Thomas Anderson

THE HISTORY OF THE PANZERWAFFE

VOLUME 1: 1939–42

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INTRODUCTION

The Panzer – tank – was the vehicle which spearheaded the rapid German advance through Western Europe. Also the Panzer allowed the A*frika Korps*, commanded by Erwin Rommel, to rapidly advance through the deserts of North Africa. The vehicles were deployed to lead the invasion of the Balkans and in the forefront of the invasion of Russia, advancing to the edge of Moscow. Panzers also led the attack on the Caucasus.

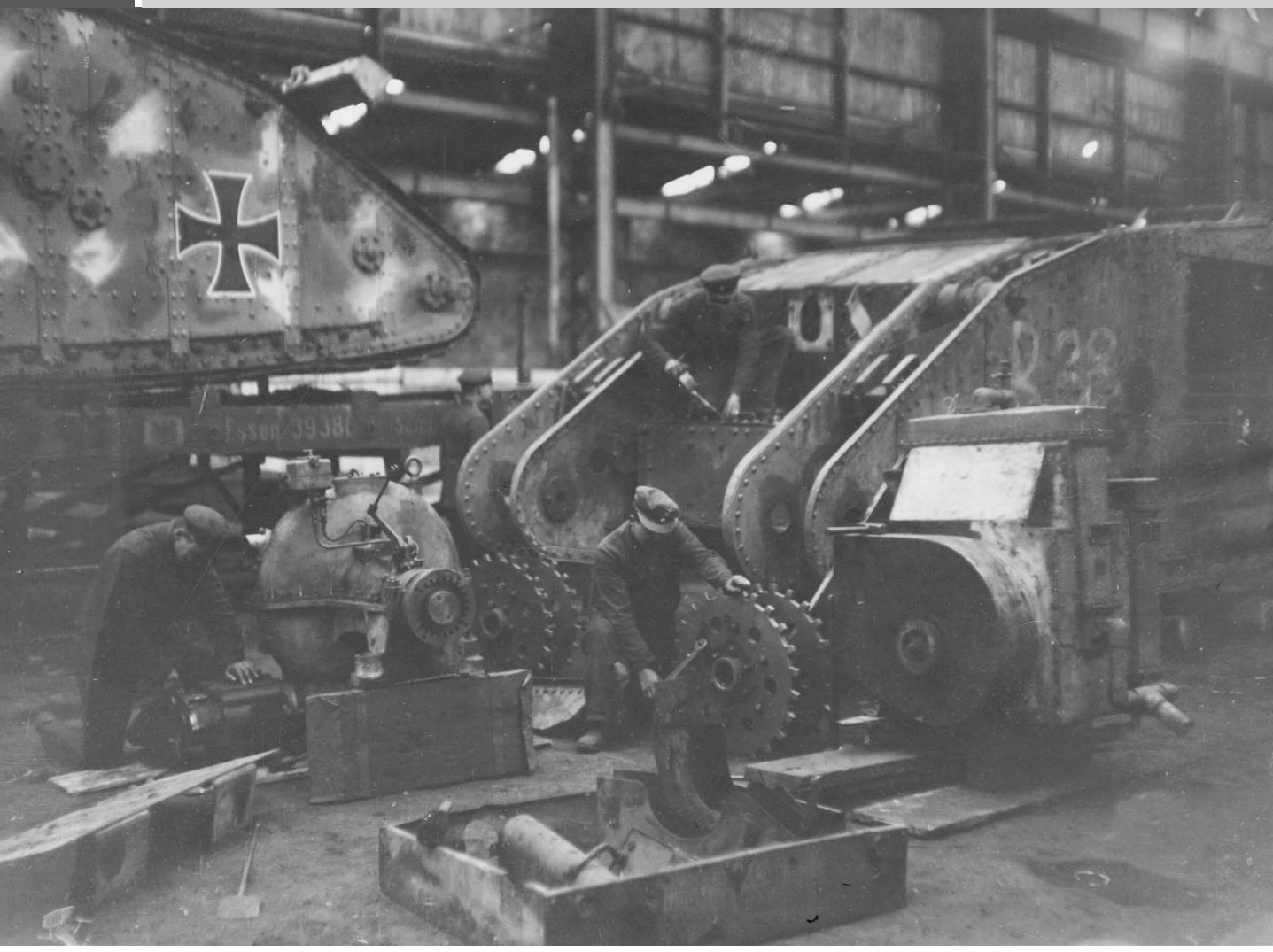
However, there is a danger of thinking that the stunning success of the German war machine in the first years of the war was due to this vehicle: this would be both wrong and imprecise. To completely understand the historical development in its entirety, it is wise to go back in history.

In 1915, during the catastrophe of World War I, infantry warfare came to a halt and opposing forces faced each other across a no-man's land. Modern weapons had entered the battlefield. New and accurate heavy artillery allowed a steady and precise bombardment of the front line. Here, among the hundred thousands of soldiers cowering in trenches, barbed-wire and the machine gun dominated the battlefield. For the next few years the battle was static; many times an advance was followed by an immediate retreat.

To breach this stalemate a new weapon was developed and appeared on the battlefront: The tank. Although the contribution it made to the Allied victory is commonly overestimated, it certainly marked the dawn of a new age in mobile warfare. By the end of the war an estimated 8,000 tanks had been produced.

The war ended in November 1918 with the unconditional surrender of the *Reich*. The German Empire had been defeated both economically and militarily. After the war the balance of power in Europe completely

Left:
German forces captured some 40 British Mk IV tanks on the Western Front. The tanks were transported to the *Bayerische-Armee-Kraftwagen* Park 20 (BAKP 20) workshop at Charleroi, Belgium, to be dismantled and repaired for return to the battlefront to fight against the British and French forces. (NARA)



Above:
Mechanics at BAKP 20 dismantle and inspect the drive units of a British Mk IV tank. The vehicle in the background has been painted in German-style camouflage and carries the German *Balkenkreuz*. The first combat using the *Beutepanzerwagen* (*Beute* – looted [captured]) was by *Sturmpanzer-Kraftwagen-Abteilung* in early 1918. (NARA)

changed; the monarchies of Germany, Austria-Hungary and Russia had been overthrown, and the Ottoman Empire had disintegrated. A new global player had entered the field: the United States of America.

A League of Nations was formed to prevent any armed international conflict and solve differences by diplomacy. A fragile peace followed until 1939.

However, after the end of the war further problems arose. The German *Reich* was held responsible for the war and the victors, mainly France, demanded immense reparations. Furthermore, the Treaty of Versailles forced the German *Reich* to disarm and abandon all overseas colonies. It is interesting that the German delegation was not allowed to participate in these negotiations.

Quite naturally, the content of the treaty was controversial. The French and others were not content, and judged the volume of the reparations as

being too low. However, the respected British economist Keynes thought that the terms of the treaty as being too harsh and counterproductive. Time would show that Keynes´ fears were valid. In Germany, the conditions set out in the treaty, justified or not, were disputed and most unpopular. The rampant inflation in Germany, which had begun at the outbreak of World War I, reached a climax in 1923 after the French Occupation of the Ruhr, the largest industrial area in Germany. The population was severely affected and held the French occupiers responsible. The Great Depression, of the late 1920s, aggravated the situation. A high rate of unemployment and a depressed population prepared the ground for nationalism to rise unchallenged. In this atmosphere of desperation Hitler was able to seize the power, undermining and finally supplanting the fragile German democracy.

Above:
A rebuilt Mk IV of *Sturmpanzer-Kraftwagen-Abteilung* (*Beute*) parked on a street in Armentiéres, France shortly before the type was first used in combat by German forces during March 1918. Any success was limited due to the usage of inexperience crews and who had not been sufficiently trained in tank tactics. (NARA)

The army of 100,000

In the inter-war period the German military, hampered by the restrictions, maintained as a small standing army, the 100,000 *Mann-Heer* (army of 100,000 men), which was allowed to be used to maintain law and order in Germany. Thus the creation of the German tank force took place under most difficult circumstances, with all work cloaked in secrecy. The first tracked vehicles and tanks were developed as 'agricultural tractors' by companies like Daimler-Benz, Rheinmetall and Krupp. Testing the vehicles was possible only at locations a long distance from Germany. At that time the fledgling German republic was in close contact with the Soviet Union, which was most interested in all types of modern technology. The German prototypes could be tested without being observed in the eastern regions of Russia. It was here the trials to develop the combat methods for the new vehicles were first carried out.

Author's Note

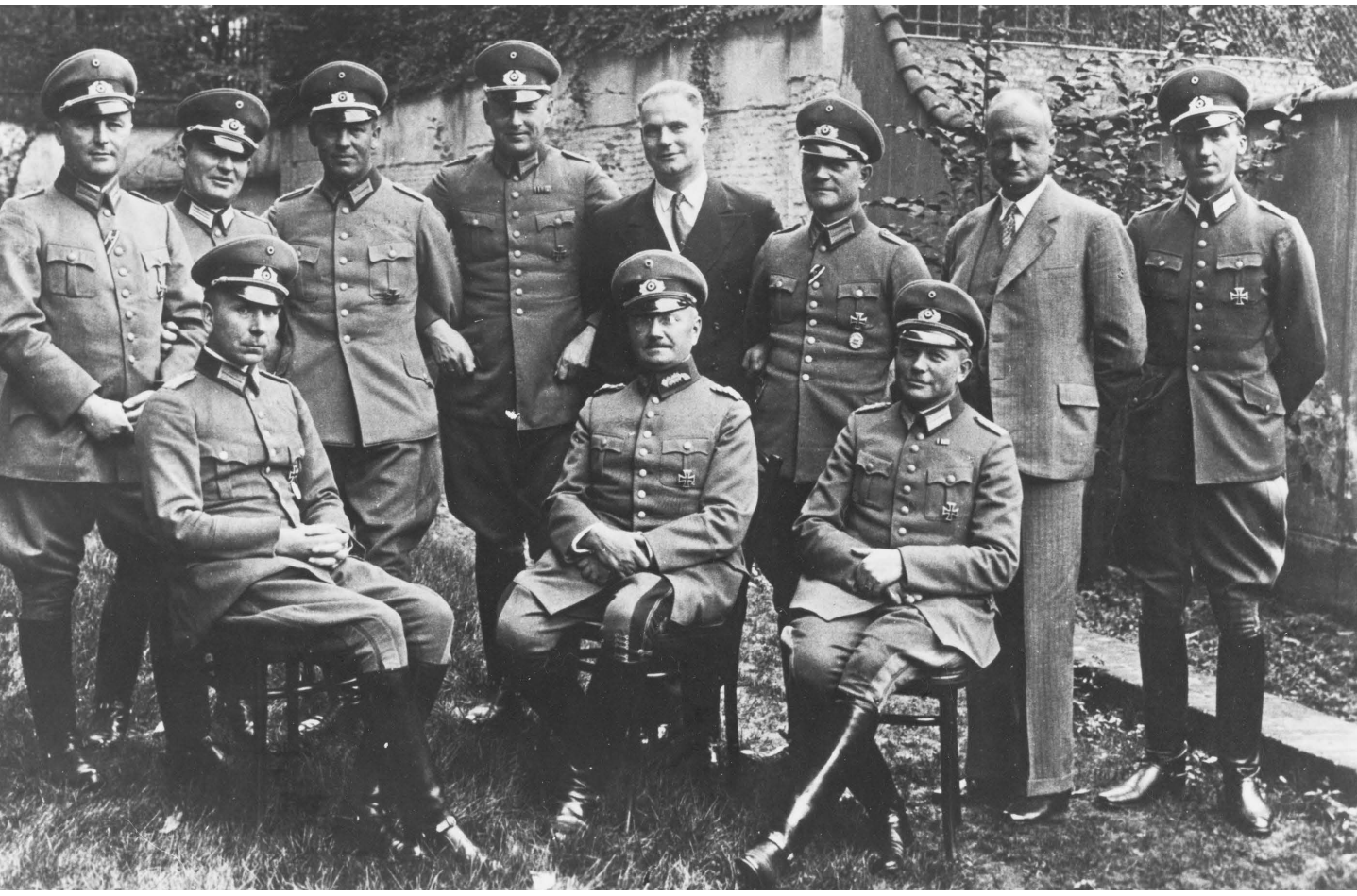
I will try to explain the origin and development of the German tank force comprehensibly and accurately. Wherever possible, original German official documents have been referred to and all relevant technical data used. Thanks to the German bureaucratic mind many documents were created, and

Below:
The 30-ton A7V was Germany's answer to British and French tank designs. Both countries produced more than 8,000 tanks, whereas Germany was only able to deliver 20 before the end of World War I. The A7V was armed with six machine guns and a 57mm main gun mounted at the front. (von Aufsess)

Above:
The four *Sturmpanzer-wagen* A7V being unloaded near Charleroi, Belgium represent 20 percent of German tank production in World War I. Despite having a superior drive train, the A7V had an inferior cross-country performance to that of enemy tanks. (Kümmel)

Left:
Armoured cars were cheaper and simpler to manufacture than tanks, and both sides deployed significant numbers of the type during World War I. This Daimler DZVR 21 *Schützpolizei Sonderwagen* (police special vehicle), armed with two machine guns, was developed after the war. (Hoppe)

Left:
The main street of a town in Germany in the 1920s; several Daimler DZVR 21 *Schützpolizei Sonderwagen* are parked with staff and transport vehicles. (Anderson)



Above:
Officers and officials of the *Inspektion der Kraftfahrtruppen* (Inspectorate of Motorized Troops) photographed in 1933. Seated from the left are Walther Nehring and the two officers who are known as the founders of the *Panzerwaffe*, Oswald Lutz (centre) and Heinz Guderian (right). (Anderson)

subsequently stored. Luckily, many of these files survived the war and were collected by members of the Allied military. Much of this material has been archived at the National Archives and Records Administration (NARA) in Washington, DC. The original documents were returned to Germany, and are located at the Bundesarchiv-Militärarchiv in Freiburg. These sources are more or less available to the public, and have been used in my research for this book.

The nomenclature for German weapons, vehicles and tanks followed a clear structure. Tanks were *Panzerkampfwagen*, abbreviated to PzKpfw. The term *Sonderkraftfahrzeug* (SdKfz) for special purpose motor vehicle was also ubiquitous. This strict naming was possibly a result of a certain German, or Prussian tradition – discipline, precision and (sometimes) slavish obedience.

However, in service on the frontline a commanding officer would use a different designation than his technical officer. A PzKpfw IV, for

Above:
The Vickers Mk I light cavalry tank, was the backbone of the British army until the mid-1930s. The interesting design shows many characteristics of a modern tank, it mounted a 47mm main gun in a centrally-positioned rotatable turret. The type also carried no less than four machine guns. (Anderson)

instance, was normally referred to only as the Panzer IV, or Pz IV. The production variants, commonly denoted as *Ausführung* (Ausf – model or mark) with letter (A, B, etc.) were absolutely irrelevant to him. Only the technical officer would have needed to know which model, and its chassis numbers. Matters changed when the long-barreled 5cm and 7.5cm guns were introduced. Subsequently, the terms *Langrohr* (Long barrel) and *Kurzrohr* (Short barrel) described the length. Now a clear differentiation was essential. But again, in his reports the unit commander would have used the simple suffixes k (*kurz*) and l (*lang*).

I will use the various designations as I found them in official reports, government orders, factory correspondence or, of greater importance, in the after action reports written by front-line commanders.

Thomas Anderson
June 2015

CHAPTER 1

LAYING THE FOUNDATIONS

Heinz Guderian has always been seen as the 'father' of the German tank force. He was born in 1888, and served in a front-line signals battalion during World War I.

After the war he was selected for service in the Reichswehr and served briefly in Prussia, where he fought against Soviet forces menacing the fragile situation in the Baltic. After some years as an instructor at a military school in Stettin, he transferred to the motorized troops. This was an awakening for the ageing officer who maintained a youthful attitude to life. Guderian, who always showed a great interest in sophisticated technology and new tactics, finally had the opportunity to make a significant contribution to the transformation of the Reichswehr into a modern army. After the long years of comparatively easy tasks, this was a true challenge. His experiences in World War I had left the impression that due to the enormous firepower of modern artillery, conventional offensive operations would not be feasible in any future conflict. Conversely, he was certain that only the tank would be the decisive weapon on any future battlefield. However, Guderian also realized that this would apply only under very special conditions. He demanded speed for a successful breakthrough operation and the concentration of his attacking forces against a specific target to shatter the defensive lines of the enemy. The fast-moving armoured forces should then exploit this local success and fan out to enlarge the gap. By employing and developing these theories Guderian and a number of his staff officers began to elaborate tactics for the future, but at that time, a hypothetical German tank force.

Guderian wrote in his book:

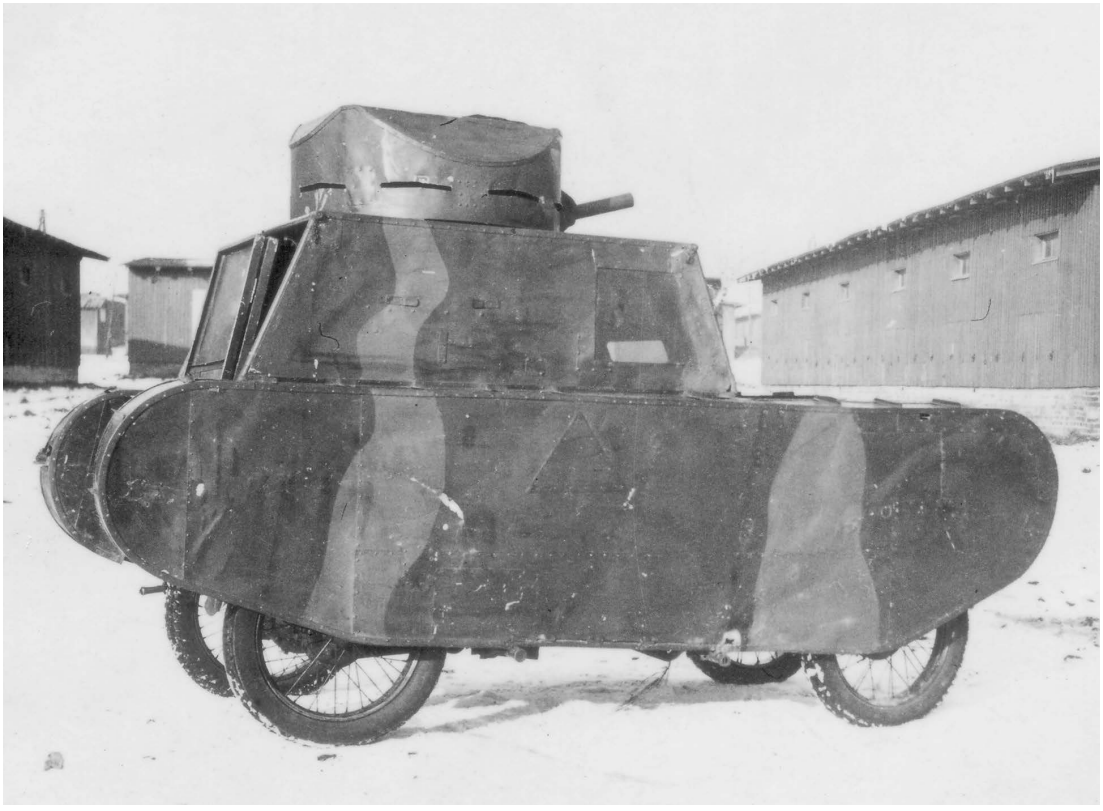
Left:
Panzerkampfwagen I Ausf A being used by tank crews of 4.*Panzerdivision* to practice manoeuvring through forested areas at Modling training grounds, near Vienna, in May 1941. (Anderson)

Above:
The Krupp-built *Leichttraktor* was designed in the late 1920s, and was extensively tested at the *Panzerschule* (tank school) training grounds at Kazan in Soviet Russia. This is a later version with modified suspension and is fitted with a *Gefechtsantenne* (frame aerial) around the superstructure. The 8-ton vehicle mounted a 3.7cm gun and a *Machinengehwehr* 13k (MG 13k). (Anderson)

> In 1929, I was finally convinced that Panzers could never play a decisive role if they are closely deployed with the infantry. My studies in military history, the evaluation of the large exercises in Great Britain and our own experiences with dummy tanks persuaded me that Panzers can exploit their extraordinary performance only if all associated support weapons, on whose assistance the Panzer relied, would be able to follow. Both speed and cross-country mobility of the respective forces have to be on a similar level. The Panzer must lead all other forces have to follow. We must not deploy Panzer within infantry divisions, and must establish *Panzerdivisionen*, which include all the support weapons required for a successful combat…

However in 1929, Guderian had to fight against many reservations uttered by senior German military leaders, who deemed such units as *Panzerdivisionen* as a dream. The *Reich* was surviving despite a severe economic crisis as the rate of unemployment increased.

In early 1930, Guderian was given command of *Kraftfahrabteilung* 3, a Prussian unit formed of four companies, stationed partly in Berlin and also Neisse/Lusatia. Guderian promptly started modifying this *Abteilung*



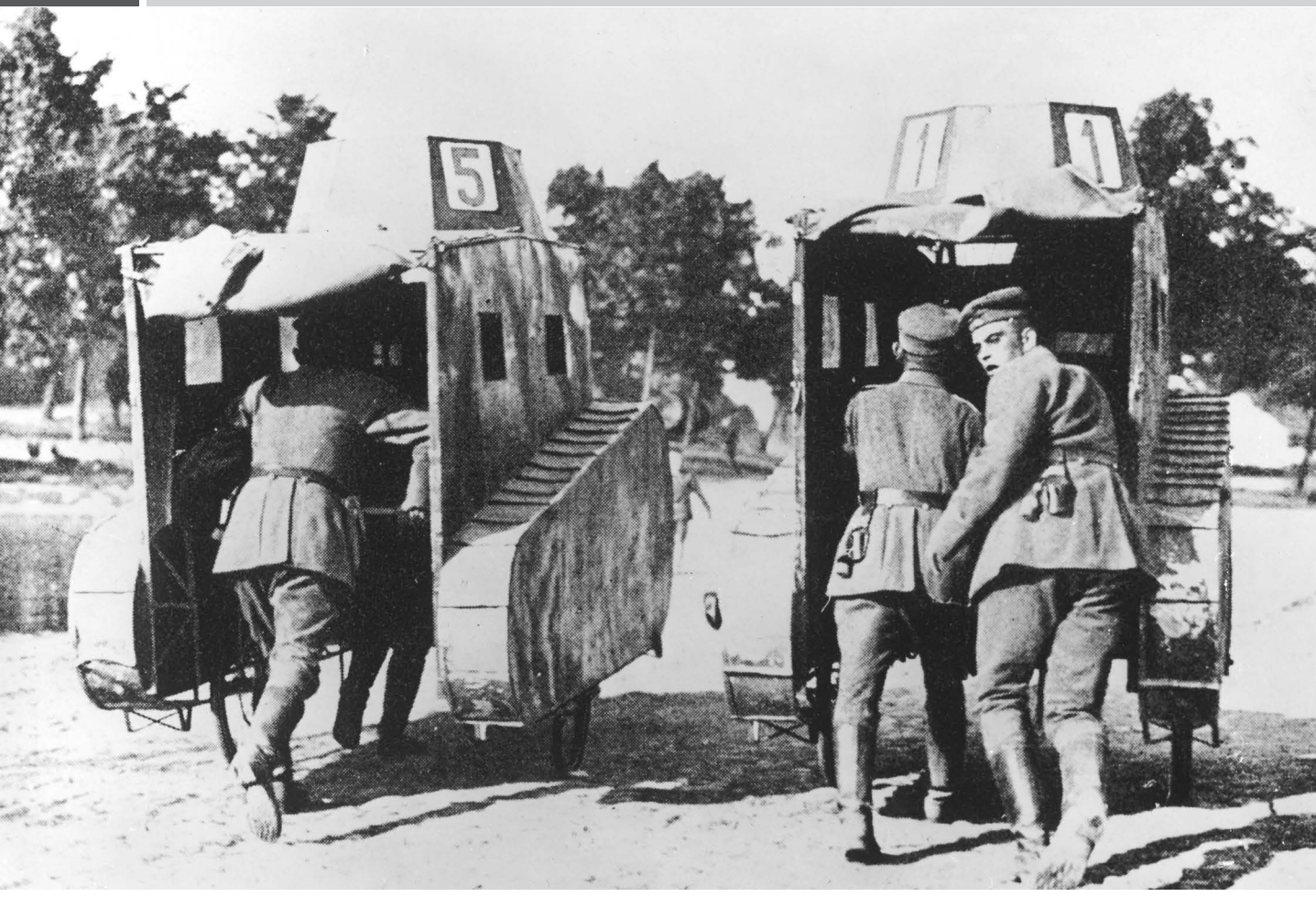
to his wishes.

The 1.*Kompanie* (Kp – Company) received Daimler Benz DZVR 21 *Schutzen Polezie-Sonderwagen* (police personal carrier) which entered service after World War I. The 4.Kp supported the 1.Kp with motorcycles and was the only unit armed with machine guns. Together, both companies played the rôle of a *Panzeraufklärungs-Abteilung* (armoured reconnaissance battalion). The 2.Kp simulated the *Panzer-Kompanie*, and was equipped with dummy tanks. The 3. *Panzerabwehr-Kompanie* (tank destroyer company), was also provided with dummy guns.

It can be assumed that *Kraftfahrabteilung* 3 formed the nucleus of what would later become the *Panzerwaffe*. The unit was regularly ordered to participate in numerous military manoeuvres. But, Guderian always complained that most military authorities did not take him, or *Kraftfahrabteilung* 3 seriously. Due to the restrictions of the Treaty of Versailles, the German army was still not allowed to have tanks, and as most of the German military had never seen an operational tank in combat; Guderian's dummy tanks raised pitiful laughter.

By the spring of 1931, *Oberst* Oswald Lutz, was promoted to General

Above:
As the German military was not allowed to have tanks under the terms of the Treaty of Versailles they were forced to use *Panzerkampfwagen-Nachbildungen*, (dummy tanks) when on manoeuvres. Passenger vehicles like the BMX 'Dixi' (a British-designed Austin 7 built under licence in Germany) were fitted with a dummy. (Anderson)



Above:
The first dummy tanks were mounted on frames fitted with bicycle wheels and had to be pushed over the 'battlefield'. For authenticity the 'tanks' were painted with tactical markings for this exercise in 1927. (bpk)

and succeeded Otto von Stülpnagel as the *Inspekteur der Verkehrstruppen* 6 (In.6 – inspector of motorized troops). Guderian appreciated that his direct superior had good organizational skills and, for his age, a surprising understanding of technical matters. General Lutz supported Guderian´s ideas and together they formed the organizational background for the future German armoured forces.

Of similar importance, however, was the theoretical background which was compiled by Guderian and his staff.

In his book Guderian mentions a simple numbers game:

> Red and Blue wage war against each other. Each party has 100 infantry divisions and 100 tank battalions. Red has deployed its tanks in the infantry divisions: Blue combined them with divisions as army troops. Over a front of 300km we assume 100km being safe against mechanized warfare, a further 100km being difficult to negotiate by tanks, and 100km suited for tank attacks. For an attack the following scenario is likely: Red

> has disposed a considerable part of its tanks in more or less impassable terrain, where they cannot move forward. A further part of the Red tank force will be hindered by difficult terrain. Thus Red has only a small part of its tanks in the sector with favourable terrain available. On the contrary, Blue has concentrated its tank force where they want to press for a victory, and where a commitment of tanks is possible. Here Blue can attack with a double superiority, while the rest of its tanks are available elsewhere to defend possible counterstrikes…
>
> Thus a decision to evenly disperse the tank force to infantry divisions will be a step back to the primitive British tactics of 1916/17, which at that time totally failed. It was not until Cambrai that their concentrated commitment of tanks led to a convincing success…

After World War I, a firm conviction prevailed that, despite the experience at Cambrai, the artillery and specialized anti-tank weapons would be able to stop any tank assault. Among many army officers and civilian administrators, be it home or abroad, an opinion was formed that any capital spending on large tank forces would be a waste.

Not surprisingly, Guderian and his staff disagreed with this opinion. The tank assaults in the final period of World War I had been thoroughly analyzed, as were the few available reports provided by Ernst Volckheim (by 1918 *Leutnant*), a commander of a German A7V tank. In the meantime, Guderian made visits to a number of foreign tank units, among these to the Swedish Army, where he gained valuable experience.

His organizational structures had to be different to all of those units he had visited in Britain and France, both of which maintained large armoured forces.

At the end of the 1920s, Britain, France and the Soviet Union intensified their efforts to build up their armoured forces. As noted in a German document dated April 1937, the basic combat principles of these possible future opponents were as follows:

> Since the end of the war the European armies have chosen different ways regarding the tactical advancement of their tank forces.
>
> France defines the true determination of her tank formations in the direct and immediate consolidation of the attack power of the infantry.
>
> England does not integrate her tanks into the infantry to the same degree as France. However, tanks have to assist other weapons, especially the infantry. The main task of British tank units is the exploitation of any battle success, and the participation in rapid operations, which require speed and great operating range.
>
> Finally, Russia follows both methods: the French tight coupling of tanks and infantry as well as a disengaged and far more independent commitment…

Seen in retrospect this assessment, written in 1937, was very close to reality.

However, it is uncertain whether Guderian and his staff were able to forecast or recognize this development as early as the end of the 1920s, when the nucleus of the future *Panzerwaffe* was theoretically discussed. In Germany, at that time, neither the tanks had been produced nor had the organizational structures been decided. In summary, the German military had to admit to be entering into the unknown. But the dummy tanks played an important rôle in this period allowing infantry to gain experience of operating with a 'mechanized' force.

In 1932, In.6 organized a field exercise in which a large number of *Kampfwagen-Nachbildung* (KpfwNachbBtn – dummy tank battalions) were involved. After the event a report detailing the results of the important exercise was written. Excerpt:

> Suggestions and lessons learned from the joint exercises with the dummy tank battalions in cooperation with infantry and artillery forces at the Grafenwöhr and Jüterbog training areas.
>
> Purpose of the exercises:
> a) Clarification of the theories on tank tactics
> b) Exercise and experience concerning anti-tank defense
> c) Exercise and experiences of cooperation of tanks and other weapons
> d) Collection of experiences of leadership during mobile exercises
>
> As for a)
> 2)
> The tank is an exclusively attack weapon and will be used in focal points to make a breakthrough. Wherever they will be used, they will temporarily be the main and most important weapon.
> 3)
> Tank units will receive independent combat orders with special consideration of their high firepower and mobility. Any commitment to less mobile units has to be refused, as their advantages will be diminished.
> 4)
> Tank units can therefore never be a subordinated part of the infantry.
> 5)
> Any deployment of tanks under battalion strength has to be rejected. A sole company cannot gain a decisive success facing the qualities of known anti-tank weapons.
> 6)
> For a successful commitment of tanks the element of surprise will be the most important advantage.
> 8)
> A succession of tanks in several waves has proved to be most favourable.
> 12)

The place of the tank battalion commander has to be in the forefront of the attack, to quickly react on changing conditions.
13)
Commanding a tank unit requires high mental agility and guile. Quick decisions have to be made and promptly acted upon. Field orders are the rule…
14)
Upon reaching its objectives, the company or platoon leader has to re-launch the attack, or turn the attack to any flank and take advantage of the achieved breakthrough.
17)
The requirement for a platoon of light tanks for the staff of the tank battalion is a proven necessity. These tanks are important for reconnaissance duties, and for the liaison with the tank companies and other units…
As for d)

Below:
A dummy tank built on the chassis of a Hanomag 2/10PS passenger car to resemble a French tank of that period. (Hoppe)

Above:
The Daimler-Benz version of the *Grosstraktor* (also built by Rheinmetall-Borsig) mounted a 7.5cm gun and three *Maschinengewehr* 13k. One was mounted in a small turret at the rear of the vehicle, typical for tanks designed in the early 1930s. The gun on this vehicle has been removed from the armoured mantlet. (Anderson)

1) Due to the lack of radio equipment many problems regarding the leading of the KpfwNachbBtl occurred…
2) The speed of the tank force … calls for a rapid advance in the course of the battle.

After Hitler seized power, General Lutz issued a further statement on 3 August 1933 in which he described the fundamental problems his fledgling force had to face:

Expansion of motorized combat elements

Other armies are equipped with modern firearms, while the attack power of our armed forces has diminished since 1914. After 1919 [Versailles] the German *Reichsheer* had to be established according to this treaty, and without heavy weapons it has no attack power at all. Facing her neighbours equipped with new and modern aircraft, tanks and heavy artillery, the *Reichsheer* has only weak defence force. The imposed limitations make even a defensive war hopeless…
I however, believe that I have to make some suggestions… These are stated

in the armed forces´ office development programme:

Most important is the requirement for utmost operational mobility. This is because we have to compensate for our numerical inferiority. Only operational mobility will ensure freedom of action… Besides fully exploiting the railway network and motorized transport on roads, this operative mobility can only be achieved by quick mobile combat elements, which can be used independently from other forces against the flanks and rear of the enemy. This task cannot be accomplished by the cavalry anymore… This task can only be fulfilled by motorized combat elements… Tank forces will make the decisive breakthrough, with speed and firepower, the following light divisions [in this context infantry forces subordinated to the tank division, author] will only have to exploit the situation…

For the realization of the above mentioned measures I suggest:
1) Tank units in liaison with light divisions. Due to the absence of own research, we have to rely on experiences made by foreign countries, which cannot be fully verified. Therefore we have to build up our own formations step-by-step, incorporating foreign experience, and the work of our own *Versuchsverbänden* (experimental units). Independent from this, the establishmnet of tank battalions in the future is indispensable.

Suggestion:

- Establishment of seven tank battalions in regiments of two to three battalions each…
- Establishment of a motorized-rifle battalion

2) Advancement of the motorized-recconnaissance battalion.
3) Reinforcement of the number of tank destroyer companies
4) The enhancement of the tactical mobility of the further subordinated units…

b)
For the newly to be established tank unit (including light division) in the first instance, a regiment staff has to be formed, which will be directly subordinated under the *Inspekteur* [Lutz]. Later this staff will be developed to a brigade staff, which will immediately start the preparations for the experimental unit to be established in 1935…

This was the starting point for the first German armoured formation, the 1.*Panzerdivision*. In October 1934, important decisions were finalized and the first machine-gun armed tank delivered.

Above:
A line of dummy tanks (which have the appearance of a British Army Vickers cavalry tank) built on the chassis of the BMW 'Dixi', give fire support to machine-gun teams as they prepare to move forward and attack the 'enemy' during an exercise in 1928. (bpk)

Panzerwaffe – genesis of the hardware

The tank was designed and developed as the weapon to break the 'stalemate' of trench warfare in World War I. It is still difficult to determine as to how important the Allied tank force was in the final outcome of World War I. One matter appears to be clear, the German military (and industry) were taken by surprise and their development of the tank continued without any urgency.

However, German forces used some 200 captured British Mk IV tanks as *Beutepanzer* until the end of the war. The first German tank, *Sturmpanzerwagen* A7V, entered service in 1918, but only twenty were produced. A few battle reports have been published. In his most interesting, if somewhat one-sided book, Major Ernst Volckheim, the commander of an A7V, describes the German tank as being superior to its British counterparts. However, the author wishes to point out that this book was written in 1937 and is based on the personal recollections of Volckheim:

> In contrast to the layout of the enemy tanks the tracks of the A7V-*Sturmpanzerwagenagen* were protected by armour plates. The fact that each track was powered by one engine resulted in a better steering performance. Due to the thicker armour, vulnerability to enemy fire was lower. On the other hand the mobility of the A7V in rugged terrain, under constant artillery fire, was significantly worse. Trenches and shell craters

caused serious problems. The strong armour protection (30mm at the front, 16mm at the sides and 20mm at the rear) offered sufficient protection against infantry fire. The heavy German tank was even safe against hits from armour-piercing rounds…

…The British *Beutekampfwagen* (improved Mk IV), which were used by Germany, had a clearly weaker fighting power than the A7V. Due to the exposed tracks and the weaker armour protection, the tank was vulnerable to infantry fire. Driver and commander were placed in the front of the vehicle. While the driver operated the engine and the transmission, the commander had to handle the steering brakes to initiate turns… Orders were shouted. The commander had no influence on the firing of the weapons; he was occupied guiding the tank by operating the steering brakes. The commander's observation was limited; he had no view to the sides…

Volckheim finished this chapter in his book with a more or less helpless, but patriotic conclusion:

Despite the many disadvantages of the *Beutekampfwagen* we had been able to gain many great successes. These positive results were gained owing to the abilities of the commanders and the competence of the crews rather than to the technical perfection of the [British] tanks.

Below:
Adolf Hitler and his entourage attend the first major exercise undertaken by 1.PzDiv in 1935. Five *Grosstraktoren* are lined up for the presentation, all are 7.5cm armed test vehicles. (Anderson)

German industry had a skilled workforce available – Germany was one of the leading industrial powers in the world – but the situation in the inter-war period was not favourable. In 1930, many parts of the German armaments industry were still restricted, and mistrust was rife. The severe restrictions of the Treaty of Versailles had officially banned any overt work in this field, and also the acquisition of heavy armaments including tanks.

Quite naturally, the German government sought options to secretly by-pass these restrictions and tanks were considered as being most important for the building of a strong army in the future.

The Germans followed all international military developments with interest. As stated earlier, the developed nations (Britain, France, Soviet Union, and the USA) did not make heavy investments the modernization of their armed forced directly after World War I. Nevertheless, their armament industries did produce prototype vehicles and weapons and sought customers around the world.

In the mid-1920s, the British army had disbanded their original tank units. The Royal Tank Regiment (RTR) was equipped with 200 Vickers Medium tanks, a modern design armed with a 47mm gun in a large rotatable turret. The Vickers Company continued with the development of the tank and produced the Vickers Mk E, or 'Six-Ton Tank'. Although not adopted for service by the British, this light tank set the standard for many future designs. The Soviet Union acquired a licence for the type and improved the design to produce the T-26 tank. This tank was truly massed produced with over 10,000 built. Further customers which purchased a licence to produce Vickers designs were Poland and also the Czech Republic.

After Vickers acquired Carden-Loyd, the company produced a number of different tankettes. The Carden-Loyd suspension system, due to the rugged construction, reliability and cost effectiveness, was produced under licence by many nations – including the German *Reich*.

Vickers developed another interesting vehicle, the Vickers 'Independent'. This heavy tank weighed 30 tons, and was fitted with a main turret mounting a 47mm gun and another four turrets mounting light machine guns. However, neither the British government nor any other nation was interested in buying this tank. Despite this, the multi-turret design appears to have inspired tank designers worldwide, among them France, Germany and, again, the Soviet Union. The latter was the only nation to produce their designs, the T-28 and T-35 in larger numbers.

Early German developments

In 1927, Daimler-Benz, Krupp and Rheinmetall were commissioned to develop a modern heavy tank armed with a 7.5cm gun. The secret project had the codename *Grosstraktor* (heavy tractor), and each company produced two vehicles very similar in design. The main armament was mounted in a turret: a second turret mounting a machine gun was installed towards the rear of the vehicle.

Above:
The PzKpfw I Ausf A, SdKfz 101 (*Sonderkraftfahrzeug* – special-purpose vehicle) was a small vehicle and had a two-man crew. It was armed with two *Maachinengewehr* 13k mounted in a rotatable turret. By 1940, most PzKpfw I Ausf A had been withdrawn from front-line units. (Anderson)

A year later, a light tank armed with a 3.7cm gun was ordered. Krupp and Rheinmetall delivered two examples each and the type was designated as the *Leichttraktor* (light tractor).

In the 1920s, tank manufacturers were learning how to design tanks by experience. In Germany there were only few engineers sufficiently experienced in the design and manufacture of tank transmission, steering and suspension – they were working in uncharted waters.

Since the British, French and US governments remained suspicious of German militarism, a strange collaboration far in the east was initiated. The new German republic sought assistance in the Soviet Union and subsequently a test facility was established at Kazan, 600km east of Moscow. On completion, the prototypes were transported to Kama for development trials. It is obvious that both sides gained from this cooperation.

The time spent at *Panzerschule* (tank school) Kazan was of essential importance to the German tank industry. The vehicles were thoroughly tested under all conditions and all components underwent a detailed examination. New technology, including radio telegraphy, was also tested under battlefield conditions. The course for the coming German arms build-up was set. At the same time the first officers of the emerging *Panzertruppe* were trained for this new, sophisticated type of warfare.

By December 1932, the German *Reich* had achieved full military equality. When Hitler came to power, all cooperation with the Soviet Union came to an end and *Panzerschule* Kama was subsequently closed.