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Germany's panzer arm: Anatomy and performance

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GERMANY'S PANZER ARM: ANATOMY AND PERFORMANCE

by

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Abstract

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by

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Although the German Army of the Second World War has generated an enormous corpus of literature, this literature remains incomplete. Much attention, perhaps too much, has been devoted to the relationship between Adolf Hitler and his generals, while the number of campaign studies abound. Matters such as divisional organization have largely been overlooked. This study examines divisional organization and those factors that affect it. Some general observations will also be made on the nature of the German Army during this period.

A number of things affected the organization and deployment of German panzer divisions in the field. These would include the ability of the German economy to provide the requisite number of vehicles and the amount of fuel needed to keep them running, an army's personnel policies, training and its theory and doctrine. German divisional organization was reflective of all these influences, and it can be argued that the German Army derived tactical and even strategic

advantages from their organization, which was markedly superior to that of their opponents, especially in the early stages of the war. The panzer arm's unique position within the German Army, and the army's basic reliance on horses for transport, would also indicate that the German Army of World War II, far from being a mechanized juggernaut, was actually more closely related to the 19th century than many would admit.

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Although many people have been mentioned here, all of the work presented in this dissertation is my own. I freely accept responsibility for all errors and omissions.

R.L.D.

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Introduction

No 20th century military machine has generated a greater corpus of literature than the German Army of World War II. A vast number of studies have been published dealing with the activities of the General staff and its relationship with Adolf Hitler. There have also been numerous studies of the various campaigns, and a few of the various branches of the Army, with major attention being devoted to the panzer arm.

For many people with an interest in World War II, the "darling," if such a term might ever be used in this context, of the war was the German panzer force. An apparently glamorous service, it consisted of units that would certainly be considered elite by any standard. It was also led by some of Germany's most dashing field commanders, such as Heinz Guderian, Erwin Rommel and Hasso von Manteuffel, to name a few. It has certainly drawn the lion's share of publications dealing with specific elements of the Army.

Yet, this body of literature in regards to the panzer force is incomplete. Many books on it are of the technical type, and little concerned with other matters. Many other books are of the "picture book" type favored by model or regalia buffs, with titles

such as "SS Serbo-Croatian Panzers in Action," to peak their interest. Memoirs abound, but these too are unsatisfying. Many, Manstein being a prime example, are written by former generals in irritatingly pompous tones glorifying their own self-professed brilliance, and thus are of little use. Others, Guderian in particular, ascribe the success of the panzer force to the simple implementation of the ideas of the British thinkers J.F.C. Fuller and B.H. Liddell-Hart, for reasons having more to do with the post-war situation in Europe than with historical truth. In short, there has never really been a completely integrated history of the panzer arm, dealing with the interrelation of those organizational, economic, personnel, doctrinal and tactical factors that affected the panzer force's performance. It is precisely this gap which this dissertation will attempt to fill.

Of all the considerations mentioned above, organization is perhaps the most underrated. How an army and its subunits are organized can often confer an advantage which can affect the outcome of a campaign. A fine example of this would be Napoleon's early campaigns, where his corps d'armee system gave him an important advantage over his opponents, organized along 18th

century lines.

Since the standard German panzer unit was the panzer division, this dissertation will study its organization from 1935 to 1945. During this period the German panzer division went through a plethora of reorganizations, the most important of which was in late 1940. The higher units into which the panzer divisions were integrated will also be analyzed. The purpose of this section would be to analyze the positive and negative aspects of German organization and how these affected operational performance in the field.

Also to be examined are those factors that influenced German divisional organization and the performance of the panzer force in the field. These would include equipment, personnel policies, training and doctrine.

The equipment section will naturally cover primarily armored fighting vehicles and associated heavy weapons used by the Germans. However, this chapter must also address several important questions about the German economy in general. What was the true nature of German rearmament? How did this affect the development of Germany's panzer force? Did Germany possess the economic base needed for the creation and

maintenance of a large armored force? The answers to these questions will allow an evaluation of the quality of the equipment, as well as observations about how well or poorly the German economy operated both before and during the war. Also relevant in this area are such issues as the tank versus assault gun question and the German propensity for building many different models of the same vehicle.

The personnel who fill a division's organization and do the actual fighting are, of course, the most important element of any military establishment. This study will include a general survey of how personnel were selected for panzer units. This would also include armored units raised by the Luftwaffe and the SS.

This chapter will study a number of issues vital to an understanding of the German Army. The first of these is the German conscription system and the internecine warfare waged by the three services for their respective shares of the available manpower. Within this issue the conflict between the Army and the SS also comes into focus, as well as the traditional territorial system employed by the Germans for conscription. Some attention will also be focused on the Anschluss, and the question of how the German Army

was able to absorb the Austrian Army.

Tactical superiority has always been the keystone of German military prowess. Yet how much of this was due to pre-combat training or to simple improvization in the field? This question is best dealt with by examining German manuals and unit training orders, and then comparing them to actual tactical operations in the field.

For doctrine, the question is slightly different. Here it must be asked, how much of Germany's panzer doctrine was indigenous, and how much was derived from foreign theorists? This question has always brought forth strong opinions from historians on both sides of the issue. Dealing with this question will allow a full evaluation of the importance of General Heinz Guderian's writings and the influence of the more famous foreign theorists, especially B.H. Liddell-Hart and J.F.C. Fuller.

In most cases, the best method available to accomplish the tasks at hand is the case-study method. In the course of this dissertation, depending on the chapter in question, the problems under examination will be dealt with by looking at individual German panzer divisions. They would be selected as the sub-

ject for discussion depending upon their relevance to the question under consideration. For example, when the impact of the Anschluss is discussed, the pertinent division to be studied is the 2nd Panzer Division, since although it was originally a German unit, by 1944 it was composed almost exclusively of Austrian personnel. This method will be used whenever it would be germaine to the question at hand.

The significance of such a study cannot be underestimated. It would provide some insights into the rise and decline of the most important part of the German Army. Some important information can also be gained on the "nuts and bolts" aspects of the German Army's expansion and its absorbtion of two foreign armies. It will also provide a rigorous examination of the German tactical system and doctrine. Hopefully, this study will not only be a complete analysis of the German panzer arm, but also provide a microcosmic view of Nazi Germany at war.

Chapter One
Equipment and Economy

An armored or motorized force is heavily dependent on the quality and quantity of its equipment, and the German panzer arm was no exception to this. However, in considering the question of the panzer arm's equipment, to simply look at the technical specifications of tanks and their performance in battle would be woefully inadequate. A number of other matters must be considered. First, the nature of the German economy and its ability to produce the required equipment, especially motor vehicles, in quantity must be dealt with. Techniques used in the production of equipment must also be considered. Finally, disruptions in the economy, both internal and external, must be considered, and so must battle losses and their effects on the fighting ability of the panzer arm.

For a country to arm and maintain a large armored or motorized force in the field, several prerequisites must be achieved. Since these units rely primarily on vehicles, a country must have a well-developed motor vehicle industry to produce the necessary numbers of vehicles. A large tractor industry is helpful for producing tracked or half-tracked vehicles. An obvious corollary to this would be a substantial oil refining industry, or at least a guaranteed supply of oil, without which the vehicles are useless. Another important

prerequisite is an efficient maintenance service for the repair of damaged vehicles. Combat vehicles also require several kinds of highly sophisticated equipment. This would include electrical wiring, radio communications, and optical equipment.

According to B.H. Liddell-Hart, there are some twenty basic raw materials vital to the waging of modern war: coal, oil, wool, iron, rubber, copper, nickel, lead, glycerine, cellulose, mercury, aluminum, platinum, antimony, manganese, asbestos, mica, nitric acid and sulphur.[1] In almost all of these, Germany was deficient. For our purposes, however, we shall concentrate only on the two most important materials in the production and use of tanks and motor vehicles, namely steel and oil.

Right from the start, Germany's position in steel production was precarious. Germany was one of the major steel producers of Europe, but was lacking an indiginous supply of iron ore. Although strenuous attempts were made by Reichsmarschall Hermann Göring's Four Year Plan to increase iron ore production, they were opposed by German steel industries, who considered the extracting of low grade German ore a process both too expensive and impractical.[2] In fact, both before

and during the war, Germany received most of its iron ore from Sweden, reaching a high of 10.3 million tons in 1943.[3] During the pre-war period, fairly substantial amounts of iron ore were also imported from the Soviet Union and south-eastern Europe.[4] Given these circumstances, Germany entered her period of rearmament and later the war poorly prepared.

Germany's position in regards to oil was also very weak. In 1933 Germany produced 233,000 tons of crude oil.[5] This was minor compared with Rumania's production of 7,377,000 tons and the Soviet Union's output of 21,489,000 tons.[6] Matters were not improved by Hitler's contradictory desires in this area. He wanted Germany to become self-sufficient in oil and become a fully motorized economy, but projects such as the autobahns and the mass production of the Volkswagen served only to increase oil consumption.[7] Thus Germany once again had to depend upon imports. As early as 1934, for example, Germany consumed about three million tons of petroleum products, of which 85% were imported.[8] The Austrian Anschluss did little to improve this situation, although it did give Germany an extra indigenous source of iron ore.[9]

If Germany did have one advantage, it was in

its ability to produce synthetic oil. Germany built the first synthetic oil plant after World War I. The synthetic oil program was supported by the military, but the only company to express interest in the rather expensive process was I.G. Farben. The depression almost destroyed the synthetic program when it created an oil glut. Its survival and expansion, however, were assured by Hitler's coming to power.[10] Although ahead of the rest of the world in this area, synthetic oil production in 1938 amounted to only 1.6 million tons.[11]

Germany's ability to produce the requisite equipment for the panzer force was limited by several other factors. The prime of these was the question of who was responsible for directing the process of rearmament, not to mention the economy as a whole. Initially the authority for rearmament rested with two agencies, the Wehrmacht's Office of Economics and Armaments (Wirtschafts und Rüstungs Amt, or Wi Rü Amt), headed by Major General Georg Thomas, and the Reich Ministry of Economics (Reichswirtschaftsministerium, or RWM), headed by Dr. Hjalmar Schacht.

Then in 1936 Hitler, ostensibly for the purpose of making Germany ready for war, created the "Four Year Plan," and placed the agency under Hermann Göring.

This was a poor decision in two ways. First, although Hitler chose Göring for his "energy," the Reichsmarschall knew nothing about economics, and openly said so.[12] The choice of Göring also did not bode well for the Army and Navy, as he was both Minister of Aviation and commander of the Luftwaffe, and thus expected to starve the other two services of resources in favor of his own. Hitler completed this unhealthy brew in 1940 by creating the Ministry of Armaments and Munitions under Dr. Fritz Todt. In February of 1942 Albert Speer succeeded Todt when the latter was killed in a plane crash.

The structure of the economy had several unfortunate effects. The prime of these was the question of who actually ran the economy. Göring stated after the war that he and Schacht encountered jurisdictional problems almost immediately after his appointment.[13] The Armed Forces High Command (OKW) was also not happy. Their economic staff (later Wi Rü Amt) strenuously opposed Göring's appointment.[14] Even worse, there was not even a strong regulating mechanism among the armed services themselves. Thus the services competed not only against the civilian economy for resources, but against each other as well. Although Speer succeeded in imposing some order on this chaos in 1943, it was

far too late to effect the outcome of the war.

Another factor detrimental to Germany's armament effort was the continued high priority of the civilian sector of the economy. As late as 1938 civilian construction projects still had high priority. These included buildings to stage future Nazi Party congresses and the autobahns.[15] The high priority on civilian projects and consumer goods continued during the war. In 1943, for example, Germany produced some 120,000 typewriters, 13,000 duplicating machines, 50,000 address machines, 30,000 accounting machines, 200,000 radios, 150,000 electric bedwarmers and 3,600 refrigerators.[16] Although harmful militarily, it did give Germany a political stability that was absent in World War I.[17]

The amount of slack in the German economy has been subject to several very different interpretations over time. Alan Milward saw it as a system that allowed maximum flexibility and the shifting of priorities.[18] More recent German scholarship, probably more correctly, has portrayed the process of German rearmament as chaos pure and simple.[19] In any case, the structure and organization of the German economy was not well-suited to satisfy the demands of a large armored force.

The satisfying of the panzer arm's needs was also effected by several inherent factors in the German economy and in her military policy. Tanks are items that are needed in large numbers in war. Since they are required in large numbers, they are best produced by industries acquainted with the facets of mass production. Since tanks are automotive devices, they are best produced by automobile companies. This was certainly the case with the Sherman tank, which was produced by a combination of Ford, Chrysler, and General Motors.[20] This was not the case in Germany. In Germany the companies that produced tanks also produced railroad equipment, especially locomotives.[21] The construction of railroad equipment did not lend itself to the techniques of mass production. This situation was made worse by the fact that Germany suffered from a shortage of rolling stock.[22] This was certainly an inhibiting factor in German tank production.

Tank production was further hindered by the production of a veritable plethora of models and the fact that Germany went to war with a stock of tanks of which 80% were obsolete.[23] When Germany went to war in 1939, the vast majority of the Army's stock of tanks consisted of either Pz Is or Pz IIs. Even before the French cam-

paign General Franz Halder, Chief of the General Staff, rated the Pz I as being good only against a weak and demoralized enemy and the Pz II as only slightly better.[24] To upgrade the quality of the German panzer force before the invasion of Russia, most of the Pz Is and Pz IIs were removed from active service and replaced by the more modern Pz III and Pz IV, although the older machines were still kept in the total park. The result was that although Germany's tank park increased over the period 1 April 1940 - 1 June 1941 from 3,387 to 5,694, some 2,034 were obsolete models. To make matters worse, delivery of the newer Pz III and Pz IV lagged well behind the "planned" figures announced by Hitler and Todt.[25] It is also important to bear in mind that at this time, by the divisional reorganization undertaken by the Army, the number of panzer divisions was effectively doubled. Although tactically advantageous, it did spread the tank force even more thinly.

The Germans also hurt themselves by building a large number of variations of the same model. From 1934 to 1945 the Germans produced four versions of the Pz I, ten versions of the Pz II, thirteen versions of the Pz III, ten versions of the Pz IV, four versions of the Pz V (Panther) and several versions of

the Pz VI (Tiger).[26] There were also several variations of the two models of captured Czech tanks used by the Germans, the Pz 35 and the Pz 38.

Although the need for some changes, such as the up-gunning of tanks in light of combat needs, there was a tremendous overlapping of authorities. The Army's Ordnance Department had a committee for the development of any new weapon. The Ministry of Armaments and Munitions also had such committees, which had to deal with the designers of the weapons. Field troops also had input into this process. During periods between campaigns units conducted tests on vehicles. From December 1939 to January 1940, for example, the 11th Panzer Regiment conducted a series of tests on the Pz III and Pz IV under winter conditions.[27] In any case, deficiencies were noted and would then be corrected in later versions of the vehicle. Finally, there was Hitler's influence. Being fascinated by technical devices and machines, he often personally ordered design changes in tanks such as the Tiger and the Pz IV.[28]

The profusion of vehicle types created several serious problems. First, the introduction of new types always meant slow downs in production, as a certain amount of time was required for retooling, especially for changes in the engines. Even more important was

the problem of field maintenance. In order to be effective, a tank, like most other vehicles, requires a steady supply of spare parts. This was something Germany completely failed to provide. Burkhart Müller-Hillebrand blamed this situation on "some armament production officials."[29] Albert Speer took the more standard course of blaming Hitler.[30] Whatever the case, the German Army faced an almost continuous shortage of spare parts. This situation was made worse by the profusion of models, which made the allocation of spare parts. At times army groups received spare parts for tank models they did not have.[31]

Another problem was the German automobile industry. A panzer division is not simply based on tanks alone. To be effective, a tank needs to be supported by a variety of vehicles. The most important of these are trucks needed to tow artillery, and carry gasoline, ammunition and men. Yet it is quite clear that Germany did not possess the automobile industry needed to fulfill the demands of Germany's panzer arm.

Albert Speer believed that Germany's automobile industry was working up to standards of modern efficiency when he took up his duties in February of 1942.[32] In fact, however, the German automobile industry was

poorly suited to meeting Germany's needs in fighting a modern war, and underutilized in any case. There was apparently no system in place by 1939 for converting the automobile industry to war production. In fact, even as late as 1944 the Army was still using large numbers of civilian trucks, which were unsuited to military service.[33] Since the German motor vehicle industry was incapable of satisfying Germany's needs, the Germans had to resort to the very chancey expedient of using captured equipment.

By 1939 the Germans had already had extensive experience in handling captured equipment in their occupations of Austria and Czechoslovakia. The Austrian material was easily incorporated into the Army. A considerable amount of material was captured in Czechoslovakia, including 810 tanks.[34] This material, however, was poorly handled. Each occupying division gathered any equipment and shipped each piece to various ordnance offices in Germany. This was a serious mistake, as all the writing on the equipment was Czech, which few Germans could read.[35] The Germans were fortunate, however, in that it was still peacetime, and were able to profit from their mistakes. Nonetheless, having to use captured vehicles in large numbers did

not bode well for the future.

The outbreak of war quickly magnified all of the deficiencies inherent in Germany's panzer force due to the inadequacies of the German economy. Although the victory over Poland was relatively cheap, problems arose immediately. Shortages of trucks were experienced during the Polish campaign.[36] After the campaign Halder noted that the Army was being alloted only 1,000 trucks per month, not even enough to replace normal wastage, let alone combat losses.[37] This led him to consider the demotorization of a number of infantry divisions.[38] The Chief of the General Staff's comments on the weaknesses of German tanks has already been noted.

Even worse from Germany's standpoint was the raw material situation. Although Germany received fairly substantial amounts of iron ore from southeastern Europe, Sweden, as noted previously, remained Germany's main supplier of iron ore. This was eventually curtailed by Allied political pressure. Strenuous efforts were also made by the Royal Air Force to lay mines to stop coastal traffic.[39] The Royal Navy also employed light forces at the Rhine estuary off Holland for the same purpose.[40]

Oil was a far more serious problem. Rumania re-

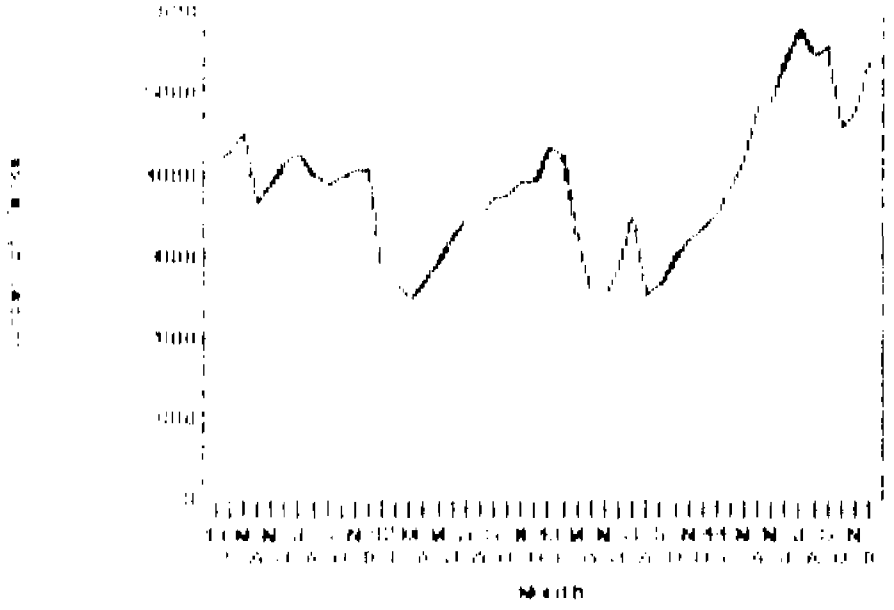
mained Germany's main supplier of oil. In 1939 alone Germany imported 1,272,000 tons of oil.[41] This was almost 20% of Rumania's total production. It is also important to note that Rumanian oil fields were vulnerable to Allied pressure, as they were largely owned French or British companies.[42] The Polish campaign did very little to improve the situation, as the Soviets, by the terms of the Nazi-Soviet Pact, occupied about 70% of Poland's oil producing areas.[43] Hitler therefore considered it imperative that the industrially developed west be conquered quickly to alleviate Germany's raw material situation.[44] Regardless of those anticipated benefits, Hitler still sought to strengthen his ties to Rumanian oil sources. On 27 May 1940, Germany signed the "Oil Pact" with Rumania, by which Germany would trade arms for oil.[45]

The conquest of France and the Low Countries most certainly improved Germany's material position, and was vital to the panzer force. Although France did not produce a great deal of oil, all of France's oil installations were captured intact when the attempts to demolish them were botched.[46] The Germans also captured an enormous amount of equipment, which they used extensively. According to one German officer, "French

motor vehicles were indispensible to the invasion of Russia."[47] Although French tanks were unsuitable to German style operations, the Germans gave them to shattered panzer divisions rebuilding in France. This gave them the strength to undertake internal security missions in occupied France.[48]

The panzer force ran into real problems, however, both before and during the invasion of Russia. First, the Germans realized that most of their tanks, mostly Pz Is and Pz IIs, were obsolete and had to be replaced by the more modern Pz III and Pz IV. However, the inability of German industry to meet the unrealistic production quotas put forth by the responsible agencies and the expansion of the number of panzer and motorized divisions meant that although the number of divisions had doubled, Germany's total tank park remained static, as Table 1 shows.[49]

Operation Barbarossa proved to be the beginning of the end for the German armored force. All of the defects present in its equipment that proved to be only minor problems in the 1939-1941 campaigns now became almost insurmountable obstacles. The Wehrmacht entered Russia with over 2,000 different types of vehicles.[50] Many of the French vehicles proved unsuit-



able to Russian conditions and large numbers quickly broke down. German wheeled vehicles also had tremendous difficulties, especially after the autumn rains turned roads into bottomless canals of mud. Captured Russian trucks were too few and both spare parts and repair facilities for them were lacking.[51] By the autumn, divisions such as the 11th Panzer were reporting serious shortages. That division was short some 134 tanks and 427 vehicles by 16 October 1941.[52] The German Army had entered Russia on 22 June 1941 already

short some 2,700 trucks.[53] Matters became worse as early as August when truck losses began to outrun production. The situation became catastrophic by late autumn. In November the Germans lost 5,996 trucks on the eastern front.[54] This was double the production of 2,752 for the same month.[55]

The tank situation was equally bad. Production failed to keep pace with losses and repair efforts suffered from a shortage of spare parts and the plethora of types used. Guderian noted the need for replacement engines, and the inadequacy of Hitler's promise of 300 replacement engines for the entire eastern front in July.[56] Although tank strength fell during the battle of Kiev, the Panzer Groups were able to recover a fair degree of strength by the start of operation Typhoon by strenuous maintenance efforts.[57]

The strains of the final lunge towards Moscow and the ensuing Russian winter counter-offensive produced a severe crisis. Even worse was the nasty shock experienced by the Germans when they met the Russian T-34 tank and the heavy KV-1 tank, thus presenting them with the situation of fighting under conditions of both qualitative and quantatative inferiority.

The passing of the winter crisis of 1941 left

the Germans with the problem of replacing losses. Halder realized as early as 10 December 1941 that it would be impossible to fully refit all of the panzer divisions.[58] This ultimately led to a reorganization of the panzer and motorized divisions operating in Army Group South for the 1942 summer campaign. The Pz II was fully removed from active service as obsolete, while both Hitler and the Army agreed to the upgrading of the guns on the Pz III and the Pz IV. These changes, however necessary, did cause slow downs in production, and the tank production figures reflect this.

The Germans also started the process for the production of two new tanks; a medium tank to match the T-34 and a heavy tank to combat the KV-1. The results were the Pz V, or Panther, and the Pz VI, better known as the Tiger. The history of these two vehicles is important because it illustrates the strengths and weaknesses of the panzer force in its equipment and in terms of the German economy.

After seeing the competing designs for the Panther, Hitler decided on the model produced by the MAN company, which also produced railway equipment, and ordered production to begin in December of 1942.[59] Two models of the Tiger were also produced in 1942.

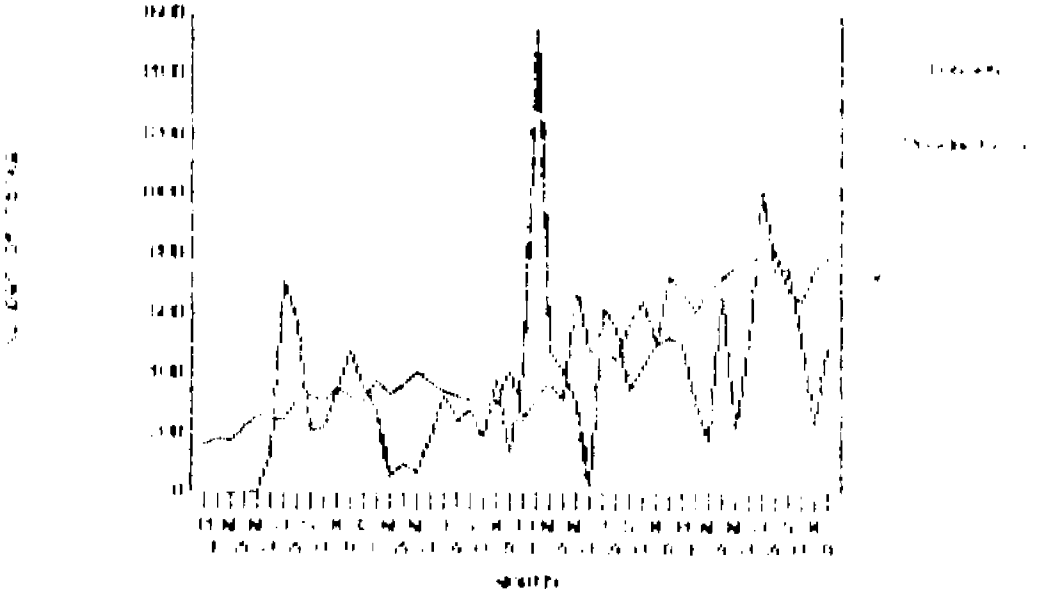
In this case, however, the two models were allowed to compete; one being built by the Henschel company, the other by one of Hitler's favorites, Prof. Ferdinand Porsche.

The Panther went into production in January of 1943, with the goal of producing 250 per month by May. The Germans were able to slightly surpass this, but the entire first production series was insufficiently tested. Major defects were discovered at the front, especially in the steering mechanism. As a result, all 325 Panthers were withdrawn from service and sent to a specially constructed tank rebuilding plant outside of Berlin.[60] In May they went out again and Army Group South employed some 200 at the battle of Kursk.[61] There they were a disappointment, due primarily to a poorly protected fuel system, which gave it a distressing tendency to burn when hit.[62] Although the Panther went on to become one of, if not the best, tanks of the war, it was not really ready for combat service until late 1943. As favored a division as the 2nd SS Panzer Division (Das Reich), for example, did not employ Panthers in action until 1 September 1943.[63]

The Henschel Tiger first went into service in late 1942. It proved to be a superb fighting machine,

and served effectively throughout the war. The Tiger designed by Prof. Porsche was another matter. A large investment in time, money and effort, it was officially adopted at Speer's speech of 22 November 1942.[64] The vehicle was employed at Kursk where it was a resounding failure. Although its large gun could destroy any opposing armored vehicle, it had no secondary armament. Guderian, serving as the Inspector General of Panzer Troops, noted its helplessness at Kursk when it literally had to go "quail shooting" with its gun against infantry.[65]

Even worse from the German standpoint were the production figures. German tank production for 1943 was based on the "Adolf Hitler Panzer Program," first presented by Speer at the afore-mentioned speech of 22 November 1943. Henschel Tiger production was set at 25 per month, rising to 50 by June of 1943. Even these modest targets could not be met, and some disruptions were experienced due to the Allied bombing offensive.[66] These numbers, plus combat losses suffered even before the battle of Kursk, rendered Guderian's proposal for creating 300-400 tank panzer divisions utterly ludicrous. Production and losses are compared on Table 2.



By 1944, disruptions in production caused by the bombing, shortages of spare parts and ever-increasing combat losses all combined to vitiate the strength of Germany's panzer force. This was especially true in the west, where crushing Allied air superiority made the movement of replacements to the front extremely difficult. Of all the panzer divisions in Normandy by 8 July 1944 only the 21st Panzer, which had been in action since 6 June, had received any replacements for tanks and assault guns, and these amounted to only 17 Pz IVs.[68] The vehicle situation was just as bad. Dur-

ing the first twenty-four days of the Normandy invasion, the Germans lost some 4,200 vehicles, including 1,866 trucks.[69] In the aftermath of the St. Lo breakout and the Falaise disaster, vehicle losses swelled to about 20,000.[70] Catastrophic losses were suffered at the same time on the eastern front, when Army Group Center was obliterated by the Soviet summer offensive. In fact, German truck losses from January to August of 1944 were over 109,000, the equivalent of the entire 1943 production.[71] The 1944 production could not nearly keep up with this.

Even worse was the oil situation. Already dependent on Rumania for oil before the war, the outbreak of hostilities only increased this. The victorious campaigns of 1939 and 1940 did nothing to relieve Germany's oil problem. On 28 November 1940 the Army High Command (OKH) reported to the Armed Forces High Command (OKW) that the newly established monthly allocations of gasoline and diesel fuel were wholly inadequate to meet the needs for even relatively minor operations such as the projected invasion of Greece.[72]

Germany increased its oil imports from Rumania to 2,114,000 tons by 1941.[73] This proved totally inadequate to meet the requirements for the 1941 campaign

in Russia, forcing the Germans to conduct Barbarossa on what amounted to a logistical shoestring.[74] Indeed, it was the demand for oil that led Hitler to undertake the ill-fated Staligrad campaign.

By 1944 Germany's oil situation was desperate. The oil campaign carried out by the Allied air forces in mid 1944 greatly affected Germany's synthetic oil production.[75] Allied bombing attacks also seriously damaged the Rumanian oil industry. Rumanian oil production fell from 5,665,357 tons in 1942 to 5,273,432 tons in 1943, and then to only 3,525,000 tons in 1944.[76] Further difficulties were created when the RAF was able to disrupt oil traffic from Rumania to Germany by heavily mining the Danube.[77] The Germans ultimately lost their most important source of oil when Rumania changed sides on 23 August 1944.

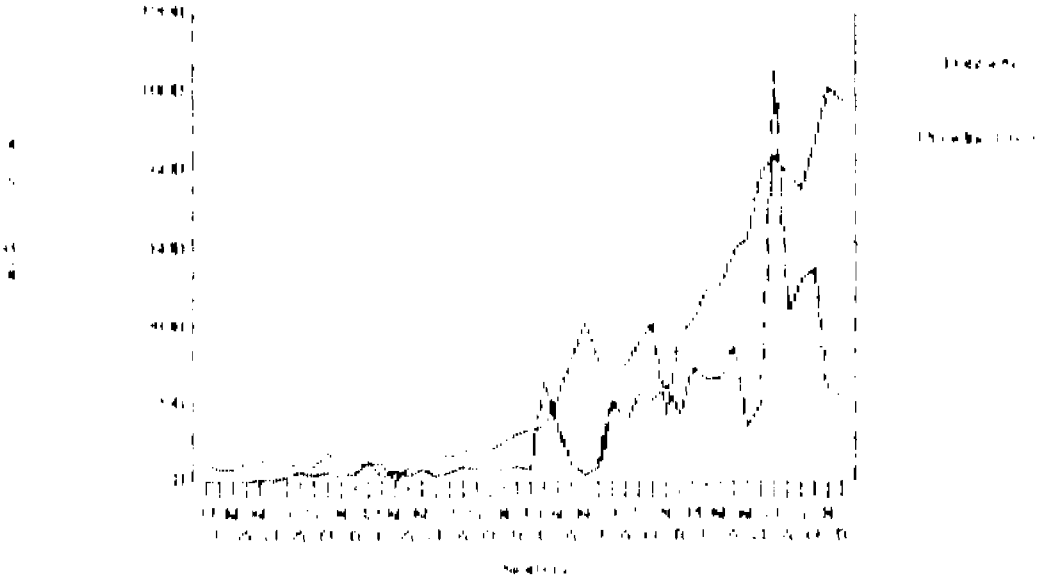
Efforts were made to compensate for the lack of oil. The Army, for example, adapted vehicles to run on wood gas. The effort was not successful. On 29 May 1944 the Army Group B Quarter Master noted that of the 14,578 trucks in the Seventh and Fifteenth Armies, only 3,552 had been converted to run on wood gas. A shortage of tires was also noted.[78] The Economics Ministry tried to compensate by developing oil sources in

Austria, but the effort failed for a variety of reasons.[79] Even if it had been successful, it still would have been too little, too late.

The failure of the German economy to keep the panzer force adequately supplied with equipment forced important changes on the organization of both panzer and panzer grenadier divisions. The most important of these was the very existense of such divisions. Since the vast majority of the German Army's tractive power was based on horses, tanks and vehicles had to be concentrated in a few special divisions to maximize their effectiveness. If the German Army could have fielded a force composed of all mobile divisions, the need for panzer divisions would have been obviated.

Another manifestation of the German economy's inadequacy was the reduction of authorized tank strength in divisions during the war. In 1939, German tank companies had an authorized tank strength of 22. By 1943 this was reduced to 17. In the case of panzer grenadier divisions, authorized tank company strength was 14. Very often assault guns were used in lieu of tanks.[80] This was essentially a tank gun mounted in a turretless hull on a tank chassis. They were originally designed by von Manstein to give armored support to infantry

divisions.[81] Eventually, however, they became an economically feasible substitute for a regular tank, since they were cheaper to build. The adsense of a turret was a tactical drawback, as it gave the gun only a very limited traverse. Germany's reliance on them in the later stages of the war is clearly shown in Table 3.



Since Tiger tanks were relatively rare, they were used mainly as corps or army assets, although the Army's elite Gross Deutschland Division did have an organic battalion of Tigers.[82] A Tiger company's strength was only 10. By 1945 tank companies of all

types had their strength reduced to 10.

The number of other armored and wheeled vehicles used by the panzer force was also effected. By 1943, Army panzer divisions had only one infantry regiment equipped with armored half-tracks. By 1944 this was reduced to only one battalion. The other infantry units had to rely on wheeled transport, which was of only limited use tactically.

Captured equipment was still used. Captured factories were employed to fill the needs of divisions in local areas. In Italy, for example, the Germans used the Ansaldo-Fiat works to produce several types of assault guns, armored reconnaissance cars and other vehicles. They were sent to units in either Italy or to the Balkans.[83] In the west, the 21st Panzer Division, although equipped with German tanks, had to use a large amount of French equipment.[84]

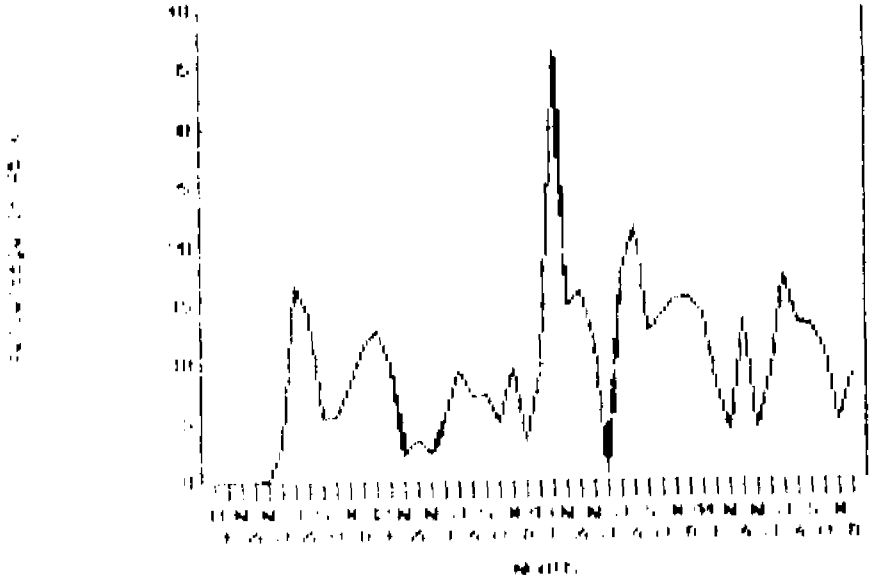
The SS formations, being somewhat more favored in terms of equipment, had both infantry regiments of most of their panzer divisions equipped with half-tracked vehicles. The rest used wheeled transport.[85] By late 1944 this was also abandoned. Equipment shortages forced the 1st SS Panzer Division (Adolf Hitler) to employ a "mixed" tank battalion, consisting half

of tanks and half of infantry mounted in half-tracks.[86] This eventually became the standard organization for Army panzer divisions in 1945, and probably for SS panzer divisions as well, when transport shortages mandated the use of horses.[87]

These consistent cuts in vehicle strength unquestionably impaired the fighting efficiency of the panzer force. By 1943, divisions rarely came up to strength. Matters were made worse by the loss rates suffered.

Services often measure success or failure by the rate of loss suffered by the units involved. Air forces, for example, consider a loss rate of 5% on a mission basis to be prohibitive over the long run.[88] Although no rate of loss on a monthly basis was apparently ever established by any army, it might be possible to arrive at a figure by the following proceedure. That would be to look at monthly tank losses as a percentage of the total park of tanks, and then compare that rate to the corresponding success or failure encountered by the army in its campaigns.

The figures would tend to indicate that in periods of crisis or defeat, losses generally ran at a monthly rate of about 10% or more of the total park,



as indicated in Table 4. This rate would be affected by several things. First, it must be realized that one of the most important things in making losses good is the ability to move replacements to the front. The Germans were hindered in this on both fronts. On the Russian front, they never could solve the logistical problems created by the paucity of rail lines and the problem of converting Russian lines to the standard European gauge. In the west, the ability to move replacements to the front was rendered almost impossible by Allied air superiority.

Matters were made worse, from the German standpoint, by the defensive nature of the war in its later stages. From 1943 on the Germans fought in battles that often resulted in retreats. This deprived them of the primary prerequisite for efficient field maintenance, control of the battlefield. German field maintenance units themselves were also badly mauled in these circumstances. In Normandy, for example, by 14 June 1944 the 21st Panzer Division had only two 18 ton prime movers available for salvage operations. The Panzer Lehr Division's salvage platoon was operating at only 40% effectiveness due to losses.[89] The lack of vehicles in general made the German armies more vulnerable to the better equipped Allied and Soviet armies. This was certainly the case in France in 1944 and the destruction of Army Group Center on the eastern front.

In conclusion, it is obvious that Germany did not possess the type of economy necessary to the creation and maintenance of a large armored force. Her steel and oil industries were clearly incapable of providing for the needs of three services.[90] Even if the requisite number of tanks and vehicles could have been produced, Germany's synthetic oil production and

importation of Rumanian oil was insufficient for their supply. The inability of the German economy to keep the panzer force indigenously supplied forced the Army into the risky expedient of using foreign equipment and a heavy reliance on horses for the majority of the Army's transport. This dependence increased as battlefield reverses created shortages of both vehicles and gasoline. Ultimately, the best way to describe the panzer force in the context of the German Army is that in a technological sense, it was the only part of the Army that was related more to the 20th century than to the 19th.

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Chapter Two
Personnel Policies and the Panzer Force

In spite of all the technological advances made by man in military matters, war is still a human activity. People are generally a country's most important resource, and how this resource is used will affect a country's performance in war. Germany was no exception to this rule. In examining Germany's use of manpower, one should ask the following questions. What kind of population did Germany have? What were the conscription policies of the German government? What were the processes that determined the selection of men for the panzer force? What were the procedures for processing wounded and replacements? How did these things influence the panzer force's performance? Several of these questions have been brilliantly discussed in Martin van Creveld's book Fighting Power, and this chapter will rely heavily on that work in some areas. Other areas will be explored in greater depth.

An armored force is based heavily on machines, but these are both operated and repaired by people. Thus one of the most important prerequisites for the creation of a large armored or motorised force is an automotively inclined population. That is, a population that has extensive contact with automobiles, trucks, or any other automotive devices. Perhaps the best way

to measure such an inclination in a population is to look at the number of people per vehicle in a country. By this measurement, Germany was in a very backward state. In a 1935 article, Guderian stated that in 1933 there was one vehicle for every five people in the United States, while there was one vehicle for every seventy-five people in Germany.[1] In fact, things were even worse than Guderian stated. In 1933 the ratio was actually one vehicle for every eighty-nine people. Although strenuous efforts reduced this ratio by 1937 to one vehicle for every forty-seven people, it was still the poorest ratio in western Europe with the exception of Italy.[2] Thus Germany did not have a population conducive to the creation of a large motorized or mechanized force. This, along with several other factors to be discussed later, caused shortages of drivers and personnel for salvage and maintenance units.

Perhaps the most important phase in a soldier's training is his initial drafting and classification, for it is at this point that an army can exert an important influence on his subsequent military career. In Germany, this even involved the service he went into because there were no all-volunteer services. In Germany the three services got a pre-determined share of

the manpower for that year. For example, when the class of 1920 was drafted in 1940, the total number of men available for military service was 520,739. Of these, some 377,536, or 72.5%, went to the Army. The Luftwaffe got the next highest share, 114,562 men, or 21.9% of the total. The Navy got only 22,913 men, a mere 4.4%. The Waffen SS was low on the totem pole, getting 5,728, or 1.2%. The SS also received further compensation from the other three services. The Army had to give up 7,322 men, 1.9% of its share. The Luftwaffe also gave up 1.9% of its share, some 2,223 men. Even the Navy had to give up 445 men to the SS. All of the services also recruited volunteers.[3]

Induction into one of the armed services depended on the organization one belonged to as a child or as an adolescent. A comparison of the maps showing the boundaries of the various Military Districts (Wehrkreise) and the "Hitler Youth Regions" (Hitler Jugendgebieten) reveal an almost exact correspondence. The only exceptions were the larger Military Districts, which incorporated two Hitler Youth Regions. The Hitler Youth itself was not a homogenous organization, but was divided into flying units, naval units, and so on.[4] A youth from one of these organizations was likely to

wind up in the Luftwaffe or in the Navy.

For the panzer force, the two most important organizations were the motorized units of the Hitler Youth and the National Socialist Motorized Corps, the NSKK. The motorized Hitler Youth expanded from 3,000 members in 1933 to 102,000 in 1938. Training in this organization included both driving and mechanics. A member was generally given 80 hours of driving time and 105 hours of mechanical training. This was slearly intended as preparation for service in the Wehrmacht.[5]

The NSKK took over training of members of the motorized Hitler Youth after their passing out of the organization. Between 1933 and 1939 the NSKK trained 187,000 drivers for the Army.[6] The NSKK also trained personnel for maintenance shops and repair units.

A person's civilian occupation also tended to determine one's branch of service. The Luftwaffe, for example, in its formative stages did draw personnel from Germany's national air line Lufthansa, although civilian flying experience did not automatically mean that a person could fly a military aircraft.[7] The panzer force made a similar error in drafting auto mechanics directly into tank maintenance units, where

they proved to be a liability in combat situations because they lacked military training.[8]

Once drafted into the service, a soldier would then be carefully examined by a physician and by his prospective regimental commander. The outcome of these interviews would ultimately determine the soldier's branch of service.[9] The soldier would then be sent to the replacement battalion of his division that was part of the Replacement Army. The soldier would then undergo training at the necessary schools required for his branch, and then eventually be posted to a "march" battalion, which would take replacements en masse to the parent unit. There the battalion would be broken up, and the men assigned to their proper units by the regimental commanders.

The German Army's divisions were formed on a territorial basis. The personnel came from the same territorial area, or even a city such as Vienna or Berlin. As the number of Wehrkreise increased with Germany's territorial acquisitions in the 1930s, the Army would often post divisions to a new Wehrkreis to tap in on newly available sources of manpower. The 2nd Panzer Division, for example, was originally German, but was posted to Austria after the Anschluss,

so that by 1944 its personnel consisted almost entirely of Austrians.[10] This, incidentally, caused the Americans, mistakenly as it turned out, to rate the division as being of poor quality.

The territorial system provided the Germans with several advantages. First, the system was very cognizant of the psychological needs of the fighting soldier. This contributed to the cohesion of German divisions in combat. Strenuous efforts were made to maintain the territorial integrity of the units. This involved the pulling out of entire units from the line for rehabilitation, the careful treatment of replacements and wounded and the granting of leave. The authority for the conduct of these policies was generally in the hands of the officers of the units concerned.[11]

The treatment of wounded was very important. Wounded were always returned to their old units.[12] For this purpose, divisions often established their own convalescent homes. Here, usually under the supervision of NCOs, men would engage in a variety of activities, including sports to begin the process of getting the men back into suitable physical condition.[13]

The granting of leave was also given high priority. Fighting units regularly granted leave to

soldiers as a matter of policy. This policy was maintained by the Sixth Army even while it was under heavy strain, such as in the Stalingrad campaign.[14] Policies such as these were instrumental in building a division's "Kampfkraft" or fighting power, and in keeping the number of psychological casualties to a minimum.

The Germans also determined on the basis of personnel whether or not to rebuild a destroyed division. A comparison of the fate of the panzer divisions lost at Stalingrad and the 10th Panzer Division provides an excellent example. The German Sixth Army contained three panzer divisions, the 14th, 16th and 24th. All of them were rebuilt after their destruction at Stalingrad. The 14th, for example, was rebuilt in terms of personnel from several sources. First, the division's replacement battalion was still functioning in Germany and could provide men. Also the division had been in combat for an extended period of time and had accumulated a large number of wounded who were at rear area hospitals. These men would be sent to the replacement battalion in Germany and then on to the division itself in France after their recovery. Some men would also have been obtained from those flown out of Stalingrad. During the Luftwaffe's effort to

supply the surrounded Sixth Army, about 42,000 men were flown out of the city; 35,000 wounded and about 7,000 specialists. The latter included people ranging from general officers to drivers and maintenance personnel from panzer units.[15] Also, since German divisions even in the most trying circumstances granted leave, there were a number of men on leave when the division was surrounded in November of 1942. Thus there were enough men around to reconstitute the division.

The 10th Panzer Division had been severely battered in the 1941 Russian campaign. It spent 1942 rebuilding in France and participated in the occupation of Vichy France. In December of 1942 it was deployed to Tunisia, and fought there until the surrender on 13 May 1943. The 10th Panzer Division was not rebuilt because the manpower sources available to the 14th Panzer Division were not available to the 10th. Since the Axis supply line to North Africa became extremely tenuous, it was impossible to evacuate wounded or send soldiers out on leave. Thus there were not enough cadre personnel to rebuild the division after it had been destroyed. Indeed, it is interesting to note that while the 10th was not rebuilt, the other two panzer

divisions in Africa with long service there, the 15th and 21st, were rebuilt. Both these divisions had been in North Africa for two years, and had been receiving replacements by airlift.[16] Having been there for an extended period of time, they were thus able to develop the same sources of manpower available to divisions such as the 14th Panzer. Additionally, the German forces in North Africa had to send some 17,000 men back to Germany in August of 1942. These were men who, while suitable for duty in Europe, were no longer able to withstand the rigors of tropical service.[17] These men were thus available to these units when they were later rebuilt. The 21st Panzer Division was reformed in the summer of 1943, while the 15th Panzer Division was reformed as the 15th Panzergrenadier Division due to equipment shortages.[18]

When the Germans did reconstitute a division from scratch, it generally took about three months to assemble the required personnel. On 23 March 1943, the 14th Panzer Division reported its strength as 78 officers, 1,054 NCOs and 4,271 men.[19] By 20 June 1943 the division had 282 officers, 2,181 NCOs and 9,450 men, close to deployable strength.[20] The Kriegstagebuch of the 24th Panzer Division gives an almost identical

story.[21]

All this, however, is not to say that the Germans always used their manpower wisely. During the Army's expansion during the 1930s, the Army had to rely on the classes of 1914-1917, which were relatively small owing to the depressed birthrate encountered during World War I. The number of men available in these classes was made smaller still by the fact that a substantial number of men from these classes had been trained as skilled workers in armaments industries and therefore could not be drafted.[22] In addition to this, a large number of men were also kept on in non-essential factories, something that caused Halder extreme irritation.[23] A potentially large source of manpower was wasted on the creation of the Luftwaffe Field Divisions, and Göring refused to disband them even after their demonstrable failure as combat formations. Wasteful policies such as these combined with steady combat losses to place a serious drain on the Army's available manpower.

The recruitment of personnel for the SS divisions was quite different from that of the Army. The SS was a voluntary organization, although it did have access to about 1% of the Army's yearly draft.[24] The SS gen-

erally obtained its members from other Nazi Party organizations. An agreement between Himmler and Baldur von Schirach, the Hitler Youth Leader, dated 17 December 1938, essentially made the Hitler Youth Land Service a replacement organization for the SS.[25] Members of the "General SS," were also liable for service in the Waffen SS. Some divisions even had special sources of personnel. The Totenkopf Division, for example, was staffed by personnel drawn from the guard detachments of concentration camps.[26]

The relatively meager supply of manpower available to the SS was sufficient, however, for their units up through the end of the French campaign. The expansion of the SS from two to five divisions, directed by Hitler on 21 February 1940, called for a much larger supply of manpower.[27] The SS was able to accomplish this without the use of foreign manpower, as SS training schools had been able to produce a surplus of soldiers, especially officers.[28] This was vital in facilitating expansion.

Unlike their Army counterparts, SS divisions had no territorial affiliation. Rather, their esprit de corps was based on a combination of ideological training and a firm belief that they were the elite

of the Nazi movement.

The SS faced a serious manpower shortage, however, due to high combat losses. Between 1 September 1939 and 1 March 1942, the SS lost 14,213 men killed and missing and 35,576 men wounded.[29] To offset these losses, the SS staged a massive recruiting drive in Germany to lure draft age men away from the Army. Another source of recruits was foreign manpower.

After the start of operation Barbarossa, a substantial recruiting campaign was initiated in foreign countries, the prevalent theme being that Europeans should participate in a "crusade against Bolshevism."[30] For allocation purposes, foreign volunteers were classified into two categories. "Germanic" volunteers consisted of Danes, Finns, Flems, Dutch, Norwegians and Swedes. These were allocated to the SS. Non-Germanic volunteers, including French, Croats, Spaniards and Walloons, were assigned to the Army.[31]

These volunteers were quickly accepted. Between 22 June and 19 September 1941, the 5th SS Division (Wiking) incorporated 2,559 Germanic volunteers into its units.[32] By the time the Wiking Division was upgraded to a full panzer division in 1943, its personnel was almost entirely foreign.

As combat losses mounted, greater and greater use was made of non-German manpower by both services. By 1943 the SS began to raise formations composed of ethnic groups hitherto excluded, such as the French and even Croats. In the Army, French volunteers would end up even in elite units such as the Gross Deutschland Division.[33] A French SS division, the 33rd Division (Charlemagne), even participated in the defense of Berlin.[34]

The best of the SS panzer divisions, however, the 1st, 2nd, 3rd, 9th, 10th and 12th were kept as "Germanic" as possible. The SS tried to increase its source of German manpower and did so, but not without strenuous objections from the Army. For 1943, for example, the SS wanted to draft a minimum of 60,000 men from the class of 1925, while the Army declared this number to be the absolute maximum the SS could take.[35] In this case, the question was resolved in the Army's favor, as it was decided that giving the SS that many recruits from the Army would deprive the Army of too many potential non-commissioned officers (NCOs).[36]

In view of the restrictions on SS recruiting in Germany, the SS relied heavily on the "Volksdeutsche," ethnic Germans who lived outside Germany. Their use

even extended to the most "Germanic" SS panzer divisions. While reforming in early 1944, the 2nd SS Panzer Division (Das Reich) received some 9,000 replacements, many of whom were Alsatians and Volksdeutsche.[37] This applied to other SS panzer divisions, and elicited bitter complaints from division commanders such as Joseph "Sepp" Dietrich and Fritz Wisch about the poor quality of such recruits.[38]

When a new SS panzer division was created, very often key personnel were transferred from one of the older divisions. When the 12th SS Panzer Division (Hitler Jugend) was formed at Beverloo, Belgium in 1943, its cadre of officers and NCOs had been transferred from the 1st SS Panzer Division (Adolf Hitler).[39]

Although the Army was subject to the ever-increasing manpower strain, the best manpower in Germany was allocated to the panzer force. Down to the end of the war, they did not apparently have to use such improvised units as "ear" or "stomach" battalions. Older men and young boys were used, however, near the end of the war, with a corresponding decline in combat effectiveness.

Leadership is a rare and valuable commodity in any situation, but it is really at a premium in war.

Thus the selection and promotion of officers and NCOs is an extremely important part of developing an army's fighting potential.

In the Reichswehr, officer candidate selection was very methodical, as was the selection of NCOs. As with so many other personnel questions, selection was usually left in the hands of the regimental commander.[40] Also the segregation of officer and NCO promotion tracks maintained by the old Imperial Army was discarded after 1919. Although a difficult process, an NCO could become an officer.[41]

The selection of SS officers and NCOs was similar to that of the Army, but different in some important ways. Officer candidates and NCOs, like other personnel, were often selected on the basis of racial characteristics, in accordance with Nazi ideology. These would include a minimum height of 5'10," "Aryan" features and in some cases even perfect teeth.[42]

Promotion was based on a combination of experience and ability. For Army NCOs in peacetime, promotion required at least several years of service and a year of service in the grade to be obtained. Wartime promotions were considerably faster, but even here promotions to senior NCO grades generally required at

least two months in command of a unit in combat.[43] This applied even to such legendary warriors as ace assault gun commander Hugo Primozic, who was promoted to lieutenant only after he spent five months in command of an assault gun platoon, during which time his assault gun destroyed sixty Russian tanks.[44] The periods required for officer promotion could be even longer.

It is also important to point out that German officers and NCOs were treated like the wounded in that they always went back to their old units.[45] Also in the German Army the presence of an officer to command a unit was not necessary. If no suitable officer could be found, the ranking NCO took over. A bad officer was considered worse than no officer at all.[46]

German Army personnel policies were designed much more for combat efficiency than for managerial convenience. In this sense they were very successful. One recent author has contented that the Germans, by concentrating their best manpower in the panzer divisions and other motorized units, really wasted their manpower by relegating the rest of the Army to second-class status.[47] This does not hold up under close examination, primarily because of the return the Germans got on their investment in these units. By comparison,

the Allies' most expensive investment in manpower, the airborne divisions, were underutilized and fragile in any case, as Arnhem demonstrated.

Although an excellent fighting force, the panzer arm did suffer from personnel deficiencies. The prime of these was the lack of people who had contact with automotive devices. This combined with oil shortages, heavy use of foreign vehicles and combat losses to result in a shortage of drivers and maintenance personnel. Here again, the German Army was attuned more to the 19th than to the 20th century.

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Chapter Three
Military Training

It is only by rigorous training that soldiers can become effective war-fighters. The length and toughness of training is basic for making good soldiers, and, more importantly, good NCOs and officers. The NCO and officer corps made up the central core of strength of the German Army, and that strength reflected the level and the intensity of German military training.

During the Nazi era, youths of pre-military age were given a proto-military training to prepare them for induction into the Wehrmacht. It should be noted that this was not a new practice. It had once been proposed by the famous French socialist, Jean Jaures. He had proposed that a youth's military training should begin at age thirteen as a preparation for military service.[1] While it is unlikely that the Nazis ever read Jaures, they did make use of his idea. In the case of pre-military age youths, training was carried out by the appropriate Nazi Party organizations, especially the Hitler Youth.[2]

During the first few years of Nazi rule, all young men from ages eighteen to twenty were given military training by the largest Nazi Party organization, the Sturmabteilung, or SA. This was reflective of the complex relationship between Hitler, the SA and the

Army. Hitler had come to power at the head of a movement that professed to be revolutionary. Although Hitler quickly dropped the revolutionary elements in his rhetoric, the SA and its leader, ex-Army captain Ernst Röhm, retained them. For Röhm, this included the SA supplanting the Army as the sole bearer of arms in the nation.[3] Hitler's allowance of the SA to conduct military training and his authorizing the SA to form a 250,000 man reserve for the Army, which had already exceeded the 100,000 man limit set for it by the Treaty of Versailles, represented his efforts to mollify Röhm and his supporters. These efforts failed, however, and by early 1934 Röhm had gone so far as to call Hitler "a swine."[4] Hitler settled this matter once and for all with the execution of Röhm and the murder of his most important followers in the infamous "Night of the Long Knives" on 30 June 1934.

The military training conducted by the SA sought to compress the equivalent of American basic training into about four weeks. According to the training plan presented by SA Leader Baldur von Schirach dated 9 October 1933, youths were to be given four weeks of military training, lasting to about 180 hours. This included marching in formation and by the twenty-second

day a youth was expected to complete a thirty kilometer march with a twenty-five pound pack. Small-arms training was also given, and there was some limited instruction and training in heavy weapons and tactics.[5]

After the purge of 30 June 1934, the SA was removed from having any role in military training, although it retained responsibility for pre and post-military training as late as 1939.[6] Any military training given to the Hitler Youth was handled by the Army. For a few months in 1937 the job of liason with the Hitler Youth was held by none other than Erwin Rommel.[7] By 1937, pre-military training for the Hitler Youth had become more sophisticated. This included special training to be given to youths who were considered particularly suited for service in the Luftwaffe, the Navy or the motorized troops.[8]

Once drafted into the Army proper, a soldier's training would be undertaken by his parent unit. A soldier's basic training was conducted by his division's replacement battalion. The emphasis on training was very practical, with a decided stress on weapons training and small unit tactics.[9] Training was also based on a set of basic objectives. These included physical fitness, mental preparation for war, courage to over-

come fear, decisiveness, leadership and eagerness for responsibility, to name the most basic qualities that make for soldierly effectiveness.[10]

Once the soldier had completed his sixteen weeks of basic training with the replacement battalion, he was sent to his parent unit. German training was conducted according to basic principles espoused in German doctrine. A good example of this is to be found in a U.S. Army Military Attaché Report. In February 1937, three Army officers, Major Truman Smith and Captains James Crockett and Harland Hartness, spent three days with the 39th Anti-Tank Battalion, which was part of the 3rd Panzer Division.

The battalion was located at the site of the German Army's Tank School, Wunsdorf, and was a neighboring unit to a battalion of the 8th Panzer Regiment, also of the 3rd Panzer Division. The units were placed together for training purposes. Although the battalion was part of the Panzer Troops, its basic training was the same as that of the infantry. After arriving at the base, soldiers spent the next six months undergoing intense infantry training, with some training on the standard German anti-tank gun of that period, the 37mm. After the initial six month period the men

were broken up into three groups. Of these, forty-five percent received specialist training as anti-tank gun crews; forty percent were trained as vehicle drivers and mechanics and fifteen percent as signalmen. Mixed in with this specialist training were brief resumptions of infantry training.[11]

This pre-war program of training includes several features that deserve special comment. The first of these is the emphasis on familiarity with combined arms. Tank and anti-tank units were encouraged to train together. The training of these troops was only considered complete when each knew and understood completely the capabilities and functions of the other.[12] Also of note here is the fact that all of the personnel in the battalion were trained extensively as infantry. This was for two reasons. First, the Germans were constantly aware of the possibility of their having to fight a two-front war in Europe under conditions of numerical inferiority.[13] Under these circumstances, the German Army could not afford to maintain a large number of soldiers who did not serve any kind of combat function. Second, every army is based on infantry, and it is this branch which inevitably absorbs the majority of casualties. Thus the highest demand will always be for

infantrymen, regardless of the army. Also of note in German pre-war training was the considerable training carried out jointly with engineers, as they were considered integral to anti-tank defense.[14]

It is interesting to contrast this training with that of the American Army. Although weapons training was heavily stressed, troops in infantry divisions tended to lack combined arms training, and especially integration with tanks.[15] Armored division training suffered from a variety of equipment shortages, and a lack of maintenance and storage facilities for the vehicles.[16]

For practical traing aids, simple but effective devices were used. In pre-war training, anti-tank troops were given full-scale cardboard silhouettes of armored vehicles taken from Fritz Heigl's popular work, Taschenbuch der Tanks.[17] This would not only show troops where and how to aim at them, but could also be used as a practical course in vehicle identification. Later dur- the war troops were issued tables with which they could learn to estimate range.[18] To improve marksmanship, anti-tank troops used a sub-caliber device on their anti-tank guns which allowed them to be fired at a moving target that was dragged by a sled.[19] Prospective truck drivers were tested with a simple apparatus con-

sisting of lights, sounds and petals. The reactions of subjects were carefully recorded and his character and personality carefully assessed.[20]

The German Army also benefitted from the Anschluss with Austria and the occupation of Czechoslovakia. The conduct of the mobile troops in the Anschluss, in this case the 2nd Panzer Division and the SS regiment Leib standarte Adolf Hitler, revealed serious deficiencies in matters such as vehicle maintenance and march discipline.[21] These were faults that could be rectified by training.

Wartime training was a good deal tougher than peacetime training. The Germans were disappointed in the performance of their soldiers in the Polish campaign. Halder made the complaint very commonly made by generals that the infantry were not very vigorous in the attack. He also complained about poor march discipline in motorized units that caused traffic jams.[22] Guderian noted several occasions when his motorized and panzer units exhibited signs of nervousness about going into action.[23] The Army High Command became well aware of this situation, having been alerted by a number of brutally honest after-action reports from unit commanders disclosing the shortcomings of their troops.

The 2nd Light Division, for example, reported that its reconnaissance units utterly failed to produce any kind of results in conducting reconnaissances, and instead had suffered sharp losses, especially in vehicles.[24] An effort to overcome these deficiencies led to the institution of a stringent training program for both recruits and veterans. Between the Polish and French campaigns there was a concentrated effort to raise the level of efficiency in the Army to a uniformly high level.[25]

The program was intended to raise the level of war-fighting effectiveness of the Army as well as to incorporate the lessons of the Polish campaign into the Army's current doctrine. According to the commander of the 10th Panzer Division, the goal of training had to concentrate on improving the conduct of the troops in combat. The troops had to be inured to the harshness and stress imposed by combat, and the new troops had to be trained in the proper use of combined arms. This included the integration of tanks and infantry, and the use of infiltration tactics by both; march and fuel discipline, attacks with engineers on fortified positions, and radio discipline, to name a few things.[26] According to the reports filed by the divi-

sion, that is just what they did, and they did it for months on end.[27]

Very often live ammunition was used in training exercizes, a practice employed by the pre-1914 German Army during some phases of their annual summer maneuvers. Although casualties did occasionally result, as a German officer explained to Lieutenant Colonel W.D. Hohenthal, the American Assistant Military Attaché, the practice put the men on alert to become more effective in combat.[28] As late as 7 May 1940 -- a mere three days before the start of operations in the west -- SS units were still conducting exercizes.[29]

The Germans retained this kind of realistic training for the duration of the war. Before undertaking the Balkan campaign in 1941, the 11th Panzer Division spent the winter training for operations in "impassable" mountains.[30] This paid fine dividends, both tactically and strategically, in the subsequent campaign. Before the opening of the Gazala offensive in the summer of 1942, the 21st Panzer Division conducted extensive combined arms training, especially in the use of infiltration attacks by infantry.[31]

One thing the Germans paid special attention to in the wake of the French campaign was the use of air-

power tactically. Dissatisfied with air-ground cooperation during the French campaign, OKH directed that all higher headquarters conduct cooperative training with the Luftwaffe everytime a favorable moment presented itself.[32] This was also continued for the duration of the war. During the lull before the battle of Kursk, for example, the 2nd SS Panzer Grenadier Division (Das Reich) conducted intense training, culminating in a division-sized assault exercize with Stuka divebombers in support.[33]

In terms of the way this training affected the individual soldier, perhaps the best description we have of this is to be found in the recollections of Guy Sajer in his book, The Forgotten Soldier. Sajer, an Alsatian, was conscripted into the German Army in 1942. Eventually he volunteered for and spent the rest of the war with the Army's elite Grossdeutschland Division as an infantryman.[34]

During the summer of 1943 Sajer spent a month in the training camp run by the division's field replacement battalion before joining his company. Most training exercizes were conducted with some live ammunition. In a month's training, Sajer's training company lost four men killed and twenty injured.[35] Some of the

training methods exposed soldiers to serious injuries. Tanks were driven over the foxholes the soldiers had dug and in which they had to cower while a tank drove over them.[36] The purpose of this was to diminish a soldier's fear of tanks. The Germans certainly believed that this kind of training was essential for preparing men for combat. The I SS Panzer Corps adopted an old training motto from the French Army before 1914, "Training spares blood."[37]

The training of officers and NCOs was both long and thorough. In the Reichswehr, training courses were long, since both officers and NCOs were trained to act in a capacity two steps above their rank.[38] This proved a valuable asset in the Army's rapid expansion after 1935. Training schools for officers and NCOs were very strenuous, and as a result there was a high drop-out rate. This, however, was not necessarily a drawback, because the wash-outs took their training experience back to their units and made them better soldiers. This was also true of the SS.[39] It has also been argued that this "reverse flow of experience" was also true for higher German officers who had been subjected to varying degrees of General Staff training at the Kriegsakademie.[40] General Albert Wedemeyer, who attended the

Kriegsacademie from 1936 to 1938, regarded the instructors, methods of instruction and curriculum at the Kriegsacademie as being far superior to those of the U.S. Army's Command and General Staff College at Fort Leavenworth.[41]

Training for the SS was at once both similar and different from that of the regular Army. Since the Army held "the high ground," the SS was initially dependent on the Army for training areas and instruction in weapons. Between 1934 and 1944, the SS established four officer candidate schools (Junkerschulen) at Bad Tölz (1934), Braunschweig (1935), Klagenfurt (1943) and Prague (1944).[42] Along with these, the SS also had a number of branch schools, of which the most important was the SS panzer grenadier school, established in the summer of 1942 at Benneschau, in Bohemia.[43] All of these schools, however, were generally run along Army lines. This similarity included the length of the course and the training schedule being followed.[44] The only major difference lay in the ideological training given to SS officer candidates, which included the study of such "classics" as Mein Kampf, Alfred Rosenberg's The Myth of the 20th Century and Walter Darre's Blood and Soil. This was also done in SS divisions on

a unit basis.[45] To insure uniformity of training, SS schools used Army manuals. In addition, from 1935 on, SS officers could be trained at Army schools and then returned to their own units.[46]

These schools were of prime importance to the SS in enabling it to successfully expand during the war. From 1939 until the outbreak of war a total of nine classes were graduated from the Junkerschulen, each requiring ten months to complete the course.[47] Since the schools before the war could produce up to 500 officers annually, and very few of these were required for military service initially, there was a large reserve of officers available to staff the divisions created after 1940. During the war, the SS Junkerschulen furnished the SS with about 15,000 trained officers.[48]

From the point of view of the panzer force, there are several significant points to observe with respect to German Army training. First is the great weight attached to the Army's basic doctrine in its relation to training, especially the principle of combined arms. German soldiers, NCOs and officers were all trained to understand the value of the combination of tanks, infantry, artillery and engineers. This allowed not

only individual divisions to employ combined arms Kampfgruppen, but also allowed panzer divisions to do this with non-motorized infantry divisions. This doctrine and its practice had been stressed as the basic German armored doctrine before the war.[49] Even more importantly, this was the accepted doctrine of the German Army as a whole. During the latter stage of the war, Guderian, as Inspector General of the Panzer Troops, passed instructions binding the Replacement Army on training every type of soldier to cope with armored warfare. Such instructions were instrumental in maintaining uniformity of training.[50] This gave the German Army a large edge over the U.S. Army, which not only was lacking in combined arms training, but did not even have a combined arms doctrine that all the major branches could agree on.[51]

Second, the raising of so many divisions and their occasional rotation out of the line allowed them valuable time for training as well as refitting.[52] Rotation made possible the incorporation of trained replacements and keeping a sharp combat edge on divisions. German personnel policy was an important factor here also. German divisions were not subject to the "personnel raids" which proved so disruptive to many

American divisions during their training cycles. One American division, for example, lost a cumulative total of 22,235 men to Army Ground Forces as replacements, the result of which was to reduce its training efforts to a shambles.[53]

Finally, there was the emphasis on individual as well as command initiative and flexibility. This was carried over from the development of infiltration tactics by the German Army during World War I.[54] One element of pre-1939 German training that American Military Attachés found noteworthy was that the German Army lacked a "school solution" to solve problems.[55] Soldiers, NCOs and officers were trained to judge each situation as being unique and not to react in a dogmatic fashion. This attitude was reflected throughout German manuals, beginning with the basic German field service regulations, Truppenführung, which defines war as an "art, depending upon free creative activity, scientifically grounded."[56]

The declining fortunes of war exercized a deleterious effect on training. This was primarily manifested in reduced time for training courses. Panzer troops received twenty-one weeks of training during the early part of the war. By 1944 this had been re-

duced to sixteen weeks.[57] The SS Junkerschulen was forced to reduce the length of their training courses from ten months to four.[58] Training was also undoubtedly hindered by shortages of equipment and more importanly, fuel. These circumstances ultimately caught the Germans in a vicious circle. Less well-trained men were more susceptible to becoming casualties. Higher casualties in turn generated a greater demand for replacements. The Germans did attempt to partially remedy this by having higher echelon units set up their own schools to make up for the limited time available at established schools. During the fall of 1944, Army Group B set up its own informal schools to give more training for junior officers and NCOs.[59] Measures such as these, however successful, could not rescue the Germans from the consequences of the casualties they were suffering on all fronts.

In conclusion, it is clearly evident that German Army training reflected to a very great degree the most basic German Army doctrine of individual, small unit and divisional initiative. This played an extremely important part in allowing the Germans to employ their divisions as they did, and to maintain a relatively high standard of leadership at the junior and field grade levels throughout the entire war.

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Chapter Four
Theory and Doctrine

One of the most important functions of an army is the formulation and promulgation of doctrine. The doctrine of an army is generally affected by a number of influences. Doctrine may be influenced by a country's geography, its previous military experience and the army's approach to war.

An army may also be affected by foreign influences. During the Napoleonic Wars, for example, Russia, Prussia and Austria copied French Army organization and used it with some success against Napoleon. Later during the 19th century, many armies copied all things Prussian after Moltke's victories in 1866 and 1870.

If any aspect of the German panzer force is still clouded with myths and distortions, it is the matter of doctrine and foreign influence, in particular the influence of the two major British theorists of the inter-war period, J.F.C. Fuller and B.H. Liddell-Hart. This really rests on two paragraphs in the English edition of Heinz Guderian's memoirs, Panzer Leader. Though quoted many times, the passage is worth quoting here:

> It was principally the books and articles of the Englishmen, Fuller, Liddell-Hart

> and Martel, that excited my interest and gave me food for thought. These far-sighted soldiers were even then trying to make the tank something more than just an infantry support weapon. They envisaged it in relationship to the growing motorization of our age, and thus they became the pioneers of a new type of warfare on the largest scale.
> I learned from them the concentration of armor, as employed in the battle of Cambrai. Further, it was Liddell-Hart who emphasized the use of armored forces for long-range strokes, operations against the opposing army's communications, and also propsed a type of armored division combining panzer and panzer-infantry units. Deeply impressed by these ideas I tried to develop them in a sense practicable for our own army. So I owe many suggestions of our further development to Captain Liddell-Hart.[1]

This passage has been taken at face value and uncritically by most students and scholars of this subject.[2] A good deal of this, however, can be dismissed as material specifically written for the post-war British public. Guderian's English biographer, Kenneth Macksey, noted that the second paragraph of the passage quoted above is not in the original German edition of Guderian's memoirs.[3]

Equally of interest are Guderian's assertions on the character and influence of the Chief of the General Staff, General Ludwig Beck, during the period when the panzer force was created. Guderian depicts Beck as something of a reactionary, who wanted to prevent or at least limit the expansion of the panzer force.[4] As shall be seen, this view is also not truthfull.

If foreign influence is discounted, the question still remains, what were the sources of German panzer and anti-tank doctrine? German interest in tanks originates from several sources. First, it was perfectly natural that the German Army be interested in tanks. They had been on the receiving end of several devastating tank attacks during World War I, the most notable being at Amiens, where some 400 tanks completely overwhelmed the German defenses in a rout.[5] Also, the German Army had utilized motor vehicles. In 1914 the German advance into Belgium had been supplemented by the use of confiscated Belgian trucks.[6] Later during the war, the Germans did experiment with motorized combat forces. General Erich von Falkenhayn used columns of truck-borne infantry with great success in the conquest of Rumania in 1916.[7] Finally,

the restrictions of the Versailles Treaty caused the Germans to consider how to defend against tanks when they had none themselves.

German interest in tanks dated from the early 1920s. The Reichswehr had collected information on tanks during the 1920s.[8] The Chief of the General Staff, General Hans von Seekt, was very sceptical of the tank as a major weapon of war, but never committed himself firmly against their development.[9] Foreign developments in tanks were monitored and reported in the pages of the standard German military periodical, Militär Wochenblatt. These consisted of brief pieces by known writers or by military attachés posted in foreign countries, and brief unsigned summaries of foreign works.[10] In addition, there was tank testing and training going on at the secret joint Russo-German tank school at Kazan.[11]

As for German doctrine as it finally evolved, it was really an outgrowth of the Army's infiltration tactics developed during World War I. These tactics represented a philosophical approach by the German Army to break the deadlock of trench warfare. They were based on the use of small groups of specially trained assault infantry using combined arms; in this

case, a mix of rifles, light machine guns, grenades and mortars.[12] These groups, after a brief but intense barrage, were to penetrate the soft spots in the enemy line and then move into the enemy's rear area. Isolated and bypassed enemy strongpoints would be assaulted and taken by units following up after the initial advance. These tactics had proved very effective in Russia, Rumania, Italy and France.[13]

Although Germany ultimately lost the war, the Germans, particularly Seekt, believed they had discovered the correct operational concept. The 1921 field service regulations, Führung und Gefecht, advocated the use of speed and mobility. The principle of combined arms was heavily emphasized, especially in a deliberate attack.[14] The 1921 regulations also noted the possibility of using trucks to carry infantry and machine gun platoons in conducting a pursuit.[15] Thus, the basic elements of German armored doctrine were present well before the emergence of the panzer arm.

The principle of anti-tank defense in Germany also date from the 1920s. Here the Germans may have benefitted from the Versailles Treaty, which prohibited them from having tanks. The general logic of anti-tank

defense is that the best defense against a tank is another tank. Since the Germans were denied this by the treaty, a different means of dealing with the tank had to be found. The 1921 regulations had advocated a system using anti-tank rifles, heavy weapons, guns and flame throwers.[16] Later, one Lieutenant Gallwitz argued that anti-tank defense should be centered on the gun, used in combination with the machine gun.[17] These were to be deployed in "nests" with machine guns and arranged in depth.[18]

These influences made German armored doctrine quite different from that propounded by the British theorists in a number of ways. The prime of these was the emphasis on combined arms. As noted previously, this had been an important principle behind the German infiltration tactics of World War I, and the Germans fitted tanks into this concept. In August of 1935 the Germans held their first field maneuver with a panzer division, commanded by Guderian's superior and protector, General Oswald Lutz. The after-action report on the exercize stated quite clearly that infantry and tanks must work very closely.[19] This was in direct contravention to many of the writings of Fuller and Liddell-Hart. Fuller, for example, stated as late

as 1932 that infantry would be useful only in places where tanks could not go.[20] As for Liddell-Hart, he saw tanks as the modernized form of heavy cavalry.[21]

Another important element of German combined arms doctrine was the use of engineers. This was advocated by Guderian in 1936 and reflected in the 1938 manual Richtlinien für die Führung der Panzerdivision.[22] Engineers became an important element in operations throughout the war. This reflected not only the special capabilities of engineers, but also the German Army's ability to "make do" with any kind of troops in various circumstances.[23]

The use of air power was also interesting. Both Fuller and Liddell-Hart forcast aircraft in the role of a "flying artillery."[24] Contrary to popular myth, however, the Germans had something quite different in mind for aircraft. Rather than use them for ground attack, German theorists argued that they should be used for what could be called interdiction. Field Marshal Wilhelm Ritter von Leeb said that when on the defensive, air power was important for disrupting the enemy rear.[25] Guderian argued that air power could facilitate an armored assault by attacks on enemy communications, headquarters and assembly areas, aside

from front line defenses.[26] But it was also argued as late as 1934 that the utilization of air power for ground attack was impractical because it assumed complete air superiority.[27] Events in Spain, and the untiring efforts of Luftwaffe General Wolfram von Richthofen, forced the Germans to take steps toward effecting air-ground cooperation.[28] Nevertheless, the section of the 1938 manual Richtlinien für die Führung der Panzerdivision dealing with artillery make it quite clear that the Army did not expect cooperation with the Luftwaffe in a tactical sense.[29]

It is not surprizing then that during the early part of the war, cooperation between the Army and the Luftwaffe was not exactly exemplary. Even during the highly successful French campaign, the 6th Panzer Division's after-action report stated, "cooperation with the Luftwaffe (Stukas) is still unsatisfactory."[30] The 10th Panzer Division had reported similar problems with air-ground cooperation in Poland.[31] This problem was eventually solved with the introduction of the coordinated air-ground team in 1941.

From the preceeding paragraphs, it is fairly obvious that German armored doctrine was rather more sophisticated than the rather simplistic ideas put

forth by Liddell-Hart, Fuller and Fuller's French echo, Charles de Gaulle.[32] Nonetheless, the question remains, did the Germans read the works of these theorists? The answer to this is undoubtedly yes. The most obvious way of finding this out would be to see which authors were cited in footnotes or listed in bibliographies. Using this method, it is obvious that the Germans were much more familiar with the works of Fuller and de Gaulle than those of Liddell-Hart. In fact, Guderian mentioned Liddell-Hart only once in his pre-war writings.[33] His most important pre-war article, "Die Panzertruppen und ihr Zusammenwirken mit den anderen Waffen," published in the August 1936 edition of Militärwissenschaftliche Rundschau, quotes both Fuller and de Gaulle, but not Liddell-Hart.[34] The same is true of the bibliography of Achtung-Panzer![35] Also in other documents and writings, it is Fuller's name that appears, not Liddell-Hart.[36]

As might be expected, German armored doctrine exerted a great deal of influence on German divisional organization and how panzer divisions were employed. The emphasis on combined arms was present throughout the writings of theorists such as Guderian, Nehring and Leeb. This was also reflected in the Army's field

manuals, beginning with the basic field service regulations, Truppenführung, issued in 1936.

This edition of Truppenführung is very interesting, as it sheds a great deal of light on the character of the Chief of the General Staff then, General Ludwig Beck. In his memoirs, Guderian paints Beck as a reactionary who fought against the acceptance of panzer divisions in the German Army.[37] A look at the manuals prepared under Beck and simultaneous developments in the Army shows that Guderian's image of Beck was not correct. The most obvious development to prove this was that, as noted by Beck's biographer Klaus-Jürgen Müller, under his tenure as Chief of the General Staff, the number of panzer divisions in the Army was doubled from three to six.[38] In fact, Beck preferred to have a small, completely motorized force, but was thwarted by the pace of Hitler's military expansion and Germany's inability to produce the requisite numbers of vehicles and the amount of fuel needed.[39]

Both Truppenführung and the 1938 manual Richtlinien für die Führung der Panzerdivision, with its successor, Richtlinien für Führung und Einsatz der Panzer-Division, issued in late 1940, stressed combined arms. For the panzer division, this translated

into breaking the division down into combined arms battle groups, or Kampfgruppen. This concept was clear-stressed in the 1938 manual.[40] This system was used in Poland with what the Germans felt were satisfactory results. Although the conduct of the troops was criticized, after-action reports stated that the doctrinal principles proved correct.[41] The German Army maintained this principle down to the end of the war.

Another important element of German doctrine is not what the manuals say, but what they do not. German manuals are not very detailed, but rather give only general guidelines. This was in keeping with two important tenets of German doctrine. First was the emphasis on individual initiative, especially on the part of junior officers and NCOs. This was clearly expressed in the first sentence of Truppenführung, which describes war as a "free creative activity."[42] This was also an outgrowth of German infiltration tactics, which demanded this quality of junior leaders. A fine example of this was Erwin Rommel. During World War I, he commanded troops trained in these tactics in Italy. Although a captain, he occassionally commanded units up to battalion strength. In all of these operations he really had to rely on his own initiative.[43] This principle was

heavily stressed by Seekt during the 1920s.[44] It remained a staple part of German doctrine throughout the Second World War.

Another important element of German doctrine that was an outgrowth of the German Army's concept of war was the absence of a "school solution." This idea comes through very clearly in both articles and manuals. In his first article, "Truppen auf kraftwagen und Fliegerabwehr," Guderian wrote on the subject of air defense for motorized troops. In it he states "binding regulations should not be given for all cases."[45] The basic training manual for tank crews, Vorläufige Anweisungen für die Ausbildung von Pansereinheiten gives essentially the same advice as to the independence of the commander on the spot.[46] American Military Attachés were impressed by this idea, and how German training instructed officers and NCOs to judge each situation separately and to realise that there could be several solutions to a problem. The "school solution" was eschewed as being rigid and dogmatic.[47] The looseness in German doctrine led one noted panzer commander, General Freiherr Geyr von Schweppenburg, to state after the war that there was no such thing as an overall German panzer doctrine.[48]

The Germans were also very successful in being

able to alter their doctrine as well as retaining or refining elements of it. As noted earlier, cooperation with the Luftwaffe had not always been very successful in Poland or France. The 10th Panzer Division's after-action report on the Polish campaign went so far as to recommend that part of the Luftwaffe be subordinated to the Army.[49] There were situations, however, where circumstances did allow airpower to be used with devastating results, such as at Guderian's crossing of the Meuse. The experience of the Polish and French campaigns were duly noted and incorporated into the 1940 manual Richtlinien für Führung und Einsatz der Panzer-Division. This edition stated quite definitely how valuable airpower could be in facilitating the division's operations.[50]

Equally interesting was the absorbtion by the Germans from the Polish and French campaigns of the psychological value of the panzer division. During these early campaigns enemy soldiers, especially low-grade French units, were demoralized by the sight of large numbers of tanks.[51] This psychological aspect was stressed in the opening section of the 1940 manual.[52]

Many elements of doctrine remained throughout the war. The combined arms concept has already been

noted. the concept of anti-tank defense also remained the same. During the 1920s, German writers stated quite clearly that the best defense against the tank was another tank.[53] The tank remained the premier means of anti-tank defense during the war in Russia. The 36th Panzer Regiment commander noted in an after-action report that the Pz IV accounted for many more tanks than assault guns.[54] The Army High Command (OKH) noted the same thing in training instructions to units.[55]

The gun, however, also retained an important role in anti-tank defense. The 88mm gun proved its value in France in 1940 and later against the British in North Africa. On the eastern front, the Germans developed the concept of the Pak (Panzerabwehrkanone) front, using anti-tank guns in depth, in a manner very much like those described before the war by writers such as Gallwitz and Nehring.[56] These tactics also proved very effective in thwarting operation Goodwood, where a heavy tank assault by Field Marshal Bernard Montgomery's forces foundered on a series of gun lines in depth backed by armored Kampfgruppen.[57]

One great advantage held by the Germans was their ability to incorporate their armored doctrine into the overall doctrine of the Army. This was due to several

reasons. First, basic German doctrine emphasized many of the same principles that German armored doctrine did, such as mobility, speed, surprise and combined arms, to name a few. Both the 1938 manual on the panzer division and its updated 1940 edition contain numerous references to the basic field service regulations, Truppenführung.[58]

The attitude of Beck as Chief of the General Staff toward the development of tanks has already been noted. Equally important was the open-mindedness shown by other senior officers toward the development of tanks. To be sure, there were senior officers who opposed the development of the panzer force, such as General von Poseck, the Chief of Cavalry. He consistently fought against tanks, once even arguing that cavalry could deploy faster for battle than tanks could.[59] A more representative approach was shown by Field Marshal Gerd von Rundstedt. After an early exercise, he told Guderian that his ideas on tanks were "nonsense."[60] Once he had realized their potential, however, he quickly favored their use and became arguably Germany's most successful field commander in World War II.

The armor advocates were fortunate not only in having friendly superior officers, such as Generals

Oswald Lutz and Erich von Tschischwitz, who were Guderian's patrons, but also in having the approval of the supreme authority in Germany, Adolf Hitler. Tanks and aircraft appealed to him, as he was fascinated with what were considered novel forms of warfare. Guderian noted his delight at the maneuvers of motorized and tank units.[61] As his was the last word on any subject, Hitler's support of the panzer force was vital to its development.[62]

Finally, German armored doctrine fit very easily into the broader war-fighting doctrine of the German Army. This is important because it illustrates a subtle yet important difference between German military thought and that of the British theorists. Both Liddell-Hart and Fuller believed that armored operations should be aimed at inducing a strategic paralysis in the enemy. Liddell-Hart argued that the Napoleonic method of having the opposing army as the objective was wrong.[63] Instead, an army should strike at a moral objective to demoralize the enemy.[64] In keeping with the myth of British influence, some authors have argued that these concepts influenced the conduct of German operations.[65]

The idea of inflicting a strategic paralysis on the enemy was important to the Germans, but the dif-

ference was on emphasis. Whereas Fuller and Liddell-Hart regarded paralysis as an end in itself, for the Germans it was only a means to an end, that being the physical destruction of the enemy. This was accomplished by the Vernichtungsschlacht, the battle of annihilation. This had been developed by Chief of the General Staff General Alfred von Schlieffen before 1914 and it remained a staple of German military thought during the 1920s.[66]

This concept provided the basis for the conduct of German operations for the entire war. The basic objective was the physical destruction of the enemy army, since it was assumed that decisive battles would ultimately deliver victory. This proved very successful in Poland and France, but ultimately broke down in Russia because the distances involved proved beyond the effective striking range of the Army panzer and motorized divisions.[67] Even after the breakdown of the 1941 offensive, this idea was retained, right down to the Ardennes offensive in December of 1944.

If there was one disadvantage to German doctrine, it was that Germany's enemies picked up its elements relatively quickly. Only the British never really came to understand German doctrine. Their conduct of opera-

tions in North Africa and in Normandy in 1944 reveal a constant repetition of mistakes, particularly in regard to the underestimation of the power of the gun line. The Russians, after suffering a series of disasters in 1941 and 1942, eventually became better able to cope with German armored assaults. At Kursk they were able to use successive gun lines with devastating effect to blunt the German attack. The reintroduction of the combined arms-based Tank Corps in 1942 and later the Mechanized Corps presaged the development of the Russians' own "Blitzkrieg" doctrine. By 1944 they were able to inflict severe defeats on the Germans with their mobile units under commanders such as Marshals Georgi Zhukov and Konstantin Rokossovski, who had become well-versed in conducting armored operations. After their initial defeat at Kasserine Pass, the Americans learned to cope with German armored tactics relatively quickly. The best example of this was in the Ardennes, when General Troy Middleton, commander of the VIII Corps, decided to leave the 101st Airborne Division in Bastogne. His refusal to panic in a crisis was a major reason for the ultimate breakup of the German offensive.

From the preceeding pages, it is abundantly clear

that German armored doctrine was not really very much influenced at all by the ideas of foreign thinkers, although the Germans were familiar with the ideas of Fuller, de Gaulle and, to a lesser extent, Liddell-Hart.[68] German doctrine grew out of Germany's experiences in the latter stages of the First World War and the German Army's general approach to war. The unique approach to the problems of armored warfare taken by the Germans allowed them to deploy and use the panzer force in a uniquely German manner.

ENDNOTES

1. Guderian, Panzer Leader, p. 20.

2. See for example Perrett, A History of Blitzkrieg, (New York, 1983), p. 65 and Robert H. Larson, The British Army and the Theory of Armored Warfare 1918-1940, (Newark, 1984), pp. 226-227.

3. Macksey, p. 41.

4. Guderian, Panzer Leader, p. 32.

5. Larson, p. 62.

6. Creveld, Supplying War, p. 126.

7. For details see Norman Stone, The Eastern Front 1914-1917, (New York, 1975), pp. 264-281.

8. Albert Seaton, The German Army 1933-45, (New York, 1982), pp. 61-62.

9. Spires, p. 107.

10. See for example Unsigned, "Kampfwagenausbildung in Russland," Militär Wochenblatt, Vol. 111, No. 13, (4 October 1926): pp. 444-445, or Unsigned, "Kampfwagen und Kavallerie," Militär Wochenblatt, Vol. 111, No. 38, (11 April 1927): pp. 1405-1406.

11. Hans W. Gatzke, "Russo-German Military Collaboration During the Weimar Republic," American Historical Review, Vol. LXIII, No. 3, (April 1958): p. 578. For the Soviet side see Erickson, The Soviet High Command, (London, 1962), pp. 144-163. The full story of the Russo-German collaboration will almost certainly never come to light. The Germans destroyed most of the documents relating to it, while the major Soviet officers involved were killed in the 1937-1938 purge.

12. Paddy Griffith, Forward into Battle, (New York, 1981), p. 80.

13. For some eyewitness accounts, see Field Marshal Erwin Rommel, Infantry Attacks, (Vienna, 1979), pp. 201-276. The best work on the development of these tactics is Captain Timothy T. Lupfer, The Dynamics of Doctrine: The Changes in German Tactical Doctrine During the First World War, (Fort Leavenworth, 1981).

14. German Army, Command and Combat of the Combined Arms, (Fort Leavenworth, 1925), p. 118. This is the U.S. Army translation of the 1921 German field service regulations, Führung und Gefecht.

15. ibid., pp. 99-100.

16. ibid., pp. 198-199.

17. First Lieutenant Uto Gallwitz, "Beiträge zur Kampfwagenabwehr," Militär Wochenblatt, Vol. 111, No. 9, (4 September 1926): p. 295.

18. Gallwitz, "Infanteriegeschüts und Kampfwagenabwehr," Militär Wochenblatt, Vol. 111, No. 14, (11 October 1926): p. 486.

19. After-action Report on Experimental Exercises of a Panzer Division at the Drill Ground at Munster in August 1935, 24 December 1935, NARS T-79/52/000750.

20. Major General J.F.C. Fuller, Armored Warfare, (Westport, 1983), p. 18. This was actually the 1943 annotated edition of his most famous pre-war work on tanks, Lectures on FSR III, (London, 1932). The only changes from the 1932 edition were the annotations.

21. Liddell-Hart, The Remaking of Modern Armies, (London, 1927), p. 57.

22. Guderian, "Die Panzertruppen und ihr Zusammenwirken mit den anderen Waffen," Militärwissenschaftliche Rundschau, Vol. 1, No. 5, (August 1936): p. 618, German Army, Richtlinien für die Führung der Panzerdivision, 1 June 1938, p. 27.

23. John Keegan, Six Armies in Normandy, (New York, 1982), p. 172.

24. See for example Fuller, On Future Warfare, (London, 1928), p. 333.

25. Field Marshal Wilhelm Ritter von Leeb, Die Abwehr, (Berlin, 1938), p. 92.

26. Guderian, "Die Panzertruppen und ihr Zusammenwirken mit den anderen Waffen," p. 622.

27. American Military Attaché Report on Combined Efforts of Tanks With Planes, 14 November 1934, MID 2016-1200/1.

28. Murray, Luftwaffe, p. 17.

29. German Army, Richtlinien für die Führung der Panzerdivision, 1 June 1938, p. 20.

30. After-action Report of the 6th Panzer Division on French Campaign, 18 July 1940, NARS T-311/49/7061270.

31. After-action Report of the 10th Panzer Division on Polish Campaign, 15 October 1939, NARS T-315/558/000817.

32. Williamson Murray has correctly described de Gaulle's The Army of the Future as being nothing more than "a rehash of Fuller's pleas for an all-tank army." Murray, The Change in the European Balance of Power 1938-1939, p. 102.

33. Guderian, "Kraftfahrtruppen," p. 69.

34. Guderian, "Die Panzertruppen und ihr Zusammenwirken mit den anderen Waffen," pp. 615, 619.

35. Guderian, Achtung -- Panzer!, (Stuttgart, 1937), p. 214.

36. See for example Lieutenant Colonel Hoffmeister, "Der Angriff von Panzerkraften im Zusammenwirken mit Infanterie einer nicht mot. Division und deren Artillerie," c. 1936, NARS T-79/48/000592.

37. Guderian, Panzer Leader, p. 32.

38. Klaus-Jürgen Müller, Armee, Politik und Gesellschaft in Deutschland 1933-1945, (Paderborn, 1979), p. 89.

39. Müller, General Ludwig Beck, (Boppard-am-Rhein, 1980), pp. 209-210.

40. German Army, Richtlinien für die Führung der Panzerdivision, 1 June 1938, p. 25.

41. After-action Report of the 10th Panzer Division on Polish Campaign, 15 October 1939, NARS T-315/558/000817.

42. This sentence begins the 1921, 1925, 1933 and 1936 editions of this manual.

43. Rommel, pp. 235-249.

44. English, p. 68.

45. Guderian, "Truppen auf Kraftwagen und Fliegerabwehr," Militär Wochenblatt, Vol. 109, No. 12, (25 September 1924): p. 306.

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47. MID 2016-1236/1.

48. U.S. Army, "ETHINT 13: Geyr von Schweppenburg in Normandy," Detwiler ed., Vol. 2, p. 3.

49. After-action Report of the 10th Panzer Division on Polish Campaign, 15 October 1939, NARS T-315/558/000817.

50. German Army, Richtlinien für Führung und Einsatz der Panzer-Division, 3 December 1940, p. 10.

51. Liddell-Hart ed., The Rommel Papers, p. 19.

52. German Army, Richtlinien für Führung und Einsatz der Panzer-Division, 3 December 1940, p. 7.

53. Ernst Volckheim, Der Kampfwagen in der heutigen Kriegführung, (Berlin, 1924), p. 6.

54. After-action Report of 36th Panzer Regiment, 14th Panzer Division, 7 January 1944, NARS T-78/620/000228.

55. OKH, Training Division, "Experiences in Defensive Battles 1943-44," 25 April 1944, NARS T-78/620/000481.

56. Lieutenant Colonel Walter Nehring, "Panzerabwehr," Militärwissenschaftliche Rundschau, Vol. 1, No. 2, (March 1936): p. 200.

57. Carlo D'Este, Decision in Normandy, (New York, 1983), p. 377.

58. See for example German Army, Richtlinien für die Führung der Panzerdivision, 1 June 1938, pp. 12, 14.

59. American Military Attaché Report, 3 February 1931, MID 2016-1095/10.

60. Murray, The Change in the European Balance of Power 1938-1939, p. 35.

61. Guderian, Panzer Leader, p. 30.

62. Mehring, Die Geschichte der Deutschen Panzerwaffe 1916 bis 1945, (Berlin, 1969), p. 75.

63. Liddell-Hart, The Remaking of Modern Armies, p. 88.

64. ibid., p. 111.

65. See for example Major George A. Higgins, "German and U.S. Operational Art: A Contrast in Maneuver," Military Review, Vol. LXV, No. 10, (October 1985): p. 23.

66. Jehuda L. Wallach, The Dogma of the Battle of Annihilation, (Westport, 1986), p. 218.

67. Larry H. Addington, The Blitzkrieg Era and the German General Staff, (New Brunswick, 1971), p. 216.

68. Brian Bond, "Liddell-Hart and the German Generals," Military Affairs, Vol. 41, No. 1, (February 1977): p. 20.

Chapter Five
German Divisional Organization

One of the least discussed, but most important, aspects of military affairs is an army's formal organization. How an army's fighting units are organized can often determine the outcome of a campaign. A classic example is Napoleon's use of the corps d'armee of massed divisions, which gave him a tremendous advantage over his early Austrian, Prussian and Russian opponents, who still used the unwieldy 18th century organization based on the several arms. The same organizational advantage served the German Army's armored force, whose strength was embodied in the panzer division.

As a military formation, the first panzer division in 1935 was representative of several experiences gained by the post-World War I German Army. First, it represented the logical outcome of the German Army's experiments in the 1920s and 1930s to gain mobility by using more motor vehicles. Second, the panzer division represented the persuasive success of a group of officers who advocated, with the tacit assent of Adolf Hitler, the use of tanks en masse. General Heinz Guderian stood out as their leading spokesman. Finally, the division's organization embodied a significant aspect of the German Army's philosophical understanding of war, which called for the use of combined arms units

to be used in executing what was known as Vernichtungs-strategie, the strategy of annihilation.

From the start, the panzer division was based on three fundamental priciples; the use of tanks in large concentrations; their close support by the other arms, such as infantry, artillery and engineers, and organizational flexibility about the "mix" of arms. The 1935 division was built around a base element of a two regiment panzer brigade and an infantry regiment, along with supporting units.[1] The panzer regiment had a two battalion establishment, with each battalion ideally having a combination of light and heavy tanks, with the former predominating.[2] The infantry regiment contained machine gun, motorcycle and engineer elements, as well as heavy weapons. The presence of engineers even extended to the motorcycle and reconnaissance battalions. Further support units included an anti-tank battalion, a light artillery regiment consisting of 12 towed guns and 12 self-propelled guns, plus a light engineer company and a communications battalion.[3] (For details, see diagram 1 at the end of this chapter.)

In the interval between 1935 and 1938, the Germans slightly altered the division's organization,

largely by expanding the engineer unit to a full battalion.[4] It was with this establishment that German panzer divisions went to war. This organization is shown in diagram 2.

At the outbreak of war in 1939, the Germans were able to deploy ninety-eight divisions, but less than half of these were ready for active service. The best trained and equipped elements were few, actually only some five panzer divisions, four motorized infantry divisions and four "light" divisions.[5] The light divisions were built around a basic structure of two Kavalerie Schützen regiments, each consisting of two battalions, augmented with a tank battalion composed solely of the very light Pz I and II tanks.[6]

The Polish campaign provided the unblooded Wehrmacht with the test of battle that brought a relatively easy victory. The officers who had argued for and who had created the panzer divisions were pleased with their performance, although Halder noted the frequency of immobilising traffic jams.[7] The commanders of the armored forces were satisfied with the way they had handled the panzer division as a combat entity. The 1938 manual Richtlinien für die Führung der Panzerdivision called for the division to be broken down

into combined arms battle groups, or Kampfgruppen.[8]

Combat experience in Poland confirmed the successful results obtained by this practice. The 2nd Light Division noted in its after-action report on the campaign the efficacy of the battle group organization.[9] The 1st Panzer Division noted similar results with this system of organization.[10]

One of the newer formations gave the Germans less satisfaction. This was the light division. Guderian had been critical of this formation before the war. In a March 1939 article in Militärwissenschaftliche Rundschau, Guderian noted that while the light division had more reconnaissance assets than the panzer division, it had only a fraction of the panzer division's tank strength, thus giving it only a limited attacking capability.[11] The German experience in Poland confirmed the validity of Guderian's criticism. The after-action report of the 2nd Light Division (later the 7th Panzer Division), noted that the Division was armed only with the Pz I and II, which the report described as being insufficiently armored and inadequately armed.[12] Halder concurred with this view completely.[13]

Dissatisfied with the light division, the Germans reorganized them into panzer divisions. This was

done by giving each light division an extra battalion of tanks, thus creating a panzer regiment. The effect effect of this exhibited the rule of organizational flexibility, since it meant that very few of the panzer divisions now had the same establishment. The 1st, 2nd and 3rd Panzer Divisions had an establishment built around a panzer brigade of two regiments, an infantry regiment and a motorcycle battalion, along with supporting elements. The 4th Panzer Division had a two regiment panzer brigade, and an infantry brigade of two regiments, each of which had a different establishment. The 5th Panzer had two panzer regiments and two infantry regiments of the same type, while the 9th Panzer had the same infantry component as the 5th, but only one panzer regiment. The 6th and 8th Panzer Divisions had only one panzer regiment and one infantry regiment, plus a motorcycle battalion. The 7th Panzer had one panzer regiment, two infantry regiments and a motorcycle battalion. The 10th Panzer had a two regiment panzer brigade and a two regiment infantry brigade.[14]

The Germans also employed as many as four different types of infantry regiments. Two had three battalions each, but only one had a heavy weapons company

as part of the battalion organization. The other two regiments had two battalion organizations, the difference again being the presence or absence of a heavy weapons company. There were also as many as three types of motorcycle battalions, ranging from two to three companies with either a heavy weapons or machine gun company attached, or mixed with infantry elements.[15]

The Germans were able to take advantage of the lack of a standard organization by tailoring each division's organization to the operational task assigned to it. All the divisions that were to be involved in the Meuse crossing, the 1st, 2nd, 5th, 6th, 7th, 8th and 10th Panzer Divisions, had an engineer platoon as part of the divisional reconnaissance battalion. The 1st, 2nd and 10th Panzer Divisions also had a heavy artillery battalion in addition to the normal two light artillery battalions. The 9th Panzer Division, which had the fewest tanks, but whose drive across Holland was valuable to the Germans as a strategic deception, had two battalions organized into a reconnaissance regiment.[16] The tank strength of these divisions could vary considerably. The 1st Panzer Division had about 300 tanks, while the 9th Panzer possessed a mere 150.[17]

The 1940 campaign in western Europe turned out to be a tremendous success for German arms. The panzer divisions, in particular, distinguished themselves, especially the 1st, 2nd and 10th in the XIX Corps, commanded by Guderian, and the 7th, commanded by Rommel. The German Kampfgruppe method of employing the division's elements showed its value once again.[18] Another important factor was the flexibility shown in the use of weapons, especially the 88mm anti-aircraft gun in an anti-tank role. Most importantly, the campaign was not costly. Total German Army losses for the campaign were 26,972 killed, 113,152 wounded and 13,307 missing.[19] This was a very modest cost compared to the fearful bloodletting of World War I. In particular, the panzer divisions were spared heavy losses, even in the most difficult part of the campaign, which lasted from 10-30 May 1940. Guderian's XIX Corps, for example, suffered only 1% killed and 2% wounded.[20] This was primarily because the mobility of the panzer divisions allowed them to escape heavy attacks by the slower-moving Allies. They were never able to hit a panzer division with a really heavy assault while the panzer division was in a static position. The disorganization and demoralization of the Allied forces also contributed

to this.

Even during the Battle of Britain, Hitler was turning his gaze eastward. For the projected invasion of Russia, Hitler, who recognized the offensive power of armor, wanted to increase the number of panzer divisions. This was eventually decreed officially by OKH on 26 September 1940.[21] The easiest way this could be done was by having the six divisions with two panzer regiments give up a regiment. The four remaining divisions retained their panzer regiment, and new regiments were created for four other divisions.[22]

The Germans had several methods of forming a new panzer division. The 12th and 13th Panzer Divisions, for example, were simply upgraded motorized infantry divisions.[23] The 15th Panzer Division was formed from the 33rd Infantry Division. The Division was given the 8th Panzer Regiment from the 4th Panzer Division, and the rest of the new division was motorized.[24] Generally, the process of creating a new division required about two months. When the 11th Panzer Division was organized, it took from 1 August 1940 to 21 September 1940 to assemble the Division's units at its home station of Erfurt in Wehrkreis IX. It was completely equipped by 1 October 1940, and took part in large-scale training

exercises held that same month.[25]

These changes resulted in most German panzer divisions having a standard organization, depicted in diagram 3. It was based on one panzer regiment of two battalions and two infantry regiments, also of two battalions. The supporting elements were also standardized around an artillery regiment of three battalions, a reconnaissance battalion, plus engineer, signal, anti-tank and anti-aircraft battalions, as well as minor elements, including ordnance, supply and sanitation troops.[26] There were three divisions, however, the 6th 17th and 20th, that had three tank battalions.[27] Even these divisions had dissimilarities. The 6th Panzer Division's tank element consisted of the 11th Panzer Regiment with two tank battalions, plus an independent tank battalion, the 65th.[28] The 20th Panzer Division simply had one panzer regiment of three battalions.[29] Thus the Germans were able to double the number of panzer divisions, even though their total tank park remained virtually the same.

The expansion of the number of panzer divisions did, however, generate a good deal of debate, both during and after the war. Guderian thought it had a harmful effect, as the effective tank strength of the old

two-panzer-regiment division was halved. This, Guderian felt, was an unwarranted diminution of the division's striking power.[30] Guderian's subordinate and collaborator, Nehring, disagreed. He thought the expansion of the armored forces was a positive step, as a standardized organization for the division brought some order to the administrative problems arising from the variety of divisional organizations in 1940.[31]

In fact, each point of view had merit. Nehring was right in the short term, for several reasons. From the point of view of command and control, the new organization made sense. As mentioned previously, in the 1940 campaign some of the divisions possessed over 250 tanks. This, along with such a division's motorized infantry and support elements, made the division an unwieldy mass of vehicles, difficult to control. Also, any army, in order to be efficiently administered, requires at least a small degree of standardization. This is especially important in matters of supply and maintenance.

In the long run, Guderian also proved to be right. Even during the 1940 campaign, some divisions reported up to a 50% loss in strength. However, for a division with about 300 tanks, even losses of this

magnitude would still leave the division with a formidable offensive capability. Under the new organizational scheme, the divisions rapidly lost their offensive strength if they had to undertake an extended campaign without a long pause for rest and a continuous supply of replacement vehicles. This became painfully evident during the Russian campaign.

The 1941 summer offensive against the Soviet Union, operation Barbarossa, provided German arms with many initial victories. But its ultimate failure to end the war in a single campaign left the panzer divisions in a parlous state. Even before the battle of Kiev, serious difficulties were being encountered. Guderian noted that no unit of the XXIV Panzer Corps had been able to devote as much as a single day to rest or maintenance.[32] Losses in the panzer divisions were exacerbated by the fact that the divisions undertook the final offensive against Moscow, operation Typhoon, in a weakened state. By 6 November 1941 the average panzer division could deploy only a third of its normal strength.[33] By December and January, the combat capability of the panzer force reached its nadir. Two examples here are pointedly illustrative. By 19 December 1941, the 11th Panzer Division was short 101 tanks

and 500 vehicles.[34] During the retreat from Moscow the 6th Panzer Division lost every one of its tanks and anti-tank guns.[35]

For the 1942 summer campaign the Germans required a large armored force to implement operation Blue. German industry, however, could not make good the equipment losses suffered during the previous year. To make up for this and to reinforce the mobile divisions slated for operation Blue, OKH decided that those panzer divisions remaining in Army Groups North and Center would each give up one of their panzer battalions.[36] These would go either to the panzer divisions in Army Groups A and B, or to their motorized infantry divisions to give them some added punch. An example of this was the 1st Panzer Division. In April of 1942, the Division gave up the first battalion of its panzer regiment to the 16th Motorized Infantry Division.[37]

This drastic measure meant that the Germans once more had divisions with several different organizational patterns. In southern Russia, panzer divisions had three tank battalions. On the rest of the Russian front, divisions had only one, while divisions in the west had two. In North Africa, Rommel generally switched elements of the 15th and 21st Panzer Divisions back

and forth between them as the situation demanded.

The course of the Stalingrad campaign is too well-known to bear repeating here. After the Stalingrad disaster, OKH began rebuilding the three panzer divisions lost there (the 14th, 16th and 24th) and replacing the battalions given up by the divisions in Army Groups Center and North.

For the Kursk offensive that began on 5 July 1943, the Germans again reinforced their panzer divisions with a third tank battalion, consisting now of the formidable Tiger tank. The other two battalions had Pz IV and Panther tanks, respectively.[38] The three battalion panzer regiment could only be temporary. The Tiger tank was a rare commodity to begin with, and German armor suffered heavy losses in the battle. Thus, after the battle, Tiger battalions were used only as corps- or army-level assets. Furthermore, the three battalion organisation apparently applied only to the divisions of Army Group South. A report dated 1 July 1943 for the 2nd Panzer Division in Army Group Center showed that the Division had two tank battalions, one of which had only the light Pz IIIs.[39] The Tiger tanks that operated on that part of the front were those designed by Porsche, which were organised into two bat-

talions and attached to Colonel General Walter Model's Ninth Army, where they prooved to be a failure.[40]

Marked similarities can be observed between the development of the Army panzer divisions and that of the SS panzer divisions. Before the war the only large SS unit was the SS Verfügungstruppe (special duty troops), which was fully motorized.[41] There was also the Leibstandarte Adolf Hitler, a regimental-size body-guard for the protection of the Führer under his old party crony, SS Colonel Joseph "Sepp" Dietrich, and units of concentration camp personnel, the Totenkopf-verbände, under the sinister SS General Theodor Eicke, head of the concentraion camp system and one-time commandant of Dachau.

For the Polish campaign, the Leibstandarte Adolf Hitler was employed as a regimental combat team broken down into battle groups.[42] The SS Verfügungstruppe was combined with the 7th Panzer Regiment and some other Army units to form an ad hoc unit called Panzer Division Kempf, which was something between a reinforced panzer brigade and a weak panzer division.[43] The Germans were able to do this because of the uniform training conducted by both SS and Army units, based on Army manuals.[44]

In 1940 the SS Verfügungstruppe, having been upgraded to a full division, was committed to the offensive against France. Eicke was able to organize the SS Totenkopf Division from current or former concentration camp personnel. This unit was also committed to the French campaign, as was Dietrich's Leibstandarte Adolf Hitler, now upgraded by attached units to a brigade-size motorized infantry unit.[45]

After the French campaign the Waffen SS (Armed SS) were further expanded. The Leibstandarte Adolf Hitler was expanded to division strength. The SS Verfügungstruppe was broken up and its base regiments used in the formation of two other divisions, the SS Das Reich and the SS Wiking.[46] Another division, the SS Polizei, was formed from the uniformed German police, along with the SS Nord. All of these divisions saw action in the Russian campaign of 1941. With the exceptions of the SS Polizei and the SS Nord, all of the SS divisions were fully motorized and patterned on the organization of an Army motorized infantry division.[47] They were based on three regiments of three battalions each, plus divisional engineer, reconnaissance, artillery, anti-tank, and signal units. This organization is shown in diagram 4.

Following Barbarossa's failure in December, 1941, the Adolf Hitler and Das Reich divisions were withdrawn from the front and sent to France. A new Totenkopf Division was being formed, and its personnel would be supplemented by the original division's survivors extricated from the Demyansk pocket in September of 1942.[48] The Wiking Division was part of the First Panzer Army's drive to the Caucasus, while the Polizei Division remained in Army Group North, and the Nord Division was reorganized into the 8th SS Cavalry Division (Florian Geyer).

While in France the SS divisions had one of their infantry regiments converted into a panzer regiment, and received other elements as well. In October of 1942 these units were designated Panzergrenadier divisions.[49] In fact, these units, with a panzer regiment of two battalions and two infantry regiments of three battalions each, were really panzer divisions and were so designated in the autumn of 1943.[50]

By June, 1944 the Army could field some twenty-three panzer divisions and the SS an additional seven. The problem was that the strength of these units fluctuated widely. Since the SS infantry regiments had one more battalion than their Army counterpoints, the SS

panzer divisions had considerably more infantry. For example, in Normandy in June of 1944, the 9th Panzer Division could muster only 12,768 men while the 1st SS Panzer Division (Adolf Hitler) counted 21,386.[51] Tank strength also varied. The 1st SS Panzer had only 88 Pz IVs and Panthers out of an authorized tank strength of 203. The shortfall was partially made up with assault guns.[52] The Panzer Lehr Division, an elite Army formation consisting of units drawn from training schools, possessed 188 tanks by 1 June 1944. Its infantry component was also slightly larger than that of a normal Army panzer division.[53] The difference between Army and SS panzer divisions is clearly shown in digrams 5 and 6.

As a consequence of military disasters both in the east and west in the summer of 1944, the Germans made three changes in their panzer organization. First, the Germans created ad hoc panzer brigades composed of a tank battalion with 36 Pz IVs or Panthers, an infantry battalion and an engineer company.[54] Later three brigades were formed with two battalions of tanks and infantry each, plus reconnaissance, engineer and anti-tank elements.[55] This experiment was tried in the west in the autumn of 1944 to create a flexible mobile

reserve for use over a wide front. The scheme proved to be a complete failure. Most of the brigades were tank heavy, poorly trained, and often thrown into situations where they could do little in the face of overwhelming Allied superiority. Lieutenant General Edgar Feuchtinger, the commander of the 21st Panzer Division in Normandy, considered the brigades to be a complete waste of men and material.[56] The brigades were disbanded and incorporated into the existing divisions by the winter of 1944.

The second change was the creation of the unitary panzer corps. This was really a permanent marriage of two understrength panzer divisions to form a strong unit with a reduced administrative staff. Four of these corps were formed: XXIV, XL, Grossdeutschland and Feldherrnhalle. This also proved a failure, as the "creation" of merely four relatively strong panzer formations was, at that date, in no way going to effect the outcome of the war.[57]

The last change was a reorganization of the panzer division undertaken to deal with the shortage of vehicles and fuel. The panzer regiment had one of its tank battalions replaced with a battalion of mechanized infantry. The infantry regiments were stripped of their

transport and resumed being marching infantry. The division's transport was augmented by horses, to be serviced by a veterinary platoon. The new division would have 11,422 men and only 62 tanks.[58]

It should be noted, however, that this new organization -- officially at least -- applied only to Army units. The SS divisions went through a rather different reorganization. They retained the two battalion tank regiment, but the infantry regiments were each reduced to two battalions.[59] Although the division was supposed to be fully motorized, the shortage of both vehicles and fuel was so widespread that it was very likely that SS divisions were forced to use horses for transport as well.

If any conclusion is possible from the preceeding pages, it would certainly be that the Germans never really employed a standard divisional organization. It is interesting to note that the 1938 field manual for the employment of the panzer division, Richtlinien für die Führung der Panzerdivision, had an organizational diagram at the end of the manual.[60] This is missing from the 1940 edition, Richtlinien für Führung und Einsatz der Panzer-Division, as by that time the Germans no longer adhered to a standard organization.[61]

The same could be said for the way in which the Germans operated their divisions in the field. The 1938 manual had stressed the importance of the principle of combined arms. It was recommended that when moving, the division be broken up into march groups of all arms.[62] In the field this translated into the "Kampfgruppe," or battle group. They could vary considerably in size. For a full-strength division, such units could be based on regiments. On 25 June 1941, for example, the 11th Panzer Division on the eastern front was divided into two Kampfgruppen. Kampfgruppe Angern was based on the 110th and 111th Infantry Regiments, with the divisional artillery, anti-tank and anti-aircraft units. Kampfgruppe Riebel was composed of the 15th Panzer Regiment and the divisional reconnaissance battalion. Both Kampfgruppen had engineers.[63] Kampfgruppen could also be based on battalions, and in dire straits even companies. A good example of this was the 10th Panzer Division. By the onset of the winter of 1941, one of the strongest elements of the 10th Panzer Division -- also on the eastern front -- was Kampfgruppe Baumgart, consisting of a motorcycle company, a tank company, an infantry company and two troops with 88mm guns.[64]

The Germans continued this practice throughout the war and on all fronts. In the east some representative examples would be the 1st Panzer Division's counter-attack of 6 December 1943,[65] and the 6th Panzer Division's attack to aid the escape of the Vilna garrison in July of 1944.[66] In the west, after enduring heavy losses over the first two months of the Normandy campaign, the Panzer Lehr Division was split into three combined arms Kampfgruppen to support the various corps over a wide front.[67] An even more famous, or infamous, unit was Kampfgruppe Peiper. This force, which was from the 1st SS Panzer Division (Adolf Hitler), was to lead the Sixth Panzer Army's thrust to the Meuse, was composed of about 4,000 men. It included 102 tanks, divided roughly evenly between Pz IVs, Panthers and Tigers; five flak tanks, a self-propelled flak battalion armed with 20mm guns, 25 self-propelled guns, a towed 105mm artillery battalion and a battalion of SS mechanized infantry. It also had reconnaissance elements and two companies of engineers.[68]

The Germans even extended this principle to forming ad hoc units from several units. Three excellent examples of this are Panzer Division Kempf, Panzer Brigade Eberbach and Korpsgruppe Fischer. Panzer Divi-

sion Kempf presents an interesting case, as it was a combination of Army and SS units. In August of 1939 the Germans formed Panzer Division Kempf, as previously mentioned, around the 7th Panzer Regiment and the SS Deutschland Regiment, with other units provided by either the Army or the SS Verfügungstruppe. It fought in the Polish campaign before being officially broken up on 7 October 1939.[69]

Panzer Brigade Eberbach was formed in November of 1941 by Guderian to save as much gasoline as possible for the advance on Tula. Guderian pooled all the tanks from the 3rd and 4th Panzer Divisions, paired them up with the Grossdeutschland Motorized Infantry Regiment, and placed it under the command of Colonel Hans Eberbach, commander of the 4th Panzer's panzer regiment.[70] The unit then operated as such for the better part of a month. For immediate support the Brigade relied on the Grossdeutschland Infantry Regiment's heavy weapons. In December it was disbanded and the units returned to their parent formations.

Korpsgruppe Fischer was formed as part of the German attempt to prevent the Allies from completing a rapid occupation of Tunisia. In this case the 10th Panzer Division was paired up with the 334th Infantry

Division and one regiment of the Hermann Göring Panzer Division. The Korpsgruppe was then broken down into four Kampfgruppen of varying sizes. The tanks were evenly divided among two of them, Kampfgruppe Weber and Kampfgruppe Lang. All of the Kampfgruppen had infantry, artillery, anti-aircraft, anti-tank and engineer elements.[71] It is also interesting to note that of the two Kampfgruppen with tanks, Kampfgruppe Weber had some 43 Pz III tanks armed with long 50mm guns, while Kampfgruppe Lang, having only 32 such Pz IIIs, had eight Tigers unlike Kampfgruppe Weber, which had only four Tigers.[72] The Germans were able to put together units made up of such diverse elements because panzer doctrine and training was binding on all elements of the Army, non-motorized as well as motorized.[73]

The German practice of utilizing their divisions in this manner had several effects, some intended and some accidental. First, the Kampfgruppe concept allowed the Germans maximum latitude for "tailoring" forces for specific missions. Additionally, the combined arms nature of the Kampfgruppe allowed it to undertake almost any type of mission. The only other army to come close to this was the U.S. Army with its concept of

the "Combat Command."[74] The practice, however, did not come up to the expectations of theory, primarily because in the field, the U.S. Comabt Command was based on a "permanent marriage" of a tank battalion and an infantry battalion.[75] Since these units became the permanent basis of the Combat Command, the command's combat value would decrease considerably if the base elements suffered heavy casualties. The American organization was also hurt by the Army's inability to develop a uniform armored doctrine for the entire Army.[76] In addition, the Commander of the Army Ground Forces, General Leslie J. McNair, was a very severe critic of armored divisions and fought against their employment.[77] Throughout the war, the German system remained more flexible, in that their ability to mix and match units in forming Kampfgruppen was much greater than the U.S. Army's. The British did experiment in North Africa with the small, mobile "Jock Columns," but this was strictly an improvization and apparently used only in North Africa.[78]

Another advantage derived by the Germans from their system was that it allowed them to minimize the number of headquarters personnel in a division. By organizing the division into several self-contained combined arms units using all of the division's subordinate

units, the Germans were able to maintain a division headquarters with a relatively small staff.[79]

Finally, the Germans enjoyed one probably unintended advantage as a result of their system. The Kampfgruppe system allowed the Germans to obtain maximum use of their divisions, even after they had taken heavy losses. The 10th Panzer Division, for example, having seen extensive service in the 1941 Russian campaign and having suffered heavy casualties, was reorganized on 20 December 1941. Its main strength was now concentrated in Kampfgruppe von der Chevallerie. It contained infantry, tank, artillery, engineer, and other elements, and was manned by men combed out of the Division's rear services.[80] This type of organization was to prove very effective in Normandy in 1944, as the Germans had to fight against heavy odds. The bocage country, with its thick hedgrows, also helped the Germans in this, as it confined Allied thrusts largely to roads, which the Germans could hold with small combined arms Kampfgruppen.

The Germans even used this system for shattered units rebuilding in France. When the 14th Panzer Division was rebuilt after Stalingrad, the Division by 31 March 1943 had only about 6,000 men.[81] These, how-

ever, were concentrated into a Kampfgruppe and armed with captured French tanks.[82] This gave it more than enough strength to undertake internal security missions in occupied territory.

In terms of higher units, the Germans tended to group their panzer and motorized infantry units together, something that had been planned as early as 1935.[83] Since these units, including the SS, never amounted to more than 25% of the total number of divisions in the Wehrmacht, to distribute them among the infantry divisions that used horse-drawn transport would have been the height of foolishness. Thus, the Germans grouped their mobile divisions into units successively termed first Army Corps, then Motorized Corps and finally Panzer Corps.[84]

The Germans also tended to utilize a unit consisting of two or more panzer corps called a panzer group. This was first done in the 1940 campaign, when General Hans-Georg Reinhardt's XXXIX Corps and Guderian's XIX Corps were paired up and placed under the command of a panzer group staff commanded by Colonel General Ewald von Kleist.[85] For the later stages of the campaign, a second panzer group was formed and placed under Guderian's command.[86]

For the invasion of Russia, the Germans employed four such panzer groups. Sometimes equipment considerations played an important part in determining the divisions that would compose the group's subordinate corps. For example, all of the component divisions of the Third Panzer Group had either Czech tanks or French vehicles.[87] In this way the Germans hoped to minimize their spare parts problem with regard to the large numbers of foreign vehicles that they used.

In the field, the panzer groups generally operated as independent entities, subordinate only to army group command. On only one occasion, the Smolensk encirclement of July 1941, were Guderian's Second and Colonel General Hermann Hoth's Third Panzer Groups subordinated to Field Marshal Gunther von Kluge's Fourth Army, something that made the panzer generals extremely unhappy for doctrinal and personal reasons.[88]

In the fall and winter of 1941-1942, the panzer groups were reorganized. On 6 October 1941 the First and Second Panzer Groups were redesignated as Panzer Armies.[89] The Third and Fourth Panzer Groups were also redesignated as such on 2 January 1942.[90] This was unquestionably a mistake, as these units now incorporated a higher number of marching infantry divisions

which depended on horse-drawn transport, which would tend to slow down the advancing tanks. Liddell-Hart thought that this contributed in no small part to the escape of the Russian forces in the Don bend from being encircled by the Germans in the summer of 1942.[91]

It is interesting to note that once the term "panzer" was applied to a higher unit, it remained with that unit until the end of the war, regardless of whether it had panzer or panzergrenadier divisions or not. For example, in the Kursk offensive in July 1943, the XLVI Panzer Corps, part of the Ninth Army, did not possess a single panzer or panzergrenadier division.[92]

The organization of the panzer division is important in itself as it gave the Germans an important advantage over their opponents. This was primarily due to the fact that the German panzer division contained large infantry and engineer elements. If one looks at the organization of the French Division Cuirassée Reserve (D.C.R.), for example, the lack of infantry in the unit is striking.[93] The same can be said for the various organizations used by the British for their armored divisions throughout the war. The 1940 British Armored Division had over 260 tanks and only 1,580

infantry.[94] Although they reorganized their armored divisions several times throughout the war, their organization was consistently hurt by a lack of infantry.[95] As for the Russians, the heavy losses suffered in the early stages of the 1941 campaign forced them to organize their tanks into tank-heavy brigades which were dispersed among the infantry divisions. Later on the tank corps and mechanized corps were reintroduced, both of which proved effective organizations.[96] The American organization has already been commented on.

None of these units proved to be as effective as those organized by the Germans. Thus, much like Napoleon, the Germans owed much of their initial military success to a superior organization of their most important offensive unit, the panzer division.

Legend For Diagram Symbols

Unit Size

XX	Division
X	Brigade
III	Regiment
II	Battalion
I	Company
•••	Platoon

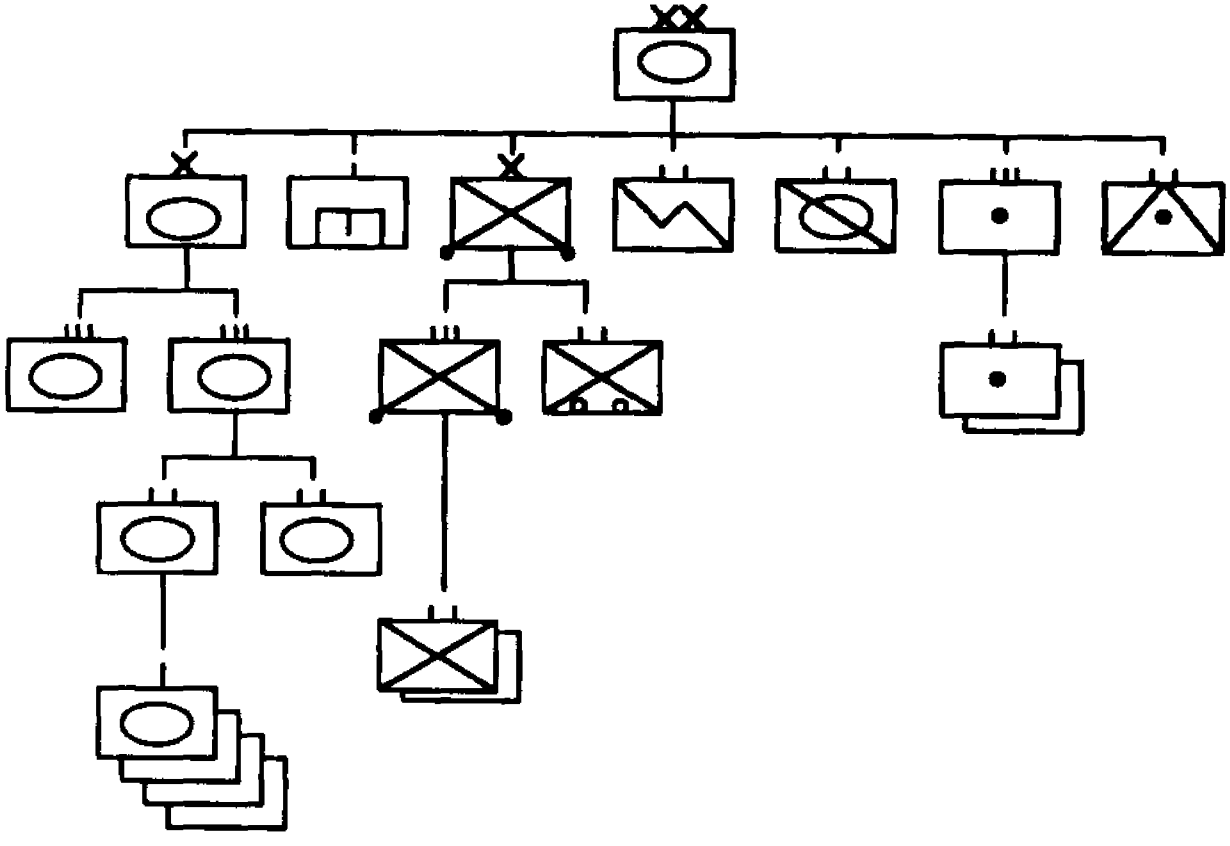
Unit Type

	Reconnaissance
	Tank
	Mechanized Infantry
	Motorized Infantry
	Engineer
	Towed Artillery
	Self-Propelled Artillery
	Motorcycle
	Anti-Tank
	Anti-Aircraft
	Signal
	Supply

The symbols used are considered standard by NATO. They should contribute to the easy understanding of the following diagrams.

Diagram 1

The 1935 Panzer Division[97]

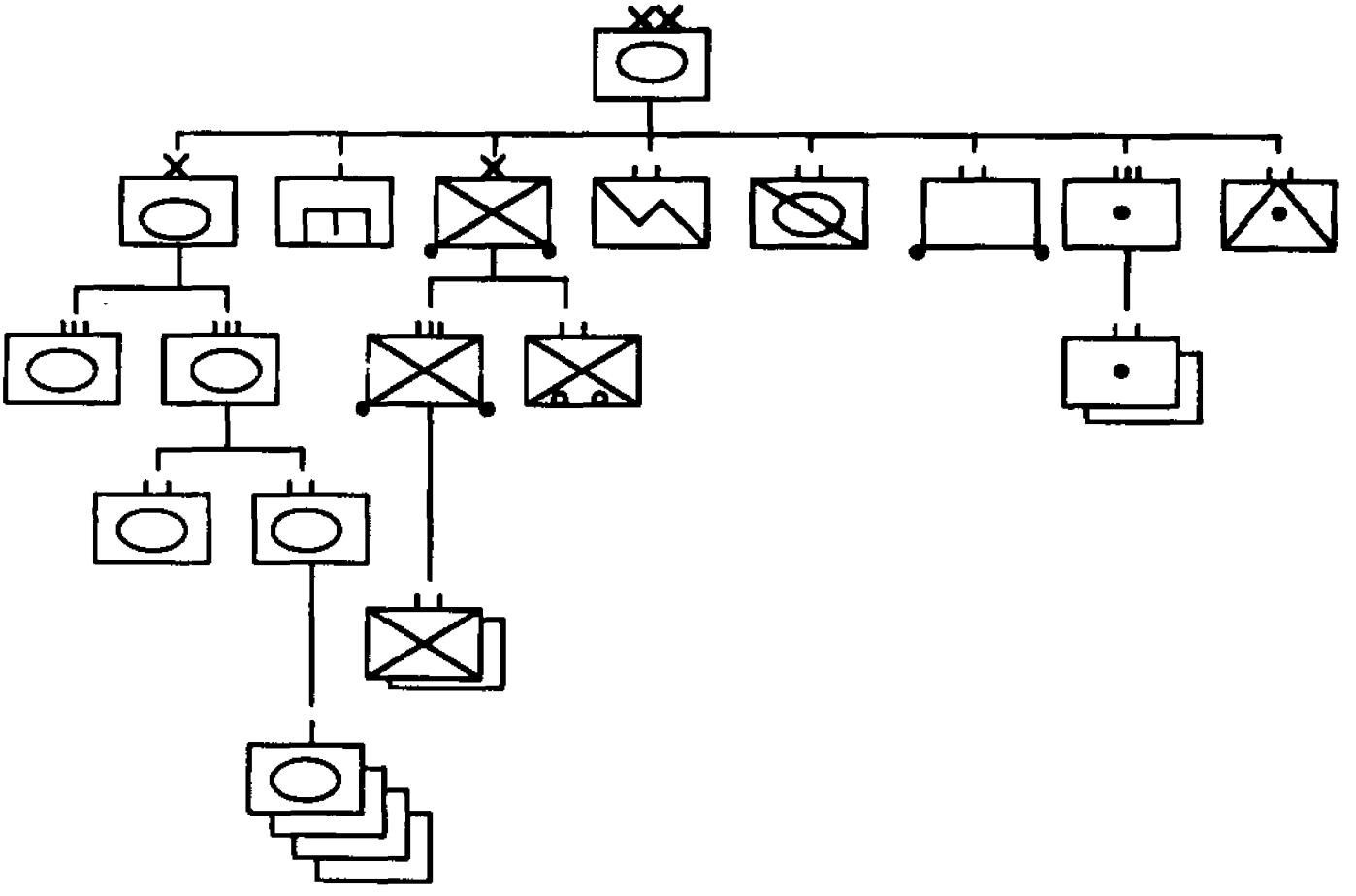


The division's organisation is somewhat more complicated than the diagram shows. The tank battalions each had one company of heavy tanks; the other three were light. Also the infantry battalions had motorcycle, engineer, machine-gun and anti-tank elements. Nevertheless, the diagram gives a clear indication of the direction the Germans were headed in. An exercise conducted with this type of division in

August of 1935 involved about 13,000 officers and men, 4,025 wheeled vehicles and 481 tracked vehicles, the majority of which were tanks.[98]

Diagram 2

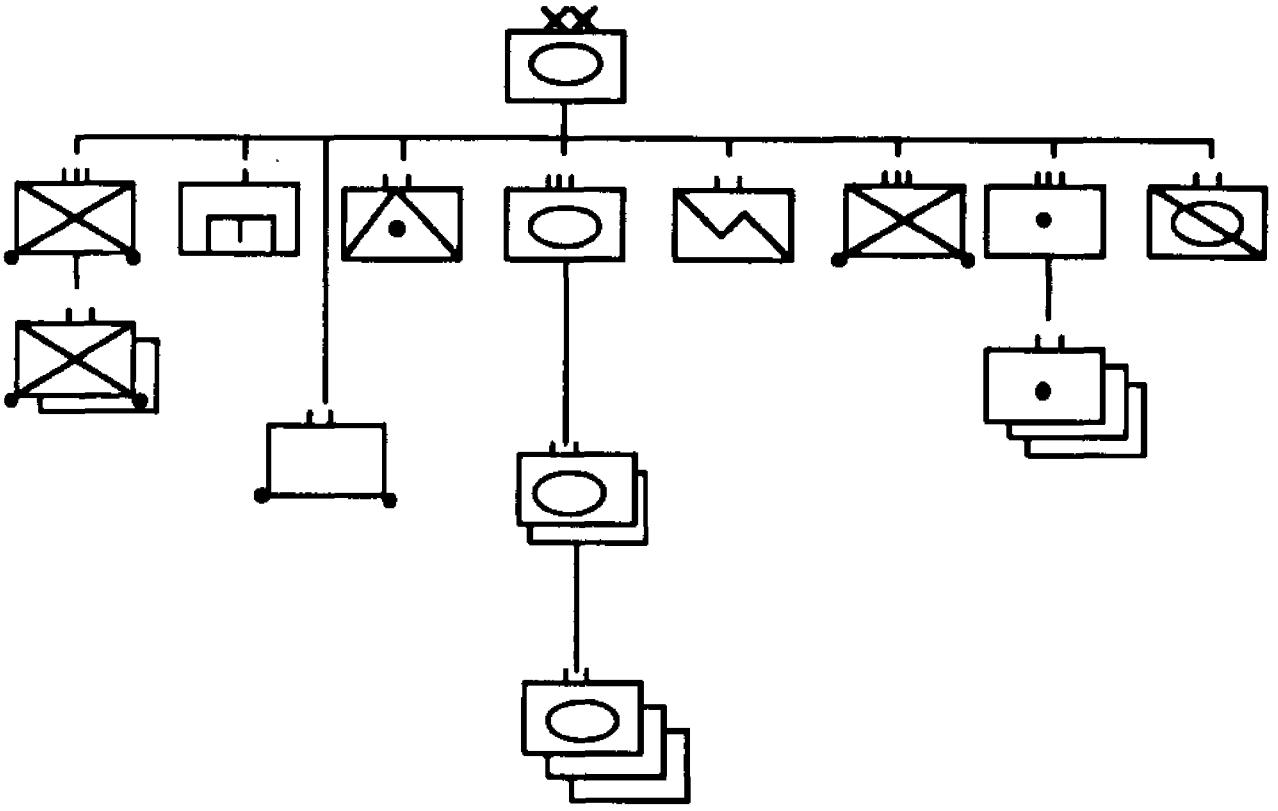
The 1938 Panzer Division[99]



The 1938 division has marked similarities to the 1935 division, but there are important differences. The tank battalions have only three companies, which have a mix of medium and light tanks. Between 1938 and the beginning of the war, an extra infantry regiment was added to the infantry brigade. Also the engineer element was upgraded. This type of establishment was used by the original divisions until late 1940.

Diagram 3

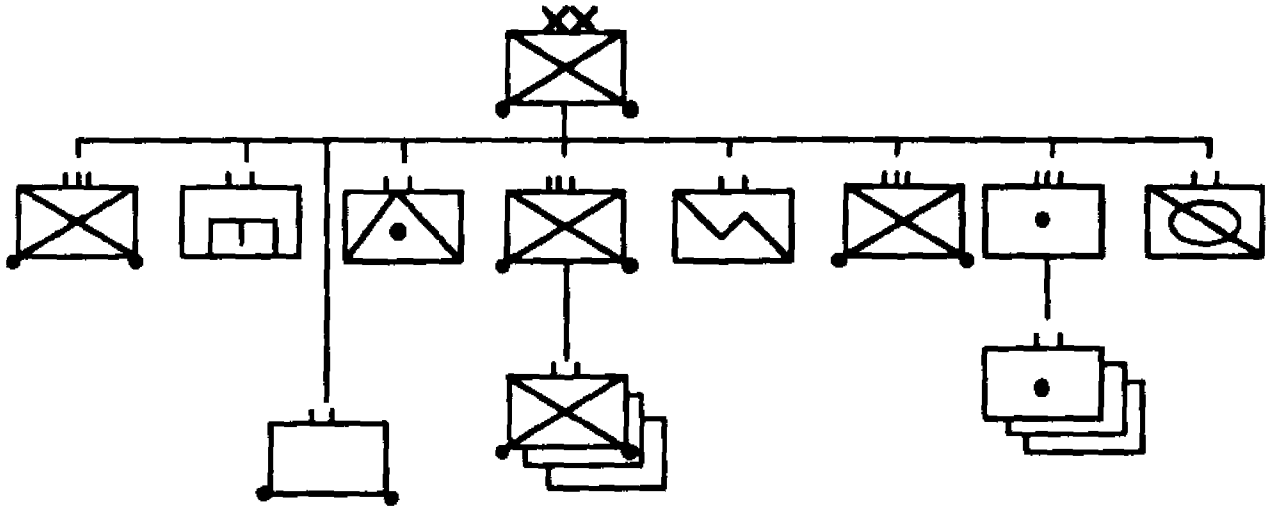
The 1941 Panzer Division[100]



This was the organisation used by the Germans for the 1941 campaign, with several exceptions. Again the organisation is slightly more complex than the diagram indicates. The infantry regiments contain motorcycle and engineer elements. Also of interest is the proportion of the various arms to each other. The proportionate increase of infantry to tanks helped give it more staying power. It is easy to see how the Kampfgruppe could be applied to this unit.

Diagram 4

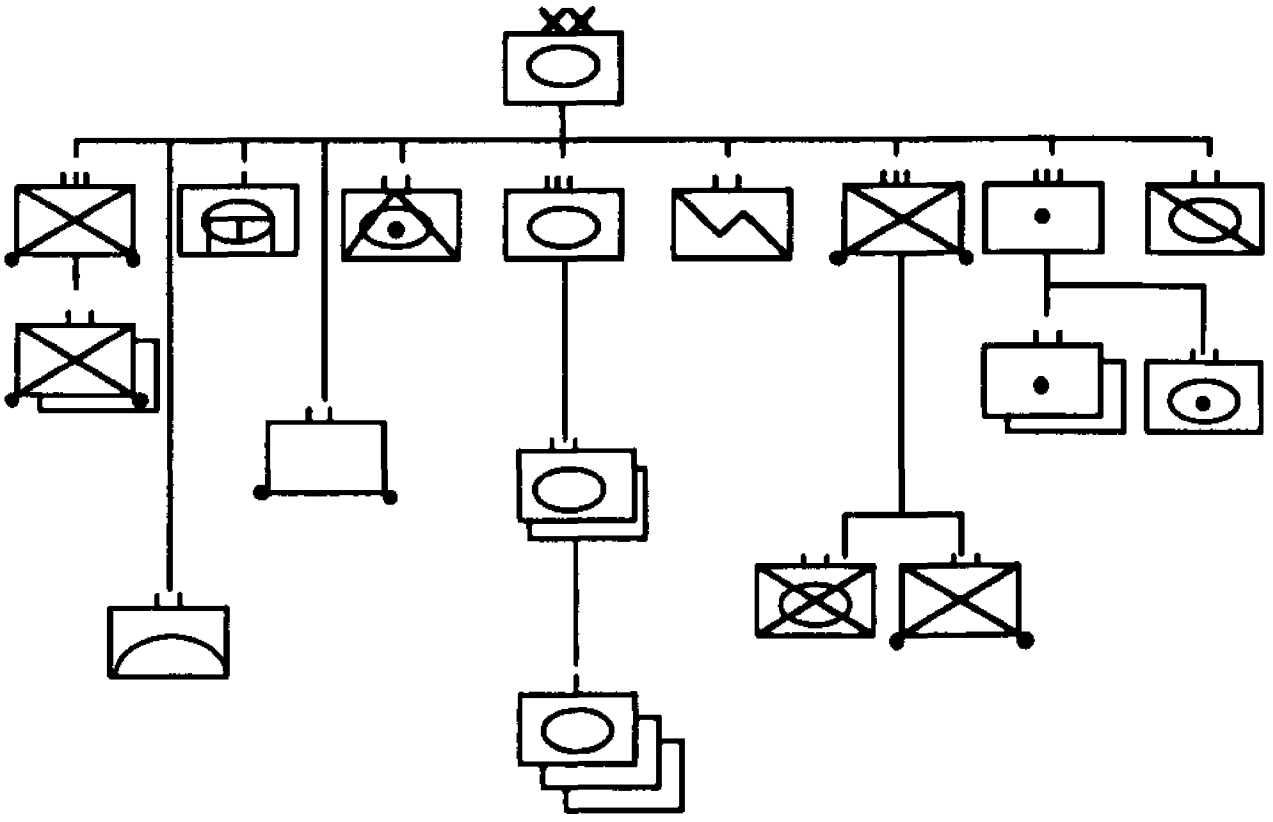
The 1941 SS Motorised Division[101]



This unit was patterned on the Army motorised infantry division, but with two important differences. First, the SS division had three regiments to the Army division's two. Also the SS used a three battalion regiment down to 1945. Later one of the infantry regiments was converted to a panzer regiment with two battalions.

Diagram 5

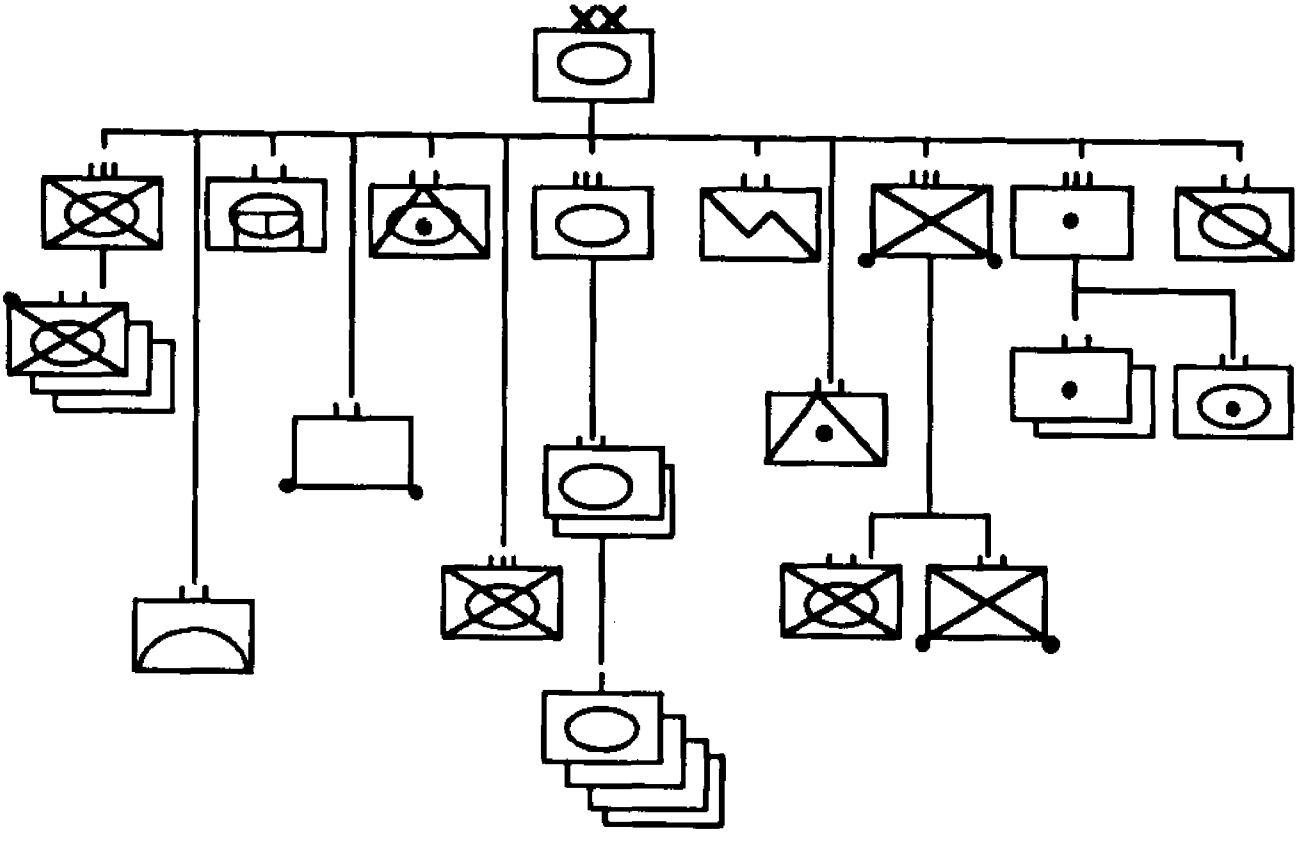
The 1944 Panzer Division[102]



Ideally, the division should have had about 14,000 officers and men and about 160 tanks, but that was rare. The panzer regiment had one battalion of Pz IVs and one of Panthers. The anti-tank battalion had a combination of towed anti-tank guns and assault guns or tank destroyers. Although much more of the division was armored than previous versions, the vast majority of the units still had to use soft-skinned wheeled transport. The infantry regiments still had their own engineer companies.

Diagram 6

The 1944 SS Panzer Division[103]



The difference here from its Army counterpart is quite clear. Aside from having two more battalions of infantry, the infantry was fully mechanised. Also the armored anti-tank battalion consisted of assault guns. Additionally, the panzer regiment had its own anti-aircraft elements. One can easily see why these units were the "fire brigades" of the German Army.

ENDNOTES

1. See organisational diagram found in the records of Wehrkreis VII, NARS T-79/32/000814.

2. Compare ibid. with Guderian, Panzer Leader, p. 518.

3. ibid.

4. Compare NARS T-79/32/000814 with Annex I of German Army, Richtlinien für die Führung der Panzerdivision, 1 June 1938, p. 39.

5. Robert M. Kennedy, The German Campaign in Poland, (Washington, 1956), pp. 28-31.

6. Senger und Etterlin, pp. 69-70.

7. Halder, Vol. II, p. 22.

8. German Army, Richtlinien für die Führung der Panzerdivision, 1 June 1938, p. 26.

9. After-action Report of the 7th Panzer Division (formerly the 2nd Light Division), 19 October 1939, NARS T-315/436/000480.

10. Rolf Stoves, Die 1. Panzer Division, (Bad Neuheim, 1961), p. 76.

11. Guderian, "Schnell Truppen einst und jest," Militärwissenschaftliche Rundschau, Vol. 4, No. 2, (March 1939): p. 242.

12. After-action Report of the 7th Panzer Division (formerly the 2nd Light Division), 19 October 1939, NARS T-315/436/000480.

13. Halder, Vol. II, p. 83.

14. Müller-Hillebrand, Das Heer 1933-45, Vol. II, pp. 142-143.

15. ibid., p. 143.

16. ibid.

17. ibid., p. 141.

18. After-action Report of the 6th Panzer Division in France, 18 July 1940, NARS T-311/49/7061270.

19. Hans Umbreit, "Der Kampf um die Vormachtstellung in Westeuropa," Militärgeschichtlichen Forschungsamt, Das Deutsche Reich und der Zweite Weltkrieg, Vol. 2, p. 307.

20. Rudolf Steiger, Panzertaktik im Spiegel deutscher Kriegstagebücher 1939-1941, (Freiburg-im-Breisgau, 1973), p. 18.

21. Klink, "Die Militärische Konzeption des Krieges gegen die Sowjetunion," Militärgeschichtlichen Forschungsamt, Das Deutsche Reich und der Zweite Weltkrieg, Vol. 4, p. 262.

22. Tessin, Vol. I, pp. 161-162.

23. Seaton, p. 158.

24. This process is demonstrated in 15th Panzer Division Progress Reports, NARS T-315/664/000001.

25. Various entries in KTB/11th Panzer Division, NARS T-315/584/000007-17.

26. Organisational diagram of the 11th Panzer Division, 20 May 1941, NARS T-315/2320/000243.

27. Rolf-Dieter Müller, "Von der Wirtschaftsallianz zum kolonialen Ausbeutungskrieg," Militärgeschichtlichen Forschungsamt, Das Deutsche Reich und der Zweite Weltkrieg, Vol. 4, pp. 186-187.

28. KTB/6th Panzer Division, 22 June 1941, NARS T-315/322/000857.

29. Organisational diagram of the 20th Panzer Division, 2 October 1941, NARS T-315/741/000764.

30. Guderian, Panzer Leader, pp. 138-139.

31. Nehring, Die Geschichte der Deutsche Panzerwaffe 1916 bis 1945, pp. 126-130.

32. Guderian, Panzer Leader, p. 198.

33. OKH Report on Combat Strength of the Eastern Army, 6 November 1941, NARS T-78/335/6291878.

34. 11th Panzer Division Readiness Report, 19 December 1941, NARS T-315/2320/000215.

35. Department of the Army Pamphlet #20-201, Military Improvisation During the Russian Campaign, (Washington, 1951), p. 4.

36. Tessin, Vol. I, p. 174.

37. Stoves, p. 342.

38. Organisational diagram of the 11th Panzer Division, May 1943, NARS T-315/657/000125.

39. 2nd Panzer Division Report, 1 July 1943, NARS T-315/96/000840.

40. Guderian, Panzer Leader, p. 311.

41. Appendix to Wehrkreis VII Order #2594, 3 July 1939, Supplementary Instructions on the Arming of SS Units, NARS T-79/38/000017.

42. Lehmann, Vol. I, p. 149.

43. Weidinger, Vol. I, p. 120.

44. Appendix to Wehrkreis VII Order #2272, 25 April 1939, NARS T-79/38/000030.

45. For details see Weingartner and Sydnor.

46. Strassmer, p. 23.

47. Stein, p. 203.

48. Sydnor, p. 254.

49. Stein, p. 203.

50. The Adolf Hitler Division, for example, was designated 1st SS Panzer Division (Adolf Hitler) on 22 October 1943. KTB/I SS Panzer Corps, 28 October 1943, NARS T-354/603/000538.

51. Russell Weigley, Eisenhower's Lieutenants, (Bloomington, 1981), p. 30.

52. ibid., p. 31.

53. Helmut Ritgen, Die Geschichte der Panzer Lehr Division im Westen 1944-1945, (Stuttgart, 1979), p. 343.

54. CMH, MSS #B-251, General Horst Stumpff, "106th Panzer Brigade," 1947, p. 5.

55. ibid., p. 6.

56. CMH, MSS #A-871, Lieutenant General Edgar Feuchtinger, "21st Panzer Division in Combat Against American Troops in France and Germany," 1947, p. 15.

57. Seaton, p. 242.

58. Senger und Etterlin, pp. 226-228. Although no numbers are available, it is likely that the division employed anywhere from 500 to perhaps 800 horses.

59. Basic Organizations and Special Organizations of SS Units, 15 February 1945, NARS T-354/116/3750050.

60. German Army, Richtlinien für die Führung der Panzerdivision, 1 June 1938, p. 39.

61. The Army issued no further editions of this manual after the edition dated 3 December 1940.

62. German Army, Richtlinien für die Führung der Panzerdivision, 1 June 1938, p. 21.

63. 11th Panzer Division Report, 26 June 1941, NARS T-315/2320/000200.

64. Report of Kampfgruppe Baumgart to XL Panzer Corps, 15 November 1941, NARS T-315/568/000531.

65. Stoves, pp. 444-445.

66. CMH, MSS #D-079, Lieutenant General Rudolf von Wagenfels, "Advance and Breakthrough of the 6th Panzer Division on 15-16 July 1944," 1947, p. 4.

67. Ritgen, p. 181.

68. Charles MacDonald, A Time For Trumpets, (New York, 1985), p. 198.

69. Weidinger, Vol. I, p. 262.

70. Guderian, Panzer Leader, pp. 242-244.

71. Organization of Korpsgruppe Fischer as of 9 January 1943, NARS T-315/570/000318.

72. ibid.

73. See page 70.

74. Kent Roberts Greenfield, et al., The Organization of Ground Combat Troops, (Washington, 1947), p. 323.

75. Weigley, p. 19.

76. Brown, p. 99.

77. Greenfield, pp. 334-335.

78. For details on the creation of these units, see Barrie Pitt, The Crucible of War, (London, 1980), pp. 69-70.

79. Creveld, Fighting Power, pp. 57-58.

80. KTB/10th Panzer Division, 20 December 1941, NARS T-315/568/001638.

81. KTB/14th Panzer Division, 31 March 1943, NARS T-315/657/000062.

82. KTB/14th Panzer Division, 8 April 1943, NARS T-315/657/000058.

83. Manstein, p. 241.

84. Seaton, p. 135.

85. Guderian, Panzer Leader, p. 99.

86. ibid., p. 120.

87. Rolf-Dieter Müller, "Von der Wirtschaftsallianz zum kolonialen Ausbeutungskrieg," Militärgeschichtlichen Forschungsamt, Das Deutsche Reich und der Zweite Weltkrieg, Vol. 4, pp. 186-187.

88. Bryan I. Fugate, Operation Barbarossa, (Novato, 1984), p. 110.

89. KTB/OKW, 6 October 1941, Vol. I, p. 681.

90. KTB/OKW, 2 January 1942, Vol. II, p. 187.

91. Liddell-Hart, History of the Second World War, p. 251.

92. Werner Haupt, Heeresgruppe Mitte, (Dorheim, 1968), p. 160.

93. Senger und Etterlin, p. 154.

94. L.F. Ellis, The War in France and Flanders 1939-1940, (London, 1953), pp. 367-371.

95. In the later years of the war this was due to a serious manpower shortage in Britain. For details see Carlo D'Este, Decision in Normandy, (New York, 1983), pp. 252-270.

96. Steven Zaloga and James Grandsen, Soviet Tanks and Combat Vehicles of World War Two, (London, 1984), pp. 146-149.

97. Source: organisational diagram, NARS T-79/32/000814.

98. After-action Report on Experimental Exercises of a Panzer Division at the Munster Training Area in August 1935, 24 December 1935, NARS T-79/52/000750.

99. Source: German Army, Richtlinien für die Führung der Panzerdivision, 1 June 1938, p. 39.

100. Source: war organisation chart of the 14th Panzer Division, 4 June 1941, NARS T-315/195/000851.

101. Source: Sydnor, p. 45.

102. Source: Senger und Etterlin, pp. 218-220.

103. Source: Max Hastings, Das Reich, (New York, 1981), p. 236.

Conclusion

Can any overall conclusion be drawn from the preceeding pages as to German divisional organisation, not to mention the German Army in general? In terms of a broad conclusion one can reach about the German Army, it is that in many ways the German Army was more attuned to the 19th century than to the 20th. The inability of the German economy to produce the necessary numbers of vehicles, and more importantly, the gasoline needed to run them, forced the German Army to remain heavily dependent on the horse for the bulk of its transport.[1]

The German Army's approach to war and its broad war-fighting doctrine were also rooted in the 19th century. The great focus was on the battle of annihilation. The German Army, from the elder Moltke on, heartily endorsed the idea of making the enemy's army the object of a campaign, just as Napoleon did. The German Army thus endorsed the very strategy rejected so strongly by the panzer force's alleged British guru, Liddell-Hart, in <u>The Remaking of Modern Armies</u>.[2]

The German economy's inability to supply the vehicular needs of the Army had a profound effect on the panzer force. To begin with, it almost certainly

created the need for panzer divisions at all, since it would have been wasteful to spread the tanks about the large number of infantry divisions which relied on horse-drawn transport. Had the Germans been able to produce a completely motorized force, the German Army in this sense would probably have borne a strong resemblance to the U.S. Army. Certainly Beck had this in mind. He wanted a smaller, but completely motorized force.[3] Failure to obtain this due to the breakneck speed of Army expansion forced him to do the next best thing, which was the creation of the panzer force. This in turn had the effect of essentially dividing the German Army into two distinct parts, a small, motorized force and a large, non-motorized force.[4] While this did not cause insurmountable difficulties in the 1939-1940 campaigns, the invasion of Russia in 1941 quickly demonstrated the limitations of such a force.[5]

Although somewhat speculative, the question must be asked: could the Germans have produced the vehicles and fuel in sufficient quantities to completely motorize the Army? The answer to this question must undoubtedly be no. Germany simply did not have the resources to create an air force, a navy and a completely motorized army. A completely motorized army might have been

created if Hitler had decided not to build a navy, but rather devote those resources to the production of motor vehicles. This point had been made tangentially in an article in Militär Wochenblatt in 1935.[6] In addition, even if the requisite numbers of vehicles could be produced, Germany could not obtain the oil needed to fuel them. The following statistic tells a great deal: in December 1940, at the height of her military success, Germany and the occupied countries possessed 4.1% of the world's oil refining capacity, compared to 21.5% for the Allies, and 73% for the neutrals, which included at that time the U.S. and the Soviet Union.[7] This created serious problems in maintaining tank and vehicle strength in the panzer divisions, particularly in the latter stages of the war.

The personnel policies used to man the German Army's panzer and motorized divisions were the same as those employed by the rest of the German Army. These policies did have some effect on the panzer force, as they provided the criteria by which it could be decided whether a destroyed division would be rebuilt or not. The examples of the 10th Panzer Division and the divisions destroyed at Stalingrad have already been

discussed. A major factor in the area of personnel was the lack of people who had exposure to automotive devices. This, combined with fuel and vehicle shortages, placed the Germans at a disadvantage in training drivers. In addition, the German Army mistakenly assumed that maintenance units could be staffed by simply transferring civilian auto mechanics directly into units without some prior training on tank repair.[8]

Training also affected the panzer force. German Army training, and that of the SS as well, stressed the importance of combined arms, no matter what type of unit an individual served in. This was especially important to the German Army, since it was composed of such disparate elements. The ability to keep the Army "on the same sheet of music" in terms of training was vital to the successful employment of such ad hoc units as Panzer Brigade Eberbach and Korpsgruppe Fischer.[9]

It is important to note, however, that the training of panzer and mobile units were severely affected as the war went on by several things. First, training was severely hindered later in the war by shortages of both fuel and vehicles. This, along with the need for replacements, forced the Germans to reduce train-

ing time for their recruits. These soldiers, being less well-trained, quickly became casualties, thus creating the need for more replacements. Finally, the invasion of France in 1944 deprived the Germans of a quiet area where they could reform and refit shattered divisions. The demands of both fronts and the lack of quiet areas made the rehabilitation of divisions very difficult. It was only with the greatest difficulty that OKW was able to amass some eight panzer divisions and two panzergrenadier divisions for the opening of the Ardennes offensive in December of 1944, but even this imposing array was backed up by 970 tanks and assault guns.[10]

For the panzer force, as well as the rest of the German Army, doctrine was the cornerstone. German armored doctrine, as stated previously, was the outgrowth of the German Army's experiences in the latter stages of World War I. It fit into the broader German war-fighting doctrine, which was based on the Napoleonic concept of achieving the destruction of the enemy's army through the decisive battle.

The panzer division was conceived within these two doctrines as a combined arms force which enhanced the Army's ability to conduct operations in accordance

with its doctrine. Since equipment deficiencies mandated the separation of the German Army into two separate and distinct parts, one motorized and the other not, the panzer force represented the only means by which the Germans could achieve the type of strategic penetration which eluded them in 1918. In the German Army's most successful campaigns, it represented the Army's cutting edge and created the conditions in which the opposing army could be destroyed.

Doctrine was absolutely vital to the German Army because from it, all other things flowed. The effect of doctrine on training was undeniable. The ability of the German Army to have the most dissimilar elements of the Army trained with doctrinal consistency reflected two things. First, it reflected the fact that the German Army's broad, basic doctrine was very close to its armored doctrine. Both emphasized the same principles. Second, it reflected the power of the office of the Inspector General of Panzer Troops, especially when Guderian made the principles of armor training binding on all units in the Replacement Army.[11] This was vital in allowing marching infantry divisions to work well with panzer divisions in various situations.

This was an enormous advantage because it was something that eluded Germany's oppenents. The U.S. Army lacked a consistent armor doctrine to begin with, and most infantry divisions had had precious little training with tanks.[12] British attempts to have infantry and armored divisions work in tandem in North Africa produced a string of disastrous failures. This was generally due to a lack of training, but there was also a great deal of confusion over the tank's role in combat.[13] The Russians also suffered from the same kind of problems early on, and this led them to fashion an army very similar in appearance to that of the Germans.

All of these influences contributed to the manner in which the Germans organized, deployed and fought their panzer divisions. From the available evidence, several conclusions can be drawn. The first is that the Germans never employed any kind of standardized divisional organization. This was true even during the period in 1941 before the Russian campaign, when the German Army undertook a reform precisely to standardize their divisional organization. In the field, it is fairly clear that the division was used only as an administrative organization. The basic elements of the

division were broken down into combined arms battle groups. These were constantly mixed and matched to fit the existing situation.

The German ability to do this constituted a tremendous advantage over their opponents. The failures of the tank-heavy British armored divisions and the French D.C.R. have already been noted.[14] Since the panzer divisions provided the German Army's offensive cutting edge, it can certainly be argued that German divisional organization, and its superiority over their enemies, was a key element in the Army's victorious campaigns, as well as in its ability to hold off defeat.

One can also draw a general conclusion about the German Army from this study. The German Army often presents the image of a mechanized juggernaut, the epitome of mechanized warfare in the 20th century. As stated previously, current scholarship has clearly demonstrated that this was not the case. Given the fact that the German Army of the 20th century derived so much from the 19th, one can say that the panzer force was the most modern element of what was a premodern army.

ENDNOTES

1. This important question is examined in R.L. DiNardo and Austin Bay, "Horse-Drawn Transport in the German Army," Journal of Contemporary History, Vol. 23, No. 1, (January 1988): pp. 129-142.

2. Liddell-Hart, The Remaking of Modern Armies, p. 88.

3. Manstein, p. 241.

4. Creveld, Supplying War, p. 145.

5. Addington, p. 216.

6. Wim Brandt, "Stellungskrieg oder Bewegungskrieg?," Militär Wochenblatt, Vol. 120, No. 22, (11 December 1935): p. 938.

7. Goralski and Freeburg, p. 338.

8. Müller-Hillebrand, German Tank Maintenance in World War II, pp. 41-42.

9. See pp. 130-131.

10. MacDonald, p. 45.

11. CMH, MSS #B-036, pp. 11-12.

12. Brown, p. 99.

13. Captain Jonathan M. House, Towards Combined Arms Warfare, (Fort Leavenworth, 1984), p. 50.

14. See p. 136.

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