Battle Orders

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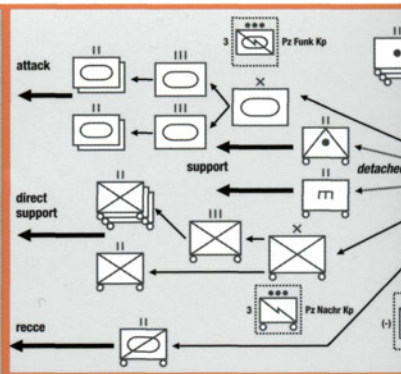
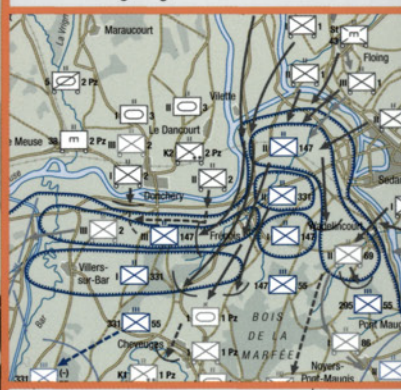
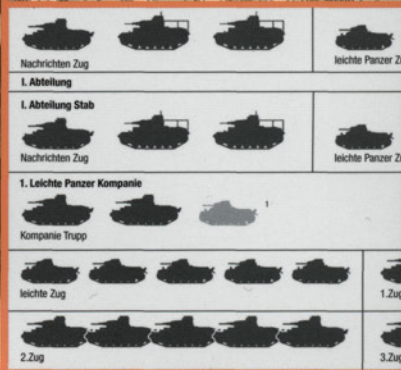
Panzer Divisions: The Blitzkrieg Years 1939–40







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Pier Paolo Battistelli

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In the tree diagrams and maps in this volume, the units and movements of national forces are depicted in the following colours:

German army	Grey	Waffen-SS	Black
Luftwaffe	Sky blue	French	Dark Blue
British	Brown	Polish	Red
Belgian	Yellow		

Key to vehicle identification

Command tanks


PzBefh I


PzBefh III


PzBefh 38 (t)

Tanks


PzKpfw I


PzKpfw II


PzKpfw 35 (t)


PzKpfw 38 (t)


PzKpfw III


PzKpfw IV

Armoured cars (not to scale)


SdKfz 247


SdKfz 221


SdKfz 222

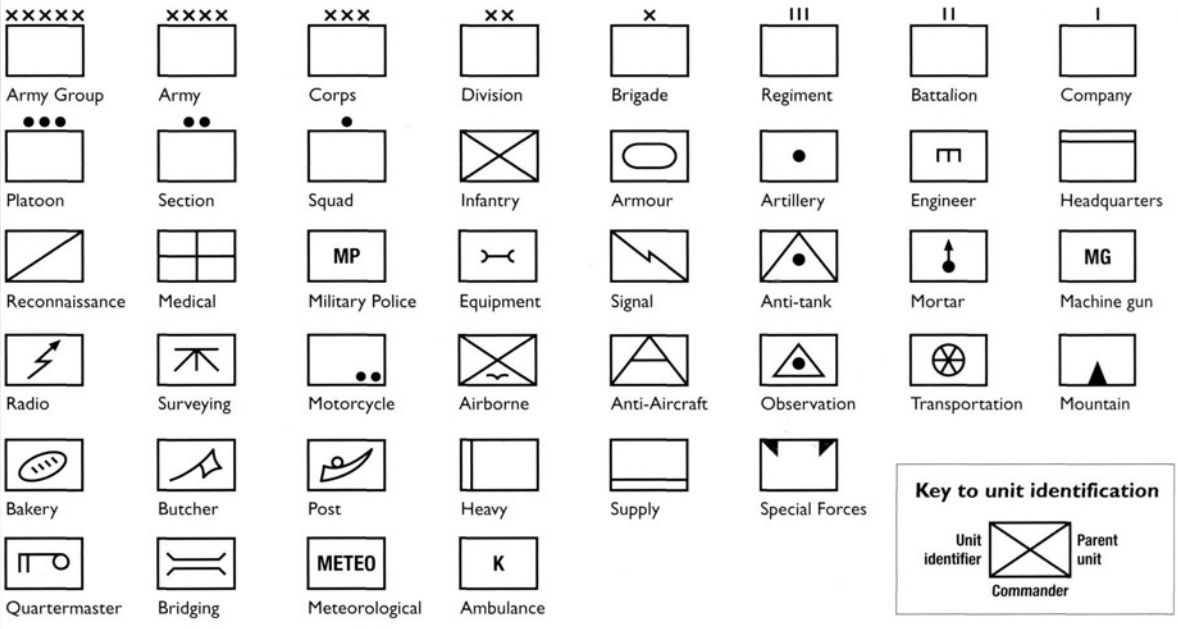

SdKfz 223


SdKfz 231 (6 wheels)


SdKfz 231 (8 wheels)


SdKfz 263

Key to military symbols



Key to unit identification

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Introduction

As the sun was setting in the late evening of 20 May 1940, the vanguards of 2. Panzer Division entered the city of Abbeville in France. Later that same night, they reached the town of Noyelles and their objective: the Somme river estuary. It was the culmination of a ten-day battle during which the division, along with the other two parts of Guderian's XIX. Armee Korps, had crossed the Meuse, broken through the French defensive lines at Sedan, and penetrated deep behind the enemy lines, covering more than 300km from the German border to the Atlantic shores. At the conclusion of this ten-day drive, the remnants of two French armies plus the British and Belgian ones, which formed the core of the Allied forces, were trapped with their backs to the sea. The inconceivable had become reality; Germany had won a stunning victory, her enemies were in shambles. A little more than a month later France capitulated, and the entire world marvelled at the German blitzkrieg.

Even though many, on that day in May, were surprised by what had happened, some were not. Interestingly the following day, in peaceful Switzerland, an unknown commentator on Radio Beromünster, talking about the German offensive in the West, observed: 'the rapid German success is owed to a method of warfare that had not been used before the Polish campaign of last September. This method of warfare is completely mechanized. Technology has taken possession of war. The offensive did not take place along a continuous front, but rather it took the shape of numerous thrusts by the Panzer Divisions.'[1] Actually this was something of a look into the future; war was still far from becoming 'totally mechanized', even if it had taken a significant step forward.

Nevertheless, the May 1940 campaign looked like a revolution. At first sight, the time of infantry marching into battle and of static trench warfare had disappeared forever; now the tank ruled the battlefield, and it did it in a manner not even its most devoted advocates might have been able to predict. As such, 20 May was not only the culmination of one of the most stunning military campaigns of the 20th century, but it was also a historic landmark in warfare. Yet, it was only the beginning of a military revolution, one in which the Panzer Division provided the leading characters, and one that would go on to shape warfare for many years to come.

PzKpfw I Ausf A parading in Berlin in front of Adolf Hitler, probably in 1935. The birth of the Panzerwaffe can be dated back to 15 October 1935, when the first three Panzer Divisions were formed.

1 Piekalkiewicz, *Ziel Paris*, p. 135.

Combat mission

'Blitzkrieg', or 'lightning war', is certainly one of the best-known German words. Most commonly, it refers to a brief war won with a swift, decisive victory on the battlefield achieved by armoured and mechanized units, and through the use of airpower. Actually, the concept of blitzkrieg was born well before the word itself; its origins can be traced back to the military thinking of von Moltke and von Schlieffen, Germany's most reputable Chiefs of Army Staff in the second half of the 19th century. Assessing the strategic situation facing Germany, situated in the middle of Europe and surrounded by real and potential enemies, von Moltke came to the conclusion that the only option was to win a quick victory against one of them (namely France) before focussing all her strength on the remaining one (namely Russia). This way a *Zweifrontenkrieg* (a war on two fronts) could be avoided, and Germany – with her limited resources – would not have to face two strong enemies at the same time. However, the ever-increasing size of modern armies and the development of new weapons made blitzkrieg more difficult to achieve. The solution was found by von Schlieffen who, taking his cue from von Moltke's studies on the battle of envelopment, found what looked like a feasible solution; expanding the concept of the battle of envelopment from the tactical point of view to the operational one, he developed a plan for a massive envelopment through which the French Army could be defeated in a matter of weeks.

Several reasons explain the failure of the Schlieffen plan, though only one is relevant here: it was to be executed without adequate instruments of warfare. In 1914 the command, control, communications and intelligence (C3I) structure of the armies differed only slightly from that of the Napoleonic age, as did their units and tactics. Infantry advanced on foot along continuous fronts, while cavalry was used for probing and reconnaissance. Improvements came over three

Two PzKpfw II Ausf c training in woodland. The Ausf c was the first variant of this tank, produced from March 1937; it featured a new suspension system, with five independent large road wheels and new tracks.

The Panzerwaffe in its infancy: Panzer-Attrappe (dummy tanks) conduct training with anti-tank guns, in this case the 37mm Pak 35/36. Initially made of wood and later of light steel alloy, these dummy tanks were mounted on cars. Their purpose was to get soldiers and tank crews acquainted with cooperating with armoured vehicles.

years of trench warfare, even if none of them turned into a suitable instrument of warfare. Revised tactics and C3I structure enabled the Germans to breach the enemy front line in several points early in 1918, yet without achieving a major victory. The Allies successfully used tanks later that summer, but again they only breached the enemy defences and were of little use during the breakout. In the post-war years, in spite of technological developments, the tank was still not considered suitable for operational manoeuvre warfare. Thus, as late as 1940, many still believed that warfare was still bound by the very same principles and instruments of half a century before. Some did not, however.

It would be wrong to assume that the German Army was well ahead in this field, since the key to its early wartime victories lay in the coming together of different elements. The first blitzkrieg war against Poland in 1939 was won using much the same methods as had been employed during World War I: the Panzer divisions were scattered and used to spearhead different armies, and there was no overall penetration in depth of the enemy defences. Even the initial attack plans of the French campaign echoed concepts dating back to the age of von Schlieffen; though restricted to Belgium and Holland, the advance was to take place on a broad front with the Panzer Divisions scattered along it. It was mainly thanks to generals like von Manstein and Guderian that a workable plan was eventually developed. Von Schlieffen's idea of a giant envelopment was split in two, with a first, massive envelopment of the bulk of enemy armies in the north and a subsequent campaign against the rest of France. To obtain the first envelopment a large number of Panzer divisions were gathered together, this time with the aim of spearheading the advance with a single thrust. These units would later slash their way through the enemy forces in Belgium and Holland. Operational manoeuvre warfare eventually attended to armour and mechanization, and a new principle took root: penetration in depth behind enemy lines. The German victory of May 1940 revealed for the very first time that both a successful breach of the enemy's defences and exploitation of this success were possible, assuming the proper instrument of warfare was available. In 1940, only the German Army possessed such an instrument: the Panzer Divisions.

The genesis of the Panzer Divisions

Although slowed by the terms of the Versailles peace treaty, the development of the Panzerwaffe retained its overall momentum. In 1928, the Reichswehr was already planning the creation of Panzer companies within three to five years, although in reality it would take longer. The first major step in this process was the creation, in October 1931, of the Inspektion der Kraftfahrtruppen (inspection of motor troops) led by Oberst Oswald Lutz and with Heinz Guderian as Chief of Staff. Under their supervision crews were secretly trained in the Soviet Union and eventually, in November 1933, they formed the Kraftlehrkommando Zossen (motor training command, actually an armoured force training command). In July 1934 the Inspektion der Kraftfahrtruppen was split in two, forming the offices of the Kommandeur der Kraftfahrtruppen (commander of motor troops, also known as Inspektor der Kraftfahrtruppen II, directly subordinate to the army chief of staff and working as a technical advisor) and the Inspektion für Heeresmotorisierung, part of the Allgemeine Heeresamt (inspector for army motorization, part of the army general department and responsible for organization and training) – with both of these offices held by Lutz.

In October 1934 a draft organization for a Panzer Division was laid down and the Kraftlehrkommando Zossen was expanded to become a full tank regiment with two battalions. In February 1935 the first Panzer Brigade was secretly formed, absorbing three former Kavallerie Regiments. Such designations could only be openly used from March 1935, when Hitler revealed that Germany was rearming. The following October the first three German Panzer Divisions were officially formed: the first under the command of General der Kavallerie Maximilian von Weichs (who held the position until September 1937 and was subsequently replaced by Generalleutnant Rudolf Schmidt who, in November 1939, was replaced by Generalmajor Friedrich Kirchner), the second under the command of Oberst – later Generalmajor – Heinz Guderian (replaced in March 1938 by Generalmajor Rudolf Veiel), and the third under the command of Generalleutnant Ernst Fessmann, replaced in October 1937 by Generalleutnant Geyr von Schweppenburg who, in October 1939, was replaced by Generalmajor Horst Stumpff.

PzKpfw I Ausf A on parade in a training ground. In 1935 a mixed dark brown/dark grey standard camouflage was introduced for all German Army vehicles, and it remained in use until 1939, when the 'Panzergrau' (dark grey) became the standard colour. The use of 'playing card' markings is interesting, though their exact meaning is unknown.

Training began almost at once in spite of the lack of tanks, and reached its peak in February/March 1936, when all the Panzer units were alerted to act as reserves during the German re-occupation of the Rhineland. A few months later Panzer Brigade 4 and two more Panzer Regiments (7 and 8) were formed; also, in October 1936, the Panzerwaffe began its first combat trials – involvement in the Spanish Civil War. Led by Oberstleutnant Wilhelm von Thoma, the first group (attached to the 'Legion Condor') was made up of 32 PzKpfw I and a few PzBefh. The figures across the sources vary, but the total number of German tanks sent to Spain amounted to between 100 and 150, all of which were PzKpfw I and PzBefh I. In contrast to the Luftwaffe, the German Army learned few lessons from their involvement: its tanks were poorly armed and thinly armoured, and greater combat experience was needed before the Panzer Division could be thrown into battle.

In September 1937 the first, large-scale exercises involving Panzer units were held, and in October more units were formed, comprising four Panzer Regiments and two Panzer Abteilungen (Panzer Regiments 10, 11, 15 and 25; Panzer Abteilungen 65 and Lehr). It was only in 1938 that the Panzerwaffe began to take on a more definitive shape; in March Guderian led 2. Panzer Division during the Anschluss, the annexation of Austria, and – though not a single shot was fired – he gained personal experience of the capabilities and the shortcomings of these new formations. His division was able to cover some 700km in just two days, but it lost about 30 per cent of its tanks during the march due to mechanical breakdowns. After the annexation of the Czech region of the Sudete in October 1938 (in which 1. Panzer Division took part) Germany was now faced with the possibility of waging war against France and Britain, something she was still unprepared for, especially because of the belated development of her armoured force. The seizure of a number of Czech tanks and factories enabled some further developments to take place, amongst them the formation in November 1938 of four Panzer Brigades (4, 5, 6 and 8), four Panzer Regiments (23, 31, 35 and 36) and three Panzer Abteilungen equipped with Czech tanks (65, 66 and 67). Two more Panzer Divisions were formed, numbers 4 (led by Generalmajor Georg-Hans Reinhardt and, from February 1940, Generalmajor Johann Joachim Stever) and 5 (led by Generalleutnant Heinrich von Vietinghoff until October 1939, then by Generalleutnant Max von Hartlieb until 21 May 1940 and subsequently by Generalleutnant Joachim Lemelsen).

A line-up of PzKpfw I Ausf A in a training exercise, all sporting the standard two-tone colour scheme and a small flag on the rear hull (which may be a unit identification marker). The checkerboard on the turret top of the second from right vehicle denotes it belonged to the company headquarters platoon. In 1936 Panzer units took part in German Army manoeuvres for the first time.

The definitive developmental step occurred between October and December 1938, at the upper levels. In November both the offices of Kommandeur der Kraftfahrtruppen and of Inspektion für Heeresmotorisierung were merged together to form the Waffenabteilung der Panzertruppe, Kavallerie und Heeresmotorisierung, Inspektion 6 of Allgemeine Heeresamt (inspection department 6 for armoured troops, cavalry and army motorization at the army general department), while in December Guderian – now a General der Panzertruppen – became Chef der Schnellen Truppen im Oberkommando des Heeres (the commander of fast troops – as they would be known until 1942 – at the Army High Command). Both offices worked together, with remarkable results. Led by Generalmajor Adolf von Schell after Lutz's retirement (and with officers like Hermann Balck and Hasso von Manteuffel in his staff), the Waffenabteilung worked on matters like the creation of new units and their organization, the replacement of officers and other ranks, training, the development of vehicles and anti-tank guns, and fuel procurement. Guderian, who had a smaller staff and was directly subordinate to the commander in chief of the army (and as such, he had Panzertruppen and cavalry schools subordinate to him), worked on matters of doctrine and tactics (which provided the basis for the development of field manuals) and was also a technical advisor for the army staff and the same Waffenabteilung, to which some of its requests had to be addressed, although cooperation between von Schell and Guderian was never good.

Their efforts would have fallen short without another decisive step forward: the creation of motorized corps commands. The first to be formed, in February 1938, was XVI. Armeekorps (from November led by Generalleutnant Erich

A PzKpfw IV Ausf B parading through the streets of an Austrian city while the population cheers, March 1939. Leading the German forces during the annexation of Austria was 2. Panzer Division, which covered the 680km between its home station, Würzburg, to Vienna in two days with few problems.

A PzKpfw III Ausf E/F proceeding through a village in North-West Europe on 18 May 1940. The meaning of the symbol on the left side of the turret – different from those used by 1. Panzer Division – is unclear, and it might have been a short-lived unit insignia. Note the 'K' letter on the hull.

Hoepner), which controlled all three of the Panzer Divisions. The creation of XIV. Armeekorps (led by General der Infanterie Gustav von Wietersheim) followed in April, which controlled the four motorized infantry divisions, and in October XV. Armeekorps (led by General der Infanterie Hermann Hoth) was formed to take charge of the three leichte Divisions. All were subordinate to the Heeresgruppen Kommando 4 (10. Armee from September 1939), led from February 1938 by General Walther von Reichenau.

The development of the Panzertruppen was a product of all these influences. Schell worked well on organizational matters, Guderian did the same on doctrine, and the creation of corps commands (eventually) ensured that the Panzer Divisions would not be dispersed or employed piecemeal. During the campaign in Poland, however, the German Army was still bound to the concept of 'fast' troops and still mixed Panzer and infantry divisions. In August 1939 XIX. Armeekorps was created under Guderian's command, controlling 2. Panzer Division and 4. leichte Division. Following Guderian's departure from the post, the office of the Chef der Schnellen Truppen was disbanded and replaced by that of the Inspekteur der Schnellen Truppen, led by Generalleutnant Georg Kühn (a relatively unknown but nevertheless skilled officer already serving with the Kraftlehrkommando and subsequently commander of Panzer Brigade 3, who held the position until June 1942), which had less power and was bound to close cooperation with Schell's Waffenabteilung. In the same month, 10. Panzer Division began to be formed as a combat unit under the command of Generalleutnant Ferdinand Schaal.

In September 1939 the Panzer Divisions were still dispersed under several different commands. Heeresgruppe Nord, composed of both 4. and 3. Armee, had at its disposal 3. Panzer Division, which, along with the 2. and 20. Infanterie Division (mot), were part of Guderian's XIX. Armeekorps under 4. Armee (Panzer Verband Kempf was part of I. Armeekorps along with two infantry divisions under 3. Armee). Heeresgruppe Süd had two Panzer Divisions with 10. Armee (1. Panzer Division, along with two infantry divisions, under XVI. Armeekorps; 4. Panzer Division with two infantry divisions under XIV. Armeekorps) and another two with 14. Armee (3. Panzer Division, along with three infantry divisions and the SS-Standarte Germania, under VIII. Armeekorps; and 2. Panzer Division, along with one mountain and one leichte division, under XVIII. Armeekorps); its 8. Armee had no Panzer troops. Since these commands attacked in different areas, every single Panzer Division actually formed the spearhead of its own corps and army. 4. Armee, which later included 10. Panzer Division, attacked south of Danzig and advanced to the north of Warsaw (Guderian's XIX. Armeekorps actually advanced to Brest Litovsk), while 3. Armee attacked from Eastern Prussia and advanced to the west of Warsaw. In the south, 10. Armee advanced towards Warsaw from the east with both 1. and 4. Panzer Divisions, while 14. Armee's 3. and 2. Panzer Divisions advanced south of the River Vistula to the Carpathian mountains. All the Panzer Divisions were moved to the west in October 1939, and at the same time three new divisions were formed: numbers 6. (Generalmajor Werner Kempf), 7. (Generalleutnant Georg Stumme until February 1940, then Generalmajor Erwin Rommel) and 8. (Generalmajor Adolf Kuntzen), followed in

February 1940 by 9. Panzer Division (under the command of Generalmajor Alfred von Hubicki). The complete reorganization of the Panzertruppen that was undertaken marked the final, decisive step forward. On 5 March 1940 the office of the General der Schnellen Truppen beim Oberbefehlshaber des Heeres (general of fast troops to the commander in chief of the army) was created and assigned to Generalmajor Wilhelm von Thoma, commander of Panzer Regiment 3. Von Thoma was tasked with reporting to the Army Staff the battlefield experiences of the Panzertruppen, and giving advice on matters such as training, tactics, organization and weaponry.

In the same month, a complete reorganization of the German Panzer force was undertaken for the 'Fall Gelb' ('case white'), the attack against Belgium, Holland, Luxembourg and France in May 1940. The XXII. Armeekorps, under the command of General der Kavallerie Paul Ewald von Kleist, was reorganized as Gruppe Kleist and took under its command three Armeekorps, which now controlled five Panzer Divisions and three motorized infantry divisions destined to spearhead Heeresgruppe A's drive across the Ardennes to the Meuse; these were XIV. Armeekorps (mot), von Wietersheim, with 13. and 29. Infanterie Divisions; XIX. Armeekorps (mot), Guderian, with 1., 2. and 10. Panzer Divisions); and XXXXI. Armeekorps (mot), formed in February 1940 under the command of Generalleutnant Georg-Hans Reinhardt, with 6. and 8. Panzer Divisions and 2. Infanterie Division. Just to the north of them, and part of 4. Armee, was Hoth's XV. Armeekorps (mot) with 5. and 7. Panzer Divisions, destined to cross the Meuse in the Dinant area. This meant there were seven Panzer Divisions spread across about 100km of front. Close to Heeresgruppe A's left wing, and at Heeresgruppe B's right one under 6. Armee, was the last group of two Panzer Divisions (3. and 4.) under Hoepner's XVI. Armeekorps (mot), while 9. Panzer Division was under 18. Armee's XXVI. Armeekorps, destined to seize Holland. None of these commands was ever actually known as a 'Panzergruppe', a designation which was first used only in June 1941; following German practice, they were sometimes called 'Gruppe' followed by the name of their commander, even though their size matched that of an army. Gruppe Kleist apart, even XV. Armeekorps was called Gruppe Hoth between 19 and 30 May, while Gruppe Guderian was the official designation granted by Hitler to XIX. Armeekorps from 28 May.

After they had reached the Channel and sealed the fate of thousands of Allied soldiers, the Panzer Divisions switched their subordination to different corps several times according to the needs of the moment. However, a major reorganization took place before the final attack against France was started on 5 June, following the 'Fall Rot' ('case red') plan. The concentration of forces was maintained; Heeresgruppe B now had XV. Armeekorps under 4. Armee command with two Panzer Divisions (5. and 7.) and one motorized infantry division plus 'Gruppe Kleist' with XIV. Armeekorps (9. and 10. Panzer Divisions, two infantry divisions and the 'Grossdeutschland' regiment), and XVI. Armeekorps (3. and 4. Panzer Divisions, two infantry divisions, and the SS units 'Leibstandarte Adolf Hitler' and 'Verfügungstruppen') – a total of six Panzer Divisions along the River Marne and around Paris. Further to the west, under Heeresgruppe A, was Gruppe Guderian lined up along the Swiss border, behind the Maginot line; it had the remaining four Panzer Divisions under both XXXIX. Armeekorps (1. and 2. Panzer Divisions and one infantry division) and XXXXI. Armeekorps (6. and 8. Panzer Divisions and one infantry division). The French surrendered 20 days later, signalling the triumph of the Panzerwaffe, and bringing the developments of the past five years to a peak.

Doctrine and training

The roots of blitzkrieg lay in the principles of war enunciated by Frederick the Great and subsequently revised by Scharnhost, von Clausewitz, von Moltke and von Schlieffen. Basically, these principles hinged on two concepts: the first was the primary goal of the destruction of enemy forces, and the second was the method used to attain it, namely movement warfare. The battle of annihilation was deemed the best way to achieve the complete destruction of enemy forces and its best example was the battle of encirclement (*Kesselschlacht*), in which enemy forces were either surrounded or attacked on their flanks through manoeuvre. As such, movement warfare, largely predominated by manoeuvre rather than by firepower, was considered the best way to surround enemy forces and eventually generate the definitive battle of annihilation. Though simple at first sight, these concepts were based on several assumptions that eventually shaped the German Army doctrine. The first assumption was concentration of forces: a commander had to select a 'key point' (*Schwerpunkt*) to engage the enemy, a point that enabled him to gain the advantage over his adversary, and had to concentrate all the forces at his disposal there. Finely studied and well-prepared march orders were a fundamental prerequisite to the concentration of forces, as was the capability to issue orders quickly and have them implemented by subordinate commanders. Staff officers had to submit detailed and accurate analysis of the situation, which enabled their commander to make a decision. Then the moment came for the *Auftragstaktik* – the 'mission command' orders.

The method of issuing 'mission command' orders (the opposite of 'top-down command') was the key feature of the basic principle of flexibility advocated by the German commanders. Since, in von Moltke's words, no plan could survive contact with the main body of enemy forces, field commanders were required to alter or change their plans according to the situation they actually faced on the battlefield. The best way to meet this requirement was to give them a free hand, as far as possible, at every level; therefore, an objective was set for the commanders, but they were also given the freedom of choice on how to achieve it. Commanders had to possess decisiveness and good command skills but, above all, they had to rid themselves of any preconceived ideas: the basic German concept was that there was no ready-made solution to any problem. Thanks to these principles and doctrine the Prussian Army won

A leichte Panzer Kompanie on the move in an open field somewhere in North-West Europe, May 1940. The mixture of light PzKpfw I and PzKpfw II tanks along with the medium PzKpfw III (seen in the background) was typical of the 21 February 1940 provisional establishment for these companies, which was introduced to make up for the lack of PzKpfw III.

battles like Sadowa in 1866 and Sedan in 1870, though the German Army did not emerge victorious from the most important battles of World War I. The reasons for the German defeat were analysed by the Reichswehr (the German Army between 1919 and 1935) Chief of Staff, General Hans von Seeckt; following the failure of the Schlieffen plan the German Army became involved in static trench warfare, thus meeting its nemesis. Yet von Seeckt remained firmly convinced that the failure and the ensuing static warfare had not been the results of the supremacy of defence, nor the consequence of new weapons and increased firepower, but rather that they had been imposed by the huge size of modern field armies. Masses of inexperienced and often partly trained soldiers were unable to manoeuvre effectively in order to obtain the much-needed breakthrough. This led to severe losses that, along with the ever-growing sizes of the armies, brought about the deployment on the battlefield of ever-decreasing numbers of properly trained soldiers; as a result, while their sizes increased, the armies lost much of their effectiveness.

It appears that the development of Stormtrooper tactics – that is, the use of groups of carefully selected and highly trained assault troops – did manage to break the deadlock of static warfare, but eventually these too ended in failure. Although the Germans were able to break through the enemy lines in 1917 and 1918 during their offensives in Italy and in France, they proved unable to exploit their successes thereafter, with the result that their offensives only achieved temporary victories. Therefore, von Seeckt saw in the development of a small nucleus of mobile units made up of highly trained and skilled troops a means of avoiding static warfare, and it was thanks to him that eventually the Panzer Divisions became such a successful instrument of warfare. The basic issue was the development of combined-arms warfare, which eventually shaped this new kind of unit. While in France and in Britain the uncertainty about the use of tanks led to two unfeasible solutions – the tank being used either to support infantry, or in all-tank formations, which in both cases resulted in slow and cumbersome units – in Germany a new idea took shape: the development of an all-arms, elite armoured formation that could assault and break through enemy lines, and exploit the success on its own. In practice, the Panzer Division was a kind of small-scale, self-contained army; albeit rather 'tank heavy' in 1939 (though the tank:infantry ratio was increased in 1940 in favour of the latter), it was made up of tanks, infantry, reconnaissance, artillery, anti-tank, engineer and support units. Thanks to such an organization, it could attack, seize, hold and break through its objectives, eventually exploiting the successes it had achieved.

Organization was not the only decisive innovation of the Panzer Division: highly developed radio communications, unparalleled in other armies, granted the German Army a decisive superiority in command, control and communications. Moreover, the Luftwaffe (the German Air Force), which focused on air-to-land support, offered further decisive advantages: not only did it achieve air superiority on the battlefield, but its capability to strike land targets on request provided the much-needed highly mobile and flexible fire support which the Panzer Division otherwise lacked. By September 1939 the Germans had a decisive advantage over their enemies: they possessed a superior doctrine of war, a better C3I organization, and an advanced air-to-land support system. Above all they possessed an effective strike force, the Panzer Divisions that already were the 'perfect weapon for the war of movement on the operational level' (Citino, *The German Way of War*, p. 254). However, although a 'perfect weapon', they were not yet the instrument of warfare that nine months later would crush Germany's most powerful enemies. Although Poland can be considered the first example of a blitzkrieg campaign, it did not see the birth of modern, mechanized warfare; rather, it supplied some valuable experience prior to it.

Many flaws were highlighted during the Panzer Divisions' first engagements on the field of battle. Amongst these were the need for better and improved training, the need for some officers to show more initiative, and the need to

Panzermänner taking a rest under the shadow of a PzKpfw I Ausf B during a lull in the last days of the German campaign in France, 18 June 1940. The incredible speed of the German advance in May–June 1940 put a heavy strain on the tank crews.

improve inter-arms cooperation. As early as October 1939, all German Army divisions were requested by the Oberkommando des Heeres (Army Staff) to issue monthly status reports on combat readiness, which were used to improve training. First of all, new officers were commissioned from experienced rank and file, while an intensive training programme was started for officers, NCOs and field commanders (company level and above). This programme culminated in February 1940 in a special training course for battalion commanders held by the *Panzertruppeschule* (armoured troops school), which included field exercises during which units from both the 1. and 10. Panzer Divisions took part. Meanwhile, the divisions held intensive rehearsals at large training centres such as Grossborn and Sennelager, using specially organized 'aggressor forces' that acted the role of the enemy. Training focussed on improving inter-arms cooperation (in particular that between infantry and tank units), reconnaissance, march discipline and traffic regulation. Engineers were trained both in constructing bridges and assaulting enemy fortifications, as well as carrying assaults across rivers. The latter formed specific training for all infantry units, including the MG Bataillon. Last but not least, vehicle and weapon maintenance were improved. Corps and divisional staff were kept similarly busy, creating march orders and attack plans, which the units tested during their rehearsals.

Yet it was mainly thanks to the new attack plan in the West, developed from February 1940, that the Panzer Division turned from a 'perfect weapon' into a real 'instrument of warfare'. For the very first time most of the Panzer and motorized divisions were gathered together in a single attack force with a specific aim: to achieve and exploit a breakthrough across the enemy main defensive lines. This actually enforced Guderian's principle of 'strike concentrated, not dispersed'; actually a principle that not only echoed the classical *Schwerpunkt* concept of German doctrine, but also covered a new and vital issue – exploitation. As von Kleist and Guderian pointed out, the best way to successfully exploit a breakthrough was through penetration in depth; taking advantage of speed and surprise, the attacking forces had to drive deep behind the enemy main line of resistance, disrupting the lines of communications, and command and supply centres. Manoeuvre alone, now mainly a tactical solution, could no longer secure success on the battlefield – at least, at the operational level. As the campaign of May 1940 demonstrated (which marked the transition to a new age of warfare), defence no longer held supremacy on the battlefield: now a small, extremely mobile nucleus of highly trained and skilled units was capable of approaching and breaking through the enemy defences and, above all, of successfully exploiting this breakthrough with a penetration in depth, whose effects proved devastating to enemy forces. The Panzer Divisions were now a real instrument of warfare, the key factor in German victories.

Unit organization

In the early war years the organization of the Panzer Divisions varied greatly, often according to a given unit's seniority. In September 1939 there were three different basic organizations for the five existing Panzer Divisions, while in May 1940 ten divisions shared five different organizations. Generally, a lack of weapons, vehicles (tanks in particular) and equipment precluded the creation of units with the same organization and strength, thus preventing uniformity. The basic organization for a 1939 Panzer Division included a Panzer Brigade with two Panzer Regiments (each with two Panzer Abteilungen); a Schützen (motorized infantry) Brigade with a two-battalion Schützen Regiment and a Kradschützen (motorcycle infantry) Bataillon; one Aufklärungs (reconnaissance) Abteilung; a two-battalion Artillerie (artillery) Regiment; a Panzer Abwehr (anti-tank) Abteilung; a Pionier (engineer) Bataillon; a Panzer Division Nachrichten (communications) Abteilung; and divisional services. In September 1939 only three Panzer Divisions followed this basic organization, while two others had no Schützen Brigade Stab and only one or two Schützen Regiments with no Kradschützen Bataillon.

The differences were not only maintained, but further increased when the Panzer Divisions were reorganized and expanded in late 1939/early 1940. The first three divisions added one more Bataillon to their Schützen Regiment, while 4., 5. and the newly organized 10. Panzer Divisions had two Schützen Regiments but no Kradschützen Bataillon. The newly formed divisions did actually in part inherit the organization of the old leichte (literally, 'light' – actually mixed infantry, cavalry and tank) Division from which they derived;

Table 1: 1.–5. Panzer Divisions, 1939–40: organization and unit numbering

Stab	1. PzDiv	2. PzDiv	3. PzDiv	4. PzDiv	5. PzDiv
Div Kartenstelle (mot) Kradmeldezug	81	82	83	84	85
Panzer Brigade	1	2	3	5	8
Panzer Regiment	1 and 2	3 and 4	5 and 6	35 and 36	15 and 31
Schützen Brigade (mot)	1	2	3	**4**	**5**
Schützen Rgt. (mot)	1	2	3	12 **and 33**	13 and 14
Kradschützen Btl.	1	2	3		
Aufklärungs Abt. (mot)	4	5	3	7	8
Artillerie Regiment (mot)	73	74	75	103	116
Panzer Abwehr Abt. (mot)[1]	37	38	39	49	53
Schwere MG Kompanie (mot Z)[2]	**2./59**		**6./59**	**5./66**	
Pionier Bataillon (mot)	37	38	39	79	89
PzDiv Nachrichten Abteilung (mot)	37	38	39	79	77
Divisional services	81	82	83	84	85

Notes

The items in bold indicate changes that took place in 1940.

[1] Panzerjäger Abteilung (mot) from 16 March 1940.

[2] No longer present in 1940.

Table 2: 6.–10. Panzer Divisions, 1940: organization and unit numbering

Stab	6. PzDiv	7. PzDiv	8. PzDiv	9. PzDiv	10. PzDiv
Div Kartenstelle (mot)					
Kradmeldezug	57	58	59	60	90
Panzer Brigade					4
Panzer Regiment	11 (*PzAbt 65*)	25 (*PzAbt 66*)	10 (*PzAbt 67*)	33	7 and 8
Schützen Brigade (mot)	6	7	8	9	10
Schützen Rgt. (mot)	4	6 and 7	8	10 and 11	69 and 86
Kradschützen Btl.	6	7	8	[59][1]	
Aufklärungs Abt. (mot)	57	37	59	9[1]	90
Artillerie Regiment (mot)	76	78	80	102	90
Panzerjäger Abt. (mot)	41	42	43	50	(Lehr =) 90
Pionier Bataillon (mot)	57	58	59	86	49
PzDiv Nachrichten Abteilung (mot)	82	83	84	85	90
Divisional services	57	58	59	60	90

Notes

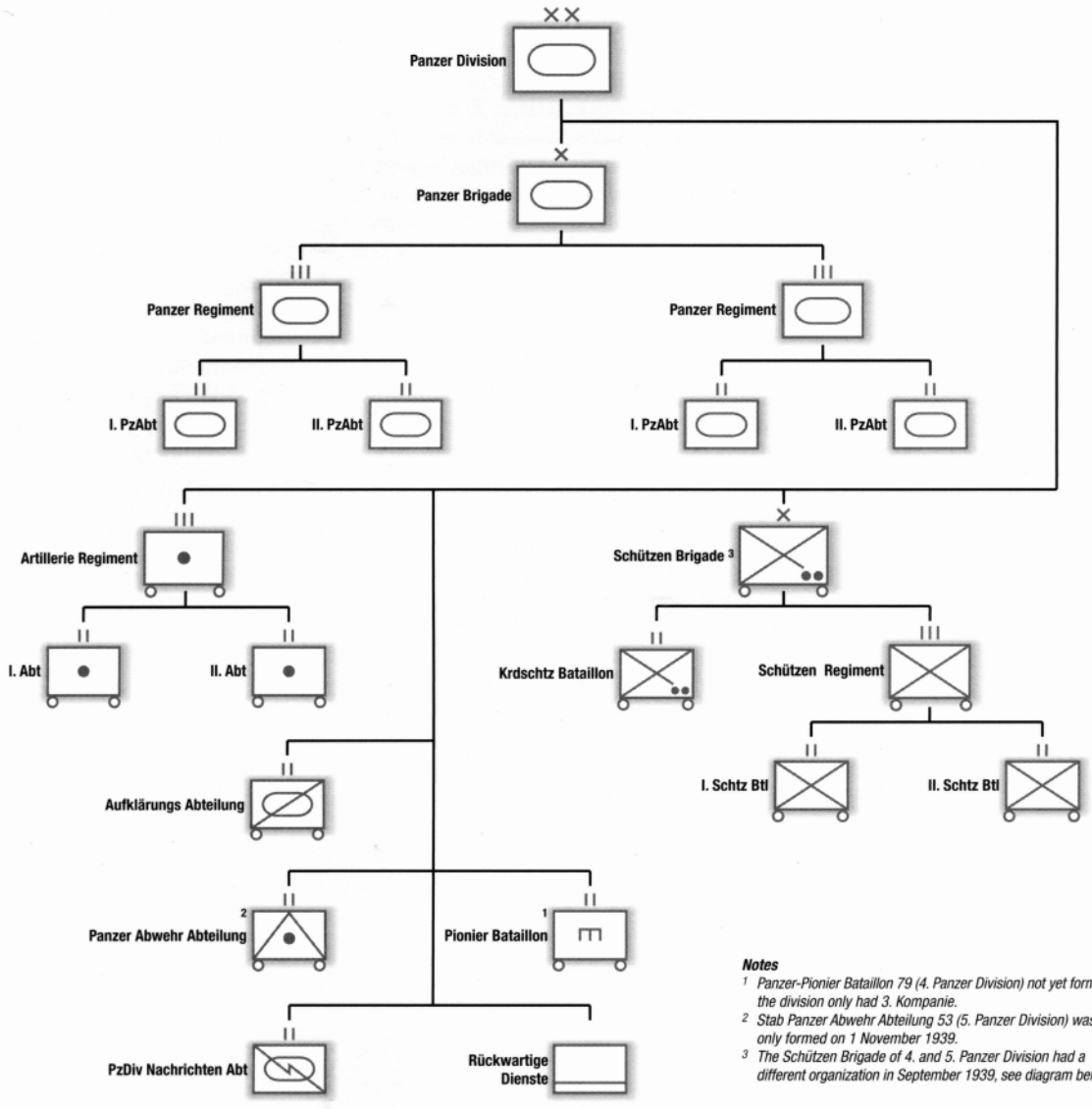
[1] *Aufklärungs Regiment 9 (with Kradschützen Bataillon 59 and Aufklärungs Abteilung 9).*

6. and 8. Panzer Divisions shared a similar organization with a three-battalion Panzer Regiment, a Schützen Brigade with a three-battalion Schützen Regiment, and a Kradschützen Bataillon. Both the 7. and 9. Panzer Divisions had two Schützen Regiments, each with two battalions, plus the Kradschützen Bataillon, while the 9. Panzer Division lacked a third Panzer Batallion. These were just some of the many peculiarities.

The divisions

1. Panzer Division, the first and most senior of the divisions, was formed on 15 October 1935 at Weimar from the old 3. Kavallerie Division. When activated in August 1939 its Panzer Regiments 1 and 2 were authorized to implement the new war establishments (Kriegsstärkenachweisung) but, although the division was much better equipped than any other, a lack of tanks precluded both regiments from reaching established strengths. By September 1939 only Panzer Regiment 2 had begun its reorganization. This was not the only oddity: 3. Kompanie of Panzer Abwehr Abteilung 37 had been left in Germany and the 2. MG Kompanie 59 (an anti-aircraft unit) had been attached as its 4. Kompanie. Moreover, the division had seven rather than six kleine Kraftwagen Kolonnen (the extra one numbered 10./81), and also had the following units attached: the leichte Flak Abteilung 83 and the 2.(H)/Staffel 23, an aerial reconnaissance unit (both from the Luftwaffe). Following the end of the Polish campaign, 1. Panzer Division's organizational changes continued: on 1 November 1939 the III./Infanterie Regiment 69 from the 20. Infanterie Division (mot) was attached to Schützen Regiment 1 (it was renamed III./SR 1 on 1 April 1940), also Kradschützen Bataillon 1 gave its 2. Kompanie to the Infanterie Regiment 33 (mot), which eventually became 4. Panzer Division's Schützen Regiment 33. On 21 February 1940, again because of a lack of tanks, Panzer Regiment 2 was authorized to implement the revised war establishments, while II./Artillerie Regiment 56 was attached to the Artillerie Regiment 73 (it was renamed III./73 only in October). In March more changes

1 –5. Panzer Divisions' basic organization, September 1939



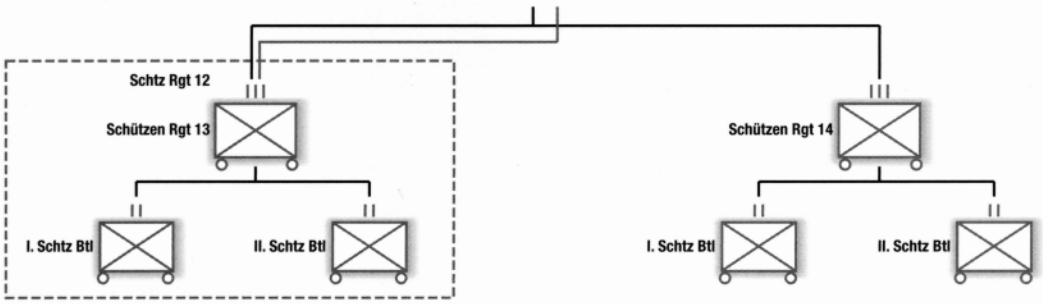
Notes

1 *Panzer-Pionier Bataillon 79 (4. Panzer Division) not yet formed; the division only had 3. Kompanie.*

2 *Stab Panzer Abwehr Abteilung 53 (5. Panzer Division) was only formed on 1 November 1939.*

3 *The Schützen Brigade of 4. and 5. Panzer Division had a different organization in September 1939, see diagram below.*

Changes to 4.–5. Panzer Divisions' organization, September 1939



Note

4. Panzer Division only had Schützen Regiment 12.

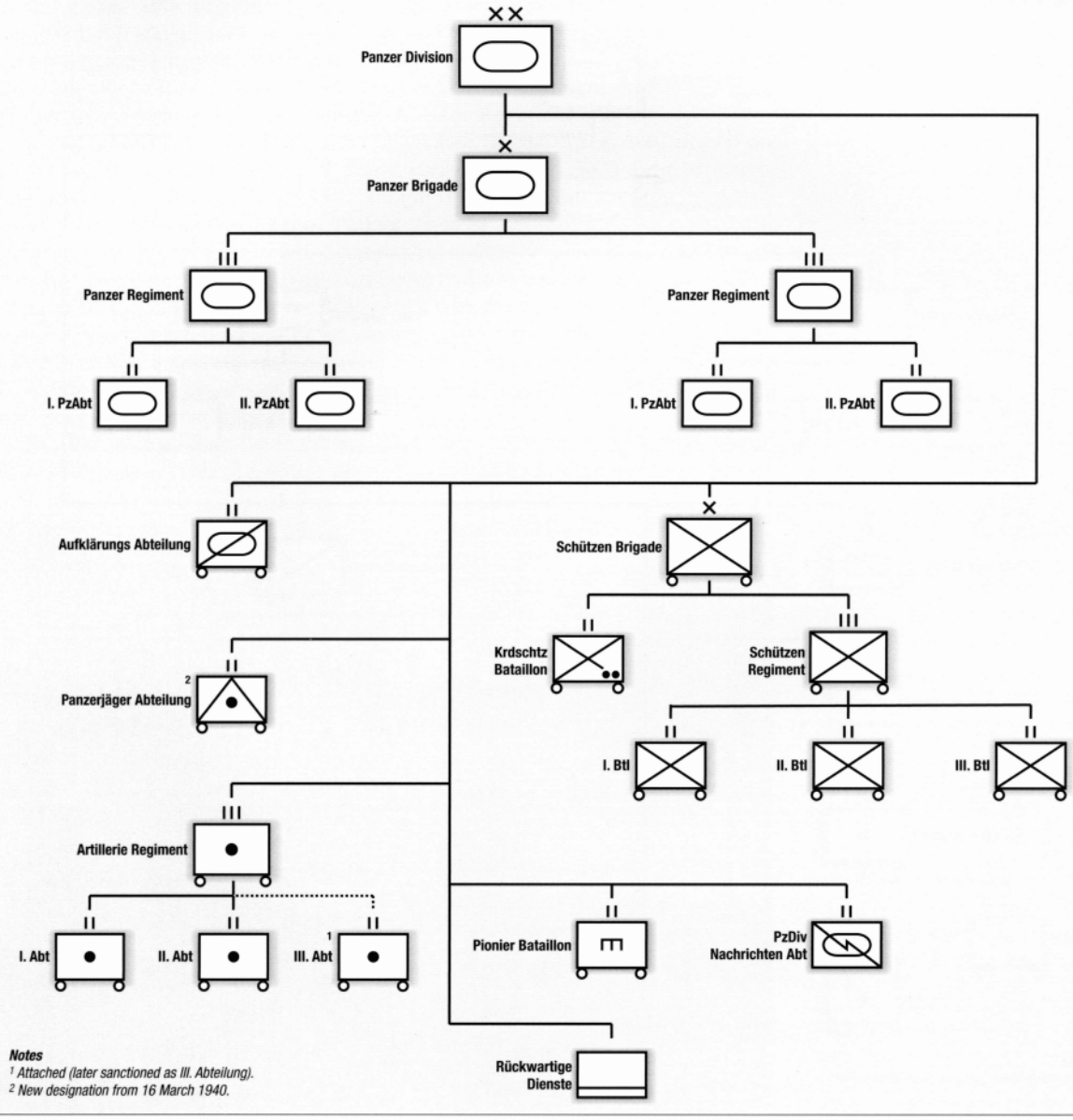
took place: the 3. Kompanie of Panzerjäger Abteilung 37 was back with the division, though it exchanged its designation with the 1. Kompanie (something similar happened to the Kraftwagen Kolonnen 10 and 7./81, which exchanged numbers), and all the Schützen Kompanien of Schützen Regiment 1 began to be equipped with armoured personnel carriers (Mannschafts Transport Wagen, MTW). By May 1940 the division also had the following units attached: the schwere Infanterie Geschütz Kompanie 702 (to Schützen Brigade 1), and 1. Kompanie of the schwere Panzerjäger Abteilung 8 (to PzJäg Abt 37).

2. Panzer Division, also formed on 15 October 1935 at Würzburg (moving to Vienna in 1938), shared a similar organization but without the same equipment allowance. In fact, by September 1939 its Panzer Regiments 3 and 4 were still equipped according to the March 1939 war establishments and no MG Kompanie was attached, though the second Abteilung of Artillerie Regiment 74 (actually the heavy I./Artillerie Regiment 110) had one battery equipped with 105mm K18 guns and two others with the heavy 150mm sFH18. Also, the 2. Kompanie of Panzer Abwehr Abteilung 38 had been disbanded. The division had the Luftwaffe leichte Flak Abteilung 92 and 1.(H)/Staffel 14 attached. On 1 November 1939 the I./Infanterie Regiment 33 (mot) was attached to the division and eventually became III./SR 2; other organizational changes in early 1940 included the loss of the 1. Kompanie of Kradschützen Bataillon 2 and the formation of a seventh kleine Kraftwagen Kolonne. On 21 February 1940 both Panzer Regiments changed their organization according to the revised war establishment and, on 1 April, the division had I./Artillerie Regiment 13 attached (it eventually formed II./AR 74, I./AR 110 being renamed III./AR 74). Also, a new 3./Panzerjäger Abteilung 38 was formed from 1./PzJäg Abt 52 (the old 3. Kompanie became 2. Kompanie), and a fourth anti-aircraft company was formed from the 2./MG Kompanie 47. The available sources are unclear over the latter: in May 1940 Panzerjäger Abteilung 38 appears to have had 1. Kompanie attached from an unnumbered schwere Panzerjäger Abteilung, while 2./Fla Bataillon 59 (Fla was the army's equivalent of the Flak, an anti-aircraft unit) is shown attached to Division Nachschub Führer 82. Also unclear is the attachment to Schützen Brigade 2 of schwere Infanterie Geschütz Kompanie 704 and the replacement of both Flak Abteilung 92 and 1.(H)/Staffel 14 with the leichte Flak Abteilung 84 and 2.(H)/Staffel 23. It is worth noting that Schützen Regiment 2 should have been equipped with MTWs, but actually only a single company had them.

A Panzer column on the march. According to the original caption the photo was taken 'on the road to Dinant' on 17 May 1940, although the 'K' sported by the tank in the foreground reveals that the column belonged to one of the Panzer Divisions of 'Gruppe Kleist' – namely 1., 2. and 10. in Guderian's XIX Armeekorps or 6. and 8. in Reinhardt's XXXXI Armeekorps.

3. Panzer Division was the last of the senior divisions; formed in Berlin on 15 October 1935, by September 1939 its organization matched that of its sister divisions (Panzer Regiments 5 and 6 were equipped according to the March 1939 war establishment until May 1940), though subsequent minor organizational changes took place. During the Polish campaign the Panzer Lehr Abteilung was attached to Panzer Brigade 3, while an unknown Abteilung from the Luftwaffe Flak Regiment 101 was attached to the division (also 6. MG Kompanie 59 was attached to Panzer Abwehr Abteilung 39). On 1 November 1939 the I./Infanterie Regiment 69 (mot) was attached to the Schützen Regiment 3 and eventually became its III. Bataillon (in May 1940 one Schützen Kompanie of the brigade was equipped with MTWs); in early 1940 a seventh kleine Kraftwagen Kolonne was formed and, apparently, the 1./Kradschützen Bataillon 3 was lost (though it appears in some orders of battle as late as May).

1.–3. Panzer Divisions' basic organization, May 1940

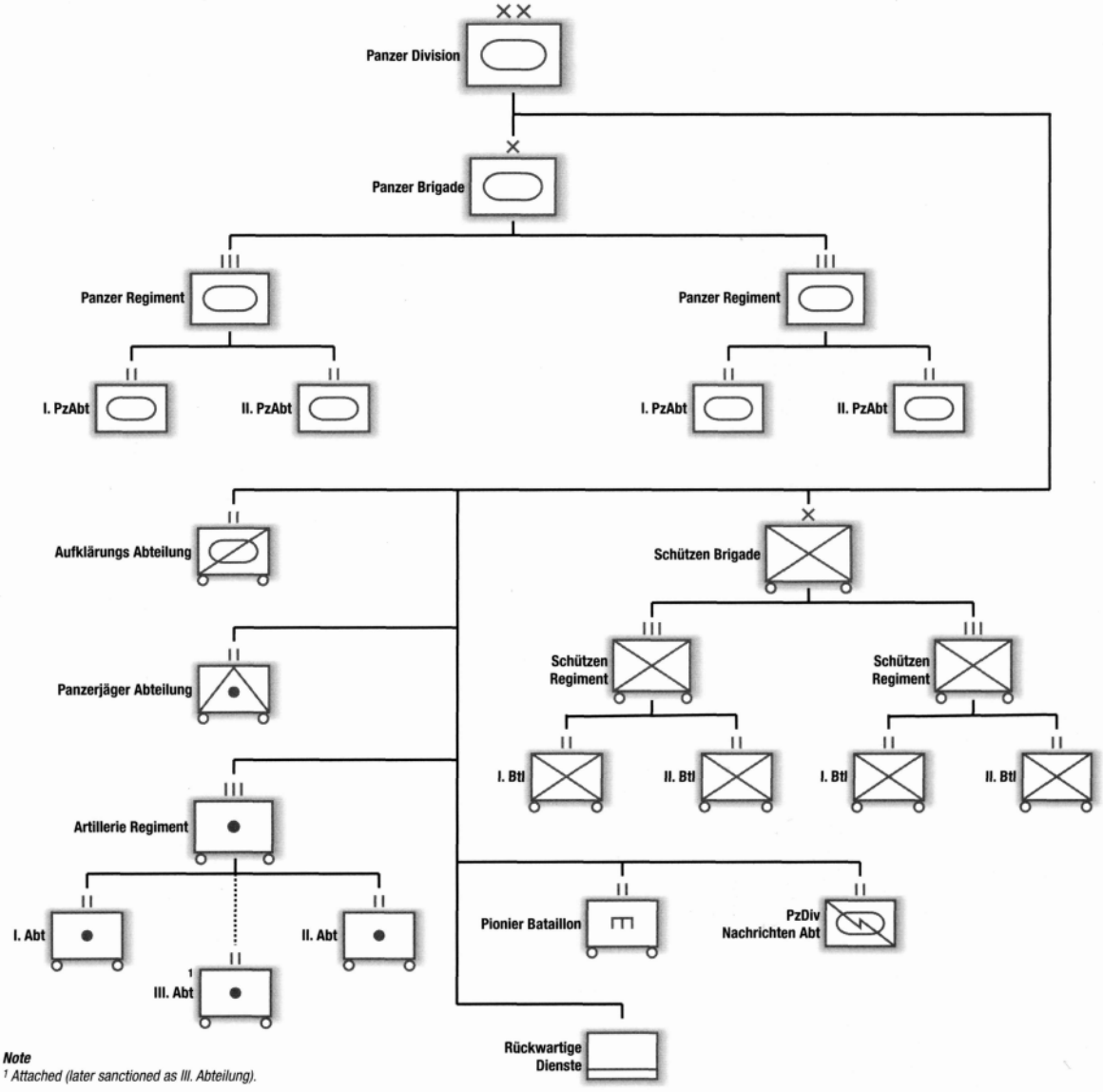


Notes
[1] Attached (later sanctioned as III. Abteilung).
[2] New designation from 16 March 1940.

In the same period, 3./Panzerjäger Abteilung 39 seems to have been replaced by a provisional company, but on 1 April 1940 a 4. Kompanie appears to have been formed, and in May even a 10. Kompanie is sometimes shown. In May the division had the following units attached: MG Bataillon 7, II./Flak-Lehr Regiment and II./Artillerie Regiment 49, the latter eventually becoming III./AR 75 on 1 August 1940.

4. Panzer Division was formed on 10 November 1938 in Würzburg. In September 1939 the division, whose Panzer Regiments 35 and 36 were still equipped according to the March 1939 war establishments as late as May 1940, was still missing both the Schützen Brigade Stab and the Kradschützen Bataillon; the latter was never actually formed. Also, its Panzer Abwehr Abteilung 49 only had two companies (though it had the 5. MG Kompanie 66 attached), and the engineer element was reduced to only the 3. Kompanie of Pionier Bataillon 79. Several units were attached during the Polish campaign.

4.–5. and 10. Panzer Divisions' basic organization, May 1940



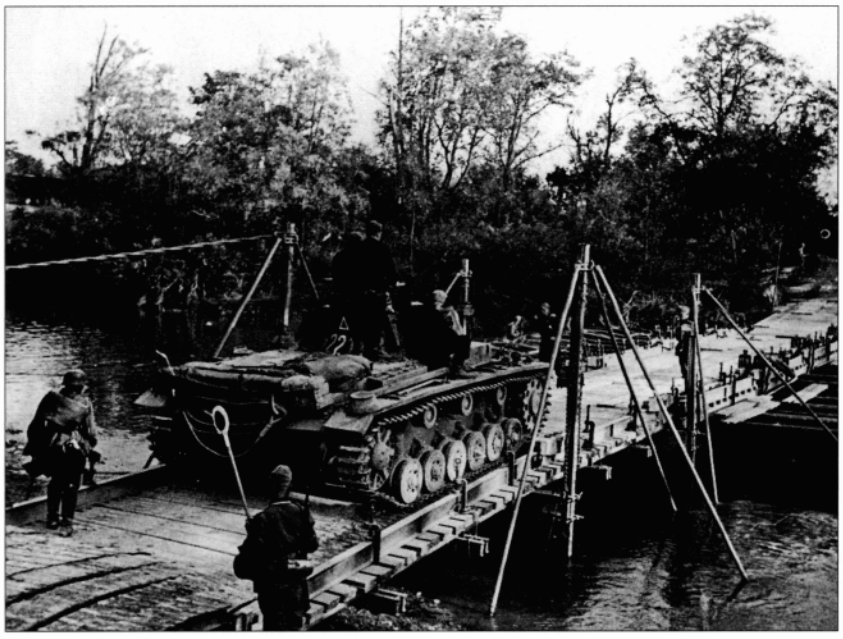
Note
[1] Attached (later sanctioned as III. Abteilung).

These included Infanterie Regiment 12, I./Artillerie Regiment 31 and II./ Artillerie Regiment 54, leichte Flak Abteilung 77, the Stab and 1. Kompanie of Pionier Bataillon 62 and 1./Pion.Btl. 31, plus the Luftwaffe 4.(H)/Staffel 13.

Soon after the conclusion of the Polish campaign, 4. Panzer Division began its reorganization: on 18 October 1939 the Infanterie Regiment 33 (mot) from 13. Infanterie Division (minus the I. Bataillon, which went to 2. Panzer Division) was attached to the division, thus forming, on 1 November, Schützen Brigade 4 (the regiment was to be renamed Schützen Regiment 33 on 1 April 1940). On the same day the Stab of Pionier Bataillon 79 was formed, although – like Panzerjäger Abteilung 49, whose 3. Kompanie would only have been formed in March – it only reached full strength in February 1940, when II./Artillerie Regiment 93 was also attached to Artillerie Regiment 103 (only becoming the III. Abteilung on 7 January 1941). Apart from the creation of a seventh kleine Kraftwagen Kolonne, other minor changes occurred in Schützen Brigade 4: 1. Kompanie of SR 12 began to be equipped with MTWs in April 1940, while 6. Kompanie was transformed into a Kradschützen Kompanie (training was still ongoing in May 1940). Also, 7. Kompanie of Schützen Regiment 33 was disbanded and replaced by 2. Kompanie from 1. Panzer Division's Kradschützen Bataillon 1. In May 1940 the division had the following elements attached: MG Bataillon 9, Panzerjäger Abteilung 654, Artillerie Kommandeur 30 (HQ only) and I./Flak Regiment 'Göring'.

5. Panzer Division, the last one to be created in peacetime, was formed on 24 November 1938 in Oppeln, and, like 4. Panzer Division, lacked the Schützen Brigade Stab and the Kradschützen Bataillon, though the division had two Schützen regiments. The Stab of Panzer Abwehr Abteilung 53 was also still missing (only being formed on 1 November 1939) and Pionier Bataillon 89 only had two companies, the third one eventually being formed in early 1940 along with the customary seventh kleine Kraftwagen Kolonne. However, the division was subjected to few other changes until May 1940, when it had the following units attached: the Luftwaffe I./Flak Regiment 93, and 2.(H)/Staffel 31. Both its Panzer Regiments 15 and 31 were still equipped according to the March 1939 war establishments.

The Panzer Divisions were reorganized soon after the conclusion of the Polish campaign, with the senior ones changed and strengthened. 10. Panzer



A PzKpfw III Ausf E/F of 1. Panzer Division (the divisional insignia, barely visible, is to the left of the turret number) crosses the River Aisne on an engineer-built bridge near Chateau Porcien on 6 June 1940, on the second day of the German final offensive in France.

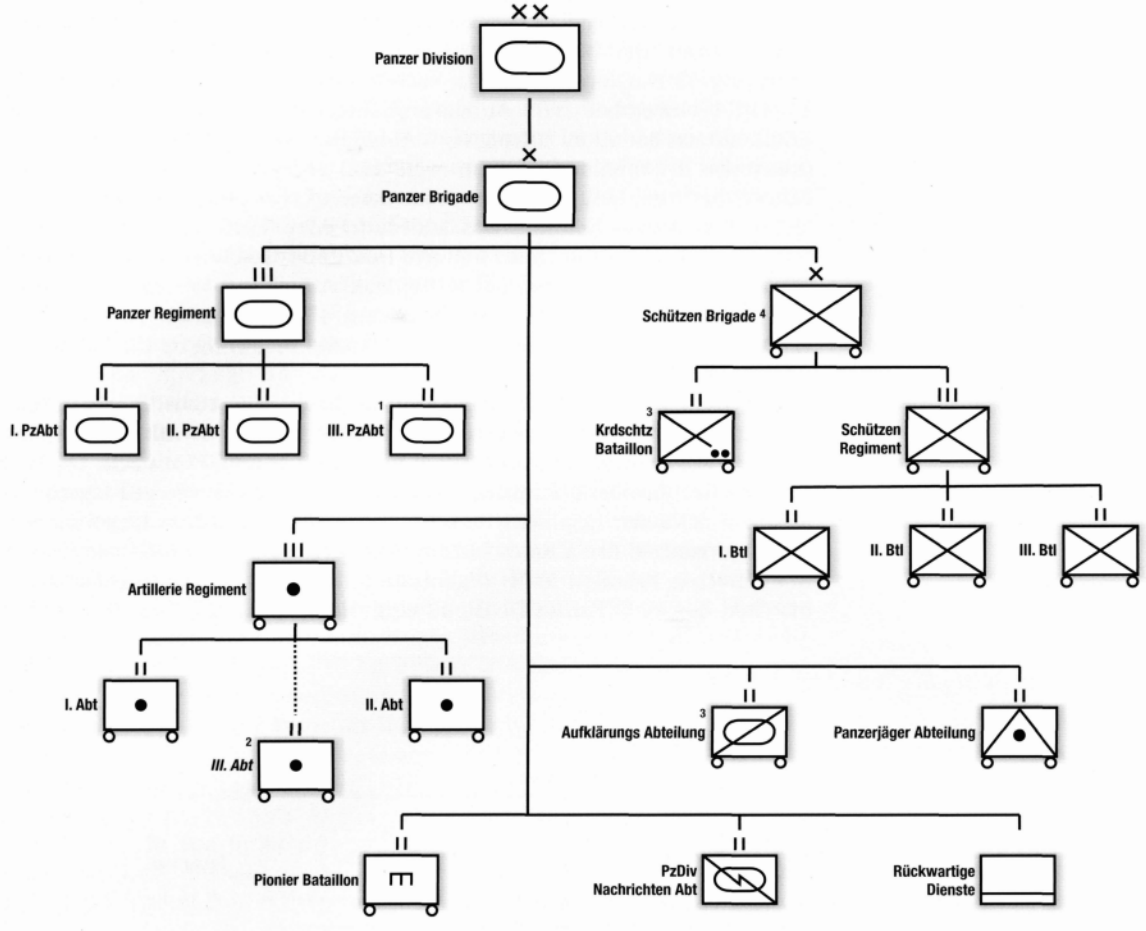
Division – which fought the Polish campaign with a provisional establishment – was brought up to strength and four new divisions were created from the old leichte Divisions, whose mixed organization was deemed unsuitable for combat against the stronger enemy forces on the Western Front. Once more, a lack of weapons, equipment and trained personnel imposed numerous restrictions on this process. The organization of the new divisions was quite different to that of the older ones, mainly because the former had no Panzer Brigade and no second Panzer Regiment, although a single Panzer Abteilung was sometimes attached to their Panzer Regiment. For the rest, the organization matched that of the first five divisions down to and including two different organizations for the Schützen Brigade. It is worth noting that in the meantime the organization of the Schützen units of the senior Panzer Divisions was changed to match that of the new ones.

The first of the three new divisions to be formed (all on 18 October 1939) after the Polish campaign was **6. Panzer Division** (based at Wuppertal), which inherited the units of 1. leichte Division with the addition of Panzer Regiment 11 from Panzer Brigade 6, which had already been attached to the division during the Polish campaign. This, like Panzer Abteilung 65 from 1. leichte Division, was equipped with Czech PzKpfw 35 (t) tanks according to the revised war establishments of September 1939. Most of the original organization of 1. leichte Division was retained; Kavallerie Schützen Regiment 4 changed its designation to Schützen Regiment 4 and, on 1 April 1940, Aufklärungs Abteilung 6 was renumbered 57 and a seventh kleine Kraftwagen Kolonne was added. The only major change occurred to Panzerjäger Abteilung 41, which was reduced from three to two companies. In May 1940 the division had the following elements attached: schwere Artillerie Abteilung 605 (from 3 August renamed III./Artillerie Regiment 76), plus the Luftwaffe Flak Abteilung 76 and 3.(H)/Staffel 12.

7. Panzer Division was formed at Gera from 2. leichte Division with the addition of Panzer Regiment 25, whose II. Abteilung came from I./Panzer Regiment 23 (the change of designation taking place on 1 April 1940). Like

An armoured infantry unit of 1. Panzer Division on the move toward Chaumont, 14 June 1940. Barely visible on the light cover of the SdKfz 251 on the extreme right is the letter 'G', denoting 'Gruppe Guderian' (the letter was used only in the second half of the French campaign). Leading the column of SdKfz 251 armoured personnel carriers is an SdKfz 10 half-tracked prime mover.

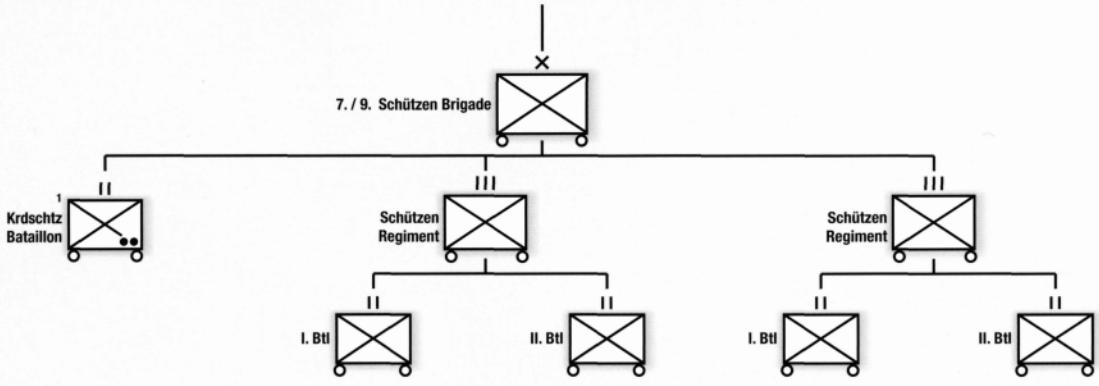
6.–9. Panzer Divisions' basic organization, May 1940



Notes

[1] 9. Panzer Division's Panzer Regiment 33 had no third Panzer Abteilung.
[2] Attached (later sanctioned as III. Abteilung).
[3] Kradschützen Bataillon 59 and Aufklärungs Abteilung 9 (9. Panzer Division) still formed Aufklärungs Regiment 9.
[4] The Schützen Brigade organization shown applied to 6. and 8. Panzer Divisions only; for 7. and 9. Divisions' Schützen Brigades, see chart below.

7. and 9. Panzer Divisions' Schützen Brigade organization, May 1940



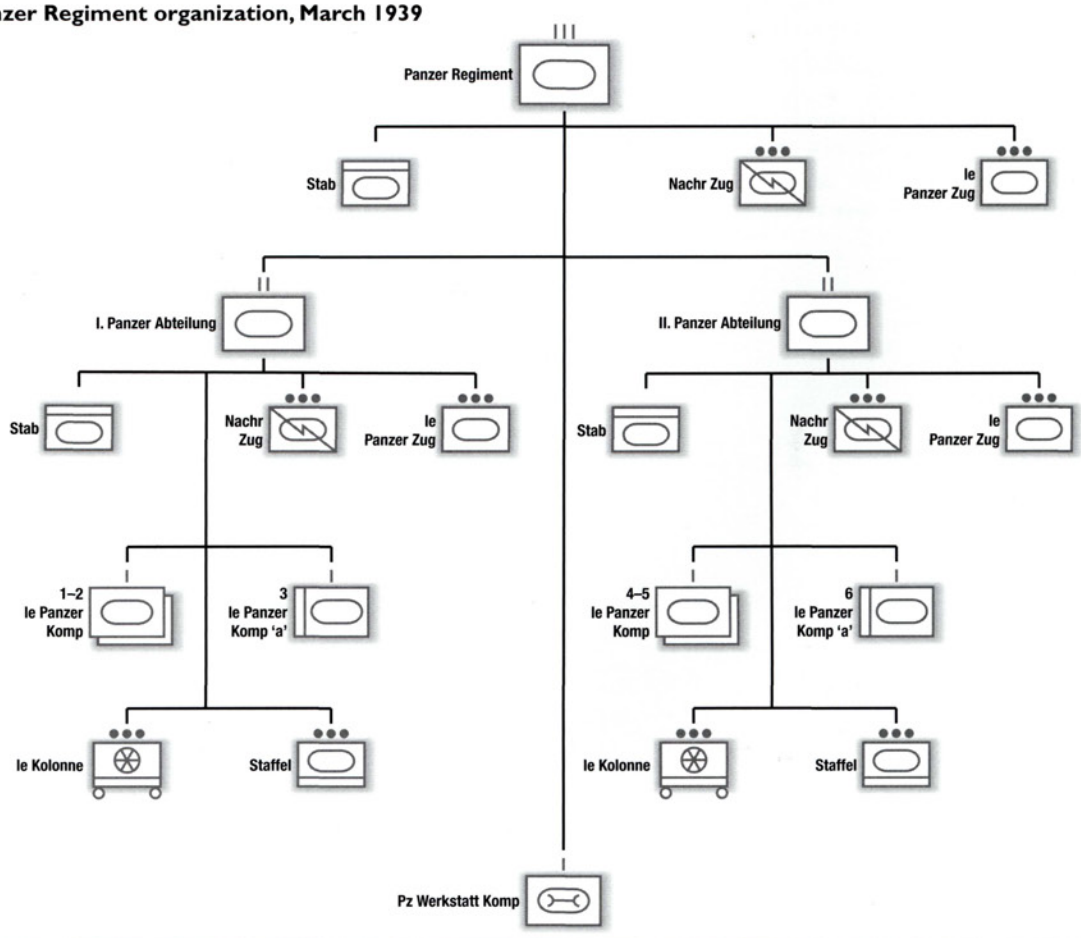
Note

[1] Kradschützen Bataillon 59 and Aufklärungs Abteilung 9 (9. Panzer Division) still formed Aufklärungs Regiment 9.

Panzer Abteilung 66, it was equipped with Czech PzKpfw 38 (t) tanks according to a mixture of new and old war establishments. Also, on 27 October a new Schützen Brigade 7 was formed to take over Schützen Regiments 6 and 7, both created from the old Kavallerie Schützen Regiment, while Nachrichten Abteilung 83 was formed from 2. leichte Division's 3./Nachrichten Abteilung 29. On 1 November 1939 Aufklärungs Regiment 7 was disbanded to form Kradschützen Bataillon 7 (from its I. Abteilung) and Aufklärungs Abteilung 37 (from the II. Abteilung), which were also reorganized (see below). Again, Panzerjäger Abteilung 42 shrank from three to two companies and a seventh kleine Kraftwagen Kolonne was added. In May 1940 the division had the following elements attached: schwere Infanterie Geschütz Kompanie 705 (to Schützen Brigade 7), the Luftwaffe Flak Abteilung 59 and 86, and the 1.(H)/Staffel 11. The II./Artillerie Regiment 45 had also been attached from early June to Artillerie Regiment 78, eventually becoming its III. Abteilung on 4 February 1941.

The organization of **8. Panzer Division** (based at Cottbus) matched that of 6. Panzer Division. It was created from 3. leichte Division with the addition of I./Panzer Regiment 10 (expanded to a full regiment on 20 October). On 1 April 1940 its two Kavallerie Schützen Regiments 8 and 9 were merged together and renamed Schützen Regiment 8. Since II./Kavallerie Schützen Regiment 9 was already organized like a Kradschützen Bataillon, it was eventually used to create Kradschützen Bataillon 9 (its organization, like that of Schützen Regiment 8, matched that of 6. Panzer Division's equivalent units). Schützen Brigade 8 had

Panzer Regiment organization, March 1939



already been formed on 4 November 1939, three days after the creation of Nachrichten Abteilung 84 from 4./Nachrichten Kompanie 3. Also, on 1 April 1940, Aufklärungs Regiment 8 was split, forming Aufklärungs Abteilung 90 (attached to 10. Panzer Division) and 59 (which was retained by the division). Moreover, Panzerjäger Abteilung 43 shrunk to the customary two companies while Pionier Bataillon 59 expanded to three (a seventh kleine Kraftwagen Kolonne was also added). By May 1940 Panzer Regiment 10 and Panzer Abteilung 67, both using Czech PzKpfw 38 (t) tanks, were equipped according to the revised war establishments charts of 1 September 1939. In May 1940 the division also had the Luftwaffe Flak Abteilung 84 and the 3.(H)/Staffel 41 attached.

9. Panzer Division was formed at Frankstadt on 4 January 1940, by all but renaming the units of 4. leichte Division. On 2 February 1940 a new Panzer Regiment 33 was formed using the Stab of Panzer Lehr Regiment, III./Panzer Regiment 5 (formerly I./Panzer Lehr, now I./PzRgt 33) and Panzer Abteilung 33, which became II./PzRgt 33. Its varied origins accounted for its mixed organization, which included both the March and September 1939 war establishments. On 18 March 1940 the two Kavallerie Schützen Regiments 10 and 11 became the Schützen Regiment, while a new Schützen Brigade 9 was also formed. On 15 February the Nachrichten Abteilung 85 was formed from 3./Nachrichten Kompanie 38, while Panzerjäger Abteilung 50 retained its three companies and Pionier Bataillon 60 expanded to three (the customary seventh kleine Kraftwagen Kolonne was also added). In May 1940 the division still retained the old Aufklärungs Regiment 9, which eventually formed Kradschützen Bataillon 59 and Aufklärungs Abteilung 9 on 1 August 1940. II./Artillerie Regiment 50 seems to have been attached to Artillerie Regiment 102 in May 1940, eventually becoming its III. Abteilung on 1 August.

The Stab of **10. Panzer Division** had begun forming on 1 April 1939 in Prague, and was still forming in September when it was put at the head of a provisional formation that included, amongst others, Panzer Regiment 8 and Infanterie Regiment 86 (mot). At the end of the Polish campaign, it was sent back to Prague in late September, and on 11 October the division absorbed Panzer Regiment 7 (already part of Panzerverband Kempf, another provisional unit) and the Stab of Panzer Brigade 4 (both Panzer Regiments were organized

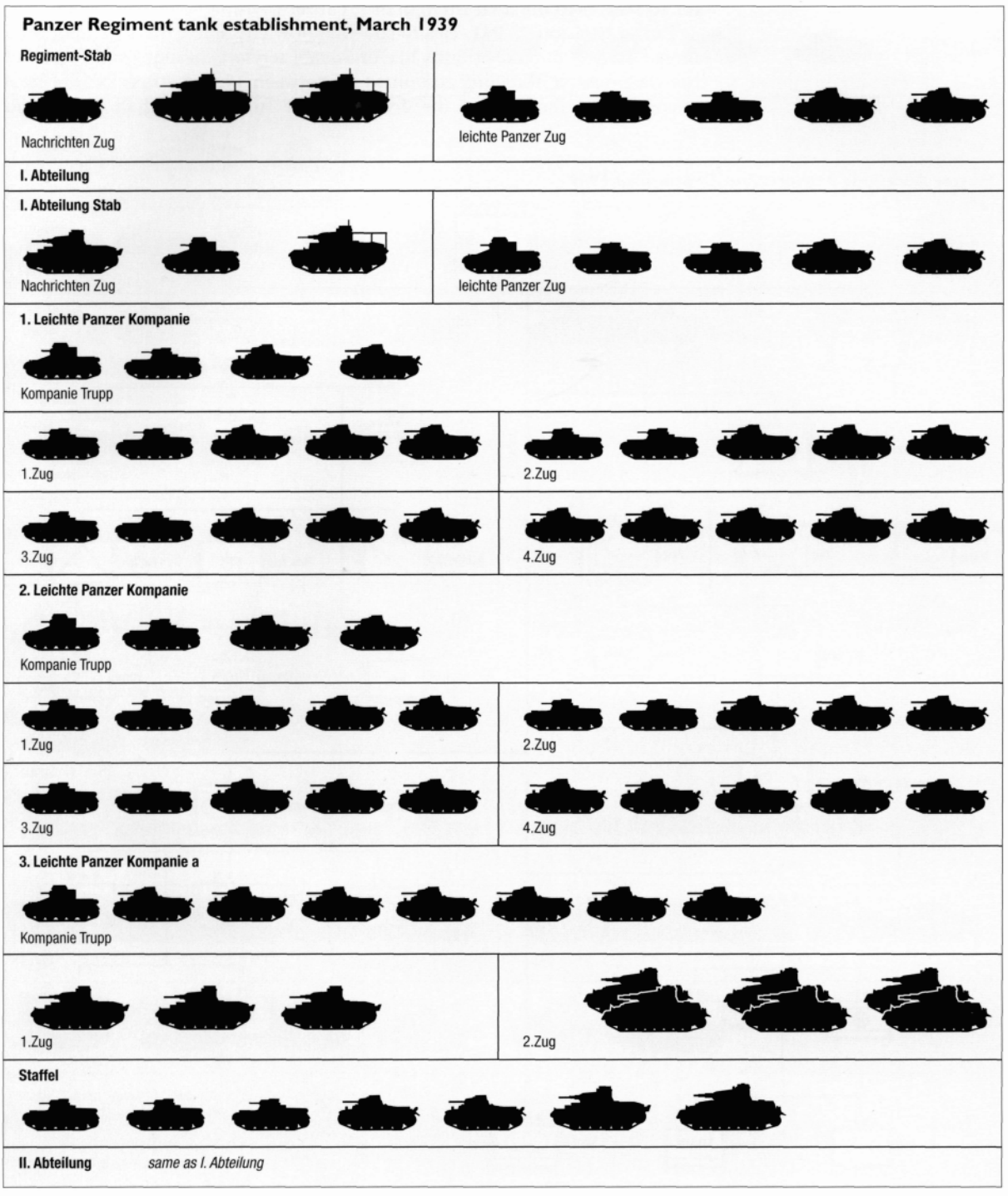
A Panzer Abteilung waiting for the order to move during the 1940 campaign in North-West Europe. The first two columns from the right are made up of a mixture of PzKpfw II light tanks and what seem to be PzKpfw 35 (t) tanks, which can also be seen on the extreme left after the first three PzKpfw IV. Note the use of flags for identification from the air.

according to the revised war establishments of 21 February 1940). On 1 November 1939 – three days after the creation of Schützen Brigade 10 – II./Infanterie Regiment 69 (mot) was attached to the division from the 20. Infanterie Division and, merged with III./IR 86 (which became I./IR 69), formed the new Infanterie Regiment 69. Both IR 69 and 86 were renamed as the Schützen Regiment on 1 April 1940, when Aufklärungs Abteilung 90 was formed as well from I./Aufklärungs Regiment 8, while two weeks later Pionier Bataillon 49 (formerly corps troops) eventually became part of the division. Other units had already been formed in late 1939: Artillerie Regiment 90 (formed on 28 October 1939 using II./AR 29, with schwere Artillerie Abteilung 105 attached from 9 January 1940, subsequently renamed III./AR 90 on 1 February 1941), Panzerjäger Lehr Abteilung (formed as Panzer Abwehr Abteilung 90 on 18 November 1939, expanded to three companies and renamed Panzerjäger Lehr Abteilung on 1 April 1940, only to revert to the old designation on 14 February 1941), Nachrichten Abteilung 90 (formed on 27 October 1939 from the Nachrichten Kompanie 90) and the divisional services (formed between the summer and autumn of 1939). In May 1940 the division had the Luftwaffe Flak Abteilung 71 and the 1.(H)/Staffel 71 attached.

According to war establishments, in September 1939 1. Panzer Division had a total strength of 11,603 (11,792 with the attached MG Kompanie) plus

A Panzer column on the move in May 1940; the tactical insignia barely visible to the left of the hull of the PzKpfw II in the foreground reveals they belong to 4. Panzer Division. Interestingly, this particular PzKpfw II sports one number (312 – third company, first platoon, second tank) on its turret, but a different one (300, company headquarters) on the rhomboid plate close to the national insignia.

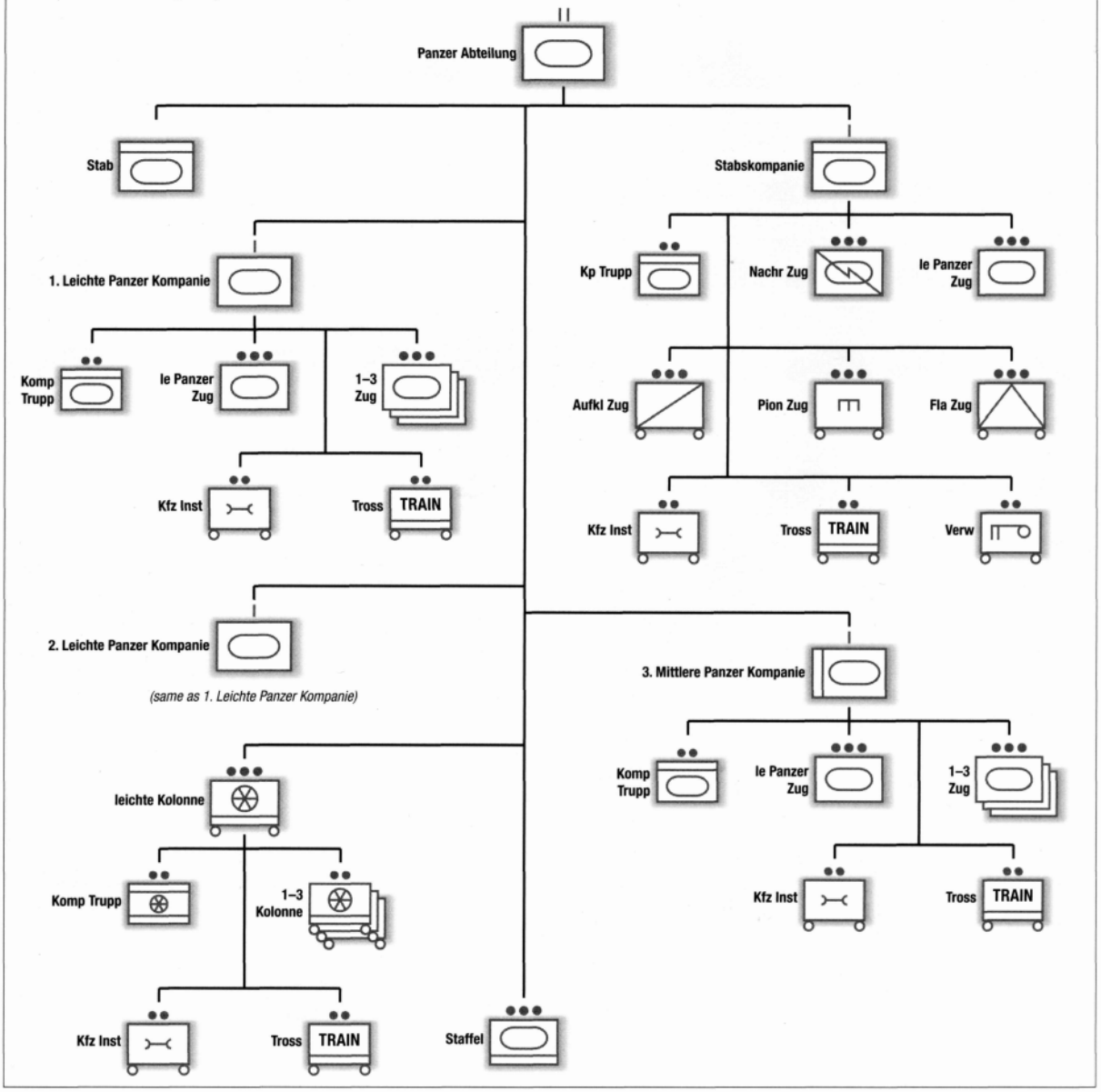
3,621 vehicles, 421 of which were AFVs (246 gun-armed tanks included). The strength of the other divisions differed. 2. to 5. Panzer Divisions each had 3,637 vehicles, of which 405 were AFVs (with only 182 gun-armed tanks). 4. Panzer Division, with its single Schützen Regiment, had a total strength of 10,680, while 5. Panzer Division's strength, with its two regiments, was 12,974. Deficiencies, particularly with regard to incomplete units, affected these figures. 4. Panzer Division still lacked its Pionier Bataillon and had only two



Panzer Abwehr Kompanien (but with the MG Kompanie attached), and thus was temporarily authorized a total strength of 10,286; 5. Panzer Division's strength (with only two Pionier Kompanien and no Panzer Abwehr Abteilung Stab) was at 12,779. 2. Panzer Division's Artillerie Regiment 74, with its second schwere Artillerie Abteilung, granted the division a total strength of 11,610.

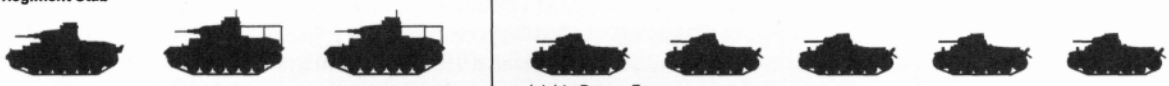
Actual strengths on the battlefield more or less matched the established ones. In September 1939 4. Panzer Division's total strength was 10,221, which is close to the established one. Organizational changes also affected the actual strengths: on 10 May 1940 the total strength of 1. Panzer Division was 13,192 and that of 4. Panzer Division 13,941, clearly showing how efficiently the latter had been reorganized. Non-combat units like divisional services, headquarters units and the Nachrichten Abteilung accounted for between 17 and 20 per cent of total strength, and the bulk of the divisions were supplied by their Panzer and

Panzer Abteilung organization, September 1939



Panzer Regiment tank establishment, September 1939

Regiment Stab



Nachrichten Zug

leichte Panzer Zug

I. Abteilung

I. Abteilung Stab

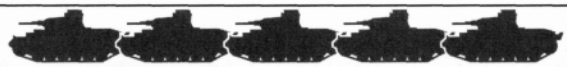
Nachrichten Zug

leichte Panzer Zug

1. Leichte Panzer Kompanie

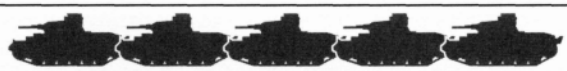
Kompanie Trupp

leichte Zug



1.Zug

2.Zug

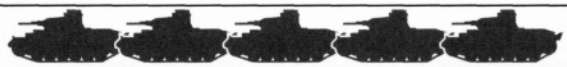


3.Zug

2. Leichte Panzer Kompanie

Kompanie Trupp

leichte Zug



1.Zug

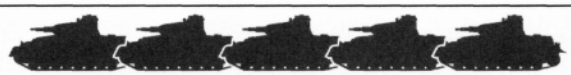
2.Zug

3.Zug

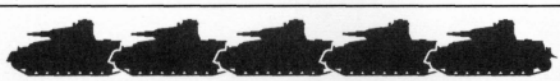
3. Mittlere Panzer Kompanie

Kompanie Trupp

leichte Zug



1.Zug



2.Zug

3.Zug

Staffel

II. Abteilung *same as I. Abteilung*

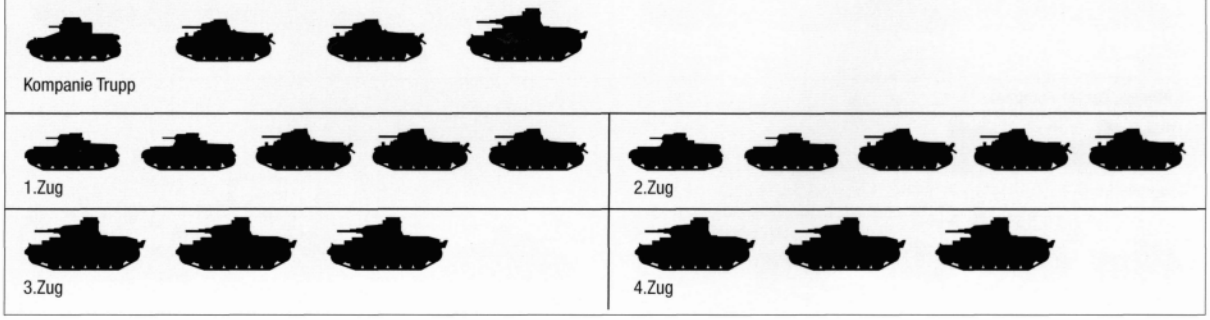
Note

[1] One PzKpfw II could replace one of the PzKpfw III.

Schützen Brigades. Divisional headquarters and related units only accounted for about 1.4 per cent of divisional strength (see the *Command and Control* chapter); they included 18 officers, 14 Beamte, 26 NCOs and 107 other ranks, armed with a total of 50 pistols, 111 rifles and two heavy MGs. The vehicle allotment was 41 motorcycles, 11 staff cars and 13 medium/heavy lorries.

The Panzer Brigade's total established strength was 120 officers, 22 Beamte, 682 NCOs and 2,112 other ranks (a single Panzer Regiment had 58 officers, 11 Beamte, 338 NCOs and 1,044 other ranks). The differences between divisions lay in the vehicle and equipment allowances: 1. Panzer Division had 1,235 rifles, 296 MPs and 592 light MGs (AFV-mounted weapons included), while the four other divisions had 1,801 pistols, 1,111 rifles, 336 Maschinenpistolen (MPs) and 508 light MGs. Tank allocations accounted for the most noticeable differences amongst the regiments; according to its March 1939 organization, each Panzer Regiment was composed of a regimental Stab, a Panzer Werkstatt (tank maintenance) Kompanie plus a Panzer Nachrichten Zug and a leichte Panzerzug (armoured communication and light tank platoons), the latter equipped with one Panzerbefehlswagen I plus two PzKpfw I and two PzKpfw II. Each Panzer Abteilung was made up of a Stab, a Nachrichten Zug, a leichte Panzerzug, a leichte Kolonne (battalion train), a Panzer Staffel (equipped with the battalion's spare tanks) and three Panzer Kompanien (the fourth was left at the unit depot for training purposes), plus two leichte Panzer and one leichte Panzer Kompanien 'a'. The former included one PzBefh I and a total of seven PzKpfw I and 16 PzKpfw II, while the latter included one PzBefh I, 7 PzKpfw II, 3 PzKpfw III and 6 PzKpfw IV. Thus, the grand total for a single Panzer Regiment in March 1939 was 11 PzBefh I, 4 PzBefh III, 34 PzKpfw I, 85 PzKpfw II, 8 PzKpfw III and 12 PzKpfw IV. With the Staffel included, it meant a total of 30 command, 258 light, and 48 medium tanks per brigade. New organization tables, dated 1 September 1939, were issued in August 1939 and both Panzer Regiments 1 and 2 were authorized to implement them, though only the latter actually started to

Leichte Panzer Kompanie tank establishment, 21 February 1940

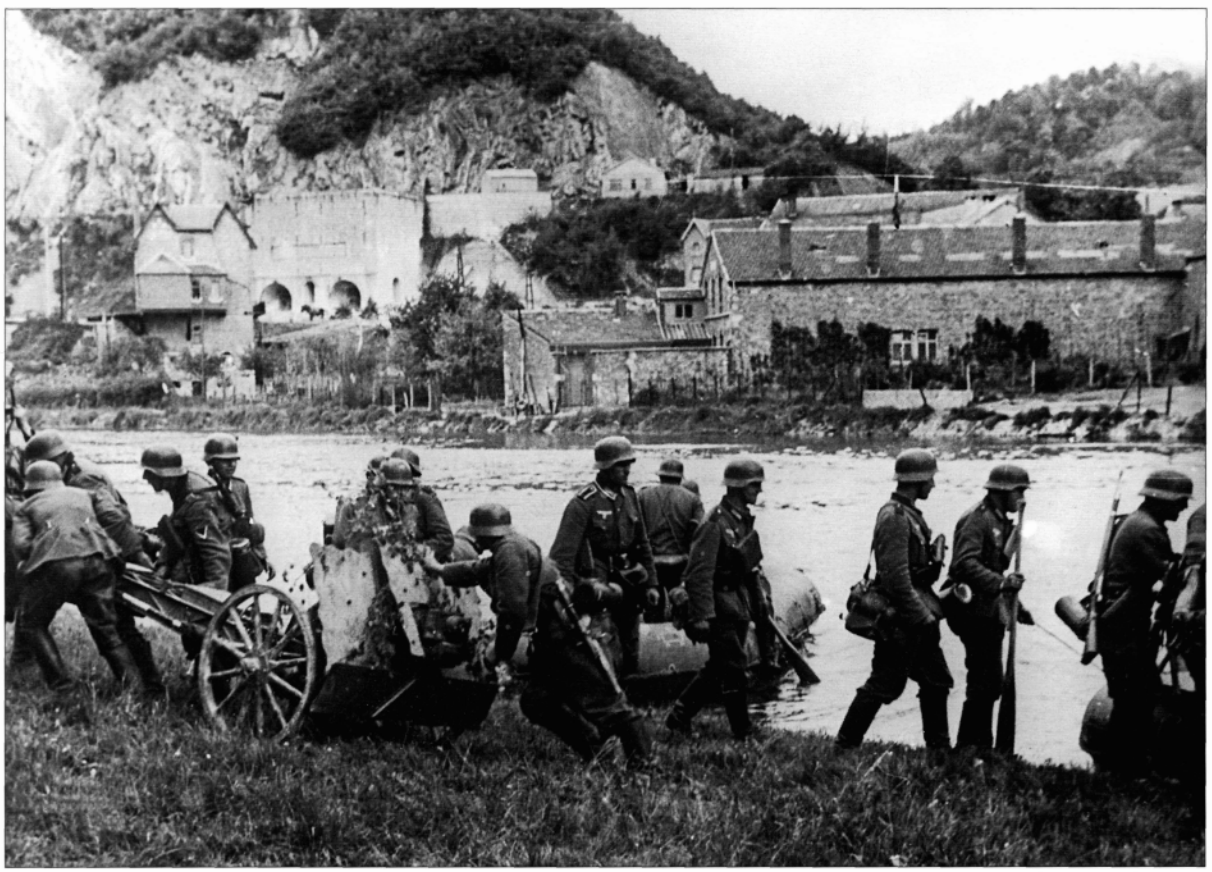


Mittlere Panzer Kompanie tank establishment, 21 February 1940

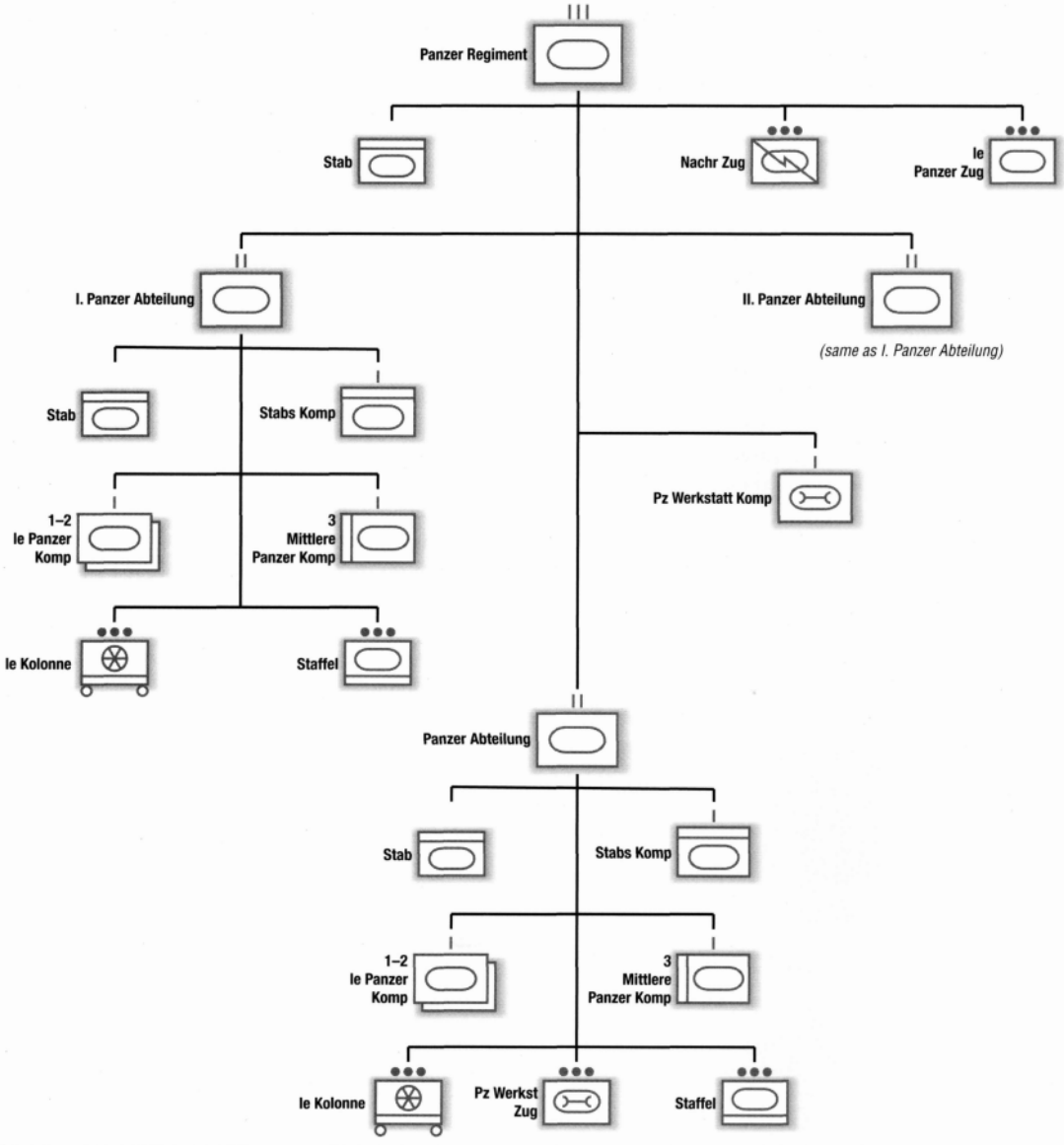
reorganize before the outbreak of war put an end to the whole matter. Changes affected the Panzer Abteilung's Stab and support units, now reunited under a single Stabskompanie (HQ company, which also included an Aufklärung, a Pionier and a Fla Zug – a light anti-aircraft platoon). The organization of both the leichte Panzer Kompanien and of the leichte Panzer Kompanien 'a' – now renamed mittlere Panzerkompanien – was changed. According to the new Kriegsstärke Nachweisung (war establishment chart, KStN), a leichte Panzer Kompanie now included 5 (or 6) PzKpfw II and 17 (or 16, when a PzKpfw II replaced a PzKpfw III) PzKpfw III, while the mittlere Panzer Kompanie included 5 PzKpfw II and 16 PzKpfw IV, for a grand total of 6 PzBefh III, 45 PzKpfw II, 71 PzKpfw III and 32 PzKpfw IV per Panzer Regiment (the Staffel excluded). In 1939 the establishment of a Panzer Brigade also included 246 motorcycles, 88 staff cars, 296 (for 1. Panzer Division) or 328 (in other divisions) medium and heavy lorries and 26 trailers.

Organizational differences were further increased following the creation of the four new Panzer Divisions, which also enhanced the already scarce availability of weapons and equipment, in particular of medium tanks. To fill this gap, on 21 February 1940 new provisional KStN were issued and both the leichte and mittlere Panzer Kompanien of Panzer Regiments 2, 3, 4, 7 and 8 were authorized to implement them. According to the new establishments, the new leichte Panzer Kompanie was to have 1 PzBefh I, 4 PzKpfw I, 8 PzKpfw II and 7 PzKpfw III, while the new mittlere Panzer Kompanie was to have 1 PzBefh I, 6 PzKpfw II and 8 PzKpfw IV for a grand total of 11 PzBefh I, 4 PzBefh III, 22 PzKpfw I, 51 PzKpfw II, 30 PzKpfw III and 16 PzKpfw IV per Panzer Regiment. The logical consequence was that the Panzer Divisions' organization became even more chaotic: by May 1940 1. Panzer Division's Panzer Regiment 1 retained

Schützen preparing to cross a river, most likely the Meuse in the Dinant area, in May 1940. The gun in the foreground is a 75mm leichte Infanterie Geschütz 18 (light infantry gun), the most common infantry support gun used by the German Army during World War II.



Panzer Regiments 10, 11, and 25 organization, May 1940



the 1 September 1939 war establishment, while its Panzer Regiment 2 converted to the new 21 February 1940 KStN. Both regiments of 2. and 10. Panzer Divisions converted to the 21 February 1940 KStN, while all the Panzer Kompanien of both Panzer Regiments of 3., 4. and 5. Panzer Divisions were still organized according to the 1 March 1939 KStN, though their Abteilung Stab had implemented the new organization of September 1939 forming the Stabskompanie.

Further variations were introduced by the creation of new regiments: the single Panzer Regiment and the attached Panzer Abteilung of both 6. and 8. Panzer Divisions, all equipped with Czech tanks, were organized according to the 1 September 1939 KStN, while 7. Panzer Division's Panzer Regiment 25 and Panzer Abteilung 67 were organized according to the 21 February 1940 KStN, again with Czech tanks replacing the PzKpfw II and III. 9. Panzer Division's Panzer Regiment 33 was a rather odd mixture, with its I. Abteilung conforming to the 1 September 1939 establishment and its II. Abteilung to the

Panzer Regiments 10 and 11 tank establishment, May 1940

Regiment Stab

Nachrichten Zug

leichte Panzer Zug

I. Abteilung

I. Abteilung Stab

Nachrichten Zug

leichte Panzer Zug

1. Leichte Panzer Kompanie

Kompanie Trupp

leichte Zug

1.Zug

2.Zug

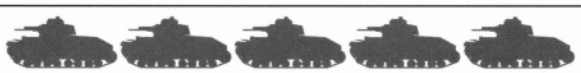
3.Zug

2. Leichte Panzer Kompanie

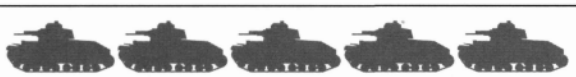
Kompanie Trupp

leichte Zug

1.Zug



2.Zug



3.Zug

3. Mittlere Panzer Kompanie

Kompanie Trupp

leichte Zug

1.Zug

2.Zug

3.Zug

Staffel

II. Abteilung *same as I. Abteilung*

65./67. Panzer Abteilung *same as I. Abteilung*

Notes

The PzKpfw 35/38 (t) could replace the PzKpfw II in the leichte Zug of the leichte Panzer Kompanie.
Czech command tanks could replace the Befehls-PzKpfw III in units equipped with the PzKpfw 38 (t).
The PzKpfw 38 (t) – shown here – and the PzKpfw 35 (t) were interchangeable.

1 March 1939 one. However, no Panzer unit ever reached its established strength, in particular due to the shortage of PzKpfw III and IV tanks.

In September 1939 the lack of infantry became apparent as a serious shortcoming of the Panzer Divisions: the Schützen Brigades of 1. to 3. Panzer Divisions comprised a two-battalion Schützen Regiment plus a single Kradschützen Bataillon, with a total strength of 3,183 all ranks. Each Schützen Regiment, 2,203 strong and with an extensive weapons allowance (62 light and

Panzer Regiment 25 tank establishment, May 1940

Regiment-Stab

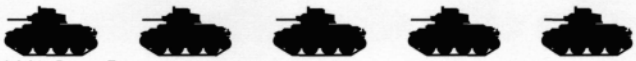
Nachrichten Zug

leichte Panzer Zug

I. Abteilung

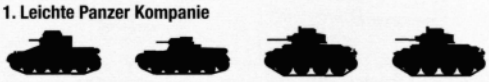
I. Abteilung Stab

Nachrichten Zug



leichte Panzer Zug

1. Leichte Panzer Kompanie



Kompanie Trupp

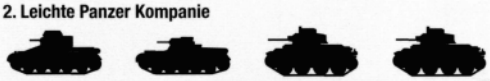
1.Zug

2.Zug

3.Zug

4.Zug

2. Leichte Panzer Kompanie



Kompanie Trupp

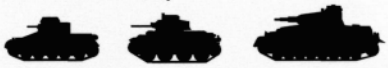
1.Zug

2.Zug

3.Zug

4.Zug

3. Leichte Panzer Kompanie a



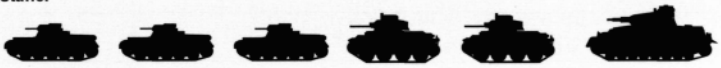
Kompanie Trupp

leichte Zug

1.Zug

2.Zug

Staffel



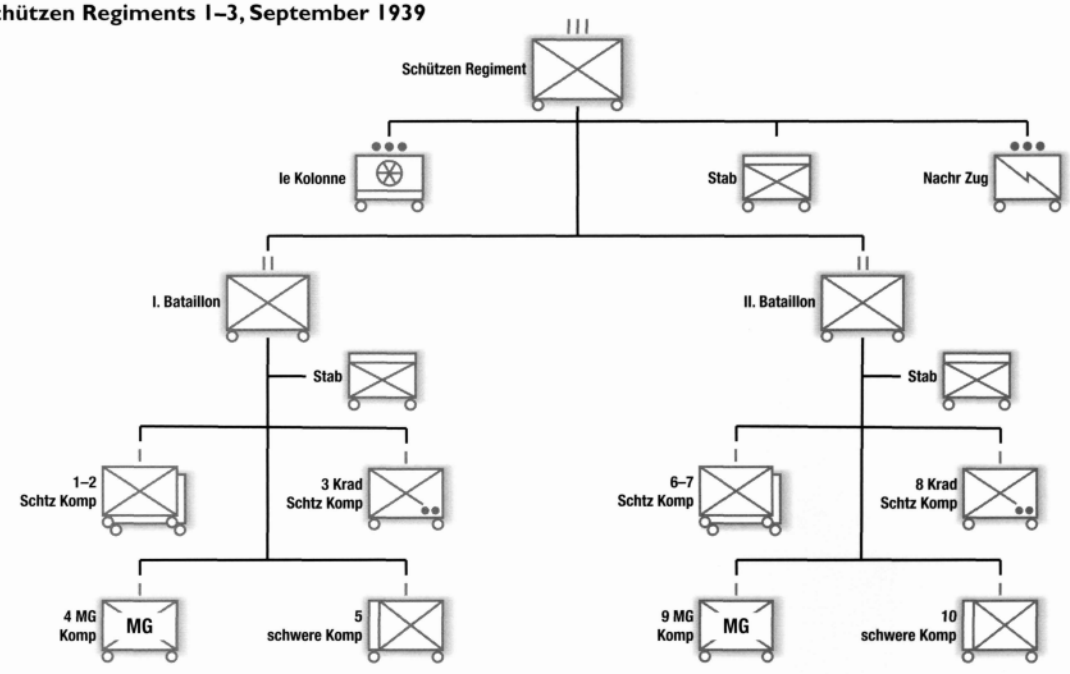
II. Abteilung *same as I. Abteilung*

66. Panzer Abteilung *same as I. Abteilung*

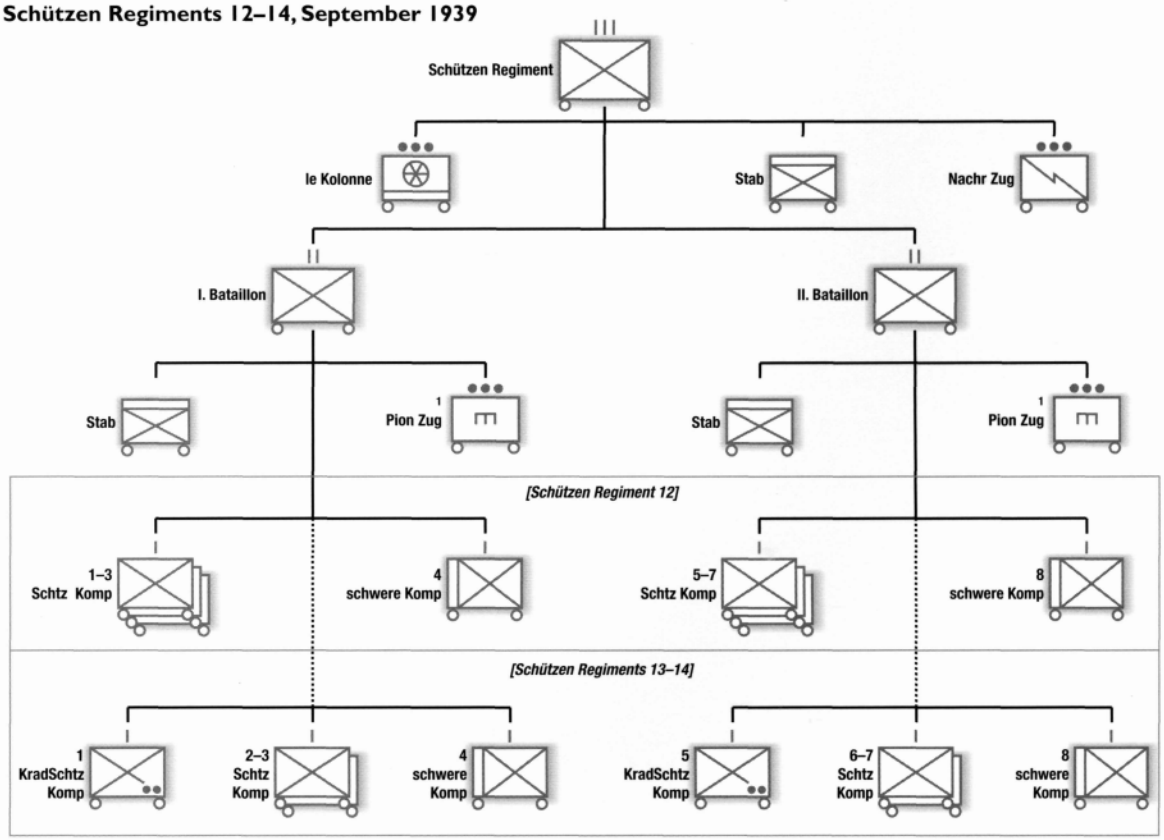
28 heavy MGs, six 37mm PAK 35/36 AT guns, 18 light 50mm and 12 heavy 81mm mortars, four light Infanterie Geschütz 75mm), was centred around its two Schützen Bataillone, each one composed of two motorized infantry companies (Schützen), one motorcycle infantry (Kradschützen), one MG and one heavy weapons (schwere Waffen) company. This organization was not matched by the Schützen units of other divisions: 4. Panzer Division's Schützen Regiment 12 – the only infantry unit with the division – was made up of two battalions each with only three Schützen and one schwere Kompanie. 5. Panzer Division's Schützen Regiments 13 and 14 each comprised two battalions with one Kradschützen, two Schützen and one schwere Kompanie. Overall regimental strength matched the weaker organizations; all three of Schützen Regiments 12 to 14 were 2,260 strong (but in September 1939 Schützen Regiment 12's actual strength was 2,298), and their weapons allowance was extensive: 108 light and 24 heavy MGs, six 37mm PAK 35/36 AT guns, 18 light 50mm and 12 heavy 81mm mortars, and 8 light Infanterie Geschütz 75mm. Experience gained during the Polish campaign, when the Panzer Divisions encountered problems while fighting in towns and cities due to a lack of infantry, suggested that the Schützen Brigade should be strengthened. This

A column of Krupp L2H143 Kfz 81 2.6-ton light lorries, commonly used to carry half a Schützen or a machine-gun squad, led by a Horch 830 Kfz 15 communication car on a march in the early stages of the Polish campaign. The tactical symbol on the left mudguard denotes a motorized infantry platoon.

Schützen Regiments 1–3, September 1939



Schützen Regiments 12–14, September 1939



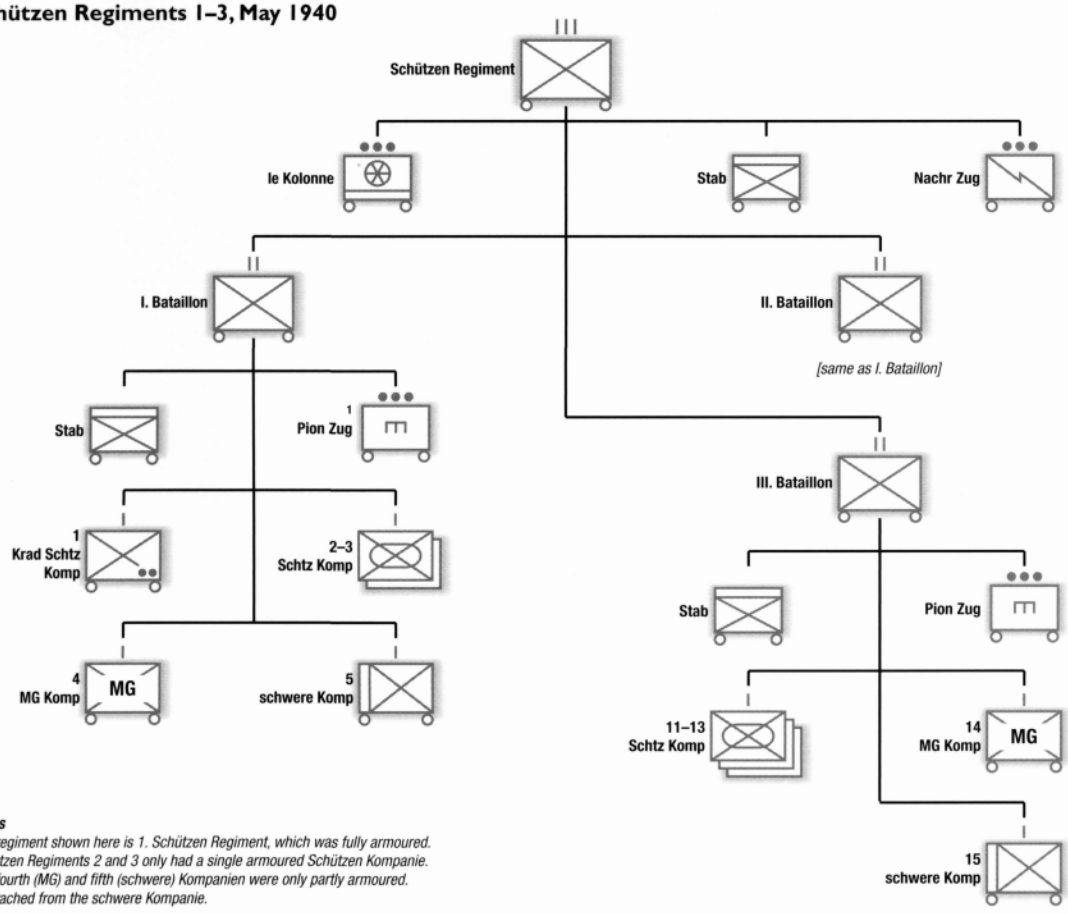
Note

[1] Detached from the schwere Kompanie.

would not prove difficult to do, as a decision had already been taken to reduce the number of Schützen Regiments in the Infanterie Division (mot) from three to two. In November 1939, 1. to 3. Panzer Divisions had a third battalion attached to (and later integrated into) their Schützen Regiment, thus bringing the total strength to about 3,300 with a corresponding increase in firepower except for in the light MG allowance (the regiment now had 87 light and 42 heavy MGs, nine 37mm PAK 35/36 AT guns, 27 light 50mm and 18 heavy 81mm mortars, and six light Infanterie Geschütz 75mm guns). The increased availability of half-tracked MTWs also allowed for 1. Panzer Division's Schützen Regiment 1 to be fully equipped, but for only one single Schützen Kompanie in both Schützen Regiment 2 and 3.

Similarly, in November 1939 Schützen Regiment 33 joined 4. Panzer Division, which now, like 5. Panzer Division (whose organization remained unchanged), had two of them. In May 1940 Schützen Regiment 12 – whose only organizational change had been the reorganization of its 6. Kompanie as a Kradschützen Kompanie – had an actual strength of 3,384 (50 officers, 530 NCOs and 2,804 other ranks) with no changes to its weapons allocation. In contrast, Schützen Regiment 33 had quite a different organization, matched only by that of 10. Panzer Division's Schützen Regiments 69 and 86 – both former Infanterie Regiments (mot). Their strength was actually weaker at approximately 2,200 (in May 1940 Schützen Regiment 33's actual strength was 2,144), as was their overall weapons allowance, with the notable exception of heavy weapons: each regiment had 61 light and 28 heavy MGs, twelve 37mm PAK 35/36 AT guns, 18 light 50mm and 12 heavy 81mm mortars, and 8 light

Schützen Regiments 1–3, May 1940

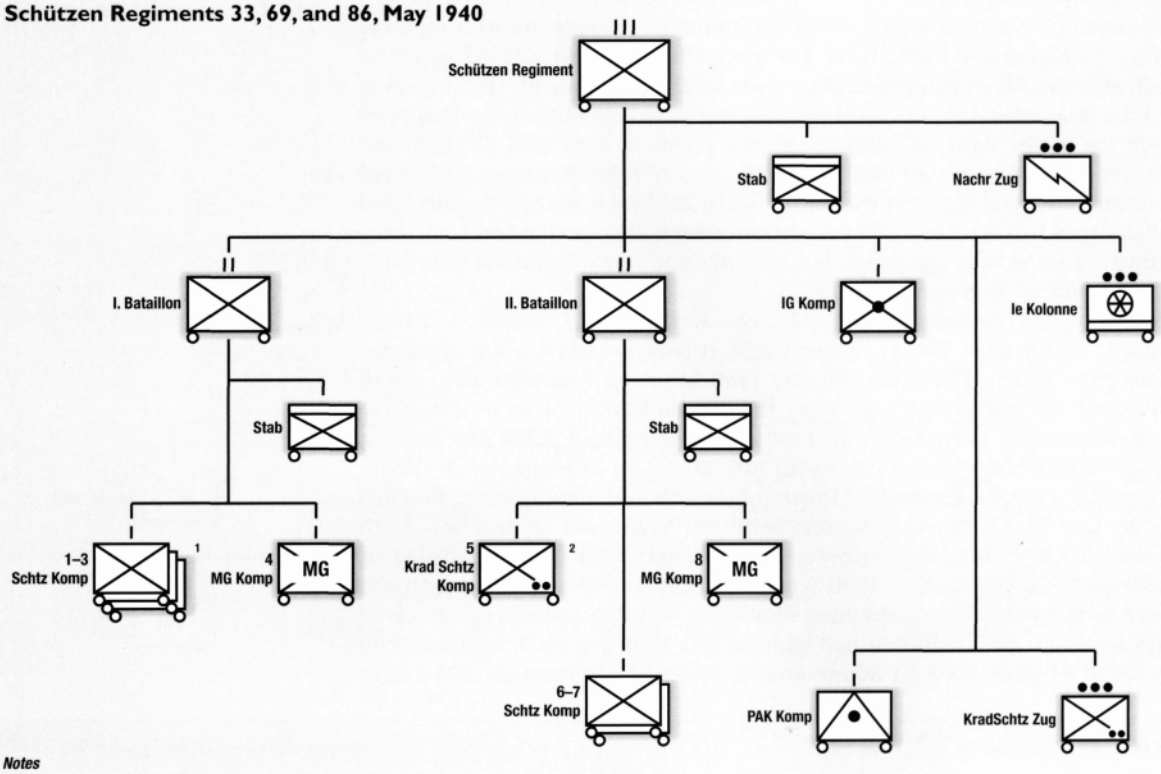


Notes

The regiment shown here is 1. Schützen Regiment, which was fully armoured. Schützen Regiments 2 and 3 only had a single armoured Schützen Kompanie. The fourth (MG) and fifth (schwere) Kompanien were only partly armoured.

[1] Detached from the schwere Kompanie.

Schützen Regiments 33, 69, and 86, May 1940

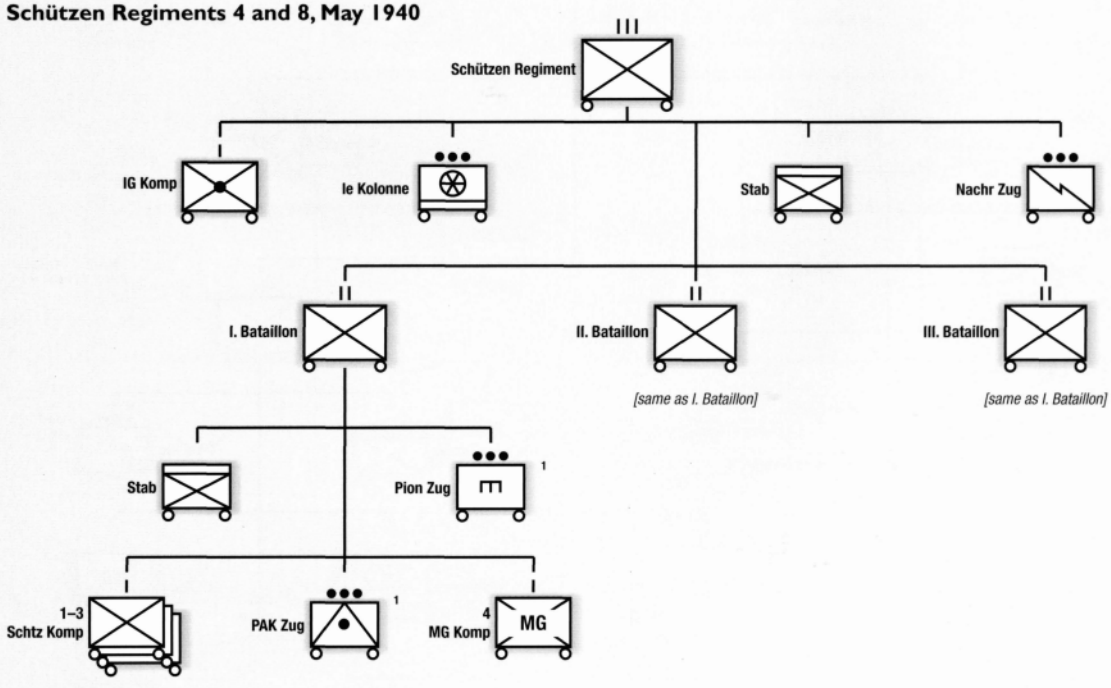


Notes

[1] Schützen Regiment 69 (10. Panzer Division) had both a 1. and a 5. Kradschützen Kompanie.

[2] Schützen Regiment 86 (10. Panzer Division) had Schützen Kompanien 5.–7. and no Kradschützen Kompanie.

Schützen Regiments 4 and 8, May 1940



Note

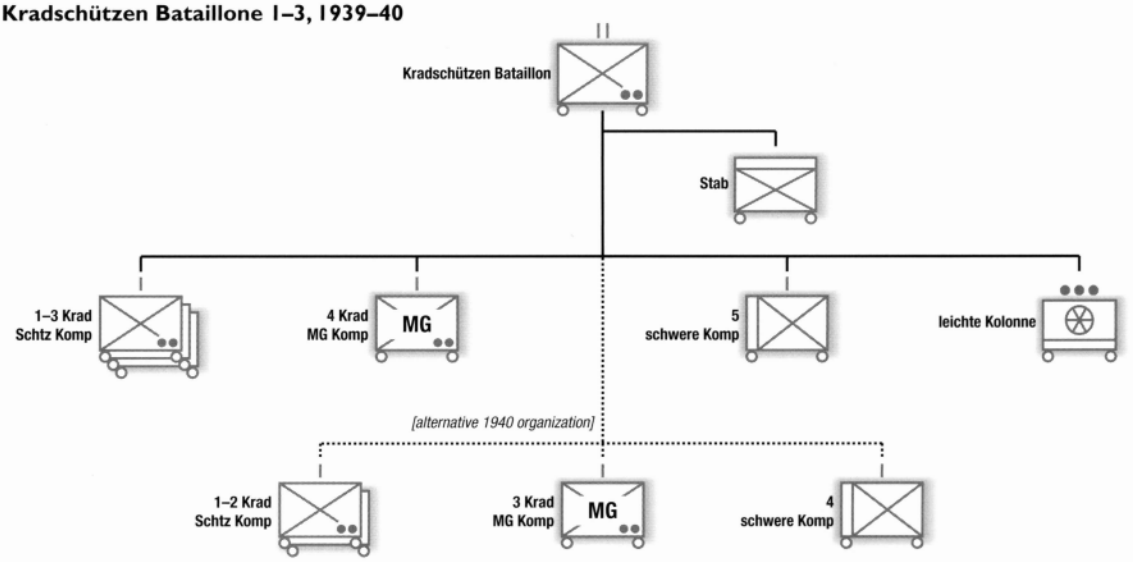
[1] Detached from the schwere Kompanie, now reduced to a MG Kompanie.

A Kradschützen (motorcycle infantry) group from 4. Panzer Division takes a moment of rest in the Place de Tourcoing in Lille, 27 May 1940. Motorcycle infantry, part of either the Kradschützen Bataillon or the Aufklärungs Abteilung, comprised the fast-moving infantry element of the Panzer Division.

Infanterie Geschütz 75mm guns. The major differences in their organization were the creation of the regimental Pak and Infanterie Geschütz Kompanien, formed from the units part of the schwere Kompanie (now just an MG Kompanie), and the reorganization of some infantry companies into Kradschützen Kompanien; Schützen Regiment 12 apart, this mostly affected Schützen Regiment 69, which had its first and fifth companies reorganized in this way, but not Schützen Regiment 86 which had none. Schützen Regiments 4 and 8 – both former Kavallerie Schützen Regiment with the leichte Division – were made up of three battalions each with three Schützen Kompanien and a schwere Kompanie, whose Pionier, Pak and Infanterie Geschütz Zug had been detached, the latter to form a regimental IG Kompanie. The total strength was about 3,300, and both had a significant weapons allowance: 174 light MGs, 42 heavy MGs, 27 light and 18 heavy mortars, nine 37mm PAK 35/36 and 8 light Infanterie Geschütz 75mm guns. In May 1940 the organization of 7. Panzer Division's Schützen Regiments 6 and 7 as well as 9. Panzer Division's Schützen Regiments 10 and 11 – all derived from Kavallerie Schützen Regiment – matched that of Schützen Regiment 12 in September 1939, though the former had more light MGs (116 compared to 108).

When available, the Schützen Brigade also included a Kradschützen (motorcycle infantry) Bataillon. Its speed and its capacity to redeploy quickly

Kradschützen Bataillone 1–3, 1939–40



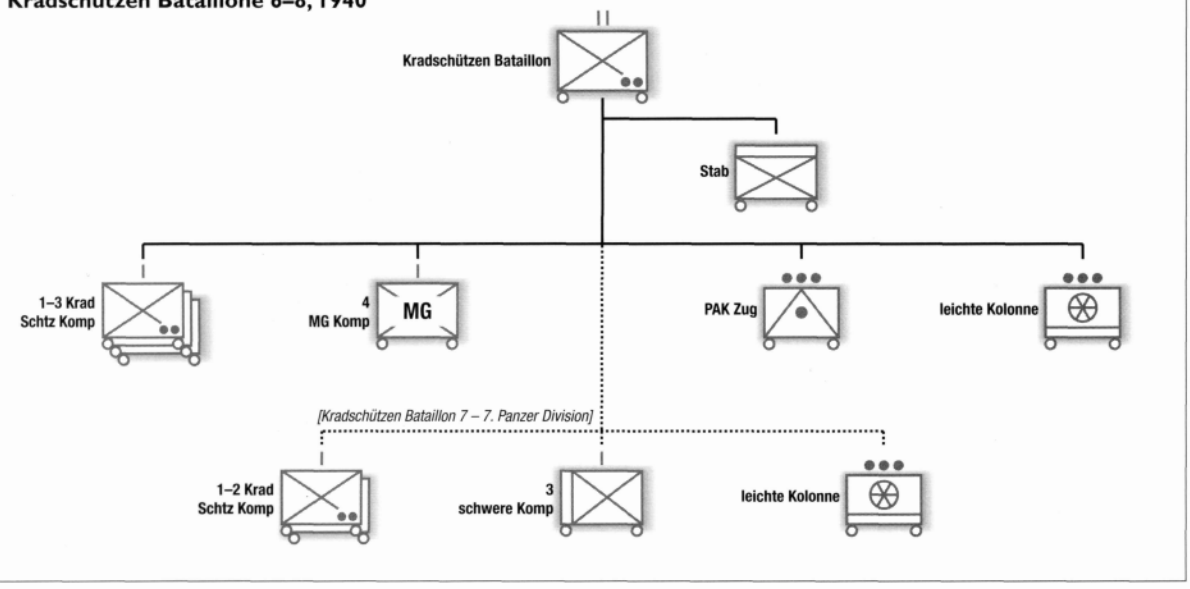
Notes

The alternative 1940 organization applied to Kradschützen Bataillone 1 and 3 (Kradschützen Bataillon 2 retained the three Kradschützen Kompanien). In 1940 these Kradschützen Bataillone no longer had a leichte Kolonne.

made it the natural spearhead of the Schützen Brigade, and it was often used in offensive reconnaissance missions. In September 1939 its overall strength was 959, and its organization included three Kradschützen Kompanien plus a single MG Kradschützen and the schwere Waffen Kompanie. Its weapons allocation was also impressive: 31 light and 14 heavy MGs, 9 light (50mm) and 6 heavy (81mm) mortars, three 37mm PAK 35/36 AT and 2 light Infanterie Geschütz 75mm guns. However, composed as they were of highly trained personnel, Kradschützen units were also comparatively rare; between late 1939 and early 1940 both Kradschützen Bataillone 1 and 3 lost one of their companies, which were not replaced, and of the original three battalions only Kradschützen Bataillon 2 retained its three Kradschützen Kompanien. All in all, this meant a loss of some 100 men plus 9 light and 2 heavy MGs, and

A Krupp 'Protze' Kfz 81 towing a 37mm Pak 35/36 in Liege, which the Germans captured on 16 May 1940. In 1940, the Pak 35/36, the only towed anti-tank gun available to the German Army, was already outdated and fairly ineffective against most enemy tanks.

Kradschützen Bataillone 6–8, 1940

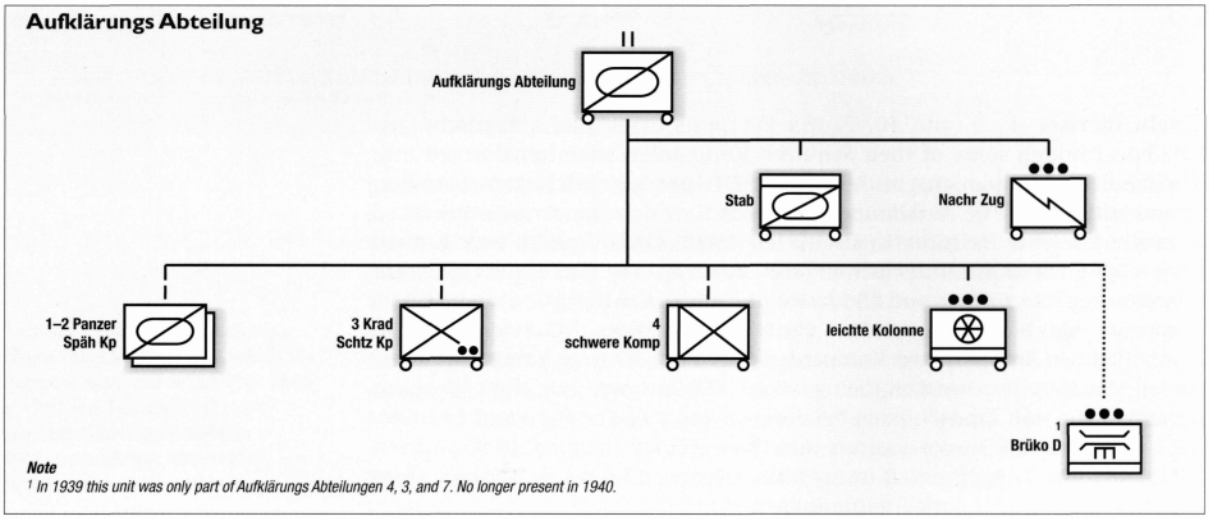


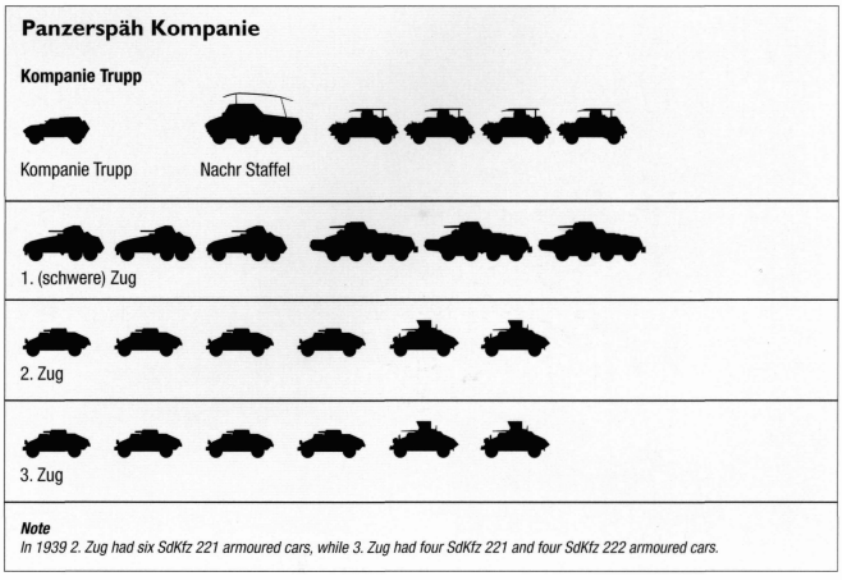
3 light mortars. 4., 5. and 10. Panzer Divisions never had a Kradschützen Bataillon (though some of their Schützen Kompanien were transformed into Kradschützen Kompanien), and 9. Panzer Division's Kradschützen Bataillon 59 was still part of the Aufklärungs Regiment 9, which the division inherited from the 4. leichte Division. Kradschützen Bataillone 6, 7 and 8 were formed from leichte Division's units as well, and, as such, they had a quite different organization: the former and the latter had three Kradschützen and an MG Kompanie, plus a Pak Zug, while 7. Panzer Division's Kradschützen Bataillon 7 only had two Kradschützen Kompanien plus a full schwere Kompanie. Their overall strength was weaker (being about 800 strong), but their weapons allocation was not: Kradschützen Bataillone 6 and 8 had 55 light and 14 heavy MGs, 9 light and 6 heavy mortars and three 37mm AT guns; Kradschützen Bataillon 7 had 37 light and 8 heavy MGs, 6 light and 6 heavy mortars, three 37mm AT guns and 2 light Infanterie Geschütz.

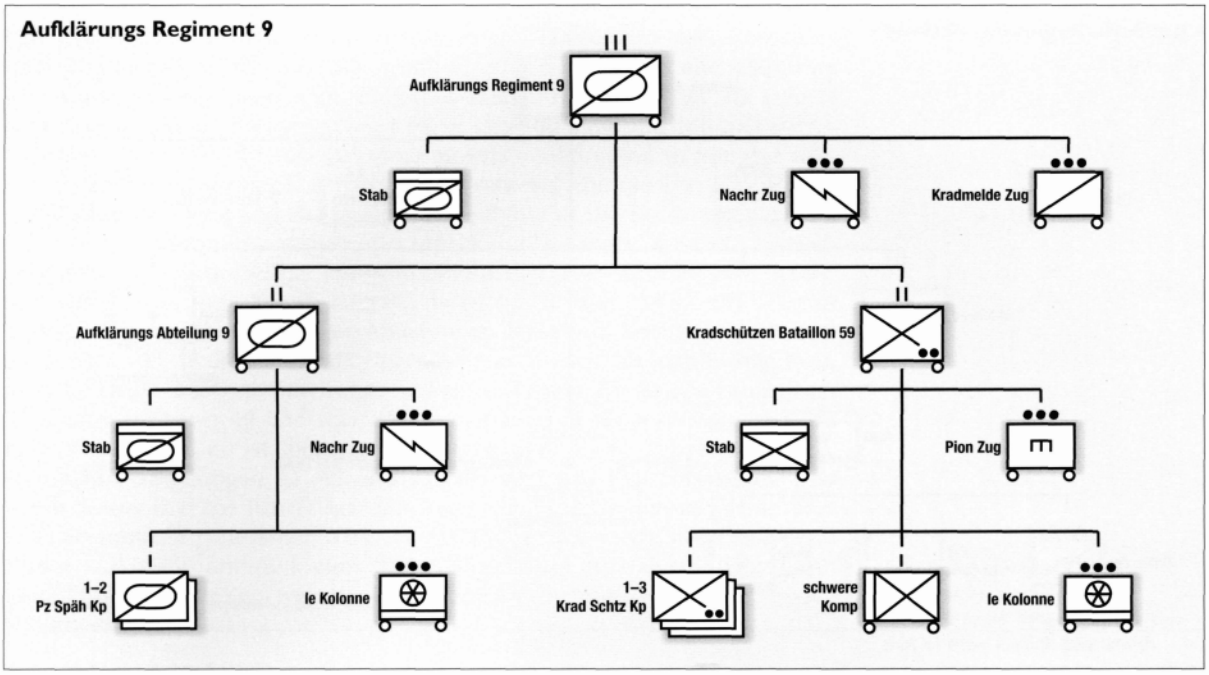
A motorcycle column crosses a river at night on an engineer-built bridge during the 1940 campaign in North-West Europe. Bridging equipment was particularly important given both the number of rivers the Panzer Divisions had to cross and the limited number of bridges that could be built.

Reconnaissance

The 'eyes' of the Panzer Division were provided by the Aufklärungs Abteilung, or reconnaissance unit. Its organization remained unchanged between 1939 and 1940 and every division had one – including 9. Panzer Division, which in May 1940 still had its Aufklärungs Abteilung 9 merged with Kradschützen Bataillon 59 forming the Aufklärungs Regiment 9. Each Aufklärungs Abteilung was made up of two Panzer Späh (armoured car) Kompanien, one Kradschützen and a schwere Waffen Kompanie (the term Kompanie was only introduced on 11 March 1940; before, the cavalry term Schwadron was used instead). In 1939 Auklärungs Abteilungen 3, 4 and 7 also had a Brücken Kolonne D, which was not retained in 1940. The Aufklärungs Abteilung's overall strength lay at 753 (26 officers, 4 Beamte, 116 NCOs and 607 other ranks) and its weapons inventory comprised 427 rifles, 16 light and 2 heavy MGs, 3 light mortars, three 37mm AT guns and two light Infanterie Geschütz. Each Panzer Späh Kompanie also had six mixed radio and staff armoured cars, eight four-wheeled MG-armed SdKfz 221 armoured cars, four four-wheeled gun-armed SdKfz 222,





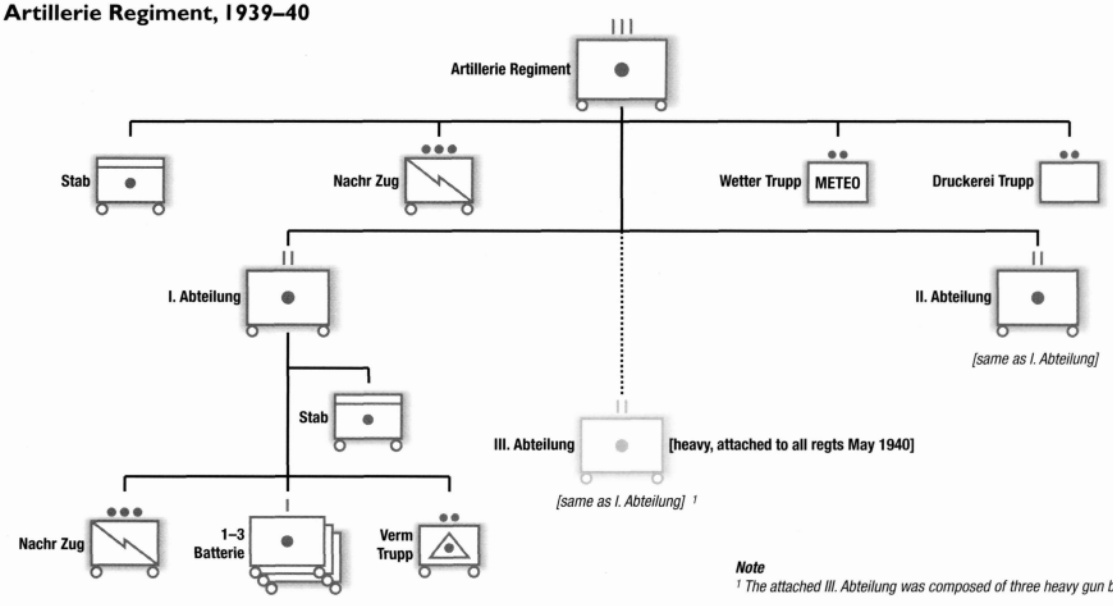


three six-wheeled SdKfz 231, and three heavy eight-wheeled SdKfz 232 armoured cars. All in all, each Aufklärungs Abteilung was equipped with 60 armoured cars, 119 motorcycles, 34 staff cars and 68 lorries.

Divisional artillery

In 1939 artillery was, like infantry, one of the weaker components of the Panzer Division; every division (with the exception of 2. Panzer Division) had a two-battalion artillery regiment composed of the HQ plus communications, meteorological and printing detachments. Every battalion had its own staff and a calibration detachment, as well as three four-gun batteries, giving a total of 24 guns per regiment. Only 2. Panzer Division, whose II. Abteilung had been replaced by the I. Abteilung of Artillerie Regiment 110, counted on heavy artillery, since the latter was equipped with two batteries each with four 105mm Kanone 18 (heavy field guns) and a battery with four 150mm schwere Feldhaubitze 18 (heavy howitzers). All the other artillery battalions were equipped with the 105mm leichte Feldhaubitze 18, which fired a 14.8kg projectile up to 10,600m. Each regiment was 1,203 strong (1,210 with 2. Panzer Division's Artillerie Regiment 74), including 44 officers, 4 Beamte, 116 NCOs and 607 other ranks armed with 993 rifles and 12 light MGs. The lack of firepower, due to the insufficient allocation of heavy artillery, was eventually recognized by the Germans, and soon after the Polish campaign heavy artillery battalions began to be attached to the Artillerie Regiment of their Panzer Division. Once more, a lack of suitable vehicles – each battery required five half-tracked prime movers (either SdKfz 7 or 6/1), while the 105mm Kanone 18 battery required nine SdKfz 7 prime movers – was the biggest hurdle to the expansion of mechanized artillery. In 1939 each two-battalion Artillerie Regiment had an established allowance of 110 motorcycles, 104 staff cars and 143 lorries and half-tracks plus 24 trailers. In May 1940 practically every Panzer Division had a third artillery battalion attached, though these became part of their permanent establishment only late in 1940 (sometimes even in early 1941). Their composition varied, though most often these III. Abteilungen were made up of three batteries each with four 150mm schwere Feldhaubitze 18, or two batteries each with four sFH 18 plus a battery with four 105mm Kanone 18.

Artillerie Regiment, 1939–40



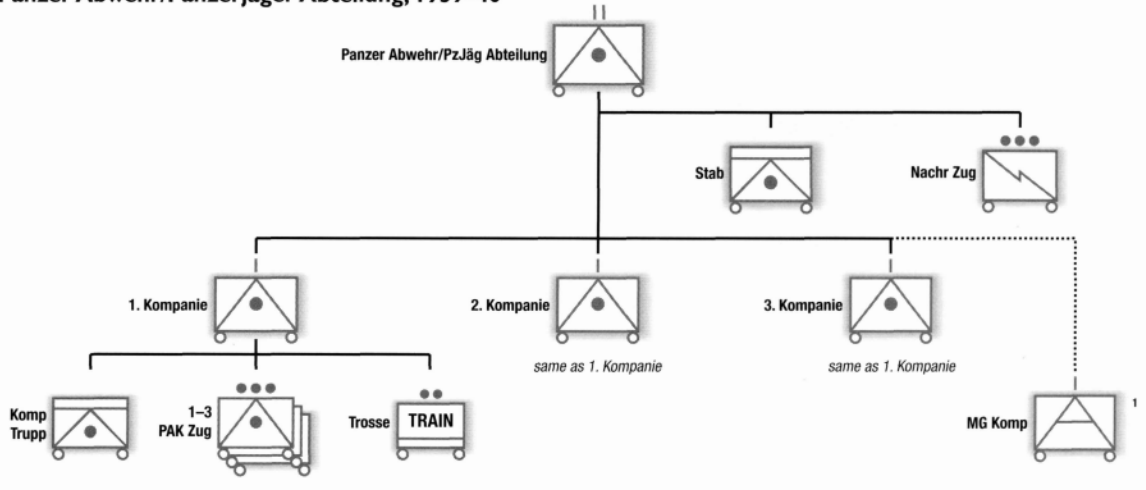
Note
[1] The attached III. Abteilung was composed of three heavy gun batteries.

Anti-tank units

The anti-tank component of the Panzer Division was provided by the Panzer Abwehr (tank defence) Abteilung, renamed on 16 March 1940 as the Panzerjäger (tank hunter) Abteilung. In 1939 its established strength lay at 519 (18 officers, 3 Beamte, 103 NCOs and 395 other ranks), while its weapons allocation included 315 rifles, 2 MPs, 18 light MGs and 36 towed (motorisiert Zugkraftwagen, mot Z) 37mm PAK 35/36 anti-tank guns. Its vehicle inventory included 63 motorcycles, 29 staff cars and 68 lorries, prime movers included (the usual prime mover used to tow the PAK 35/36 was a light six-wheeled lorry, such as the Krupp 'Protze').

In September 1939 Panzer Abwehr Abteilung 79 of 4. Panzer Division was still without one of its three PAK companies, while 5. Panzer Division's Panzer

Panzer Abwehr/Panzerjäger Abteilung, 1939–40



Note
[1] In September 1939 only present in Panzer Abwehr Abteilungen 37, 39, and 79.

Abwehr Abteilung 53 was still missing its Stab. However, 1., 3. and 4. Panzer Divisions' Panzer Abwehr Abteilung each had a Fla schwere MG Kompanie (mot Z) attached, which was 189 strong (6 officers, 29 NCOs and 156 other ranks) and was equipped with 12 towed 20mm Flak 30 or 38. Its vehicle allowance included 15 motorcycles, 14 staff cars and 23 lorries and half-tracks, the latter – light 1-ton SdKfz 10 prime movers – being used to tow the anti-aircraft guns. The shortage of half-tracked vehicles, the need to concentrate anti-aircraft defences, and the overall unsuitability of the Fla Kompanie soon led to the abandonment of their attachment to the Panzer Divisions; instead, they were attached to the Luftwaffe motorized Flak Abteilungen, which provided more robust anti-aircraft defence. In May 1940 the overall organization of the Panzerjäger Abteilungen remained unchanged, though some were still incomplete, partly because one of their companies had been used to create another Abteilung. 3. and 4. Panzer Division's Panzerjäger Abteilungen 39 and 49 had their third companies at reduced strength with only 9 PAK and no supporting LMGs, while 6. to 8. Panzer Divisions' Panzerjäger Abteilungen 41, 42 and 43 only had two PAK companies. It is worth noting that the Panzerjäger Abteilung's main shortcoming was not due to its organization, but rather to its lack of suitable equipment, since the twelve 37mm PAK 35/36 anti-tank guns that equipped the average company (with four of them in each Zug) were hardly a match for the heavily armoured French and British tanks.

Pionier units

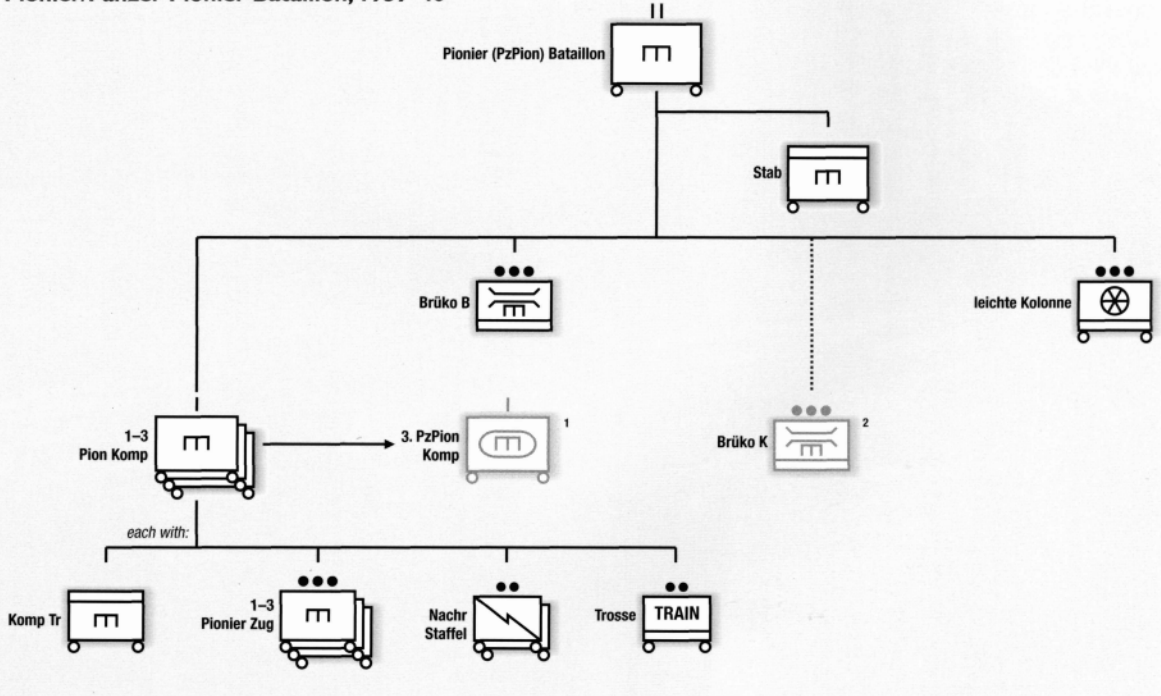
The divisional Pionier (from 15 April 1940, Panzer Pionier) Bataillon was much more than just an engineer unit, since it included both sappers and assault engineers. In September 1939, 1. to 3. Panzer Divisions' Pionier Bataillone 37,

Two PzKpfw III Ausf E/F being refuelled. Not only were the German tanks' ranges greater than that of their French and British counterparts, but the use of barrels and canisters (later to be known as 'Jerrycans') greatly eased and speeded refuelling operations in the field.

38 and 39 were at full strength, with their three motorized Pionier Kompanien and their Brücken Kolonne K ('bridging column K' – the K being a small girder bridge with a maximum load of 16 tons and a maximum length of 76m). The unit's established strength was 820 (22 officers, 2 Beamte, 83 NCOs and 713 other ranks), its weapons included 678 rifles and 27 light MGs, and its vehicle allowance comprised 78 motorcycles, 43 staff cars, and 117 lorries. 4. Panzer Division had only a single Pionier Kompanie and a Brüko B, a more versatile pontoon and trestle bridge that could be used to cover spans of up to 50m at loads of up to 16 tons (reduced to eight tons for the 80m-wide bridge and to four tons for the 130m-wide one). 5. Panzer Division's Pionier Bataillon 89 was only short one Pionier Kompanie and had a Brüko K.

A shortage of bridging equipment, which led to the widespread use of captured Czech models, as well as a lack of trained engineers (which led to infantry units being trained to build bridges), severely hampered the development of Pionier units. Nevertheless, by May 1940 all the Panzer Divisions' Panzer Pionier Bataillon had their usual three companies, one of which was now fully armoured and equipped with six MTW SdKfz 251/5 (a modified version of the SdKfz 251 which carried only eight men instead of ten, the extra space being used to carry engineer equipment), five PzKpfw I 'Ladungsleger' (demolition charge layers) modified to carry demolition charges, and four 'Brückenleger' (bridge layers), which comprised PzKpfw II or IV tanks with their turrets removed and their hulls equipped as bridge layers. All the Panzer Pionier Bataillone also had a Brüko B column, save for 2. Panzer Division's Panzer Pionier Bataillon 38, which had one Brüko K, though both 5. and 10. Panzer Divisions' Panzer Pionier Bataillone 49 and 89 had two. Furthermore, two Brüko K equipment units had also been attached to the Panzer Pionier Bataillon of 1., 3., 6. and 7. Panzer Divisions.

Pionier/Panzer Pionier Bataillon, 1939–40



Notes

[1] In May 1940 the third Kompanie was armoured.

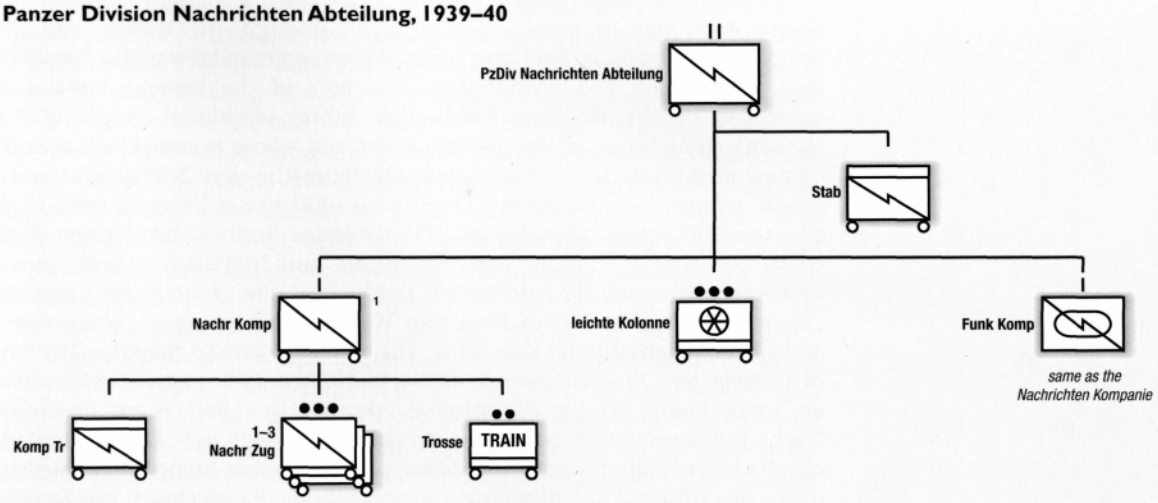
[2] In September 1939 Brüko K was only present with Pioner Bataillone 37, 38, 39, and 89 (there was no Brüko B at that time). In May 1940 Brüko K was only present in Panzer Pionier Bataillon 38 (which had no Brüko B); the Brüko B columns were with Panzer Pionier Bataillone 49 and 89. The Brüko B columns in Panzer Pionier Bataillone 37, 39, 57 and 58 also had two Brüko K units.

Support units

Of foremost importance amongst the non-combat, divisional support units was the Panzer Division Nachrichten Abteilung, the divisional radio and communication unit. This was made up of a Nachrichten Kompanie, composed in 1939 of a telecommunications and three radio platoons (in 1940 there were only three mixed platoons), and a Panzer Funk (armoured signal) Kompanie, also of three platoons. In 1939 the Nachrichten Kompanie was mainly equipped with communications cars and vans (Kfz 2, 15, 17, and 77) carrying either radio or cable communications equipment. In 1940 its vehicle inventory also included seven PzBefh III (SdKfz 267 and 268, the difference between the two variants lying in the different radio equipment carried aboard) and three radio armoured cars (SdKfz 260, 261 and 263, though, given their scarce availability, Kfz 17 radio vans could replace the latter while PzBefh I or radio vans certainly replaced the former, whose presence was even less common). In 1939 the Panzer Funk Kompanie was equipped on paper with two PzBefh III (SdKfz 266 and 268) and four radio armoured cars (SdKfz 260, 261 or 263). In 1940 only the former had increased its overall allowance, again mainly on paper, since its established strength was now of seven PzBefh III (SdKfz 267 and 268). Total strength for the Nachrichten Abteilung in 1939 lay at 422 (13 officers, 3 Beamte, 83 NCOs and 323 other ranks); its weapons included 326 rifles, 27 MPs and 15 light MGs (vehicle-mounted ones included) and its vehicle allowance was 7 command tanks, 20 armoured cars, 27 motorcycles, 40 staff cars and 35 lorries. Flexibility was a basic prerequisite for the Nachrichten Abteilung. As a general rule the first platoon of its Panzer Funk Kompanie was attached to the divisional headquarters (Stab). Its second platoon – along with one radio section from the Nachrichten Kompanie – was attached to the Stab of the Schützen Brigade (or, if unavailable, to the Stab of the Schützen Regiment), while its third platoon (along with two telephone sections from the Nachrichten Kompanie) was attached to the Stab of the Panzer Brigade, or just to the Stab of the Panzer Regiment.

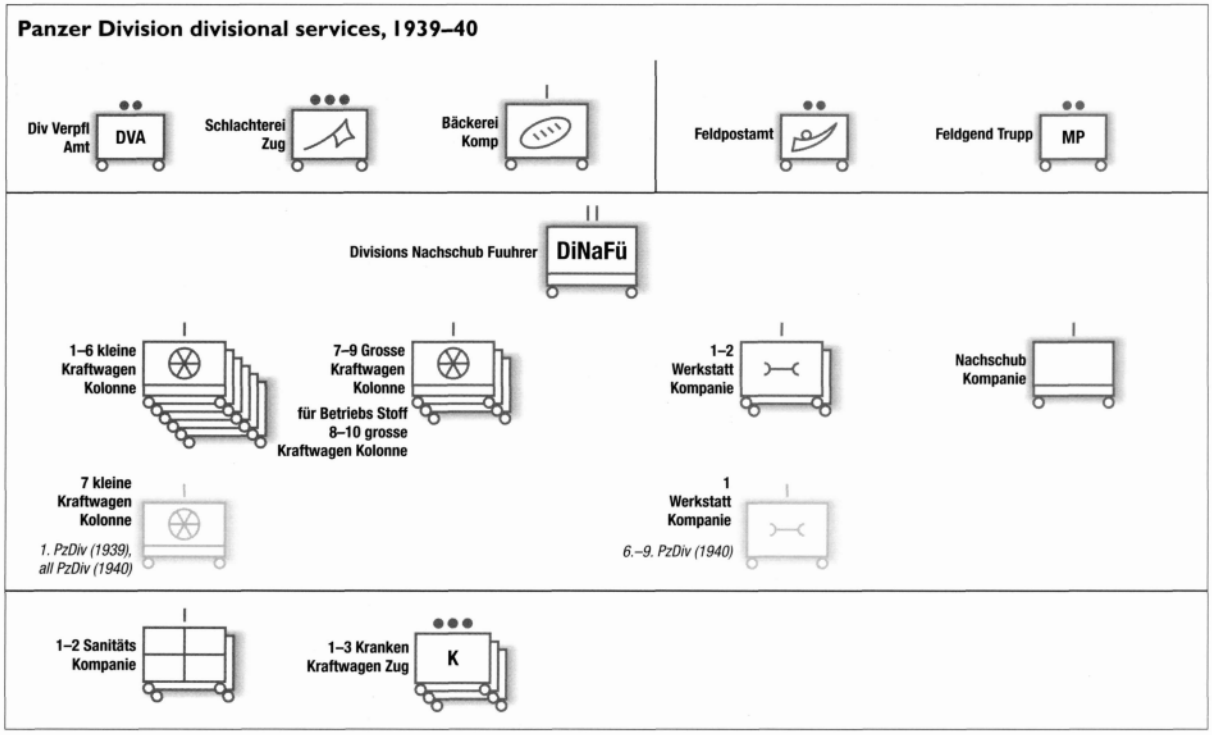
A final mention must go to the divisional services proper, which were the units tasked with caring for, maintaining and supplying all the other divisional units. All in all, their strength amounted to some 13–15 per cent of the entire divisional strength and it must be stressed that, without them, no Panzer Division could move, let along fight. In 1939 the established strength of all the support units lay at 1,602 (42 officers, 50 Beamte, 213 NCOs and 1,297 other

Panzer Division Nachrichten Abteilung, 1939–40



Note

[1] In 1939 the Nachrichten Kompanie also had a telecommunications platoon.



ranks), but the actual strength could be even higher. In August 1939 the total strength of 4. Panzer Division's support units was 1,630, which is almost 16 per cent of the total divisional strength. In May 1940 this dropped to 1,601, which is about 11.5 per cent of the total.

The vehicle allocation for the support units was also impressive: it included 97 motorcycles, 49 staff cars and 323 lorries. Directly subordinate to the divisional administration officer were the Divisions Verpflegungs Amt (rations administration detachment, with a strength of about 22), the Schlachterei Zug (butchery platoon, with a strength of about 44) and the Bäckerei Kompanie (bakery company, with a strength of about 142); their total strength was about 200. Directly subordinated to the Divisions Stab were both the Feldgendarmerie Trupp (military police squad, with a strength of about 68), whose duty was to keep law and order amongst the troops, and the Feldpostamt (divisional field post office) whose commander was also divisional field post master (Feldpostmeister). The bulk of the support units were controlled by the Divisions Nachschub Führer (divisional supply officer, DiNaFü), himself part of the divisional staff and whose personal staff actually commanded the divisional Nachschub Abteilung (the word Nachschubdienst – supply service – was preferred). The various units under his command, all in all some 900 strong, included in 1939 six kleine Kraftwagenkolonnen (light transport columns each carrying a 30 ton payload), three grosse Kraftwagenkolonnen für Betriebsstoff (heavy transport columns for fuel, each carrying 25 cubic metres of fuel), two Werkstatt (maintenance) Kompanien, and a Nachschub (supply) Kompanie. The total payload was therefore 180 tons of supplies and 75 cubic metres of fuel. In 1939, only 1. Panzer Division had an extra kleine Kraftwagenkolonne, though by 1940 every divisional Nachschubdienst had acquired one (by then, 6. through to 9. Panzer Divisions also had three rather than the customary two Werkstatt Kompanien). Medical units, subordinated to a divisional surgeon officer (IVb), included two Sanitäts Kompanien (medical companies, each about 227 strong) and three Krankenkraftwagen (ambulance) Zug, for a total strength of about 500.

Tactics

A PzKpfw I Ausf A in Poland, September 1939. Woods were a common obstacle during the campaign; according to German doctrine, Panzer units could by-pass them, leaving the infantry to mop them up.

Given that the creation of the Panzer Divisions was the final step in the development of the German Army's doctrine, it is not surprising that their tactics followed this accordingly. According to German doctrine, attack was the most important aspect of combat and the Panzer Division had been purposefully created to execute this as the 'army spearheads'. Tank units held a prominent place within the Panzer Divisions since they were considered the decisive weapon, even in an 'all-arms' armoured formation. The Panzer Brigade thus had to be kept intact so that it could always be available to deliver the decisive blow against enemy forces.

The concepts of the concentration of forces, the selection of a decisive point (*Schwerpunkt*) at which to attack, and the use of speed and manoeuvre were adapted to fit the Panzer Divisions' tactics, which developed into the first real blitzkrieg tactics. The first move toward the attack was the approach to the enemy's defensive lines; speed was, in this case, of the essence since the Panzer Divisions had to take the enemy by surprise. However, the Panzer Divisions were mostly restricted to using the available roads, which thus defined the advance routes. The careful and detailed planning of such routes, along with extensive training and practice, were the basic prerequisites for a rapid advance, both by day and night. Also essential were march and traffic discipline, particularly important when more than a single division was using the same routes in restrictive terrain.

Though the principle worked well enough, particularly with Guderian's XIX. Armeekorps in the Ardennes, German commanders soon discovered this was a double-edged sword. During the Polish campaign, the XVI. Armeekorps' command aptly remarked that the Panzer Divisions, being excessively tied to the road network, were prevented from deploying in full on the battlefield, thus denying themselves the advantage of numerical superiority even against weak enemy forces. The extensive road network available in North-West Europe managed to make up for this shortcoming at the time, though the problem remained unresolved.

Schützen of 4. Panzer Division, under cover of a PzKpfw II, attack Polish-held positions in Warsaw's western suburbs, 10 September 1939. Early German tanks were not fit for urban warfare, lacking both armour and firepower. Consequently, heavy losses were suffered.

A PzKpfw II of 1. Zug of a leichte Panzer Kompanie – as revealed by the number '111' carried on the rhomboid plate on the hull – leads the way for a PzKpfw I Ausf B. The large 'dot' on the back of the turret is probably a sign used to mark a distinction between different Panzer Abteilungen.

German tanks on a march through a Belgian forest in May 1940; the tank in the foreground is a PzKpfw II Ausf A, followed by a PzKpfw I Ausf B, and by other wheeled vehicles. This is probably part of a Panzer Regiment HQ, as suggested by the symbol to the left of the driver's port of the PzKpfw II, a white rhomboid with an 'R'.

A Kfz 15 German staff car passes by two abandoned French Hotchkiss H 39 tanks. Although the date and place are unknown, the photo suggests what the battlefield at Hannut may have looked like after the German victory against the French 3rd Division Légère Mécanique, which was equipped with about 150 Hotchkiss H 35 tanks.

A German column advances into North-West Europe in May 1940, as a group of Stuka dive-bombers flies over on the way to their target – a common sight during the early war years. It is not possible to identify which unit used the symbols shown here, namely the circle close to the letter 'K' and the sword seen on the lorry in the lower centre. Since the lorry to the left has a Luftwaffe licence plate, it may have been a Flak unit attached to the Gruppe von Kleist.

According to the official caption, this photo was taken in 'burning Peronne', which 1. Panzer Division seized on 19 May 1940 and eventually left two days later without waiting for 10. Panzer Division to relieve the position – a move that caused a certain amount of resentment between the two. The tank in the foreground is a PzKpfw III Ausf E/F.

Movement

Even during the approach march, the leading elements of a Panzer Division were the Panzer units. Moving in echelons, the Panzer Brigade would lead the way with a single Panzer Abteilung followed by the second Abteilung from the same Panzer Regiment. If two roads were available, the two regiments would move line abreast, each one with a single Abteilung forward. These units usually formed the *Vorausabteilung* (advanced detachment) of a Panzer Division, ready to attack any target of opportunity. The rest of the division followed in echelons too; first came the Schützen Brigade, which might include the Pionier Bataillon and which formed, along with the Panzer Brigade, the bulk of the division. Then came all the other divisional units – sometimes on different routes – which made up the long tail of divisional service and supply units.

The divisional Aufklärungs Abteilungen could be deployed either on the right or on the left side of the main axis of advance, to reconnoitre the flanks for enemy units and/or alternative routes. Aerial reconnaissance and intelligence supplied information on the location of enemy forces. As the Panzer Division neared the enemy, it would deploy and prepare to attack. Here, too, the terrain affected the choice of the 'decisive point'. In spite of pre-war optimism amongst the German commanders, who were convinced that their Panzers would stumble across few obstacles and be able to push their own way forward, in reality the Panzer Divisions faced major hurdles that impeded their advance, not least physical barriers such as major rivers. If a crossing was a planned one, as at Sedan, the Panzer Divisions would move the tank units to the rear. Spontaneous crossings required the divisions to search for the best crossing site, which also forced them to take the enemy's deployment into account. The most pressing issue was to employ bridging material, the only way a Panzer Brigade could cross a river. Other obstacles came in the form of built-up areas, where the enemy could deploy anti-tank weapons at close range. In Poland such obstacles were mainly found in the larger cities like Warsaw, but in North-Western Europe even small villages turned into major hurdles. A solution was found by sending two Panzer Abteilungen or regiments around the sides of each village, allowing the follow-up Schützen units to by-pass the danger. In June 1940, however, during the final phase of the war against France, the French tactic of turning villages into strongholds severly delayed the advance of the Panzer Divisions, as the Schützen became embroiled in clearing them out.

A PzKpfw III Ausf E/F in a train station square (location unknown) on the River Aisne (according to the original caption), probably in early June 1940. The white portion on the turret side is probably either a turret number or unit insignia that has been censored to avoid identification.

Attacking

The attack proper was carried out on a limited front. Each Panzer Division, moving in waves, was allotted a sector roughly half the size of an infantry division, that is, no more than 800–1,000m. As a general rule the Panzer Brigade would lead the 'waves', closely followed by the Schützen Brigade, though there were notable exceptions, such as when crossing major rivers. There were also cases when the Panzer units attacked together with the Schützen, or were even withheld to await for the 'decisive blow'. Combined-arms cooperation, though deemed indispensable, was all but absent. While the infantry, artillery and engineers offered support to the Panzer units, they were not yet closely integrated with them. At a tactical level, the tank ruled the battlefield; the Panzer Brigade was considered the lowest echelon unit to be employed, as smaller units could fall prey to enemy anti-tank defences. If these gained the

Congestion in the Ardennes. In addition to the mixture of vehicles shown belonging to several different units, other points of interest are the road conditions during the opening stages of the German offensive, and the two columns belonging to the SS-Totenkopf Division (far right, note the 'death's head' insignia) and the 'Regiment General Göring', as indicated by the insignia on the lorry in the centre (in May 1940 its I./Flak Regiment was attached to 4. Panzer Division).

'Over the Schelde and the Rhine' reads the original caption to this photo, although the two rivers are not close to each other. It probably shows a Panzer column (with a PzKpfw III Ausf E/F in the foreground) from 4. Panzer Division crossing the Albert Canal – linking the Schelde and the Meuse – on 11 May 1940.

BELOW A 88mm heavy Flak 18 or 36/37 towed by a SdKfz 10 Krauss-Maffei KM 10 half-tracked prime mover. Although the 88mm gun was largely used in a dual-purpose role (anti-aircraft and anti-tank) from May 1940, only Luftwaffe heavy Flak units were equipped with them. German Army anti-aircraft units (Fla) were only equipped with light 20 or 37mm guns until 1943.

The tank that sank a ship. On 25 May 1940 two PzKpfw IV of 4. Kompanie, I./Panzer Regiment 3 of 2. Panzer Division attacked a destroyer that was entering the harbour of Boulogne to land troops. After more than 10 minutes firing, the two tanks – led by Oberleutnant von Jaworski, the company commander, and Feldwebel Langhammer (shown in the picture) – damaged the destroyer to the point that it sank a few hours later at the harbour's entrance.

upper hand, the Panzer advance might be halted. Moreover, the Germans relied heavily on the morale effects of their tanks: the simple statement 'the Panzers are coming' was considered enough to bring about a collapse in the enemy forces.

The plan of attack of a Panzer Division was quite simple. Tank units would break through the enemy's defences and start the penetration in depth behind the enemy's lines, while infantry would take control of the captured terrain, with the help of anti-tank weapons and artillery support, ready to face any possible counter-attack. As soon as the enemy began his collapse, the whole Panzer Division would begin to move to its final objective. Speed and manoeuvre were once again essential, even at this stage.

A seemingly endless column of British and French prisoners of war marches into captivity, while a Panzer column made of three PzKpfw 35 (t) passes by on its way to the front. According to the original caption the photo was taken at Bailleul, indicating it was probably taken on 28 May and shows tanks belonging to Rommel's 7. Panzer Division.

Weapons and equipment

Tanks

Contrary to the popular opinion that the Panzerwaffe was superior to its enemies during the blitzkrieg years both in the number and quality of its tanks, the reality saw a marked inferiority in both fields. In the wake of the Versailles peace treaty of 1919, Germany had been forbidden to build tanks, and was thus something of a latecomer in the field. Until 1935, when Hitler started German rearmament, tank formations existed only on paper. Wooden cutouts mounted on cars (known as Panzer Attrappe, or 'dummy tanks') were used for training. The first tanks to be produced, the light PzKpfw I and II, were only a stopgap measure until newer and better models were available. The development of tanks in Germany was plagued by many problems, though. The first real combat tanks – the PzKpfw III and IV – were commissioned in 1935, but were only produced in limited numbers from 1937 and were scarce in September 1939. German tanks also conformed heavily to the demands of doctrine, and consequently had light armour and light weapons. Six factors must be taken into account when considering the efficiency of a tank: armament, speed and movement, armour, range, shape and ammunition. A heavy tank will favour armour, armament and ammunition while making sacrifices in areas such as speed and movement, range and shape. Since German doctrine stressed the need for both speed and manoeuvre, speed and movement, range and ammunition were prioritized. German tanks had to be able to outmanoeuvre the enemy, and specifically had to be able to conduct river crossings. Thus, taking into account that both the PzKpfw III and IV were shaped according to modern requirements (both had larger turrets that could accommodate three crew members and a main gun), as a consequence they had both light armour and weapons when compared to some of their French and British counterparts. This proved to be a serious shortcoming when facing the Soviet T-34 tank, but in 1939/40 superior German doctrine and tactics made up for this.

German light Panzers during a winter exercise somewhere in Germany in 1939/40. Barely visible on the left side of the hull of the PzKpfw II Ausf B in the foreground is what looks like a variation to 4. Panzer Division's insignia: an upside down 'Y' with three dots, all painted yellow (bars should have been used). In the background is a PzKpfw I Ausf B.

First commissioned in late 1933 under the disguise of being an agricultural tractor, the **PzKpfw I** was a light tank weighing between 5.4 and 5.8 tons with a crew of two and armed with two 7.92 MG13 in the turret. With a speed of 37–40 km/h and a range of 145–170km, it conformed to the basic requirements of German doctrine, though its 13mm-thick armour made it extremely vulnerable. All in all 1,856 PzKpfw I were produced between 1934 and 1938 (818 Ausführung A, 675 Ausf B), though 179 of them were turretless (used for training, and tank recovery and maintenance units) and another 184 were Panzer Befehlswagen. Already outdated by September 1939, several conversions were carried out on existing examples: by September 1939, 51 had been converted into ammunition carriers, and from early 1940 a further 38 were converted into self-propelled guns (150mm Sturm Infanterie Geschütz 33), about 170 into SP anti-tank guns (47mm Czech Pak) and a further 100 into Ladungsleger (demolition charge layers).

The **PzKpfw II** (with its crew of three, 7.6–10-ton weight, and 20mm KwK 30 L/55 and 7.92mm MG 34

A PzKpfw III Ausf E/F experimenting with camouflage. The PzKpfw III was the Panzerwaffe's main battle tank until early 1943, when it was replaced by the PzKpfw IV. It was, however, poorly armed with its 37mm gun (the new 50mm gun was only introduced in 1941) and poorly armoured, which made it very vulnerable.

armament) was commissioned in 1934 as the first 'gun-armed tank'. Although still a light tank, its 20mm quick-firing gun enabled it to take on soft targets and lightly armoured vehicles, but not tanks. Once again, its impressive maximum speed (40–55 km/h) and range (200km) made up for its light armour (13–15mm) and modest weapons. Some 1,232 were produced between 1936 and August 1939, mostly Ausf c, A, B and C (1,089 of them); 100 were earlier production models (of which 25 were Ausf b, four of which were converted to Brückenleger – bridge layers – and used by 7. Panzer Division during the campaign in the West); and another 43 were Ausf D and E, which never saw combat and were converted later into flamethrowers.

Only about 160 **PzKpfw III** (plus about 30 PzBefh – though some sources give a grand total of 201) were produced between 1937 and August 1939. Sixty-five of them were older variants (Ausf A–D) which were withdrawn from frontline service after the campaign in Poland, while the rest (96 produced until October 1939) were Ausf E. With a weight of between 16 and 19.5 tons (the latter being that of the Ausf E), the PzKpfw III had a crew of five and was armed with a 37mm KwK L/46.5 gun and three 7.92mm MG 34 (two coaxial) machine guns. Its maximum speed was 40 km/h, and it had a range of 165km. Its armour was limited to a maximum of 15mm on the Ausf A to D, and was increased to 30mm only on the Ausf E.

The 'heavy' **PzKpfw IV** was built in far greater numbers until August 1939. Some 211 were produced, most of which were Ausf C (134 in total). It weighed between 18.4 (Ausf A) and 20 (Ausf C) tons, had a crew of five, and was armed with a short 75mm KwK 37 L/24 gun and two 7.92mm MG 13 or 34 machine guns. Its top speed was 40 km/h (31 km/h for the Ausf A) and it had a range of 200km (150km for the Ausf A). Its role was intended to be that of the support (or 'infantry') tank; however, its 30mm-thick armour (15mm on the Ausf A) made it unsuitable for this.

On 1 September 1939 the German tank inventory only included a grand total of 2,983 tanks out of the 3,459 produced to date (comprising 1,445 PzKpfw I; 1,224 PzKpfw II; 103 PzKpfw III; and 211 PzKpfw IV). The shortages were made good by using Czech tanks captured in 1939; these included 424 PzKpfw 35 (t) and 78 PzKpfw 38 (t), of which, respectively, 202 and 78 were available on 1 September. This brought the grand total to 3,263. The PzKpfw 35 (t) weighed 10.5 tons, had a crew of four, and was armed with one 37mm

Two PzKpfw IV, either Ausf B or C, belonging to 1. Panzer Division (whose insignia is just visible on the right side of the hull of the tank in the foreground), during what looks like a river crossing exercise held in the winter of 1939/40.

Table 3: Panzer Division tank strength, 1 September 1939

		PzKpfw I	PzKpfw II	PzKpfw III	PzKpfw IV	PzKpfw 35 (t)	PzKpfw 38 (t)	PzBefh
1. Pz. Div.	Pz. Rgt. 1	39	60	20	28			6
	Pz. Rgt. 2	54	62	6	28			6
2. Pz. Div.	Pz. Rgt. 3	62	78	3	8			9
	Pz. Rgt. 4	62	77	3	9			11
3. Pz. Div.	Pz. Rgt. 5	63	77	3	9			8
	Pz. Rgt. 6	59	79	3	9			8
4. Pz. Div.	Pz. Rgt. 35	99	64		6			8
	Pz. Rgt. 36	84	66		6			8
5. Pz. Div.	Pz. Rgt. 15	72	81	3	8			11
	Pz. Rgt. 31	80	63		6			11
Non-divisional units		299	420	46	81	112	55	52
Totals		973	1,127	87	198	112	55	138 [1]

Notes

[1] *Of which eight were PzBefh 35 (t) and two were PzBefh 38 (t).*

Source: Jentz, T. Panzertruppen.

KwK 34 L/40 gun plus two 7.92mm MG 37 (t) machine guns. Its top speed was 35 km/h, it had a range of 190km, and the maximum thickness of its armour was 25mm (at the front; the rear was 15mm thick). The superior PzKpfw 38 (t) weighed 9.4 tons, had a crew of four, and was armed with a 37mm KwK 38 (t) gun and two 7.92mm MGs. Its maximum speed was 42 km/h, with a range of 250km, although it shared the same armour as the PzKpfw 35 (t). Eight PzKpfw 35 (t) and two PzKpfw 38 (t) had been converted to PzBefh by September 1939. Only 2,690 tanks were actually with the German field army in September 1939, the rest being used for training and other purposes; of these only 1,625 were with the Panzer Divisions (comprising 674 PzKpfw I, 707 PzKpfw II, 41 PzKpfw III, 117 PzKpfw IV, and 86 PzBefh), while the rest were either with the leichte Divisions or in non-divisional units.

Thus, the Panzer Divisions only accounted for 60 per cent of the total number of tanks in the German Army, though a further 314 were used by the ad hoc Panzer Divisions such as Panzer Division 'Kempf' and 10. Panzer Division (comprising 118 PzKpfw I, 155 PzKpfw II, 6 PzKpfw III, 16 PzKpfw IV, and 19 PzBefh). Serious losses were incurred during the campaign in Poland: up to 10 October 1939 these amounted to 320 PzKpfw I (of which 89 were write-offs), 259 PzKpfw II (83 write-offs), 40 PzKpfw III (26 write-offs), 76 PzKpfw IV (19 write-offs), 77 PzKpfw 35 (t) (7 write-offs, according to certain sources only), 7 PzKpfw 38 (t) (all written off) and 13 PzBefh (5 write-offs). Looking at the write-offs alone, total losses amounted to between 229 and 236 tanks, 8.8 per cent of the grand total. Nine per cent of the PzKpfw I deployed were lost, 7 per cent of the PzKpfw II, almost 30 per cent of the PzKpfw III,

A PzKpfw 35 (t) leads the way for a PzKpfw II in a wooded area, probably during exercises held in Germany. The use of Czech tanks was of great help to the Panzerwaffe since it made up for the lack of medium tanks. The chassis of the PzKpfw 38 (t) was later used to build several self-propelled anti-tank vehicles.

9.6 per cent of the PzKpfw IV, six per cent of the PzKpfw 35 (t), 12.7 per cent of the PzKpfw 38 (t) and 3.6 per cent of the PzBefh. The higher percentages for the PzKpfw III and the PzKpfw 38 (t) suggests these were used in a prominent role, suffering accordingly.

Following the conclusion of the Polish campaign, the Panzer Divisions underwent a major reorganization, and tank production was increased. As already noted, some of the older PzKpfw I were converted to other roles, as were some PzKpfw II (flamethrowers), although 24 new examples of the Ausf A to C series were produced in the period up until April 1940. New production mostly focussed on the main battle tanks, namely the PzKpfw III and IV and the PzKpfw 38 (t) – although the PzKpfw III Ausf E was produced until October 1939, and the new (19.8-ton) Ausf F was produced from September 1939 until July 1940. Production of the PzKpfw III Ausf G, which retained the 37mm gun, began in April 1940, and only a few were issued to the Panzer Divisions before the offensive in the West. All in all, PzKpfw III production reached a monthly average of over 40 tanks, with a peak of 65 tanks produced in May 1940. From September 1939 to June 1940 a total of 473 PzKpfw III were produced (432 of which were produced up to May). During the same period some 169 (or 191, according to some sources) PzKpfw IV were produced, all of which were Ausf D, which had increased side armour (15–20mm) and the characteristic stepped front hull. Production of the PzKpfw 38 (t) Ausf A continued up to November

Table 4: Panzer Division tank strength, 10 May 1940

		PzKpfw I	PzKpfw II	PzKpfw III	PzKpfw IV	PzKpfw 35 (t)	PzKpfw 38 (t)	PzBefh
1. Pz. Div.	Pz. Rgt. 1	26	49	28	20			4
	Pz. Rgt. 2	26	49	30	20			4
2. Pz. Div.	Pz. Rgt. 3	22	55	29	16			8
	Pz. Rgt. 4	23	60	29	16			8
3. Pz. Div.	Pz. Rgt. 5							
	Pz. Rgt. 6	117	129	42	26			27
4. Pz. Div.	Pz. Rgt. 35	69	50	20	12			5
	Pz. Rgt. 36	66	55	20	12			5
5. Pz. Div.	Pz. Rgt. 15	51	61	24	16			15
	Pz. Rgt. 31	46	59	28	16			11
6. Pz. Div.	Pz. Rgt. 11							
	Pz.Abt. 65		60		31	118		14
7. Pz. Div.	Pz. Rgt. 25							
	Pz.Abt. 66	34	68		24		91	8
8. Pz. Div.	Pz. Rgt. 10							
	Pz.Abt. 67		58		23		116	15
9. Pz. Div.	Pz. Rgt. 33	30	54	41	16			12
10. Pz. Div.	Pz. Rgt. 7	22	58	29	16			9
	Pz. Rgt. 8	22	55	29	16			9
Totals		554	920	349	280	118	207	154[1]

Notes

[1] *Of which 14 were PzBefh 35 (t) and 23 were PzBefh 38 (t).*

Source: Jentz, T. Panzertruppen.

A PzKpfw III Ausf E/F of 1. Panzer Division crosses the River Aisne on an engineer bridge at Chateau Porcien on 6 June 1940, the day after the German final offensive against France had started. Above the turret number (the divisional insignia is to the left of it) is a triangle, probably used to distinguish between different Abteilungen.

1939 with a total of 72 tanks produced; production of the new Ausf B and C (featuring minor improvements) started in January 1940, and by June a total of 155 tanks had been produced. Between September 1939 and June 1940 a total of 37 Panzer Befehlswagen were produced. Other minor losses were incurred during the campaigns in Denmark and Norway, including at least eight PzKpfw I, two PzKpfw II, and one PzKpfw IV.

In May 1940, German tanks had at least improved their quality, compared to September 1939, if not their numbers. The total strength lay at 3,505 tanks, of which 1,276 were PzKpfw I; 1,113 were PzKpfw II; 429 were PzKpfw III; 296 were PzKpfw IV; and 391 were PzKpfw 35 and 38 (t). Once again, not all of these were deployed with frontline units, although all were employed in the Panzer Divisions. The sources for the figures diverge: according to Jentz (see Table 4) there were a total of 2,582 tanks, while Frieser and Hahn give a total of either 2,574 or 2,597 (523 PzKpfw I, 955 PzKpfw II, 349 PzKpfw III, 278 PzKpfw IV, 106 or 128 PzKpfw 35, 228 or 229 PzKpfw 38 and 135 PzBefh). The differences can be easily explained by the variety of sources available, and the different ways of calculating the number of vehicles actually operational. The records of 4. Panzer Division show some differences with Jentz's figures for 10 May: 152 PzKpfw I as opposed to 135, 111 PzKpfw II as opposed to 105, and 27 PzBefh as opposed to 10. However, the differences are not stark.

According to the files of the Oberkommando der Wehrmacht (German Supreme Command, OKW), in the period 10 to 20 May 1940 – during the breakout to the Channel – tank losses, (probably referring to write-offs only)

The Ardennes, May 1940: a column of Schützen from one of Gruppe Kleist's Panzer Divisions has dismounted from their vehicles (note the half-tracked Demag D 7 SdKfz 10) and is preparing to march toward the starting positions for an attack. The Schützen's weapons and equipment did not differ much from that of the ordinary, marching infantry.

A Kradschützen column waits for the order to move, on a rainy day. According to the official caption, the photo was taken after the unit had crossed the River Marne at Chateau Thiery, which would set the date as 10 June 1940 and the unit as part of XVI. Armeekorps. Tactical symbols on the mudguards are hard to make out, and cannot be identified with certainty, but the car in the background has a Panzer unit tactical symbol on its left mudguard.

were as follows: 41 PzKpfw I, 45 PzKpfw II, 26 PzKpfw III, 14 PzKpfw IV and one PzKpfw 35/38 (t) – a total of 127 tanks. Figures from 4. Panzer Division's records offer up some details. On 16 May the division had 137 PzKpfw I (68 operational), 106 PzKpfw II (53 operational), 36 PzKpfw III (18 operational), 19 PzKpfw IV (9 operational) and 27 PzBefh (13 operational). Total losses amounted to 15 PzKpfw I, 5 PzKpfw II, 4 PzKpfw III and 5 PzKpfw IV – a total of 29 tanks. Although these figures may appear high when compared to the OKW ones, one should take into account the fact that 4. Panzer Division was involved in some of the fiercest tank battles, in contrast to the others. However, other OKW figures give the following losses for the period 21 to 31 May (which includes the Arras counter-attack and the Dunkirk pocket fighting): 101 PzKpfw I, 150 PzKpfw II, 84 PzKpfw III, 63 PzKpfw IV, 87 PzKpfw 35/38 (t) – a total of 485 tanks. It is worth noting that on 25 May 7. Panzer Division only had 31 PzKpfw II, 50 PzKpfw 38 (t) and 5 PzKpfw IV operational. Figures for the period 1 to 10 June 1940 (the breakout on the Somme) are as follows: 28 PzKpfw I, 32 PzKpfw II, 16 PzKpfw III and 9 PzKpfw IV – a total of 85 tanks. The figures for the period 11 to 30 June 1940 (the final breakout in France) are: 12 PzKpfw I, 14 PzKpfw II, 9 PzKpfw III, 11 PzKpfw IV, 10 PzKpfw 35/38 (t) – a total of 56 tanks. Thus, according to these figures, during the campaign in the West the Panzerwaffe suffered the following losses: 182 PzKpfw I, 241 PzKpfw II, 135 PzKpfw III, 97 PzKpfw IV and 98 PzKpfw 35/38 (t) – a total of 753 tanks lost. Figures given by Hahn present some differences: 240 as opposed to 241 PzKpfw II lost, 45 PzKpfw 35 (t) and 54 PzKpfw 38 (t) lost, plus 69 PzBefh lost, thus bringing the grand total to 821 tanks (Jentz's figures only differ for the PzKpfw 35, giving a total of 62 lost). Taking into account the three different figures given above, during the May–June 1940 campaign in the West the Panzerwaffe lost something between 31.6 and 31.9 per cent of its tanks, clearly demonstrating it was not the 'cake walk' many believed.

A detailed breakdown of losses to tank types gives quite a different picture to that of the Polish campaign. According to various sources, PzKpfw I losses were between 32.8 and 34.8 per cent, PzKpfw II between 25 and 26 per cent, PzKpfw III at 38.7 per cent, PzKpfw IV between 34.6 and 34.9 per cent, PzKpfw 35 (t) between 35 and 42.4 per cent, PzKpfw 38 (t) between 23.7 and 26 per cent, and losses for the PzBefh were between 44.8 and an astonishing 51 per cent. In the West, the Germans were quite clearly facing an army that had a greater number of tanks and adequate anti-tank defences, though not always properly used. The Panzerwaffe's losses were more evenly distributed amongst the various types of tanks, although these were nonetheless prominent amongst the main battle tanks, such as the PzKpfw III and IV and the PzKpfw 35 (t), without taking into account losses suffered by the outdated PzKpfw I and those suffered by the PzBefh. This proved that German tank commanders really did lead their units from the front.

Facing the enemy

The French and British tanks were more than a match for the German ones, which eventually overcame their enemies only through superior tactics and doctrine and better organization. In May 1940 the French Army deployed about 3,200 tanks out of a grand total of some 4,300 available in the north-eastern part of the country – up to May 1940 France had produced 4,688 tanks. Not all of them were new models, though most of them – in contrast to the German tanks – were gun armed.

The best way to compare German and French tanks is through an analysis of their armament and armour. The German 20mm KwK 30 L/55 (equipping the PzKpfw II) could penetrate 20mm of 30° inclined armour at 100m, reducing to 14mm at 500m. The 37mm KwK L/46.5 could penetrate 35mm at 100m and 29mm at 500m (both the Czech KwK 35 (t) L/40 and 38 (t) L/47 had performed similarly). The PzKpfw IV's 75mm KwK 37 L/24, primarily designed for close support and with a low muzzle velocity, had an even inferior penetration capability, and to compound matters armour-piercing ammunition was scarce. Given that the average frontal armour thickness of French tanks was 30–40mm, German tanks could clearly only take them on at very close range, or by attacking them on their flanks. The actual range of engagement was also dictated by the quality of the gun arrangements and sights. French 37mm-gun-armed tanks had to fire at a very close range (100m or less) to achieve a critical hit against a PzKpfw III or IV, while the latter were able to achieve a decisive hit against French light tanks at distances of 300m and beyond. On the other hand, French 47mm-gun-armed tanks could hit their German opponents at ranges of over 800m, whereas the PzKpfw III and IV had to get much closer (400m or less) to do so.

According to a German report of late May 1940, the frontal armour of the Somua S 35 could only be penetrated by the German 47mm gun (equipping the Panzerjäger I) at 150m, while the 37mm gun could only penetrate its side armour at about 200m. If we consider that the French tanks were armed with

Table 5: French tanks during the 1940 campaign

Type	Production numbers	Weight (tons)	Armament	Armour thickness (mm)	Max speed (km/h)	Range (km)	Crew	Notes
Renault R 35	1,000–1,500	10.6	37mm L/21; 7.5mm MG	32–45 hull front and turret, 40 sides and rear	20	140	2	Equipped the 30+ independent tank battalions and the newly formed 4th Division Cuirassé.
Hotchkiss H 35/H 39	800–1,000	9.6 (H 35) 12 (H 39)	37mm L/21 or 33; 7.5mm MG	25–45	36	150	2	Equipped the independent tank battalions and a dozen independent tank companies, plus the four DLMs, and the cavalry and motorized infantry units.
Somua S 35	300–400	20	47mm L/34 gun; 7.5mm MG	35–56	37	250	3	Equipped the DLMs.
Char Renault B 1	c. 300	32	75mm L/17 (hull); 47mm L/34 (turret); 7.5mm MG	46–60	28	150	4	Equipped the Division Cuirassé, the independent tank companies, and the first two DLMs.
Renault D 2	100	20	47mm gun; 7.5mm MG	40	23	n/a	3	
FCM 36	100	12–20	37mm gun; 7.5mm MG	40	24	225	2	
Renault FT 17	300–500	6.5	37mm SA 18	22	7	65	2	Obsolete (but equivalent to PzKpfw I).

Speed is the key

On 13 May, while approaching Merdop, Pz.Rgt. 35 was attacked by French tanks firing from concealed positions some 800–1,000m away. Unable to return fire at this distance, Oberstleutnant Eberbach (the regiment commander) moved ahead followed by heavier PzKpfw IV tanks. Understanding that a direct approach would have been suicidal, Eberbach decided to outflank the French positions from the north via a 2km march. The French tankers soon began firing on the moving German armour, but the superior speed and manoeuvrability of the two Panzer Abteilungen completed the outflanking movement, and once under fire the French lost their nerve, either abandoning their tanks or being destroyed.

The previous day, a tank commander of II./Pz.Rgt. 35 had been able to destroy three French tanks (probably Hotchkiss H 35) by using his PzKpfw II's higher speed and better manoeuvrability, positioning himself behind the enemy tanks before his presence was detected. When he was spotted, the French were unable to follow and target his fast-moving PzKpfw II at 100m. His quick-firing 20mm KwK 30 did the rest; some hits pierced the rear armour of the enemy tanks, others stunned their crews, who abandoned their vehicles.

37mm (capable of piercing 40mm-thick armour at 100m) to 47mm guns (capable of piercing more than 60mm of armour at 100m) and that German tank armour was between 15 and 30mm thick, it is clear that had the two met on a more even tactical footing, the Germans would have struggled to come out on top. Yet, according to French sources, out of the total of some 4,000 French tanks engaged between 10 May and 25 June 1940 (3,400 of which were modern ones), no fewer than 1,749 (43.7 per cent) were lost. This is higher than the corresponding German figure. If we include the number of tanks abandoned by French crews, it brings the total losses to more than 2,000. Interestingly, most of them, 1,669 (95.4 per cent), were lost due to German guns and artillery pieces, while only a small number was lost to mines (45, or 2.6 per cent) or aircraft (35, or 2 per cent). Though it is impossible to say how many were actually destroyed by German tank guns, the Germans clearly came out on top in the battle against French armour on the field.

The reasons for this superiority lie in several areas. The Germans took advantage of the concentration of forces and better unit organization: in May 1940 there were seven Panzer Divisions concentrated along some 100km of front (nine in the whole north-west), and these were grouped together into three – four with XVI. Armeekorps – main thrusts. Although the French Army managed to deploy some 2,200 tanks in the north-west area during the first ten days of the campaign, these were dispersed among 11 different divisions and several independent tank battalions and, as a result, were employed piecemeal. The Panzer Divisions were also superior to the French armoured units in terms of average tank strength: the former had an average of 200 (minimum) to 300-plus tanks in each division, while the latter averaged 160 tanks in both the Division Cuirassé and the DLMs, with the notable exception of the 3rd DLM, which had 237 tanks – but which at Hannut faced two German Panzer Divisions with some 655 tanks, of which 132 were gun-armed PzKpfw III and IV. The tank battle at Flavion, where German tanks did not enjoy numerical (nor technical) superiority, suggests on the other hand that concentration of forces was not the only reason for the German successes.

German doctrine was oriented toward speed and movement, while French tanks – actually conceived as 'infantry tanks' – were mainly oriented toward firepower and armour. This led to quite different tactical approaches. All German tanks were equipped with wireless sets (the PzKpfw I only had a receiver) and intercoms, which improved communication between the commander, the driver and the wireless operator. Thanks to their multi-man

A heavy, eight-wheeled SdKfz 231 armoured car during winter training in 1939/40. This type of armoured car was commissioned in 1934 and production started in 1936. It equipped the 1. (schwere) Zug (heavy platoon) of the Panzerspäh Kompanie, the armoured car company of the divisional recce unit.

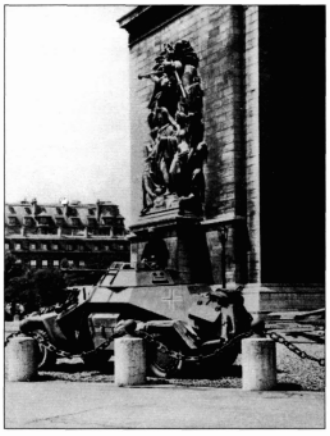
Fighting the 'Kolossus'
The French Char B 1 (nicknamed 'Kolossus' by the Germans) was one of the tanks the Germans feared most. The B 1's 60mm armour was almost invincible to every German tank gun; the light 37mm Pak 35/36 anti-tank gun (which, at best, could penetrate 34mm of 30° armour at 100m) was equally useless, earning the moniker of 'the door knocker'. At Stonne, south of Sedan, a French armoured counter-attack on 15–16 May posed the first real threat to the German breakout. On the 16th a single Char B 1 ('Eure', led by the commander of the 1st Company, 41st Tank Battalion) attacked a Panzer Kompanie of Panzer Regiment 8 moving into the town, and eventually destroying eleven PzKpfw III, two PzKpfw IV and two Pak with its 47 and 75mm guns. The French tank was hit 140 times, though none of these pierced its armour. At Abbeville another B 1 was hit more than 90 times, again without its armour being pierced. Although at Stonne the 37mm Pak 35/36 guns were eventually able to destroy three Char B 1 by firing at their radiators, in most cases these tanks could only be dealt with by direct fire from the 105mm field guns or, better, from 88mm Flak guns.

turrets, German tank commanders could also see more around the tank, enabling them to spot targets, provide directions to the driver, and pass on information both to other tanks via the wireless operator and to the gun crew. Even though the PzKpfw II only had a single-man turret, it still had the technological advantages of tracer shells and a magazine-fed 20mm KwK 30 gun with a rate of fire of 150 rounds per minute. French tank commanders, on the other hand, were greatly handicapped since they had to act as spotters, loaders and gunners as well as platoon or company commanders on occasion.

The German commanders found coordinating and concentrating the movement and action of their platoons and companies much easier than their French counterparts. Generally, the French company commanders communicated with other tanks using flags, while platoon commanders had often to dismount from their vehicles and walk to other tanks to issue their orders. Though it aimed for better coordination with the infantry, the French system proved cumbersome in tank versus tank engagements and difficult to put into practice in the confusion of the battlefield. The end result was that French tank formations moved slowly, whereas the German ones were fast and could react quickly.

British tanks and tactics seem to have been inferior even to the French ones, since in the two counter-attacks at Abbeville and Arras 28 per cent of the total amount of British tanks available were lost. At Abbeville the 1st Armoured Division lost 120 out of 165 tanks in just two hours, while at Arras 60 out of 88 tanks (68 per cent) were lost in a single afternoon, along with half of the accompanying infantry and some 20 out of the 60 French tanks involved. In particular, British tanks largely suffered from their thin armour and mechanical breakdowns, which caused more problems than battlefield losses (as at Calais and Boulogne).

Even though the Panzer Divisions owed a good deal of their success to their all-arms formation and their combined-arms tactics, in 1939/40 it was the tank that ruled the battlefield – just as German doctrine prescribed. The tank was the only weapon that could achieve a decisive breakthrough, as well as halt enemy



A four-wheeled, light armoured car SdKfz 222 in Paris, June 1940. Produced from 1936, this armoured car equipped the light platoons of the Panzerspäh Kompanien along with the 'sister' SdKfz 221 (armed only with a 7.92mm MG). Though at first sight the crewman appears to be wearing the black Panzer uniform, he is actually sporting a dark field-grey overcoat, commonly used by Panzertruppen too.

Six-wheeled SdKfz 231 armoured cars on parade in a training ground, probably in 1935. Based on the chassis of the Krupp 'Protze' L2H143 Kfz 81 2.6-ton light lorry, 123 examples were produced between 1932 and 1937 and were used to equip the heavy platoons of the Panzerspäh Kompanien. Due to its limited off-road mobility, it was withdrawn from frontline service after the French campaign.

British armour in France
On 10 May 1940 the British Expeditionary Force in North-West Europe had 308 tanks distributed in 9 battalions which were part of the 1st Armoured Brigade or supporting the infantry divisions. 208 of these were light Vickers Mk VI tanks, roughly comparable to the German PzKpfw I (12 tons, 56.3 km/h, 4–14mm armour, one 15mm and one 7.92mm gun), a further 77 were the heavier (but only machine-gun armed) A11 Infantry Mk I tank Matilda I (25 tons, 13 km/h, 10–60mm armour, one .50 or .303-cal. machine gun), while the remaining 23 were A12 Infantry tank Mk II Matilda II (60 tons, 24 km/h, 13–78mm armour, and one 2-pdr gun plus one 7.92mm machine gun) – the British equivalent of the Char B 1.A further 330 tanks were due to arrive in France with the 1st Armoured Division, which by 17 May had some 284 tanks in the Calais area; these were mostly (134) Vickers Mk VI and Matilda I (24), but also 31 A10 Cruiser Mark II (32.5 tons, 26 km/h, 6–30mm armour, one 2-pdr gun and two Besa machine guns), and 95 A13 Cruiser Mk III (32 tons, 48 km/h, 6–14mm armour, one 2-pdr gun and one .303-cal. machine gun). The fact that even limited counter-attacks (which turned out to be among the biggest ones attempted during the campaign) such as at Arras were more than enough to spread havoc amongst the Germans, clearly demonstrates the potential of British armour.

armoured formations. Although inter-arms cooperation still required much improvement, the tanks were nevertheless able to rely on the support of the Schützen during both attack and defence, such as when clearing and securing areas otherwise denied to tanks, including built-up areas and woods, and during river crossings. The Schützen in turn relied on the tanks to deal with enemy armour, especially given the lack of good anti-tank weapons (the Panzerbüchse PzB 38 and 39 were only effective at close range against lightly armoured vehicles) and of appropriate armoured personnel carriers to enable them to keep up with the tanks' pace of advance; in 1939/40 the concept of such carriers was still in its infancy.

Pionier and Panzerjäger troops

Ensuring cooperation between the tanks and other parts of the Panzer Divisions was no easy task, given the widespread lack of armoured personnel carriers. The Pioniers could only offer limited support to advancing Panzer units, and mostly occupied themselves with enemy fortifications and obstacles. Being equipped with the 'door knocker', the outdated 37mm Pak 35/36, Panzer Abwehr (later Panzerjäger) units were only effective against lightly armoured enemy vehicles and proved useless at Arras, even though the very same gun had managed to destroy three heavy Char B 1 at Stonne. The anti-tank support they could provide to non-armoured units of the Panzer Divisions was thus negligible.

Divisional artillery

The Panzer Divisions' artillery allocation was rather weak, even after the attachment of a third battalion before the offensive in North-West Europe. The most widely used artillery piece was the 105mm howitzer leichte Feldhaubitze 18, which had a good balance between shell weight and range (14.8kg at 10,600m). Other guns used by the attached artillery battalions included the heavy 150mm schwere Feldhaubitze 18, the 105mm Kanone 18 and the 150mm Kanone 18. All were pulled by half-tracked prime movers, which gave them mobility and speed of movement, though the long columns formed by this combination were too slow and cumbersome to keep up with the leading elements of the Panzer Division.

Reconnaissance

The divisional Aufklärungs Abteilung, the reconnaissance unit, was better balanced than its equivalents in the French and British Armies since it was composed of both armoured cars and motorcycle/motorized infantry, even though they only played a minor role both in the Polish and the North-West

An Opel 'Blitz' lorry from 9. Panzer Division crossing a Dutch river on a pontoon bridge, 13 May 1940. A medium, 2.8-ton, 4 x 4 lorry, the Opel 'Blitz' was the workhorse of German Army motor transport during the war.

Europe campaigns. German armoured cars struck a good balance between armament and speed, even if they were poorly armoured. The light, four-wheeled SdKfz 221 armoured car weighed 4 tons and had a top speed of 90 km/h, with a range of 320km; its armour was only 8mm thick, and its armament only included a single 7.92mm machine gun. The four-wheeled SdKfz 222 weighed 4.8 tons and had a top speed of 85 km/h, with a 300km range; its armour was 8mm thick, but it was armed with a 20mm KwK 30 or 38 L/55 and a 7.92 MG 34. The light, radio-equipped, command car SdKfz 223 lay halfway between the two, with its 4.4-ton weight, 85 km/h speed, 300km range, 8mm of armour, and its 7.92mm MG 34. The six wheeled SdKfz 231 weighed between 5.3 and 6 tons, had a top speed of 70 km/h and a range of 300km; its armour was 8mm thick and its armament included one 20mm KwK 30 L/55 and one 7.92mm MG 13. The eight-wheeled SdKfz 231 and the radio-equipped command car SdKfz 232 both weighed 8.3 tons, had a top speed of 85 km/h and 300km range; the armour varied between 8mm (on the sides) and 15mm (front), and the armament included a 20mm KwK 30 or 38 L/55 and a 7.92 MG 34. The turretless command car SdKfz 263 derived from the latter and weighed 8 tons, had a top speed of 100 km/h and 300km range, between 8mm and 18mm of armour and a single 7.92mm MG 34.

A 105mm leichte Feldhaubitze (light howitzer) 18 during a pre-war exercise in Germany. Developed in 1929 from the World War I Haubitze 16, by September 1939 some 4,800 pieces of both models were available to the German Army.

Something the Panzer Division greatly missed in 1940: a heavy, self-propelled, anti-tank gun. Apart from the Panzerjäger I, built on the PzKpfw I chassis and armed with a Czech 47mm gun, there was only one other self-propelled AT gun available: the 88mm Flak 18 (sfl) auf Zugkraftwagen 12t SdKfz 8. Twenty-five examples of this vehicle were produced in 1939/40 to provide German Army units with a heavy anti-tank SP gun also capable of dealing with enemy fortifications. They were used to equip 8. schwere Panzerjäger Abteilung.

Armoured personnel carriers

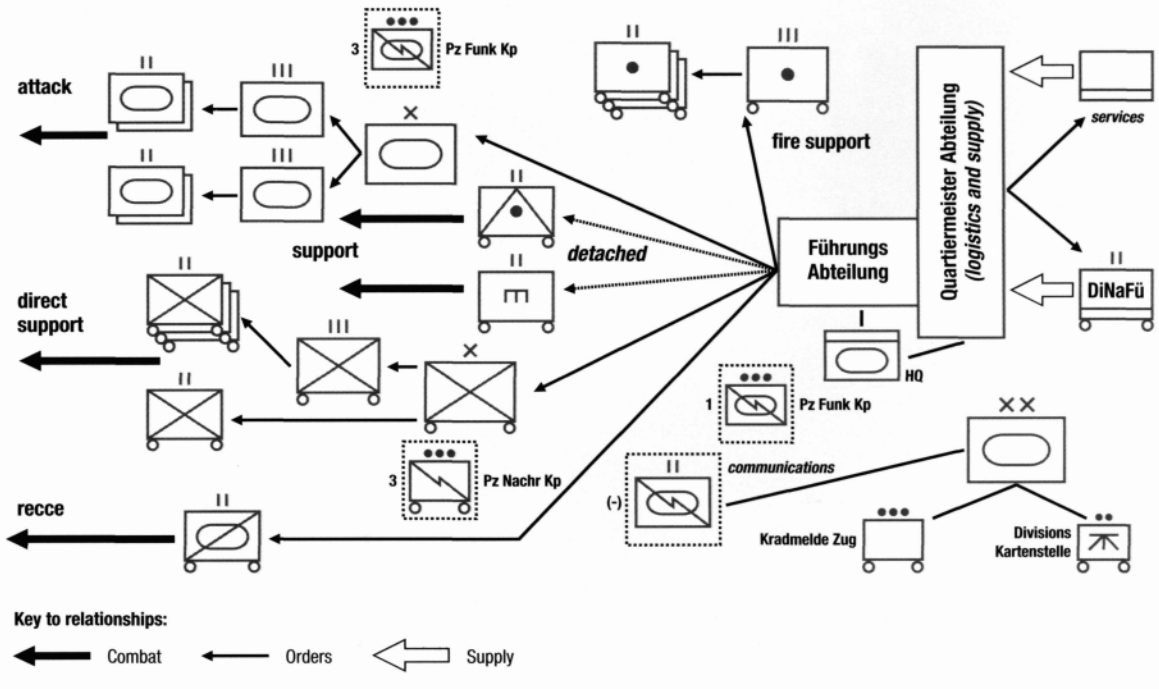
First developed in 1933 as a half-track tractor, the forefather of the German armoured personnel carrier (the SdKfz 11) only entered production in 1938 as a prime mover for the artillery. In the same year its chassis was converted to produce the armoured SdKfz 251 (known as the 'Hanomag' from the company that developed it), an 8-ton half-tracked vehicle with a top speed of 52 km/h and capable of carrying an entire Schützen squad of ten men plus the driver and co-driver. Until 1942, the SdKfz 251 was officially designed as 'gepanzerte Mannschaftstransportwagen' (gep. MTW, armoured personnel carrier), and thereafter as 'Schützenpanzerwagen' (SPW, armoured vehicle for the Schützen). Production was limited, however; only in the spring of 1939 did 1. Panzer Division receive the first models, only enough to equip a single company (14 in all; four for each of the three Schützen Zug plus two for the MG Zug). The sources disagree once more; in 1939, between 230 and 250 were produced, while in 1940 another 340 seem to have been produced, at an average of 25 per month. Their limited availability only permitted the Schützen Kompanie of Schützen Regiment 1, one single Schützen Kompanie in both the Schützen Regiments 2 and 3, plus the Pionier Abteilungen to be equipped with them.

Command, control, communications and intelligence

German doctrine and tactics were founded on the principles of speed, manoeuvre and flexibility, and the command system thus needed to be able to work quickly and to react promptly to any unexpected situation. Caution and circumspection were seen as the most dangerous enemies, which might easily lose a commander the advantage and enable the enemy to gain precious time, understand German intentions and react accordingly. On the other hand, fast movements and bold attacks would unbalance the enemy and pave the way for the decisive battle of annihilation.

It was also important for German commanders to lead their units forward. In this way they could quickly appreciate the situation at the front and react promptly. Such a method was required not only in the lower echelons, i.e. for company and battalion commanders, but brigade, division and even corps commanders were required to lead their units from the front. Although Rommel was probably the most daring and bold Panzer Division commander, there were many instances of German commanders leading their own units from the front down to corps level. Guderian himself was often to be seen with the leading elements of his corps, resolving potentially dangerous problems. The ability to take decisions quickly and to issue orders rapidly was also vital. An expedient order issued at the right moment was always better than a formal one that arrived too late.

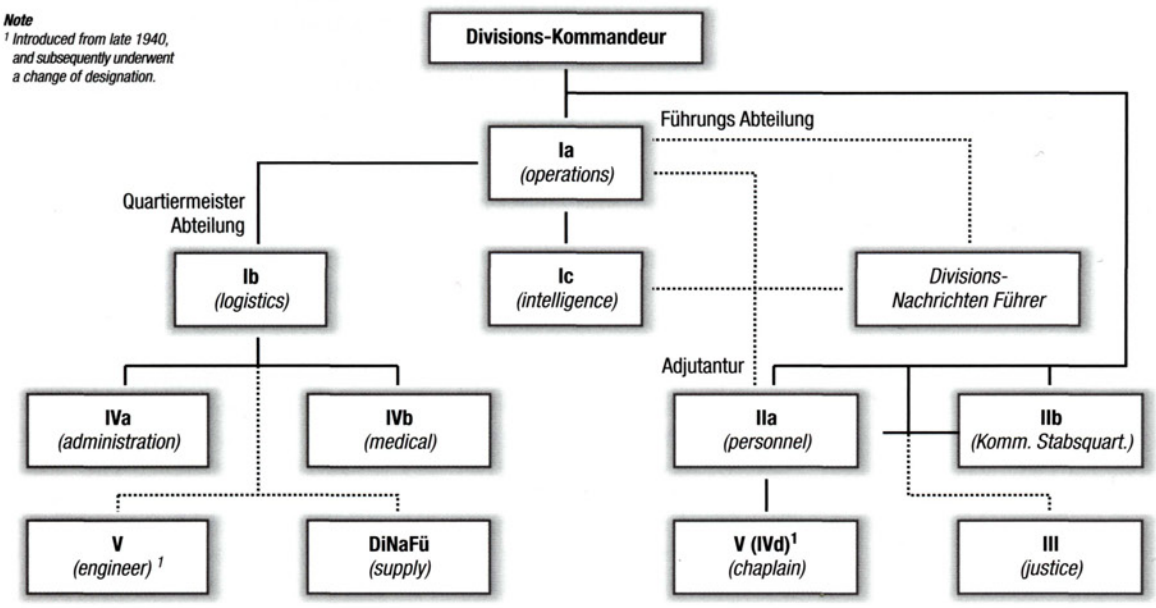
Panzer Division command system



The divisional headquarters and its staff (Kommando and Stab) were the heart and the brain of a Panzer Division, which linked together all its constituent elements. There were two main subordinate HQs used to execute orders: the Panzer Brigade HQ, and the Schützen Brigade HQ. The Panzer Brigade HQ was the main element used either in attack or in the exploitation of favourable situations, whereas the Schützen Brigade HQ was committed to providing direct support to the former, by either seizing the key positions needed to permit a successful deployment of the Panzer units (such as establishing a bridgehead), or securing any areas by-passed during their advance. Other units provided support to these two, either directly – like the Pioniere Bataillon and the Panzerjäger Abteilung, which were generally attached to either the Panzer or the Schützen Brigades – or indirectly, as was the case with the Artillerie Regiment, which provided fire support. The Aufklärungs Abteilung was, generally speaking, used under the direct command of the divisional HQ, performing reconnaissance duties in the divisional area.

The command system was structured in self-contained compartments, corresponding to the highest HQ. The divisional HQ would issue orders to the brigade HQs, which, in turn, issued their own orders to the regiments, which controlled the subordinate battalions. Units could be attached either to the brigade or the regimental HQ, and in such cases they took their orders from them. Units were occasionally mixed, for example Panzer and Schützen, though this was not common during the blitkzrieg years. Through this system, a unity of command was retained: in its own sector, the Panzer Division HQ was solely responsible for command, just as the brigade and regiment HQs were in their own sectors or in the tasks they had been assigned. Such a system required the issuing of clear, brief and direct orders – conforming to the *Auftragstaktik* principles – which, as already noted, had to be issued as quickly as possible. Higher HQs would issue orders directly to their subordinate units' commanders that simply required them to move to or to seize a determined position or, if relevant, to provide either direct or indirect support. There were,

Panzer Division command staff organization



A Panzer column crossing the border and entering Belgium on 10 May 1940. The tank in the foreground is a PzKpfw I Ausf A; the two in the background seem to be PzKpfw II. The large steel gates all along the Belgian–German border were erected in an attempt to slow down any invasion of Belgium.

of course, cases in which more specific and detailed orders had to be issued (as for assaults across enemy fortified positions or rivers), though in most cases these were also kept as brief as possible.

Commanders at the lower echelons were in turn required to provide prompt and clear assessments of the situation in their own sectors, so that higher headquarters could obtain a clear picture of the situation on the ground – one that would became even clearer as such reports were passed on to the brigade or divisional HQs. Fire support was under the direct control of the divisional HQ, and the fire control support centre was located with the artillery regiment HQ.

Simple map references, obtained using either grid squares or pre-arranged key reference points (the system also included the use of the *Stosslinies*, or thrust lines, which, drawn on maps and scaled in centimetres, were used as a main reference system for all the units), allowed orders to be issued and received quickly. Such information was mainly transmitted via wireless; telephone links were not suitable for the fast-moving Panzer Division. Almost every unit of the division had its own communication section, which enabled it to maintain contact with its parent HQ. Furthermore, elements from the divisional Nachrichten Abteilung were detached to divisional and brigade HQs to help them maintain contact with each other. In general, the 1. Zug of the Panzer Funk (radio) Kompanie was attached to the divisional HQ, the 3. Zug of the Panzer Funk Kompanie to the Panzer Brigade HQ, and the 3. Zug of the Panzer Nachrichten Kompanie to the Schützen Brigade HQ. The fact that orders and reports were kept short (often down to a few words), and the basic nature of wireless equipment available at the time, meant misunderstandings occasionally developed, as happened to Rommel's 7. Panzer Division during the crossing of the Meuse. What was left of the Nachrichten Abteilung was under the direct command of the divisional HQ to maintain contact with higher HQs and neighbouring units; it also relied on its own Kradmelde (motorcycle messenger) Zug, which delivered more extensive or sensitive messages that could not be transmitted via wireless (possibly with supporting documents such as maps produced by the Kartenstelle). The portion of the divisional HQ devoted to logistics and supply had under its direct control the divisional services and supply units – the 'tail' of the division.

With ultimate responsibility resting in its hands, the divisional HQ was the most critical element of the entire Panzer Division. How it performed would affect all the other units. The Panzer Division Kommando was actually rather small, having a total strength of only 112, which eventually increased to 165 with the attached Kradmelde Zug and Divisions Kartenstelle. At the heart of the Kommando, and the whole division, was the Stab, or divisional staff, which was only 52 strong – about 0.4 per cent of the total strength of the division. Its

basic structure comprised four main elements: the commander (Divisions Kommandeur), the operations department (Führungs Abteilung), the logistics and supply department (Quartiermeister Abteilung) and the personnel department (Adjutantur). The commander, a Generalleutnant (though the position could also be held by a Generalmajor), was ultimately responsible for the decisions that would affect his own division, though he could and often did rely on his staff for some of these. His only direct support came in the form of his personal orderly (Ordonnanz), a soldier having at best the rank of Gefreiter (corporal). Second to him and charged with both supervising the staff as a whole and directing the division's operations in the field was the Ia ('Eins A' or 'One A', equivalent to the G3) or 'erste Generalstabsoffizier' – the first staff officer, who was also chief of the Führungs Abteilung, the operations department. As chief of staff and chief of operations he not only coordinated the work of all the other members of the staff and resolved any issues that might arise, but was also responsible (amongst other things) for operational and tactical matters, unit organization, strength, training and transport, as well as for communications. His rank was either a Major or Oberstleutnant i.G. (im Generalstab – a general staff officer who had completed the two-year Kriegsakademie course), and he could rely only on very limited support since the whole operations department only numbered four people: himself, an aide (01, Ia first staff assistant, a Hauptmann) plus one NCO and one other ranks. Subordinate to him and responsible for field intelligence (Feindnachrichten und Abwehr, the equivalent of a G2) – namely the dispositions of the enemy in front of the division – was the Ic; his own personal staff included the 03 (third staff assistant, a Oberleutnant) plus two interpreters, and one NCO and one other ranks – thus bringing the total of the Führungsabteilung to four officers, two Beamte (civilian officials), two NCOs and three other ranks.

The chief of the logistics and supply department – Ic, Quartiermeister Abteilung (the equivalent of a G4) – was responsible for the logistics and supply of the division. He also coordinated the work of the other officers of the department: the IVa (Divisions Intendant, the administration officer) and the IVb (Divisions Artz, medical officer), plus, from late 1940, the V (Divisions Ingenieur, divisional engineer); the Divisions Nachschub Führer (DiNaFü, divisional supply commander), who was actually the commander of the supply units, also referred to him. Rather oddly, the Quartiermeister Abteilung was actually more senior than the Führungs Abteilung; the Ib, himself a Hauptmann, had at his disposal an 02 (second staff assistant) and five other officers holding the same rank, and was responsible for motorization, ammunition, matters relating to infantry and artillery equipment, and also controlling the divisional food supply columns and the divisional trains (the department also included one Beamte, three NCOs and four other ranks). The IVa, responsible for administration and also controlling the paymaster, was a Beamte, with four further Beamte, one NCO, and two other ranks at his disposal. The IVb, the medical officer, was an Oberst with an aide (a Oberleutnant) plus two NCOs and one other ranks at his disposal, for a total of nine officers, six Beamte, six NCOs and seven other ranks. The personnel department was led by the IIa (equivalent to the G1), the Adjutant (a Hauptmann), responsible for all matters concerning the officers belonging to the division and, as such, directly subordinate to the division commander and forced to cooperate closely with the Ia (he had at his disposal one Beamte, one NCO and one other ranks). Subordinate to him were the IIb, actually the Kommandant des Stabsquartiers (commander of the headquarters group, a Hauptmann), responsible for personnel matters concerning the NCOs and other ranks, and the V – later IVd – department, which consisted of the divisional chaplains (two Beamte attending to the spiritual needs of both Catholics and Protestants, helped by two other ranks). Working closely with him but otherwise directly subordinate to the

The Stosslinie (thrust line)
During the North-West Europe campaign an ingenious map reference system was developed by the Germans. Known as the *Stosslinie* (thrust line), it provided the Panzer Divisions' staff with a quick reference system that the enemy could not easily decipher. Every day a new *Stosslinie* was drawn on maps between two determined points, generally along the main axis of advance. The line was then marked in centimetres and numbered, often starting from a pre-arranged basic key number (e.g. with 30 as the key number the line would have been numbered 30, 31, 32, etc.). Then, secondary lines were drawn and marked to the left and the right side of the main Stosslinie at a 90-degree angle, thus covering the entire area of operations. Orders were issued making reference to the main thrust line and to the secondary lines; for example, 'move at 42.8 right 12' meant that a secondary 12cm-long thrust line had to be drawn on the right side of the main one at 12.8cm from its beginning (which is 42.8 minus the key number), its end showing the target in a manner that no one else – namely the enemy monitoring German radio transmissions – was able to understand. Even if a map was captured, the use of simple codes and the possibility of easily changing the main thrust line would have removed any advantage to the enemy.

divisional commander was the chief of III department (justice – Divisions Justiz Beamter, then Divisions Gericht), a Beamte helped by another Beamte and one other ranks.

All in all, the divisional staff numbered 15 officers, 13 Beamte, 9 NCOs and 15 other ranks; the total strength of the Kommando also included another officer, a further Beamte, eight more NCOs and 50 more other ranks who were part of the Stabsquartier, which was made up of its own HQ, a food supply column and a train (Verpflegung and Gepäcktross), a motor vehicle squadron (Kraftwagenstaffel) and an infantry guard unit (Infanterie Stabswache). It only had 61 rifles and two light MGs, and its vehicle allowance was two motorcycles, ten cars, seven lorries and two coaches. These figures were subsequently revised on 28 August 1940, 1 February and 1 November 1941, the latter eventually bringing the total number of staff to 17 officers (19 in the whole Kommando), 11 Beamte (12), 17 NCOs (40) and 16 other ranks (114). New departments were introduced such as the divisional engineer (V, Divisions Ingenieur, which led to a change in designation of the chaplain department to IVd) and a fourth staff assistant (04) joined the Ia department. The Kradmelde Zug was also absorbed into the Divisions Kommando. Attached to the divisional staff were officers from other units, tasked with clearing any matters concerning their own specific fields and giving advice to staff officers; other than the DiNaFü, these included the commander of the Nachrichten Abteilung (that, as such, became Divisions Nachrichten Führer, commander of divisional communications), the field post master (Feldpostmeister, in charge of the field post detachment), the commander of the field police (Feldgendarmerie) plus the commanders of the artillery, engineers, Panzer and Schützen units (brigade, regiment or battalion level) as commanders of their own arms and, later in the war, also a Luftwaffe liaison officer (FliVO, Flieger Verbindungs Offizier).

The small size of the divisional staff assured a very high degree of mobility, further enhanced by its separation into operational (combat-oriented) and non-operational departments, which enabled part of the staff to directly follow the units it controlled on the battlefield. In fact, when in combat the divisional

An armoured column of the Condor Legion in Spain, with a kleiner Panzerbefehlswagen SdKfz 265 followed in the background by a PzKpfw I Ausf B. Based on the PzKpfw I Ausf A chassis, this was the first command tank to enter use. The one shown here is a first variant with a machine gun in a hull mount without the cupola. The Spanish called the German tanks *negrillos* because of their colour.

staff was split into two different parts: the Führungs Staffel (operation echelon), made up of the Divisions Kommandeur and the Führungs Abteilung, which closely followed the combat units, and the Quartiermeister Staffel, which was made up of both the Quartiermeister Abteilung and the Adjutantur and remained close to the division's logistics and supply units. In this way, both the commander and the operations officer (to whom he could also delegate command functions) were able to lead the combat units of the Panzer Division from the front. One drawback, though, was that the logistics and supply detachments were simply told to keep pace with a commander's needs, and, being rarely consulted on such matters, saw their capabilities and resources stretched to the utmost. Moreover, it also meant that the Ia, the operations officer, was overburdened with work and could only rely on a very small personal staff for help.

Staff officers, and operations officers in particular, were generally speaking young, low-ranking, general staff officers possessing little if any personal knowledge or experience of the battlefield. They could be delegated to represent the divisional commander, with full powers and not just to deliver his own orders or instructions – a remarkable level of responsibility for such officers. Though often forgotten or simply overlooked, staff officers always played decisive roles. Carefully selected and exceptionally well trained and prepared, they represented a small and independent group within the German officer corps; their careers could progress more quickly, and their powers within the staffs were often greater than their rank suggested. In May 1940, out of the 39 officers that made up the Stab of 1. Panzer Division (the division already had a Divisions Ingenieur) there were, divisional commander and Beamte apart, only four majors and five captains, and the distinguished achievement of the divisional Ia, Major i.G. Walter Wenck, provides a good example of a successful general staff officer's career. Promoted to Major in 1938 at the age of 37, he became Ia of the 1. Panzer Division, having been promoted to Oberstleutnant less than three months previously; he would hold this position until February 1942. For the following seven months he was an instructor at the

A kleiner Panzerbefehlswagen SdKfz 265 apparently negotiating a river somewhere in North-West Europe during the May 1940 campaign. Built on the PzKpfw I chassis, the PzBefh I was the lightest command tank in use by the Panzer Division. From the end of 1940 it was no longer used to equip the Panzer Kompanien, and was only used by regimental HQs or as an artillery observation vehicle.

A Panzer Division advanced command post somewhere in France just before the start of 'Fall Rot', 4 June 1940. In the foreground, two motorcycle dispatch riders are waiting for orders from the group busy with the field radio. In the background, to the left, is a PzKpfw IV sporting a command pennant, and to the right a PzKpfw 35 or 38 (t).

Kriegsakademie and was promoted to Oberst. In September 1942 he was appointed chief of staff of LXVII. Panzer Korps. Subsequent appointments included that of chief of staff to the 3rd Romanian Army and, following Stalingrad, to the Armee Abteilung Hollidt. Promoted to Generalmajor in February 1943, Wenck was appointed as the chief of staff to various other army and army group commands (6. Armee, 1. Panzer Armee and Heeresgruppe Südukraine) and was promoted to Generalleutnant in April 1944. He then became chief of operations and deputy chief of the Army General Staff in July 1944. Shortly after his promotion to General der Panzertruppen in April 1945 he was given command of the newly formed 12. Armee, with which Hitler intended to break the Soviet encirclement of Berlin. The fact that Wenck had been awarded not only the Knight's Cross in December 1942, but also the Tank Assault Badge, demonstrates how closely involved in the fighting he was. Although Wenck was certainly a very successful staff officer, he never had the chance to become a unit commander.

This was not always the case with general staff officers, although taking command of field units seems to have slowed the progress of the careers of such men. Kurt von Liebenstein became Ia of the 10. Panzer Division in February 1940 and subsequently served as chief of staff of Panzergruppe Guderian (later 2. Panzer Armee) between October 1940 and May 1942. From that point, his career took a different direction. In June 1942 he became commander of Panzer Regiment 6 and, having been delegated to command 3. Panzer Division for nearly two months, subsequently took over the command of Panzergrenadier Brigade 3. He was given his first real divisional command only in March 1943, when he took over the 164. leichte Afrika Division in Tunisia. However, he was taken prisoner two months later, and his career ended there, save for the award in May of the Knight's Cross.

Thus, much of the Panzer Divisions' success during the blitzkrieg years was due not only to their commanders, but also to their staff officers, who in many cases provided vital support. Both of these parties were well trained and motivated, something their opponents were not, and were also highly skilled, very capable, and willing to risk their own lives by leading from the front.

Combat operations

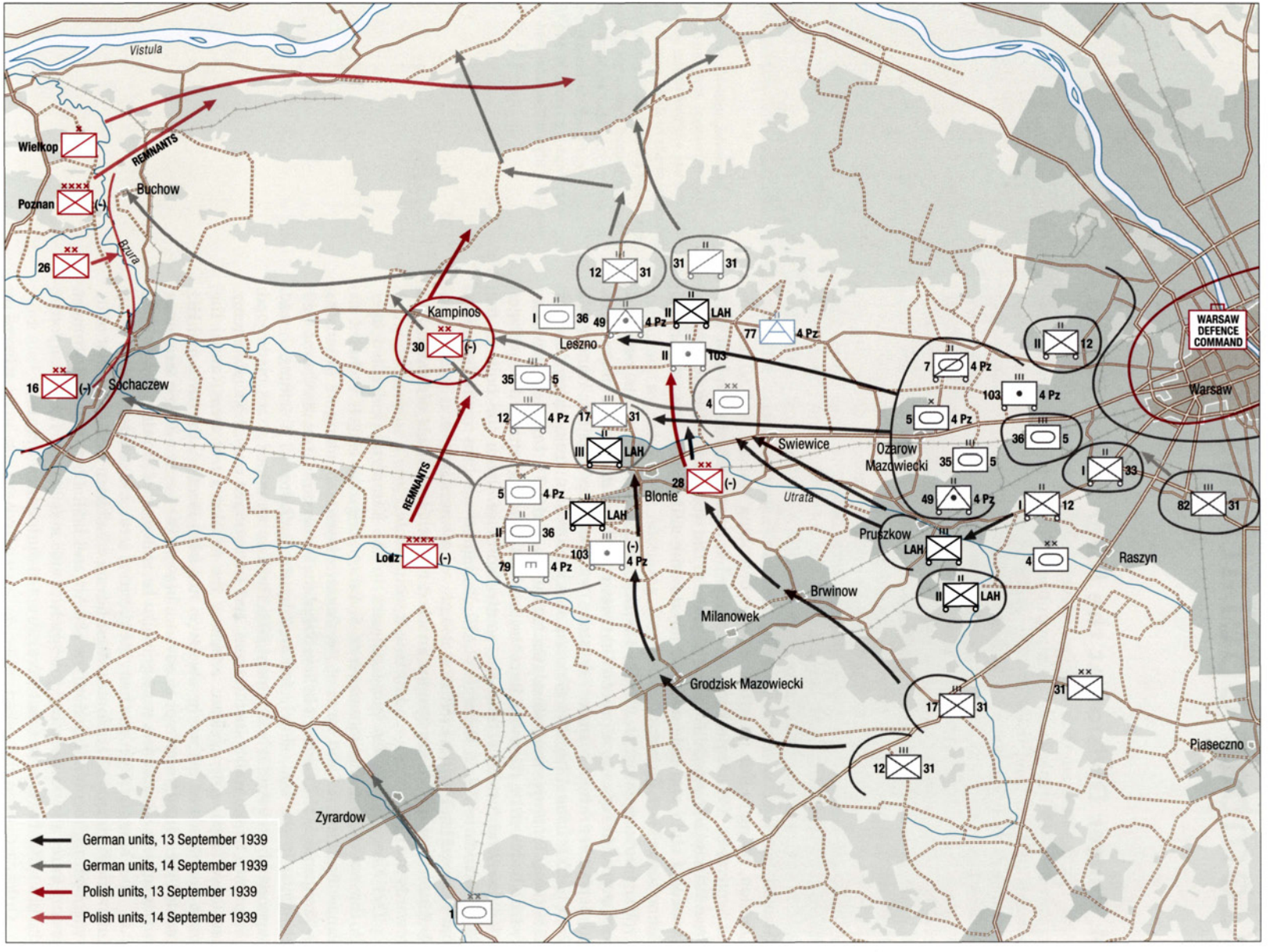
4. Panzer Division at the River Bzura, Poland

Although the German Army only fully developed the concept of the mission-oriented, mixed battle group (Kampfgruppe) after the fall of France, moves towards this had been made as early as September 1939 during the Polish campaign. On 10 September the leading elements of 4. Panzer Division, part of XVI. Armeekorps (mot), had reached Warsaw and began an attack on the south-west suburb of Ochota. It was met by strong Polish forces supported by artillery, who, taking advantage of close-range fire, inflicted heavy losses on German tanks and infantry before eventually counter-attacking on the 12th. By then, however, the attention of the commander of 4. Panzer Division, Generalmajor Georg-Hans Reinhardt, had turned to the west of the city. On 9 September Polish forces had counter-attacked along the River Bzura, and, three days later, advanced close to the city of Lódz, thus threatening XVI. Armeekorps' rear areas. Large portions of the Army Lódz had escaped the German trap and were now moving north-east, to the rear of 4. Panzer Division, trying to link up with the forces defending Warsaw. At 5.50 p.m. on 12 September, XVI. Armeekorps HQ ordered 4. Panzer Division to pull back from Warsaw and switch its axis of advance to the west, to face the new threat. It made a rapid and bold advance towards the village of Sochaczew on the Bzura, some 35km distant.

That same evening, 4. Panzer Division pulled back from its positions and started to regroup, a process that was completed during the morning of 13 September when a major air strike was launched against Warsaw. At 2.30 p.m. on the 13th, the German attack moved in from three different directions. From the south-east, two regiments of the 31. Infanterie Division (which had been on the move since the previous morning) attacked the villages of Blonie and Swiewice from the south. North of them, the bulk of the SS-Leibstandarte Adolf Hitler (SS-LAH) Regiment – minus its II Bataillon, but followed later by the I./SR 12 – also moved towards Swiewice. To the west, 4. Panzer Division's Kampfgruppe attacked towards the village of Leszno and towards the north–south road linking it with Blonie.

This Kampfgruppe was quite different to the Kampfgruppe formed later in the war. Under the command of 5. Panzer Brigade's HQ, it included its Panzer Regiment 35 and most of the Panzer Abwehr Abteilung 49 (minus its 1. Kompanie, as the Germans believed that the Polish units contained armoured elements) in the lead, closely followed by the Aufklärungs Abteilung 7, and supported by the Artillerie Regiment 103. The Kampfgruppe's attack made good progress in terrain well suited to tanks, and encountered only moderate enemy resistance (apparently, civilians attacking the division's rear areas caused the most trouble). Even before the objectives had been reached, the divisional HQ ordered the Kampfgruppe not to advance beyond the Leszno–Blonie area, since it was unclear what orders were going to be issued the following day. At 6.30 p.m. the Kampfgruppe reached the Leszno area and made contact with Infanterie Regiment 12 at Blonie, whose advance had been easier that that of its neighbour regiment and that of the SS-LAH and I./SR 12, which met stronger enemy forces and only reached the Swiewice area at 6.00 p.m. The Polish forces did not suffer heavy losses, but were disrupted during their retreat.

Orders arrived in the late evening: 4. Panzer Division was to be relieved at Warsaw by the 31. Infanterie Division and was to proceed to its final objectives, the Bzura crossings at Sochaczew and Brochow. The forces were regrouped



4. Panzer Division at the Bzura, Poland, 13–14 September 1939.

again and a new Kampfgruppe was formed – KG Hartlieb under Generalmajor von Hartlieb, commander of Panzer Brigade 5. It was made up of a left group (with the HQ of Panzer Brigade 5, II./Panzer Regiment 36, I./SS-LAH, most of Pionier Bataillon 79, and Artillerie Regiment 103) heading for Sochaczew, and a right group (with II./Panzer Regiment 36, Panzer Abwehr Abteilung 49, II./SS-LAH, II./Artillerie Regiment 103 and most of leichte Flak Abteilung 77), whose objective was Brochow. Panzer Regiment 35 and Schützen Regiment 12 were to reach and hold the Kampinos area, while elements from 31. Infanterie Division were tasked with reconnoitring the woods to the north of Leszno.

The left group reached Sochaczew at 9.00 a.m. and found it occupied in strength by the enemy. Two attempts were made to enter the village, one at 10.20 a.m. and one at 2.00 p.m., before the group withdrew 2km eastwards, repulsing the Polish counter-attacks until 6.00 p.m. The advance of the right group was slowed by enemy forces and it only reached the outskirts of Brochow by 11.00 a.m. Having found strong Polish forces there, it tried at first to by-pass the village before eventually withdrawing several kilometres, fearing a Polish counter-attack. At 5.00 p.m. the situation descended into chaos: Polish forces crossing the Bzura trying to make their way to Warsaw became mixed up with those of the Polish counter-attack. Defensive lines were thus established at Kampinos and reserves were brought in, most notably 1. Panzer Division. Only at 8.00 p.m. did the situation calm down, and the order to cross the river was issued the following day. The Bzura pocket was eventually closed on the 17th, and eliminated the following day, with some 120,000 Polish soldiers captured.

Hannut: the first tank vs. tank battle

In May 1940 XVI. Armeekorps (mot), under the command of General der Kavallerie Erich Hoepner, was the only armoured force of Heeresgruppe (army group) B to take part in the operations in Belgium. Moving north of the Sambre–River Meuse line (the latter crossed at Maastricht), the corps marched towards the so-called 'Gembloux Gap', actually a stretch of open terrain between the Meuse and Dyle rivers just to the north-east of Charleroi. The area between Wavre and Namur was part of the Dyle defence line and was strongly defended by the French First Army; to the east of it, the Belgians had built the 'barrage de Cointet', an anti-tank barrier.

The French command had decided to send the Corps de Cavalerie under General René Prioux, with the 2nd and 3rd DLM (Division Légère Mécanique), some 30km to the east of these defences. As they deployed in the Hannut area on 11 May 1940, the stage was set for the first tank vs. tank battle of the war. The undulating terrain of the Belgian plain was well suited to armoured warfare, though some obstacles were present, such as the River Mehaigne running to the south of Hannut and the Petite Gette to the east, running south to north. The many towns and villages in the area also formed barriers for the Panzers, which General Langlois (commander of 3rd DLM) turned to his advantage by establishing a series of strongpoints over a 17km-wide front. To the north lay the bulk of 6th Light Mechanized Brigade with two battalions of Dragoons Portés (motorized infantry) supported by four squadrons of the 1st Cuirassier Regiment, while to the south (around Hannut, where outposts were established) were the 5th Light Mechanized Brigade with the four squadrons of the 1st Cuirassier Regiment plus the 1st Dragoons Portés Battalion and the bulk of the divisional artillery. All in all, the division had 87 Somua and 87 R 35 Hotchkiss tanks in the 5th Brigade plus a further 63 R 35 Hotchkiss tanks in the 6th Brigade. 3. Panzer Division had 343 tanks, of which 68 were PzKpfw III and IV, while 4. Panzer Division had 331 tanks, of which 64 were PzKpfw III and IV.

Having crossed the Meuse on 11 May, the following day both of XVI. Armeekorps' Panzer Divisions set out for their objective of Hannut. 3. Panzer Division led with Panzer Brigade 3, while 4. Panzer Division created two Verfolgungs (pursuit) Abteilungen: to the right was Panzer Regiment 35

with II./Artillerie Regiment 103, and to the left was Panzer Regiment 36 and behind them Schützen Brigade 4. At 7.00 a.m. Panzer Regiment 35 had reached Lens St. Remy; it pushed forward, and came into contact with the French vanguards at Villers le Peuplier. From there the bulk of the regiment turned south toward Avennes, leaving behind 5. Kompanie with orders to drive to Hannut. During its approach at 10.30 a.m. it came up against the positions held by the 2nd Cuirassiers at Crehen; the ensuing clash soon convinced the regimental commander to dispatch the entire II./Panzer Regiment 35 northwards. It arrived at Hannut by noon, just in time for the first tank battle of the war.

The French soon withdrew from their outposts at Hannut, but Crehen was defended by a squadron of the 2nd Cuirassiers with 21 R 35 Hotchkiss tanks and a company of Dragoons; they were facing about 50–60 German tanks. The fighting was intense; in late morning the surviving 10 French tanks withdrew to Thisnes while the Dragoons pulled back to Merdop. At 3.00 p.m. a squadron of Somua tanks arrived in support and started to counter-attack toward Crehen, which was retaken at 6.30 p.m. – but too late. The whole of 3. Panzer Division and the left column of 4. Panzer Division had been held back due to a shortage of fuel. In the late morning the latter was north of Braives and could only dispatch a single company south for reconnaissance before waiting for resupply, while the former started its move late in the day and arrived at Poucet at 6.15 p.m. Hoepner, greatly concerned by the supply situation and his exposed flanks, decided to dispatch a single battalion, I./Panzer Regiment 6, to Hannut and Thisnes. At 7.00 p.m. its tanks drove into Hannut only to be met by heavy French artillery fire and the counter-attack of the Somua tanks. Less than one hour later both the Germans and the French withdrew from their positions. Hoepner decided to launch a fresh attack the following day after the divisions had regrouped and been resupplied.

The new attack started at 12.20 p.m. on 13 May for 3. Panzer Division, and ten minutes later for 4. Panzer Division. 3. Panzer Division moved with II. and I./Panzer Regiment 5, accompanied by II./Schützen Regiment 3, to the Petite Gette north of the twin villages of Orp le Grand and Orp le Petit. I. and II./Panzer Regiment 6 (accompanied by I./SR 3) moved to the Orp le Petit–Jauche line. Meanwhile, 4. Panzer Division attacked south of Hannut with I. and II./Panzer Regiment 35 moving abreast toward Merdop and with I. and II./Panzer Regiment 36 moving just to the south of them. Three battalions from Schützen Brigade 4 were to attack the French strongpoints at Thisnes, Merdop and Jandrenouille while the Aufklärungs Abteilung covered the left flank of the division. The first step was to reach the Petite Gette–Jandrenouille line, the second the railroad running south from Jodoigne to Ramillies.

The first unit to make contact with the enemy was I./Panzer Regiment 6 at Orp le Petit; after a bitter struggle the village was cleared by the men of I./SR 3, joined later by elements from Panzer Jäger Abteilung 39, though French tanks and anti-tank guns eventually compelled the Panzers to look for an alternative route south. Oberst Kuhn, commander of Panzer Brigade 3, then ordered I./Panzer Regiment 5 to switch south and join Panzer Regiment 6 in the area between Orp le Petit and Jandrain – a wise decision since II./Panzer Regiment 5, which had crossed the Petite Gette after 2.30 p.m., was under counter-attack by French tanks and the accompanying II./SR 3 had only been able to establish a bridgehead across the river at Orp le Grand with great difficulty. Eventually, the large concentration of tanks in terrain well suited to them decided the battle. At 3.00 p.m. a tank vs. tank battle erupted just east of Jauche, and two hours later II./Panzer Regiment 5 achieved a breakthrough north of Marillies, while the Schützen secured the Orp villages. By 7.00 p.m. Panzer Brigade 3 had emerged victorious at Jauche, and the division had secured the Petite Gette area. One hour later both Panzer Regiments regrouped and attacked toward Enines and, from there, headed to their final objective.

4. Panzer Division's Schützen Brigade 4 moved first at noon after a massive air raid against the French positions (actually mere outposts) at Thisnes and Crehen. One hour later the Schützen had passed these positions, heading for Merdop, while at 12.30 p.m. Panzer Brigade 5 started its own move. By 4.00 p.m. Panzer Regiment 36 had reached the road to the south of Jandrenouille, while Panzer Regiment 35 attacked Jandrenouille and Merdop along with the Schützen. Two hours later, both places were in German hands and the French began to withdraw. After rest and resupply, at 7.30 p.m. Panzer Brigade 5 resumed its march west, passing Ramillies, while 3 Panzer Brigade started its own pursuit. The battle was over, and the French were in full retreat. The 3rd DLM had lost about half of its Hotchkiss and a third of its Somua tanks (all in all, some 110 tanks), while both Panzer Divisions lost between a quarter and a third (150–200) of their tanks, though not more than 15–20 were write-offs.

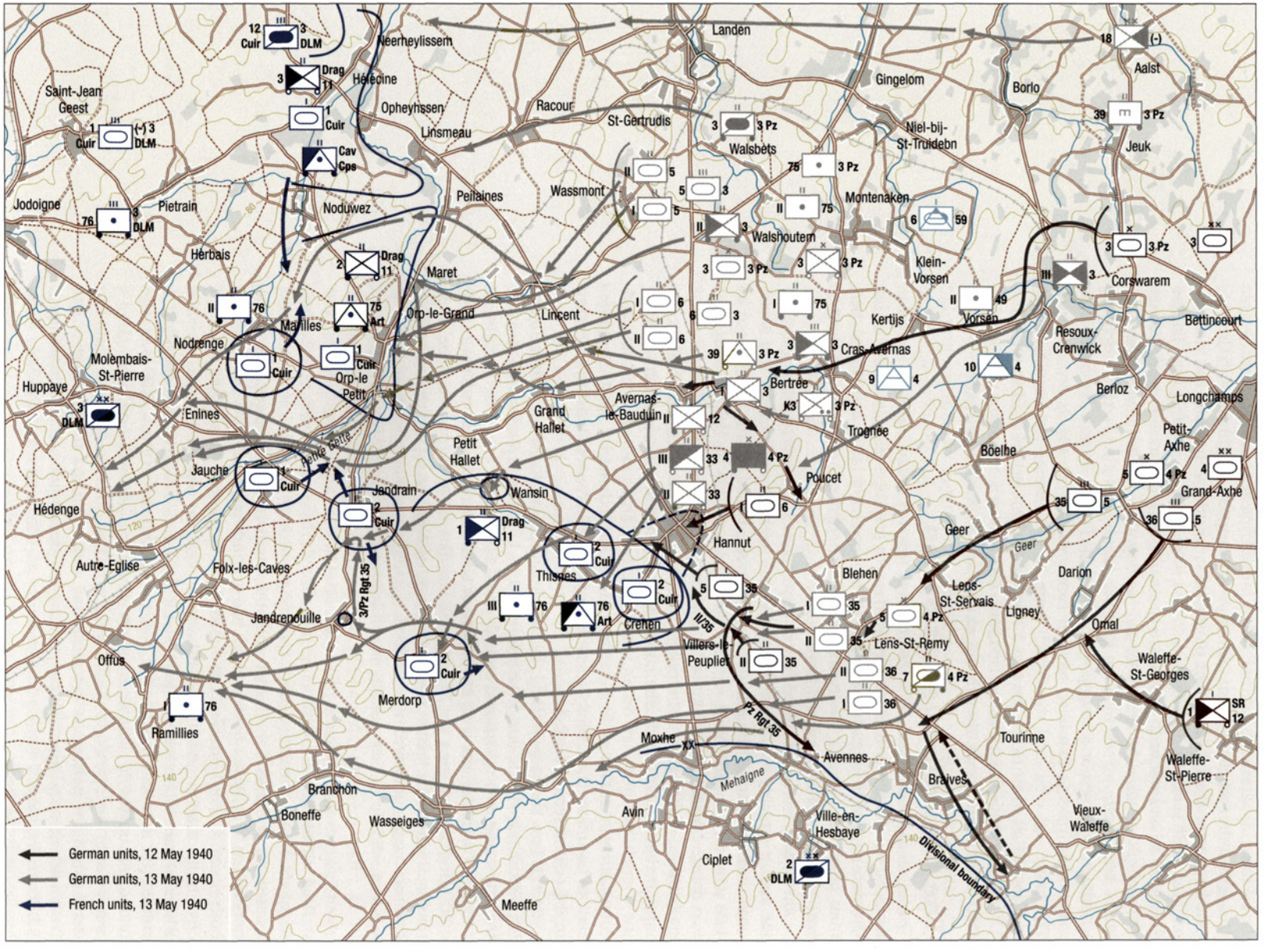
The breakthrough at Sedan

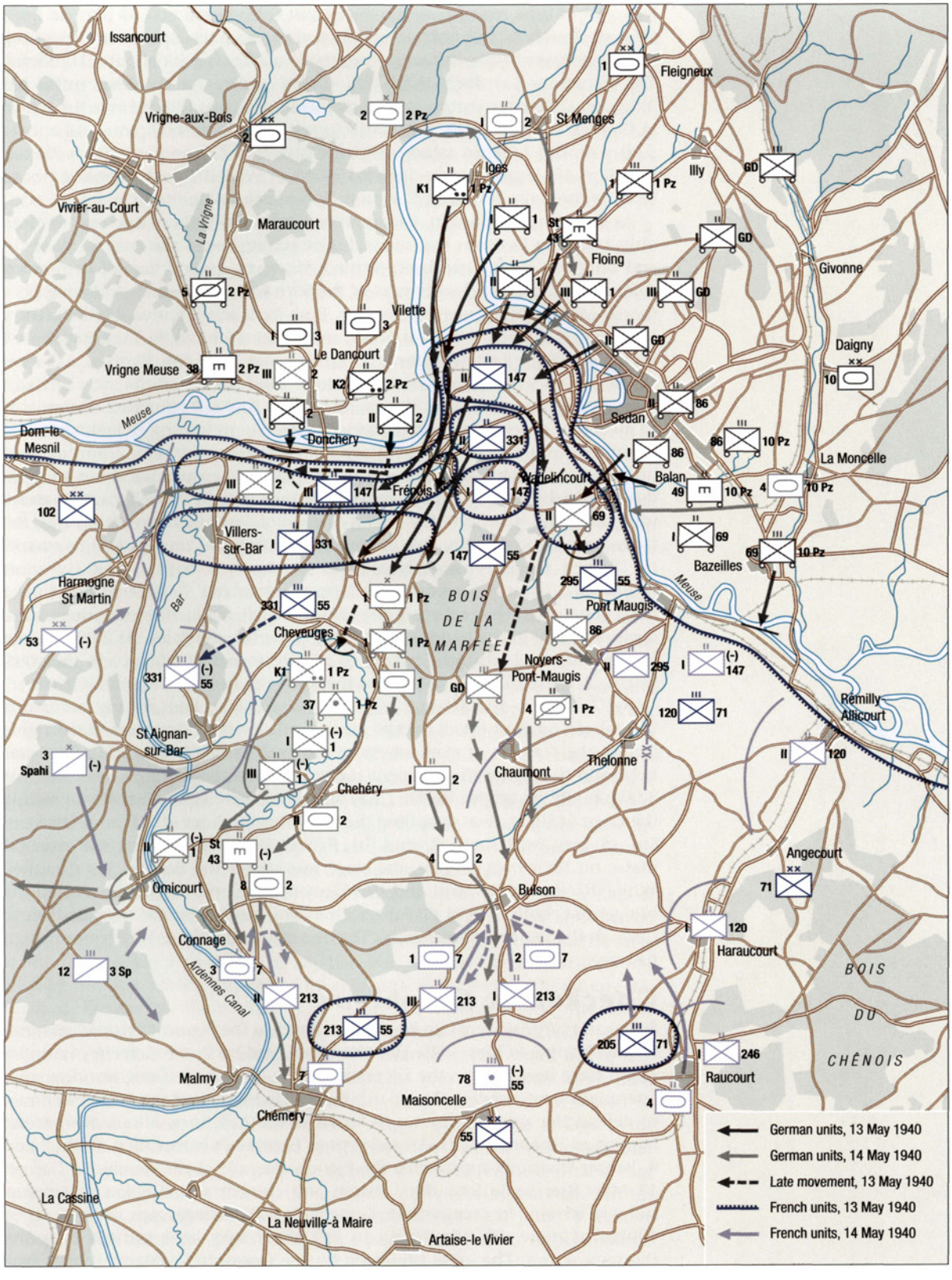
The advance of Guderian's XIX. Armeekorps towards Sedan is one of the most remarkable achievements of modern warfare. In just three days its three Panzer Divisions moved through terrain deemed impassable for tanks and approached their objective, covering more than 100km, though not without problems – traffic jams being the first and foremost.

On 12 May Guderian voiced his concerned about the lack of preparation for the assault crossing and issues of supply, but his own commander von Kleist urged him on, and in the afternoon orders were issued setting the X-hour as 4.00 p.m. on the 13th. Such rapidity was made possible by the exercises held two months before on the River Moselle, which enabled Guderian's chief of staff, Oberst Nehring, to issue orders quickly and with minimal changes. To support the German attack, the Luftwaffe laid down a heavy bombardment of the French positions at Sedan, starting at 10.00 a.m. on 13 May and culminating at 3.00 p.m. in a massive attack carried out by 1,000 airplanes. Half an hour later the artillery (mostly supporting 1. Panzer Division's crossing in the central sector) joined in.

At 4.00 p.m. the vanguard of 1. Panzer Division began to cross the river. To the left, Kradschützen Bataillon 1 (later followed by I./Schützen Regiment 1) crossed the loop in the river unopposed and advanced towards the canal. To the right, II. and III./SR 1 crossed the river in the area of Glaire, while III./'Grossdeutschland' ('GD') Regiment crossed the Meuse at Sedan. The latter encountered the most trouble: fire from the French positions, almost untouched by the air and artillery bombardments, destroyed three assault squads before being silenced. Only at 4.50 p.m. did II./'GD' succeed in establishing a bridgehead. Meanwhile, II. and III./SR 1 had crossed the river and by 5.30 p.m. had advanced to the railway line about 1.5km away. By then, II./'GD' had begun to be ferried across the Meuse and its lead elements were advancing into Torcy. The commander of Schützen Regiment 1, Oberstleutnant Balck, quickly grasped the situation: if he held and secured the bridgehead the French might strengthen their defences, and so the only option to achieve a breakthrough was to continue the advance. At 6.30 p.m. both II. and III./SR 1 attacked the French lines at Frenois, which they breached after more than a one-and-a-half-hour struggle. At the same time, II./'GD' advanced east of Frenois, while at about 7.00 p.m. Kradschützen Bataillon 1 crossed the river and raced to get past the French defences. At 8.00 p.m. the bridge constructed by Pionier Bataillon 37 in two hours at Gaulier (II./SR 1's crossing site) was opened to traffic, and the rest of 1. Panzer Division started to move across the Meuse. In the meantime, Balck noticed the collapse of the French defences and urged his men to continue the advance. At about midnight, Schützen Regiment 1 held positions as far as Cheveuges and the Bois de la Marfée, with the leading elements moving down to Chéhéry.

The other divisions had less of an easy time. The lack of most of their artillery meant they had no adequate fire support, and 2. Panzer Division also


German units, 12 May 1940
German units, 13 May 1940
French units, 13 May 1940
Divisional boundary
Landen
Neerheylissem
Saint-Jean Geest
Hélécine
Opheylissen
Racour
St-Gertrudis
Linsmeau
Gingelom
Borlo
Aalst
Jeuk
Niel-bij-St-Truidebn
Walsbets
Walshoutem
Montenaken
Wassmont
Peiselines
Noduwez
Jodoigne
Pietrain
Herbais
Maret
Orp-le-Grand
Lincent
Marilles
Nodrenge
Orp-le Petit
Molembais-St-Pierre
Huppaye
Enines
Jauche
Petit Hallet
Grand Hallet
Avernas-le-Baudouin
Cras-Avernas
Bertrée
Trognée
Poucet
Wansin
Jandrain
Hédenge
Autre-Eglise
Folx-les-Caves
Thisnes
Hannut
Crehen
Blehen
Geer
Darion
Lens-St-Servais
Ligney
Omal
Lens-St-Remy
Villers-le-Peuplier
Jandrenouille
Offus
Merdorp
Ramillies
Moxhe
Avennes
Tourinne
Waleffe-St-Georges
Waleffe-St-Pierre
Vieux-Waleffe
Braives
Ville-en-Hesbaye
Avin
Wasseiges
Branchon
Boneffe
Meeffe
Ciplet
Mehaigne
Kertijs
Vorsen
Klein-Vorsen
Corswarem
Resoux-Crenwick
Bettincourt
Berloz
Longchamps
Petit-Axhe
Grand-Axhe
Boelhe
Jandrain
Tanks Ecole
3/Pz Rgt 35
II/35
I/35
Pz Rgt 35



Breakthrough at Sedan, France, 13–14 May 1940.

lost a lot of time regrouping for the assault. This began at 5.30 p.m. on both sides of Donchery, but only at 8.00 p.m. did a small group succeed in getting across the river to the east of it, eventually advancing for about a kilometre. The situation was such that XIX. Corps' orders for 14 May instructed 2. Panzer Division to bring its leading elements across the river via the bridge at Gaulier. 10. Panzer Division's attack started at about 4.00 p.m., and only at 6.00 p.m. did I./SR 86 (along with the attached 2. Kompanie from Pionier Bataillon 49) establish a bridgehead north of Wadelincourt, enabling troops to cross the river. Schützen Regiment 69's attack was not successful.

As dawn broke at Sedan, the situation on the bridgehead appeared critical: only 1. Panzer Division had succeeded in getting across the river in strength, and only one bridge had been secured. However, a good deal of the French defences had collapsed with most of the 55th Infantry Division suffering poor morale, and reinforcements were late. Tank Battalion 7 joined 213th Infantry Regiment at Chémery only at 5.00 a.m. on the 14th, while Tank Battalion 4 joined the 205th Regiment north of Flaba only at 10.45 a.m. By then, 1. Panzer Division had secured the German victory. After it crossed the river at night marching to the south, at 6.30 a.m. on 14 May Panzer Regiment 2 was ordered to meet the French threat at Chémery and Bulson; its leading elements reached Connage (just north of Chémery) and Bulson at about 9.00 a.m., running head on into the French counter-attack. A bitter struggle ensued for about an hour, during which several German tanks were lost, but the French counter-attack was halted and, thanks to the arrival of most of Sturmpionier Bataillon 43, the Germans were eventually able to secure the village of Connage and to compel the French to retreat shortly after noon. By then both I. and II./Panzer Regiment 2 (later followed by the 'Grossdeutschland' Regiment) had joined their vanguards, thus securing the division's left flank. However, the critical decision rested in the hands of two men: Guderian and Balck. At 2.00 p.m. the former ordered 1. Panzer Division to switch its axis of advance to the west, getting Schützen Regiment 1 across the River Bar and the Ardennes Canal.

By 7.30 a.m. the leading elements of II./SR 1 had already secured a bridgehead (and an intact bridge) across both rivers at Omicourt, just in time to face the reaction of elements from 3rd Spahi Brigade. The bridgehead was held, and the rest of the regiment regrouped there, beginning a new attack at 3.00 p.m. By midnight, III./SR 1 had advanced some 10km to the west seizing the town of Signy, thus signalling the definitive breakout of 1. Panzer Division. On 15 May, with both 2. and 10. Panzer Divisions crossing the river en masse on their own bridges, the stage was set for the dash to the Channel. While 10. Panzer Division and the 'Grossdeutschland' Regiment secured the bridgehead, both 1. and 2. Panzer Divisions pushed to the west and broke through the last French defences. The decisive battle of the Western campaign had been won.

Checked at Gembloux

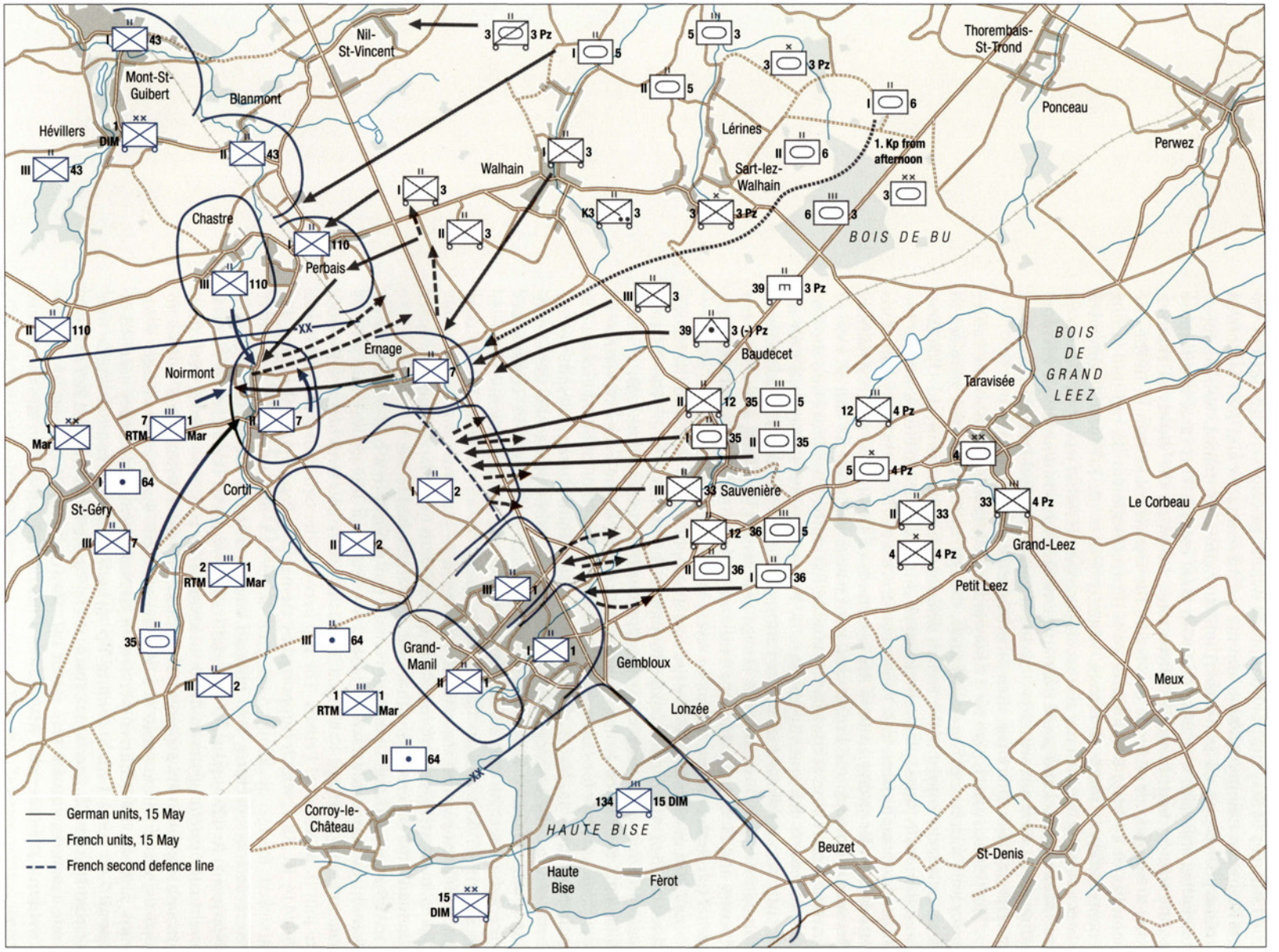
Speed and surprise were two key tactical issues in the Panzer Divisions' advance to the Channel in May 1940. Had they been held back, the element of surprise might have been lost, to the advantage of the defenders. If one wonders what fate might have befallen Guderian's Panzer Divisions had the Belgians chosen to defend the approach routes to Sedan in the Ardennes, a look at what did happen to Hoepner's XVI. Armeekorps at Gembloux is revealing. Both 3. and 4. Panzer Divisions approached the French defences of the Gembloux Gap on 14 May after some four days' march and combat across 80km of armour-suitable terrain. In comparison, Guderian's XIX. Armeekorps covered about 100km of more difficult terrain in just three days, and without incurring the same losses. The extra time won by the Corps de Cavalerie, though at a high price, enabled General Georges Blanchard's First Army to reach its positions on the Dyle Line and to man them properly (with units deploying on

the 13th). On 14 May the positions in the Gembloux Gap were defended by the 1st Moroccan Infantry Division and the neighbouring 1st and 15th Motorized Infantry Divisions, all at (or near) full strength, well trained, well equipped (including anti-tank weapons), and with good morale. This came as a surprise to the men of both Panzer Divisions who, following the victory at Hannut, were attempting to seize the line before the French could man it. In the late morning of 14 May, 8. Kompanie of II./Panzer Regiment 35 ran into strong enemy defences south of Ernage, while to the north I./Panzer Regiment 6 (later joined by II. Abteilung and accompanied by II./SR 3) was slowed down by anti-tank obstacles and could only attack the French positions at late evening. At dusk the Germans withdrew, having realized they had lost the element of surprise; a major attack was then ordered for the following day.

The German attack plan for 15 May is a perfect example of how the Panzer units were meant to play a decisive role, though, in this case, they were not to lead the attack. In light of the French defences and obstacles on the Dyle Line, both Panzer Divisions' plans envisaged an infantry attack to clear a way for the Panzers to assault them. In 4. Panzer Division's sector, three infantry battalions attacked under strong artillery fire just north of Gembloux, roughly halfway between Gembloux and Ernage, and both Panzer Regiment 35 and 36 were to start moving as soon as the infantry crossed the railroad and broke into the first line of French defences. By contrast, 3. Panzer Division's plan called for an infantry attack followed up by the Panzers; Schützen Regiment 3 had to break through the French defences at Ernage and Perbais, reaching a line between Chastre and Noirmont. After the breakout, Panzer Brigade 3 would intervene either to counter enemy armour or to exploit the breakthrough.

At 7.30 a.m. German artillery fire and air support began to pound the French lines (though it did not manage to silence the artillery) while the infantry started its move. As soon as they approached the enemy positions, at about 9.00 a.m., the French artillery opened up, causing severe losses. Nevertheless, the Schützen leapt forward and at 10.30 a.m. the men of II./SR 12 crossed the railroad. The Panzers started their advance immediately, despite being hampered by the obstacles and the terrain. As they approached the enemy lines, all hell broke loose: the tank of Panzer Regiment 35's commander received a direct hit and all crew members became casualties, while I./Panzer Regiment 35 lost almost all its heavy tanks. However, both the Panzers and Schützen reached the railroad and began to push forward, but at about 5.00 p.m. – having seen no breakthrough and with losses mounting – 4. Panzer Division's HQ ordered the withdrawal. The attack had failed.

At 9.30 a.m. II./SR 3 attacked Perbais, but ground to a halt in the face of French resistance. Meanwhile, I./SR 3 – which had lost its way and arrived late in front of Ernage – changed its axis of attack and switched northwards, to join II. Bataillon at Perbais. The gap between the two Panzer Divisions was filled by III./SR 3, which (supported by elements of Panzerjäger Abteilung 39) attacked Ernage at about 5.00 p.m. Some 40 minutes later the latter succeeded in reaching the railroad, and started a new attack toward Noirmont. At 12.30 p.m. both I. and II./SR 3 renewed the attack at Perbais, eventually reaching the railroad at about 2.00 p.m. The tanks were then committed, albeit in a piecemeal fashion. I./Panzer Regiment 5 moved to Perbais, while 1. Kompanie of I./Panzer Regiment 6 moved to Ernage. With tank support, the Schützen pressed on to Noirmont, which they reached at about 7.00 p.m., before coming up against a French counter-attack that started 30 minutes later. Once again, there was no breakout, and heavy losses were taken; the attack was called off. Shortly before 9.00 p.m., 3. Panzer Division's HQ ordered a withdrawal, thus putting an end to the Gembloux battle. The following day, aware of the German breakthroughs to the south, the French withdrew and Hoepner's Panzer Division followed them. In this instance, at least, blitzkrieg had failed.


Nil-St-Vincent
Mont-St-Guibert
Blanmont
Hévillers
Walhain
Chastre
Perbais
Noirmont
Ernage
Cortil
St-Géry
Grand-Manil
Gembloux
Lonzée
Corroy-le-Château
Haute Bise
Fèrot
Lérines
Sart-lez-Walhain
Baudecet
Sauvenière
Thorembais-St-Trond
Ponceau
Perwez
Taravisée
Le Corbeau
Grand-Leez
Petit Leez
Meux
Beuzet
St-Denis
BOIS DE BU
BOIS DE GRAND LEEZ
HAUTE BISE
1. Kp from afternoon
German units, 15 May
French units, 15 May
French second defence line

Rommel's breakthrough at the Meuse

Hermann Hoth's XV. Armeekorps (mot) faced quite a difficult situation during the first days of the offensive. Moving on Heeresgruppe A's right flank, its 5. Panzer Division got caught up in traffic jams that delayed its advance to the Meuse, while Generalmajor Erwin Rommel's 7. Panzer Division took full advantage of the lack of sophisticated French road obstructions. Such obstacles, minefields in particular, tended to be placed almost exclusively on main roads, which enabled Rommel to re-route his division to country or side roads.

On the morning of 13 May Panzer Regiment 31 was attached to 7. Panzer Division, since, along with part of Aufklärungs Abteilung 8, it formed 5. Panzer Division's spearhead. Also, Rommel created two Verfolgungsabteilungen (pursuit detachments) to chase the retreating 1st and 4th French Cavalry Divisions, one under Oberst Rothenburg with most of Panzer Regiment 25 (which he commanded) plus Schützen Regiment 6, and the other under Oberst von Bismarck made up of Schützen Regiment 7 (which he commanded) and II./Panzer Regiment 25. Each one of these groups was spearheaded by a single Vorausabteilung; for example, Kradschützen Bataillon 7, reinforced by a Panzer company, led the way for Gruppe Rothenburg. As early as mid-afternoon on 12 May the leading elements of Gruppe von Bismarck reached the river at Dinant, followed a little later by the leading elements of Panzer Regiment 31 at Yvou. Neither could get across the river, and Aufklärungs Abteilung 8 was sent to look for a suitable crossing point. It actually found one a few kilometres to the south, at Houx, and lost no time. Using a lock gate, its 3. Kompanie crossed the river at 11.00 p.m. and established a small bridgehead, thus taking the French completely by surprise (it was actually the first German unit to cross the Meuse in May 1940, and was only temporarily under Rommel's command). In the early morning of 13 May three Schützen battalions from SR 14 and 13 crossed the river expanding the Houx bridgehead, though the attempt to establish a second bridgehead north of it eventually failed.

The French reacted strongly, though any attempt to counter-attack was slow and poorly coordinated. Shortly after the Germans crossed the Meuse at Houx on the 12th, the II Battalion of the 39th Infantry Regiment was sent to check the situation. This did not prevent the Germans from strengthening and enlarging the bridgehead, however, and in the end no real counter-attack ever took place. II French Army Corps gathered infantry, tanks and recce units with the aim of delivering a counter-attack against 5. Panzer Division on the 13th. However, during the approach march the II/129th Infantry Battalion was hit hard by Stuka dive-bombers and withdrew to its start position, while other units were late in reaching their assigned areas; it was only at 9.00 p.m that all was ready for the attack to start. With the advent of darkness, the artillery could no longer provide support, and the attack was postponed to the following morning, only to be cancelled later.

XI French Army Corps' attempt suffered a similar fate. Its slow reactions brought delays in concentrating units scheduled for the attack, the infantry in particular. In the end the armoured and motorized units only got going at 9.00 p.m. on 13 May, advancing close to the Meuse, before, with no trace of their own infantry, they decided to pull back. This certainly helped Rommel in getting his own men across the river. On the 13th, the two groups made two separate attempts to do so. To the north (south of Houx) Kradschützen Bataillon 7, along with elements from Schützen Regiment 6, established a bridgehead that soon merged with that of 5. Panzer Division. To the south, von Bismarck's men had quite a difficult time: the French positions were intact and German soldiers trying to cross the river in boats were fired on continuously. The French artillery also kept harassing the German troops on the eastern side of the Meuse. Eventually, a small bridgehead was established at Bouvignes, held only by a single Schützen company. However, Rommel soon realized this was

the *Schwerpunkt* of the battle. He ordered the construction of a bridge between Leffe and Bouvignes and, wasting no time, also ordered Pionier Bataillon 58 to ferry tanks across the river. The task was a complicated one, but, when the morning come, some 30 tanks had been ferried across. However, by then even Rommel had been taken by surprise by 7. Panzer Division's advance.

Taking advantage of the experience and the knowledge gained from an exercise held before the offensive (actually dealing with an attack from Dinant to Onhaye), von Bismarck decided to execute an all-out attack. With a good deal of his regiment ferried across the river during the night, he began a march towards Onhaye, which he reached at about 8.00 a.m. on 14 May. He reported the news to Division HQ, but the message was misunderstood and Rommel was told that Bismarck had been surrounded (*eingeschlossen*) at Onhaye rather than having reached (*eingetroffen*) it. To face the 'crisis', Rothenburg and the 30 tanks already ferried across the Meuse were sent to Onhaye, where they met Schützen Regiment 7 and eventually seized the town. As usual, Rommel in person led the attack inside one of the tanks, which was hit twice by French artillery fire. Wounded in the face, he eventually abandoned the tank and soon restored the situation.

A few hours later, the construction of the bridge had been completed, and Rommel could now issue orders for 15 May. The division was to advance to the west, avoiding villages where possible and always keeping on the move – something Rommel was going to make sure of by leading the attack himself. The objective was Philippeville, some 22km west of Onhaye. Meanwhile, during the 14th the French belated reaction came and a fierce struggle ensued with 5. Panzer Division for the control of Haux la Wastia, which the latter eventually won. The bridgehead at Yvou could not actually be expanded much further, simply because Rommel insisted to Hoth that the only available bridge – actually belonging to 5. Panzer Division – had to be used instead by his own division, something that created bitter resentment with Generalleutnant Max von Hartlieb. The decision was sound, however; thanks to the advance of Hoepner's XVI. Armeekorps toward the Gembloux Gap (just to the north), on 14 May the HQ of French First Army was still convinced that the main German effort was in the north, and that the attacks across the Meuse were mere diversions. Only in the afternoon of 14 May were both the 4th North African and the 1st Armoured divisions ordered to move to the Dinant area. During the night the leading elements of 1st Armoured Division reached the Flavion area, close to the town of Morville, which the advanced elements of Panzer Regiment 25 had reached more or less at the same time, paving the way for the next day's advance. If the French tanks had had a greater range they might have been able to proceed further east, as their commander wished, running head on into Rommel's still weak 7. Panzer Division.

At first light on 15 May, the Luftwaffe bombed the area west of the German bridgeheads between Dinant and Sedan, destroying in the process the fuel columns of 1st French Armoured Division. At about 8.00 a.m. Panzer Regiment 25, personally led by Rommel, moved north to Flavion where it all but destroyed two tank battalions – the 25th (equipped with Hotchkiss 39 tanks) and the 28th (equipped with the heavy Char B1), both losing 26 tanks. At 11.00 a.m. 5. Panzer Division's Panzer Regiment 31, which had crossed the Meuse during the night, arrived north of Flavion. Though markedly inferior in terms of numbers and equipment – all in all the French had some 170 tanks (minus those destroyed by Panzer Regiment 25 and those sent to Denée), 65 of which were Char B1; whereas Panzer Regiment 31 only had 30 PzKpfw III and IV and some 90 light PzKpfw I and II – it eventually overwhelmed the French 1st Armoured Division. The reason for this success lay in radio communications and the use German tank commanders made of them. Attacking French tanks on their flanks and in their rear, the Panzers soon destroyed them. At the end of the day, French 1st Armoured Division had only

36 tanks left, which withdrew to the west. The losses also included nine Char B1 from 3rd Company of 37th Tank Battalion, which, trying to outflank Panzer Regiment 31, ran into the advanced positions reached by the leading elements of 8. Infanterie Division, which had replaced 5. Panzer Division at the Yvou bridgehead. Using artillery and anti-aircraft guns, the Germans destroyed the French tanks one by one.

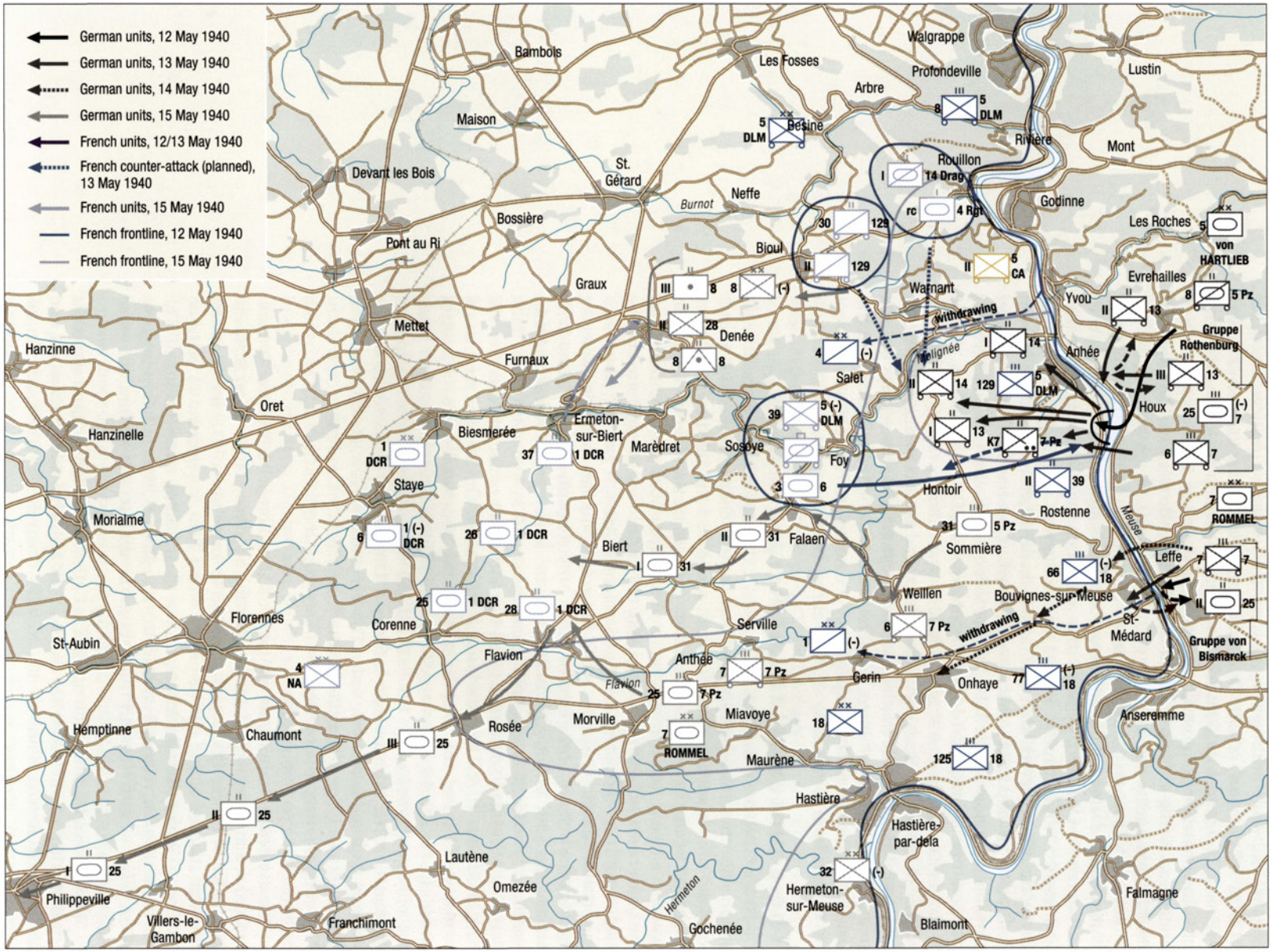
Rommel's Panzers fought briefly at Flavion, before marching to Philippeville, overwhelming all the units of 4th North African Division they encountered on the road. By noon they were at Philippeville and at dusk they had reached Froid Chapelle, some 15km to the west. On 15 May the Panzer Divisions had achieved what just a few months before would have been considered an impossible goal. To the south, Guderian's 1. and 2. Panzer Divisions were now almost 30km west of Sedan; north-west of them, 6. Panzer Division (the leading division of Reinhardt's XXXXI. Armeekorps, whose 8. Panzer Division was still at the Meuse) was 40km away at Montcornet. Further to the north, Hoth's XV. Armeekorps had broken through the French 9th Army defences, while north of Namur Hoepner's XVI. Armeekorps was still trying to get past the Gembloux Gap. The breakthrough had been achieved and the road to the Channel was open. Only a counter-attack could now prevent the Panzers from surrounding the bulk of the Allied forces.

The counter-attack at Arras

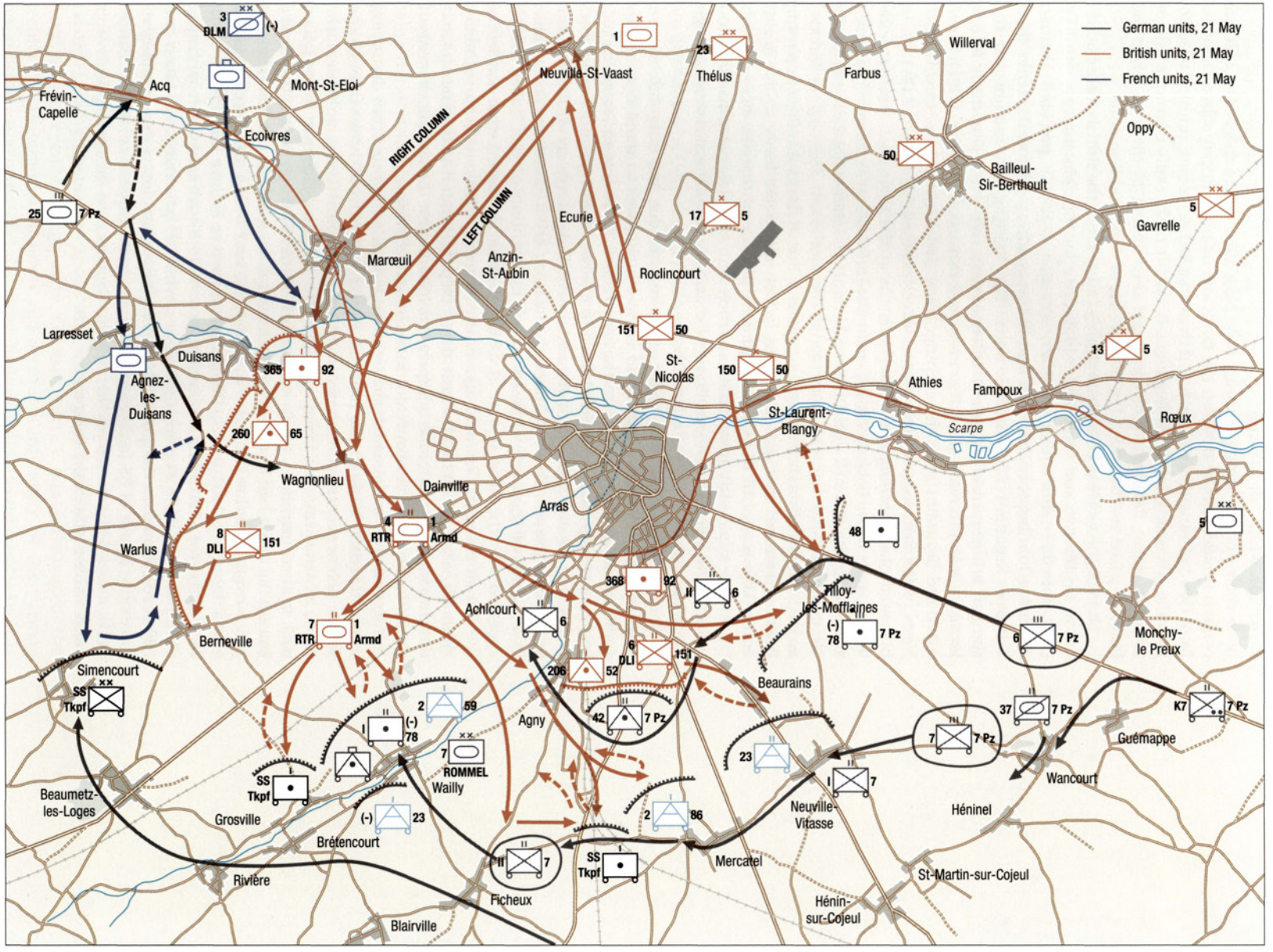
On 20 May 1940 the spearheads of Guderian's XIX. Armeekorps reached the sea at Abbeville, thus cutting off the equivalent of four enemy armies. The 'Panzer Korridor' was, however, still rather weak, and a decisive Allied counter-attack might still be able to restore the situation. Once again, the French reaction was slow and sluggish and the proposed counter-attack from both the north and the south never materialized. In the end, only British forces, supported by the French 3rd DLM, moved against the Germans at Arras. It was not, however, a true counter-attack: rather, it was a large mopping-up operation aimed at securing the defence of the city, in which only elements from 1st Army Tank Brigade and 50th Infantry Division took part. Moreover, technical problems significantly reduced British tank strengths. On 10 May the 4th Royal Tank Regiment (RTR) had 50 Matilda I and five Vickers VI tanks, whereas 7th RTR had 23 Matilda II, 27 Matilda I and 7 Vickers VI. On 21 May mechanical breakdowns reduced the total strength of the two battalions to a total of 88 tanks, of which 58 were Matilda I and 16 Matilda II tanks (the latter being the only gun-armed one). 7th RTR led the right column, also comprising 8th Battalion The Durham Light Infantry (DLI) plus one field artillery battery, and anti-tank and motorcycle units. The left column was made up of 4th RTR plus the 6th DLI, one field artillery battery, and anti-tank and motorcycle units. Protecting their right wing were elements from the French 3rd DLM, which deployed some 60 Somua tanks.

The day before this force set out for the attack, Rommel's 7. Panzer Division was ordered to move west of Arras and secure a crossing on the River Scarpe at Acq. Since 5. Panzer Division was unable to keep up, on 21 May 7. Panzer Division attacked alone. On Rommel's orders Panzer Regiment 25 acted as divisional Vorausbteilung with the task of spearheading and seizing Acq. The rest of the division, mainly its two Schützen Regiments, were to follow up some 10km away – with virtually no protection against any enemy armoured counter-attack.

Slowed down by congestion on the roads, the British right column started its attack at 2.30 p.m. The troops had only had a little time to study their orders, and no time at all to reconnoitre the terrain. After Etrun the 7th RTR headed in the wrong direction and lost contact with the infantry, which, in the meantime, seized Duisans from the German vanguard troops. Most of 8th DLI (minus two companies plus two anti-tank batteries left at Duisans) moved to Warlus and



Rommel's breakthrough at the Meuse, 12–15 May 1940.



The counter-attack at Arras, France, 21 May 1940.

Berneville, while 7th RTR reached the road south of Dainville and, from there, once more took a wrong turning, switching west rather than east. The left column avoided similar troubles: the tanks and infantry quickly seized Dainville from German vanguard elements and then attacked Achicourt, running head on into the advancing Schützen Regiment 6. British tanks easily overran a line of 37mm German PAK guns and continued their march to the east, while the infantry seized and defended the two villages of Agny and Beaurains.

Though the Germans had been dealt a heavy blow, the British force had no follow-up reserves and soon paid a high price for this. Moving east, 4th RTR (split into two different spearheads) attacked a hastily prepared German defensive line between Mercatel and Tilloy, made up of four batteries from Artillerie Regiment 78 plus Flak units. The fighting was intense and the German artillery and Flak guns exacted a heavy toll, destroying many British tanks. In late afternoon the left column had exhausted its drive; 6th DLI held Agny and Beaurains until the evening, when they were ordered to withdraw. News of the British armoured counter-attack reached Rommel at 4.00 p.m. in his usual place, leading Panzer Regiment 25 at the divisional spearhead. He immediately drove back to Wailly, where the II./Schützen Regiment 7 had been attacked by the 7th RTR (8th DLI seized Walrus and Berneville and only briefly attempted to push on to the main road to the south-east). Even before Rommel arrived, the situation did not appear critical: a line of fire had been set up using field, anti-aircraft and anti-tank guns, which shot relentlessly at the British tanks. This was until the German gunners discovered that the heavy British tanks were apparently invulnerable to their fire, at which point panic spread through the German soldiers. Rommel's reaction saved the situation, though not without help from the enemy too.

Rommel acted both as a leader and a commander. Not only did his own physical presence on the battlefield compel his soldiers to stand fast, but his appreciation of the situation on the spot (which British commanders lacked, being faraway from the battlefield) led to a series of decisive orders. The lines of defence created using artillery and heavy Flak effectively dealt with the British heavy tanks. Between Mercatel and Tilloy 4th RTR lost two dozen tanks in a matter of minutes, while the quick intervention of the Stukas (which appeared over the Arras skyline at 6.00 p.m.) soon destroyed what was left of the British columns. Rommel also ordered Panzer Regiment 25 to withdraw, although, when it reached Duisans after 7.00 p.m., it ran into the French tanks now heading north after having spread havoc amongst the leading elements of the still-green SS 'Totenkopf' Motorized Infantry Division.

After a fierce battle, which the Germans won at a high cost (but destroying some 20 French tanks in the process), Panzer Regiment 25 broke through the British defences between Duisans and Walrus at about 10.00 p.m. By then, the battle at Arras was over. What was left of the British and French forces pulled back to their own lines, while Rommel's 7. Panzer Division licked its wounds. During the day it had lost 89 dead (Rommel's aide included), 116 wounded and 173 missing in action (though 90 of them got back to the division); no data is available on the tank losses, though some sources believe 20 German tanks were destroyed. According to German records 43 British tanks were destroyed (25 by the Artillerie Regiment 78 alone), while 50 prisoners were taken and 200 dead counted on the ground. However, British tank losses were even higher since only 28 out of 88 tanks made their way back. Three days later the Panzer Division would be halted on their way to Dunkirk, but they had already won the decisive battle of the campaign.

Lessons learned

The German victories during the blitzkrieg years of 1939–40, and the defeat of France in particular, led to the creation of several myths about the might of the German Army and the superiority of the Panzer units and the Luftwaffe. The myth of the Panzerwaffe even grew stronger and lasted long after Germany's final defeat, in spite of the fact that no other major victory followed to match that of the May–June 1940 campaign. The campaign was indeed a turning point in the history of modern warfare, although many years would pass before the real lessons were properly understood. The Germans, indeed, learned the wrong lesson: having overvalued their enemies, they overvalued their own achievements and capabilities – and those of the Panzerwaffe in particular – suggesting to themselves that the Soviet Union could be defeated with a similar campaign. Germany's adversaries, on the other hand, came to quite different conclusions. At first, the German victory was explained by the numerical superiority of the German Army, then (some time after the war, when the true figures became available) by the lack of preparation and the eventual collapse of the French Army's morale. Only in recent years, thanks to the works of Karl-Heinz Frieser and Ernest R. May (to name but two of the most significant ones), has a more accurate and reliable picture been provided. The French were not inferior to the Germans, rather they held a significant advantage, and their 'morale collapse' was anything but the real reason for their defeat. The May–June 1940 campaigns, like the 1939 campaign against Poland, were not the 'cake walk' described in the early war years, especially when compared to the Russian campaign. Both were hard fought and hard won against enemies that not only were superior in terms of numbers and weapons (as in France's case), but were also bold and skilled. The Germans were even more bold and skilled, which led to the myth of the Panzerwaffe growing stronger. It was indeed a stunning and unrepeatable victory.

The evolution of the German armoured arm was the result of the development of doctrines and strategies dating back to the previous century. There were, however, several decisive contributions, the most important being the decision to concentrate most of the Panzer Divisions in a small stretch of the front to achieve a decisive breakthrough and envelop the enemy. However, the victories of 1939–40 were the result of many different factors coming together at the right time and in the right place. Divisional organization was one; the most decisive innovation was the creation of an inter-arms unit that enabled the Panzer Divisions to break through the enemy lines of resistance along the Meuse. The creation of the Panzer Brigades also enabled the Panzer Divisions to make up for their inferiority in terms of numbers and of quality against their adversaries. This process was helped by the German command system and by tactics, which highlighted the need for speed and boldness. Although later in the war German armoured tactics switched towards increased combined-arms warfare, mostly carried out by the Kampfgruppe, in 1940 the supremacy of the tank on the battlefield proved to be a perfect solution to the conditions which then existed. Lacking adequate weapons with which enemy armour could be dealt with on an even footing, early German tactics counterbalanced the technical – in terms of weapons and armour – inferiority of the Panzers towards their adversaries. Yet the speed, manoeuvrability and aspects such as multi-manned turrets and wireless communications, provided great advantages to the Panzer Divisions.

Rapid and fast communications – something we take for granted today – proved decisive, simply because they enabled the German commanders to put their tactics into practice. This is probably one of the keys to the Panzer Divisions' successes during the blitzkrieg years. The Germans were already fighting modern, mechanized warfare, whereas their adversaries simply were not. However, the decisive factor undoubtedly lay in the German command and leadership. Without the talents and dedication of those working on the development of the German armoured arm during the interwar period, and of the skilled and capable commanders and staff officers on the field of battle, no innovation, tactics, or technological advance would have sufficed to achieve such emphatic victories. In the campaigns that followed, there would be few similarities, and the Panzer Divisions would undergo many changes in organization, doctrine, tactics and weapons.

Abbreviations and glossary

In German, a number (either Arabic or Roman) followed by a full stop denotes an ordinal number. Thus, for example, '1. Panzer Division' should read 'First (or *Erste*) Panzer Division'. Note that in German practice companies, regiments and divisions used Arabic numbers, while battalions, brigades and corps used Roman ones.

AA	Aufklärungs Abteilung (reconnaissance unit)
Abt	Abteilung (detachment, battalion)
AR	Artillerie Regiment (artillery regiment)
Armee	Army
Art	Artillerie (Artillery)
Armeekorps	Army Corps
Aufklärungs (Aufkl)	reconnaissance
Ausf	Ausführung (variant)
Beamte	civilian officials serving in military units
Betriebs Stoff	fuel (petrol)
Brig	Brigade
Brüko	Brücken Kolonne (bridging column)
Bt, Bttr	Batterie (battery)
Btl, Batl	Bataillon (battalion)
CA	Chasseurs Ardennais
Cav Cps	Cavalry Corps
Cuir	Cuirassiers
DCR	Division cuirassé de la reserve (reserve armoured division)
DIM	Division d'infanterie motorisée (motorized infantry division)
DiNaFü	Divisions Nachschub Führer (divisional commander of supply units)
Div	Division, Divisions (division, divisional)
DLI	Durham Light Infantry
DLM	division légère mécanique (light mechanized division)
Drag	Dragoons
Drückerei	printing
DVA	Divisions Verpflegungs Amt (divisional food supply office)
Feld	field
Feldgendarmerie	military police
Feldlazarett	field hospital
Feldpost	field post
FH	Feld Haubitze (field howitzer)
Fla	Flieger Abwehr (anti-aircraft, used for Army AA units)
Flak	Flieger Abwehr Kanone (anti-aircraft artillery)
Funk	radio
GD	Grossdeutschland ('greater Germany', the name of an elite infantry regiment)
Geschütz	gun
Gruppe	group (used for Panzer commands at corps level, such as 'Gruppe Guderian')
H	Heer (army)
Haubitze	howitzer
Heeresgruppe	Army Group
IG	Infanterie Geschütz (infantry gun)
Inst	Instandsetzung (maintenance)
IR	Infanterie Regiment (infantry regiment)
K, Krdschtz	Kradschützen (motorcycle infantry)
Kanone	gun
Kartenstelle	mapping detachment
Kdr, Kdt	Kommandeur/Kommandant (commander)
Kfz	Kraftfahrzeug (vehicle)
KG	Kampfgruppe (battle group)
Kolonne (Kol)	column
Kommando	divisional headquarters
Kompanie (Kp, Komp)	company
Kradmelde	messenger

Kradschützen	motorcycle infantry
Kraftwagen (Kw)	motor vehicle
Krankenkraftwagen	ambulance
KStN	Kriegsstärke Nachweisung (war establishment chart)
KwK	Kampfwagen Kanone (tank gun)
LAH	Leibstandarte Adolf Hitler (Hitler's bodyguard, a Waffen-SS unit)
Lehr	demonstration
leichte (le, l)	light
Mar	Marocaine (Moroccan, division)
MG	Maschinengewehr (machine gun)
mittlere	medium
mot	motorisiert (motorized)
mot Z	motorisierte Zugkraftwagen (motorized, towed by a vehicle)
MTW	(gepanzerte) Mannschafts Transport Wagen (armoured personnel carrier vehicles)
NA	*nord africain* (north African)
Nachrichten (Nachr)	communication
Nachschub	supply
OKH	Oberkommando des Heeres (Army High Command)
Panzer Späh, Panzerspäh	armoured car
PAK	Panzer Abwehr Kanone (anti-tank gun)
Pi, Pion	Pionier (engineer, sapper)
Pz	Panzer (tank, armour)
PzB	Panzerbüchse (anti-tank rifle)
PzBefh	Panzerbefehlswagen (command tank)
PzDiv	Panzer Division (armoured division)
PzJäg	Panzerjäger (anti-tank)
PzKpfw	Panzerkampfwagen (tank, AFV)
PzRgt	Panzer Regiment (tank regiment)
Rc	recce
Rgt	Regiment (regiment)
RTM	Regiment tirailleurs marocaines (Moroccan rifle regiment)
RTR	Royal Tank Regiment
Sanitäts	medical
Schlachterei	butcher
Schützen (Schtz)	light infantry, motorized
schwere (schw, s)	heavy
SdKfz	Sondern Kraftfahrzeug (special vehicle)
sfl	Selbstfahrlafette (self-propelled) [also: mot S, motorisierte Selbstfahrlafette]
Sp	Spahi
SR	Schützen Regiment (motorized infantry regiment)
SS	Schütz Staffeln (protection squads)
SS-T	SS Division 'Totenkopf' (death's head)
St	Sturm (assault)
Stab (St)	HQ, staff
Staffel	squadron
(t)	tschechisch (Czech)
Tross	train
Trupp (Tr)	section
Verfolgungs Abteilung	pursuit detachment
Verm	Vermessung (survey)
Verw	Verwaltung (administration)
Vorausabteilung	advanced detachment
Werkstatt (Werkst)	workshop
Wielkop	Wielkopska cavalry brigade
zbV	zur besonderen Verwendung (for special purposes)
Zug	platoon

Officers' ranks equivalents

Leutnant	Lieutenant
Oberleutnant	First Lieutenant
Hauptmann	Captain
Major	Major
Oberstleutnant	Lieutenant Colonel
Oberst	Colonel
Generalleutnant	(Brigadier) / one-star General
Generalmajor	Lieutenant General / two-star General
General der...	Major General / three-star General
Generaloberst	General / four-star General
Generalfeldmarschall	Field Marshal

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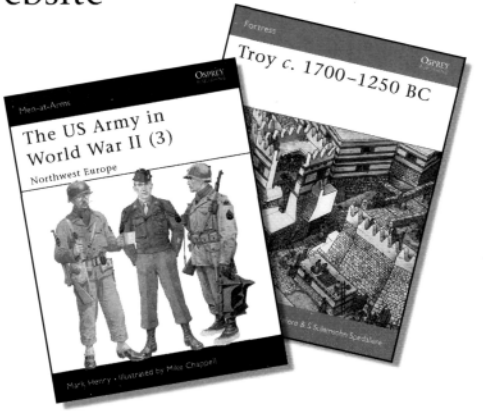

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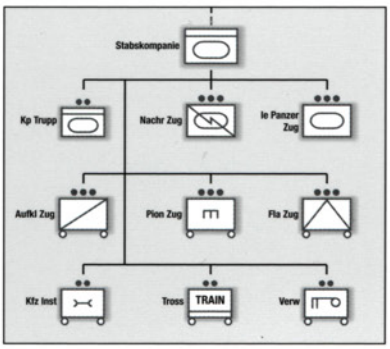

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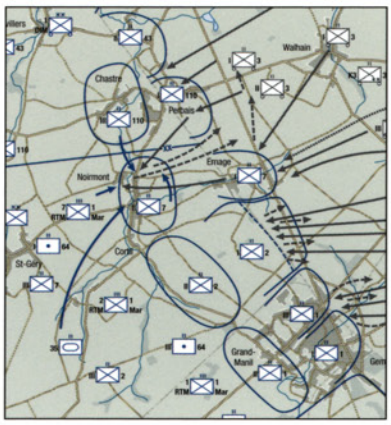

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