Every leader in the *Panzertruppe* was trained according to that principle from the beginning and judged according to those precepts, regardless of whether he was the commander of only a single tank, a leader of a platoon of four or five vehicles, a company commander with fourteen vehicles or a commander of a battalion or regiment. One must be very clear about the fact that command in combat is "organized chaos." In spite of the enemy, in hostile weather, faced with one's own losses and des-

perate calls over the radio and, at times, uncertainty regarding the situation, the commander must force himself to preserve his understanding of the larger picture and remain relatively calm. If he fails in that, he fails his troops. Because such coolness can neither be produced by training nor can it be expected of everyone, one must follow certain fundamental principles.

It is vitally essential that every soldier at every level must have the highest possible standards of training so that he can do his job in the crew even in his sleep. Leaders must have learned to formulate reports and orders according to certain formats. Although that may sound narrow and formalistic, in situations of anxiety and stress it produces certainty in operations. Radio reports, just as with commands for movement and for the conduct of fire during engagements, are always given according to the one and the same format:

1. Enemy (with information concerning location and direction of movement),
2. Own situation/course of action and
3. Execution/follow-on measures/recommendations.

If every commander at every level knows that format in his sleep, then he will also follow that format in battle and avoid the danger of becoming longwinded or leaving out something important. That is the only way that the greatest possible time can be guaranteed for the actual process of command, the constant evaluation of the situation and the (hopefully correct) making of decisions.

The tank commander directs the engagements (*Feuerkampf*) of his tank. He must select the fighting position or firing halt so that enemy antitank weapons and artillery, as well as all other targets that can be engaged with the cannon—even those at long range—can be taken under fire and the position will not be immediately spotted by the enemy.

When the target has been destroyed or other tanks have approached so close to the target that further firing is not possible without endangering the other tanks, then the firing tank hastens forward to a new firing halt. In general, such forward bounds are at least 200 to 300 meters.

When one's own position has been spotted by the enemy and the tank is fired on, a rapid change of position to the side or forward is called for. In so doing, the commander and driver have to watch out for sudden obstacles, such as shell craters, and let each other know about them. The tank commander



At the battalion level and above, special command vehicles with additional radio equipment were generally employed. Those special variants of the Sd.Kfz. 251, in addition to cross-country capability, had the advantage of relative spaciousness and the fact that command assistants could offer direct support. Subordinated commanders could also ride along without difficulty.

has the additional concern in that the tank must keep its place in the combat formation of the platoon or company. With foresight, he selects his next position.

The platoon leader is responsible for the combat readiness of his platoon. He leads the platoon according to the orders of the company commander by radio transmissions, personal example or the use of signals or flags. When issuing orders over radio, the platoon leader gives them either to the entire platoon or to a section. He receives acknowledgement either through immediate execution of the order or by signals.

Signals are given either by hand or with flags. At night, colored lights are used. Orders given by signals are carried out immediately on recognition and are also passed on by repetition, which constitutes acknowledgement.

The company commander drives in front of his company until the leading platoon has become engaged in combat. Then he leads from the position that provides the best observation of the battlefield. If the company is committed in the second echelon, he remains in front of his company. Of the two tanks in the company headquarters troop, one serves as the command tank and the other as a reserve vehicle. The three motorcycle messengers in the company headquarters troop carry orders. When combat begins they stay with the company commander's wheeled vehicle in the combat trains (*Gefechtsstoß*).

The battalion commander must inform the company commanders about his intentions in sufficient time so they can inform their units regarding their tasks. Verbal orders are the rule. Within the formation, the radio is the prime means of command. Radio silence is usually enjoined until immediately before action. Orders, therefore, are passed by messenger for as long as that is possible. In the quartering area and in the assembly area, telephone wires are laid.

At the battalion level there were different forms of organization, depending on the type of tank. In addition to the tank companies, however, the following was uniform in the battalion: the battalion staff and the headquarters company (*Stabskompanie*). The *Stabskompanie* had the following: a communications/signals platoon (*Nachrichtenzug*), an armored reconnaissance platoon (*gepanzelter Aufklärungszug*), an engineer and scouting (terrain reconnaissance) platoon (*Pionierund Erkundung-*

*zug*) and an air-defense platoon (*Flugabwehrzug*). The signals platoon was eliminated in 1943 and placed under the command group of the headquarters company. In those formations which were not separate, the maintenance company (*Panzerwerkstattkompanie*) was a regimental unit. In the separate tank battalions (such as the Tiger battalions) it was an integral component, just as was a separate supply company (*Versorgungskompanie*).

Even though the command group was well equipped with its three tanks, establishing the battalion command post (*Abteilungsgefechtsstand*) was difficult. The tables-of-organization provided no permanent deputy battalion commander/executive officer who could function as a leader of the command post. In addition, the commander of the headquarters company doubled part-time as the communications officer (*Nachrichtenzug*) and, as such, had his place in the commander's tank (according to the *Kriegsstörkenachweisung* or tables of organization and equipment, his place was as gunner!). The commander of the second tank in the command group was the adjutant. The third tank commander was a noncommissioned officer. Normally the orderly officer (*Ordonnanz*) served as the loader on the commander's tank. There he was, more or less, in a position where he was could take pressure off the commander in combat, while he maintained orientation with the map, directed the tank driver and, when needed, received and gave reports by radio.

In practice, the battalion used various ways to set up the command post. In general, an officer served as "battle captain" of the command post and functioned as the operations officer. Usually it was the commander of the headquarters company. Since there was no permanently authorized command post vehicle, an SPW from the reconnaissance platoon was frequently used for a purpose it was not intended for. In addition, there was the two-ton truck with the eighty megawatt radio of the radio section and the two-ton truck of the wire-laying section. The latter section was responsible for laying cable for wire communications and maintaining the battalion switchboard. Often one of the three tanks of the command group was also used as a radio station. In addition there were two motorcycle messengers, one of them being stationed at the command post of the next higher headquarters. The battalion surgeon (*Abteilungsarzt*) was only intermittently present at the command post with his SPW *Sd.Kfz.*

251/8 (medium half-track Krankenpanzer or armored ambulance). In addition there were three or four medium or light wheeled vehicles. Beginning in 1943/44 there were also two half-tracked motorcycles (Kettenkrad Sd.Kfz.2).

That structure had certain disadvantages, since the commander of the headquarters company was mostly taken away from his actual duties. When that happened, the headquarters was led by the rations officer (Verpflegungsoffizier). When that position was eliminated in the 1944 "free" organization (freie Gliederung 1944), then one of the platoon leaders was assigned that duty (for example, the platoon leader of the Erkunder- und Pionierzug). That was not a problem during operations, since the company was divided into separate elements. However, while actively preparing for operations he was unable to adequately concern himself with his company. In the separate battalions there was some amelioration of the problem, since it had separate supply and maintenance companies. With that, the large and unwieldy headquarters company was divested of its motor vehicle repair and maintenance section (Kfz-Instandsetzungsgruppe), the rations trains (Verpflegungstrupp) and the main body of the combat trains (Gefechtsstrupp). In the "free" organization the designation of the company was "Stab und Stabskompanie" (headquarters and headquarters company).

In practice, there were many variations, since changes in the tables of organization were not always immediately adopted (sometimes due to the failure to send the required materiel and personnel). The command tanks were always equipped with two radio sets (transceivers) and, sometimes, an additional receiver. The organizational leader was on the command net of the unit to which his unit was subordinate and also on his own command net. Generally, a special headquarters net was used to avoid overloading the battalion net. The headquarters net monitored all support and logistical forces (also attached formations and units). As a rule the following were on the battalion radio command net:

- Battalion commander
- Other tanks of the command group
- Signals officer (as discussed above)
- Battalion surgeon
- Platoon leader of the combat reconnaissance platoon (Aufklärungszug)

- The leader of the terrain reconnaissance and combat engineer platoon (Erkunder- und Pionierzug)
- Platoon leader of the air defense platoon (Fliegerabwehrzug)
- Leaders of the trains
- Leader of the maintenance elements
- Tank company commanders
- Attached tactical commanders
- Liaison officers, forward air controller (Fliegerleitoffizier) and the like and, if necessary and
- Forward observers not directly attached to line companies or commanders of attached mortar, artillery or rocket launcher batteries.

In the event the battalion commander was disabled, the signals officer temporarily filled in. However, as a rule, the most experienced commander of one of the companies then took over.

When the company commander's tank had two radios (which was not the case initially), then the company command net was used and the company commander himself switched the second set to the battalion command net. All of the tanks were on the company command net, as were the radios of temporarily attached units and the artillery forward observer who was placed under the operational control of the company. While a deputy company commander was authorized in the initial organizational structure, he did not last long. A company command post (Kompaniegefechtsstand) could only be formed in a makeshift manner (for example, in the assembly area) by the headquarters section leader (Kompanietruppführer). If the company commander was disabled, one of the tank platoon leaders took over the company.

In summary, it must be said that the outfitting of communications equipment was adequate to the demands made on it. During the initial phase of the war the Wehrmacht was superior to all other armies in that respect. In the other armies, as a rule, only the command tank had a radio. However, even up to the end of the war important element leaders, such as the leaders of the trains and the company first sergeant, were still without radios.

#### **TABLES OF ORGANIZATION AND EQUIPMENT**

The lack of adequate numbers of Panzerkampfwagen III and IV at the start of the war resulted in for-





Early command and control vehicles were based on the chassis of the Panzer I. These versions are the kleiner Befehlspanzer I, Ausführung B.

KARL-HEINZ MÜNCH

mations of mixed vehicles. That was repeated in the organization of the first schwere Panzerabteilungen (Tiger) which were equipped with Panzer III's along with the few Tigers.

At the start of the war, there were so-called light tank companies (leichte Panzerkompanien) equipped with PzKpfw I and II as well as medium tank companies (mittlere Panzerkompanien) with the Panzer III or IV. As the war continued, the battalions became more uniform in the types of tanks they had. The Panzer II's continued to be produced and were sent to Panzeraufklärungsabteilungen and functioned as armored reconnaissance vehicles (Spähpanzer). During the transition, there were also reconnaissance platoons in the regiments and battalions that "used up" the last of the Panzer II's.

Right up to the end of the war all tank regiments had two different kinds of battalions, differing in the kind of tanks with which they were armed. In general, the first battalion (I. Abteilung) had the PzKpfw Panther, while the second battalion (II. Abteilung) had the Panzer III and Panzer IV. Later, as Panzer III's ceased to be supplied, the second battalion became more uniformly outfitted with Panzer IV's. There were, of course, many special and varied mixes of equipment types (such as with Sturmgeschütze) that will not be examined further here.

The initial mixed equipping caused numerous problems for the battalions and not only from a

logistical point of view. It soon proved that the Panzer I and II were simply unsuitable for actual combat due to their miserably inadequate armor protection. The penetration capabilities of the cannon were generally unsatisfactory until the PzKpfw IV's with the L48 gun and the Panthers became available. The deficiency in penetrating power of the earlier tanks was compensated for by superior tactics and better means of command.

Tactically it became expedient to separate tasks into levels of capabilities between the light and medium tank platoons or companies. Thus it was the primary assignment of the light tank platoons to reconnoiter, to perform guard missions and to secure lines of communications. The light tanks were suitable for those assignments. They were not suitable for working closely with the medium tanks and for commitment in the attack.

The original idea for the use of mixed formations in combat was that the medium tanks would provide cover while the light tanks would thrust through enemy positions, taking advantage of their higher mobility. Experience soon set limits on this line of thinking. The losses of light tanks were too great. Increasingly they were moved back to the rear or used to screen the flanks. There were, however, no differences in training, so the crews and leaders could be transferred to medium and heavy tanks with no problems.

### EXTENDED FORMATIONS

In order to simplify organization on the battlefield, particularly in the attack, standardized forms of movement and deployment were developed (Formen der Bewegung und der Entfaltung). In contrast to the frequent presentations in general literature on the Panzertruppe, those drills played only a limited role in combat, though they were used to excess in combat and leader training. That did have one advantage, however, in that all crews had a good, basic understanding of their position in the company, as well as of distances between and among vehicles. In combat, orders were seldom given to form a "Kette", "Breitkeil" or the like. The



The maxim always applied that whenever a command vehicle arrives on the scene, the tactical commanders seek to establish communication, report their situations and receive information that is important for them.

reason is that the position of the tanks within the platoon or within the company is, primarily, determined by the terrain. In practice it proved that movement continually and smoothly flowed between various formations. Standing orders for specific formation types, therefore, only caused confusion. It worked far better for each experienced tank commander to take the best position on his own initiative and take advantage of the terrain in seeking cover. It was simply irrelevant whether one could move on parade with beautiful distances and intervals.

The following formations and battle drills were established:

#### **Tank battalion (according to Heeres-Dienstvorschrift 470/10, Appendix 1):**

##### **Formations (Formen)**

1. One differentiates among:
  - Assembly formations (Versammlungsformen): Battalion column, row (Reihe) and double-row (Doppelreihe).
  - March formations (Marschformen): row (Reihe) and double-row (Doppelreihe).
  - Combat formations (Gefechtsformen): wedge (Keil) and inverted "V" formation (Breitkeil).

The dispersal distances for those formations are standard. (In combat they were somewhat larger).

2. Unless otherwise ordered, the forward company on the right is responsible for direction and contact.

3. The tanks of the battalion staff were only tied to a position when in assembly-type formations.

4. The battalion column is the most usual assembly formation. The companies are in company-column formation.

5. The row formation is the march formation of the tank battalion on the road.

6. The wedge (Keil) is suitable as the maneuvering formation of the battalion when it is developing a situation. Width of the battalion "wedge" is about 500 meters, with a depth of about 1,800 meters.

7. The inverted wedge (Breitkeil) is the most usual attack formation for the battalion. Width of the battalion in the wedge is about 1,000 meters, with a depth of about 1,300 meters. The lead companies in this formation are also in company wedges.

8. In all changes of formation, unless otherwise ordered, the foremost company on the right is

responsible for maintaining direction and contact. The other companies make the approach or break off contact based on it.

As a rule in a wedge or inverted "V" formation, the follow-on company moves to the right. If it approaches to the left of the right company, then a left inverted "V" is ordered.

The company third in line moves on the right in the wedge. In the Breitkeil it follows in the center, behind the companies in the forward line.

The last company drives last in wedge or inverted "V" formations. Formation changes that deviate from these norms are on order.

##### **Movements (Bewegungen)**

9. Battalion movements are executed on order by radio from the battalion commander.

10. The battalion commander either gives the radio order to all companies through a net call (using the battalion code name) or to individual companies using their code names. If the battalion commander wants confirmation of receipt of the message from a company, he must request it.

#### **Tank Company**

##### **Formations**

For the assembly:

- Line (Linie)
- Company column (Kompaniekolonne)
- Row (Reihe) and
- Double row (Doppelreihe)

On the march:

- Row (Reihe) and
- Double row (Doppelreihe)

In combat:

- Extended row (geöffnete Reihe)
- Double row (Doppelreihe)
- Extended line (geöffnete Linie)
- Wedge (Keil) and
- Inverted wedge (Breitkeil)

The combat formations serve for the commitment of the entire company. When moving on line, the platoon that is second in line moves right and the platoon moving third in line moves left. The platoon that is moving in the center is generally responsible for maintaining direction and contact with the other platoons. If another platoon is to take over the approach march or break off from another element, then that must be ordered.

**Tank Platoon****Formations**

For the assembly:

- Line (Linie) and
- Row (Reihe)

On the march:

- Row (Reihe) and
- Double row (Doppelreihe)

In combat:

- Extended row (geöffnete Reihe)
- Double row (Doppelreihe)
- Wedge (Keil) and
- Extended line (geöffnete Linie)

Platoon leaders and company commanders are only tied to their prescribed positions in formal (non-combat) movements. In combat they choose

their place according to situation and terrain where they can best conduct the battle.

Movements are carried out according to radio command, previous orders or signals. On the order to move out (Anfahren), all tanks start moving uniformly and, at first, straight ahead. If a change of formation is desired at the same time as the start of the move, the formation order is given first, followed by the order to move out. Distances, intervals and formation are assumed while driving.

When changing formation (Abbrechen), the unit which forms the base of the formation maintains its former speed. The units that are changing formation correspondingly reduce their speed and drive to their positions by the shortest route.

When changing the direction of the march, the commander orders "Follow me!" or "Direction of march is . . . !" while giving the direction point or compass bearing.

If a formation change is to take place at the same time, the march direction is given first, followed by the new formation. Platoons that have four instead of five tanks execute these formations and maneuvers in analogous fashion. In the wedge formation, the platoon leader is usually the second vehicle from the left. Toward the end of the war, the term "chain" formation (Kette) also was used for this formation.

**RADIO COMMANDS**

The primary method of command in combat is the radio. In contrast with command by signals, visual contact does not have to be maintained. Misunderstandings are more easily avoided, especially under conditions of limited visibility.

Maintenance of radio discipline is vital in order to avoid overloading the respective frequency with long-winded verbosity and lack of clarity in choice of words. To this come the standard formats for orders and commands, as well as the requirements for preserving secrecy. The latter becomes relative to ongoing operations. In combat, the content of reports must often be given in the clear because of time constraints. In most cases, the information obtained is of limited significance to enemy signals intelligence, since measures at that level are taken immediately and are not important for the overall outcome of the battle. The higher command levels are of more interest to enemy intelligence, especially if orders are carelessly given in the clear. That provides valuable information to the enemy, especially when he



Far-reaching radio communications above the company level could not usually be established on ultra-short radio-wave sets. For that purpose, special short- and medium-wave radio vehicles were also employed as illustrated here with the Funk-Kraftfahrzeug 17.

has time to take countermeasures. On the other hand, the higher levels of command, as a rule, also have significantly more time available to ensure communications security. Also, there are limits to enemy radio intelligence. Just on the basis of capacity alone, the enemy cannot listen to many radio nets at the same time and do it thoroughly.

If the enemy successfully intercepts a radio net, he has three possibilities:

- Eavesdropping (unnoticed),
- Disrupting or
- Deceiving

Eavesdropping is productive, especially when on the command net. It provides valuable information.

The victim remains unsuspecting. When disrupted the radio net is overwhelmed with a strong signal, either continuously, intermittently or only when there is a transmission. Deafening noise fills the earphones of the members of the radio net and communication is impossible. When using deception, one uses a codename that has been intercepted and causes confusion with false reports and orders. That can be very successful in periods of intense combat. If the unit detects that sort of signals intelligence measure, the highest level of alertness is required. The brevity table (*Sprechtafel*) lists one or more alternate frequencies for just such situations. With a single command, the commander can order everyone to switch frequencies. If there is total interference on one frequency, everyone makes a frequency change on his own. Contact must be immediately established on the new frequency, e.g.: "All Lion stations, this is Lion commander: How do you read me, over?"

The identity of a suspected enemy individual on the radio can be checked out, either by posing leading questions that only the genuine individual can answer or by authentication with the help of alphanumeric groups from the brevity table.

In spite of everything, the radio is the most workable means of command.



The radio specialist performed a vital mission. The illustration shows a radio troop of *schwere Panzerabteilung 503*. Feldwebel Beierlein and two of his *Gefreiter* had an important task in filtering radio traffic. They had to master simultaneous operation of several frequencies.

### COMMAND THROUGH SIGNALS

If radio communications cannot be conducted—either to maintain radio silence or reduce radio emanations—command is often done by signals. Differentiation is made among:

- Hand signals
- Flags and
- Light signals

Those signals were standardized (according to *Heeresdienstvorschrift 472*) and were the subject of intense training. The flag signals were dropped after only a short time, since they were very conspicuous and rapidly revealed who was the leader at the time. Also, it was very awkward to always have the three flags ready. Instead, hand signals became the rule, since they are easy to give and generally easy to understand (signals for assembling, changing directions, and moving past other vehicles). In addition the tank commander usually has his hatch open in combat to insure unrestricted observation of the terrain. At moderate temperatures, he gives his signals without gloves, since the bare palm of the hand shows up better against the background.

It is more difficult to give signals in the dark with lights. For that purpose, it was anticipated that individual command signals would be given in dif-



ferent colors (red, green or white). In practice, the signals—in which the arms made vertical or crossways movements—were easily misunderstood, e.g., when the tank went through a depression in the ground or when a branch momentarily interrupted the light signal. It therefore became the practice to disregard the manual and establish ones own light signals. It also was advisable for individual platoons or companies to have their own colors permanently assigned. Signals for a halt, holding back and the like were then given in lengthy intervals, those for closing up and accelerating in short intervals. In so doing it was obviously important that the lights were turned away from the enemy. The troop units also made their own devices, sometimes with partially opened tin cans with an electric light bulb from the interior lighting of the vehicle or simply with a kerosene lamp (the so-called "Hindenburg" light).

### **RADIO COMMUNICATIONS**

In armored combat, the frictionless functioning of radio communications is often decisive. Particularly at the beginning of the Second World War, it often tipped the scale between success and failure. Only when all of the commanders have communication with their subordinates or superiors can forces be assembled without delay, observations passed on and orders issued without loss of time.

If for no other reason than concealment of information, no more than what is necessary for the operation should be passed over the radio. But there are other reasons that also make it desirable to be brief and to use other forms of command (signals, signs and leading by example). Radio discipline is important so that the radio net is not congested with longwinded talk.

The tanks of the German Army were generally equipped with one radio set. The vehicles of the company commander and the battalion commander had two transceivers or one transceiver and one receiver.

Because of its decisive value in battle, there was intensive training in radio traffic and the operation of the equipment. In addition, each company had field telephones so that wire communications could be established in the assembly area and with forces pulling security.

### **CONTROL OF RADIO TRAFFIC**

There were strict rules for the conduct of radio traffic. If they are drilled into the crews during training, then the number of violations in combat was held within limits. The rules dealt with articulation, choice of words and formulation. It is essential that everyone forces themselves to be as brief as possible. That requires that, before transmitting, the operator

is clear in his understanding of the contents of the message. If orders consist of more than a few sentences, notes should be taken in advance.

Information of interest to the enemy should not be sent in the clear. Every radio transmission should use code names. The operator takes all the necessary information from the so-called brevity table (Sprechtafel). In verbal radio traffic, the command structure is also maintained. That means that not everyone has the same amount that must be said. Superiors have priority. Contact reports or alerts (for example, "Enemy air-



Not even the most precise report nor the best presentation on the situation map can replace the personal, visual observation of the terrain by the tactical commander! This Tiger was from schwere panzer-Abteilung 502.

craft alarm!") always have absolute priority. Words that are not known to everyone are to be spelled out according to the military phonetic alphabet.

### VOICE TRAFFIC

Call and response always follow the same format. In order to catch the attention of the addressee with the first word, the addressee is always named first, followed by the sender: "Tiger, this is sparrow hawk, over." The answer: "Sparrow hawk, this is Tiger, over." If the messages are to be passed along, one after another, to others (linear traffic), or if the receipt is to be individually confirmed, the call is abbreviated: "All Lion stations, net call, over." The rule was that in every answer, the codename of the respondent comes first. In practice, this was not the case among callers who knew each other.

Several addressees can obviously be called in a single call: "Tiger and Lion stations, this is Sparrow Hawk, over." All members of the net can also be called simultaneously: "All Sparrow Hawk stations, net call, over." Those called then answer in the numerical order of their tactical numbers.

Transmission of a message is closed with: "Out" (Fertig). The other party does not need to answer at that point. The recipient may be required to repeat back important information.

If two radio stations are unable to establish contact, a third station that has contact with both can serve as a relay. The third party can either be called upon to perform that service or can offer its services on its own.

When a unit changes its attachment relationship, then the commander's vehicle must have all vehicles switch to the new frequency by platoons. The command vehicle then reports itself as attached to the new command: "Mouse, this is Eagle. Eagle is attached to you, over."

During conditions of bad voice reception, the radio traffic can switch over to keyed transmission (continuous wave transmission). The commanders and especially the radio operators were specially trained in that.

### RADIO TRAFFIC SECURITY

The following measures are used:

- Encoding (Verschlüsselung)
- Use of code names (Verschleierung) or
- Paraphrase or circumlocution (Umschreibung)

Encoding (Verschlüsselung) is a time-consuming process that is carried out by communications personnel (for example, at the command posts). The encoding changes the entire content of the message into a classified secret.

Code names (Verschleierung) are used for the so-called "four secrets":

1. Troop identification is through code names.
2. Places and terrain designations are by use of numbers assigned to them or by denoting an axis reference line (Stoßlinie).
3. Time designations are by use of code times (specified time values are added to the actual times).
4. Numerical information and status reports are given through code numbers (specified numerical values are added to the actual numbers).

The tactical commander can assign special code names for specified tactical expressions.

Ranks and positions are never named. Commanders at all levels are referred to by code name plus the suffix "Leader" (Führer). The adjutant and deputy commanders get the suffix "Assistant" (Gehilfe). There were many violations of those rules. It was customary to use first names or to use code names for extended periods without changing them. For those reasons, Generaloberst Guderian let loose a thunderbolt in an order to everyone:

The Generalinspekteur der Panzertruppen has ordered:

The use of actual personal names of commanders, unit leaders and tank commanders and of open troop designations in radio traffic is to be stopped immediately.

Only codenames are to be used!

The use of designations in the clear for locations and terrain must immediately cease. Code words, terrain number designators, axis reference lines and, in cases of need, general references, are to be used.

Radio commands must immediately translate into armed action!

Radio reports cannot contain anything of use to the enemy. During combat, status reports must not contain any open statements regarding losses, ammunition supply, usage etc. Code numbers are to be used for all numerical values.



The location for the command tank depends on the situation. Sometimes it safeguards the commander while he is standing at an observation point.



The commander's tank could also serve as a mobile command post. Here it covers a river crossing by friendly forces.

All violations of the above orders are to be immediately investigated without regard to rank or position. The guilty parties are to receive disciplinary punishment. In serious cases, a detailed report is to be made.

(signed) Guderian

The brevity table (*Sprechtafel*) was changed for each operation in a new area or if it was lost or compromised. At the latest, it was changed every nine days.

Circumlocution (*Umschreibung*) requires an allusion to things that only the persons in the conversation can know.

## SIGNAL SECURITY

In contrast to modern radio equipment, the equipment needed frequent tuning and alignment during World War II. That had to take place at the beginning of the operation—immediately before entering combat—at the lowest possible power level of emission.

Transmitting strength should be appropriate for the distance over which transmissions will occur. It can also be limited by shortening the antenna.

Frequent (simultaneous) changes of frequencies, as well as deception and coding measures complicate the collection of radio intelligence by the enemy. Complete radio silence is the rule for units that have not yet been committed. All of their radio sets are simply turned off. One method of limiting traffic is to order listening silence (*Empfangsbereitschaft*). The equipment is set to receive only. The tactical commander can initiate radio traffic or, in case of need, give permission to transmit. Reports on the enemy can always be transmitted.

Under no circumstances are any communications instructions to fall into enemy hands, since the enemy can gain important insight regarding the operation, even including data on objectives.

## FORMATS FOR ORGANIZING RADIO TRAFFIC

Radio commands for changing directions, formations or speeds are given according to the mnemonic “EKA”: *Einheit* (unit), *Kommando* (order), *Ausführungskommando* (command of execution). Example: “Rose an alle, Stellung, Marsch!” (All Rose stations, occupy firing position, move out!)

Orders to change direction and march formation follow the mnemonic “EMMA”: *Einheit* (unit), *Marschrichtung* (direction of movement), *Marsch-*

or *Gefechtsform* (march or combat formation), *Ausführungskommando* (command of execution). Example: “All Rose stations, this is Rose 3. Corner of woods to the half-left, row formation, move out!”

Combat orders (*Gefechtsaufträge*) are issued according to “EMEZA”: *Einheit* (unit), *Marschrichtung* (direction of movement), *Entfernung* (distance), *Ziel/Feind* (objective/enemy), *Auftrag* (mission). Example: “All Eagle stations, this is Eagle. 11 o’clock, to the intersection on the hill, infantry in position, overrun!”

Reports (*Meldungen*) are always transmitted according to the following sequence: *Wann*, *Wen* (*Feind*), *Wie*, *Wo*, *Was tue ich?* (When, Who (enemy), How, Where, What do I do?) When making enemy reports, for practical reasons, the location is given first, so that the recipient is already looking in the right direction or has already located the place on the map.

## LOCATIONS OF PLACES

Locations can be veiled (*verschleiert*) with the help of pre-assigned terrain numbers, by christening the landscape with cover names (*Geländetaufe*) or with the so-called *Stoßlinie* process (roughly: axis reference line. See below). Terrain numbers are established by the originator of the brevity code (battalion level or above). Any tactical commander can initiate a *Geländetaufe*.

The *Stoßlinie* process is a special form of orientation. Two precisely specified points on the map (*Anlagepunkte*) are connected with each other. Grid lines are not used for these points. The connecting line should run approximately in the attack direction of the formation. The connecting line is divided into centimeters and an arbitrary centimeter value is assigned to the first point on the *Stoßlinie* (not “0”). To designate a point on the terrain according to the *Stoßlinie*, a numerical value in centimeters is given for the point at which a perpendicular intersects the *Stoßlinie*. The direction (right or left) along the perpendicular and the centimeter-value on the perpendicular to the designated terrain point identify the location.

A new direction of attack calls for a new *Stoßlinie*. The original *Stoßlinie* is never shifted. Where the use of several *Stoßlinien* could lead to confusion, they are identified by the alphabet. Completely aside from changes ordered for purposes of maintaining security, new points are designated whenever switching to a different map sheet. For

transmission by key (continuous wave transmission), discretionary signals (*Verfügungssignale*) are designated for the directions, right and left, for the *Stoßlinie* and, if necessary, different map scales. These signals are (as a rule) two digit number groups given as letters using the German phonetic alphabet. The *Verfügungssignale* were either noted on the *Sprechtafel* or came on a special sheet.

#### **OPERATION OF THE RADIO EQUIPMENT**

For reasons of space, the numerous different types of radio sets and the combinations in which they were installed cannot be dealt with here. However, what can be said is that the care and operation of the equipment requires a great deal of time and attention. That is the reason why most of the tanks of the *Wehrmacht* had a radio operator as a fifth member of the crew.

The problem with the tube-apparatus of the time was that the calibration of the frequency changed over time. That occurred not only with replacement of the oscillating tube but also in quite normal service. That became evident in traffic at greater distances where the stations involved might not be able to understand the signal, where there was disturbing static and whistling or the other station might only be heard intermittently. The radio operator had to perform so-called frequency checks. The regulations specified frequency checks on a

weekly basis. In reality, they had to take place significantly more often.

Before important operations, radio adjustment procedures always had to be carried out to assure smooth functioning of communications. Poor reception could also come as a result of changes of weather or location, however.

Calibration of frequencies was performed in the reception mode. A responding station had to transmit on the test frequency (for example, with an "F"-type radio set, on channel 370). With a screwdriver, the balancing condenser would be adjusted to get the strongest signal (greatest sensitivity). The radio operator took care of the constant adjustment of the apparatus during service by rotating the knob of the adjusting condenser if the field-strength indicator called for it. In the earlier radio sets, that had to be done with a screwdriver! The radio operator was also, as a rule, trained as a radio technician so as to be able to undertake simple repair and maintenance procedures (e.g., exchange of parts) as well as troubleshooting and maintenance. The radio operator was also responsible for the operation of the intercom system for on-board communications (*Bord-sprechgerät*) and the maintenance of the intercom sets for all of the crew. Based on his special knowledge, he also assisted the tank commander and the driver in maintaining the vehicle's electrical system (such as, among other things, replacing fuses etc.).



Nur für den Dienstgebrauch! — Nicht in Feindeshand fallen lassen!					
<b>Sprechtafel</b>		Einheit:		Jäger, Trupp:	
		Prüf.-Nr.	5	Gültig vom	bis
Geländeangabe	G.-Pkt.	Geländeangabe	G.-Pkt.	Geländeangabe	G.-Pkt.
Gr. 1	22	Gr. 2	23		
Gr. 3	24	Gr. 4	25		
Gr. 5	26	Gr. 6	27		
Gr. 7	28	Gr. 8	29		
Gr. 9	30	Gr. 10	31		
Gr. 11	32	Gr. 12	33		
Gr. 13	34	Gr. 14	35		
Gr. 15	36	Gr. 16	37		
Gr. 17	38	Gr. 18	39		
Gr. 19	40	Gr. 20	41		
Gr. 21	42	Gr. 22	43		
Gr. 23	44	Gr. 24	45		
Gr. 25	46	Gr. 26	47		
Gr. 27	48	Gr. 28	49		
Gr. 29	50	Gr. 30	51		
Gr. 31	52	Gr. 32	53		
Gr. 33	54	Gr. 34	55		
Gr. 35	56	Gr. 36	57		
Gr. 37	58	Gr. 38	59		
Gr. 39	60	Gr. 40	61		
Gr. 41	62	Gr. 42	63		
Gr. 43	64	Gr. 44	65		
Gr. 45	66	Gr. 46	67		
Gr. 47	68	Gr. 48	69		
Gr. 49	70	Gr. 50	71		
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Gr. 59	80	Gr. 60	81		
Gr. 61	82	Gr. 62	83		
Gr. 63	84	Gr. 64	85		
Gr. 65	86	Gr. 66	87		
Gr. 67	88	Gr. 68	89		
Gr. 69	90	Gr. 70	91		
Gr. 71	92	Gr. 72	93		
Gr. 73	94	Gr. 74	95		
Gr. 75	96	Gr. 76	97		
Gr. 77	98	Gr. 78	99		
Gr. 79	100	Gr. 80	101		
Gr. 81	102	Gr. 82	103		
Gr. 83	104	Gr. 84	105		
Gr. 85	106	Gr. 86	107		
Gr. 87	108	Gr. 88	109		
Gr. 89	110	Gr. 90	111		
Gr. 91	112	Gr. 92	113		
Gr. 93	114	Gr. 94	115		
Gr. 95	116	Gr. 96	117		
Gr. 97	118	Gr. 98	119		
Gr. 99	120	Gr. 100	121		
Gr. 101	122	Gr. 102	123		
Gr. 103	124	Gr. 104	125		
Gr. 105	126	Gr. 106	127		
Gr. 107	128	Gr. 108	129		
Gr. 109	130	Gr. 110	131		
Gr. 111	132	Gr. 112	133		
Gr. 113	134	Gr. 114	135		
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Gr. 127	148	Gr. 128	149		
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Gr. 133	154	Gr. 134	155		
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Gr. 143	164	Gr. 144	165		
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Gr. 177	198	Gr. 178	199		
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Gr. 407	428	Gr. 408	429		
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Gr. 411	432	Gr. 412	433		
Gr. 413	434	Gr. 414	435		
Gr. 415	436	Gr. 416	437		
Gr. 417	438				



Major Lueder (schwere Panzerabteilung 501) sitting on a Panzer III of his reconnaissance platoon. He keeps a motorcycle messenger standing by to pass on reports.



Commanders of Kampfgruppen also frequently use a main battle tank so that they can be right at the front with suitable protection, as in this picture of Oberst Dr. Bäke as commander of his specially formed schweren Panzerregiment during the Tcherkassy Operation on 16 February 1944. JÜRGEN WILHELM



A later variant of the Panzerkampfwagen III already had the star antenna characteristic of the later command tanks. In order to make more space inside, a wooden dummy gun replaced the actual turret gun. A machine gun in the turret served for self defense.



KARL-HEINZ MÜNCH

During the Second World War, commanders at the battalion and regimental level were provided with special command tanks which were easy to spot because of the special frame antennas on the rear deck.



KARL-HEINZ MÜNCH

Generally, regimental and battalion commanders met face-to-face on the battlefield, thus eliminating any unnecessary radio conversation.

The command group (*Kommandeutgruppe*) is a vital instrument of command at the battalion level and above. As a rule, it consists of the command tank, the command vehicles of supporting units and, on occasion, additional radio vehicles, as well as messengers and



small vehicles of the commander, depending on the situation. Note the juxtaposition in this photograph of the *Befehlspantzer* of the regiment and a *Panzerbefehlswagen I*. The *Panzerbefehlswagen I* should have been relegated to a training status only by this point in the war. Of further interest is the piece of wood mounted in lieu of a machine gun on it. This photograph was taken in the summer of 1944 on the Eastern Front.

Tank battalions set up command posts, concealed in the surrounding terrain or based in buildings. These support the commander in controlling the combat. Officers seek-



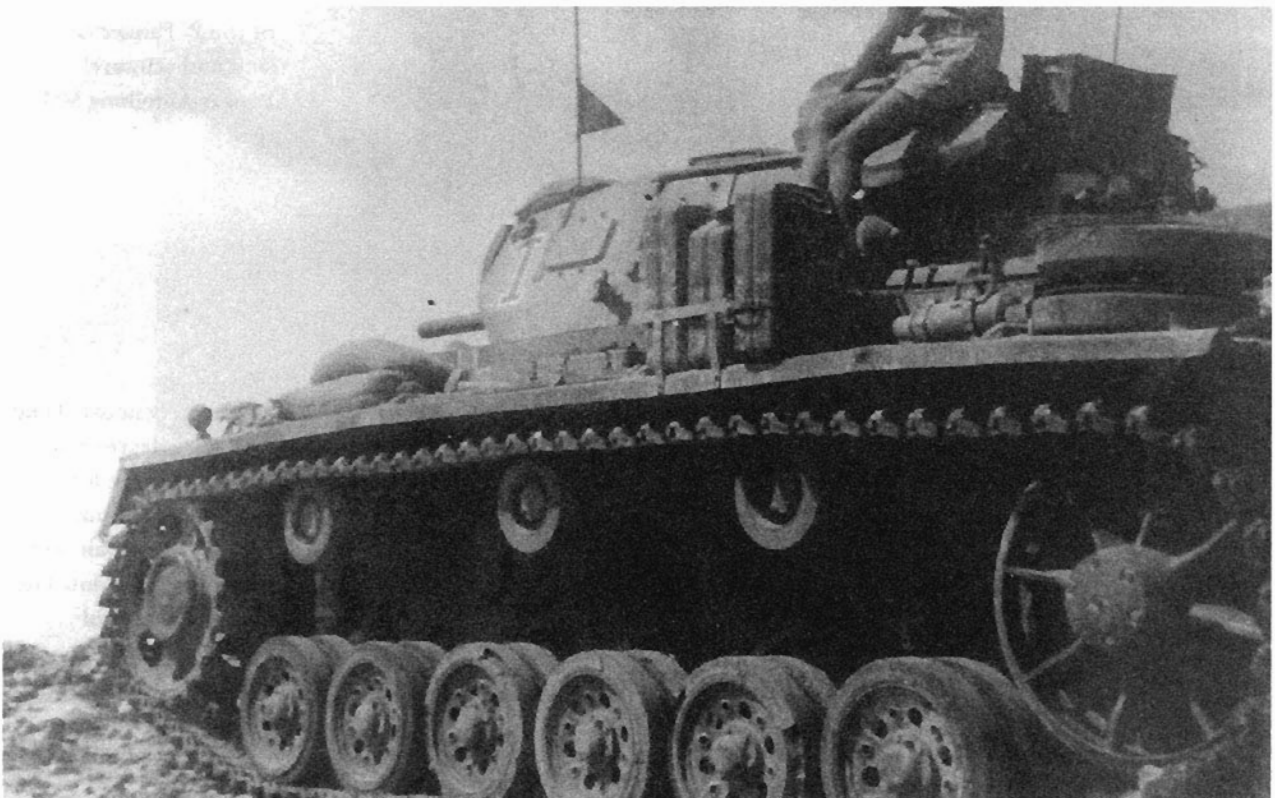
ing contact or motorcycle messengers are guided by signs from the approach route to the operations center. The pennant on the left is the battalion commander's command symbol (black bar on an elongated triangle). It is always in the *Waffenfarbe* (color denoting arm of service), in this case, pink for the *Panzertruppe*. The number of the formation was often painted on the black bar. The formation symbol might also be painted on it. Here we see the tiger of schwere Panzerabteilung 501 (employed in Tunisia). The other pennant, also pink, with the abbreviation *St* in the Panzer lozenge, identifies the staff of the battalion, whose personnel form the command post. AUTHOR'S COLLECTION





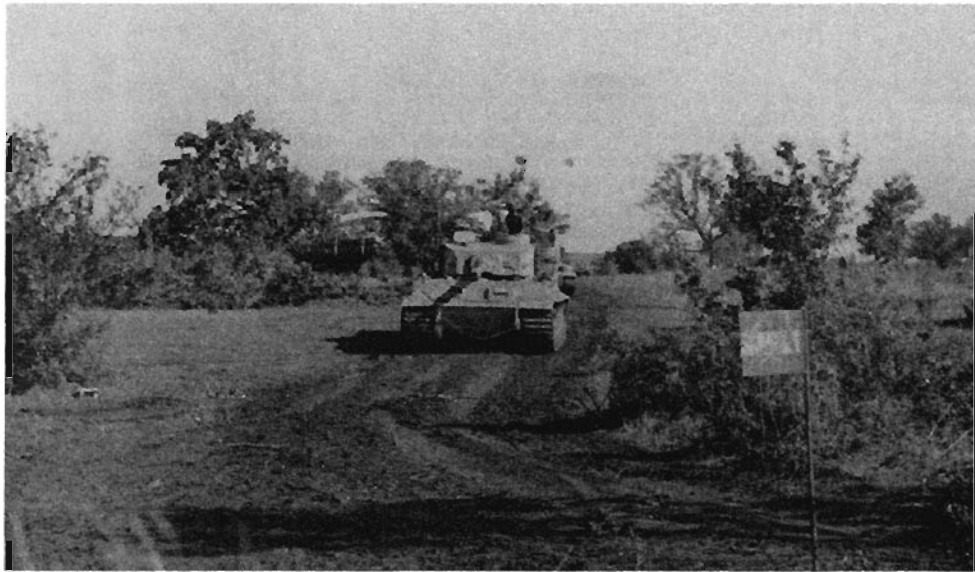
Face-to-face meetings helped avoid misunderstandings that could occur as a result of radio transmissions.





KARL-HEINZ MÜNCH

The commander's vehicle might also carry the command symbol to insure better identification.

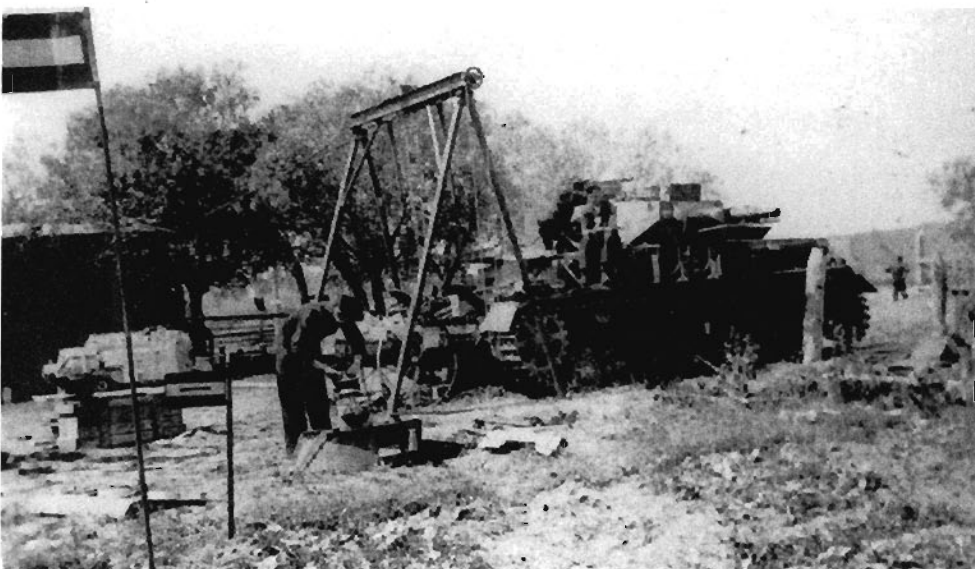


In order to deceive the enemy, the other combat vehicles are not to be found in the immediate vicinity of the command post. Here a column of Tigers approaches a regimental command post. STUMME



The combat vehicles are drawn up at some distance from the command post and carefully camouflaged. This photograph shows vehicles of the 2. Panzer-Division and schwere Panzer-Abteilung 505.

PRIEN



Completely unusual and to a large degree inappropriate is the location of a command post close to the repair and maintenance point. The command symbol proves it to be that of a regiment (white bar on a rectangular Waffenfarbe-colored field).



In the course of operations, requirements or opportunities for discussions and establishing contact continually arise for the commander. If all of those had to be conducted by radio, the radio net would be hopelessly overloaded and the enemy radio intelligence service provided with valuable information. In general, personal contact is more precise and effective.



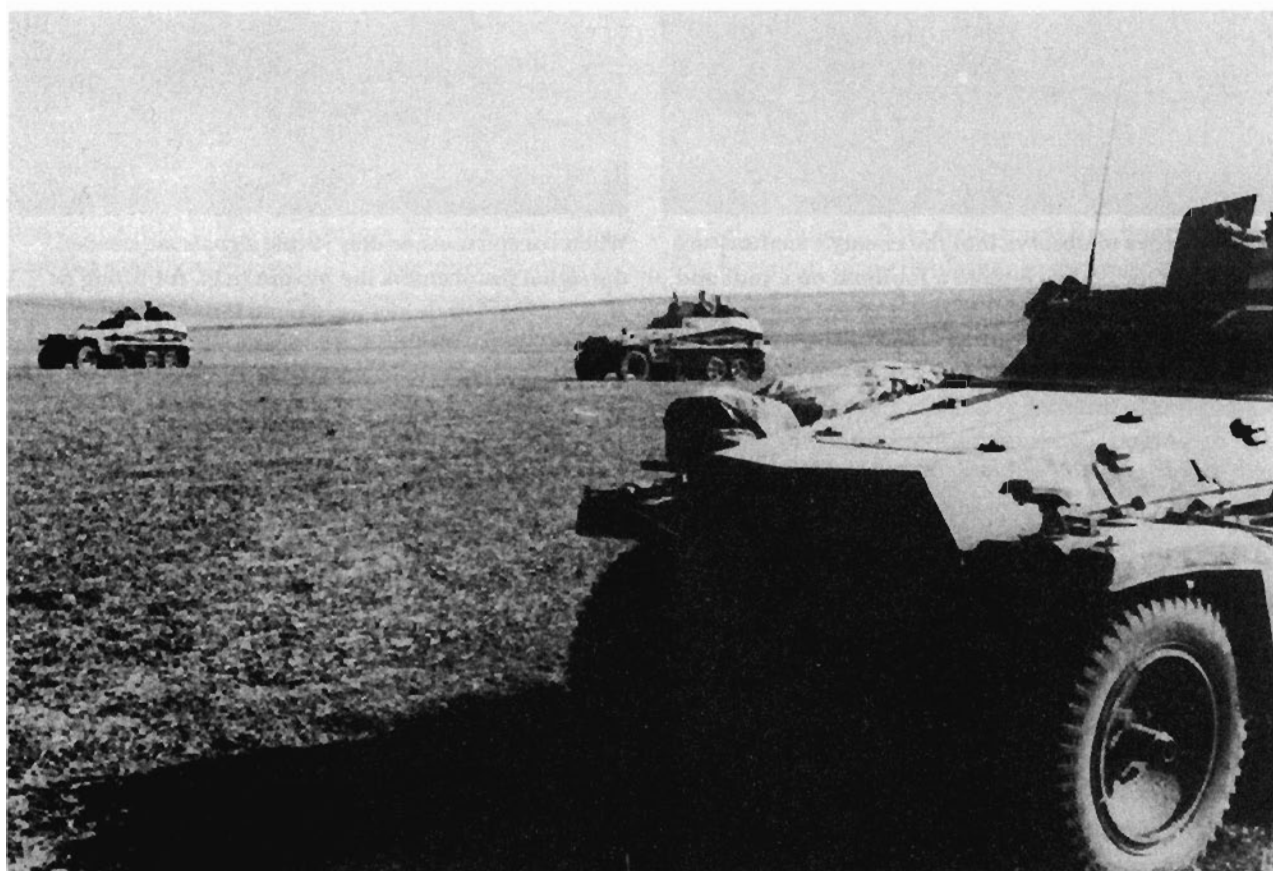


Whenever possible, issuing of orders takes place where there was a view of the terrain. Here, Major Burmester of schwere Panzerabteilung 503 observes a discussion between one of his company commanders and the commander of a Panzeraufklärungskompanie (armored reconnaissance company). Commanders and platoon leaders had a practical wooden clipboard/box, in whose center the combat map was secured in a more or less weatherproof manner. Items such as pencils, markers, rulers, etc. could be stored in the box.



Not only does the patrol commander inform the commander who had sent him out of his return, but also the troops holding the position.





Local reconnaissance provides important information for command. The battalion controls its own reconnaissance platoon for that purpose. It is led by one of the most experienced tank platoon leaders.



Opportunities to observe into the enemy's territory are manifold. One could climb to a foothold on a roof and stay there, while the vehicle remains concealed.



When conspicuous, widely visible signals are needed, the signal pistol enters the picture (e.g., for lifting an artillery barrage or as a warning to fliers). The meaning of the signal colors has to be disseminated in advance to all participants.

**Zuviel auf einmal**

Ein Mann, der dienstlich viel beschäftigt.  
Dies meist nach außen hin bekräftigt  
Durch möglichst häufige Diktate  
Und viele Fernsprechapparate.  
Er ist dann allseits auf Draht,  
Der reinste Fernsprechakrobat.  
Doch endet die Gemütlichkeit,  
Wenn alles tönt zu gleicher Zeit.

**Der Chef hat 2 Empfänger in seinem Panther:**  
Einen zur Verbindung mit der Abteilung und einen zum Funk mit seiner Kompanie. Beide Empfänger sind gekoppelt. Kommen auf beiden Empfängern gleichzeitig Funksprüche an, schaltet der Funker auf „Trennung“.  
Grundstellung der Bordsprechanlage beim Chef ist „FUNK-BORD“

**Wer hört Was?**

1. Funker! Du hörst Empfänger 2.
2. Der Kommandant hört Empfänger 1.
3. Richtschütze und Fahrer hören zusammen mit dem Kommandanten Empfänger 1.

Obwohl die Empfänger getrennt sind, kann jeder mit jedem Bordsprechen!

**Funk u. Bord**

**Trennung**

**Altkonfig. beliebig**

The Pantherfibel (tank primer) offered this practical proposal for allocating the crew in the command tank to monitor two communication nets. The radio operator listened primarily to the battalion net while the others in the tank monitored the company net. In that way misunderstandings were avoided. If the commander was needed on the battalion net, the radio operator reported to the company commander over the intercom.

# *Logistics and Maintenance* *(Die Logistik und Instandsetzung)*

Supply is not everything, but without supply, everything is nothing!

That saying makes clear the significance of logistical measures and their advance planning. An otherwise powerful armored formation that is immobilized by lack of fuel is worthless in the face of the enemy. Unless its equipment is in good technical and mechanical condition, the armored formation cannot fulfill its mission. For the tactician, logistical mastery is equal in importance to operational command.

The logistical support elements are designated as the combat and field trains (*Gefechtsstroß*). On the march and during operations it is divided into the combat trains I and combat trains II (roughly equivalent to field trains). In a rest or refitting area, there is no need to separate the trains. The *Gefechtsstroß* I must be kept small. Its composition changes and must be matched to the requirements of the battle. The *Gefechtsstroß* I can include:

- Refueling vehicles
- Ammunition carriers
- Recovery vehicles (*Bergefahrzeuge*)
- Vehicles for the weapons specialist and his equipment
- Replacement crews and the
- Field kitchen (*Feldküche*)

In every company the combat trains are led by an experienced noncommissioned officer.

On the march, the *Gefechtsstroß* I remains with the combat elements. Upon deployment it consolidates with the other company combat trains of the battalion and the combined *Gefechtsstroß* I is led by

a battalion officer. This enables it to be brought forward rapidly from the battalion rear area to exchange crews and provide supplies before the unit goes into combat.

All remaining vehicles of the trains go to the *Gefechtsstroß* II (field trains). In each company the field trains are led by the company first sergeant (a *Hauptfeldwebel* also known as the *Kompaniefeldwebel* or *Spieß*). The field trains are controlled by the battalion or by the larger organization to which the battalion is attached or assigned.

Experienced and enterprising officers must be assigned as leaders of both types of trains.

During operations, the repair and maintenance sections (*Instandsetzungsgruppen*) belong to the combat elements. The battalion commander orders their commitment. The leader of the maintenance section, the battalion engineer (*Ingenieur*), decides which vehicles are turned over to the regimental repair company (*Werkstattkompanie*) for repairs and maintenance. He maintains communication with the battalion commander.

The rations vehicles (*Verpflegungswagen*) of the headquarters and the line companies belong to the ration supply train (*Verpflegungstroß*). That train is led by the rations officer of the battalion.

The baggage trains (*Gepäcktroß*) are collocated within the battalion. They belong to the field trains if they are not moved on orders of the higher headquarters formation.

Medical services (*Sanitätsdienst*) are run by the battalion surgeon (*Abteilungsarzt*). Prompt medical attention, especially in combat, must be assured by

having a doctor accompany the attack in an armored ambulance (gepanzelter Krankenkraftwagen).

The establishment of the aid station (Truppenverbandplatz) and the transfer of the wounded to the clearing station (Hauptverbandplatz) are the mission of the second doctor. Those facilities must be at least one kilometer apart from the other logistic locations so that they will not be involved in combat in the event of an attack. They must be suitably marked. The battalion commander decides whether they are to be camouflaged or are to openly display identification. If aerial attack is imminent, the camouflage is immediately removed.

During operations, the company medics (Sanitätstrupp) are assigned to SPW's. The company commander orders their commitment and determines the locations for medical collection points (Verwundetennester). The medical collection points are planned to the rear of the positions and under cover. All of the soldiers must know their locations. Company commanders and platoon leaders ensure the care of the wounded who are brought there and decide whether further care by combat soldiers is needed. Depending on the ground vegetation and weather conditions, the medical collection point may be provided with protection against the weather, a roof, a fire for heating or additional provisions for allowing the wounded to rest. The first priority is to use buildings. The company commander reports the location of the medical collection point to the battalion command post.

Wounded are recovered and treated by their own tank crew or by other crews who provide security and cover for them. The platoon leader continues the mission and reports to the company commander. He decides whether the wounded will:

- Be taken along by their own crew
- Be left behind at a medical collection point or
- Be cared for by the company medics

The company medics care for the wounded and transport them to the aid station. Every soldier must know the location of the aid station. The company medics must know the route to the aid station perfectly. To the extent that the situation allows, they should scout the route in advance. The company commander determines the position of the company medics. It is usually near him. During fluid operations the medics follow the company and, in so doing, move from cover to cover.

If the company medics do not have sufficient transportation assets, the company commander decides whether:

- A multiple commitment of the medics can be made
- Other available transport assets are to be utilized (e.g., trucks belonging to the first sergeant, supply vehicles, vehicles belonging to reinforcing troop units)
- Additional transport assets must be requested or
- Tanks are to be used for the transport

The primary duty of the repair and maintenance company (Werkstattkompanie) is repairing tanks. For its work to be effective, the company requires a degree of stability. Therefore it is necessary that during ongoing operations, the repair company remain in the same location for several days before it relocates. Its timely and pertinent commitment is decisive for the maintenance of the combat strength of the formation.

Empty supply vehicles must be released immediately. They take wounded back with them to the aid station and then drive to the supply area of the controlling organization without delay. Only when they have been refilled with supplies and have returned to their own troops do the supply personnel bivouac and rest.

Supply trucks have the following cargo capacities:

- 3-ton truck: 2200 liters (about 581 gallons) in 110 jerry cans or 11 barrels
- 4.5-ton truck: 3600 liters (about 951 gallons) in 180 jerry cans or 18 barrels.

The companies and, ultimately, all the crews support logistical resupply measures by advance planning as well as constant status reports and immediate reports of damage and losses. The company first sergeant is responsible for forwarding rations. He receives the rations at the field kitchen and transports them to his company. During ongoing operations the company feeds itself with the help of combat rations (Einsatzverpflegung, the so-called "iron rations") that have been issued to each crew. Those must also be continuously replenished as a result of advance planning. The first sergeant brings the mail along with the rations.

Necessary personnel replacements are provided for by replacement crews (Wechselbesatzungen). Those, in turn, are continually replenished by per-

sonnel replacements requested by the first sergeant from field replacement units. Crews of tanks that have been disabled stay with their tank while it is being repaired. If the tank can no longer be repaired, they go to the holding area for the replacement crews. Soldiers returning from illness or wounds take their place in their original crew.

In every estimate of the situation (*Lagebeurteilung*), the tactical commander reports the:

- Number of available tanks
- Level of ammunition and fuel supplies and
- Requirements for rations, clothing and other supply items that are important for operations

He includes the time requirements for picking these items up and bringing them forward in his estimate of the situation.

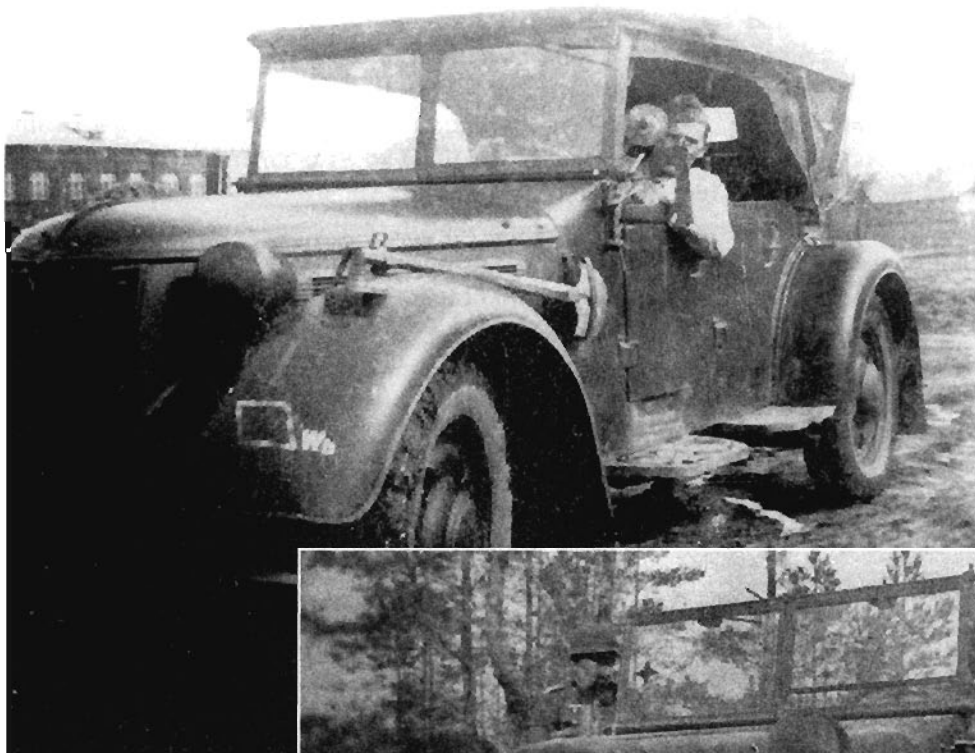
Platoon leaders and the logistics officer (*Versorgungs-offizier*) support the company commander. The logistics officer of the battalion advises the battalion commander and bears overall responsibility for the supply personnel of the battalion.

To a large extent, company operational readiness is determined by preventive maintenance of the equipment. It is the task and duty of all soldiers to use the equipment as set out in the technical manuals, with attention to performance limits, as well as to carry out regular and thorough technical servicing and maintenance. Maintenance and technical inspections were meticulously carried out right up until the last day of the war. The great operational successes of the Wehrmacht were only possible because of the outstanding performance of the logistical services.

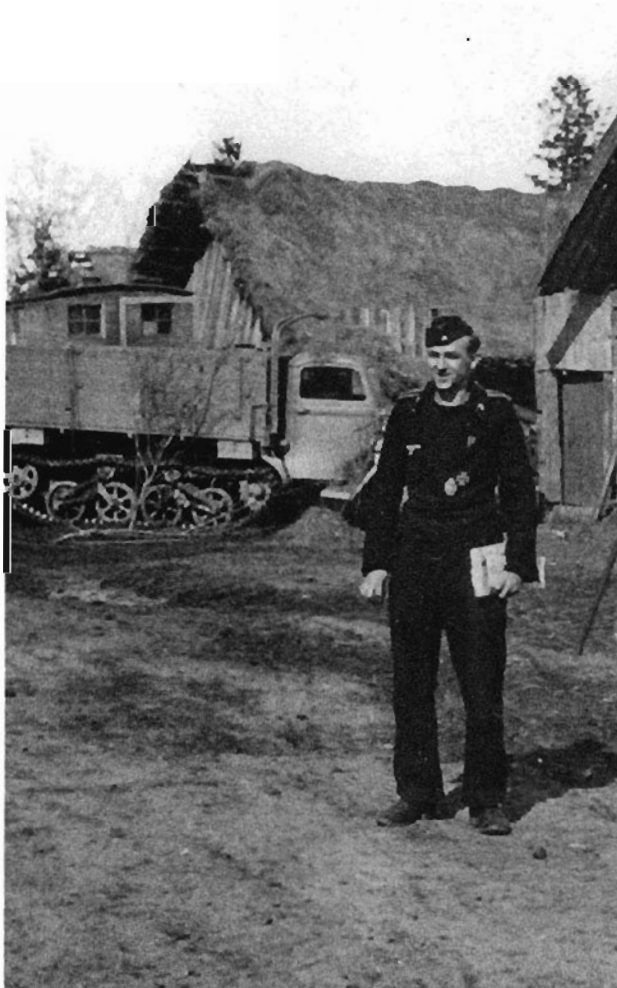




The commanders of the various units of the logistical services used a variety of small motor vehicles. The problem was that they were not equipped with radios.



An interesting view of the Type 82 military version of the Volkswagen.



The transport vehicles of the logistic services were either trucks or, later, half-tracked cargo vehicles, such as this 2-ton Maultier (Mule).





Considering the disadvantageously high consumption of the gasoline-powered German tanks, timely supply of fuel was a central problem for the German armored forces. The standard and probably least popular form of fuel supply from the crew's standpoint was from 20-liter (5-gal) jerry cans.



Refueling from a 200 liter drum was not necessarily any easier. If a hand pump were available, the drum could stand on the ground beside the tank. Otherwise, it had to be strenuously heaved up onto the rear deck of the tank.

AUTHOR'S COLLECTION



Filling the fuel tanks with help from an electric pump was incomparably easier.





Ammunition supply was next in priority. Cannon ammunition was usually packed, two to a case, in wooden containers. The crew first had to unpack the ammunition which was very well protected against moisture. The empty containers were meant to be returned.





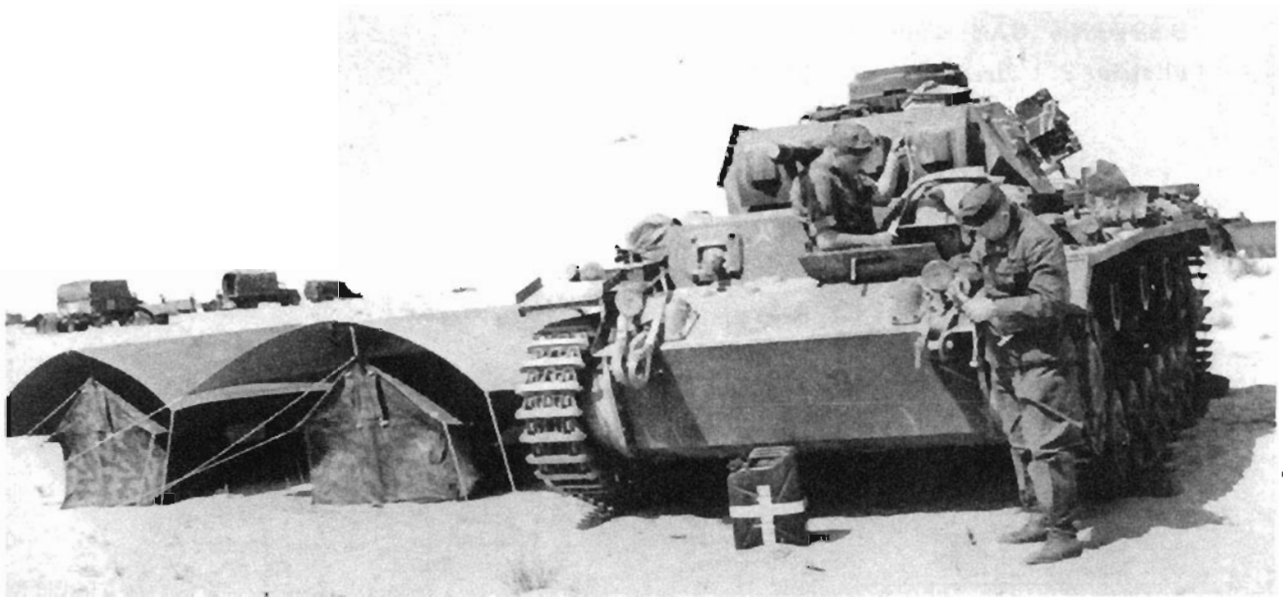
The ammunition is removed from the containers and passed up by a crew member from down on the ground. The rounds of fixed ammunition are passed in through one of the hatches and stowed away in the racks.



Supply points are often sites where there was great congestion of vehicles. Obviously, the danger from aircraft had been underestimated in this picture.



An official tailor first appeared at the division level, however, someone good with a needle and thread was always found at company level to help with uniform repairs and alterations. Obviously, this tailor was very good with his shears!



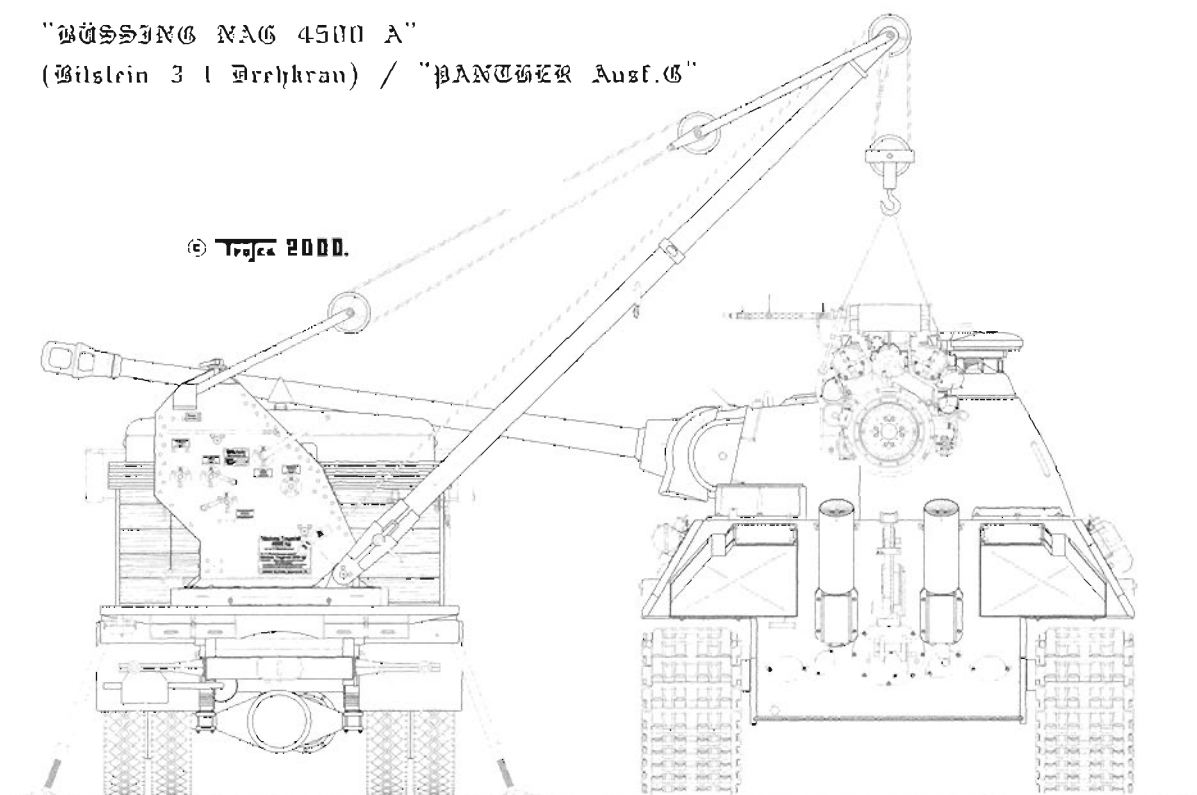
KARL-HEINZ MÜNCH

In areas of hot climate, the supply of drinking water is of equal importance. The 20-liter jerry cans are conspicuously marked with white crosses to prevent mistaking them for gasoline containers.

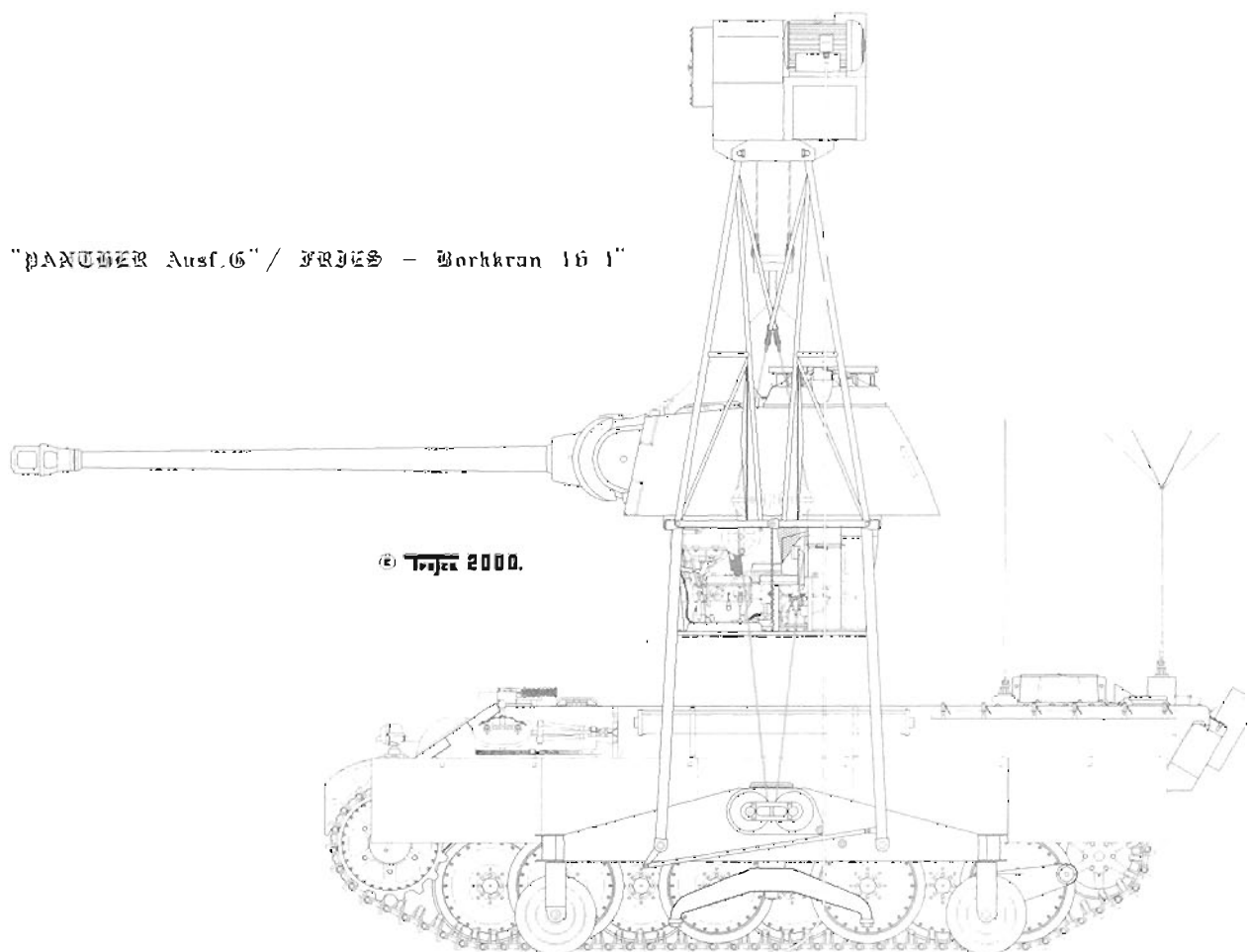


"WÜSTENNAAG 4500 A"

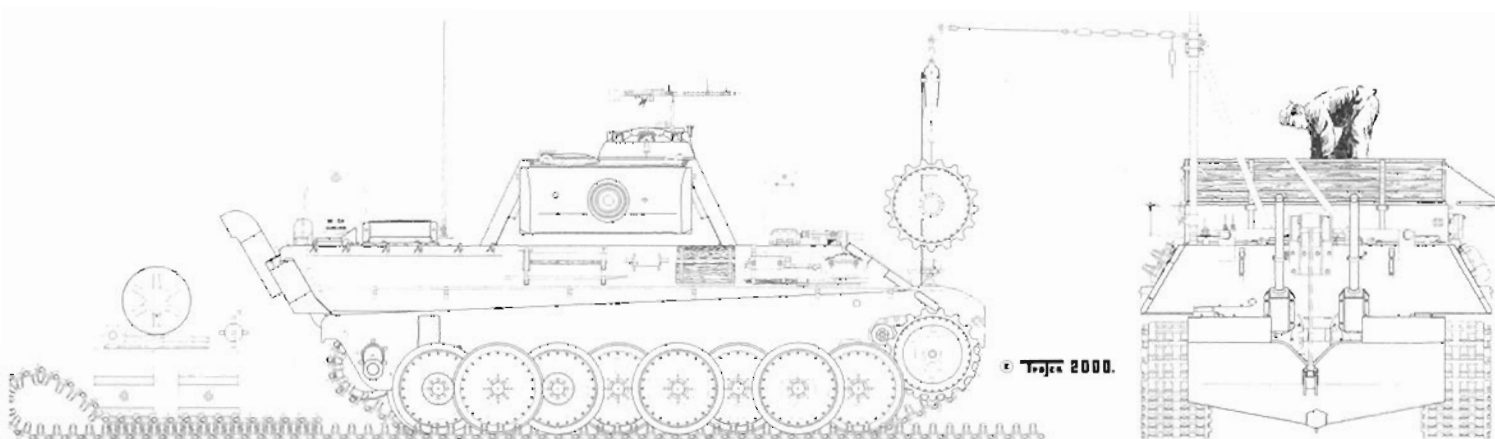
(Wilslein 3 I Drehkran) / "PANTHER Ausf. G"



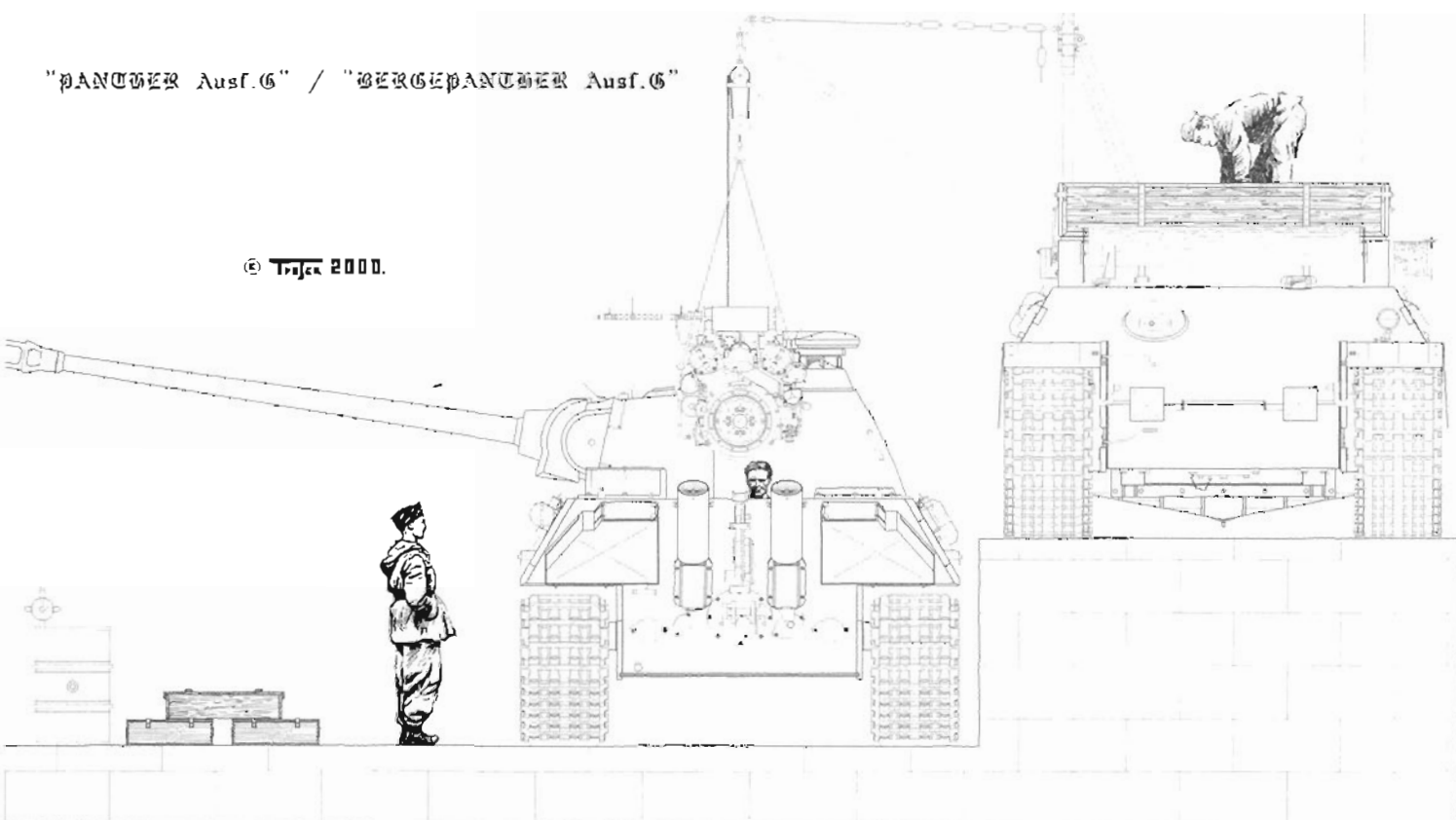
"PANTHER Ausf. G" / ZRÜTZ - Wörkkran 16 I"



"PANTHER Ausf. G" / "BERGEPANTHER Ausf. G"



"PANTHER Ausf. G" / "BERGEPANTHER Ausf. G"

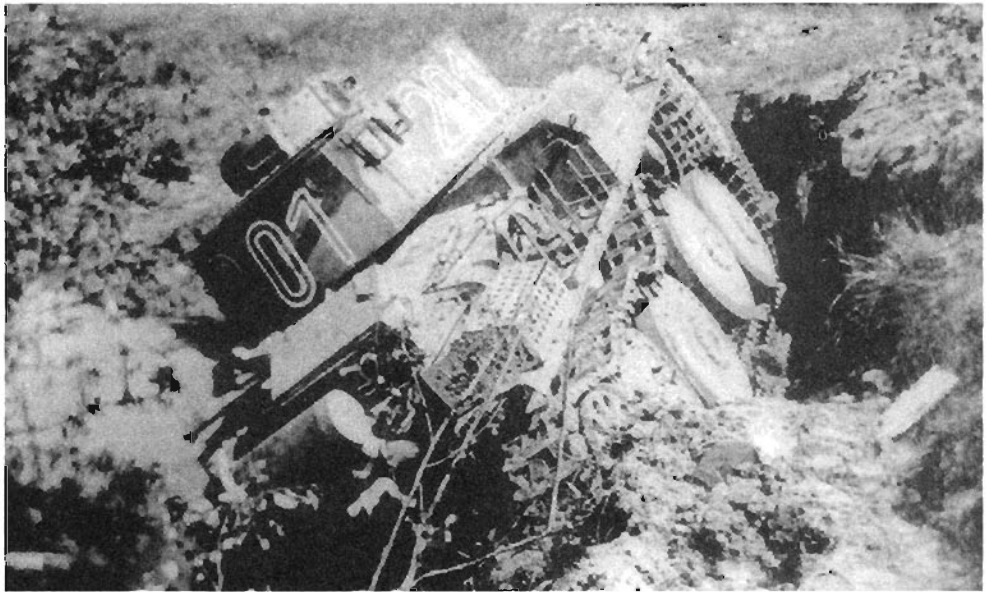






There are many ways to put a tank out of service. Every tanker knows of such an experience. The overwhelming majority of such cases are a result of inexperience or stupidity. Once a tank gets down to sitting on its hull, it is almost never able to get out on its own (for example, using a recovery beam).





Additional views of bogged down vehicles



A wooden trestle bridge has to be crossed with a great deal of trust in God!

Crossing expanses of ice also calls for prior reconnaissance.



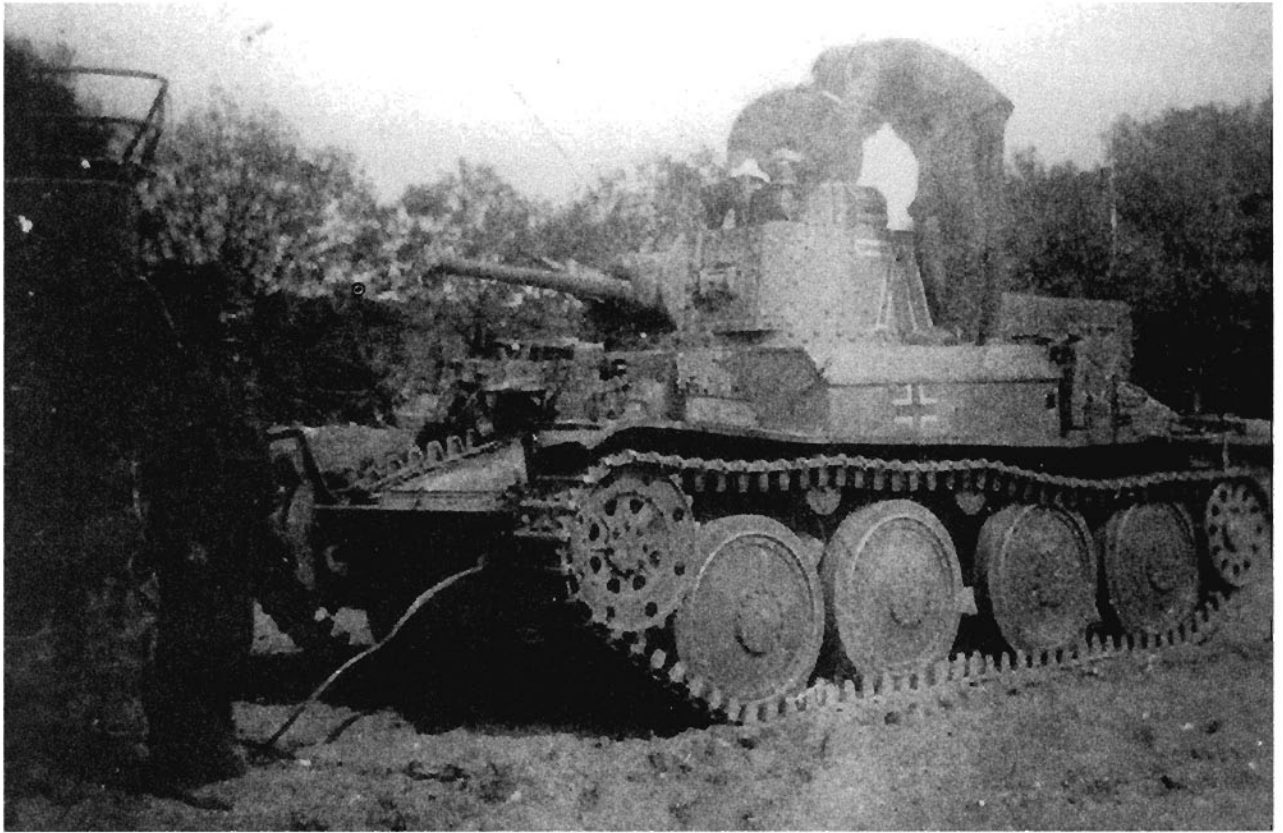
Many of the causes of breakdowns are mechanical problems. If the crew is unable to solve the problem on its own, it puts out the breakdown flag (black cross on yellow background) and prepares for recovery by readying the tow cables.



Towing is done with crossed tow cables. It allows smoother turning. This Tiger was from schwere Panzer-Abteilung 508. IERWIC



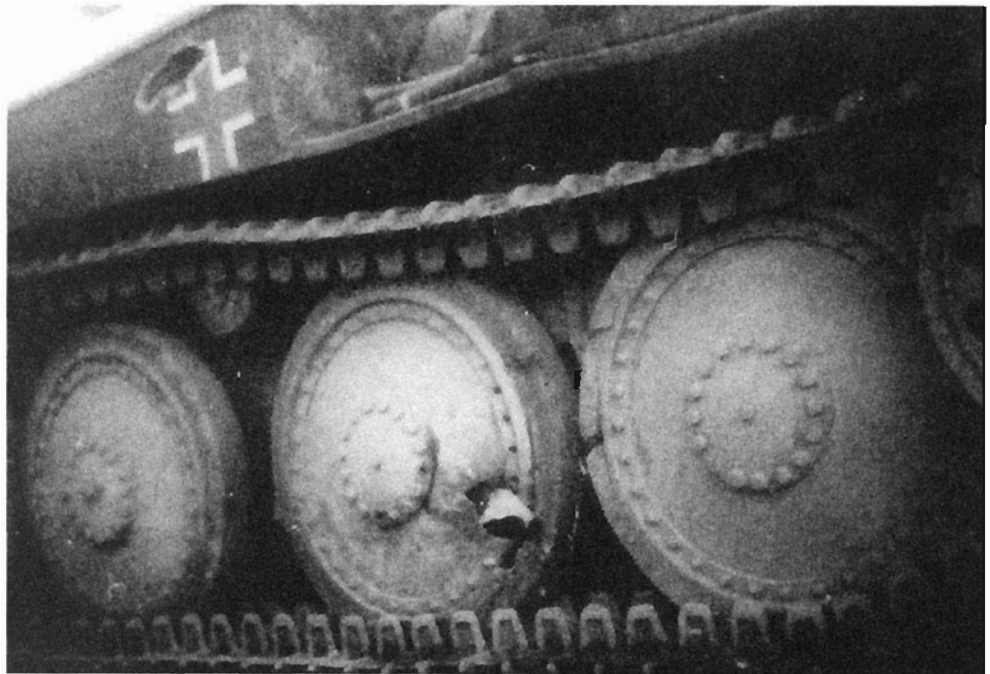




Because recovery vehicles are not available—or out of pride—neighboring tanks attempt to free other tanks from awkward situations. A tow should only be for a short distance—to the next available cover. Otherwise the transmission and final drive of the tanks doing the towing might be damaged.



A tank with damaged running gear could frequently make its own way to the repair facility, even though at greatly reduced speed.

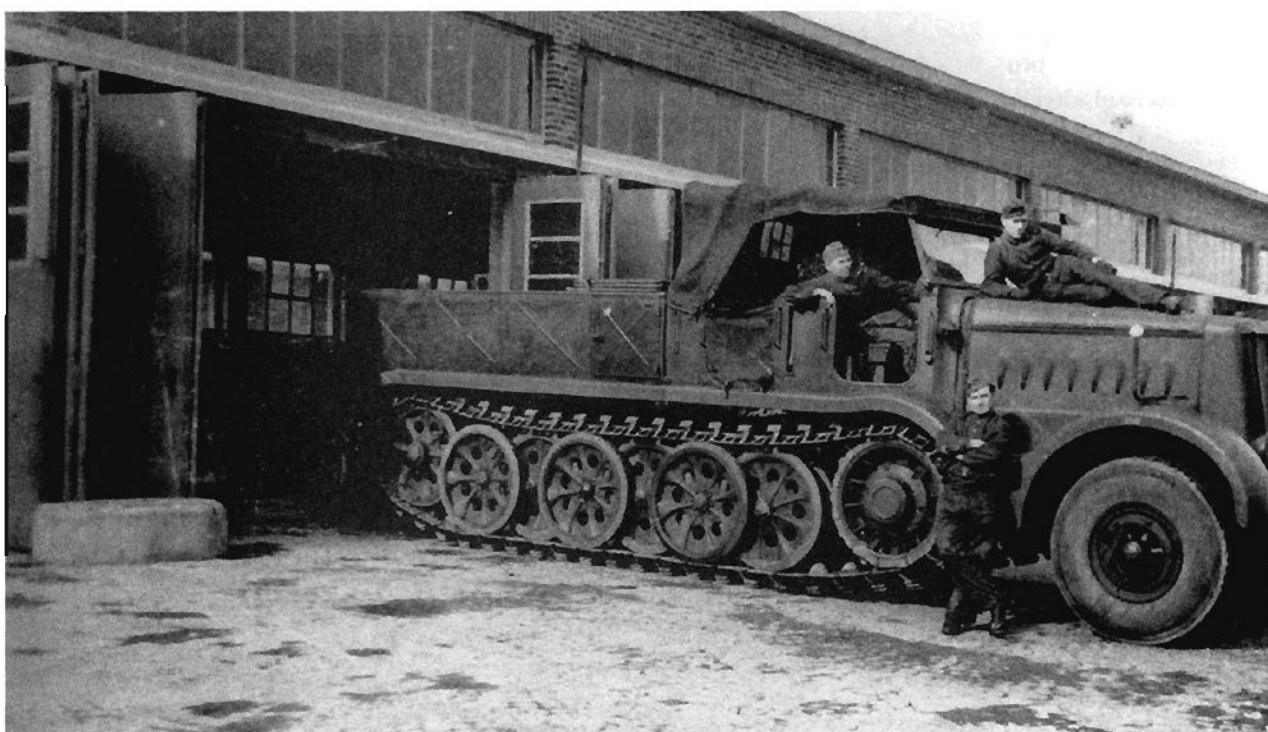


This Panzer IV can still move out under its own power to the repair site despite the loss of two of its road wheels.



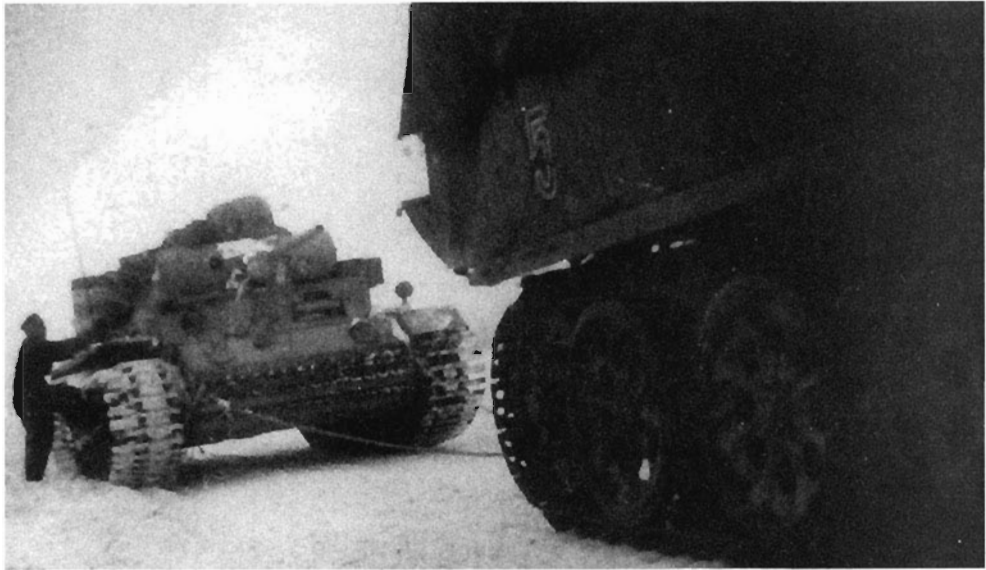
Additional view of the ubiquitous FAMO 18-ton recovery vehicle.





Until shortly before the end of the war, the only recovery vehicle available was the 18 ton-FAMO Zugmaschine (prime mover).

The 18-ton vehicles were able to recover and tow the relatively light Panzerkampfwagen I through IV with no problems.



This photograph shows the beginning of a recovery. The crew had cleared the towing eyes on the front of the tank. The two-armed tow-bar (one arm is lying in front of the right tank track) has been brought out by two of the crew members. The turret was traversed to the rear so that the gun was not in the way. The first prime mover has driven in front of the tank.





The two ends of the tow-bar were attached to the damaged tank. Notice how young the crew was!



Because of a lack of prime movers, a Panther or Tiger was also frequently towed by a single vehicle—in contravention of regulations.



To assuage the honor of the tank crew, it should also be shown that, on occasion, the prime mover itself had to be recovered. In the next two photographs, this recovery unit developed the idea of being able to tow the errant prime mover out over the rim of the ditch after righting it with a block and tackle.



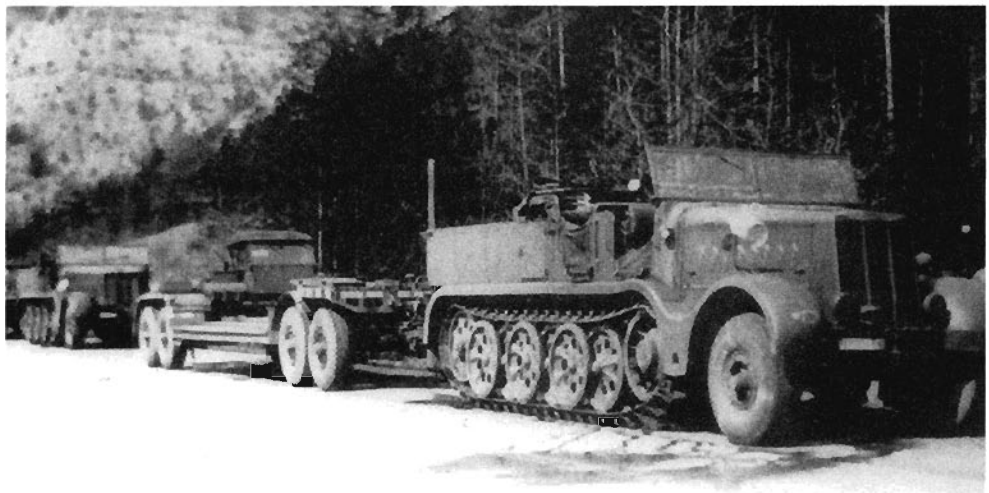
The recovery proceeds  
in a field-expedient  
manner . . .



. . . the makeshift  
method works!



If the damaged tank  
had to be moved a  
long distance, then a  
low-boy trailer was used.  
Here, an Ah 116 with  
24-ton capacity.







Although a good method for transporting damaged or inoperable vehicles, the low-boy trailers (Sonderanhänger) were in short supply.

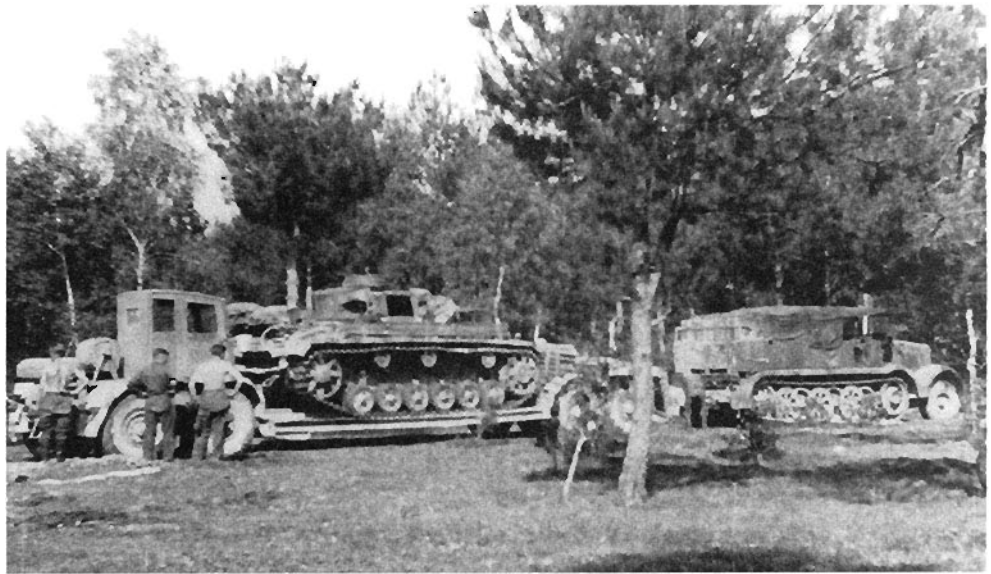


A column of prime movers with low-boy trailers moves out.



In order to load the trailer, the rear axle unit is unhitched so that the tank can be pushed or towed on. The tractor was usually used to push the tank on to the trailer.

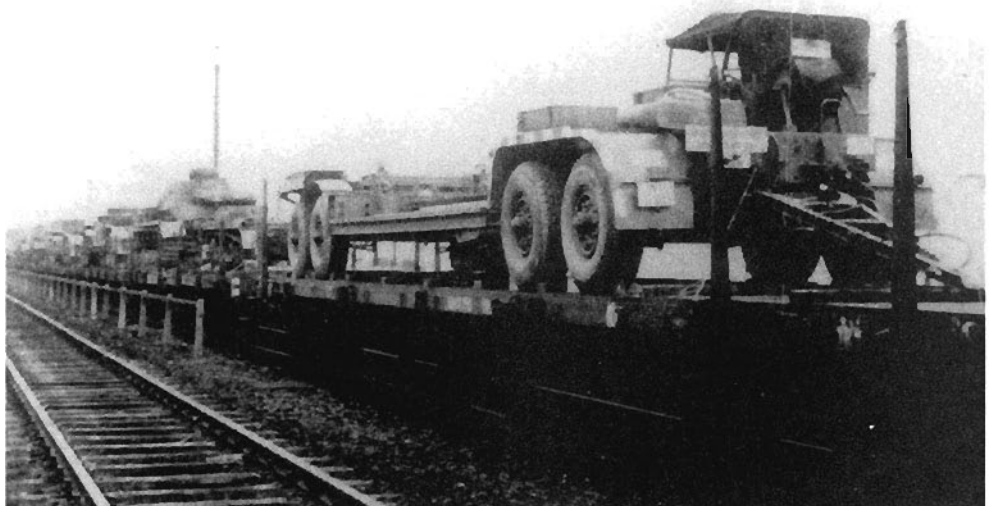
In this case, a Panzer III is pushed on to the lowered trailer. At that point, the rear wheel assembly was reinstalled.



Naturally, crossing a military bridge with such a rig gave rise to tense moments!



Obviously, the trailers could also be transported by rail along with their "clients."

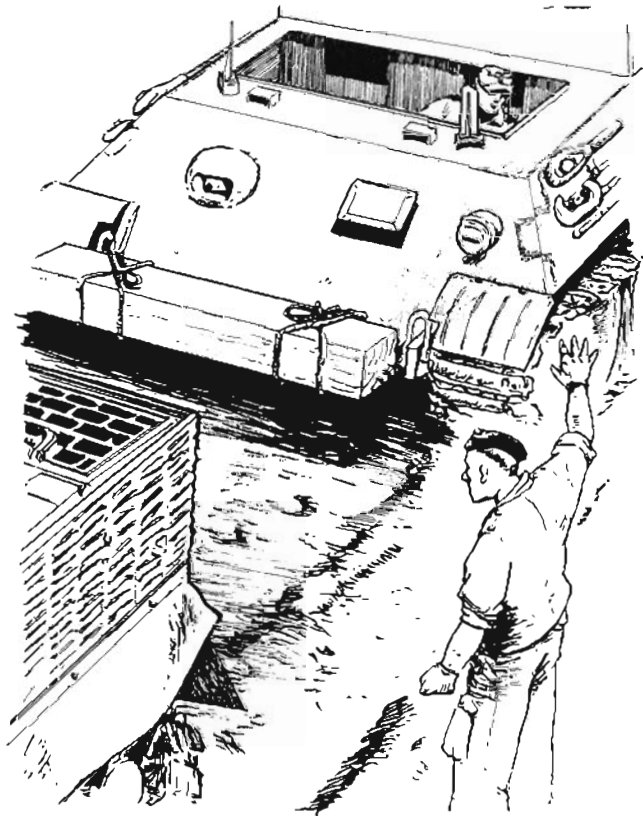
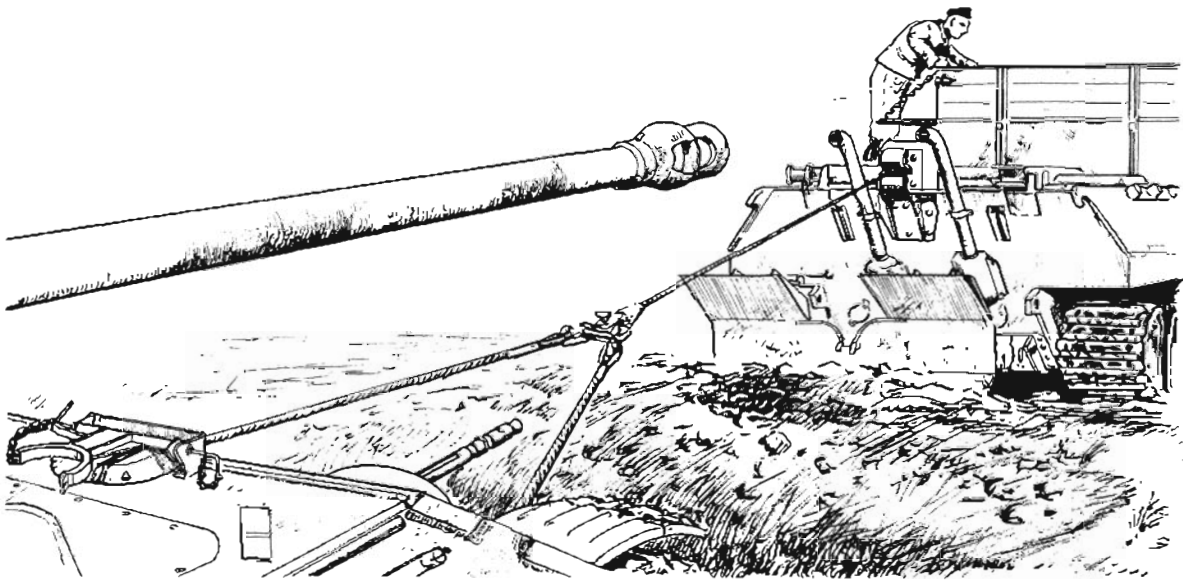




This picture shows a quite different kind of recovery, in which a Panzer III retrieves a derailed railroad car. Undoubtedly that called for a bit of persuasion in the form of some commissary goods!



It was not uncommon for towing pintles to break. Because of the great strain of towing, welding seldom achieved satisfactory repairs.



Incomparably more effective was the “true” recovery tank, the Bergepanther (recovery Panther). It was able to deal with the heavy tanks. Unfortunately, only a few were built. In contrast with the FAMO prime mover, the Bergepanther was equipped with a sufficiently powerful winch for tank recovery. The recovery tank secured itself from being dragged with a ground-anchor blade.



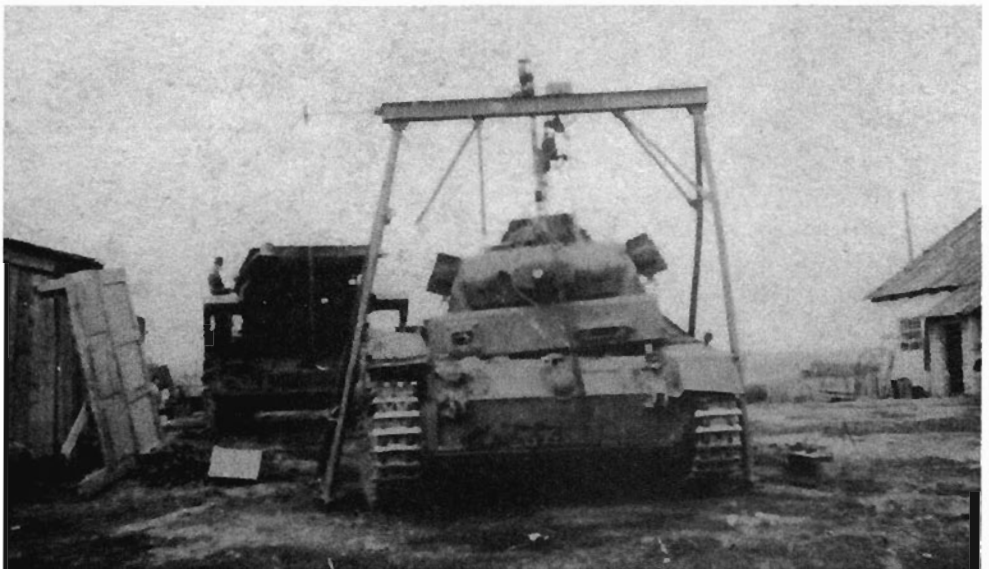
At the repair point, each tank is worked on according to the length of time required for the repair, the urgency of repair and the availability of replacement parts. As a rule, the crews remain with their tanks and assist. During the early years of the war, the companies had problems because tank battalions had different types of tanks in them.



The repair platoons and Werkstattkompanien had light crane trucks for lifting loads of 3 to 7 tons.

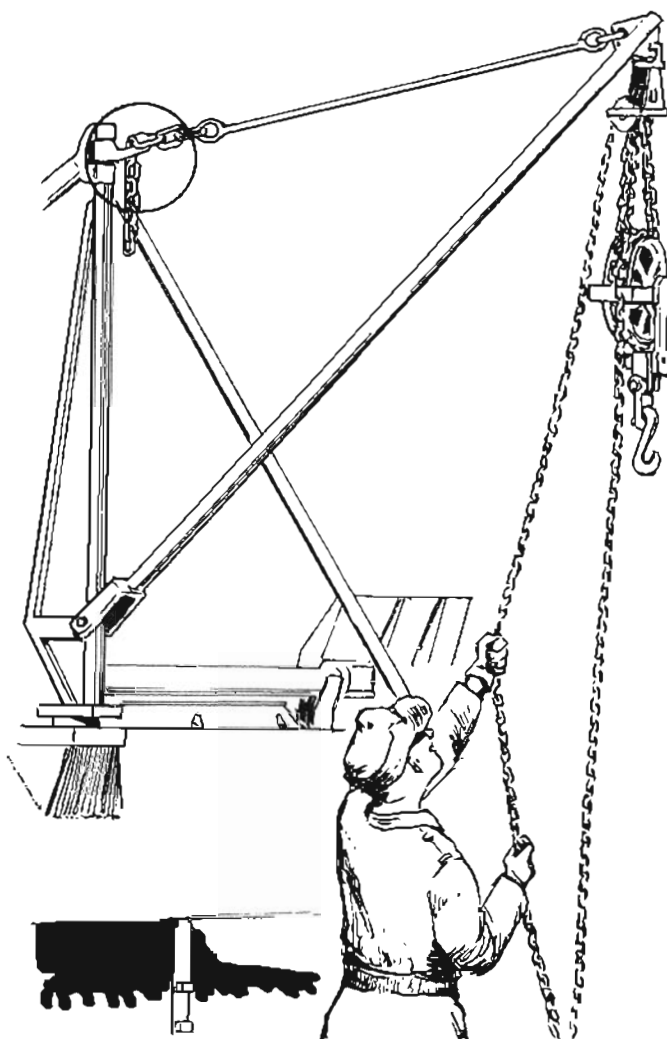


For work on the medium Panzerkampfwagen III and IV, the Werkstattkompanie had portable cranes that could be assembled. Here we see the superstructure of an early-model Panzer IV being removed.





Transmissions, even turrets, of medium tanks could be lifted with those cranes.



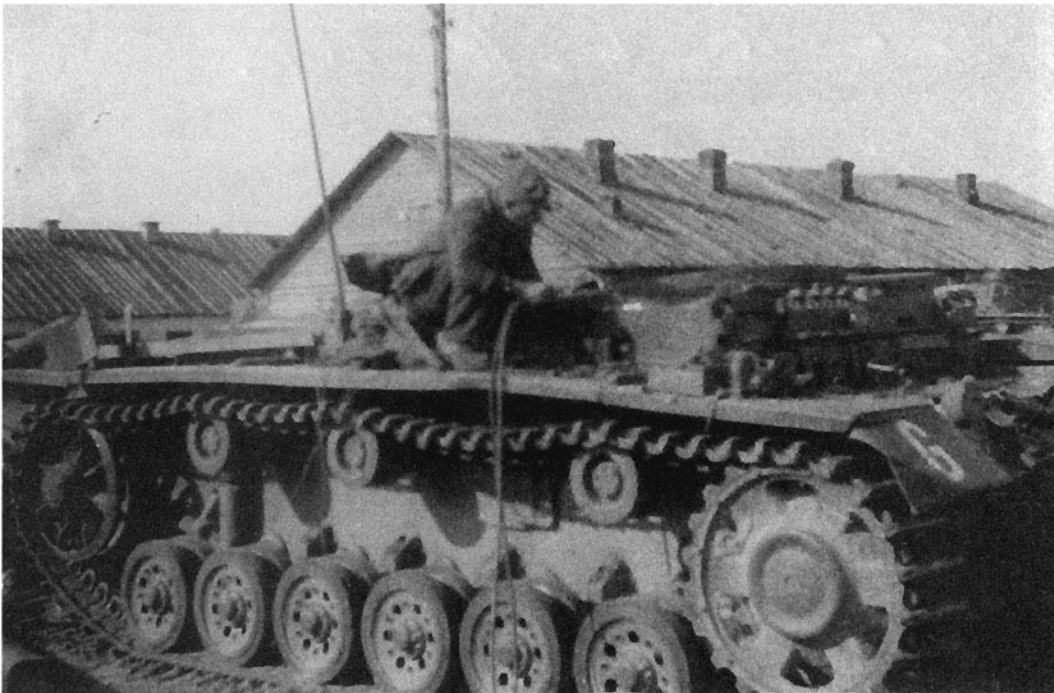
Practical cranes could also be set up on the tanks themselves. This illustration shows the crane installed on the Bergepanther.



The gantry crane was developed for heavy loads. However, setting it up took more than an hour.



The crane could be folded together and transported on a practical trailer.



The field repair facilities had almost all of the tools required for repairs, including welding equipment.





Work on motors and transmissions was considerably more difficult. Highly qualified civilians from the manufacturing plants worked at the Werkstattkompanien, performing so-called "Werkstattmeister" work. For protection under the Hague Rules of Land Warfare, they wore uniforms. As additional support in repair and maintenance, the Armee and Heeresgruppe also had their own repair and maintenance units.

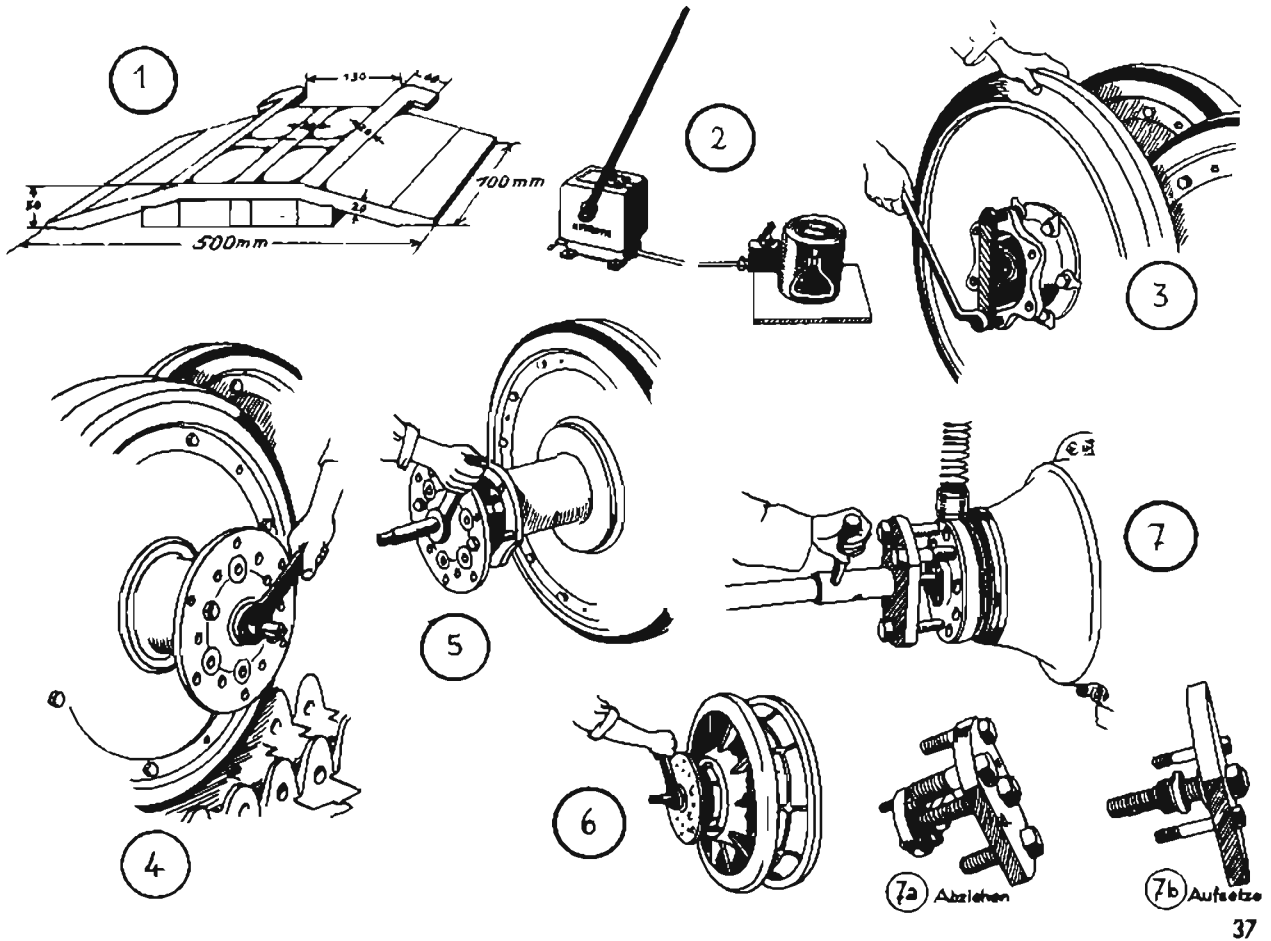


Often—all too often—the tank crew has to work on running gear and tracks. The repair and maintenance platoon only helps in exceptional cases.



Breaking track is never an easy process, especially under field conditions.





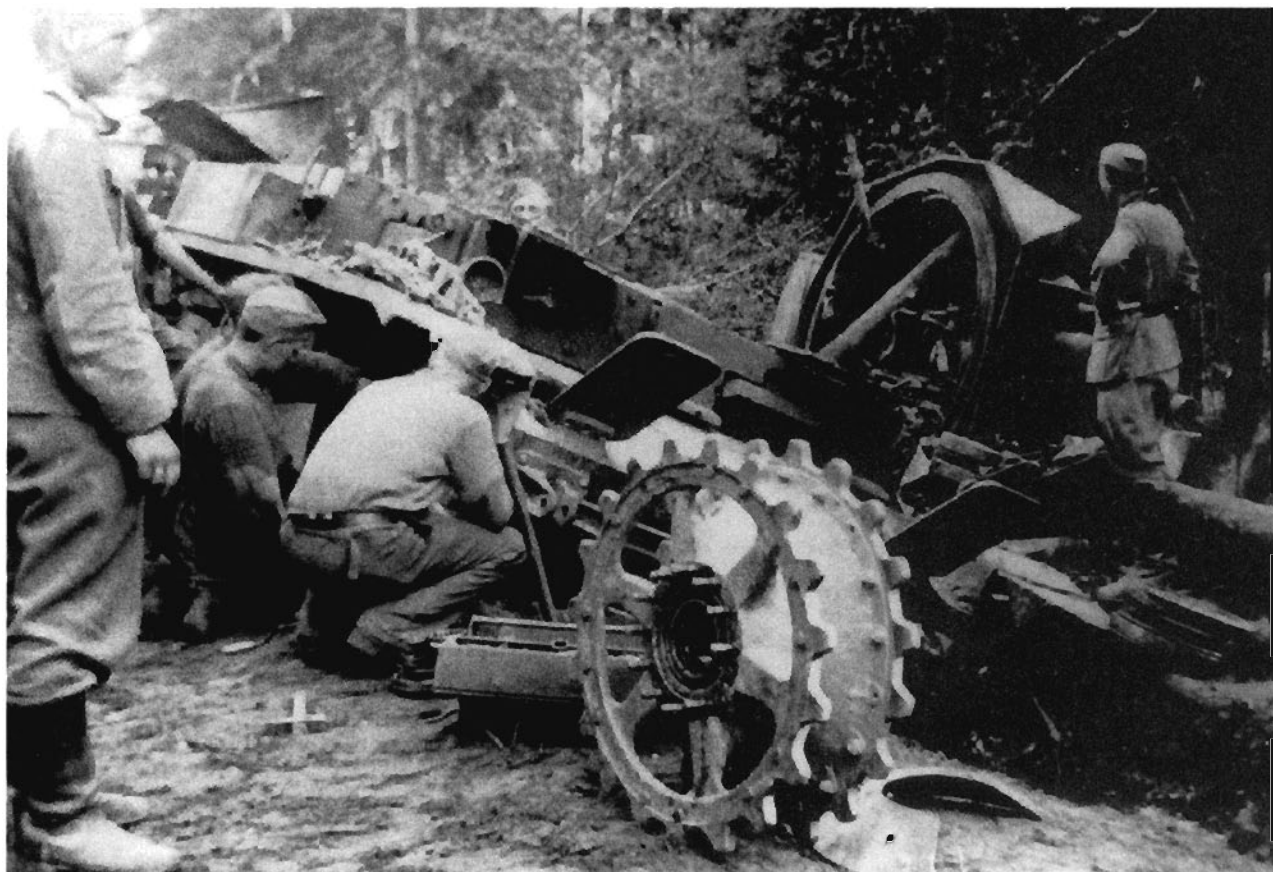
37

The service manuals for this work were very graphic and, to a high degree, self explanatory. Here are illustrations from the Tigerfibel (Tiger primer).

Past a specified level of destruction, the wrecks were scrapped for parts.

That decision was made by the regimental engineer.





At a certain level of destruction, a fighting vehicle was only good for salvage.



## CHAPTER 7

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# *Combined Arms Operations (Die Zusammenarbeit)*

**I**n the Second World War, tanks were frequently committed alone. However, that was usually borne out of necessity, because the other branches of the service were not in a position to work closely with armor. In spite of all its combat power, situations rapidly develop in which the tank cannot bring its strength into play. That is especially true in difficult terrain and in offensive operations against deeply echeloned defenses as well as when running into obstacles.

Particularly at the beginning of the Second World War, problems developed with assaults at a brisk tempo. Neither the infantry nor the horse-drawn artillery were able to follow. The tanks were on their own, with effective support coming only from the air.

That was the reason that the infantry of larger armored formations (gepanzerter Großverbände) was motorized. At first this was done in a provisional manner, using trucks. The experience of the First World War led to the formation of the mechanized infantry (Panzergrenadiere). Granted, they were only equipped with the mediocre protection of the SPW Sd.Kfz. 251, but they were at least in a position to follow close behind the tanks. That was also true for the combat engineers. The outfitting of the antitank arm (Panzerjäger) and the artillery with self-propelled mounts (Selbstfahrlafetten) came late and, at first, only in limited numbers. The concept of combined arms combat that is so important for armor only became a reality in 1942.

### **MECHANIZED INFANTRY (PANZERGRENADIERE)**

As the name suggests, the Panzergrenadiere were formed from the motorized infantry as a specialized branch for combined operations with tanks. They belonged to the Panzertruppe(n) and were in the area of responsibility of the Inspectorate for Armored Forces. That set them apart in a fundamental way from the mechanized infantry of the Americans or the motorized riflemen of the Soviets.

Generally the Panzergrenadiere do not carry the burden of combat on their own. Instead they are the most important auxiliary arm of the tanks. Their employment has to be strictly tied to the actual objective of the commitment of the tanks. It is vital that the commitment of the Panzergrenadiere does not put a brake on the fluidity of the movement and the dynamic of the maneuver-oriented operations of the tanks. In contrast to infantry, the Panzergrenadiere are capable of both mounted and dismounted combat. The infantry performs its missions only in a dismounted role. It is important to keep in mind that dismounted combat is very time-consuming and incurs the danger of leaving the tanks stationary, which increases their vulnerability. If the operation is delayed, the enemy who is under attack may also be able to take advantage of the time he gains by reorganizing in the depth of his sector. A delayed resumption of operations is costly.

The tactical commander must therefore carefully consider how he effectively commits his Panzer-



A necessary prerequisite for successfully carrying out operations was mastery of the fundamentals of combat with combined arms. This picture clearly shows that cooperation in a Kampfgruppe. The grenadiers ride on the tanks during the approach march phase. Vehicles of the combat support elements (armored engineers and artillery forward observers) are integrated in the formation. KARL-HEINZ MÜNCH

grenadiere and what missions he assigns to them. There is a fundamental difference between combined and separate commitment. The latter, however, must always be focused on the overall mission, as stated in the maxim: Move separately, strike together! (*Getrennt marschieren, vereint schlagen!*)

It then follows that the Panzergrenadiere:

- Fight as mounted troops for as long as possible
- Complete their dismounted tasks as rapidly as possible and
- Are only committed to fulfill "armor-appropriate" missions.

How should that final item be understood? The interests of an armor and an infantry commander differ fundamentally. If the one thinks of leading wide-ranging maneuvers and delivering massive blows, the other, in contrast, has to control the terrain that is assigned to him and clean out the enemy that is there. Taking and holding terrain is, there-

fore, the primary objective of infantry operations. In armor operations, that is only a means to an end.

Armor operations were early seen in terms of combat at sea. The tank hunts down the enemy and delivers a destructive blow to him. It does not concern itself with elements that are incapable of combat nor with local pockets of resistance. Certainly Panzergruppe Kleist would never have got as far as the Meuse in 1940, let alone to the English Channel, if it had started a free-for-all at every point of enemy resistance.

It therefore follows that Panzergrenadiere execute completely different missions than infantry forces. The training manual—*Heeresdienstvorschrift 298/3a* concerning command and control and combat operations for Panzergrenadiere (*Führung und Kampf der Panzergrenadiere*)—hits the nail on the head:

Mechanized Panzergrenadiere are the armored assault troops (*Sturmtruppen*) of the Panzerdivi-

sion. Their unique, rapidly maneuvering operations form the prerequisite for operational commitment. Together with tanks they form a close combat team. They carry out independent assignments in bold, rapid action.

A high level of maneuverability, all-terrain capability, armored protection, high firepower and an abundant outfitting of the means of command and control enable them to master difficult situations rapidly and successfully.

Mechanized Panzergrenadier formations fight from Schützenpanzerwagen. Enemy action and terrain can temporarily force them to a rapid change from mounted combat to fighting on foot. Even during dismounted operations, the heavy weapons mounted on the Schützenpanzerwagen—(antitank guns and mortars) in mobile commitment—give them a unique capability.

Combat elan and boldness, united with lightning-fast power of decision and great maneuverability, characterize the Panzergrenadier.

The following primary tasks of the Panzergrenadiere arise from that:

- Support of the tank attack by eliminating enemy antitank guns that have not been taken out
- Safeguard the tanks from attack by enemy antitank hunter/killer teams
- Clear, occupy and hold territory gained by the tanks
- Rapidly exploit success by tanks and
- Provide security for assembly positions, pauses during combat and movements of armor formations

The Panzergrenadiere often have to create the prerequisites for tank operations:

- Fight for jump-off positions (*Ausgangstellungen*) and attack positions (*Bereitstellungen*) for a tank attack
- Attack the enemy in or beyond terrain that prevents or limits passage of tanks
- Attack obstacles, rivers and terrain sectors that are unsuitable for tanks and
- Fight in towns and woods.

In summary, it can be said that Panzergrenadiere have three primary missions:

1. Overcome defiles, obstacles and barriers with speed and surprise
2. Rapidly advance through enemy-held areas in which opportunities for observation and

fields of fire are limited and, if necessary, claim the battlefield in dismounted combat

3. Take and hold terrain sectors that do not have clear fields of observation and/or are difficult to negotiate in advance of other forces.

The tactical commander, therefore, must evaluate the enemy situation and terrain in advance so as not to make excessive demands on the Panzergrenadiere. He must always regain their use as rapidly as possible and avoid slowing down the momentum of the tank movements.

In concrete terms, how does the cooperation between the branches take place? With regard to the force mix, one mechanized infantry company (*Panzergrenadierkompanie*) is generally attached to a tank battalion (*Panzerabteilung*). There are in principle two types of commitment: The commitment of the entire company as an integral unit or the distribution of the platoons among several tank companies. The commander of the Panzergrenadierkompanie, on the other hand, may receive one or two tank platoons attached to his unit, so that it forms an additional maneuver element in the battalion's combined forces. The nature of the task organization depends, first of all, on the terrain and on the mission. During offensive operations, it has most often proven successful to keep the Panzergrenadiere together, to give their employment more combat power. The more unfavorable the terrain is for armor, the more desirable it becomes to farm out the Panzergrenadiere. However, task organizing does not extend below the platoon level! Only when performing security duty or reconnaissance does the assignment of individual armored personnel carriers enter the question.

As far as the technique of command is concerned, the battalion commander or the company commander command their Panzergrenadiere in exactly the same manner they do their own tankers. All in all, they are involved in reconnaissance of the terrain and issuing of orders; they are commanded during movement by radio and signals. Hierarchies of rank remain in the background. When it comes to assigning missions, consideration is based on the special strengths and weaknesses of the branch (*Panzergrenadier* vs. *Panzer*). Fields of fire and ranges must be appropriate to the branch, as well as tasks assigned. As a result, the tank always has as a major task in protecting the Panzergrenadiere from



the major threat to their existence, the enemy armor. Movements must be coordinated and times at which fire is to be opened must be discussed.

The position of the Panzergrenadiere in the combat formation is, first of all, governed by the terrain and conditions of visibility. Because of their moderate armor protection, SPW's are generally echeloned to the rear so that they do not come into enemy armor engagement range. In open terrain they follow the tanks, taking advantage of depressions and vegetation for their own movements. Whenever possible, they move on a road network and proceed in line. If they have to negotiate terrain that does not have good fields of observation, the same formations for developing the situation apply to them as for the tank platoons. When performing security and defense for a limited period of time, the dismounted riflemen dig in and fight according to the fundamentals of infantry combat. If they have to withdraw, the re-mounting must be carefully planned in advance. When the Panzergrenadiere are dismounted, the SPW's are located under cover and the radio set is manned. The machine guns are dismounted and employed with the riflemen. Those SPW's equipped with cannon take hull-down positions and provide cover.

When working with attached tanks, Heeresdienstvorschrift 298/3a lists the following as necessary components of orders for assigning missions:

1. Enemy situation (especially antitank defenses)
2. Friendly situation
3. Terrain (trafficability, terrain obstacles, cover from observation and enemy fire)
4. Objective of the attack and phases of the attack
5. Intended conduct of the operation (directions of attack, attack formations, fire support)
6. Move-out times for tanks and Panzergrenadiere
7. Liaison and coordinating instructions and
8. Actions following the attack.

## INFANTRY

Cooperation between armor and infantry is difficult, since infantry fight only on foot. The kind of close cooperation that takes place between tanks and Panzergrenadiere is not usually possible. The commitment of infantry forces thus often takes

place independent of the commitment of tanks. That means that the infantry carry out missions for which they are independently responsible in other locations, while the tanks concurrently fight in accordance with their own specialty (high mobility). From that, it follows that the commitment of the infantry either has to precede the commitment of the tanks (for example, crossing a contested water obstacle) or be without direct tactical connection (for example, holding key terrain). Only on an operational level (division or corps) is there a connection. It must never turn into a situation where tanks have to wait for the infantry!

A major advantage of Panzergrenadiere over infantry, therefore, is their rapid availability.

All tank commanders seem to have had a fair number of unfortunate experiences with infantry. Unfortunately, the viewpoint of the tactical commander of infantry generally corresponds with his grass-roots perspective in battle. When subject to command by infantry officers, tanks have frequently been committed in a stationary role as moveable bunkers with platoons divided up, movements prohibited under the threat of punishment, tanks assigned to terrain that is unsuited to them and the like. Subordination to infantry, therefore, excites anything but enthusiasm in the tanker. Nevertheless, as the end of the war drew near, the tank was often the most valuable support for a hard-fighting infantry that had only had brief training and was no longer equipped with weapons that were appropriate to the times.

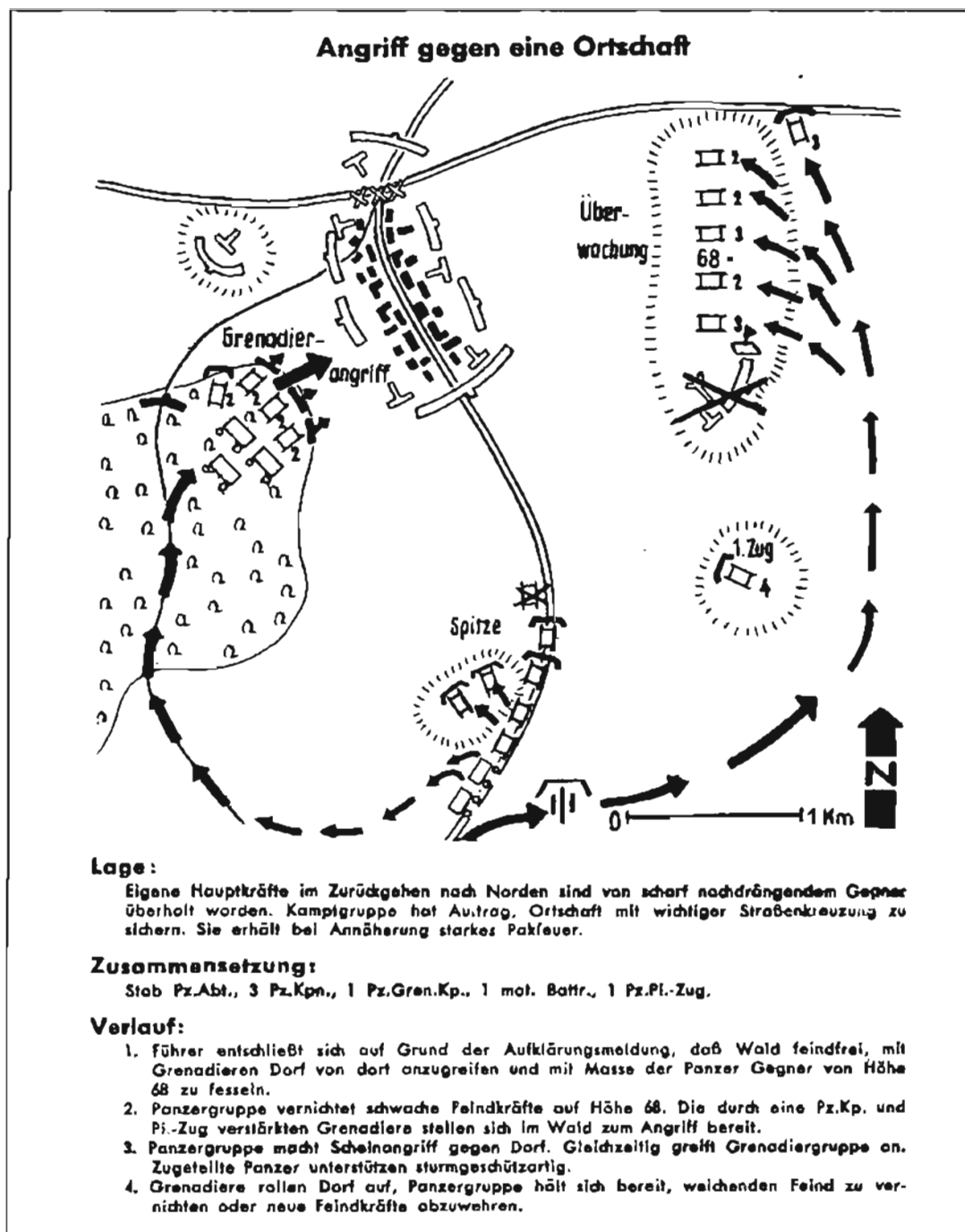
## ARTILLERY

In spite of all their firepower, tanks are dependant on the support of extensive indirect fire. That is especially important in attacking deeply echeloned defenses or preventing the prompt reinforcement of the enemy in defense.

As a rule, the battalion has several artillery forward observers under its operational control to coordinate the supporting fire. They are assigned to individual companies based upon the Schwerpunkt of the operation.

The respective company commander involves the forward observer comprehensively in the total planning and command and control of the operation. Highest priority goes to choosing his position in the attack or his dismounted observation position. The forward observer must know:





#### ATTACK AGAINST A BUILT-UP AREA

**Situation:** Main body of friendly forces, withdrawing to the north, are overtaken by an enemy who is pushing hard on their heels. Kampfgruppe has the mission to cover the village with its important highway intersection. On approaching the village, the Kampf-gruppe receives strong antitank fire.

**Task Organization:** Tank battalion staff; 3 tank companies; 1 Panzergrenadier company; 1 motorized battery; and, 1 Panzerpionier platoon.

**Course of Events:** 1. Based on reconnaissance reports, the commander determines that the woods are free of the enemy and he will attack the town from there with the Panzergrenadiere. He will pin the enemy with the main body of the tanks from Hill 68. 2. The Panzergruppe destroys weak enemy forces on Hill 68. Reinforced with one tank company and the Panzerpionier platoon, the Panzergrenadiere prepare for the attack in the woods. 3. The tanks deliver a feint against the village. At the same time, the Grenadiergruppe attacks, supported by the attached tanks functioning as assault guns. 4. The Panzergrenadiere roll up the village; Panzergruppe stands by to destroy the enemy as he withdraws or to fend off new enemy forces.

- Enemy situation
- Concept of the operation (including Geländeaufklärung, signals and emergency signals)
- Positions of friendly troops and planned movements
- Dead ground
- Obstacles and
- Location of the commanding officer.

The forward observer orients regarding:

- Missions received
- Target reference points (Zielpunkte), engagement areas (Feuerräume) and interdicting fire (Sperrfeuer)
- Times and areas for adjusting fire (Einschießen)
- Time, location, type and duration of fires for effect (Wirkungsschießen) and
- Changes in amount of support available (for example, priority to neighboring units).

The forward observer accompanies the tanks in his SPW, moving from cover to cover, skillfully taking advantage of the terrain while considering opportunities for observation. He is a member of the company command net on the radio.

In combat he keeps close contact with the commander, puts in requests for fire, reports results of the observations of other forward observers and passes on information on the course of the artillery battle. On his own he makes recommendations for the use of artillery. Calls for fire from the platoon leader and company commander should contain:

- Target location (where is the enemy?)
- Target description (which enemy, what is he doing?)
- Desired effect (e.g., destroy, pin down, interdict)
- Time (when to fire and, if necessary, for how long).

If fire is requested for several targets, the company commander prioritizes the sequence of engagement. The decision for artillery commitment is made by the artillery battalion itself in coordination with the tactical commander.

Artillery can be assigned the following missions:

- Destroy (Zerschlagen): Degrade the enemy's combat strength so that, for a limited time, he can no longer engage in operations or, as a minimum, can no longer carry out his intention.
- Pin (Niederhalten): Force the enemy to take cover for a limited period of time and, in so doing, prevent him from fighting.

- Blind (Blenden): Take away the enemy's vision for a limited time—to include firing smoke rounds—block his observation, prevent him from delivering observed fire or interfere with his movements.
- Interdict (Abriegeln): Halt an attacking or retreating enemy in his movements for a limited time or prevent him from passing through a specified sector of terrain.
- Cover (überwachen): Observe a specified area and be ready to combat an enemy with observed fire as soon as he enters it.
- Harass (Stören): Harass the enemy, interfere with his operations and, in so doing, possibly cause him losses.
- Illuminate (Beleuchten): Use of pyrotechnic illuminating rounds with parachutes.

All the details of the artillery plan are expressed in the fire plan (Feuerplan).

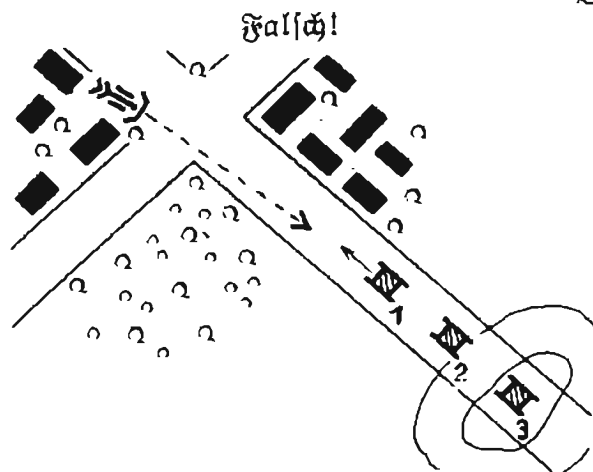
If no forward observer is available, the platoon leader or company commander can direct indirect fire. That kind of call for fire is called line-of-sight method (Sehstreifenverfahren). The prerequisite for that method of firing is a radio link to the firing position of the battery doing the firing, the exact target distance (e.g., obtained from a range card) and the determination of one's own position and the direction to the target (e.g., by using a compass). If a fire plan is already worked out with the artillery (e.g., in the defense), target reference points can also be given. If necessary, place locations can be given, so long as they are not too large in area. Map coordinates (Planzeiger) are more exact.

The call for fire takes place, for example, as follows:

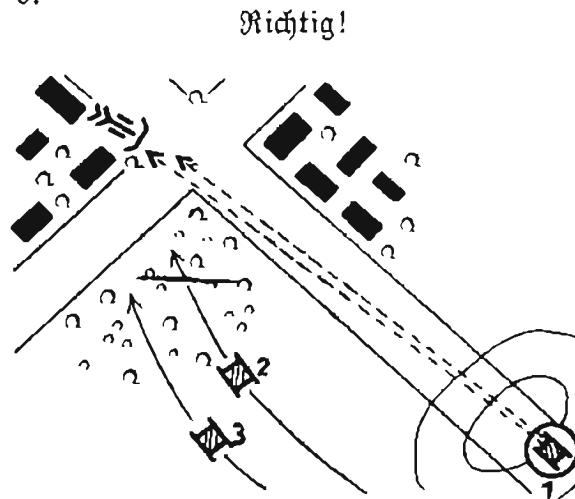
1. (Establishing contact): "Badger, this is Wolf, over."
2. (After contact): "Fire mission, over."
3. (After confirmation): "Direction: 5-7-0-0, over."
4. (After repeating the direction): "Coordinates 6840-5430; three enemy tanks in position; fire, over."
5. (After repeating the fire command and initial impact of rounds): "Right 200; fire, over."
6. (After observing the impact): "Add 400; fire, over."
7. (After observing the impact): "Drop 100; fire, over."
8. (After rounds on target): "Fire for effect (Wirkungsschießen), over!"

## Annäherung an eine Ortschaft

Bild 9.



Ein Dorf anzufahren, ohne die Geländeformen- und Bewachung zur Annäherung auszunutzen.



Unter Überwachung und Ausnutzung der gegebenen Deckungen das Dorf zu erreichen.

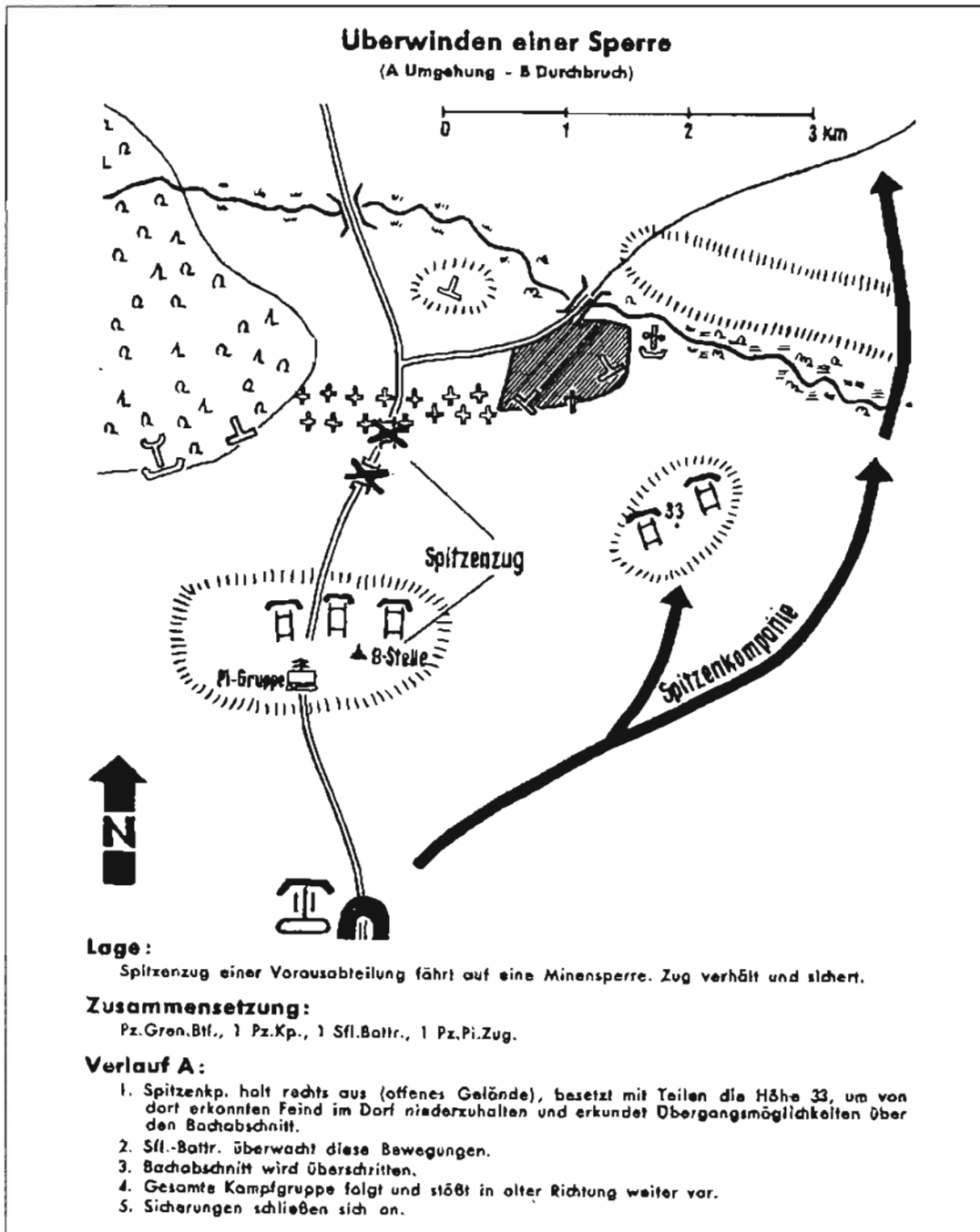
Skizzen aus: Kauffmann, Panzerkampfwagenbuch

### APPROACHING A BUILT-UP AREA

Wrong! Approaching a village without exploiting the terrain and assigning tanks to provide cover.

Right! Exploiting concealed routes and providing cover in reaching the village.

Sketch from Kauffman, *Panzerkampfwagenbuch*.



### OVERCOMING AN OBSTACLE

**Situation:** Lead platoon of an advance guard detachment encounters a minefield. The platoon stops and provides cover.

**Task Organization:** Panzergrenadier battalion; 1 tank company; 1 self-propelled artillery battery; and, 1 Panzer-pionier platoon.

**Course of Action A—Bypassing the Obstacle:** 1. Lead company maneuvers right (open terrain) and occupies Hill 33 with elements in order to suppress the enemy in the village. It determines the possibilities for crossing the stream. 2. Self-propelled artillery battery covers those movements. 3. Stream is crossed. 4. Entire Kampfgruppe follows and continues the advance in its previous direction. 5. Forces that provided cover close up.

The battery fires the authorized amount of ammunition or the one controlling the fire has the fire halted.

### **COMBAT ENGINEERS (PIONIERS)**

Cooperation is also particularly close with combat engineers. They have two major tasks: limit movements of the enemy and promote movement of friendly forces.

The first mission moves to the forefront in defensive situations: Making the enemy's advance more difficult through preparation of obstacles and barriers of every sort. The second mission is decisive to the success of the friendly advance. Offensive operational demands have also—as with the Panzergrenadiere—called forth a special form of engineers, the Panzerpionier (armored combat engineers). They are outfitted with SPW's. With armored personnel carriers they are in a position to follow the tank attack under armor protection. The major portion of the engineers' commitment, however, is performed on foot and requires a great deal of time. It calls for advanced planning.

The tank battalion already had an engineer capability in its Erkunder- und Pionierzug. That platoon has the capability to scout obstacles and prepare the way for the commitment of forces assigned from the division's engineer battalion. It can deal with minor obstacles on its own. With its organic antitank mines it can mine roads and support its own forces' security measures. During an attack against strong defenses, engineer forces are temporarily attached to prepare gaps in obstacles and blow up barriers. Their commitment requires detailed coordination so that the engineers' mission is not interfered with by friendly fire and movements can follow without delay. Signal flares, in particular, are commonly used. On arriving at a water obstacle, the commander of the brigade or division must have crossing and/or bridging materials brought forward at the right time. In addition, the engineers provide valuable support in preparation of positions, clearing fields of fire and preparation of roadway (particularly for wheeled vehicles).

Because of the great time that is sometimes required for engineer missions, they must be prioritized and the commitment of personnel and materials must be efficiently directed. The concentration of engineers assures more rapid completion of current tasks. The battalion provides support with its trucks in bringing up engineer materiel (demoli-

tion materials, mines, wire etc.). Engineers must not be detained after completion of tasks nor, indeed, committed to security duties. They work from an engineer plan according to which they are ready to complete tasks at short notice. In the attack, they are placed forward in the organization so that they can be brought up without delay. Reconnaissance is conducted together. The commander of the engineers appraises the resource demands and time requirements for his mission. The armor commander takes that into consideration in his planning for the operation. The commitment of the engineers is secured or guarded by tanks.

After the work is completed, the tank company must be informed about all the obstacles in its sector with respect to their nature, location and extent, as well as their effectiveness. All of the other forces for which those measures have significance must be informed. Obstacles that are prepared for execution (demolition) or have already been executed are handed over to the combat troops from the engineers.

When obstacles are handed over, the officer-in-charge:

- Determines the location of the obstacles,
- Obtains the obstacle folders (obstacle plan, demolition plans) and
- Obtains the demolition supplies and equipment (for example, for final closure of the gaps).

The acceptance or release of obstacles must be reported.

### **AIR DEFENSE (FLUGABWEHR)**

As the forces of the Luftwaffe declined to an increasingly inferior position, close cooperation with air-defense forces (Flugabwehr) became ever more important. The air-defense platoons (Fliegerabwehrzüge) of the battalions were inadequate in numbers and could basically provide only point coverage. The supply units often had to be given priority in that regard. Depending on the situation, the battalion was occasionally assigned a light antiaircraft battery (Flak-Batterie) from the division (for example, while forming a bridgehead).

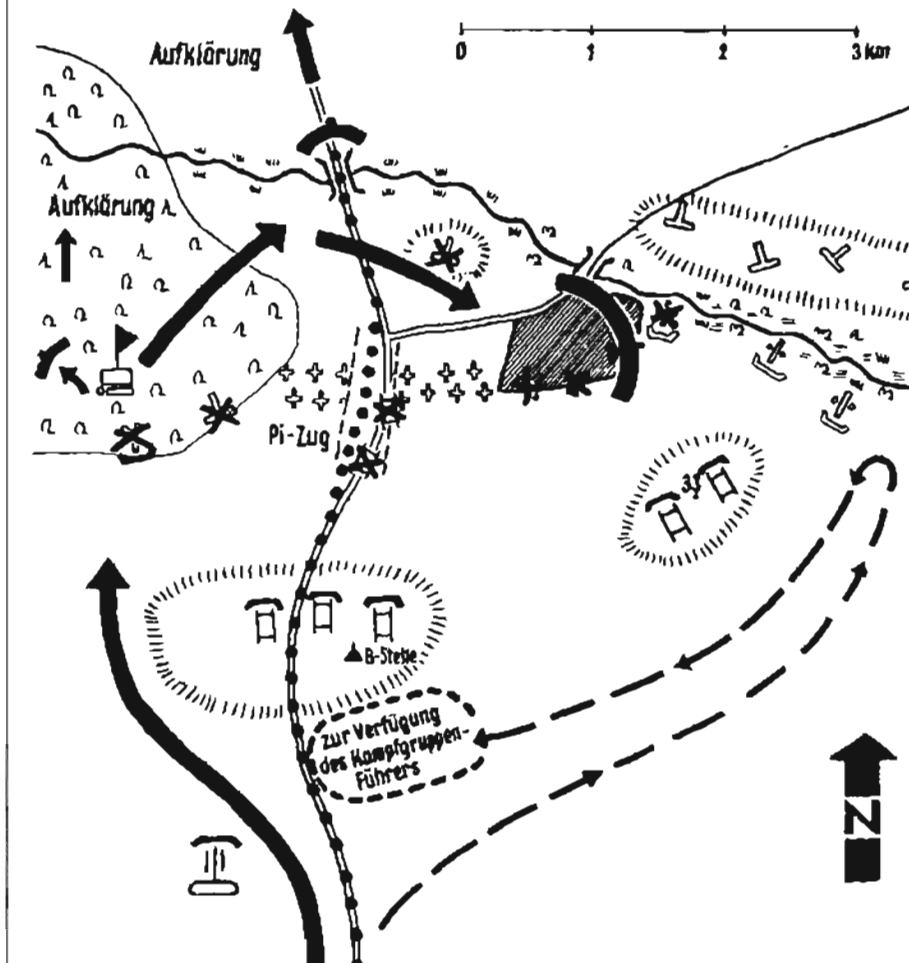
In choosing a position, the air-defense forces have priority so as to obtain optimal effectiveness. They are assisted by the battalion in providing their own security.

In the event of an enemy aerial attack, all tanks also engage the aircraft with their antiaircraft



**Verlauf B:**

1. Ausholen nach rechts durch Spitzenkp. scheitert an starker Feindabwehr. Kommandeur entschließt sich, die Sperre zu durchbrechen.
2. Pz.Gren.Btl. vernichtet schwachen Feind am Waldrand, durchstößt (abgesessen) den Wald, nimmt mit 1 Kp. Brücke handstreichartig in Besitz und dringt von rückwärts in das feindbesetzte Dorf ein.
3. Sfl.Battr. unterstützt Angriff des Btls., vor allem durch Feuer auf Feindkräfte im Dorf.
4. Pi.-Zug räumt Minen entlang der Straße unter dem Feuerschutz der Panzer.
5. Kampfgruppe setzt Vormarsch fort.



OVERCOMING AN OBSTACLE

**Situation:** Lead platoon of an advance guard detachment encounters a minefield. The platoon stops and provides cover.

**Task Organization:** Panzergrenadier battalion; 1 tank company; 1 self-propelled artillery battery; and, 1 Panzer-pionier platoon.

**Course of Action B—Breaching the Obstacle:** 1. Lead company maneuvers right, but the effort is thwarted when it runs into a strong enemy defense. The commander decides to breach the obstacle. 2. The Panzergrenadierbataillon destroys the weak enemy at the woodline, advances through the woods (dismounted), takes the bridge in surprise move with 1 company and then forces its way into the enemy occupied village from the rear. 3. Self-propelled artillery battery supports the attack of the battalion, primarily by firing on the enemy forces in the village. 4. The Panzerpionier platoon clears the mines along the highway under covering fire from the tanks. 5. Kampfgruppe resumes its advance.

machine guns. If the formation is in an assembly area or in a position that has not been discovered by the enemy, it is advisable that it NOT open fire on enemy aircraft that are merely flying past or overhead. That form of fire control is called weapons hold (Feuerverbot). If the enemy aircraft attack, fire is immediately opened and without orders. That also holds true during the form of fire control known as weapons tight (Feuervorbehalt). In the case of weapons tight, the commander retains command over opening fire, for example, to coordinate the commitment of several weapons.

Attacks by aircraft or the sighting of aircraft flying past are reported as an alarm over the radio. The report contains data on direction of flight and number of aircraft. For that, no time-consuming radio call-up procedure is needed. All the information is given openly in clear text, including locations.

#### **DEFENSE AGAINST CHEMICAL WARFARE (KAMPFSTOFFABWEHR)**

The leadership and the soldiers must be constantly prepared for enemy use of chemical warfare. No gas surprises!

That is how it is stated in the training manuals of every branch of the Wehrmacht. Fortunately, as it turned out in the field, the devastating use of chemical warfare was not repeated in the Second World War. That form of attack would have been very lethal to the tank crews, since the tanks of that time had none of the protective devices for the entire crew that are in use today. In other words, the tank crew at that time had to don gas masks, with consequent interference in the performance of duties in the tank. In practice there was widespread lack of concern. As a result, in cases where smoke and phosphorus shells were used there was frequently a panic reaction. Tanks were unnecessarily abandoned. The tank crews which had bailed out put themselves in greater danger outside the tank than if they had remained inside the vehicle and donned masks. What did the regulations specify in detail?

"Gas readiness" (Gasbereitschaft) is the condition when gas attacks can be expected. When a gas attack is recognized, "Gasalarm" is ordered. Gas detectors are to be used as soon as signs are recognized that the enemy may use gas, particularly by forces committed to reconnaissance or terrain scouting.



An example of infantry bunched up too closely behind a tank. Experienced infantry would stay away from the vehicle, since it would inevitably draw the most fire from the enemy.

Enemy use of gas by air or land must be reported immediately to the next higher headquarters and to neighboring troops.

If the enemy employs aerial gas attacks, the combat mission is to be carried on with gas masks donned.

If contaminated terrain is encountered, the following is to be determined:

- Lateral extent (possibility of detouring around it)
- Depth of the contamination
- Effectiveness (application strength and age; method of employment)
- Reinforcement with mines and
- Coverage by enemy fire

Identified contaminated areas are to be marked.

Gas-detecting troops are to be sent out on vehicles or on foot, depending on enemy activity and mines. Covering fire is to be assured.

Contaminated areas are either bypassed or moved through. Contaminated areas that are not covered by enemy fire or mines are driven through with gas masks donned.

Advancing through contaminated areas under heavy enemy fire takes place on foot. The attack must be carried far enough forward so that enemy

observed fire into the contaminated area is prevented.

Soldiers that are in the contaminated areas must wear light gas-protective clothing. In case of need, field-expedient gas protection must be used. Since the protective clothing interferes considerably with the ability to fight, care must be taken to provide good covering fire. Relief is needed for longer-lasting operations.

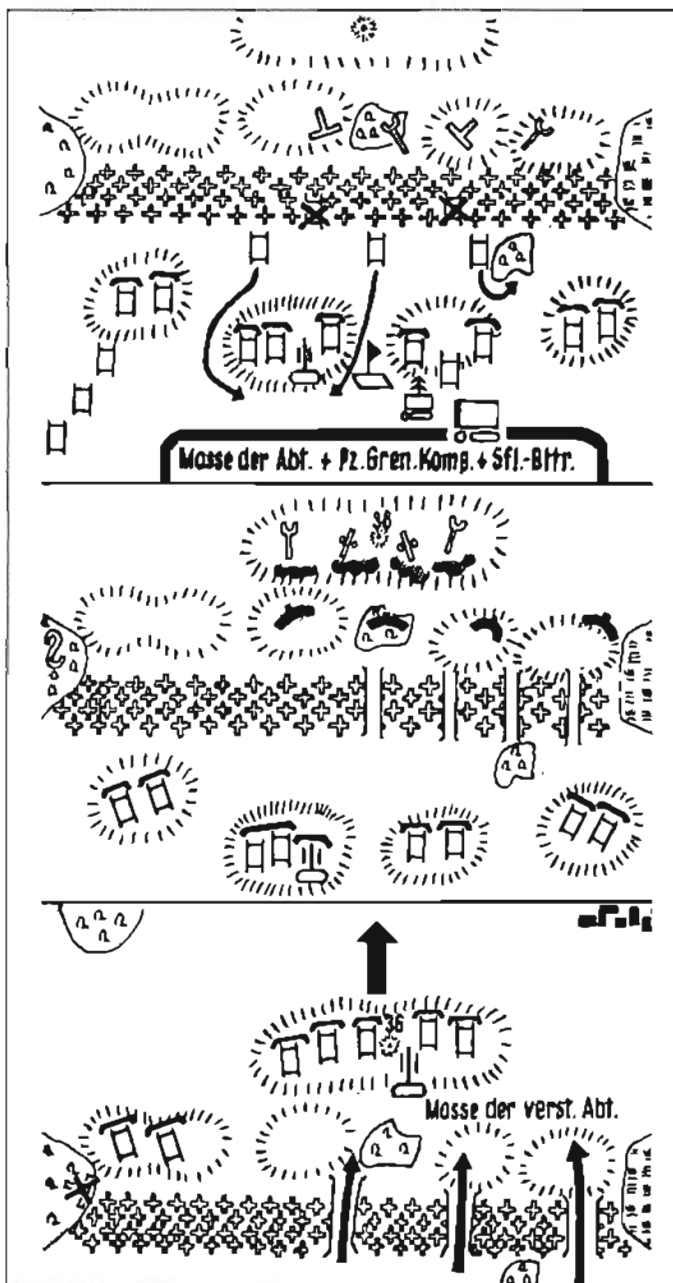
Light gas-protective clothing is to be provided from the stocks of the decontamination battalion (Entgiftungsabteilung) when traversing terrain that has been gassed. After moving through the gassed

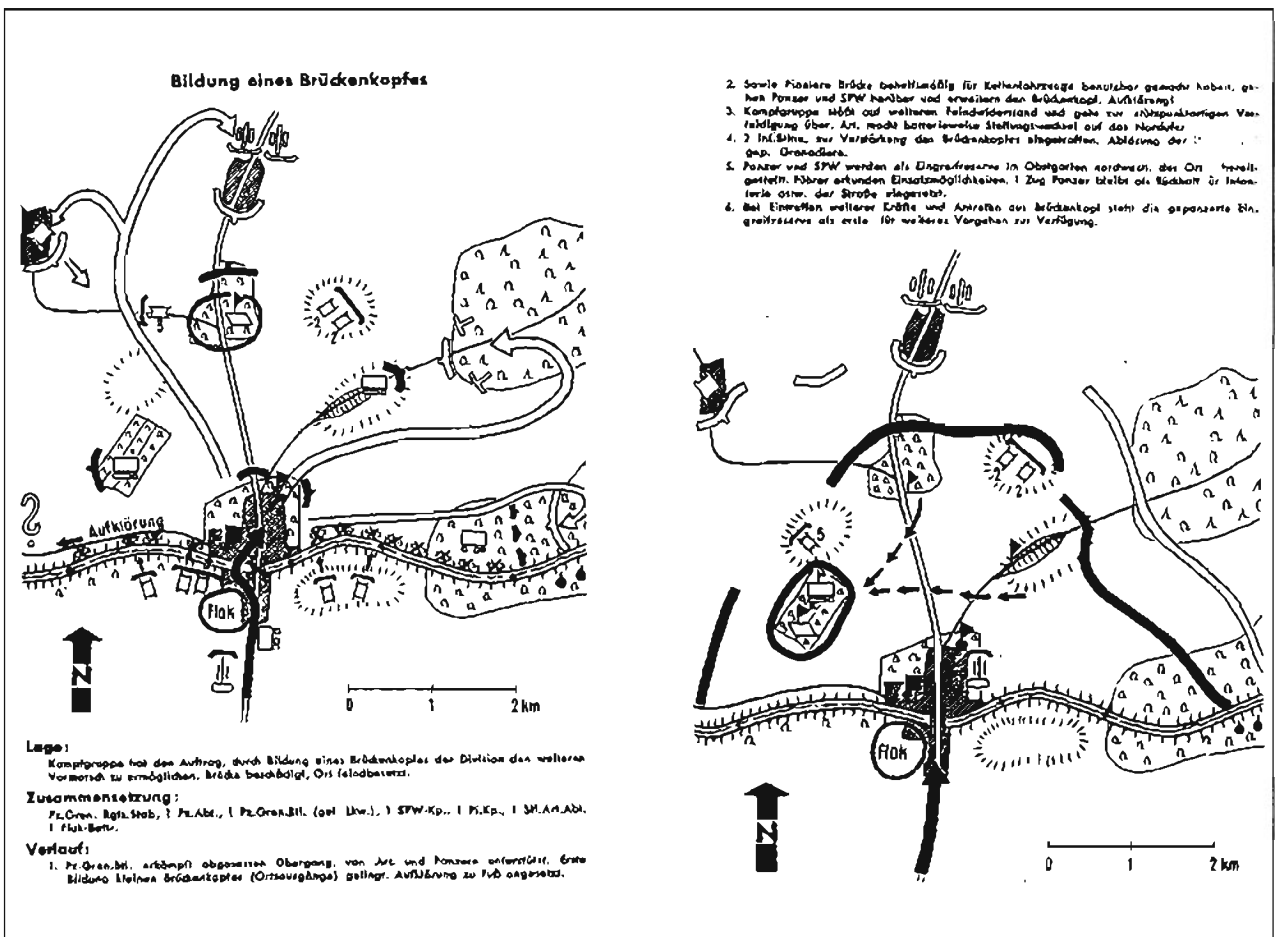
### BREACHING A MINEFIELD

**Top:** Reconnaissance elements encounter mines. Report submitted over the radio. Vehicles move back, following their tracks. Engagements against antitank weapons, possible use of smoke. Covering fire provided by overwatching elements. Withdrawal to covered positions. Terrain reconnaissance follows with the engineer and infantry leaders.

**Middle:** Dismounted sappers create a small lane for the grenadiers under protective fires. Grenadier company builds a small bridgehead on the far side of the obstacle. Artillery, individual tanks and heavy weapons destroy enemy targets. Possibly obscure the enemy through employment of smoke. Sappers widen the lanes for tanks.

**Bottom:** Tanks drive in column through the lanes and advance to the next high ground while providing the grenadiers with covering fire. This prevents the enemy from observing the breach. The main body of the battalion, mounted grenadiers and sappers continue the attack.





### FORMING A BRIDGEHEAD

**Situation:** The Kampfgruppe has the mission to make it possible for the division to advance by forming a bridgehead. The bridge is damaged; the village is held by the enemy.

**Task Organization:** Panzergrenadier-Regiment staff; 1 tank battalion; 1 Panzergrenadier-Bataillon (loaded on trucks); 1 Panzergrenadier SPW company; 1 combat engineer company; 1 self-propelled artillery battalion; 1 Flak battery.

**Course of Action:** 1. Panzergrenadierbataillon fights dismounted for a crossing point. Artillery and tanks support its crossing. Initial formation of a small bridgehead at outskirts of the built-up area is successful. Reconnaissance is sent out on foot. 2. As soon as the engineers have made the bridge temporarily trafficable for tracked vehicles, tanks and SPW's cross and expand the bridgehead. Reconnaissance employment! 3. The Kampfgruppe advances against further enemy opposition and transitions to strongpoint-type defense. The artillery repositions on the far side of the water obstacle, one battery at a time. 4. Two infantry battalions arrive to reinforce the bridgehead. The gepanzerte Grenadiere (in SPW's) are relieved. 5. Tanks and SPW's are held as a reserve in an orchard northwest of the village. The leaders reconnoiter courses of action. One tank platoon remains committed east of the highway to back up the infantry. 6. With the arrival of additional forces and planned renewed advance from the bridgehead, the armored reserve stands ready as the first force to continue the advance.

terrain a bridgehead is formed. The bridgehead allows the creation of decontaminated lanes and the bringing up of weapons and reserves.

Decontaminated lanes are created by:

- Decontamination battalions (Entgiftungsabteilungen)
- Motorized units that are committed to decontaminate road networks by makeshift means and
- Field expedient measures

If chemical warfare agents and liquid phosphorus are expected to be sprayed by aircraft, hatches must be closed. Air defense is to be secured through weapons that are identified for such duty when attacked by aerial spray. The crews of those weapons wear field-expedient gas protection. Attention to the wind direction often allows running or moving so as to avoid the spray.

After contamination by spraying, the contaminated area is vacated as rapidly as possible and the troops are decontaminated as soon as the situation allows. Above all else, sources of water are needed. If only the outsides of the vehicles are contaminated, the march continues.

The contaminated terrain must be marked and reported to the superior command headquarters. Contaminated troop units are to be given priority for withdrawal from operations after completion of their mission and taken to a decontamination site set up by the decontamination battalion. There they stay in a holding area from which personnel and

materiel are gradually called up for decontamination. Decontaminated troops assemble in a nearby upwind/upstream assembly area.

### AIR SUPPORT

Armored formations worked closely and successfully with aircraft, particularly early in the war. The best kind of coordination possible is with the help of so called tactical air control parties (Fliegerleittrupps). At first they operated from wheeled vehicles; later they were equipped with SPW's. They followed the tanks closely from their vehicles. Enemy that cannot be eliminated by artillery fire is reported to the forward air controller (Fliegerleitoffizier) by radio. He determines whether close ground support is available, contacts the pilots on their frequency and "talks them in" to the target until they recognize it and can carry on the attack on their own.

At that point it is important that the tactical air control party is accurately informed about the extent of their own forces' positions or that the foremost friendly forces can make themselves recognized. For that purpose, aircraft-identification panels and also signal materials are used (standard: multiple white star own troops).

The fliers themselves make further observations and thus add to the body of reconnaissance.

Another special form of support by aviators is aerial artillery observation. In addition, available aircraft are used for transport of wounded.



Falsch!

Bild 10

Richtig!



Aus einer Waldstraße herauszutreten, ohne das Vorgelände aus dem haltenden Wagen abzusuchen.

Am Waldrand kurz in Stellung zu fahren und mit Hilfe des Fernglases das Vorgelände abzusuchen.

## MOVEMENT ON A WOOD LINE

False: Move out of a trail in the woods without observing the terrain in front of the stationary tank.

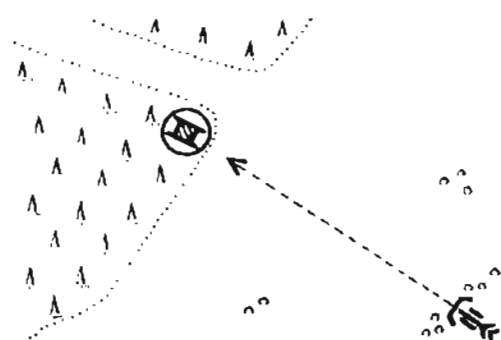
Correct: Halt temporarily in position on the edge of the woods and observe the terrain in front of the tank with binoculars.

## Verhalten am Waldrand

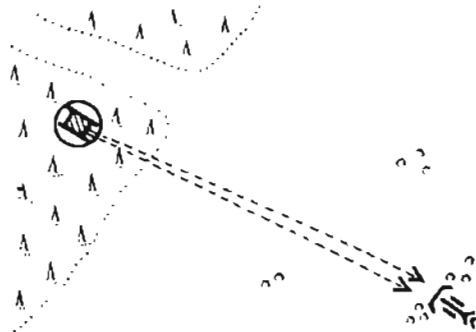
Bild 11.

Falsch!

Richtig!



Einfach am Waldrand zu halten, ohne die Deckung auszunutzen. Das Fahrzeug wird so leicht ein Opfer fdl. Pat oder Bz.-Spähwagen.



Nicht bis an den Waldrand zu fahren, denn aus einiger Entfernung vom Waldrand kann man noch aus gedeckter Stellung beobachten.

Skizzen aus: Kauffmann, Panzerkampfwagenbuch

False: Simply halt at the edge of the woods without using the concealment available. As a result, the vehicle easily falls victim to enemy antitank guns or armored cars.

Correct: Do not move to the edge of the wood line. From a short distance from the wood line observe from a concealed position



These two photographs demonstrate another reason why infantry should not get too close to the tanks supporting them. It is too dangerous for the infantrymen to stop in the immediate vicinity of the tank, since it could make unexpected turning movements and the crew inside the tank are often totally unaware of people right by the vehicle. BOTH: KARL-HEINZ MÜNCH





In the first campaigns of the war, the picture was often of the two arms of service going their separate ways. The tanks of the pursuing formations used the road networks for speedy pursuit and the infantry frequently limped along, several days' march behind. Often the only alternative is to bring the otherwise immobile foot soldiers along, riding on the outside of the tanks. When they are not in contact with the enemy, this is a good field-expedient means of transporting them. They arrive at the location where they will be employed, more or less rested.

KARL-HEINZ MUNCH



Pictures like this were suitable for propaganda. Genuine combat rarely permit such light-headed behavior. JAROLIN



In general, in approaching the enemy, the tanks use their greater mobility and protection to fight other tanks and antitank weapons and the infantry fights their counterparts.

KARL-HEINZ MÜNCH



Tanks have to avoid towns occupied by the enemy like the devil avoids holy water. If such places cannot be bypassed, the maxim is: "Grenadiers, move out!"







A Panzerkampfwagen 38 (t) Skoda from the early days of the Russian campaign. It is closely supported—perhaps too closely—by dismounted infantry.



If the town is in friendly hands, then the tanks can push on through.



The same rule holds for approaching wooded areas. There the infantry creates the prerequisites for further attack. KARL-HEINZ MÜNCH



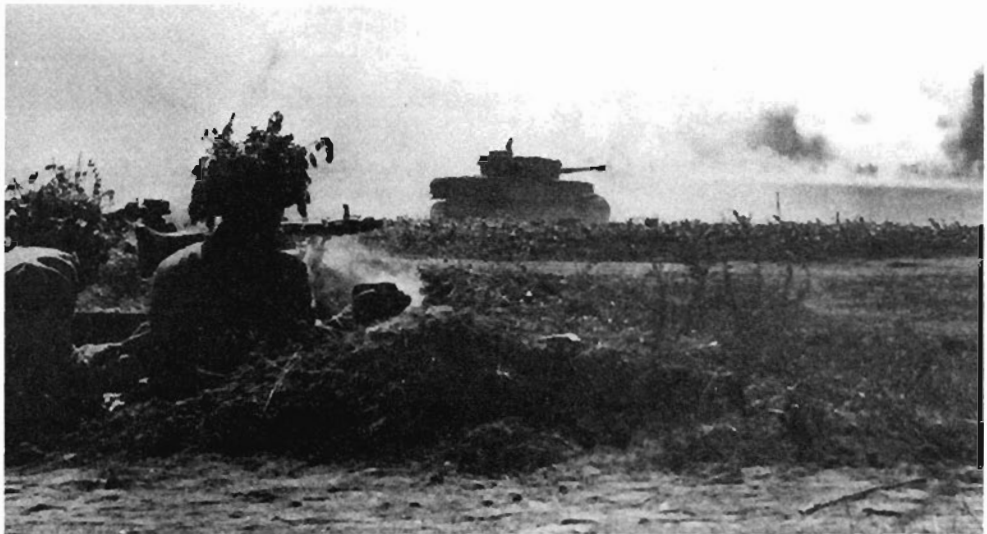
When they reach the far end of the woods, the tanks can again take over the initiative in open terrain. JAROLIN





Armor covers infantry in positions.

When counterattacks are made through friendly troops holding a position, those troops support the attack to the limit of their capabilities.



When the infantry follows the tanks, they are echeloned to the rear, ready to take action as needed.



It is altogether wrong to attach individual tanks to infantry! The infantry is totally uninterested in operations aimed at gaining ground and, all too often, employs the tanks incorrectly. Note the variety of weapons, to include MP 43 and MP 44 assault rifles. BAUMANN



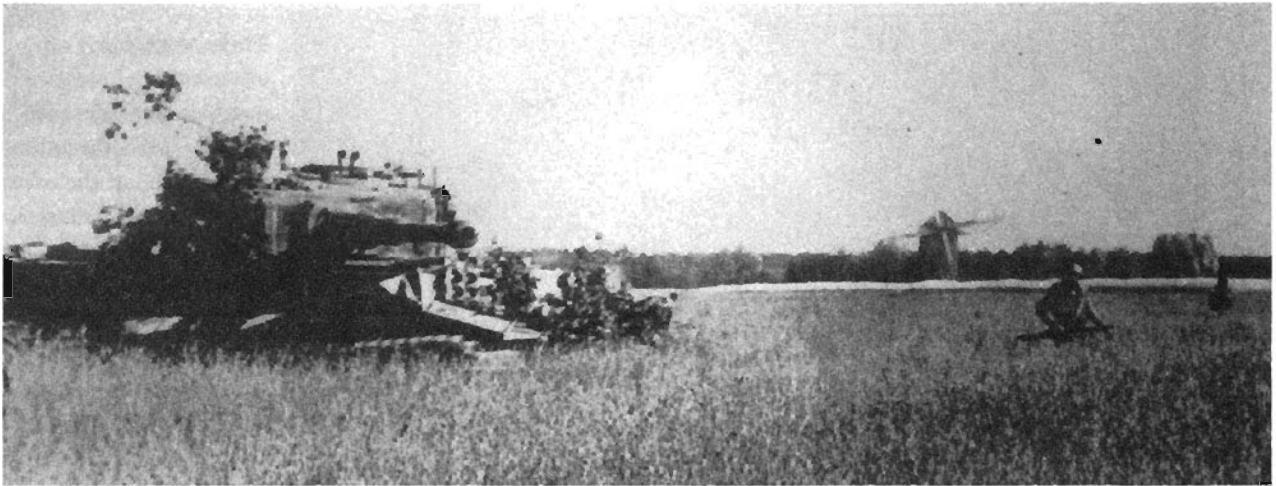


The tanks have to adjust to the tempo of the foot march, functioning as a rolling bulwark, which make them an easy target for enemy antitank weapons. KARL-HEINZ MÜNCH



It is most welcome to the tankers to have dismounted infantry defend against antitank hunter/killer teams. The only possibility open to the tank commander without them is to use his machine pistol—and that through an open hatch!





KARL-HEINZ MÜNCH

When a tank advances through heavy growth and crops without infantry protection it is defenseless to a great extent.





There were, however, other kinds of close-combatants to defend against. Here, for example, was one of the mine dogs that the Soviets employed. The dogs were trained to crawl under tanks. The triggering rod sticking up above their back then set off the demolition charge on the dog's back.



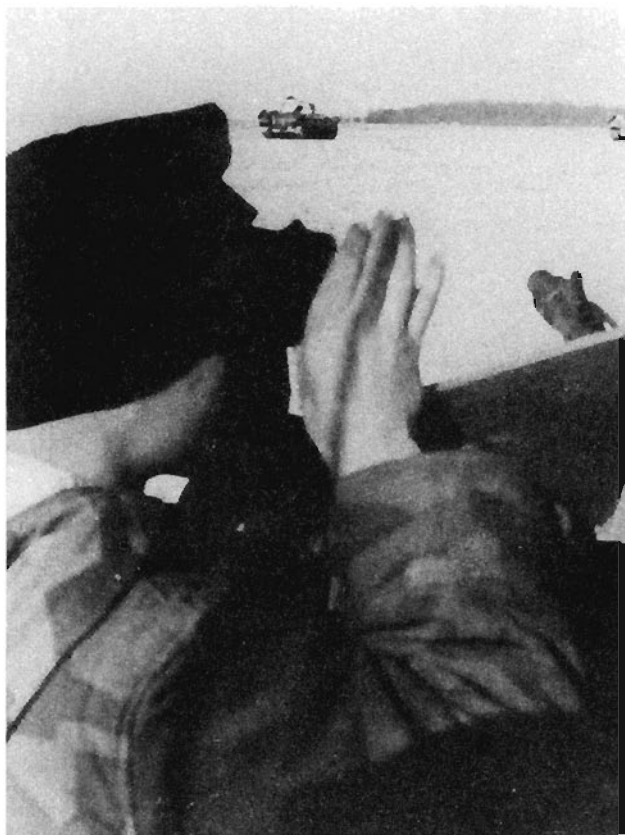
An early attempt to match the grenadiers to the tanks was to equip them with trucks. Obviously, they still performed combat tasks dismounted. The situation changed for the good with the introduction of the Schützenpanzerwagen Sd.Kfz. 250 and 251. Those half-tracked vehicles provided protection from handheld weapons and artillery fragments, enabling the Panzer-grenadiere to follow close behind the advancing armor.



A close symbiosis exists between the Panzer-grenadiere and the tankers. When employed jointly one can effectively attain many objectives with less forces committed. They become a force multiplier.

Although the concept of the Panzergrenadiere was the solution to the long-standing problem of tank/infantry cooperation, there were never enough of them. Even though the Sd.Kfz. 250 and 251 were always in short supply, nearly 22,000 of both variants were produced, more than any other German tracked armored vehicle.





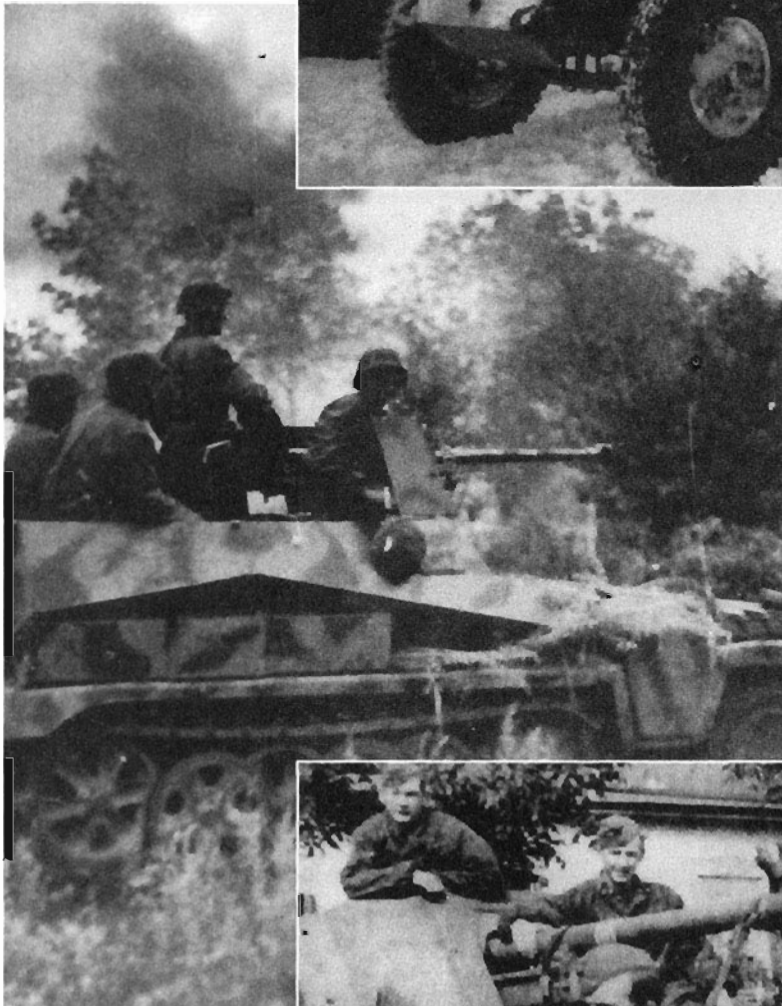
Panzergrenadiere in support of tanks continue to observe for the enemy.



The terrain and situation determined whether the tanks and Panzergrenadiere were employed together or separately. Here they work together in clearing a village.



Tanks and SPW's also complemented each other ideally in carrying out other missions, such as reconnaissance.



Most of the versatile SPW's were armed with machine guns. However, each platoon had one vehicle equipped with a larger caliber gun for use against tanks. That was advantageous in terrain that was unfavorable for tanks. It meant the Panzergrenadiere were not defenseless against surprise employment of enemy armor.







The SPW was also better than a tank in defending against aircraft. Its open top ensured crew members and the squad could observe aircraft before tankers generally could.

Unterstützung durch Feuer der Artillerie oder durch einen Stuka-Angriff mußt Du sofort ausnutzen, d. h. noch während der Feuerwirkung nahe an das Angriffsziel heranzufahren, nach Beendigung des Feuers ist es zu spät. Du mußt wissen, daß meist nur eine niederhaltende, selten aber eine vernichtende Wirkung erzielt wird. Lieber eine eigene Bombe oder Granate in Kauf nehmen als nachher doch wieder gegen Pak anrennen zu müssen.

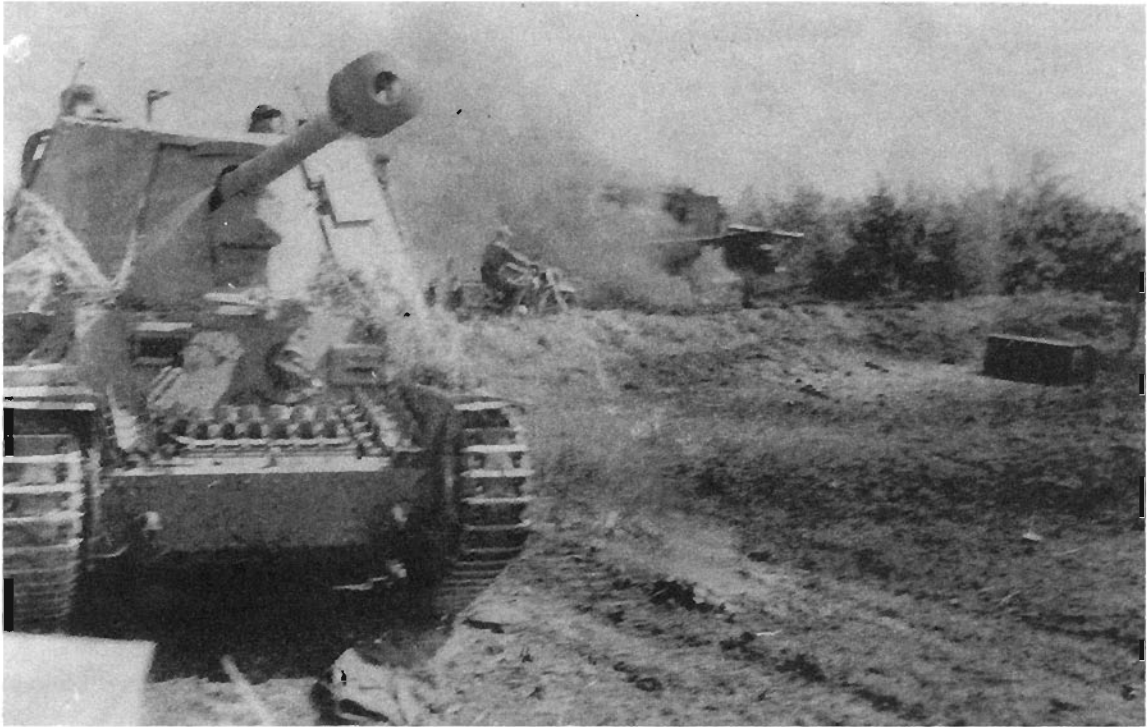


Artillery pins the enemy down until the onrushing tanks can force the decision with their precision weapons. The text reads: "You must exploit artillery support or a Stuka attack immediately, i.e., you must advance towards the objective during the support. After the support is ended, it is too late. You must understand that indirect fire or close-air support usually only pins down the enemy. It seldom destroys him. It is better to risk a few of our own bombs and shells then have to run the gauntlet against antitank guns."





The artillery forward observer is the connecting link between the combat unit and the supporting artillery. He directs the fire as needed—either mounted or dismounted.



At the beginning of the war, the predominately horse-drawn artillery was unable to keep up with the tanks. That changed essentially with the introduction of Panzerartillerie—self-propelled armored artillery. The artillery could set up immediately behind the lead formations and follow by bounds with increased cross-country capability. The



same was also true for the Panzerabwehrtruppe, later renamed the Panzerjägertruppe. Guns towed by prime movers gradually gave way to self-propelled mounts, as can be seen in the two photographs of the Panzerjäger 38 (t) Marder III.



The Panzerpioniere (armored combat engineers) are also important in conducting mechanized combat.



At first, the combat engineers were only equipped in makeshift fashion with wheeled vehicles. Starting in 1942, however, they were also given increasing numbers of Sd. Kfz. 251 and, like the Panzergrenadiere, were in a position to advance along with the tanks.



The engineers also  
remove obstacles dis-  
mounted . . . BAUMANN



. . . make passage possi-  
ble across swampy or  
muddy ground . . .



TOELL

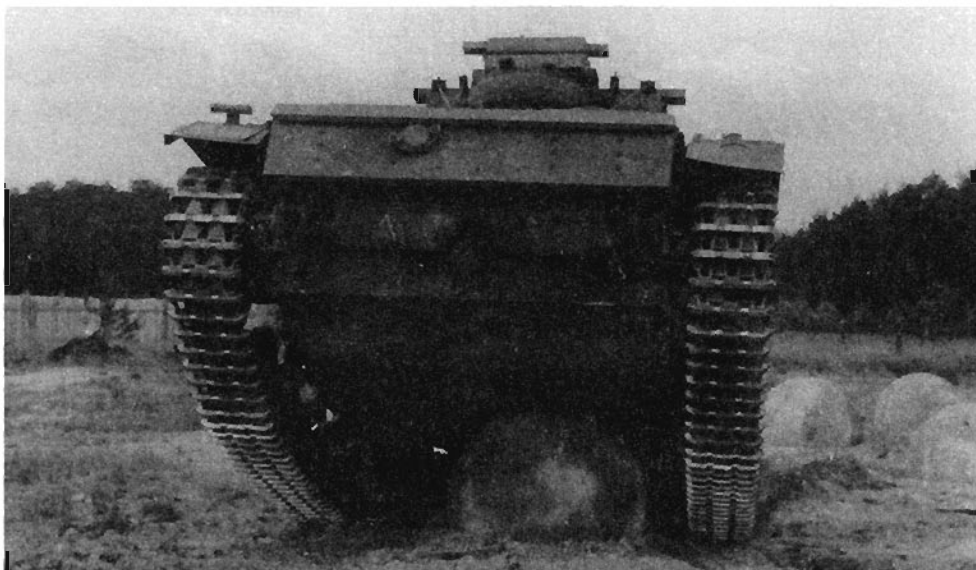


VON ROSEN





... prepare  
terrain obstacles ...  
KARL HEINZ MÜNCH



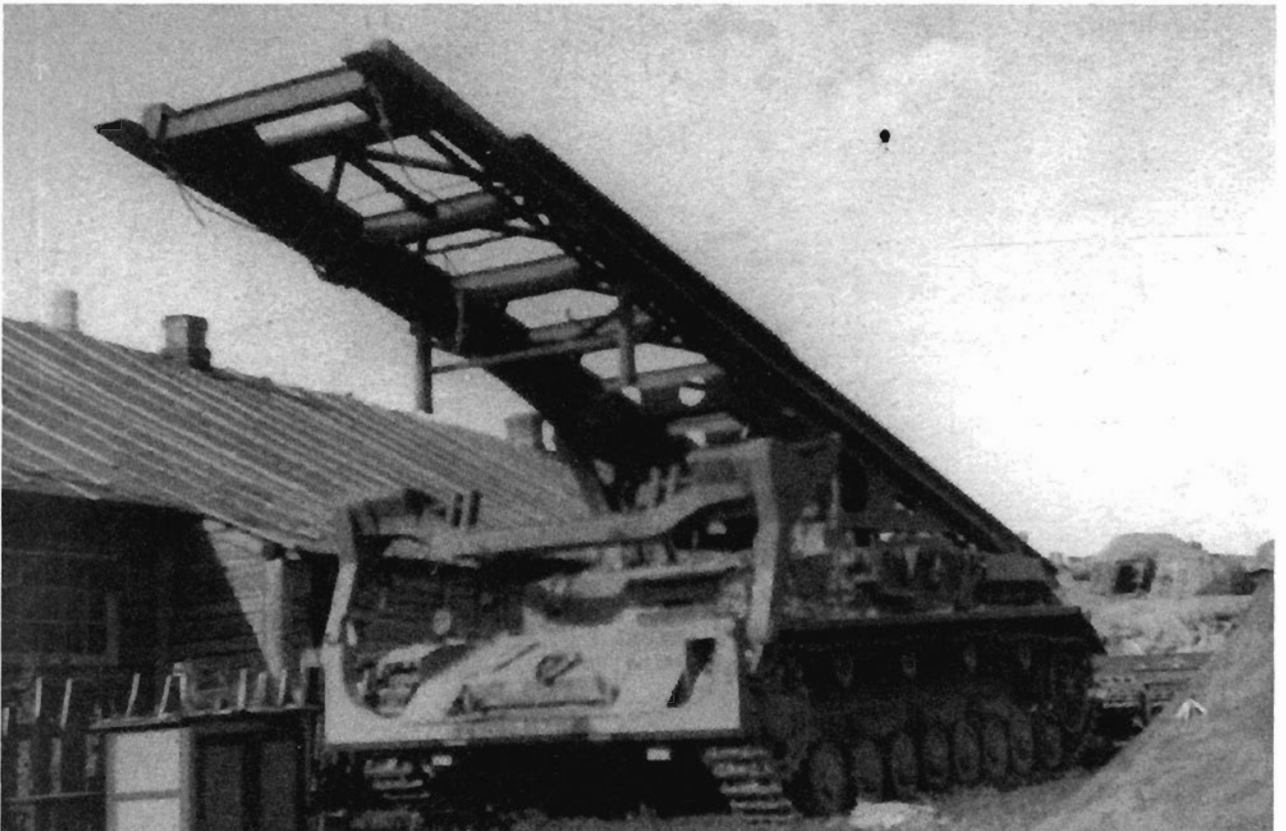
... prepare obstacles  
to stop or slow down  
tanks ...



... and detonate mines.



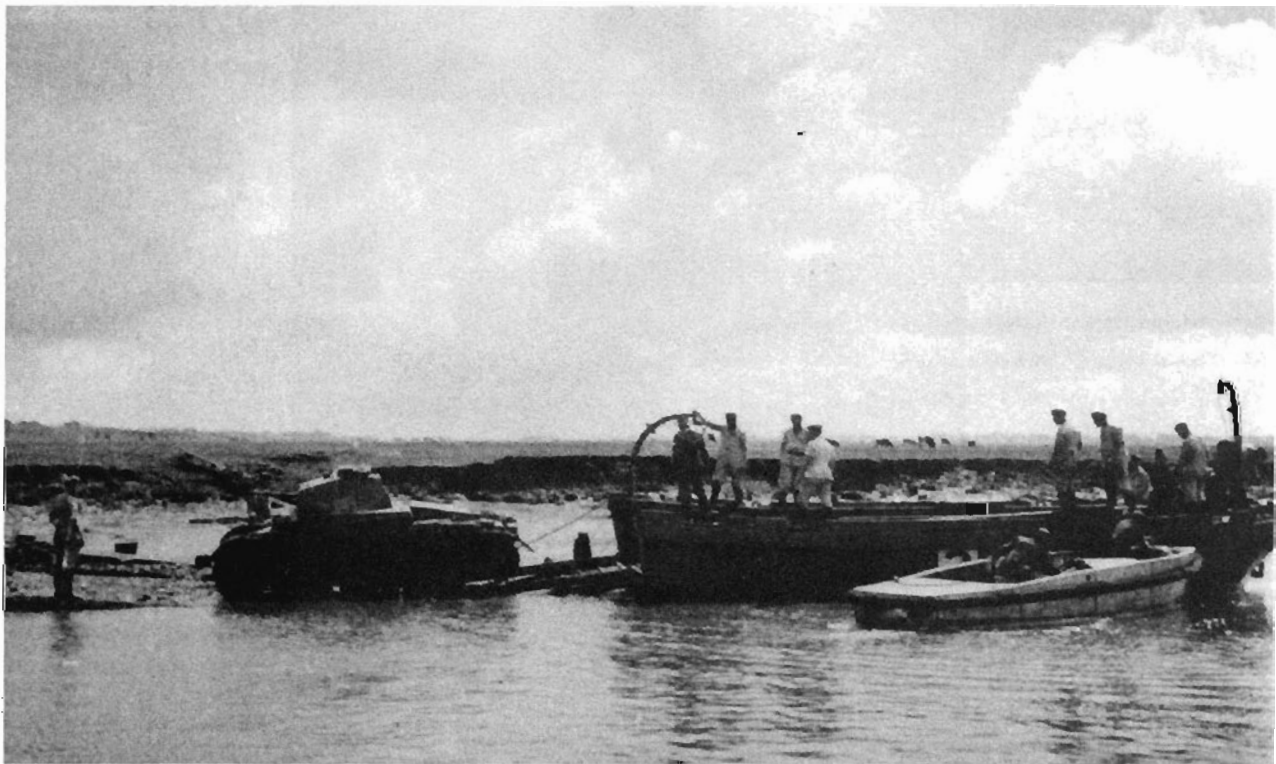
The classic task of the engineers—from time immemorial—is the construction of military bridges and emergency crossings.



Bridge-laying tanks were constructed, but only saw limited production and service. Pictures of these in an operational setting are quite rare.



KARL-HEINZ MÜNCH



Bridging a wide body of water requires advance planning, since the transport column with its pieces for the bridge and the pontoons is kilometers long. Another possibility for crossing is employment of ferries, whether existing civilian ones or military ones.

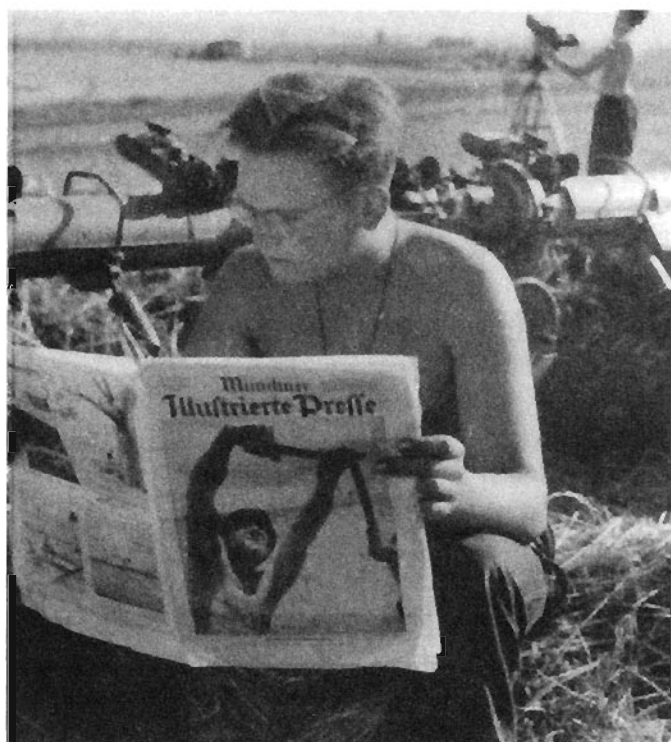




The wide range of engineer materials includes flame throwers. BAUMANN



A vital supporting arm of service, especially with enemy air superiority, is the anti-aircraft unit.





At first its guns were towed, later they were on half-tracked, self-propelled mounts.



Fully tracked self propelled mounts built on the Panzer IV were particularly effective, such as this Wirbelwind.



Massed to provide area or point-protection fires, anti-aircraft can fire a more or less thick umbrella of fire.



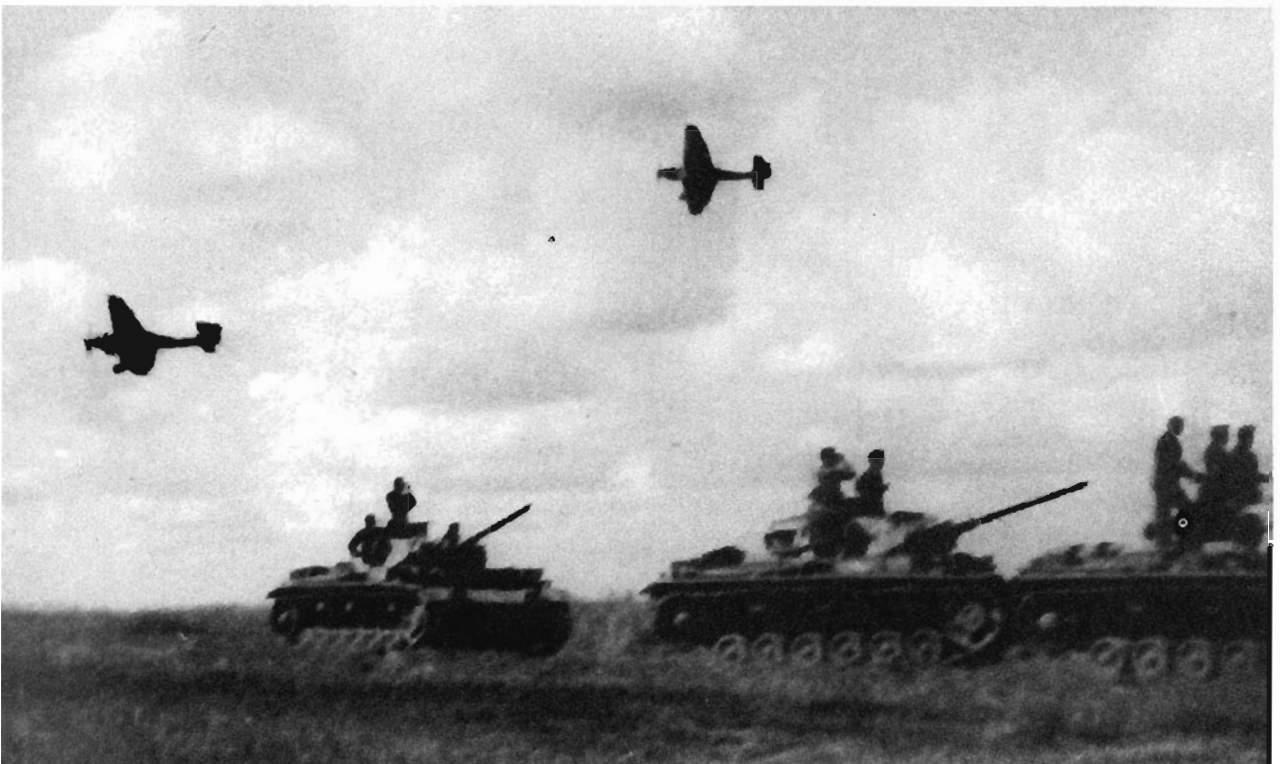
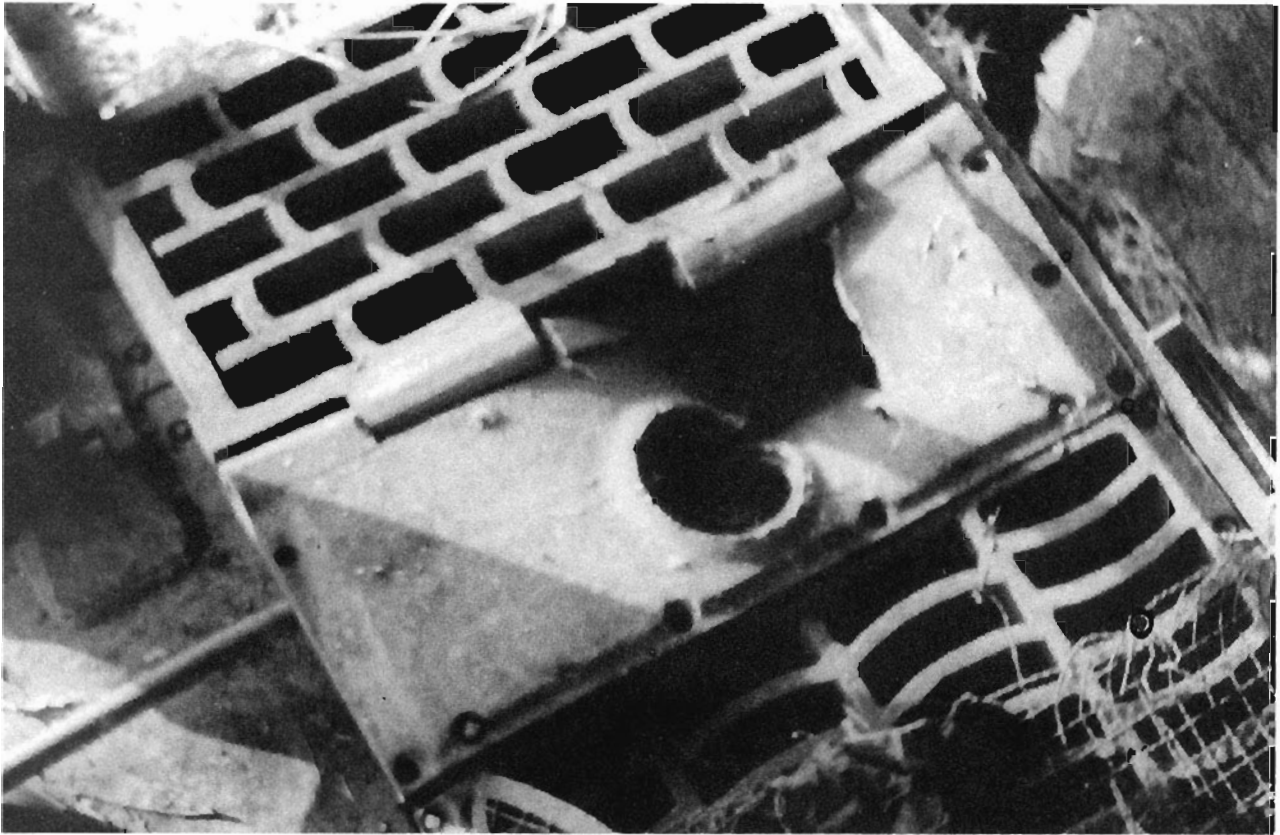


Particularly in Russia and Africa, the 88 mm anti-aircraft gun performed excellent service in a direct-fire role against armor.



Combating aircraft with the tank's own anti-aircraft machine gun is almost totally ineffective.





Attack by low-flying aircraft is a great threat to tanks, since even a "non-lethal" hit could bring the tank to a stop. Here we see a hit from above in the engine compartment of a Tiger. JAUGITZ



German tanks operated freely well into the war, especially on the Eastern Front, thanks to German air superiority and effective aerial support, for example, by the Ju-87 "Stuka." KARL-HEINZ MÜNCH



Low altitude aerial reconnaissance—in this case, a Fw 189—can effectively assist the attack with observation reports delivered by radio or the dropping of messages.



Now and then, the ground troops could provide assistance to the aviators! PRIEN





The availability of medical care is most crucial for the morale and combat determination of all. It starts at the lowest level. All soldiers receive instruction on administering first aid.



Removing injured crewmen from tanks also required special training.



If the wounds weren't too serious, the crew members could be returned to light duty.

Medical personnel on a tank—illustrated is the regimental surgeon of Panzeregiment “Großdeutschland”—was a curious exception and not exactly in accord with the Geneva convention!



The unit medics transfer the wounded who have been recovered to a medical unit.

Whenever possible, medical facilities were set up in buildings. This medical clearing facility was run by Panzer-grenadier-Division “Großdeutschland.”



Armored units also work closely with other arms of service, such as the divisional armored reconnaissance battalion . . .





... the armored antitank unit ...



... or the Sturmartillerie (assault guns).

## CHAPTER 8

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# *Life in a Tank* (*Das Leben im Panzer*)

**W**hy does a soldier fight? Why does he endure the deprivations of war, carry on despite mortal danger and put his life at risk? For honor and fame, for freedom, for his country? All studies repeatedly and thoroughly confirm that the actual motivation lies in the cohesion of the small unit. For that—for his comrades—the soldier goes into action. In an environment of extreme danger to his own life, he is supported by the special spirit of a tightly knit community. The nucleus of this community, therefore, is the squad—possibly the platoon or company. In the Panzertruppe, the squad means the tank crew.

In the system-specific allotment of duties, it is obvious to all that each is dependent on the other. No matter how competent the tank commander may be, he will only survive a tank duel if the gunner is calm and sure in engaging his target. The tank that has been spotted will only change position successfully if the driver is skillful in taking advantage of the terrain and understands how to use the engine's power. True, there is a hierarchy, which means that the tank commander has the "final say," but the formal discipline soon finds its limits if the atmosphere and camaraderie is somehow disturbed. That is particularly true for the armored unit where, right up to the battalion commander, every superior officer is also a tank commander. As a result he has to prove himself in combat, just as does the "ordinary" tank commander who is a lower-ranking non-commissioned officer. The hierarchy blurs, the special spirit of the Panzertruppe forms itself.

### COHESION (ZUSAMMENHALT)

During operations, the crew lives in and with the tank, not only during combat, but also before and after. That means that the tank is, for the crew, its home and its shelter. In winter it offers warmth; when raining, protection from the water. In bad weather conditions, the tank is an icebox, as many fighting vehicles of World War II did not have personnel heaters. Conversely, in the summer, at high temperatures, the tank becomes an unbearably hot slab of steel. In a critical combat situation, such as a withdrawal, it is the single guarantor of mobility for getting away, assuming adequate fuel supply. The crew listens to every sound of the motor and the running gear and is circumspect in its attention to keeping the vehicle serviceable. In a way that is largely incomprehensible to outsiders, the crew develops an almost personal relationship with its tank...and with each other. It is not necessarily friendship, but it is always a community borne of necessity. Survival is only possible if it functions.

The tank commander is only accepted if, in addition to ability and knowledge, he also has qualities of character that make it seem to make sense to his men to carry out his orders. After the tank commander, a special position is granted to the gunner. He is the assistant tank commander and assumes the commander's duties in his absence (e.g., if the tank commander is at an orders session, performing terrain reconnaissance or, as platoon leader or company commander, is briefing other elements on missions that are to be executed). As a result of his





The photo album of every former Panzer soldier has many photographs like these. Along with his comrades, he experienced great danger and the rigors of combat in the tightly constricted space inside his tank. Each member of the crew was dependant on each other for his survival.



training, the gunner is an experienced enlisted man or even a junior noncommissioned officer who is frequently identified as a future tank commander himself.

The driver is "looked after" by everyone because it is important that he is rested and efficient. At every opportunity that occurs, even during short march pauses, it is accepted that he rests, since driving a tank is extremely strenuous. For that reason he is often spared watch and security duties. On the other hand, for him there is no such thing as rest if the tank has mechanical problems. Then he is the most important working partner for the maintenance and repair personnel that often have to put in hours of work at night to have the tank back in service for the coming day.

An "intelligent" soldier is assigned as radio operator, one who is capable of handling delicate equipment. The frequent adjustment of frequency settings required a delicate touch and an understanding of the technical aspects of the system. On the other hand, his work was seen as relatively sim-

ple and easy to accomplish, so he often accumulated a number of additional duties, such as preparing meals, doing the laundry and looking after the quarters. A common nickname was "Stullenmax" [which cannot be translated literally, but has the connotations of being a "gofer"].

The loader is awarded the least respect. That was not because his function was unimportant. Quite the contrary! In a tank engagement, the speed of loading largely determines survival in a confrontation with superior numbers. The undervalued reputation was simply based on the more limited training time. Almost anyone could serve in that capacity after a short period of training. The loader is, so to speak, an "entry-level" position in the tank. The primary requirement is bodily strength. Intelligence is less needed.

#### DAILY LIFE OF THE CREW

Even an outsider can, to a certain extent, picture the interaction of the crew in combat. There are descriptions in the technical literature and in films.



In combat, the tank commander usually drives with the hatch open so that he could, if necessary, check out the terrain with his naked eye. He always keeps binoculars or other type of magnifying optics close at hand to closely scrutinize selected terrain sectors. This photograph is of Tiger commander Oberfeldwebel Göring of 2./schwere Panzer-Abteilung 502. He is wearing a one-piece set of coveralls as his field uniform. GÖRING

That is not true, however, for life before and after combat operations. What does the crew do in those many hours?

In that respect, one has to differentiate as to how close to the front the tank is located—whether it is in a distant rest and recovery area or in an assembly area a few kilometers behind the front lines. There is a corresponding difference in the degree of combat readiness and, accordingly, whether the crew gets to lead a carefree existence or not.

For the purpose of refitting and recovery (*Auffrischung*) after difficult operations or as a transit station after railroad movement—for example, from the place of activation for the unit to the area of commitment—the formation is, as a rule, quartered in or near a built-up area (or areas). The tanks remain in the company area. As much as possible, all of the subordinate elements of the battalion are kept together, including those that are regularly displaced to the rear during operations. The elements the company first sergeant controlled are also with the company. That held great significance, since it makes available the clothing, personal belongings and equipment of the crew that could not be carried on the tank. In addition, the crew finds time to tend to personal hygiene and mend damaged uniform items. Unserviceable items of the uniform and footgear in need of repair are turned over to the supply sergeant for repair or exchange. The long and weary way to the army laundry was seldom taken in World War II. The crew did its own washing, or that work was given to a local provider. In exchange, the crew helped out with butter, sugar, soap or the like. In many occupied areas a portion of the pay was given in local currency, so service could be contracted in exchange for payment.

The rations, which were not always noted for variety, were often improved by purchases of eggs, fowl and the like. In that way—quite in accord with the chain of command—the battalion's cooks frequently improved the meal plan. Contrary to representations of the practice, if goods were "procured" by arbitrary requisition or stolen, it was a matter for punishment.

After arriving in the assembly area, technical and maintenance matters are given top priority.

#### **TECHNICAL AND MAINTENANCE SERVICES**

Technical service of a tank is divided into ongoing preventive care and maintenance tasks and into services scheduled at given times. With a lubrication

diagram in hand, the crew takes care of technical inspections as well as preventive maintenance procedures both before and after operations, as well as during operations (such as march pauses). In large measure those inspections serve to spot problems in sufficient time to reduce the likelihood of breakdowns. Those inspections target moving parts (especially the running gear), making sure mountings and racks are secure and undamaged and the stowage of equipment is done according to the manual. That avoids damage caused by carelessness (e.g., from objects lying around in the area of the turret's traversing mechanism). The technical manuals are specific to each type of tank and designate the location of the inspection (e.g., the track-tension adjustment). The manual also describes the nature of the check ("check adjustment") and requisite equipment or materials needed ("grease-gun" or "wipe off excess grease with rags").

A trick that works in early detection of possible problems with the running gear is to feel the temperature of the road-wheel hubs with the naked hand. If they are hot, they need grease and must be filled immediately before they seize up. Observation with the naked eye can also detect traces of many deficiencies. (Is a part obviously dry in spite of wet surroundings? That could mean that it is running hot.) Leaks, seeps and drips can be caught that way.

The scheduled work is, as a rule, carried out after a stipulated number of kilometers. The D 656 series of manuals dealt with that. They were also specific to tank type. An individual maintenance log book of scheduled services (*Fristenheft*) had to be maintained by each tank commander. It was handed out each time that maintenance and servicing was done. The company maintenance sergeant (*Schirrmeister*) kept the *Fristenheft* along with the vehicular log book (*Begleitheft*) of the tank with his maintenance records. All of the other documents on the tank are also kept with him (e.g., weapons service log book, radio service log book, repair records, tool and equipment loading plans and the like).

The maintenance sergeant entered the chassis number, the book number and the kilometer reading of the vehicle on the cover and title page of the master log book.

The work that is carried out is entered in the appropriate columns. The kilometer reading at which the work is scheduled is written under "scheduled" (*Soll*). The actual kilometer reading at which

the work is carried out is entered under "actual" (Ist). In the column headed "completed" (erledigt), the driver certifies that the work has been done through his signature. The responsible supervisor (Aufsichtshabender: usually the maintenance sergeant or the platoon leader) records the date in the column marked "checked" (geprüft).

The scheduled services are valid only for normal conditions. Under severe conditions (heavy rain, muddy ground, loose sand and the like) the lubrication and service work must be done more frequently. The driver is responsible for that.

In tropical climates the intervals for lubrication and maintenance are reduced according to the conditions of the terrain. The units determine the intervals. The scheduled service entries of the maintenance logbooks are to be changed accordingly.

The maintenance logbook records up to 4,000 kilometers. At that point, a new one must be issued. On the cover and title page the extended period of coverage and the logbook number are entered (e.g., Logbook 2 from 4,250–8,000 kilometers).

Exchanges or overhauls of the engine and transmission are also entered in the maintenance logbook. Lubrication and maintenance point loca-

tions are shown on a diagram in the back of the logbook. The driver maintains the lubrication and maintenance points. The maintenance sergeant checks on the timely completion of the work once a week.

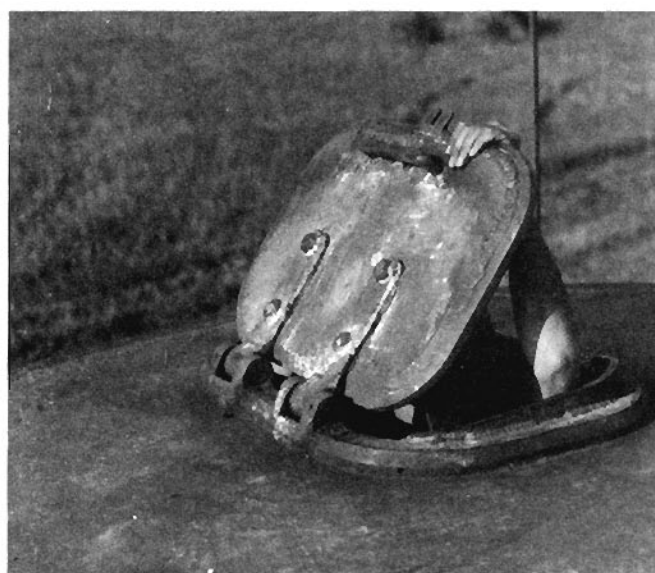
During repair work, the entire crew should remain with the tank. At the very least, the driver remains with the vehicle. Under the guidance of the maintenance personnel, he helps with the work. In the time that is left over he carries out servicing and maintenance. In order to increase the technical competence of the driver, he is generally detailed to the manufacturer's factory for a period of two to four weeks. He helps on the production assembly line and, in so doing, gains valuable experience regarding the inner working of the tank. That has the inestimable advantage that the crew can carry out procedures that would otherwise require bringing in specially trained personnel (e.g., changing torsion bars, roadwheel arms and traversing drives among other things). Maintenance personnel were also detailed to the factories in much the same manner. Long-time maintenance personnel were also required to earn a driver's license for the vehicles they worked on.



The gunner: Only his cool nerves and calm precision in extreme situations assures survival of the entire crew during a tank-on-tank engagement. An (almost) friendly relationship to his tank commander is a vital prerequisite for the combat efficiency of the gunner. ROSENBURG



This view—from the radio operator's position looking to the rear—demonstrates the constricted nature of the fighting compartment in which the crew often had to endure hours of continuous combat! KARL-HEINZ MÜNCH



Here the loader disappears into his own realm. In combat, the hatches were usually kept closed as a precaution against hand grenades. Obviously, that contributes to the claustrophobic atmosphere in the fighting compartment.

In combat, the loader has the most strenuous job. Depending on the caliber, the rounds weigh between 10 and 20 kilograms or more. He has to have the next shell ready for loading immediately after each casing was ejected. At the same time, he has to serve the coaxial turret machine gun and re-stow ammunition from less accessible stowage racks.



During a heated fire-fight the empty shell-casing holder overflows and individual hot casings tumble to the floor.

Busy with the next round, the loader wades through a mountain of empty casings. During pauses in the firing, he stows the empties in vacant racks or takes care of them in some other fashion.



The tank driver does more than just drive according to the instructions of the tank commander. Most of the time he moves on his own initiative. He concerns himself with taking advantage of the terrain. In critical situations, he must move under cover instinctively.







The driver takes every available opportunity to catch a nap. Even a few moments of deep sleep provides a break.



The radio operator—an “intelligent” soldier, if possible—is able to deal correctly with the technical business of communication. He was also trained in keying messages and in the care of the radio apparatus.



When not otherwise engaged, the radio operator looked after the well-being of his comrades as a sort of “jack of all trades.”



Organizing the radio communication documents demanded care and precision. There could be no errors in working out coded material. Every map entry has to be measured precisely to the millimeter so that locations in reports would always be exact.

The black, two-piece Panzer uniform is world renowned. The Waffen-SS, in 1943, also received a less conspicuous uniform of the same pattern with a four-color camouflage pattern. Unofficially, army tankers would also have camouflage uniforms made for them, either out of German water-pattern camouflage material or Italian stores. Official cotton variants to the black Panzer uniform—either herringbone twill in a reed-green color or cotton duck in a mouse-gray shade—were also popular, especially in more temperate climes with both the army and the Waffen-SS.





Until the end of the western campaign in 1940, the crews wore a beret/crash helmet combination that protected the head from impacts against racks, hard edges and the like inside the tank. It was, however, very unpopular with the crews. An overseas cap was then issued which was extremely popular, although it did not offer any protection to the crews. KARL-HEINZ MÜNCH.



Since there was no real heating in the tanks, the crew wore partial winter clothing. That, in turn, limited mobility within the vehicles.



A kind of tank-coverall in field-gray cotton duck came into service. That was popular with the crews because it was worn without any belt and reduced the danger of getting caught on objects inside the tank.



This camouflage tank coverall was also provided in 1943 to Waffen-SS tankers. This individual has modified the standard button closure by replacing it with a zipper! The stone-gray field shirt was always worn under it.





The driver and tank commander were provided with goggles so that they would not get dust in their eyes when driving with open hatches. KARL-HEINZ MÜNCH



Those who were not members of tank crews also wore the black tanker's uniform, even though not authorized to wear it. Here we see the *Kompaniefeldwebel* of *schwere SS-Panzer-Abteilung 503*. The official notebook of all respectable first sergeants—traditionally carried thrust in the collar opening—was obligatory for the “*Spieß*.”





Borrowed from the U-Boot crews, the practical leather jacket was much loved among certain units of the Waffen-SS, providing protection as it did against the weather in all situations. BROMANN

Life in the tank is anything but pleasant during pouring rain. The interior quickly becomes wet and slippery, the equipment and clothing cold and clammy. This crew attempted to cover the hatches and other openings in makeshift fashion.

KARL-HEINZ MÜNCH





At first no special rain gear was provided, so shelter-halves were used as makeshift ponchos.

KARL-HEINZ MÜNCH



When the opportunity presented itself, skinny-dipping was popular!

KOEFER



Additional view of soldiers interfacing with the civilian populace.



KÖNIG



KIEFER

These pictures show—contrary to many slanderous claims—how German soldiers behaved in their contact with the inhabitants. Infringement on rights and acts of force (such as plundering) were subject to disciplinary action or even courts martial. In general, a friendly arrangement with the local trades people provided comfortably for the Panzer soldiers in every respect.



Frequently, one of the soldiers in a tank company knew how to cut hair and, accordingly, attended to the regulation (very short) hair cut.



How does one react to stress? The strain of war erodes vigorous men in a few weeks, aging them by years!



After all the work is done, a game of cards helps pass the time. This picture was taken of a schwere Panzer-Abteilung 503 crew in August 1943.





Tanks crews take a break whenever they can. After being in the field for awhile, the simple pleasures of life take on a whole new meaning.





You grab some sleep whenever you can. The same applies for doing the laundry.



This idyllic photo of a Tiger crew in schwere Panzer-Abteilung 503 shows headquarters personnel using the roof of the turret as an orderly room.



Occasionally there is also something to drink!



This proves the maxim: "No food, no fight."



Less favored, but frequently encountered, was the keeping of mascots.





The most common overnight shelter was a foxhole or dug-out pit beneath the tank. It was frequently protected against wind and weather with tarpaulins at the sides.





In general, little time was left for entertainment. Where could someone stow a musical instrument in a tank?



Above and opposite: The crews develop a special relationship with their own tanks, to the extent of giving them individual names. Officially, identification was with turret numbers. Sometimes there were unofficial unit symbols, such as this Totenkopf pennant.



Most of the time there is constant activity around the tank: Cleaning and tidying, directing maintenance personnel and performing work on the running gear.





Keeping a tank combat ready was a never ending task.



Cleaning the gun barrel is a requirement after the gun has been fired. To do that, the stowed cleaning rod is assembled and cleaning/oiling attachments are placed on the end. Swabbing the barrel is a crew effort and requires a lot of work to do it properly.





KARL-HEINZ MÜNCH

In addition to oath taking, promotions and changes of command, there were also passes in review, parades and inspections. After dismounting, the crews either lined up in front of their tanks or lined up in three ranks.





By official authorization, the Panzerregiment or an independent Abteilung had a banner. The flag bearer was a specially selected Portepetträger (senior Feldwebel). Two young officers (Leutnante) armed with pistols served as the color guard.



There was no official regimental band. If time and resources permitted, one was formed. This luxury gradually vanished as the war progressed.



Tanks were particularly popular for propaganda purposes when the Wehrmacht was being expanded. Here we see vehicles on parade.

Another ceremonial occasion.



Naturally, there were occasions for celebration, such as shown here for schwere Panzer-Abteilung 502 in April 1944 when the Ritterkreuz was awarded to Oberleutnant Bölter.

Schwere Panzer-Abteilung 502 also provided one of the most successful German tank commanders of the war, the anything but terrifying Oberleutnant Carius, shown here after the award of the Ritterkreuz. He had well over 150 tank kills. REUPKE





"And if our tank becomes our eternal grave . . ." Thus begins the last verse of the German tanker's song. Confrontation with that fate also welds the crew together.



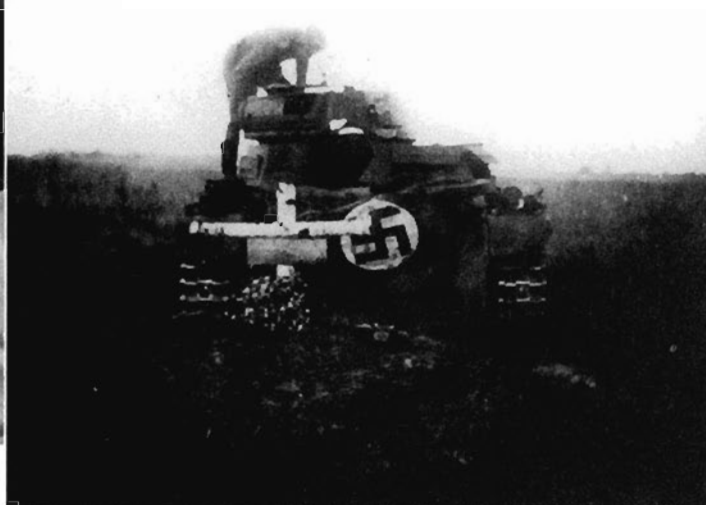


After excruciating live cremation in the tank, the occupant was reduced to the size of a doll. BAUMANN





Ich hatte einen Kameraden . . . final rest.





## CHAPTER 9

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# *Training and Tank Gunnery (Die Ausbildung und das Panzerschießen)*

### TRAINING

The essential foundation for the successful commitment of tanks is a well-grounded training of the crews and leaders at all levels. In many situations, the abilities of the troops are more important to the outcome of an engagement than the individual combat power of the weapons system and the number of them being committed. Only well drilled crews who are reliable under great psychological stress and leaders who use the correct doctrinal fundamentals in every situation are able to exert their will on the battlefield.

### TRAINING OF RECRUITS

The foundation stone for all branches of the service is always the basic training of the recruit, in which the young soldier learns to handle himself correctly as an individual rifleman in the terrain and how to use his weapon. He also gains a knowledge of other basics (preparing reports, defense against gas, preparations of positions, etc.). To that is then added tank training in his future tank position and other crew training. Individual training follows, based on the types of positions needed filled. Gunners and loaders train together initially. In the course of the training those who are suitable for gunners are then separated on the basis of performance.

The following areas are covered in detail in training:

- Behavior and soldierly conduct
- Military drill
- Training with hand-held weapons (all are trained with pistols and machine pistols. Rifle

training is only according to requirements—for example, formal guard duty—machine gun training is generally for everyone)

- Training with hand grenades
- Combat fundamentals of armor (platoon and company level)
- Vehicle identification
- Receiving radio orders and how to pass them on verbally
- Radio set operation
- Camouflage
- Training in maintaining the running gear and tracks
- Defense against aircraft
- Defense against gas
- Crew drills during firing
- Disabling of armored vehicles and
- Crossing ice surfaces

The gunners and the loaders are also trained in giving recognition signals.

The tank driver receives training in

- Care and maintenance of the tank
- Driving cross country
- Maneuvering on the battlefield and
- Recognition of signals

The radio operator is trained in

- Radio-telephone procedures
- Maintaining secrecy in radio traffic and
- Operating a transmitter and a receiver

The company commander is responsible for that training and selects recruits for their advanced training based on marksmanship, radio and driving tests. Promotion to Panzererschütze (equivalent

to Private First-Class) followed good performance. Those with the strongest performance become Gefreiter (equivalent to Corporal), generally in the second year.

### TRAINING IN THE SECOND YEAR OF SERVICE

The goal of training in the second year is to make the unit fully deployable in the field. All soldiers are trained in:

- Mastery of material covered in basic training (repeat)
- Gas detection and decontamination work
- Field engineer service, particularly in overcoming obstacles
- Guard duties
- Combat training with the machine pistol
- Fieldcraft in the winter time and
- Use of the march compass

Tankers who perform well take part in noncommissioned officer candidate training. Their suitability for advancement to a noncommissioned officer is determined during that training. It continues for four to six weeks. The gunners receive instruction in serving as the assistant tank commander. All of

the other specialties in the company are filled and the soldiers appropriately trained.

Some radio operators are trained as radio repair technicians so they can perform minor repairs on their own (e.g., exchanging circuits and fuses). Some tank drivers are given additional training in servicing tanks. Corporals are trained as radio instructors, assistant driving instructors and assistant squad leaders (assistant trainers).

### RESERVE OFFICER TRAINING

Graduates of college preparatory high schools (Gymnasium) and those with higher professional training can be selected for diversion into training as reserve officer candidates. In a special course they receive additional training in

- Duties of a superior
- Fundamentals of armor commitment
- Integration of all weapons in combat
- Training as a driver (if not already so trained)
- Training as a tank commander
- Instruction as a squad leader/section leader (Gruppenführer/Halbzugführer) and
- Umpire duty on maneuvers



As the war dragged on, equipment training and training for combat was primarily carried out with old tanks, because their inadequate weaponry or limited armor protection rendered them unsuitable for frontline operations. That practice had the advantage that it did not wear out combat-grade equipment. Here we see the relatively obscure Panzerkampfwagen I, Ausführung F.

### **NONCOMMISSIONED OFFICER TRAINING**

Particularly qualified soldiers who have successfully completed the qualification training to become a junior noncommissioned officer are then trained in the following areas:

- Operational principles of larger armor formations and combined arms operations
- Instruction as a tank driver
- Radio-telephone procedures
- Training as a squad leader/section leader (Gruppenführer/Halbzugführer)
- Umpire duty on maneuvers and
- Military driver's license (as needed)

Selected individuals are used to train recruits, receive training as a combat reconnaissance patrol leader (Spähtruppführer) or terrain reconnaissance patrol leader (Erkundungsgruppe) or as a gas-defense noncommissioned officer or as a range noncommissioned officer. More experienced noncommissioned officers are instructed in the function of the platoon leader, become communications and signals instructors, driving instructors or cross-country driving instructors. Some become leaders of the engineer section and instructors in engineer topics. The instruction in technical specialties has the advantage that individuals become specially qualified, and it lightens the burden on those directing the training (platoon leader/company commander). Following

that, some are transferred within the battalion into corresponding specialties (for example, into the signals platoon or the engineer platoon).

### **CONTINUED PROFESSIONAL DEVELOPMENT**

After completion of the first year of service, all of the remaining enlisted men are, as a rule, trained in a second crew position in the tank (tank driver as loader, gunner as tank driver etc.). Additional areas of training include:

- Use of smokescreen materials
- Guard duty and
- Engineer duty (breaching obstacles, conducting route reconnaissance, moving across swampy or cratered terrain, crossing railroad tracks and fords and setting up bivouacs and camps)

Selected individuals are trained for traffic control, as litter bearers, training assistants or bandman in the regimental band.

Gunners receive instruction as tank commander, radio operators learn to transmit combat messages and use the aerial recognition panels (Fliegetücher). Another member of the crew earns the tank driver's license. Selected tank drivers are trained as motorcycle dispatch riders. All Panzer-*überschützen* are trained in reconnaissance and security duties on foot and are instructed in com-



**A Panzerkampfwagen II, Ausführung B.**

bined arms operations and observation and messenger service. They are also trained in the remaining areas of engineer topics, such as construction of provisional bridges.

A comprehensive training program takes place within the specialty areas of duty within the company and the battalion.

The above sequence of training was maintained far into the war, although the training had to be increasingly abbreviated. Formal military drill and tank exercises were particularly shortened, as were training in other specialty areas (such as engineer duties), training for a second crew function, preliminary noncommissioned officer training and training at the battalion level.

Starting in 1943–44, the so-called Kurzausbildung (abbreviated training) was particularly focused on battle drills at the tank-crew level. That was born from necessity. Armor units were needed as rapidly as possible for service at the front. An additional reason for the shortening of the training and its concentration on certain areas was that one knew from concrete experience at the front which areas of training had priority over others.

#### **THE ABBREVIATED TRAINING PROGRAM**

The Inspector General of the Armored Forces (Generalinspekteur der Panzertruppen), Generaloberst Guderian, summed up those requirements very well in his order issued 29 May 1943.

It has been reported to me that the training of the Panzer- and motorisierte Divisionen in the West does not correspond to the urgency of the situation. Therefore I order:

1. Gunnery training is to receive the main emphasis in training on all weapons. Good results can be obtained with little ammunition.
2. I forbid:
  - a) Classroom exercises as opposed to combat ones.
  - b) Drill as a purpose onto itself on the parade ground, the athletic field, or other areas.
  - c) Sequentially ordered and functionally separated training plans, such as 4 weeks of squad-level training, 3 weeks of platoon-level training, 1 week of company-level training and the like. Training must be multi-faceted from the beginning. The

situation must not come about where commitment of the formation before it has completed its entire training cycle means that it fights, for the first time, as a battalion.

3. Those areas in which we are known to be weak take precedence, e.g., night combat, planned night-time and low-light gunnery training, fighting in woods and heavy vegetation, camouflage etc.

In this regard, I recommend training exercises and schooling of the troops according to the corresponding new instructional booklets of OKH.

Finally, I request that superior officers, including those of higher ranks, make sure that efficient use is made of time and that the attitudinal changes occur through constant checking of the weekly training schedules.

The well-known troop leader, Generaloberst Freiherr Geyr von Schweppenburg, summarized the fundamentals for executing the training as follows:

Motto—Only that which is necessary for survival and keeping one alive in war will be included in the training: Create a field soldier—nothing else matters.

- a) The location of the day's training is, first and foremost, the "battle run." Time management is of equally decisive significance. The entire training period—whether just three months or more time is available—must be arranged as a financially and managerially experienced businessman would do it. The training schedule is the means by which that is accomplished. The superior officer must continuously supervise it. It can be exchanged among the units to stimulate thought and instruct others.
- b) The objective of all soldier training is producing an independently thinking fighter, pre-trained in the spirit of the hunter.
- c) The "battle run" must fulfill the requirement that it simultaneously meet the most important demands of the foot soldier in combat: firing, camouflage, digging in and stalking. From the very beginning, those tasks must not be separated from each other or in time. They should be learned as mutu-



A Panzerkampfwagen I, Ausführung C. Photographs of this vehicle in an operational or training situation are rare.

ally intertwined functions. The traditional firing range is, therefore, obsolete. It does not simulate the terrain. Therefore it does not come within conceivable reach of the realities of war.

- d) The Schwerpunkt for all training lies in good shooting that is superior to that of the enemy. That provides the best chance of survival.
- e) Weapons training begins immediately with live ammunition, eliminating the traditional precursory theoretical and practical arenas (knowledge of trajectories and use of blank cartridges). After the initial firing points, it is left up to the trainee to determine whether to fire or not to fire. On the battle run itself, the trainee does not know where the targets will appear, what kind of targets they are, when they will appear, how long they will be visible and at which distance they will appear.
- f) Fundamental infantry training is to focus on the assault rifle, the machine pistol and the rifle equipped with a telescopic sight.
- g) The initial weapons training begins on the second day, whether or not outfitting with uniforms has been completed. The night

training plan begins on the third day, as is the first firing in low-level light conditions with live ammunition. Blank ammunition is eliminated commencing with the start of individual training.

- h) Drill and ceremonies, in every guise and under any other name, is forbidden. The troops learn essential discipline from continuous training, at the command of "Fall in!" etc. The systematic progression and differentiation of first individual training, then squad training and then platoon training in the traditional sequence is forbidden. It is replaced by the so-called "combined training:" after a few days of instruction in individual combat, one day of squad training alternates with another day of individual training, then one day of platoon training and, again, a day of squad combat. One must see disorder and mistakes and correct them through repetition or by employing instructor groups. The guiding thought is to achieve deployable units at the smallest level as rapidly as possible.
- i) A significant percentage of training time, about one third, belongs to training in night and low-level-light fighting. Conditions of





A Panzerkampfwagen II

complete darkness, clatter-free movement, nighttime and low-level-light firing, silent digging-in and the vital nighttime close-quarters fighting are substantial components of the training. Twenty-five percent of the ammunition allotment for training for all weapons is to be used in nighttime and low-level-light firing.

- j) A special night-training plan forms the basis for nighttime training.
- k) Digging-in and camouflage belong to the fundamental elements of combat. Both are learned according to a digging-in and camouflage primer, so that the combat-ready recruit meets stipulated requirements in digging-in and camouflage. He must have personally dug-in and camouflaged under realistic field conditions to the level of what combat requires of the individual combatant, i.e., a fox-hole, the squad circular trench, the abbreviated trench (Grabens-tummel), deflection trench, the Winkeldeckungsloch [a position where the

trench is angled so that shrapnel from incoming ordnance will not wipe out all of its occupants} and the like.

- l) Without exception every form of combat training for the individual combatant—in the squad or in the platoon—must be observed with the eye of an enemy, through field glasses, from the enemy side. To the greatest extent possible, an observer with combat experience does that. The “enemy observer” carries a red flag. If the flag is shown, the exercise is immediately halted. Errors are then set right through repetition until the trainer is satisfied.
- m) In all the training, in individual and in small unit combat, competitive processes in varying forms are to be employed.

Even though the Kurzausbildung was a product of the time, it included principles of training that, completely aside from the demands of the moment, reflected experience gained in long years of combat experience. During the final two years of the war,



Another view of the Panzerkampfwagen I, Ausführung C.

new soldiers were more-or-less prepared for combat commitment in just 12 weeks. Granted, they could not reach the same level that would have been the result of one or two years of training. It was obvious, however, that in the previous training methodology there was superfluous material and the training had never been close to duplicating combat experience.

### **TANK GUNNERY TRAINING**

Gunnery training is an essential fundamental in training future tank crews. That is where the foundation is laid for successful commitment in combat. Only a crew that carries out all the battle drills before and during firing and makes use of gunnery fundamentals with certainty in action will survive in an tank-on-tank engagement. By doing so, they translate technical superiority into tactical superiority as well. It is true that a tank like the Tiger starts with an ideal prerequisite in its firepower, however, there are a great number of errors that the crew can make that will permit the better trained enemy crew to succeed. The instruction booklet "Gunnery Training and Firing Exercises" (Schießanleitung

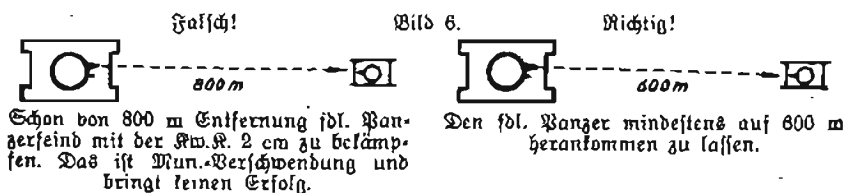
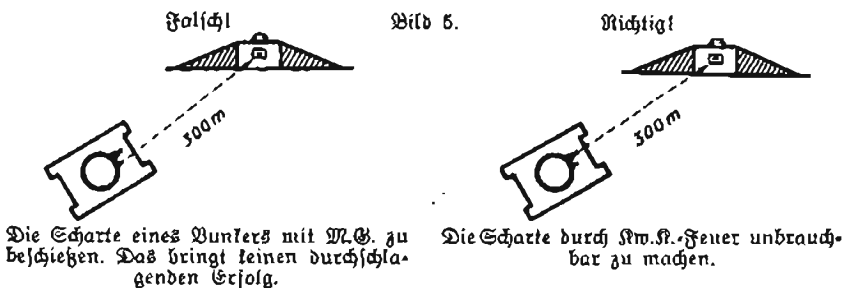
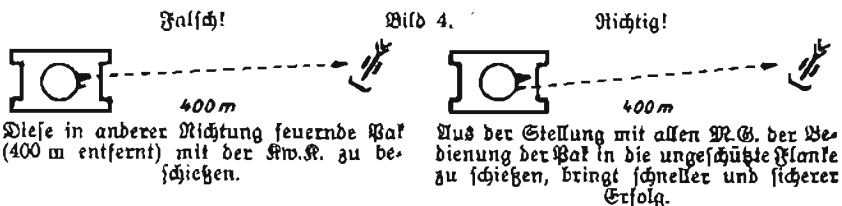
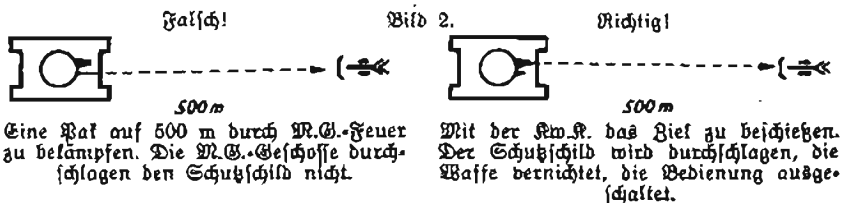
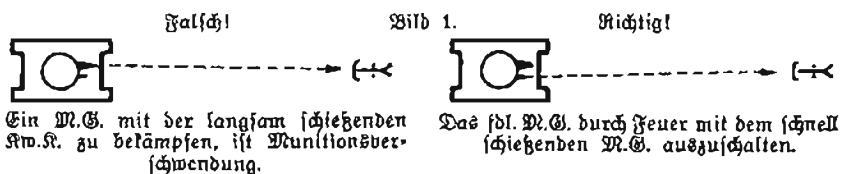
und Schulschießübungen) is very clear: "Departures from the gunnery standards lead to failures, loss of time and unnecessary expenditure of ammunition." The high standards of gunnery were maintained right up to the final days of the war.

Gunnery training comes right after the conclusion of crew training according to firmly established and standardized firing exercises. The entire turret crew was instructed in a very detailed fashion in the firing lessons and rules of gunnery. Gunnery drill in the practice tank and aiming exercises make the crew confident in its performance and make certain that all of the deficiencies that have turned up in training are corrected before the first live round is fired. It also ensure the best gunners have been selected.

### **GUNNERY STANDARDS**

It is necessary to differentiate between acquisition firing (Einschießen) and firing for effect (Wirkungsschießen). Firing for effect can only occur after the main gun has successfully acquired the target.

## Falsch-Richtig-Bilder über Waffenwahl der Pz.Kpfw. II und III.



## CHOICE OF WEAPONS FOR THE PANZERKAMPFWAGEN II AND III

*Illustration 1: Wrong! Combating a machine gun with the slow-firing cannon wastes ammunition. Right! Eliminating the enemy machine gun with the rapid-firing machine gun.*

*Illustration 2: Wrong! Engaging an enemy antitank gun at 500 meters with machine gun fire. The machine gun fire does not penetrate the shield on the antitank gun. Right! Engaging the antitank gun with the cannon. The shield is penetrated, the weapon destroyed, the crew eliminated.*

*Illustration 3: Wrong! Firing on a column of troops with the slow firing cannon. Success is limited. Right! Sweeping the target with the rapid firing machine gun promises success.*

*Illustration 4: Wrong! Engaging the antitank gun at a range of 400 meters with the cannon when the antitank gun is firing in another direction. Right! Firing into the unprotected flank of the antitank gun crew with all machine guns brings a more rapid and certain success.*

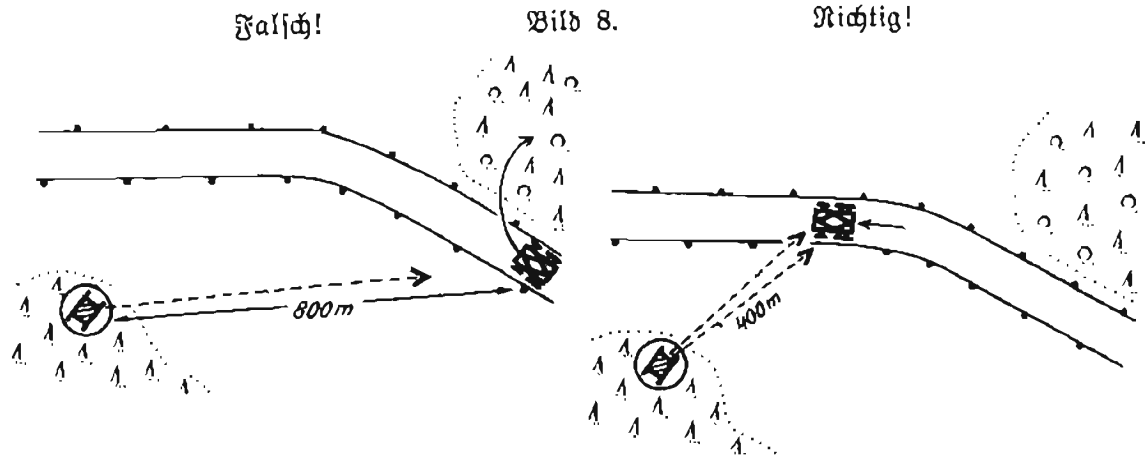
*Illustration 5: Wrong! Firing on the embrasure of a bunker with the machine gun. That brings little real success. Right! Making the embrasure unusable with cannon fire.*

*Illustration 6: Wrong! Firing on enemy armor at a range of 800 meters with the 2 cm cannon. That wastes ammunition and is unsuccessful. Right! Allowing the enemy armor to approach at within at least 600 meters.*

*Sketches from Kauffman, Panzerkampfwagenbuch.*

Skizzen aus: Kauffman, Panzerkampfwagenbuch

## Wahl der zweckmäßigen Kampffernung



Schon auf mittlerer Entfernung einen sich nähernden Pz.-Spähwagen zu beschießen. Es gelingt dem Feind leicht, sich noch zu decken oder rückwärts zu fahren.

Den fdl. Spähwagen auf nahe Entfernung herankommen zu lassen und ihn dann unter vernichtendes Feuer zu nehmen.

Skizzen aus: Kauffmann, Panzerkampfwagenbuch

### CHOICE OF AN EFFECTIVE RANGE FOR COMBAT

**Illustration 8: Wrong!** Firing on an approaching armored car at medium range. It is easy for the enemy to take cover or drive to the rear. **Right!** The enemy armored car is allowed to approach to a short range and then he is taken under destructive fire.

Sketch from Kauffmann, *Panzerkampfwagenbuch*.

Because of the flat trajectory of a main-gun round, acquisition firing can be skipped at ranges under 1,200 meters. In that case, normal firing can commence without initially ranging on a target.

When acquiring a target with armor-piercing rounds (Panzergranaten), the observed tracer and round impact must be used to adjust target direction, range and elevation.

When firing with high-explosive rounds (Sprenggranaten) the initial smoke-cloud upon impact is noted and brought into alignment with the target in range and direction.

Acquiring a target begins with a direction and range that bring the trajectory close to the target. That means it starts with aiming the round directly at the target. Lateral corrections in direction (for example, due to side winds or, at great distances, occasioned by the rotation of the round) are

inserted at the same time as required range corrections by shifting the aiming point opposite the observed impact. If the deflection error is great, the target is aligned with the mil scale in the sight based on the observed impact.

If observed impact short of or over the target's range is possible, then range corrections are carried out through bracketing (Gabelbildung). "Walking in" (Heranschießen) the rounds is used when observed impact is prevented by terrain or ground cover.

When bracketing a target, two ranges are established between which there is a high probability of the target being located. Depending on the situation, the range for the second round is determined by either adding or subtracting from that of the first round for which there is observed impact. The bracket is formed as soon as there is a range for a

short or long round. The first correction must be large enough so a bracket is formed with the second round. Only increments of 800, 400, 200, 100 and 50 meters are used. When using armor-piercing rounds at ranges between 1,200 and 2,000 meters the minimum increment is 200 meters. When using high-explosive rounds, 200 meter increments are used for ranges under 1,200 meters, 400 meter increments between 1,200 and 3,000 meters and 800 meter increments are added or dropped at ranges greater than 3,000 meters.

Increments are measured from the center of the current bracket. When firing armor-piercing rounds at ranges of less than 2,000 meters, the bracket is narrowed in incremental steps of 100 meters. At ranges greater than 2,000 meters when firing armor-piercing rounds and at all ranges with high-explosive shells, the bracket is adjusted by 50-meter increments. Another method is used at ranges greater than 3,000 meters.

When firing with high-explosive rounds at small targets at a range that is greater than 3,000 meters—because of the dispersion of the fall of the rounds at that range—it is necessary to check the boundaries of the 100-meter bracket with a second round in addition to the round that would have been accepted if the range had been less.

If observed fire in front of the target is prevented by terrain or ground cover, or if it is necessary to fire over friendly troops in the vicinity of the

target, then target acquisition fire starts at a range that is greater than the estimated or measured range to the target. In that case, firing takes place with small increments bringing the fire in from behind the target.

If observation behind the target is not possible due to terrain or ground cover, then the "walking in" method is carried out starting in front of the target. A prerequisite for that is that friendly troops will not be endangered in the process.

If a direct hit occurs during target acquisition at a given range, or a round impacts close to the target or the 100-meter bracket is reached when firing high-explosive rounds and the round is confirmed as either short or over, then acquisition ceases.

Firing for effect starts with the favorable range and deflection provided by the acquisition process as outlined above.

While servicing the target the point of aim may need to be changed and limited range corrections may be required. In correcting the point of aim, the target height must not be exceeded. The target should be destroyed during a fire for effect. A high rate of fire should be attempted. The type of target determines the amount of ammunition authorized for expenditure on it.

High-explosive rounds with delayed-impact fuses are used against personnel targets with no overhead cover if a ricochet effect resulting in airburst can be expected. Hard ground, flat terrain



A Panzer IV, Ausführung D used for training later in the war.



and grass-turf favor ricochet effect if the angle of impact is no greater than 20-degrees (360 mils). When attempting a ricochet effect, a satisfactory effect is achieved with a few rounds. Target acquisition is conducted with delayed-impact high-explosive rounds. Firing for effect is then carried out after dropping 50 meters from the target range determined during acquisition.

Acquisition firing is not used with armored targets at ranges less than 1,200 meters. Firing for effect commences immediately. It starts with a 200 meter addition to the estimated or measured range. If the first round is over (+) as a result of a large error in estimation, then drop 200 meters. If the first round is short (-) for the same reason, the point of aim is corrected ("cover the target"). If that correction of point of aim does not result in an immediate hit, then there is a much greater error in estimation of the range (the target is at a range greater than 1,200 meters). In that case, commence acquisition firing using a 400-meter bracket.

Corrections of point of aim during firing for effect may be necessary to hit weak points on an armored target.

When the target is large (such as a large truck) or a flat target is presented (such as masses of attacking infantry), acquisition firing is not needed when using high-explosive rounds at less than 1,200 meters—as long as there are reference points for the range.

If the target is an armored vehicle that is moving directly at or away from the tank, the following fire-for-effect rules apply:

- At ranges between 1,200 meters and 2,000 meters against a directly advancing armored target, firing for effect begins at the near end of the narrowed down bracket. Do not drop the range too soon.
- If an armored vehicle is moving away, firing for effect starts at the far end of the narrowed down bracket.



**Panzer-Ersatz-Abteilung 5 in 1942**

- Cease firing against moving armored vehicles when the range is greater than 2,000 meters.

When firing at a target that is moving perpendicularly or diagonally across the field of vision, it is necessary to lead the target, using the mil scale in the optics (*Nebenstachel*). The spacing between two graduations is equal to 1 mil. One mil equals one meter at 1,000 meters.

The following leads are to be used when firing at a target moving across the field of view at 90 degrees to the line of sight at a range of 2,000 meters:

Ammunition	10 km/h	20 km/h	30 km/h
AP rounds	3 mil	6 mil	9 mil
HE rounds	4 mil	8 mil	12 mil

When movement is diagonal, the lead is changed as follows:

- For an angle that is 30 degrees off the line of vision, cut the lead in half,
- For an angle that is 60 degrees off the line of vision, use the full value of the lead for a target moving at 90 degrees to the line of sight.

Gunnery training with live ammunition followed standardized exercises which were adjusted, as time passed, in accordance with wartime experience and the increased performance of the tanks.

The following school gunnery exercises were in effect as of 8 July 1944:

1st Exercise: Main gun using acquisition fire with high-explosive rounds on a target at unknown range but less than 1200 meters.

Conditions: Tank stationary, using the main gun at an unknown range between 800-1200 meters using a maximum of four high-explosive rounds. If the crew services the target with fewer rounds than allowed in the exercise, it is assigned a second target. The number of targets serviced is entered in the firing log under the remarks column.

Standard: 1 hit.

Objective: Learn acquisition firing with high-explosive rounds against point targets at unknown ranges less than 1200 meters.

Persons firing: Tank crew.

Location: Open terrain.

Target type: Frontal antitank cannon.

Tank: The tank is stationary and cleared for firing with the direction of firing at "12 o'clock" at an unknown range to the target. The main gun is unlocked. The tank commander oversees the activity of the crew from his position.

Execution: The tank commander orders the loader: "Load high explosive!" (Sprenggrenate! Laden und sichern!)

The loader reports completion of the task: "High explosive, up, safety on!" (Sprenggranate geladen und gesichert!)

The tank commander orders the gunner (after determining the range): "Gunner, high explosive, antitank gun, 900 meters, 12 o'clock, fire when ready" (12 Uhr!—Sprenggranate!—900!—Pak!—Schuß!)

The loader disengages the safety on the main gun.

The gunner fires the first round ("On the way!" = "Achtung!"), observes the impact and calls the observation to the tank commander (for example, "Over!" = "Weit!"). The tank commander orders the correction.

The remaining rounds are fired according to the gunnery rules for acquisition under the fire control of the tank commander.

Before the final round is discharged the tank commander orders "Stop loading!" ("Stopfen!")

The loader leaves the main gun unloaded after the round is discharged and reports (with the breech open): "Clear!" ("Rohr frei!").

The tank commander orders: "Elevate!" ("Mündung hoch!")

2nd Exercise: Main gun using acquisition technique with high-explosive rounds at a target at an

unknown range greater than 1200 meters. Six high-explosive rounds authorized. If the crew services the target with fewer rounds than the exercise allocates, the exercise is ended.

Requirement: 1 hit.

The course of the firing exercise is analogous to the first one except that the gunnery rules followed are those for a greater range.

3rd Exercise: Main gun using acquisition technique with armor-piercing rounds against a tank target at an unknown range greater than 1200 meters.

Exercise: The tank is stationary. Main gun: range unknown, between 1200 meters and 2000 meters. Four armor-piercing rounds



Training units presented a curious picture with their mixed outfit of equipment. Nevertheless, platoon maneuvers, utilization of terrain, choice of positions and the like could be practiced effectively with the old equipment.

are authorized. If the crew services the target with fewer rounds than the exercise allocates, the exercise is ended.

Requirement: 1 hit.

Target type: Tank target (frontal).

The course of the exercise differs from the first and second exercises in that the impact (flash of explosion) is not what is observed by the crew. Instead, it observes the tracer in relation to the target (so-called "Durchgangsebene" or level at which it passes through the target). Corrections in elevation and deflection are made by reporting in mils, according to the cross hairs in the telescopic sight (Zielmarke) or the mil divisions on the reticle, not in changing the range setting of the sight.

4th Exercise: Main gun using armor-piercing rounds against a target moving across the field of vision.

Exercise: Tank is stationary. Main gun: Range between 800 meters and 1200 meters. Three armor-piercing rounds authorized against a target moving at 20 kilometers an hour directly across the line of sight.

Distance that the target moves: 150 meters.

Firing time allocated: 30 seconds.

Requirement: 1 hit.

Objective: Learn how to take a lead and report on a target in motion across the line of sight, as well as learn to correct point of aim based on observed fire.

Target type: Armor target on moving sled (length about 4 meters; height, including turret, about 2 meters).

The course of the exercise is analogous to the 3rd exercise, except that the tank commander orders the lead to be held in mils as well as the range to the target.

Exercises also dealt with firing the coaxial turret machine gun as well as use of the air-defense machine gun.

Depending on the availability of ammunition and a suitable firing range, small combat battle runs are also carried out at the platoon or even at the company level to school the tank commanders in fire control. Prior to the exercises, so-called dry firing or aiming drills are run in order to practice crew drills before the issue of live ammunition.

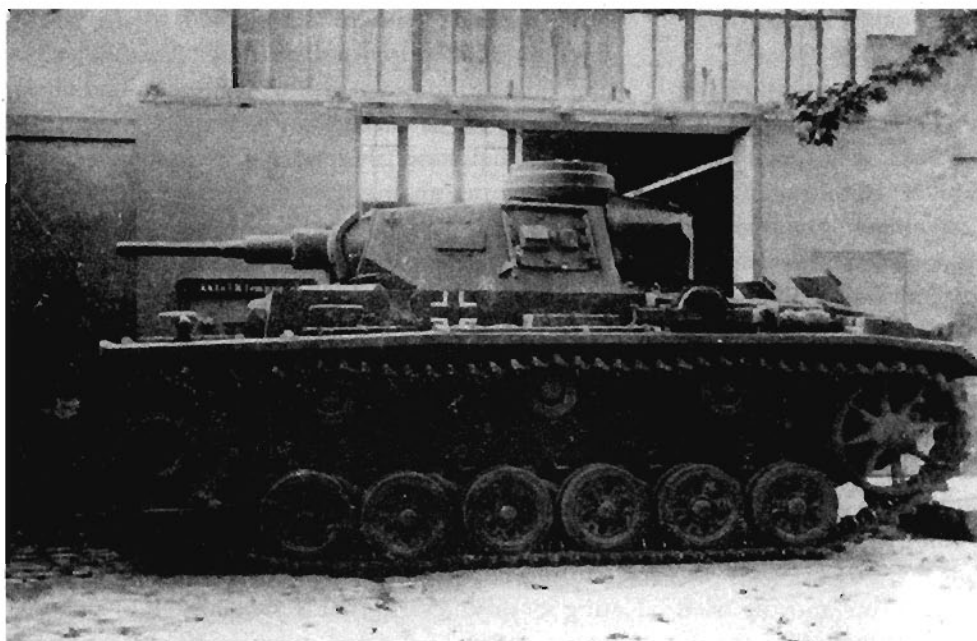
Although the tank commander controls the individual rounds in the initial phase of gunnery, the gunner is also drilled so that he can open fire on his own after the conclusion of the school gunnery exercises. As soon as a target is identified, he immediately reports (for example "Panzer!") takes aim, adjusts the range setting of the sight as may be required, warns the crew ("Achtung!") and fires. During that time the loader disengages the safety on the main gun and the tank commander decides whether to override the gunner's intentions (for example, if the opening of fire is too soon).

If several targets are spotted, the gunner fires until all of them are destroyed or until the tank commander orders a change of target or a cease fire. That procedure has the advantage that the initiation of and rate of fire is faster than when the tank commander directs the firefight.

In addition, to maintain a constant state of combat readiness a round must already be loaded in the cannon (with the safety switch on) and a range setting set on the sight that is pre-selected by the tank commander. That depends on the situation and terrain. As a rule, an armor-piercing round is loaded and the range setting on the gunner's sight is at either 800 or 1,000 meters. All of the other weapons—the turret, bow and air-defense machine guns—are also loaded.



Training in peacetime garrisons is generally favored by a good infrastructure with concrete surfaces and closed garages.



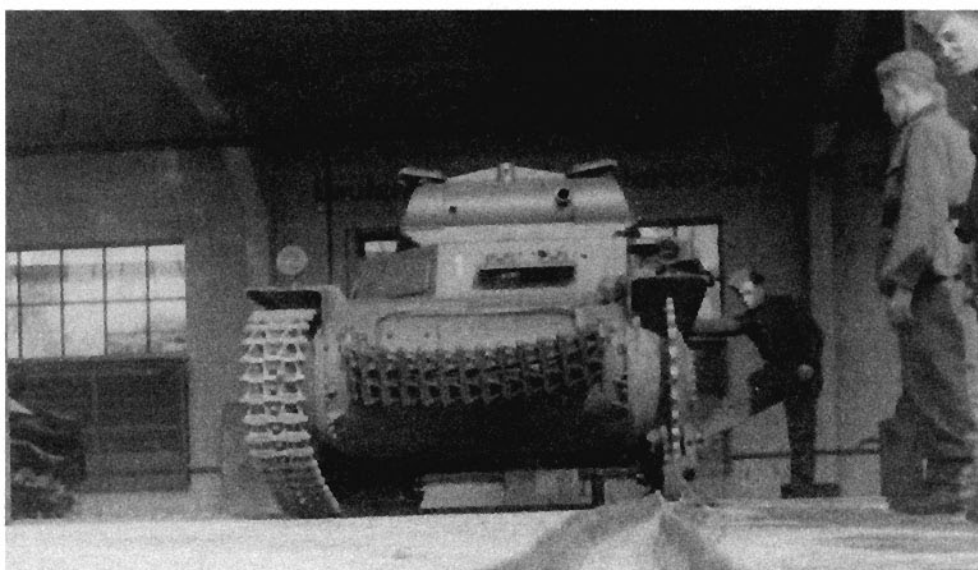


The capacity of the peacetime facilities was not adequate. The training areas often had no permanent buildings, so training camps were constructed, generally with wooden barracks.

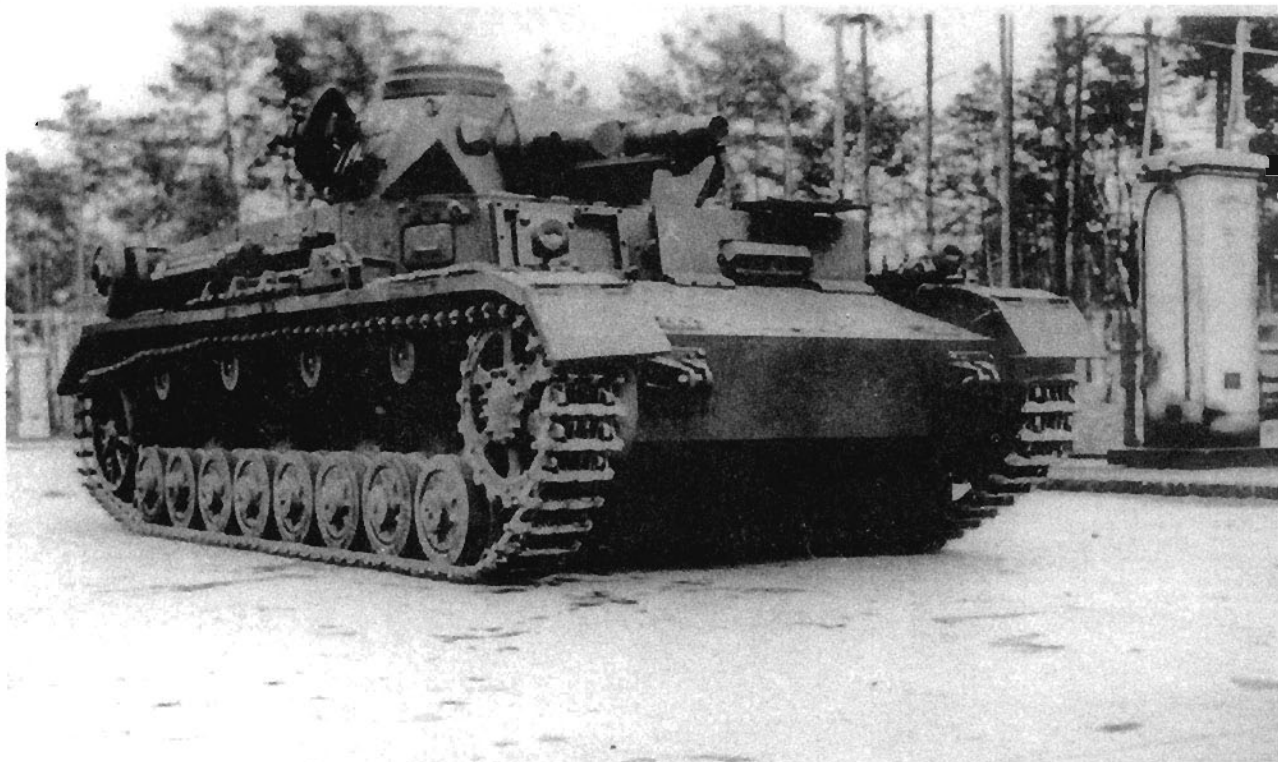




Tank use in winter in the open under extreme weather conditions is a problem. The tank becomes a refrigerator with consequences for the battery, armament, ammunition storage and the like. BOCHF.



On occasion, empty factory buildings and airplane hangars were used for training in warm, dry conditions.



At least fuel pumps were available at built-up facilities, as opposed to the jerry cans or 200-liter barrels which were more common in the field.



After basic training (without tanks), training started in individual crew specialties. Shown here is cross-country driver training. For that, tank hulls of earlier construction, mostly Panzerkampfwagen I and II, were used.



When operating on the open highway, signals are generally given with signal disks, since other motorists are more likely to recognize their meaning than that of flag signals. Illustrated here is the signal "Left turn." (Panzertruppschule).



Training started with the individual crew. Here the crew selects a position and determines the range to a target.



It was not a good idea to drive through houses. Damage to the antenna and vision devices was inescapable. Dirt often gets into the engine air intake. KARL HEINZ MÜNCH







Open areas are used in individual tank training to instruct in cross-country driving, negotiating ditches, overcoming obstacles and traversing muddy ground.

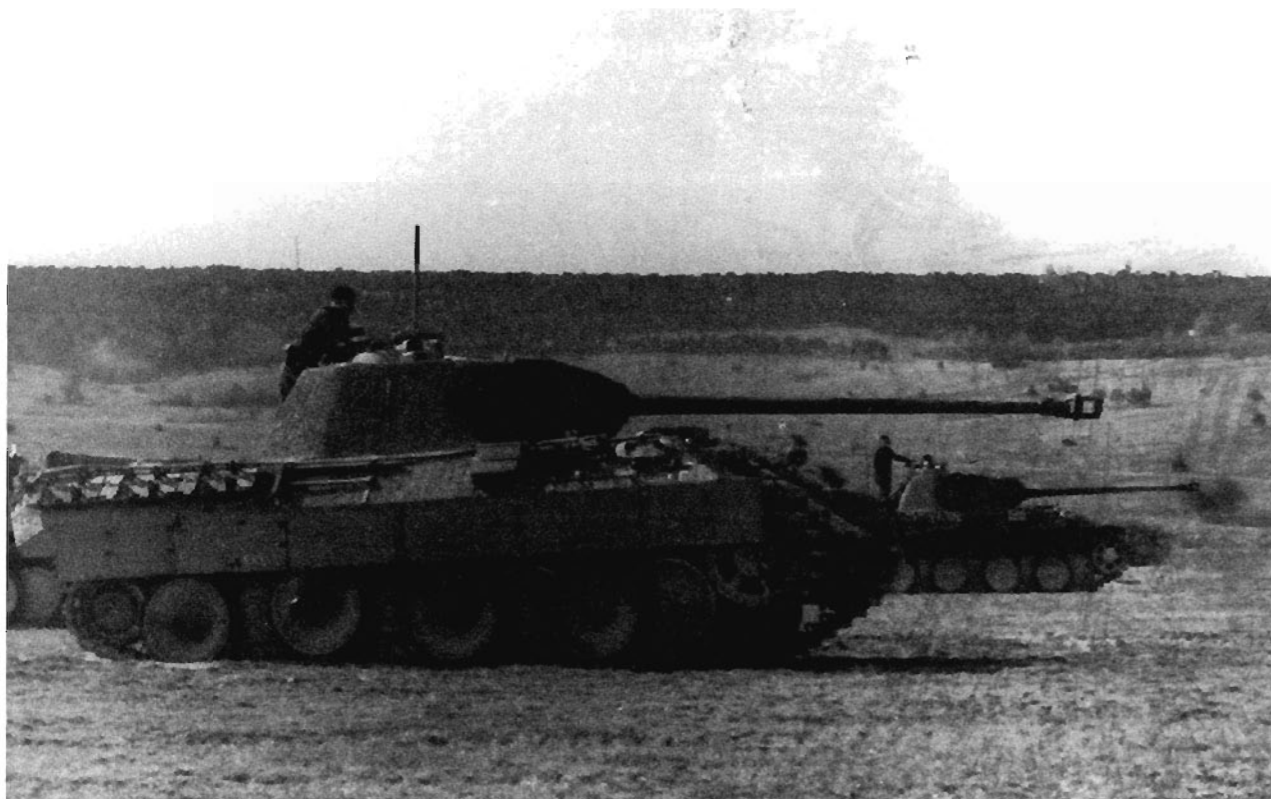


Firing practice, assisted by the company commander observing at the scissors-telescope.





Central to the training of the crew is mastery of crew weapons and their firing.



Without proper training, even powerful weapons systems such as these Panthers and Tigers were vulnerable to a determined enemy.



Conduct on the march and at halts was intensively practiced. These tanks belonged to the 18. Panzer-Division. HUHLE



The tank commander and platoon leader are trained during terrain walks and leaders' exercises.

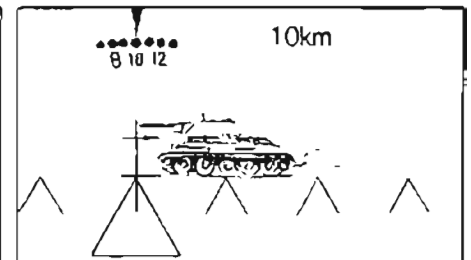
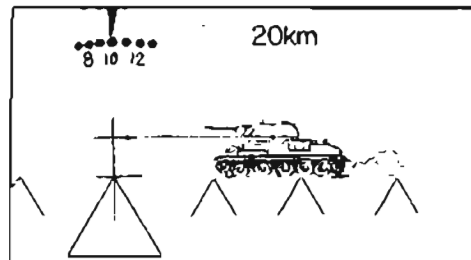
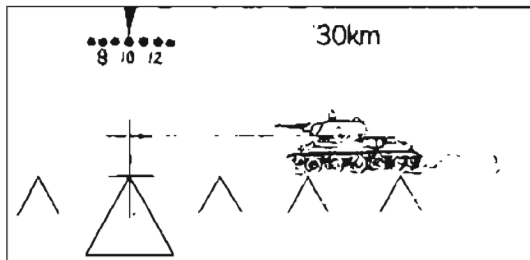
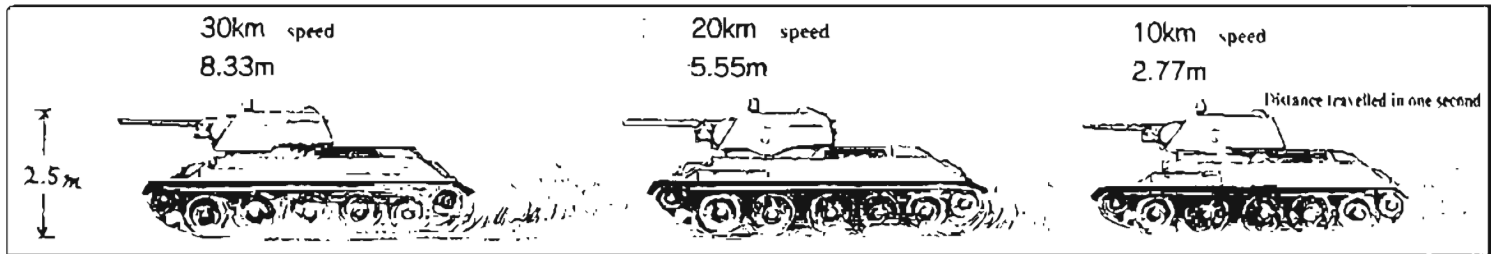


Debriefings occurred after all training and unit-level firing exercises. The tanks formed up in single file or in line, and the crews dismounted to hear from their leadership. These tanks were part of Panzer-Regiment 15.

KARL-HEINZ MÜNCH



The essential foundation for the tank soldier is mastery of tank gunnery. In contrast to automatic weapons, the emphasis has to be on precision and on securing a hit with the first round. Shown is a gunnery comparison between the prototypes of the Panther and the Tiger.



It is important to master the rules of gunnery, for example, choice of the correct amount to lead the target (corresponding to its movement across the line of sight).





After working on the armament or when it had been determined that the gun was out of adjustment, the tank immediately needed to be zeroed. To accomplish that, a good, visible target is set up at the correct range for boresighting. The optics are adjusted and a group of three—better yet five—rounds are fired with an identical aiming point. The center of mass for the shot group is calculated and the appropriate elevation and deflection corrections inserted with the adjusting knobs.



Testing of new equipment and troop trials are important in uncovering technical inadequacies and other deficiencies (for example, ergonomic problems). As a result, they are carried out by experienced tank soldiers. In this case, we see the Panther prototype undergoing trials.

# *Armor Tactics— Today and Tomorrow (Panzertaktik—heute und morgen)*

In the previous chapters the fundamentals of German armor tactics of the Second World War have been elaborated. They were the basis of smashing successes and also gave a major impulse to the doctrines of other nations. During the war the Soviets sought to apply German employment fundamentals on the operational level. At first they had to learn the hard way with several costly failures, but they achieved impressive successes in 1944 and at the beginning of 1945.

The Americans and British remained stubbornly rigid in their doctrine until the end. The British used armor almost exclusively as support of infantry, and the Americans overemphasized advance preparation of combat support (also from the air) and neglected taking advantage of or advancing those leaders who were aggressive.

At times, German principles of command control were taken up in the manuals of the young NATO armies of the 1950s and also in the Red Army. However, immense gaps yawned between words and deeds. The new (West) German Army, the Bundeswehr, was also restricted in its doctrinal thinking, since an operationally questionable, purely defensively conceived, concept of operations was forced upon it. It was conspicuous, however, that the manuals for armored forces were, in large part, identical to those of the Panzertruppe of the Wehrmacht. That was possible because of the basic understanding that even in the defense, armor should be committed in an offensive role. In large part, this principle was built into the defense plans, if only in

the fact that the main battle tanks, more often than not, formed the reserves, with the corresponding option of conducting mobile operations. In a series of NATO maneuvers, particularly in the 1970s and 1980s, armored formations—frequently and conspicuously mostly German—carried out flexible, wide-ranging operations, confirming yet again the correctness of those fundamentals.

### THE INFLUENCE OF CHANGES IN TECHNOLOGY

Another important factor was the development of the German Leopard I and, especially, the Leopard 2 tanks—both systems capable of outstanding mobility and dominance on the battlefield. Above all, the Leopard 2 in its most modern version, the Leopard 2A6, is clearly superior to most of its rivals, especially in technical reliability. Under the influence of entirely new technologies, it was then necessary to change the manuals.

The essential differences from earlier armor follow:

- Stabilized alignment of sights
- Computer-directed fire-control equipment
- Laser range finder
- Thermal-imaging devices
- New forms of tank armor
- New types of armor-piercing ammunition
- Efficient means of communication
- Command and weapons control systems

Modern battle tanks fire with a high probability of hits at full speed. The alignment of the sights is

computer guided in remaining on target, the optics are stabilized. Targets can be recognized in complete darkness. Transmission of data and verbal information is carried out with low interference in real time. All in all, the Leopard 2 has a first-shot hit probability on the move of more than 70 percent, even at distances well over 2,000 meters. It has a split-second combat reaction time and reliable target identification capability even in conditions of restricted visibility. Mobility has been sharply increased with a 30 horsepower-to-ton ratio of vehicle weight (the Panzerkampfwagen V Panther had a 15 horsepower-to-ton ratio). Today's tank also provides stabilized optics for the tank commander. After short preparation it can drive under water and it can destroy targets at ranges in excess of 3,000 meters. Its armor protection, at least in the most decisive area in an engagement—the front—is high and protects it against hits from tank guns even at short ranges. The new generation of kinetic-energy rounds (Pfeilgeschosse) attain a muzzle velocity of 1,800 meters per second and faster. At a range of 2,000 meters it penetrates over 700 millimeters of armor plate. (In comparison, the frontal armor of the Panzerkampfwagen VI Tiger II was between 150 and 180 millimeters. The Tiger's primary armor-piercing round, the Panzergranate 40/43, with a muzzle velocity of 1,030 meters per second, penetrated 165 millimeters of armor at a range of 1,000 meters.)

The pressing question, then, is whether fundamentals of action from more than fifty years ago can still be relevant. The answer is amazing: Precisely because the reaction time of modern battle tanks is drastically reduced, the commander must follow the tried and true fundamentals with greater speed and flexibility. In so doing, the prerequisites for commitment of armor are exactly the same as before (choice of terrain and point in time, issuing of orders, combat and operational support). The operational fundamentals must be employed with particular consistency, bearing in mind the ever more rapid sequence of "reconnaissance—command and control—effect" (*Aufklärung—Führung—Wirkung*) and the ever shorter decision cycle that remains.

## TRAINING

In order to take advantage of the clearly heightened capabilities of the modern tank, the crew and the leaders must be trained accordingly. Granted, it

is relatively easy to use the weapons system of a Leopard 2. However, the outcome of a modern engagement is decided in a matter of seconds. Consequently, an ingenious and efficient training system has been created with widespread use of simulators. Thus, the career of the gunner does not begin with expending excessive ammunition, but in a firing simulator. After he has achieved a "do-it-in-your-sleep" level of efficiency, tactical understanding in the context of the platoon is taught in the combat simulator. Live ammunition, of course, is not in any way eliminated, but the static school firing tables while stationary on a concrete pad are a thing of the past. Right from the beginning, firing is under tactical conditions. Non-nonsense time limits—fifteen seconds, maximum, for a combat engagement where the time begins when the target appears and not when it is spotted—almost exclusively firing on the move—with most of the targets also moving—and constant conditions of numerical inferiority coax the utmost out of the crews.

As soon as the tanker is capable of fighting in the context of the platoon, it comes to a "show-down" for the company. Battle runs with live ammunition are conducted for the tank company, during which the company is reinforced with Panzer-grenadiere. Before the battle runs, and repeatedly in between engagements, the tanks being used take each other on, using engagement simulators. Live ammunition is replaced with a laser emitter in the muzzle of the gun barrel. The opponent has reflectors mounted on his tank. Getting a "target" depends on how well the crew carries out its combat tasks. If mistakes are made (such as poor timing), then there is a miss. Errors in acquiring targets, engaging them and in use of terrain are mercilessly penalized.

The high point in training is an all-day annual exercise for the company—for the entire battalion in the crisis reaction forces—in a combat exercise center against an enemy force. Everything is evaluated online with computer support. Exact positions, determined with the help of global positioning systems, document the course of the fighting. Verbal or radio orders are recorded on video or audio tape. Granted, the stress, particularly for the commanders, is not the same as under the mortal danger of real combat, however—and you can mark my words on this—it is not far from it! If you can make it through those exercises, it is because you learn a

great deal in a hellishly short period of time and—this is important—because you can make mistakes and not be put through the grinder by the training personnel. Evaluations are exclusively internal, from the direct superiors. In no case are there evaluations by personnel of the exercise center. All tapes are turned over to the troops in the form of cut and edited material. The rest are erased after four weeks.

#### COMMAND AND CONTROL

Obviously, there is less tension in the simulator-supported training of leaders. War is practiced in a virtual setting at the battalion, brigade and division level in computerized simulation centers. Practice goes on in giving correct orders during fighting that goes on all day (and night). The advantage is that all combat elements can be trained without any of the peacetime conditions of safety that are required in a combat exercise center. These new types of command and training materials have also left their fallout in the manuals. Thus, for example, the technique of giving orders has been refined, and the commander placed in a position to act faster. That

ability to act faster is also brought about by the increasing use of so-called command and weapons control systems, a computer display that presents all sorts of data on the situation, the technical aspects of orders and other data (such as status of vehicles). In addition it also displays the positions of friend and foe, as well as being able to pass on any sort of report to others by radio.

#### SUMMARY

Tanks are not the lords of the battlefield. No single weapons ever has been. However, when correctly employed by commanders who distinguish themselves through determination and independent action, they continue to be an indispensable element of the combined-arms team in combat.

Armies that commit their armor accordingly—as did Israel in 1967 and 1973, as did the Coalition in the Gulf War of 1991 and as Germany formerly did—prove themselves superior to others and succeed with fewer losses. As has always been the case, there is a wide gap between those who are capable of executing operations well and who have the corresponding systems and the rest of the world.

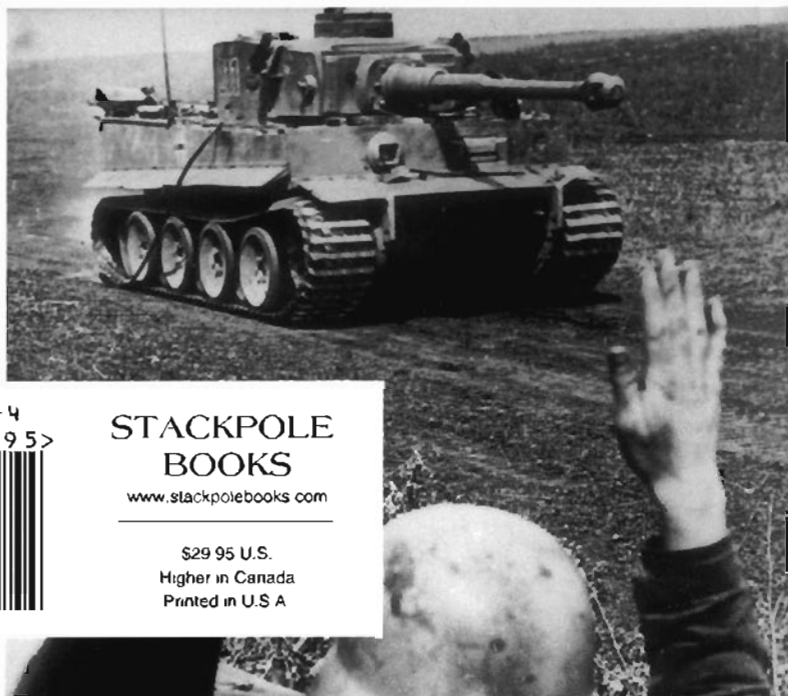


Series of extensive factory trials were set up, as here at the Henschel works in Kassel, where both the Panther and the Tiger were tested.



Not content to rest on its laurels, the Panzertruppe of the modern Bundeswehr possesses one of the best tanks in the world and trains hard to maintain battlefield dominance in an increasingly technological environment. Despite that, the principles of armor commitment remain remarkably unchanged as the new millenium dawns.





ISBN 978-0-8117-3244-4

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