

THE EVOLUTION OF OPERATIONAL DOCTRINE
OF U.S. ARMORED FORCES, 1917-1942

by

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B.A., Miami University, 1984

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF ARTS

Department of History

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1988

Approved by

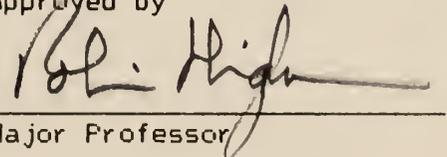

Major Professor

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ACKNOWLEDGMENTS

I would like to thank the staff members at the National Archives, the U.S. Cavalry Museum, the Command and General Staff College, and the Dwight D. Eisenhower Library for their help and assistance.

Chapter I

CREATION AND BEGINNINGS, 1917-1920

Major General J.F.C. Fuller makes the observation in Tanks in the Great War, that the giving of blows without receiving them remains the unchanging object of battle irrespective of the change of weapons; and as the European battlefield became stalemated, the search for a new weapon with which to break through the enemy's front lines began in earnest. Previous conflicts, particularly the Russo-Japanese War, hinted at the deadly firepower of the machine gun, but it took the mowing down of the tightly packed masses of men advancing across the shelterless no-man's land to illustrate that lesson to all. The machine gun gave the defense too much of an advantage over the offense, and with the static frontline a new solution was sought to bring mobility and decision to the battlefield. Poison gas and the "walking barrage" were two methods employed to break the stalemate, but they did not produce the decisive effect necessary to restore mobility to the battlefield. Another line of thinking evolved from the concept of armored knights. Armor plate was a viable counter to machine gun and small arms fire. Soldiers might be able to advance through machine gun fire if they wore fitted suits of armor or carried a large armor plate to use as a bullet proof shield. But, not unlike medieval knights, the addition of armor seriously restricted mobility or proved to be too heavy to carry and thus, impractical. When sheer muscle fails, man turns to mechanical means to achieve his goal--and

in this case the solution was the internal combustion engine.

By adding armor plate and machine guns to cars, a machine with armor protection, firepower and mobility could be produced. Wheeled armor cars lacked the mobility to traverse the rough and often muddy terrain, barbed wire obstacles, and trench systems of World War I battlefields. The problem of maneuvering across shell torn ground was solved by adopting the Holt caterpillar farm tractor as the means of locomotion. While Lt. Colonel Ernest D. Swinton receives most of the credit for conceiving of the idea of the modern tank, others, such as Rear Admiral R.H.S. Bacon (general manager of the Coventry Ordnance Works) and Lt. R.F. Macfie produced similar designs. It was William Tritton, head of the Foster Engineering Works at Lincoln, England and Major W.G. Wilson who first successfully combined armor, caterpillar traction and gasoline engines into an employable weapon. Their design, "Mother," met the War Office requirements of being able to cross a five foot trench and surmount four and a half foot parapets, and was standardized as Tank MK I.

The strategic idea behind the tank was to employ them as breakthrough weapons to breach the German lines. Tactically, tanks provided the infantry with a means to neutralize hostile fire and to create a pathway through wire entanglements. Once the machine guns and obstacles were eliminated, the large body of infantry following the tanks would maintain the momentum of the assault and exploit the breakthrough. Lt. Colonel Swinton was instrumental in developing the initial tank tactics and wrote extensively on their proper employment in combat. As in the case with the development of any

new weapon, before it is tested in actual combat, its proper employment is hidden by mechanical limitations and handicapped by the lack of experience of the men in charge.

The initial seeds in British tank doctrine, which would later be adopted by the Americans, can be found in the objective of the Admiralty Landships (a naval euphemism for tank) Committee--a device able to operate on the Western Front battlefields, and help the infantry break through enemy lines--and the designers' conceptions of the mechanical means to best achieve those ends. In the transition from drawing board to reality, Colonel Swinton led the way in developing tank doctrine because his ideas seemed to best achieve the intended goals logically and were compatible with the existing technology. Swinton's ideas were for "caterpillar machine gun destroyers" to overcome the wire and obstacles and eliminate enemy machine guns so that the following infantry could exploit the breakthrough. Thus tanks could restore mobility to the battlefield. Upon these principles it was decided to manufacture the MK I in two versions to accomplish two different, but complementary, missions. The male model was armed with two 2 pounder naval guns and four machine guns for the purpose of attacking enemy guns, fortifications, and defenses. The female version was equipped with four machine guns for anti-personnel fire and to protect male tanks from infantry attacks.

This brief look at initial British tank doctrine formation also serves to illustrate the reoccurring theme throughout this thesis: that doctrinal development is a synthesis of ideas from the

interaction between current doctrine, mental creativity, and technology. Further, changes in doctrine and the pace at which technology advances move at different rates of speed. For example, Colonel Swinton's concepts governing the employment of a caterpillar machine gun destroyer and the capabilities of the "Mother" tank moved at relatively the same speed; and each influenced the other as British tank doctrine was established. With the introduction of the lighter and faster Whippet and Renault FT tanks later in the war, we see the pace of technology began to change more rapidly than doctrine. The example of strategic bombing illustrates how doctrine developed ahead of technology. While the concept of strategic bombing was accepted in the 1930s, it was not until the B-29 bomber was employed with the atomic bomb that technology was able to catch up with U.S. Army Air Force doctrine. Other factors, such as economics, politics, and interservice rivalries are influential in the determination of doctrine. The exigencies of war often take priority over economic and political considerations.

For the British, it was the mechanical capabilities and the conditions of trench warfare that most influenced the development of tactical doctrine. We have already discussed the conditions present on the World War I battlefield and the armament of the tanks, however, little has been said about the mechanics. The MK I tanks weighed 28 tons (27 for the female version) and were powered by a 105 hp Daimler-Foster gasoline engine, which gave the tank a top speed of 3.7 mph.¹ This speed made it an excellent infantry weapon because it moved at the same pace as the footsoldiers. However, the

heat from the engine room firewall, the poor ventilation of the crew compartment, and the cramped conditions within led to the exhaustion of the crew in a matter of hours. Mechanical failures of the engine or track breakage were common occurrences that caused many to doubt the reliability of the tank, and thus its utility in general. It takes actual combat to expose all the "bugs" in a weapon's design. The tank first received its trial by fire on September 15, 1916 during the battles of the Somme. In retrospect, the initial engagements provided strong evidence that the tank could be a practical infantry support weapon for destroying machine guns, but it also exposed doctrinal shortcomings that resulted in the improper employment of the tank. Commanders were forced to create a doctrine for a weapon without being able to conduct exercises or training to determine its combat characteristics. Mistakes initially made in employing tanks were a direct result of the strict wartime secrecy surrounding the invention of a new weapon.

Tanks were organized for combat as brigades or battalions. A brigade was composed of three battalions of tanks, a signal company, a supply company and a transportation column. Three companies formed a battalion. A company's structure depended on the type of tank with which the unit was equipped. In heavy tank companies there were four sections of four tanks; medium tank companies contained an additional section of four tanks. Light tank companies organized by the U.S. Army contained four " platoons" of five tanks. Following the British practice one section or platoon was designated as the reserve/training unit. All tank units formed part of the

General Headquarters Reserve, and were allocated by Armies in brigade or battalion size units to infantry corps based on the number of tactical points contained in the operation. Allotted tank units then came under the authority of the corps commander and formed part of the corps reserve. This method parcelled out tank units among infantry divisions as the tactical picture indicated. Once assigned an objective the details were worked out by the tank unit commanders in conjunction with the divisional commander. During an attack the tactical purpose of the tank was to reduce resistance to the infantry's advance and provide local protection during the attack. Tanks operated with thirty-five yards to 100 yards between tanks, and 200 yards to 600 yards separating the attacking waves.

Armor and mobility were seen as the key to restoring maneuver to the war, and without tank support infantry could not advance on the World War I battlefield. Commanders, especially infantry commanders, saw the tank as the weapon to enable footsoldiers to advance against enemy machine gun fire and obstacles. The tank was first thought of as a weapon to assist the infantry, and thus doctrine developed for tanks as an infantry support weapon. Later when technology produced models with greater speed and radius of action, it was difficult to dispel the stereotype of the tank as only an infantry support weapon. The tank became an infantry weapon because it did not possess the performance characteristics to accomplish independent operations, but did have the capabilities to assist the advance of infantry on the World War I battlefield.

British tank doctrine can be divided into five periods: the Somme (1916) to Messines (1917), including the actions in Palestine; the Third Battle of Ypres (1917) to Cambrai; Cambrai (1917) to the action of Bucquoy; Hamel to the Armistice; the preparations for Plan 1919.²

The first period was one of great learning. Apart from mechanical difficulties and natural obstacles, such as mud, there were many tactical and strategic problems to solve. Contrary to Colonel Swinton's arguments, tanks were not amassed to deliver a surprise and decisive blow, but rather they were used in small numbers, thus reducing the psychological impact of the introduction of a new weapon to the battlefield. Historian Robin Higham in studying the weapons policy of the British ridged airships observes that "weapons may exert a decisive influence for a short time in a particular struggle or battle, but they are rarely absolute in their influence. Each new weapon is a challenge which brings its own response."³ In the battle of the Somme only forty-nine tanks were allocated, while a year later at Cambrai nearly 500 tanks participated. Whether or not sheer numbers would have been decisive is hypothetical. During this period, there were too few tanks employed operationally.

The British had little strategic success at the Somme and at other battles during this period because of ". . . the small numbers of machines used and the lack of continuity of the attacks themselves. Tanks were scattered over too wide a front and frittered away in minor actions."⁴ This led one author to characterize this

period as "the piddle method" of tank tactics.

Of the forty-nine tanks allocated for the Somme offensive, thirty-two arrived at the line of departure, and only nine made it to attack enemy trenches. These caused considerable damage and panic among the German troops, thus providing evidence that the tank with mechanical improvements (such as reliability and operation over churned up mud) could be a decisive weapon. Another benefit was that tanks drew fire away from the infantry, which reduced casualties and strengthened the morale of the advancing troops. The strict secrecy surrounding the tank undermined the effectiveness of its introduction into combat. Commanders were not able to train with the weapon so its capabilities remained largely undetermined. For this reason commanders were not able to understand the true nature of the tank. This lack of training had detrimental ramifications on command and control and infantry-tank cooperation. Evaluating the operation, it became evident that tank crews required better and more thorough training; tank personnel should reconnoiter the area before an attack; infantry specially trained in tank cooperation were necessary for more efficient operations; and separate supply system to rearm and refuel tanks and conduct salvage operations should be established. History justifies Colonel Swinton's argument to only commit tanks in mass. During the battle of the Somme decisive results were not attained because too few tanks were employed and none were held as reserves. Prior to the Ypres offensive, the British did not consolidate tank strength, but dispersed insignificant numbers of tanks throughout the length of

the attack front.

The second period of British tank tactics can be described as the "muddle method." It was assumed, more along Swinton's lines of mass employment, that if enough tanks were committed at one time the German lines would be pierced by the weight of the tank assault. This strategy was a direct continuation of the war of attrition. For the Ypres Offensive (July 31, 1917), the British allocated 252 MK IV tanks to support three corps of thirteen divisions, which was more than three times the tank density at Messines two months earlier.⁵ The time delay between design and actual production decreased to the point where tanks could be manufactured rapidly. Between June 7 and July 31 the British replaced combat losses from the Messines and built up reserves for the offensive at Ypres. It was hoped that mechanical improvements in the MK IV would help to bring about victory that tank enthusiasts envisioned.

The argument for better tanks employed in large numbers prevailed among the senior officers in command. But the substitution of numbers and relatively minor changes to doctrine did not compensate for deficiencies that remained in command and control infantry-tank cooperation, and the supply organization. Flaws in tactical doctrine led to the failure of the tank attack at Ypres. Besides relying on sheer numbers to breach the German line, Infantry commanders were not convinced of the tanks potential and shelling was considered more beneficial than tanks. A long preliminary bombardment at Messines was judged to be effective and helpful, so a ten day bombardment was planned prior to opening the offensive at

Ypres. The bombardment had only adverse effects on tank effectiveness. The preliminary bombardment disclosed the intended location of the attack and forfeited the element of surprise, thus depriving tanks of their inherent shock value. Secondly, the bombardment pulverized the terrain over which the tanks would maneuver; and rain on the first day of the offensive turned the earth into a quagmire. The Germans tactical response to the preliminary bombardment was to deploy their lines in depth to reduce the effectiveness of shelling. This development necessitated better command and control techniques to govern tanks. Unfortunately, command and control had been sacrificed in favor of mass. Even though the unfavorable terrain conditions greatly reduced the tank's tactical mobility, tanks again demonstrated tactical utility. But because of invalid doctrinal assumptions, the tank's full strategic potential was hidden by unimpressive results and was doubted by many British officers. This pessimistic view was shared by the Germans as well as the American observers sent to the Western Front. The result was a disillusionment with tanks and the continued expenditure of large amount of munitions and lives for relatively small gains.

The third period begins with the attack near Cambrai on November 20, 1917. Other officers, such as Swinton and Major J.F.C. Fuller, had been advocating different methods governing tank attacks and finally persuaded the higher command that an assault using Swinton's original recommendations from February 1916 would succeed. The changes implemented affected primarily the strategic level of tank employment. Tank Corps officers continued to improve

deficiencies in tank doctrine based on experiences in combat. The planned attack on Cambrai differed significantly from previous tank operations. Specifically good terrain for tank operations was chosen before the objective, no long preliminary bombardment was planned, and the tanks were massed in waves. The preliminary bombardment was deleted because of its adverse consequences: pulverizing the ground in the lanes of operation; the dilution of fire effectiveness resulting from the German deployment in depth; and surprise gained because previous offensives always began with intensive shellings, thus disclosing the point of attack. The tanks were deployed in massed waves, which gave the commander a partial reserve instead of all tanks advancing at once in one thin line. Even though the tank's fate was in question, British production had remained steady and 378 MK IVs, plus an additional ninety-eight command tanks participated in the attack.⁶

The thrust was successful. The Germans were taken by surprise, and within twelve hours an advance of 12,000 yards on a 13,000 yard front with only 4,000 casualties had been achieved. These gains were more rapid and less costly than those of the Somme or Ypres offensives. The battle established the concept of the tank as a breakthrough weapon. Yet, the tank failed to achieve what would be later termed as a follow-up thrust, a complete rupture of enemy lines. Mechanical weaknesses and flaws remaining in tank doctrine were responsible. Besides destroying machine guns and firing on enemy troops, tanks were assigned specific objectives to capture, or at least to hold until infantry relieved them. Upon gaining an

objective the tank crew had no motivation or reason to push on. If a tank commander decided to advance further than ordered, insufficient supply organization, crew exhaustion, and mechanical unreliability soon forced a tank to halt.

Cambrai also served as a catalyst for future doctrinal development. The heavy MK IVs served to batter their way through a trench system, but once past those obstacles the open terrain would allow for a greater rate of movement. There were two views on how to best exploit the breakthrough. One group advocated using the horse cavalry in its traditional role; another wanted to incorporate a smaller and faster experimental tank known as the "Whippet," to operate in areas behind the trench system.

The British were developing a medium class of lighter tanks possessing more speed, which enhanced their mobility and tactical value. The lack of a preliminary bombardment left the road network intact and available for use by advancing troops after the German lines were breached. The development of a fast cavalry or pursuit tank coincided with the establishment of the tank as a breakthrough weapon at Cambrai. British tank commanders acknowledged the need for another type of tank with greater speed, and when the Tank Corps expanded in the fall of 1917, they restructured the battalion to include 320 MK IV heavy and 50 MK A medium tanks. During the German offensive of March 1918, the Whippet's speed of 8.3 mph (about double that of the heavy tanks) proved to be of considerable value in a mobile battle.

The battle at Cambrai was seen by skeptics as an abnormality in

the face of so many attacks that only produced marginal results. The successful surprise attack on July 4th at Hamel vindicated the idea that tanks were necessary before any assault could succeed. Hamel and the French attack at Soissons on July 18, 1918 quieted almost all criticism of employing tanks. In fact, tanks were then employed in every major attack until the armistice ended the fighting.

With successful methods of tank employment emerging, the British (and French) continued to search for the optimal way of using tanks. The success also forced the Germans to think about antitank defenses. Initial British mediocrity met with equal enthusiasm for antitank measures in the German Army. The effectiveness of tanks after Cambrai quickly stimulated German thought, and they began to develop antitank guns and tanks. The Germans countered with armor piercing bullets (soon made obsolete by thicker armor in later models), mines, antitank obstacles (pits, barricades) and field artillery employed as antitank artillery. Both sides found direct firing artillery to be the best counter-measure, but, it reduced the strength of field artillery units for offensive/-defensive fire missions.

During this fourth period the Tank Corps were still fully subservient to the infantry assault, but the primitive concept of tank forces as self-contained fighting units began to evolve. The British adapted the tank to accomplish other tasks than fire support. Specialized tanks for mine clearing, flamethrowing, and supply were produced in limited numbers. Also, as the front was

pushed back beyond the range of friendly artillery, fire support was augmented by 6" mortars mounted on the rear of certain tanks. Sometimes, attached air units assisted in the discovery and destruction of antitank guns, and supplied "tactical air support." It should be remembered that these instances were experimental and exceptions to the rule; but they illustrate how weapons and ideas were progressing from a battering ram for the infantry to a more specialized and complex.

From Hamel to the end of the war, the employment of tanks in combat entered the last combat tested state of development. The major difference was the striving to maintain command and control, and better cohesion in the advance. To avoid tactical degeneration, phase lines were established from which further advances were resumed at definite times.⁷ A time schedule allowed for some delays in more difficult sectors, forward movement of supporting artillery, replenishment of fuel and ammunition, rest for the crews, a continuation of forward momentum and improved tactical command. While this method was a step forward it did not solve all the problems. The timed phase lines deprived tank commanders of the individual incentive to push into the German rear echelons. Command and control problems would only be eased through technology years later with the installation of individual radios in each tank. Another problem that continued to plague tank actions was that commanders unwisely handled their reserves and habitually used up local reserves before it was necessary.⁸ Commanders were instilled with the incorrect belief that an opponent could be overcome by mass--

which fit into the mind set of a war of attrition. This frame of mind and inexperience employing tanks combined to produce mismanagement of tank reserves, and prevented the concentration of forces at the decisive point at the proper time. While phase lines provided better command and control, and momentum during the attack, commanders continued to commit reserves to battle before it was necessary.

The fifth period is that of the theoretical thinking of Major J.F.C. Fuller which would have been tested in Plan 1919 if the war had continued. Fuller was associated with tanks from early in the war as part of the Tank Corps Staff. He was also responsible for working out the plan for the attack at Cambrai. As a theoretician, Fuller thought along the same lines as Swinton, however, he differed on the strategic objective of the tank. Even before Cambrai, Fuller had been promoting the idea of striking at the German headquarters with a tank raid. By targeting the headquarters Fuller's strategy was to disrupt German command and control operations, paralyzing and disorganizing resistance of front line troops. This is exactly what happened during the attack on Amiens on August 8, 1918.

This strategic concept was the foundation of Plan 1919, which was an armored offensive on a grand scale. Almost 5,000 tanks would be concentrated on a ninety mile front to penetrate through the front lines to a depth of twenty miles, a depth sufficient to disorganize the enemy's rear and paralyze his front line. With German command and control broken, the infantry could advance against a demoralized enemy. Fuller's ideas were good and his thinking

correct, but the unreliability of World War I tanks, tactical command and control problems, and supply difficulties would have limited the effectiveness of the plan. It is doubtful that a campaign, such as the German invasion in 1940, could have been carried out. While Fuller's ideas were progressive, his fundamental concept that mass could overwhelm the German rear was limited by the capabilities of even the best tank.

American association with tanks began with the United States Military Mission in Paris sent to observe the European War. Its initial reports evaluated the unimpressive tank actions during 1916 and early 1917 and helped discourage the idea of establishing a separate tank service. The tank was seen by the Mission as a mobile armored machine gun destroyer. Other studies done after America's entry into the war (and prior to Cambrai) affirmed the same conclusion. The General Organization Project for the American Expeditionary Force (A.E.F.) totally disregarded the formation of a tank service, but it did recommend that one company in each machine gun battalion be equipped with tanks.⁹ Of the promising designs, most officers believed that if any tank units were formed they should be equipped with the British Mk IV's or the French FT models.

The Renault FT was designed by Colonel (later General) J.B.E. Estienne as a light infantry accompanying tank. Estienne, thinking along the same lines as Swinton, was France's tank enthusiast. His design produced a small two man tank equipped with either a 8 mm machine gun or a 37 mm cannon, and had a speed of 4.8 mph.¹⁰ The Renault was unique because its armament was mounted in a revolving

360° turret. French heavy tank designs were a failure because the designed suspension system and track layout provided very poor maneuverability on the broken terrain of the Western Front. French Army doctrine subordinated the tank exclusively to the infantry. This confined tanks to a limited role of an auxiliary and tended to focus infantry attention on accompanying tanks--especially the Renault FT.¹¹ This was a fundamental difference between French and British doctrines.

Of the committees established to study British and French organization and tactics, the board composed of Colonel Fox Conner, Colonel Frank Parker, Major Nelson E. Margetto, and Lt. Colonel Clarence C. Williams was the most influential. Their "Report on Tanks," submitted on September 1, 1917 identified the tank as an important future element in war and recommended that U.S. troops be equipped with Mk VI heavy tanks (upgrade versions of the Mk IV) and Renault FT, procured jointly by the Allies; and be organized with a separate tank department under the command of a single chief who would report directly to the Commander-in-Chief, AEF.¹² All recommendations were later adopted by the Army in France.

The American Tank Corps was organized in December 1917 under the command of Colonel Samuel D. Rockenbach. Was it mere coincidence that the Chief-of-Staff acted to form an American Tank Corps within weeks after the stunning "victory" at Cambrai by British tanks? Prior to that date, tanks were organized as the light and heavy tank service. Colonel Rockenbach was responsible for organizing, training, and equipping all tank units in the AEF. He also

served as advisor to General Pershing on tank matters. From the Allies experiences and reports by American officers, Rockenbach decided that tank tactics would support the infantry through the barbed wire and protect them from rifle and machine gun fire. Tank units would be organized to allow the men to work in shifts, providing reliefs for dead, disabled, and exhausted crews.¹⁹ As commander of the Tank Corps, Rockenbach could not be everywhere at once, and as his organization grew so did his dependence on his subordinates. One officer in particular proved himself to be bright, energetic, innovative, and instrumental in the development of the Tank Corps--Major George S. Patton Jr.

Patton requested a transfer to the tank service in October, 1917 on advice from General Pershing, to whom Patton was an aide at the time. Upon assignment, Patton's duties were to organize the light tank service and to set up training facilities for American tankers. The light tank service was to be equipped with light tanks of the French Renault FT design. Since the FT had just appeared, Patton spent most of November with the French studying the tank and their training methods. The analogous relationship between the role of light tanks and cavalry stimulated Patton's thinking and challenged the French method of employment.

The Renault FT was designed as an accompanying tank for the infantry, and doctrine placed it behind the infantry as a mobile reserve. It was the often long response time between assignment of a mission and engagement that most disturbed the cavalry-minded Patton. This sentiment is echoed in many of his writings from the

World War I period. In any tank action he felt that "tanks like cavalry must depend on rapidity and shock for success. . . ."14 He also opposed the use of tanks as mobile pill boxes fighting in a solid line along the entire front. The heavy tanks did not possess the speed to achieve shock action and training continued to follow British teachings. Because of Patton's position as commander of the light tank units, he was able to introduce his ideas into training. He also instilled discipline, esprit de corps and aggressiveness among tankers.

Drawing from his observations of the French, Patton formulated tactics he believed tanks should follow. In a memo to the Chief of the Tank Service (Rockenbach), dated December 12, 1917, Patton wrote that in order to provide aid to the infantry, tanks must: "1) facilitate infantry advance by cutting wires ahead of the infantry; 2) prevent hostile infantry from manning the trench parapet when the preparatory barrage lifted; 3) prohibit machine guns and trench cannon from attacking the infantry; 4) help mop up, neutralizing strongpoints and blockhouses by masking them with fire and smoke bombs; 5) guard against counterattack by patrolling. . . ."15 Patton further added that tanks should ". . . push on at own initiative beyond the final objective--but only after infantry consolidated that position--in order to seek every opportunity for pursuit. At this phase the support and possibly the reserves should join the leading tanks."16 This memo shows that Patton had grasped the tactical usefulness of the tank, but as yet had not decided how tanks in the pursuit of the enemy were to be controlled. The memo,

written the immediately after Cambrai, seems to put him along the same lines of thinking as Fuller. Yet Patton's papers fail to mention contact with J.F.C. Fuller. Most of Patton's papers regarding tanks deal with tactical employment or strategic mobility and do not discuss the strategic employment that Fuller visualized in his Plan 1919. Because of his promotion to Lt. Colonel and commander of the 304th Tank Brigade, Patton was able to influence American light tank doctrine directly.

The major point that Patton stressed was speed and shock action and operating in the enemy's rear areas. Official memos and personal letters by Patton often stress these themes. In a memo from the Headquarters, 1st Tank Center, on bridging trenches, Patton opened by stating five essential qualities of a tank, the first two are: "1) Mobility of strategic employment, 2) Speed and radius of action on the battlefield."¹⁷ Given his theories based on speed and mobility, the Renault FT possessed the necessary capabilities to test his theories. During the winter of 1917-1918, he started to develop his theories, and by the spring he was openly arguing that ". . . the time has now arrived to divorce tank tactics, at least to a considerable degree, from the stereotyped formations heretofore thought essential."¹⁸ Patton envisioned waves of tanks and infantry "leapfrogging" through enemy defensive lines. The leapfrogging concept was similar to the childhood game bearing the same name. The first wave was assigned an objective to capture. The second (and/or third) wave would use the occupied position as a point from which to begin operations against its assigned objective deeper in

enemy territory. When the second wave consolidated its position the cycle was begun again by the first wave. The typical assault was to be preceded by a short intensive bombardment of high explosives and smoke to blind enemy gunners. As soon as the tanks accomplished their mission of helping the infantry, Patton believed they should move on immediately. Centers for ammunition, gasoline, and oil would be established for tanks in enemy territory in order to allow the advance to continue. Writing to the Deputy Chief of Staff, GHQ, AEF (May 6, 1918) on tank tactics and strategy, Patton expressed his urgency for tanks to continue forward as soon as possible. When tanks and infantry halted, the Germans countered with defensive artillery fire on that position which inflicted casualties. If the advance was quickly resumed, the German commanders were forced to think about possible moves instead of shelling the tanks and infantry at the intermediate objective.¹⁹ Patton saw leapfrogging also as a method for restoring mobility to the battlefield. Leapfrogging allowed tanks to be resupplied and offered a short period of rest for the crews, thus facilitating a continuous line of assault waves to maintain the momentum of the advance. Patton was trying to attain decision on the battlefield through the old cavalry principle of maneuver, rather than overwhelming the Germans by numbers in a frontal assault. This was the concept that Patton formulated and intended to use to break through German lines.

American tanks first entered combat on September 12, 1918 during the operation against the St. Mihiel Salient. The tanks provided much aid to the infantry in the successful action; however,

senior commanders repeated British mistakes made the year before and thus greatly reduced the strategic and offensive importance of tank units. Chief errors included an insufficient number of tanks, a continuing problem of infantry/tank cooperation, and the employment of tanks across unsuitable terrain. Mechanical breakdowns, heavy tank losses, and greater consumption of gasoline owing to mud further reduced their striking power. Nevertheless, American infantry and tank commanders did gain their first actual combat experience.

The St. Mihiel operation was followed shortly by the Meuse-Argonne offensive that began on September 26, 1918. In America's biggest operation of the war, better employment of tanks enabled U.S. forces to overcome heavy German resistance. Tanks were employed in more favorable terrain, and many of Patton's suggestions were incorporated into the battle plan. The 344th Tank Battalion (of the 304th Tank Brigade) was to lead the infantry advance, with the 34th tank battalion following ready to "leapfrog" and continue the advance with the infantry. Cooperation between infantry and tanks was greatly improved and effective, but coordination with infantry units remained poor. Infantry/tank coordination was further reduced because command and control of the 304th Tank Brigade was lost when its commander was wounded. Lt. Colonel Patton's concept of leading by example put him amongst the front line troops and in danger. For his actions he received a medal for valor and a leg wound severe enough to remove him from the battlefield. Patton served as the link between tank elements in combat

and the higher echelons of command--Rockenbach (commander of the Tank Corps) and the infantry commanders to which the tank battalions were attached. While Patton was in the front line, he was not in a position to receive orders, report, or advise on the feasibility of new orders. The echelons responsible for strategic decisions were unable to communicate with Patton who was at the pinnacle of tactical command during the battle. The means of command and control were inadequate to respond to events of battle, even at the slow pace of World War I. The problem of command and control was not solely a tank problem, but affected the infantry as well.

The Americans repeated the British and French mistake of allowing infantry and attached tank units to become separated during the attack. One lesson impressed on American officers was that in most circumstances the tank could take any objective, but was ineffectual in holding captured ground. For example, a tank detachment captured and recaptured Apremont five times before infantry arrived to consolidate its position.²⁰ This lesson was evident to Lt. Colonel Patton and led him to address the topic in a training pamphlet. "Practical Training, Tank Platoon" (November 10, 1918). He wrote that, "tanks must watch their infantry. If the latter is held up there is a reason; the tanks must go back and find out. They must also always watch for helmet and rifle signals from the infantry. It is perfectly useless for tanks to attack more than 200 M[meters] ahead of the Infantry. Tanks can take almost anything but can hold practically nothing. Hence they **MUST STAY WITH THE INFANTRY.**"²¹ Of the conclusions made about the tank during the war,

this one made the strongest impact on American officers.

The concept was constantly stressed in the literature and tables of organization of the following decades. There was a strong desire by American officers, theorists, and pundits to wed the tank to infantry riflemen or vice versa. This trend continued with experiments in unit composition by the infantry and cavalry, regardless of the mode of transportation--horses, motorized infantry, or mechanized infantry.

The third American tank battalion to see action was the 301st. Trained in England with heavy tanks, this unit had little effect on doctrine. American heavy tanks were employed in combat exactly as British units had been. The 301st was attached to the 2nd Tank Brigade of the British Expeditionary Force (BEF), in support of the 2nd American Corps and an Australian Corps during the Meuse-Argonne Offensive. Because of mechanical breakdowns, and an old British minefield, less than 30 percent of the brigade's tanks made it into actual combat. Coordination between infantry and tank units was extremely poor because the 27th Division, which received the majority of tank support, had never before conducted operations with tanks. For these reasons, the 301st Battalion enjoyed only limited success.

American official heavy tank doctrine changed little during the war. The War Department simply adopted British tank doctrine for the U.S. Tank Corps by reprinting documents issued by the British General Staff in 1917. The short duration of American combat participation (6 months) did not allow time for doctrine to mature

or change. The first successful tank operation at Cambrai occurred only one year before the war ended, and U.S. Tank Corps first entered combat in September 1918, barely two months before the war ended. Doctrinal changes take time to gain acceptance by the majority and there were no technological advances to hasten the process. Both infantry and tank commanders showed inexperience in employing the tank because it was a new and not totally proven weapon. Given the mixed results of tank operations, it is not surprising that not all were convinced that the tank was a revolutionary weapon. The heavy tank was slow and moved at the infantry's pace, which complemented its role as an infantry support weapon. Slow speed, when compared to contemporary tanks, limited employment options, which in turn stifled alternative thinking. Tactical doctrine changed more rapidly as the capabilities and limitations were better understood and tested in combat.

Doctrine governing light tanks varied more than heavy tank doctrine. The French designed their light tanks as a fast infantry accompanying tank to operate against German rear areas after their heavy tanks breached enemy lines. The British employed their medium tanks (Whippet) along similar principles. Others saw additional options offered by the FT's speed. Lt. Colonel Patton adopted cavalry-type tactics to American light tank units and advocated such operations.

Both heavy and light tanks were most effective when massed for an attack over suitable terrain. Spacing between tanks on a divisional front was between 35-100 yards and 200-600 yards

separating attack waves. Tanks were considered to be infantry support weapons and were placed under control of Infantry Corps or Divisional commanders. They assisted infantry by crushing down wire, bringing direct fire on machine guns and trench systems, and also drawing fire away from attacking infantry. Tanks raised the morale of attacking troops and demoralized the enemy. The Germans countered tanks by deploying in depth and developing heavier machine guns and special rounds for antitank rifles. The deadliest threat to tanks during the war remained direct fire from artillery pieces. Smoke was used in support of tanks as an effective countermeasure against artillery.

With the end of the fighting, evaluation of the role tanks had played, their future development and organization, and their continued existence began to be debated. The effectiveness of tanks was reduced by a high rate of mechanical unreliability, poor coordination with infantry, and insufficient techniques for command and control. Because tanks were developed during wartime, commanders needed to establish the proper doctrine to govern them during combat. Experiences from combat indicated that tanks were best utilized when assembled in large numbers, organized into different assault waves, and operating in terrain where they were free to maneuver. Lt. Colonel Patton critiqued the American Tank Corps in an after-action report filed November 18, 1918:

1. Infantry officers lacked understanding and appreciation of tank capabilities, for tanks needed infantry operating with them at all times to be successful.
2. A lack of liaison between tanks and infantry hampered efficient operations.

3. Infantry should act as though tanks were not present and not expect tanks to overcome resistance and wait expecting tanks to attempt to consolidate a success.

4. Tanks were too valuable because of their strengths in firepower and mobility and too weak in mechanical reliability to be dissipated in reconnaissance missions.

5. The distance between readiness positions and the line of departure should be reduced, for tanks cannot sustain a prolonged march without being overhauled and put in order.

6. A thorough preliminary reconnaissance on foot of the terrain to be used by tanks was absolutely indispensable.

7. The enemy artillery is the dangerous adversary of the tanks. Therefore, strong supporting artillery ready to deliver counter-battery fires, as well as screening smoke, was terribly important to insure tank success.

8. The value of tanks as attacking units and as a fighting arm had been demonstrated.

9. Some slight changes in tactical employment were necessary, those looking toward a better utilization of tanks in mass and in depth.²²

Patton's critique contained many valid observations. With the end of the fighting, tank enthusiasts would have to test their theories in the medium of a peacetime army environment.

Chapter II

REORGANIZATION AND STAGNATION, 1921-1927

The period between the end of World War I and the order to create an experimental mechanized force in 1927, was influential in shaping U.S. Armored doctrine, even though tank theory stagnated. The Tank Corps was abolished in 1920 as a separate arm and all tanks were placed under Infantry control. The Infantry's dogmatic view that the tank was only an infantry support weapon helped to thwart any creative thinking about independent tank action. The role of the tank as determined by the Infantry not only set the stage for doctrinal stagnation during the 1920s, but also defined the parameters within which armored doctrine was allowed to develop, until the quick destruction of the Allied Armies by German Panzer Divisions in May 1940 enlightened the conservative about the full potential of the tank.

In such a political atmosphere demobilization began, which brought up the question of how large an Army the United States needed. This question was ultimately decided in Congress which controlled the purse strings. In less than a year the U.S. Army demobilized from a wartime strength of 2,736,654 enlisted men and officers to the prescribed number.¹ The question of whether the Tank Corps was to remain a separate service or be placed under the control of the Infantry needed to be resolved. Because of peacetime budgetary stringency, this issue was finally decided on economic grounds rather than on military considerations. Tank design,

procurement, and training also suffered from inadequate funding.

The end of the war signaled the beginning of analysis to derive the lessons that would be most applicable to the next war. The Army also had the new technologies of the tank, air power and electrical communication to incorporate into the existing structure. The tank had proved its tactical value by reducing infantry casualties through crushing down wire and other obstacles, drawing fire away from the infantry, and destroying enemy machine gun emplacements; and when present, it increased the morale of friendly troops and demoralized the enemy. When tanks were used in small numbers their influence decreased dramatically while the casualty rate among tank units greatly increased. Colonel Robert Icks, in looking at the analysis of World War I tank actions, noted the lessons that were learned and ignored: tanks ". . . were most effective in depth and on a narrow front; the holding out of reserves was essential; tanks and crews could not sustain continuous combat beyond three days; that combined training and cooperation of all arms including air were mandatory; a system of communications was needed; smoke was often a more potent weapon than shell and a continuous system of supplies, maintenance and salvage was needed to keep up the momentum of any attack."² The value of the tank was not doubted, but the continuing independence of the Tank Corps did not fit with the strategic lessons drawn by the Infantry from World War I experience.

The Army's concept of future war became the dominant influence on tank doctrine because it was the guiding principle of the Army's planning, which directed its organization and the development/

adoption of a fighting doctrine. The majority of American officers seeing combat action served in infantry units, and the brief involvement with trench warfare helped to foster the false observation that the infantry played the decisive role. Like other contemporary military powers, the U.S. Army concluded that the next war would be dominated by infantry. The Army's concept of future war envisioned ". . . large infantry armies attacking on parallel routes, supported by massive artillery, tanks, and air power, directed by electrical communications, and transported and supplied by motorized vehicles. . . ." This premise guided senior officers in establishing organization and doctrine, and in developing new equipment. The tank's mediocre performance during World War I did provide evidence, though falsely, to support the infantry dominated battlefield concept and to keep tank doctrine relegated to supporting infantry. The Army's future war concept served to limit deviation from official Army thinking and thus to promote stagnation in tank doctrine.

The adoption of the National Defense Act on June 4, 1920 also helped to hinder the development of tank theory in America. The political and economic climate reduced the defense budget to a minimum, while at the same time the Army was reorganizing and developing its future war concept of massive infantry armies supported by tanks, which eventually raised the question whether the

*Faulty employment handicapped the tank's performance more than its mechanical limitations, thus giving a misleading picture of the tank's impact.

Tank Corps should remain independent.

The argument centered on the tank enthusiasts' view of the tank as a revolutionary weapon and other officers who accepted the tank as an infantry support weapon within the Army's infantry-dominated future war concept. General Rockenbach, Colonel Patton, and Major Sereno E. Brett were the most prominent and vocal supporters. It is ironic that War Department document No. 865, "Tanks and Their Employment in Cooperation with Other Arms" (October 1918), declared that "as the speed of tanks is developed and their machinery perfected it is possible that their tactical employment may develop and that their role may become more independent"⁴ (emphasis mine). The inclusion of this statement seemed to have been made with the Whippet or pursuit tank in mind. While not giving total support to autonomous tank actions, it does take into account operations after the breach of the German lines. However, soon after the war ended, pressure began to mount against the tank enthusiasts' view of tanks conducting any mission other than supporting the infantry. In April 1919 the War Department convened a board of officers to study tank tactics. The board confirmed the value of tanks in supporting the infantry, but it condemned the wartime organization of the Tank Corps as an autonomous unit. The board concluded that tanks were incapable of independent action and therefore did not need to be an independent service. Since the tanks' only function would be to support the infantry, it followed naturally that the Tank Corps should be placed under the supervision of the Chief of the Infantry.⁵ This line of thinking was very detrimental to the

development of U.S. tank doctrine because it closed the door on new ideas and began a period of stagnation.

U.S. Army doctrine focused on the infantry supported by other arms. The tank program, if placed under Infantry control, would lose incentive and motivation for creative and experimental thought because of the emphasis on (and its role) to support the infantry. The Infantry would only permit the tank to develop within parameters that enhanced its abilities to assist the infantry advance. Supporters of an independent Tank Corps believed that under Infantry dominance tanks could not develop to their full potential. Colonel Patton expressed these sentiments in a 1920 article on tanks in future wars: "As an independent corps, we may assist any one of the major arms as directed. Absorbed by any one of them, we become the step-child of that arm and the incompetent assistant of either of the others."⁶ At the theoretical level, the difference of opinion centered on how the tank was viewed as a weapon. Some considered it just an infantry support weapon, others believed it possessed the potential to perform independent actions.

The Tank Corps was placed under Infantry control and tank doctrine explored no other roles other than infantry support. Both Patton and Lt. Colonel Dwight Eisenhower (who commanded the tank training center at Camp Colt, Pennsylvania during the war) were reprimanded for advocating tank ideas contrary to official Infantry doctrine. President Eisenhower later reminisced, "I was told that my ideas were not only wrong but dangerous, and that henceforth I would keep them to myself. Particularly I was not to publish

anything incompatible with solid infantry doctrine. If I did, I would be hauled before a court-martial."7 This conservatism within the Army was responsible for the stagnation of U.S. tank doctrine and partly explains why America did not produce a Fuller or Liddell Hart.

The National Defense Act of 1920 assigned all tank units to the Infantry. The officer corps was divided on the issue and high ranking officers for both sides testified before Congress. Testifying in favor of the retention of an independent tank service were Chief of Staff, General Peyton C. March, General Rockenbach, and Colonel Patton. They advocated continuing the Tank Corps current functions. These activities included the ". . . dissemination of information as to tanks, with a view to securing a sound policy as to their employment and consequent reorganization; fitting for combat the tanks on hand and producing an improved type from experience of the World War; developing and improving the training course through tank schools; and recruiting."8 Giving opposing testimony were General Pershing (Commander AEF) and his aide, Colonel George C. Marshall. Pershing and Marshall urged that tanks should remain a supporting arm of the Infantry and denied the need for a separate tank branch. The final decision became a financial question for Congress--whether it was financially feasible to support another separate branch in the Army. Congress decided that it was not, and the Tank Corps legally became a permanent part of the Infantry. A separate arm for armor was not established until 1950. Out of this legacy of Infantry control came the term "combat

cars," which is what the Cavalry labeled tanks in the late 1920s and 30s so that they could avoid the legal restraint of the Infantry controlling all tanks.

The significance of the National Defense Act of 1920 was that under Infantry dominance the tank became ". . . an appendage to the infantry and hampered the imaginative use of the tank by reaffirming it was an infantry weapon, and not a separate arm of the Army."⁹ This philosophy carried over and pervaded the General Services School (later becoming the Command and General Staff School) at Fort Leavenworth where promising officers destined for high rank were selected to receive advanced education. Boyd Dastrup, in his history of the Command and General Staff School, concluded about the academic atmosphere during the 1920s and 30s that, "although Army authorities enhanced the stature of the Leavenworth school, they failed to keep tactics current with technological changes because of pacifism, neutrality, and conservatism in the United States and in the Army."¹⁰ Concerning the employment of tanks, the officers were able to use their positions to enforce orthodoxy: "rather than being at the front pushing new ways to adopt technology to combat, they deterred the bold use of the tank and served as counter-productive agents resisting change."¹¹ An atmosphere unreceptive to new ideas served to prohibit experimentation with new tank doctrine in the twenties and acted as a restraint during the thirties.

The conservatism of Leavenworth instructors was evident in the way they thought about war. Based on an infantry-dominated battlefield concept, the instructors thought in terms of the marching

capabilities of soldiers with nineteenth-century tactics. They refused to integrate the tank into anything other than a support role or to create new tactics around the tank. After all, they had matured in an age before motorization and mechanization was incorporated into the Army. To them ". . . manpower and not machine power was the key to victory and [they] stubbornly resisted the use of the tank as a separate arm."¹² The extreme conservatism at Leavenworth was especially evident in the restriction that faculty members base their observations on "established facts" and not on speculation.¹³ Furthermore, in order to ensure uniformity of tactical doctrine in all schools, the Adjutant General decreed that any discussion of tank tactics had to begin with the premise that tactically, tanks served as an auxiliary of the infantry.¹⁴ This curtailed debate about a greater role for tanks with infantry, the application of cavalry tactics to tanks, and, later, mechanized warfare. The refusal to contemplate alternative views at the Army school for higher education helped to create a void in doctrinal thinking about tanks until the Secretary of War ordered a study of the British Experimental Mechanized Force in 1927. From that time, instructors tried to keep the status quo in accordance with official infantry doctrine. The result was that Britain, Germany, and the Soviet Union took the lead in mechanized warfare while the United States, like France, developed a combined arms approach to operate in an infantry-dominated battlefield.

The Army established the Tank School in 1921. Its responsibility was to teach tank tactics and strategy to officers. A two-

week course ". . . comprised a study of the strategical and tactical employment of tanks with other arms, the writing of field orders, the solution of problems involving movements, both strategical and tactical, and a night problem employing tanks driven and commanded by the students themselves" (emphasis mine).¹⁵ Like the General Service School, the Tank School taught theory and methods that were compatible with Infantry doctrine. Even the school designated for training tank officers did not discuss (at least officially) or teach alternative theories for the employment of tanks. With pressure to conform to established doctrine and no place to debate the topic, American tank doctrine became stagnant during the 1920s and was restricted in the 1930s.

Within this environment some officers had different ideas towards the employment of tanks. Patton and Eisenhower became close friends after meeting while at Camp Meade. They both shared the conviction that research should be accomplished to develop fast tanks, and that they should attack in mass formations. Along with Sereno Brett, they believed that the tank was a revolutionary weapon that could break through and take the enemy from the rear. Their reasoning was along the same lines as that of Fuller and Liddell Hart in England. These three men not only differed with the Chief of Infantry over the employment of tanks, but they also disagreed with the Commander of the tank service, General Rockenbach. Under the mounting pressure to conform to established doctrine only Brett remained in the tank service. In January 1922, Eisenhower transferred from the Infantry Tank Brigade at Camp Meade to the Infantry

as Staff Officer to Brigadier General Fox Conner. Patton requested and received a transfer back to the Cavalry as he saw no future with the tank service in its then form. Even though both Patton and Eisenhower were intellectually frustrated in the tank service, they never lost their enthusiasm for tanks. If they could not bring change from within the tank service, they hoped their ideas would meet with a more favorable reception in other branches of the armed forces.

If what has just been said shows the social and intellectual milieu and some of the dissenting opinions concerning tanks, what was accepted American doctrine at this time?

Remembering the Army's future war concept and its emphasis on an Infantry dominated battlefield and a reliance on combined arms to defeat the enemy, American tank doctrine evolved in ways that best fulfilled the desired infantry support role. This trend is evident in Infantry and tank literature as well as in official documents. In the United States, France and Britain, early post-World War I doctrine evolved from the concept of "leading tanks" spearheading the assault ahead of the infantry and over wide fronts. From this we see the tank's supporting role and the continued acceptance of bludgeoning one's way through instead of breaking through at weak points.¹⁶ After the war ended, the assessment began of the tank's performance and potential. Influential upon the implementation of the recommendations was the views of the head of the Tank Corps-- General Rockenbach. Brigadier General Rockenbach was a tank enthusiast, but did not accept the tank as a totally revolutionary

weapon as did Patton, Brett, or Eisenhower. While he agreed that the tank should be used en masse to exploit its great offensive power, but still acquiesced in the idea that tanks were infantry support weapons. He once wrote that "the tank was built to restore the balance between power and mobility that is essential for victory in war; to crush obstacles and carry gun power into and beyond the enemy's lines so that an overwhelming number of infantry could reach the enemy."¹⁷ To classify him would be to call him a tank enthusiast whose conservative views sought to maintain the status quo within the current Army structure.

In the Army's future war concept, the official function of tanks was ". . . to make a path through obstacles for the infantry and protect it from destructive loss from machine guns."¹⁸ Essentially the tank retained the wartime function of increasing firepower on critical points, which allowed the infantry to advance and take their objective. This was reflected in the gunner's first priority in target acquisition by selecting ". . . the elements which are most dangerous to their infantry. . . ."¹⁹ When accompanying infantry, the tank's rate of advance was regulated by the progress of the infantry. Tankers were urged to press on even if they were out of ammunition because of the negative psychological effect on the enemy.²⁰ Cooperation between infantry and tanks, which was pitiful during World War I, had to work both ways in the Army's future war concept. Rockenbach stressed that "infantry operating with tanks must fight their way forward in all respects, as though no tanks were present. If this is entirely understood

tanks will be called on only when strong resistance is encountered; then they will be on hand and ready, when most needed, to throw their weight into the attack and push it to success."²¹ Fundamentally the tank was to operate on the same principles as heavy tanks during the war, and hopefully with better command and control, and cooperation with other arms.

The Army's view of the tank was that it was purely an offensive weapon to be employed while advancing on the enemy, or defensively in counter strokes.²² Instead of making the infantry subservient to the tank, the Army did the opposite. In mobile warfare, free from the confines of trench systems, tanks still should ". . . be held in reserve until trustworthy reconnaissance or actual experience has shown that the enemy is too strong to be evicted by infantry and artillery unaided by tanks."²³ While technology had not yet produced faster tanks, Army officials decided to keep movement with the soldiers' marching speed and not the speedometer in the future. They also structured the system to exclude debate and alternative thinking as technology produced changes.

The Army desired more speed for tanks not to penetrate further in the enemy's rear areas as in World War II, but to be able to shift their position from one critical point to another in support of the Infantry. General Rockenbach agreed with other tank enthusiasts about the need for quicker tanks. He believed speed was essential for the mission detailed above and to improve the tanks' defenses.²⁴ A tank's defensive value increased because a moving target is harder to hit.

Another opinion on tank employment came from a conference on the organization and tactics of infantry tanks held by the General Service School in October and November 1921. Its report helps to illustrate alternative thinking in the early 1920s. The conference's recommendations focused more on how the tank could best support the infantry, and the cavalry under certain circumstances, rather than on the best way to utilize the capabilities of the tank.

The conference recommended that one company of light tanks be assigned to each division, with the remaining tanks forming a GHQ reserve. Under this scenario each division contained tank units as organic elements. The tanks in the GHQ reserve would be allotted to the Corps delivering the main assault. The conference suggested that by adding more machine guns to tank companies, they could then be used as machine gun companies in defensive situations. The report added that tanks might be able to assist horse cavalry in certain situations.²⁵ The last two ideas were departures from accepted doctrine and received unfavorable comments regarding uniformity of doctrine from the Adjutant General.

The report also received harsh criticism from the Infantry Board and the Tank Board. Both Boards found fault with the proposed alterations to tank companies. Major objections included insufficient numbers of tanks to equip all divisions and GHQ units, and too much time was required to train tank units for a dual purpose role. The Tank Board stressed that tanks were offensive weapons only.²⁶

The Cavalry also analyzed the conduct of the war for lessons that were applicable for its branch. It was evident that the horse

was incapable of forcing a path through wire and obstacles, and machine guns were extremely devastating. In trench warfare, the cavalry had to wait for the infantry to create a gap through which the cavalry could pass. During the war, when German lines were penetrated the cavalry was too slow in responding; thus, it was unable to exploit its success.

The cavalry determined that tank was useful in crushing obstacles, in attacking machine gun positions, and drawing fire away from the cavalry. From wartime tank operations they concluded that under certain circumstances tanks, especially light tanks, could provide the support to allow mounted troops to penetrate enemy lines. The small part played by cavalry units during the war left them looking for missions to maintain their purpose of being.

Looking at the training regulations used at the Cavalry School at Fort Riley, Kansas, beginning in 1922, much of early cavalry-tank doctrine is revealed. The manual, entitled Minor Tactics: Employment of Cavalry-Training Regulations No. 425-105, begins by justifying the continued usefulness of the cavalry in modern wartime conditions. It states that "modern inventions and appliances affecting the conditions of war have added to the power and scope of the cavalry. Armed with modern weapons of precision, rifle, machine rifle, and machine gun, in addition to the saber and pistol, and supported by mobile artillery and other mobile weapons, cavalry can adapt itself to any conditions and fit its tactics to any country" (emphasis mine).²⁷ The "other mobile weapons" refers to armored cars and tanks. The cavalry contended that increases in available

firepower and mobile support units enabled cavalry units to remain functional in war. This view fitted nicely into the Army's future war concept.

Others besides Patton grasped the possibility suggested by the speed of the Renault FT and Whippet tanks in accompanying horsed troops and/or adapting tank tactics to the cavalry. Cavalry doctrine noted that "since the medium tank can operate on the roads at a rate of speed exceeding that of cavalry and across ordinary terrain at a rate approximating the maneuvering gallop, it will be possible for the tank to accompany cavalry in the performance of its ordinary functions. . . ."20 The cavalry acknowledged that the value of a tank was offensive power and its ability to provide supporting firepower to allow the attacker to advance in spite of the advantage given to the defense by machine guns and obstacles. The Cavalry concluded that, "tanks are essentially offensive weapons, acting by shock and short range fire, they have great moral affect. Due to their weight, mobility, and protective armor, they are also able to reduce wire and other obstacles which would seriously delay or check the advance of infantry or cavalry, and create gaps in those obstacles through which the infantry or cavalry might advance."21 To the cavalry, the tank's value was its ability to maintain the rate of the mounted troops' attack in order to achieve a quick decision.

The cavalry did not believe that tanks would replace the horse because of its inherent limitations. Besides a perceived poor cross-country mobility of early models, cavalry officers pointed to

its ". . . liability to mechanical breakdown and wrecks, difficulty of maintaining supply of fuel, doubtful ability under many circumstances to arrive at points off the road, visibility due to height and dust stirred up, limited observation, difficulty of marching in columns of other troops, difficulty of outpostting themselves due to limited personnel, difficulty of running at night without lights, extreme vulnerability to mines and artillery and difficulty of concealment due to noise. . . ."90 With these limitations and no control over the development of new models, the cavalry in the early 1920s saw the tank only as providing essential support so that the horse soldier could perform his traditional role more efficiently on the modern battlefield.

In 1923, the War Department issued new Army field regulations. The tank, as portrayed in the regulations, was solely an instrument for infantry support. Paragraphs 57 and 59 illustrate the infantry's perception of the tank and the role it was to perform. The regulations state: "the tank constitutes an armored infantry element possessing protective properties that enable it to close with entrenched defensive groups protected against the effects of ordinary infantry fire. Its essential mission is to assist in breaking down obstacles that check the infantry advance. Tanks find their most intensive application under conditions that tend to limit infantry power of maneuver."<91 And in paragraph 59: "the chief role of the tank is participation in the assault."<92 The tank, as far as the Infantry was concerned, was to provide the means to allow the infantry to maneuver by crushing obstacles and adding firepower to

overcome organized defenses in fortified positions. Regulations stipulated that, "in preparation for battle, the army commander reinforce his first-line corps by elements of army troops, particularly artillery and tanks . . ." (emphasis mine).³³ The regulations also directed that "in the initial deployment, a preparation of the tank strength at the disposition of higher commanders is usually held in reserve. It may, in whole or in part, be employed in support of the intervention of the infantry reserve or be sent in for the support of units already engaged."³⁴ Another example was the recommendations for attacking fortified positions. Advance units were first to close with the enemy. Under protection of advance units, the main body was to use a ". . . final simultaneous attack along a broad front supported by a powerful artillery and tanks" (emphasis mine).³⁵ Gunners were taught that "primary targets are those (usually machine guns) which are most dangerous to the riflemen."³⁶ In teaching, literature and organization, tankers and infantry commanders were indoctrinated with the concept that tanks were infantry support weapons, specifically designed to assist the rifleman's advance.

From wartime experience, artillery was seen as the most deadly threat to tanks. This resulted in continuing to employ tanks en masse. As defense against artillery, tanks utilized movement, concealment or smoke. In general, thicker armor was not determined to be a solution because of the tank's role in the army. It was to operate within the range of friendly artillery during the attack, and as an infantry support weapon, its armor need only be thick

enough to stop small arms fire and shell splinters. Tanks were to knock out machine guns, not artillery, thus allowing the infantry to advance and close with the enemy. With weight in numbers and the tank's firepower, it was assumed that mobility and maneuverability could be retained on the battlefield, and the stalemate of World War I avoided.

The tank arm was centered around the tank company as the basic combat element. Tank companies were the smallest unit that still had maintenance and supply functions. There were two types of companies, each configured slightly differently depending on whether they were equipped with light or heavy tanks. Light tank companies had five platoons of five tanks. Heavy tank companies were only equipped with three platoons; but because it took more men to operate each tank, they contained more personnel. Battalions were comprised of three companies of either light or heavy tanks. There were no composite units of light and heavy tanks. Several battalions combined into groups (later changed to regiments). Both groups and battalions were equipped with agencies to accomplish all supply and maintenance functions. All tank units were part of the General Headquarter's reserve to be allocated to commanders as the situation demanded.

The first three years after the signing of the Armistice in 1918 was one of the more influential on the development of operational doctrine of U.S. Armored Forces. Immediately after the war ended, strong anti-war sentiment in American society and Congress coincided with the Army's demobilization and reorganization to

create the environment in which tank theory was allowed to develop. The Army returned to its traditional small size and meager peacetime funding. When the question was raised whether tanks should constitute a separate arm in the army, the answer rested on economic rather than practical reasoning. At the same time, the Army was trying to evaluate the lessons from the war and to structure itself to fight the next war. The army's future war concept envisioned large infantry armies advancing with the support of artillery, tanks, and aircraft. Army officers concluded that future battlefields would be dominated by the infantry and machine guns with tanks clearing paths through obstacles and providing direct supporting fire. In this way tanks would maintain mobility, and therefore decision on the battlefield. The decisions that tanks were for supporting infantry and that they should be placed under control of the Chief of the Infantry ensured that tank doctrine did not progress along with tank design and technology. This was evident during the period from 1920 through 1927.

The Army's resistance to doctrinal change, especially among infantry officers, brought about the stagnation of American tank theory during the 1920s and served to restrict and hinder development in the thirties and early forties. The strict adherence to infantry principles in the General Service School and Infantry School restricted alternative thinking about tanks. Threats of court-martial were even used to repress new ideas. Given these attitudes and policies, American tank theory stopped developing under Infantry control. While the Infantry exerted pressure

throughout the late 20s and 30s to keep tank under its exclusive control, it was becoming evident that new more reliable and faster tanks, and new theories abroad deserved analysis.

Chapter III

A PERIOD OF DIVERGENT EXPERIMENTATION, 1927-1931

Between 1928 and 1933 the Army began openly to discuss motorization and mechanization and their effect on the future. Advances in reliability and speed had changed the character of the tank. To some officers, the tank was becoming more capable of an independent role than it had been in the past. As Army leaders pondered the future effects and course of mechanization/motorization within the Army, the British organized an experimental force to test their theories of the new warfare. British mechanized maneuvers on the Salisbury Plain in 1927 provided the impetus for the Americans to organize their own experimental mechanized force in 1928. Before examining the American experiment, we should first review new opinions about tanks that developing prototypes produced.

The end of the World War I found the Ordnance Department without any long-range plans for tanks during the 1920s. Infantry control over all tank units removed the impetus for other arms to show interest in tank design; and until the Tank Board was established in 1924, no direct channels existed for communication between tank units and Ordnance officials pertaining to the development of experimental models. The Infantry placed emphasis on light, fast tanks because they were cheaper to build, did not exceed the Corps of Engineers bridge weight limits, and there was a growing belief that light, fast tanks had greater tactical value over the slower heavy tanks. Without guidance from an appointed body, tank

design in the United States almost completely came to a standstill. The War Department approved the construction of light tank designs in 1922, but no action was taken until 1926. Thus, the Army had to rely on obsolete material for training and experiments. The lack of new designs helped to limit the development of tank theory to the capabilities of the modified FT and MK. VIII tank. In a continuous circle, a lack of theoretical growth can be attributed to an absence of new tank designs, and the need for better tank designs was restricted by the stagnation of theoretical development.

Infantry specifications were for a postwar light tank weighing not more than five tons. This weight limit ensured that they were transportable by truck. Other requirements were sufficient armor protection against heavy machine guns, a twelve m.p.h. speed, and a cruising radius of fifty miles. In 1926, the maximum weight and speed were raised to six tons and twenty m.p.h. The first experimental light tank was not constructed until 1927. The T1-E1 was armed with machine guns, weighed seven and a half tons, and was capable of eighteen m.p.h. The T1-E1's speed made it acceptable as either a leading or an accompanying tank.

Tank development funds were also allocated to developing a medium tank in hope of combining the most desirable characteristics from the heavy and light tank. The medium tank program, as designed by the Adjutant General's office and Ordnance Department, was at first limited to a fifteen ton weight limit. Building the tank with one-inch armor, to stop armor-piercing .50 cal. bullets, eventually proved impossible to construct without exceeding fifteen tons. In

1926, the weight limit for medium tanks was raised to twenty tons, but funding was also allocated for research for a fifteen ton model. Several models in both weight classes were tested, but none were standardized. And while none were accepted, their test results were beginning to stimulate some discussion of future tank tactics. For instance, J. Walter Christie, an American automotive engineer, designed, built, and submitted a number of different tanks, but all were rejected for various reasons. Yet, features like large engines, independent suspension systems, and removable tracks allowed his tanks to achieve cross-country speeds up to forty m.p.h. By removing the tracks, the tank could run on rubber wheels and reach seventy m.p.h. on roads. Compared to the war surplus tanks then equipping tank units, Christie's twenty-three ton tank gave a remarkable performance. While Mr. Christie had to look to other countries for orders of his design, his tanks demonstrated the possibility of armor breaking away from the infantry and close support missions. Technology was advancing to the point where it was feasible to contemplate tank thrusts as Patton, Fuller, and Liddell Hart envisioned.

While tank designs slowly progressed, the real spark to American armored development occurred on Salisbury Plain in England. As noted in the previous chapter, internal and external constraints had hindered the development of armored warfare in the U.S. Army. In Britain, conditions existed in which tank theory could develop, complemented by the intellectual prodding of Major General J.F.C. Fuller and B.H. Liddell Hart (a historian and a military

correspondent for The Daily Telegraph). They championed the idea of a new army based on the tank and mechanization. Their revolutionary concept put the tank as the key element, with armored personal transporting infantry and tracked vehicles to move the artillery. However, Britain fitted the tank into the existing conventional structure. Tanks were designed to assist the infantry: slow, heavy classics armed with machine guns and howitzers. Cavalry models were fast with mounted machine guns. British armored formations relied heavily on tanks operating on their own, like warships. This organization represented an advance in mobility over infantry or cavalry divisions, ". . . but their unbalanced composition confined them to the limited role of exploiting success won in battle by other formations, which horse cavalry had previously performed."¹

The British Experimental Mechanized Force contained: the 3rd Bn. Royal Tank Corps (armored cars and tankettes); the 5th Bn. Royal Tank Corps (Mark II tanks); the 2nd Bn. The Somerset Light Infantry (a machine gun battalion carried in half tracks and six-wheeled armored cars); the 9th Field Brigade, Royal Artillery (towed by tracked vehicles or half tracks, except one battery which was self-propelled); the 9th Light Battery, Royal Artillery (carried in half tracks); and the 17th Field Company, Royal Engineers (carried in vehicles).² Also supporting the Mechanized Force was Nos, 16 Army Co-operation Squadron, No. 3 (Fighter) Squadron, and No. 7 and 11 (Bomber) Squadrons. The British included infantry, artillery, and engineering units to assist the tanks advance and perform functions that tanks were incapable of. All vehicles were tracked or all-

wheel drive to facilitate cross-country movement. Many nations watched the British experiment, and the mobility and striking power were noted. Witnessing the British demonstration as part of the American delegation was Secretary of War Dwight Davis. He was sufficiently impressed to order the creation of a similar force in the United States to serve as an experimental laboratory.

The object of this experiment was to determine the proper development of equipment and the correct doctrine for mechanizing any future units. The unit was to be self-sufficient and include troops from all branches. Secretary Davis made it truly a test in research by giving the future commanding officer the authority to ignore existing regulations concerning organization, armament, and equipment.²

The actions of Secretary Davis also partly removed the restraints on armored theory that was unofficially imposed during the early 1920s. Previous articles on tanks or tank design always conformed to Army official doctrine. Now authors could write theoretical articles and envision the future and mechanization. There was no mass defection from the current doctrine, nor a watershed of articles, but writings on tank theory/mechanization did appear more often.

The demonstration of the British experimental force and the improved performance of the American tank model not only affected Infantry perceptions, but they also were noted by the Cavalry. Major General Herbert O. Crosby, Chief of the Cavalry, recommended the incorporation of tank units and anti-tank guns into cavalry

formations. The Cavalry became interested in light tank development because of the greater speed the new tank possessed. Just as George Patton had argued ten years earlier, the Cavalry was beginning to see that fast tanks embodied the same principles of action and strategy that the cavalry had performed for centuries. While the Cavalry did not intend to replace the horse with the tank, tanks did possess the one quality that prevented the Cavalry from functioning in the World War I--invulnerability to machine gun fire. Operating on traditional cavalry principles, the inclusion of a few tank units would increase the value of the Cavalry Arm in the next war. Some officers, including those in high ranks, saw the tank as a helpful component in preserving the traditional mission of the cavalry. First Lieutenant Eugene T. Smith, a member of the Tank Board, expressed favorable arguments for integrating tanks and armored cars into cavalry formations. In an article appearing in the January 1928 issue of The Cavalry Journal, he argued that, "the use of armored vehicles with advance guards, because of their invulnerability to machine gun and rifle fire, will be a great advantage, not only because they inspire confidence in the troops they are accompanying, but also because of the morale effect upon the hostile force."⁴ To justify the tanks' importance in a breakthrough, he wrote, "To destroy any temporary centers of resistance or isolated machine gun nests, the armored vehicle can be of untold value to the cavalry in such an exploration. It can be used to push ahead and move rapidly to the rear of the troops on either side of the breakthrough, causing greater demoralization by reason of its

presence."⁵ In addition to breakthrough missions, Smith thought tanks were suitable for reconnaissance and counterreconnaissance, security of other forces, delaying actions, holding terrain of tactical importance until friendly forces arrived, pursuit, covering withdrawals, and raiding. Lieutenant Smith voiced a growing opinion that tanks enhanced the power of the Cavalry and should be integrated into the existing system. General Crosby recommended that a small detachment of tanks be assigned to the Cavalry for evaluation as the basis for future development. He received encouragement from Secretary Davis who supported experiments in mechanization. Meanwhile, the Army proceeded with its own version of a mechanized force.

On December 30, 1927, General Charles P. Summerall, Chief of Staff, approved the G-3 report for the organization of the Experimental Mechanized Force. The backbone of the force was tanks. The Experimental Mechanized Force was composed of the 16th tank battalion (heavy), the 17th tank battalion (light), plus one separate tank platoon (light), one battalion of the 34th Infantry Regiment (motorized), one armored car troop, 2nd battalion of the 6th Field Artillery (carried in trucks--portee), one engineer company, a signal company, one medical detachment, the 1st Ammunition train, a chemical warfare platoon, an ordnance maintenance platoon, and a provisional motor repair section.⁶ The American formation used tanks as the main fighting elements to which supporting elements were attached. However, unlike the British, auxiliary units (the medical detachment and motor repair section) were also

included to make the Mechanized Force self-contained. The War Department directive organizing the Experimental Mechanized Force stated its objective as to ascertain "by practical tests in tactical and strategic employments, . . . its organization and equipment with a view to developing correct doctrines with respect to motorization and mechanization of appropriate units of the Army."⁷ Like the British experiment the previous summer, the American experiment explored the nature and practicability of entirely mechanized armies.

The Experimental Mechanized Force assembled the first week in July, 1928 at Fort George C. Mead, Maryland. Command was given to Colonel Oliver Eskridge, an infantry tank officer and former Commandant of the Tank School. The first week was spent giving instruction on equipment and determining proper methods and procedures for road travel. The next week, a march to Aberdeen Proving Grounds, Carlisle Barracks, and return to Meade provided practical experience on marching columns and the data to test theories and formations. For the remainder of July, the Force received instruction and training for tactical operations. The experiment was terminated after completing field maneuvers to test previous training and the new methods developed during the summer exercises. On September 19, 1928 General Parker recommended that the Experimental Force, having completed its mission, be disbanded. After October 1 the different units began returning to their home stations.

The significance of the Experimental Mechanized Force was that

it provided the Army with valuable practical experience with an all-mechanized force to help decide the future of mechanization for the U.S. Army. Information was gathered on proper march formations, rate of march, night marches, supply, command, and unit composition. It also facilitated the testing of different theories, and further revealed the great mobility and potential shock and power. Limiting factors included insufficient equipment, improper balance and uniqueness of the formation, and the obsolescence of wartime equipment. The performance of the outdated tanks was the greatest obstacle to overcome. Still, both Colonel Eskridge and Brig. General Parker believed that the Force furnished pertinent technical and tactical information.

The Experimental Mechanized Force was a "real life" exploration of mechanized theory that the Army conducted while contemplating the effect of motorized and tracked vehicles on the Army's future development and organization. Most officers acknowledged the obsolescence of American tanks and that current experimental models in the testing stages were going to promote some changes. The questions being debated among officers were: did the development of faster and more reliable tanks affect their employment in combat, which parts of the Army were affected, and what, if any, restructuring of organization or doctrine were necessary? More simply, was the Army's concept of using tanks in combat still current, or had tank capabilities changed enough to mandate a different function; and if so, what was the correct role of tanks and mechanization for the Army?

In 1928, the Army began its long-range mechanization planning. Projected mechanization was centered on the report submitted by General Parker, assistant chief of staff G-3. He recommended the procurement of light and medium tanks, a reconnaissance car, cross-country vehicles for infantry and supporting units, and self-propelled artillery for mechanized units; and that funding start during the 1930 fiscal year. Second, a permanent mechanized unit should be established during fiscal year 1931, and during 1931 and 1932 obsolete equipment should be phased out and replaced.⁶ The report was approved by Secretary Davis in April; and a board of General Staff officers was organized to oversee future action.

General Parker's report also studied firepower and mobility as keys to gaining success in modern warfare. To Parker the tank was the means of restoring decision to the battlefield. Parker deviated from standard Army doctrine concerning tank employment. He argued that, contrary to Infantry doctrine, tanks should not be tied to the advance of the foot soldier; instead tanks should penetrate, attacking enemy reserves and rear areas. Parker's report envisioned "light tanks, the leading element in an assault, attacked weak points in the defense; enemy flanks were particularly vulnerable. Self-propelled artillery and medium tanks supported the advance by overcoming strong points and widening gaps in the enemy's Infantry, brought forward in mechanized vehicles, consolidated the ground captured by the tanks. All supply, maintenance, and other support elements needed mechanized transportation in order to keep up with the advance."⁷ Parker's report would find favor with the growing

number of pro-mechanization officers.

The Mechanization Board first met on May 15, 1928 and was comprised of eleven officers. It was hoped that inclusion of representatives from each branch would prevent any branch rivalries from surfacing. In general, the Board functioned well in performing its stated duties and branch rivalries did not surface on this level. The Board was present for the demonstrations of new tank models and witnessed the maneuvers of the Experimental Mechanized Force during the summer of 1928. In October 1928, the Board published its own report on the mechanized experiment. Its report echoed the same conclusions that General Parker reached in his report. The Board foresaw future mechanized force centered on the tank for both striking power and mobility. Against Infantry doctrine, it also put infantry transported by mechanized vehicles in close support of the tanks. The unit was to be self-supporting with the addition of self-propelled artillery, and supply and maintenance units equipped with cross-country vehicles. The Board also recommended the establishment of another experimental mechanized force to continue tactical and technical testing.

All branch chiefs agreed with the Mechanization Board's report except the Chief of Infantry, General Stephen O. Fuqua. Fuqua's dissenting opinion contained some valid points. But his underlying concern was for independent tank units and the fear of the Infantry losing control over tanks. General Fuqua based his arguments on maintaining the status quo and tradition. In his mind, and he was not alone, the future of the tank could best be developed by the

Infantry. Tanks originally were developed to aid the advance of the Infantry. On tactical grounds he was correct in pointing out that "tanks with infantry divisions increased the mobility of the rifleman and brought firepower down to the level of the footsoldier."¹⁹ He also expressed concerns about new weapons and doctrine being forced on other branches over the objection of branch chiefs. Looking to the past General Fuqua was unwilling, or unable, to peer into the future to see the full potential of the tank. In his defense, theories of mechanization like Patton's, Fuller's, or Liddell Hart's were only theories. Their validity was not confirmed until the German drive through France to the English Channel in May 1940.

The difference of opinion between the Mechanized Board and the Chief of the Infantry was the beginning of a long-running argument that continued throughout the 1930s--who was best qualified to develop tank doctrine, and what was the correct doctrine? Like the argument over the future of the Tank Corps a decade earlier, branch rivalries played a large role just what the Mechanized Board wanted to avoid. A split developed over the direction and control of tank theory: one faction led by the Infantry to retain control; and another, exploring the use of independent mechanized forces. General Fuqua vehemently opposed the creation of a new separate branch and worked to keep all tanks under Infantry control as stated by law. Despite Fuqua's objections, the War Department proceeded with mechanization plans.

The Infantry clung to the same doctrine used during the World

War I. In combat, it still wanted to employ two types of tanks, each with a different role. The increased speed of tanks increased their strategic and tactical mobility and not their mission according to Infantry thinking. Tanks were support weapons for the infantry, who continued to advocate frontal assaults with combined arms to overcome the opposition.

Just how far tank doctrine had progressed under Infantry control can be found from a four part article entitled "Our Tanks," which appeared in the Infantry Journal in 1929 and 1930. Written by Major Ralph E. Jones, a tactical instructor at the Tank School, the articles covered American tank units from equipment and organization to school training and the Tank Board. Jones made distinctions between tanks (leading/accompanying) and tank formations (Armored Force/Mechanized Force). His articles are more informative than the contemporary Field Manuals.

Based on tactical roles, the Infantry made a distinction between tanks as either "leading tanks" or "accompanying tanks." In combat, "leading tanks smash the way for the main effort of the attack by the line troops. They attack as a single unit to facilitate and insure the capture of certain important objectives. They precede the foot troops by a greater distance than do accompanying tanks and they are independent of the lesser infantry unit commanders. They penetrate deeply into the enemy's organization and do not delay their advance for the purpose of keeping near the assaulting foot troops."¹¹ In effect, heavy tanks made pathways for the infantry to advance. It was mandatory that leading tanks attack in

depth, deployed in waves. Accompanying tanks worked in close cooperation with front-line soldiers. As part of the main axis of attack, the role of accompanying tanks was to neutralize such points of resistance as might develop after the leading tanks had passed.¹² The sole mission of tanks to supply firepower to assist the soldiers advance was clearly evident.

The basic tank unit was the tank company, and rarely did the Infantry theorize about larger, tactical or strategic units. However, some thought was given to mechanized and armored forces as tank performance improved, and as the Army considered mechanization. Major Jones also defined the Infantry's concept of mechanized and armored forces. A mechanized force is a composite of armored elements (which do not dismount to fight) and motorized elements (which do dismount to fight).¹³ Because the infantry was not mechanized it possessed only limited cross-country ability. A mechanized force, as envisioned, only enabled the soldiers to keep up with the tanks. The unit still conformed to the infantry-dominated future war concept of the Army. Armored vehicles comprised practically all of an armored force. Differing from a mechanized force, an armored force was intended for relatively independent combat missions, such as exploiting a breakthrough.¹⁴

Although the Infantry did study tank theory, it always confined tanks to the role of firepower in support of the infantry and at the pace of marching men. For instance, to achieve a breakthrough with tanks the attack would consist of: ". . . first, the leading tanks;

then the accompanying tanks (with the foot troops); and finally, the armored force, whose mission is to overrun the enemy's rear areas and thus exploit the success and prevent the enemy from restoring his defensive system."¹⁵ The Infantry did not accept Fuller's, or Liddell Hart's, concept of the tank as a revolutionary weapon, but continued to think in terms of static warfare conducted in France during World War I. When encountering enemy troops in prepared positions, ". . . infantry tanks assisted the foot soldiers in a frontal assault. The infantry gave no thought to bypassing these positions and isolating them from their command and supply facilities."¹⁶ The sending of an armored force into the enemy rear areas is deceiving. The basic tank unit was a company allotted to infantry battalions in platoon strength for support. An armored force was being thought of in terms of battalion strength, not divisions, corps or armies. American commanders lacked any experience handling large-scale units before the war.

After the Army authorized a new mechanization policy, General Fuqua once again protested against other branches being assigned tanks. In a critical memo to the Chief of Staff that ". . . tanks were infantry weapons and fighting with infantry was their habitual role; this arrangement should remain unchanged."¹⁷ Because of Fuqua's position he could exert much power and influence to restrict the development of the tank in his branch. The new Infantry Field Manual issued in 1931, still assigned tanks to provide supporting fire to aid the advance of the infantry. It gave more detail to tank doctrine than the few sentences contained in the 1923 Field

Service Regulations. Still, the Infantry remained in the same mind set as before.

British military intellectual, Major General J.F.C. Fuller, observed in lectures on mechanization that: "the advantage of motorization and mechanization are that they reduce space by economizing time. In other words, the more rapidly we move the smaller becomes the bulk of the area we are called upon to defend. Strategically, time and space are relative, and as the history of war has shown again and again, a handful of men at a certain spot at a certain hour is frequently a far more powerful instrument of war than ten times the number on the same spot twenty-four hours later."¹⁰ The Infantry earlier had grasped the strategic principle, but had not carried the concept as far as Fuller and others. To the infantry, the tank ". . . was essentially a machine gun carrier, only armed with sufficient protection to ward off enemy machine gun fire."¹¹ With new technology in the early thirties, the Army began to lean more towards light and medium tanks. Medium tanks were seen as a compromise to incorporate the best features of the heavy and light tank into one chassis. One innovation that has not been mentioned that affected tank design as well as doctrine was the perfection of reliable treads. New designs increased tread life and speed to an extent that transporting tanks by carriers was not necessary. This marked the ability of tanks to accomplish long movements under their own power. These developments did not change the role of the tank, but they did enlarge the scope of missions tanks were allowed to perform.

The Infantry did incorporate the faster tank speeds into doctrine. The greater tank speed gave the commander the option of holding his tank units from the initial attack until resistance stopped the foot troops, then ". . . push the tanks forward promptly, directing them to neutralize the hostile fire and help the assault units resume the advance."²⁰ Speed also became a way of reducing casualties. The rationale was that fast tanks required less time to reach enemy resistance, and to search for and destroy hostile machine guns and other weapons. Decreasing the time necessary in gaining fire superiority would therefore permit the assaulting foot troops to advance more rapidly and with fewer casualties. The function of tanks had not changed in infantry doctrine, but the infantry officers acknowledged a different time/space ratio.

The Infantry Board and some officers questioned the effects of greater tank speed and the fear of infantry becoming separated from the tanks as happened in World War I. Solutions for preventing the separation of tanks and infantry were better training in tank/infantry cooperation, assigning tanks limited objectives (where tanks would wait till the soldiers caught up). If the tanks neutralized all local resistance they were to seek shelter in the nearest defilade, or concealment, until the foot troops reach the objective.²¹ These last two solutions clearly illustrate the continued policy of separating tanks from the infantry, and the leading role of the Infantry while making tanks supporting weapons. Seeing the vulnerability of tanks to antitank guns and direct firing

artillery, infantry was taught to protect the tanks from the danger. Infantry support in tank actions consisted of locating hostile antitank weapons and informing tank crews of their locations, and destroying those weapons when it was within their power to do so.

The Infantry in the early 1930s also was more receptive towards a limited, independent fast tank exploitation. This exploitation could only take place after infantry and tanks breached the enemy lines. Using ". . . a regiment of fast tanks properly organized and equipped might be thrown into the fight to seize the essential feature of terrain, disrupt artillery that still interferes with the advance, and harass the defender's communications. One of the most important missions of fast tanks thus employed would be to disorganize and scatter the hostile organized reserves in order to prevent counterattacks or the organization of hostile defense in a new position farther to the rear."²² Essentially, Fuller's and Liddell Hart's theory was adapted to U.S. Infantry doctrine applied at the infantry's rate of advance. Throughout this period and the late thirties, Infantry doctrine incorporated new technology and acceptable tank doctrine into its own fixed parameters, and tank theory (under infantry control) could not, and did not develop further.

The further development of tank theory in the United States rested with the Cavalry, which began to see the tank as a modern extension of cavalry strategy and tactics. Pro-mechanization officers found a more receptive audience in the Cavalry than in the other branches. Advances were the result of the work of many

officers in all branches. It was an uphill struggle that made progress only by constant prodding. The young junior officers who were impressed by the tank during the war gradually gained seniority and held influential positions to advocate their beliefs. It was never the case of the Cavalry abandoning the horse in favor of the tank and other mechanized units. But the course of events placed the least restraints on mechanization within the Cavalry.

Prior to 1931, when General Douglas MacArthur, the new Chief-of-Staff, set a new mechanization policy for the Army, the exploration into tank theory was governed by the Mechanization Board. Differing from standard infantry doctrine, the Mechanization Board's approach relied on the tank, supported by infantry units, as the basic combat component. Using the proposed Mechanized Force as a tactical and technical laboratory, the proper composition, equipment and extent of application to the U.S. Army would be determined. Mechanized development guided by the Mechanization Board was hampered by the further reduction of already small peacetime Army budgets owing to the financial crisis of the Depression, the lack of a suitable tank to standardize, and the conservatism within the Army. Branch rivalries sometimes surfaced because the Infantry was afraid of losing control of the tanks and the Cavalry feared being replaced by tanks. With such open reservations being expressed, new tank theory was only slowly formalized. It was the general opinion within all branches that the new mechanized theory should be perfected and proven at the tactical level before any full commitment be authorized. So, with obsolete wartime surplus tanks the

Mechanized Board began to oversee mechanized experiments formed around a combined arms organization that was acceptable to the Army's future war concept that emphasized infantry penetration and cavalry exploitation.²⁹

The first significant report on mechanization and its impact on future Army planning was submitted by General Parker in March 1928. As noted earlier, the major points were that: the tank was the basic element with supporting infantry; all components were mechanized to keep pace with the advance of the tanks; the creation of tactical laboratories to test theory and equipment; and the establishment of a board of officers to oversee Army mechanization planning. While the report's recommendations were approved, the establishment of a permanent mechanized force was postponed from 1930 to 1931 because of a lack of available funds. The recommendations were followed until Army mechanization policy changed in 1931.

Only one other report during this period drew considerable attention. The report was submitted to the Adjutant General by Colonel James K. Parsons on April 17, 1930. Colonel Parsons, as the field commander of the Mechanized Force, was instructed to report on his findings. An experienced tanker, the current Commandant of the Tank School and Commanding Officer of Fort Meade, his report is interesting because of its radical proposals for mechanization: the reactions to it illustrate differences of opinions at this time. Parsons's report was too radical at the time, but during World War II, the rapid expansion of U.S. armored divisions followed lines similar to those outlined in his report.

Colonel Parsons' plan called for the funding and organization of six armored divisions. Akin to Fuller's idea, the division was composed of only tanks in the combat element. Based on Christie-type tanks, three versions were needed: combat (medium), reconnaissance (light fast tanks), and command (mediums without a main gun). Command and control was accomplished through radios, visual means (flags or smoke), and aircraft. Attached air units provided additional reconnaissance and support. The proposed armored divisions would be self-contained and capable of extended operations. Parsons believed that assault missions (infantry type) were wasteful of the unit's superior mobility. The unit was better suited for covering the advance or retirement of an army, attacking the enemy's flank or rear, exploiting a breakthrough, seizing strategic positions, and filling a gap in the line.²⁴ The tank platoon was the basic combat unit and attacked in lines. The division was composed of 486 combat tanks, 172 reconnaissance tanks, and 87 command tanks. Parsons estimated the formation of all six divisions would be approximately 270 million dollars.

The general reaction is exemplified by Lieut. Colonel Ralph Talbot, Jr. in a memorandum for General Booth on Parsons's report, "to attempt to set up such a program as is recommended in this paper is believed, at this time, to be premature. Such elaborate scheme will frighten the timid, shock the conservative, and antagonize the reactionary."²⁵ Parsons was criticized because he was basing the divisions on a tank that was still undergoing testing and development, and the overall balance of personnel. Besides questioning

technical aspects, he voiced concerns about spending a large sum on an organization that was limited by geography. Many of the points raised by critics were valid, and the course of later events revealed that Parsons' ideas were too progressive for the times. Many officers wanted mechanization to proceed, but there was a large difference of opinion as to which was the proper employment and composition. Overall opinion within the Army supported developing mechanization in small, gradual increments after the correct ideas crystallized from experience. Longtime mechanization and tank advocate George S. Patton, Jr. expressed major reservations about Parsons's report, illustrating the hesitancy for drastic and quick change in the mechanization program. He wrote "the organization of one or more tank divisions at the present time and based on present data is unwise," and "the creation of a small mechanized force, such as is now in progress of creation by the War Department gives the best promise of success for a unit composed of combined arms."²⁶ Patton's conception was analogous to the cuirassier divisions of Napoleon. Major Patton concluded that "past and present information of tanks induces the belief that any independent tank force must be utilized . . . as an offensive reserve for the delivery of a rapid and powerful blow over a limited front at a carefully selected time."²⁷ This idea is a strictly traditional cavalry conception with modern weapons applied.

The uncertainty of proper doctrine and performance of mechanized units, the divergence of opinion among officers, and the lack of funding for such an ambitious program that was proposed all

combined to influence the War Department against Parsons's recommendations. Colonel Parsons's study was probably the most radical proposal of this period, and it stimulated a great deal of thinking, which is recorded in the literature and official correspondence.

In 1930 General Summerall ordered the organization of a permanent mechanized force to conduct practical experiments in search of proper doctrine governing such forces. General Summerall interestingly appointed Colonel Daniel Van Voorhis as commanding officer. Colonel Van Voorhis was a cavalry officer with no prior experience with tanks. Yet from statements in articles and annual reports, Summerall clearly grasped the correlation between the superior mobility that mechanized force possessed and cavalry tactics. Summerall also selected Major Sereno Brett as executive officer to Van Voorhis. Major Brett was an experienced tanker and a longtime tank advocate. An instructor at the Tank School, he had commanded the 304th Tank Brigade during World War I. The formation was to assemble by October 30, 1931 at Fort Eustis, Virginia. During combat exercises, the Mechanized Force was to execute missions presenting an opportunity for tactical and strategic mobility and a quick, hard striking power. Proper tactics necessary to operate fast tanks in conjunction with other mechanized or motorized arms were to be determined and modified by the commanding officer.²⁰

Colonel Van Voorhis faced many obstacles in training the Mechanized Force. A lack of adequate funding and operating with obsolete equipment were sources of constant concern. The failure of

the Ordnance Department to produce a suitable tank for the Tank Board was the greatest handicap. As Timothy Nenninger correctly pointed out in his thesis on the development of American Armor, however, tanks were the nucleus of the force "everything else might disappear and tanks still could accomplish at least part of the mission; but without tanks the remainder of the force was useless."²⁹ Still, Van Voorhis lobbied for improvements and did the most with what he was given. Even though the Mechanized Force was disbanded after one year (due to a change in Army mechanization policy), it did accomplish further experimentation and provided American officers with a field laboratory and data which the Army felt was necessary to attain before making a major commitment in mechanization.

The current conception of a mechanized force focused on high mobility and striking power of the tank. Yet the tank was not a perfect weapon and possessed certain limitations that required the support of auxiliary units. Factors such as a weak defensive power and direct fire capacity of the main gun (or machine guns) helped to set certain parameters for the composition of the force. Pro-mechanization advocates concluded:

Since the tanks have little holding power, such a force must include a highly mobile infantry to hold the ground gained by the tanks. As the infantry must be given great defensive power, its armament will consist for the most part of automatic weapons. In view of the distance from principle forces at which the mechanized force will operate, it will require the support of artillery immediately at hand and must therefore include in its composition an artillery element having a mobility equal to that of the tanks. It must be self contained in other respects and receive the necessary quota of chemical warfare weapons, antiaircraft, engineers, signal corps, and

transport, all adapted to movement conforming to the tanks and especially equipped for the accomplishment of this particular mission. Its action would be supported by the aviation of the field army to which the mechanized force would normally be attached. The requirements of mobility leads to the adoption of the tank chassis for a large part of the gun mounts and cross-country transport of all elements of the force.³⁰

Based on these assumptions, the Mechanized Force was structured to emphasize mobility.

The Mechanized Force assembled at Fort Eustis contained thirty-six officers, 648 men, and 167 vehicles organized on a regimental level. The tank nucleus was a tank company of twenty-two tanks--two radio and command tanks (one T1E2 and one M1917 modified), three T1E2, six M1917 tanks modified with Franklin engines, and eleven M1917s.³¹ Other vehicles were twenty passenger cars, eleven armored cars (a reconnaissance company), fifteen motorcycles, seven caterpillar tractors, thirty-three carrier cart trucks, two generator trucks, four kitchen trucks, four radio trucks, five trailers, three anti-aircraft machine gun trucks, fifteen tank carriers, one machine shop truck, one wrecking truck, one caterpillar wire layer, eleven six-wheeled machine gun trucks and eleven class B trucks to carry a company of motorized infantry.³² It is evident that the Armored Force, as configured, was not self-contained like the Experimental Mechanized Force. The Armored Force lacked artillery units which decreased its fire power. The number of tracked vehicles was reduced, which affected the mobility on broken terrain. Utilizing truck (wheeled) transports enabled greater strategic mobility on roads, but was at the expense of tactical mobility on open terrain. The Armored Force used its road speed to arrive at a point and

relied on the fire power and shock value of the tanks to achieve decisive results on the battlefield. Speed was also essential for conducting pursuit or exploitation missions. Van Voorhis' training program began on November 1, 1930 and lasted until June 31, 1931, when the unit was disbanded.

Because the Mechanized Force was to study the use of fast tanks with other mechanized and/or motorized arms, training focused on operations against entrenched infantry or other mechanized forces. Exercises involved night, tactical and strategic marches, and attacks against entrenched infantry or other mechanized forces. The attacks employed wide turning movements, seizing crucial terrain features, exploiting breakthroughs, counterattacks and missions as covering force, flank or rear guards. (Notice the similarities to the traditional cavalry missions!) Training was accomplished through command post exercises, field problems, and maneuvers.

Command and control problems associated with highly mobile independent units remained unsolved until it became practical to install a radio in each tank. Control at this point was accomplished by the platoon commander receiving orders by radio and then communicating to his platoon by voice (when able), signal flags, or flares. Tanks usually deployed in ". . . two platoons of three fighting tanks each in the front line, and one platoon of three fighting tanks and the radio or tank commander's tank in reserve. Each platoon normally attacks in line with intervals of 100 yards between tanks, which gives a front of 500 or 600 yards. With each platoon is one self-propelled 75 mm. accompanying gun from

the Field Artillery Battery."³³ Smoke screens provided valuable cover and a defense against antitank guns.

In maneuvers aircraft and armored cars conducted reconnaissance for the assault echelon of tanks. Upon locating the enemy the tanks attacked with fire support from its mobile artillery. The infantry performed mopping up operations and once the objective was reached consolidated that position. The role of the Mechanized Force that continued to evolve was the use of the unit's superior strategic mobility to reach a point of opportunity, where the tactical mobility facilitated a larger exploitation of a breakthrough. The destruction and disorganization of the opposing forces was accomplished by penetrating the enemy's rear areas to capture an important objective.

During June 1931 an exercise was designed to further test marching order and travel procedure, as well as to demonstrate the strategic mobility of the unit. The Mechanized Forces started from Fort Eustis and proceeded to Camp Lee. The march was to continue to Yorktown where they would deploy for combat maneuvers. The journey from Fort Eustis to Camp Lee covered ninety-one miles in just over six hours. After a brief rest, a night march took the Force to Yorktown. The main body arrived at 4:00 a.m., thus completing a movement of over 150 miles in less than twenty-four hours.³⁴ Even using obsolete equipment, the Mechanized Force successfully demonstrated its strategic mobility. Tactical mobility was also exhibited in various operations.

All the missions assigned to the Mechanized Force emphasized

mobility. Colonel Van Voorhis, as unit commander, was directed to experiment with his forces to ascertain proper tactics necessary for operating fast tanks with other mechanized or motorized units. Based on the findings of Van Voorhis and others, the War Department envisioned a perfected mechanized force "to provide higher commanders with a powerful weapon of tactical and strategic opportunity, where the mission indicates the desirability of employing a force whose characteristics are high tactical and strategic mobility, hard hitting power, high mobile defensive power, limited holding power, and one which is capable of sustained independent action."⁹⁵ In its one year of existence, the Mechanized Force was used to achieve those goals, provide practical experience for the participating men and accumulate valuable data on tanks operating under field conditions for the Ordnance Department.

The fate of the Mechanized Force was practically sealed when it began assembling at Fort Eustis. Because the Mechanized Force in either its present form or a future organization was designed and operated best independently, it did not fit into the traditional Army structure. Pro-mechanization officers represented a growing minority and the independence of mechanized units served as a catalyst of branch rivalries. Harkening back to the controversy at the end of the World War I over whether the Tank Corps should remain independent, mechanized forces challenged the legal authority of the infantry over all tanks. As previously mentioned, the Infantry felt it was best qualified to develop tank theory, and it did not need or want inter-branch or independent help. Opposing independent

mechanization, General Stephen Fuqua was very vocal, and as Chief of the Infantry he held sufficient power to lobby effectively against such ideas.

General Fuqua received considerable support from the Cavalry. Most cavalry officers allied with an infantry supervised tank development program because they feared the tank would replace the horse completely. Notable exceptions were Major Patton, Colonel Van Voorhis, and General Guy Henery, Chief of the Cavalry. The paradox for the cavalry officer was the realization of the application of cavalry tactics/strategy to tanks and the refusal to replace a horse with a tank.

Before Douglas MacArthur became Chief of Staff in November of 1930, three different groups were trying to control the future of mechanization within the United States Army. Conservative Infantry officers saw tanks as support weapons for the foot soldier and sought to make tanks keep pace with them. The pro-mechanization officers from all branches tried to develop tank doctrine as a bipartisan coalition. They saw new performances of tanks as an indication that tank theory should fundamentally change. Greater speeds broke the bonds of tanks advancing at infantry pace. Speed increased the tactical and strategic mobility and created the idea of an independent self-contained force centered around the tank. The Cavalry saw the inclusion of a few tank units as beneficial in helping them to overcome entrenched infantry and wire entanglement and to allow the horse soldier to continue advancing. Since tanks were used only as "cavalry support weapons" in special

circumstances, the Cavalry needed only a few. By 1930, when Army mechanization policy changed, the Cavalry had done little with mechanization.

The change of Army mechanization policy altered the development of American armored theory. The Chief of Staff directed all branches, especially the cavalry, to mechanize as much as possible. The Infantry consolidated full control over tanks operating with the infantry and continued to oversee development along traditional lines. The disbanding of the Mechanized Force removed the experimental laboratory and the impetus for developing an independent unit. Under Infantry domination, tank theory stagnated in the role of providing mobile direct fire support for the infantry. The only significant development of new theory occurred in the cavalry with the organization of the Mechanized Cavalry Regiment. New tank ideas from progressive Infantry officers such as Major Sereno Brett and Major Bradford Chynoweth found refuge in the mechanized cavalry. The assigning of tanks caused friction with the Infantry and allowed branch rivalries to increase. By law, all tanks came under Infantry control, but officials evaded the law by labeling cavalry tanks as "combat cars." A period of rapid experimentation ended, as if an infantry theory met a mechanized antithesis and involuntarily formed a synthesis.

Chapter IV

SLOW FIGHT AGAINST THE CURRENT, 1931-1942*

When General Douglas MacArthur became Chief of Staff in May, 1931, he changed Army mechanization policy in order to effect a more efficient program. His memorandum entitled, "General Principles to Govern Mechanization and Modernization throughout the Army," guided Army policies for nearly ten years. Many officers in the Cavalry and Infantry opposed the existence of the Mechanized Force, especially as an independent one. The Infantry, especially Chief of Infantry Fuqua, protested against the Force because they feared losing control over tank units. The Cavalry was concerned with being totally replaced by mechanized units. By ordering all arms to mechanize as much as possible, MacArthur hoped to dispel those fears and foster progress. His decision was based on reasonably sound premises: that the infantry still needed supporting tanks; and that the horse was not as effective on the battlefield as it once was, so the integration of mechanized units was necessary. With both branches mechanizing to fit their individual missions, less conflict would occur and more progress would be made. Colonel Van Voorhis, the commanding officer of the Mechanized Force, objected, arguing

*This chapter introduces a few new terms because some cavalry designations differ from their infantry equivalents. The Cavalry referred to tanks assigned to their branch as "combat cars." This terminology will not be used. Secondly, a cavalry troop was the same command and strength equivalent as an Infantry company, and a squadron was the Cavalry's counterpart to the infantry battalion. I will use the appropriate branch terminology in these instances.

that branch rivalries would continue to be disruptive and independent development was the best way. Van Voorhis assumed that tankers acted in the interest of their technical service, and were least qualified to develop doctrine. He feared, that under Infantry or Cavalry control, each arm would allow progress only in ways which was beneficial to their branch, and not develop the tanks full potential. Though later events proved that Van Voorhis reservations were correct, he was over-ruled.

The General Principles also called for a gradual approach to mechanizing Army, which helped to hinder tank doctrine development. Because of the small defense budget caused by the Depression, only limited funding for the design, testing and procurement of tanks was allocated. With no hope of necessary funding, the gradual approach concept fit into the current budgetary restrictions. MacArthur decided that the Ordnance Department should perfect a suitable tank that could later be standardized and integrated into the Army in large numbers. The result of both of these decisions was that the rate of American progress was further slowed. As previously noted, without suitable tanks with which to experiment, doctrine could not advance because current data could not be tested. Tank capabilities were measured in terms of tanks constructed at the end of World War I. Newer tanks such as the T1E1 or Christie types ran into problems in standardization. The Ordnance Department was beset by lack of funds, rising costs and disputes between the different branches about the suitable characteristics of tanks. The Infantry naturally emphasized slower and more heavily armed tanks for infantry

assaults. On the other hand, the Cavalry desired tanks that possessed great mobility. Arguments over the merits of the convertible track/wheel system of the Christie tanks further diluted ordnance efforts. There were even discrepancies between the branch Chiefs and the Ordnance Department. The using branches emphasized maneuverability, speed and protective armor, and later in the decade firepower became a factor. Ordnance officials were more concerned with perfecting engines and suspension systems.¹ The Infantry favored tanks with tactical maneuverability and armor protection; the Cavalry needed machines with less armor but great strategic mobility. The speed of a tank is governed by the relationship between horsepower and the total weight of the tank. As more weight (armor) is added, speed decreases. With contradictory requirements, it was impossible for the Ordnance Department to produce a suitable design to satisfy both branches. While efforts were being made to develop "the perfect tank," units in the field had to be content with their war surplus machines.

Although MacArthur's decisions were based on reasonable premises, his program failed to reduce branch rivalries. The Infantry continued to view the tank as its sole possession, and resented the relabeling of tanks as "combat cars" for Cavalry use. With the change of Army policy, mechanization was forced upon many in the Cavalry. The fear of mechanized units replacing horse units remained, but, it was abated somewhat because the Cavalry controlled mechanization for its own branch. The result was infighting: the Infantry trying to regain control over all tanks, and the Cavalry

divided between needing some tanks and wanting only horses. As Colonel Van Voorhis argued, the desire to advance and protect one's branch interests became more important than the progression and exploration of mechanized warfare concepts. Branch rivalries, a gradual approach philosophy, and a lack of a suitable modern tank were the causes delaying the development of American tank theory in the thirties.

The "General Principles" effected few changes in the development of infantry tank doctrine. The Infantry was assigned to concentrate on developing machines that increased the striking power of infantry units against strongly held positions. Essentially, the Infantry had staunchly adhered to an identical policy since American entrance into World War I. Conforming to the Infantry-dominated combined arms approach to warfare, Infantry tank doctrine continued to concentrate on refining the cooperation between tanks and riflemen. All officers taking the Infantry Company Officers course received instruction in tank tactics so that they could better understand the employment and limitations of the tank.

The smallest administrative organization remained the Company unit, from which individual platoons were attached to battalions for combat support. This structure remained unchanged from the founding of the Tank Corps in 1917 until 1939. By the end of the decade, infantry doctrine changed to employing tanks en masse in support of the foot soldiers. The Chief of Infantry, General George A. Lynch, authorized the assembling of the light tank companies into battalion-strength units in August 1939. This move was designed to

ease command and control problems and to allow for a larger number of tank units to be made available from the more plentiful defense budgets. Prior to this change, tank companies from the same divisional structure were parceled out to different posts across the United States. The reorganization did not change the role of infantry tanks but was a reaction to administrative difficulties, slightly enhanced mission capabilities of new model tanks, and the perceived poor survivability of tanks on the battlefield owing to the abundance of antitank guns in infantry formations. All tank units remained part of the GHQ reserve, waiting for allotment to Army Corps, and divisions.

The Army saw infantry tanks as essentially an offensive weapon to be used in assaults or counter-attacks. According to the Field Service Regulations of 1939, tanks provide higher commanders with a powerful maneuvering force with which to influence the course of combat. To take full advantage of tank's potential, they must be assigned to divisions operating in favorable tank terrain (i.e., not in swamps), be assigned well-defined objectives, and attacks be launched with surprise and be employed in mass.² The Regulations also states the standard mission of tanks as assisting ". . . the advance of infantry foot troops, either preceding or accompanying the infantry assault echelon. They attack successive objectives which coincide with those of the supported infantry foot troops. . . ." By sharing objectives, it was assured that the mass of tanks engaged on the part of the front where the main attack is being made. This was important for conducting successful combined

arms operations.

Throughout the thirties, infantry officers sought to improve infantry and tank cooperation. Considerations about tank formation deployment focused on how tanks could quickly provide accurate fire support; yet, not be tied to the infantry so closely that they lost their tactical mobility advantage and became vulnerable to antitank weapons. Continuing to think within the Army's future war concept of a combined arms approach, the Infantry theorized how tanks could best be used in support of the infantry. Conservatism within the Infantry ranks prevented asking the essential question--what is the proper method of employing tanks to take full advantage of the capabilities of the new tanks? The Army dealt with tanks and mechanization as more effectively performing traditional missions, rather than investigating if they produced a change in the traditional missions. The Army consciously permitted the fitting of new technology into traditional roles and an existing structure.

From the perspective of the Infantry, the Civil War in Spain (1936-1939) furnished factual proof that independent tank actions would not succeed on a modern battlefield. Advocates of mechanization argued that the tanks were not properly employed. The threat of 37 mm. antitank guns, which were capable of penetrating one-inch armor plate at 500 yards, emphasized the need to concentrate tanks in mass to achieve maximum firepower and shock value. The war also began to shift opinion to favor heavier tanks instead of the light tanks. The Infantry consolidated its tank units into larger formations in 1939, but the formations did not gain the self-

sufficient capabilities that officers Sereno Brett and Bradford Chynoweth advocated for over a decade. Most in the Infantry refused to see the tank as anything other than an infantry support weapon.

The new Field Service Regulations directed that tank formations in an attack be organized in several echelons and deployed in waves. A standard 1939 infantry tank action envisioned "the advance of the leading echelon [medium tanks if available] is carefully coordinated with the supporting fire of the artillery and heavy infantry weapons. These tanks have the mission of dominating the hostile antitank guns. The second echelon, closely followed by the foot troops, advances with the mission of dominating the enemy's machine guns; these are the accompanying tanks that break into the hostile position with the assault echelon."⁴ Comparing this assault to the ones conducted during World War I clearly shows how little tank doctrine differed after twenty years.

Tank doctrine under Infantry control did not advance as much as it was refined. The Army concluded after World War I that the next war would be fought by large infantry armies attacking on parallel routes, supported by artillery, tanks, and aircraft. The Infantry sought to develop tanks and tank tactics that would work best within the Army's future war concept. This assumption was strictly adhered to during the thirties. All three Chiefs of Infantry during the thirties strongly believed that this policy was correct. Generals Fuqua, Croft, and Lynch saw the tank as an infantry support weapon to destroy any organized resistance holding up the infantry. No thought was given to bypassing centers of resistance and isolating

the frontline troops from their command and supply organizations. With Infantry leadership firmly believing in the Army's future war concept, tank doctrine was not allowed to develop more mobile forms of employment. In order to strengthen Infantry control over tank doctrine, the Tank School was moved from Fort Meade to Fort Benning, Georgia, where it became the tank section of the Infantry School. High ranking Infantry officers were alarmed at War Department flirtation with independent tank formations in 1928 and 1931. Those mechanized forces threatened the Infantry's exclusive control over the tank and revived fear of the creation of a new branch. Most officers agreed that without tank support, infantry could not advance on the modern battlefield. If the Army was to conduct operations according to its future war concept, then it was imperative that the Infantry retain control over tank units and doctrine. The tank originally was adapted to support the infantry; the infantry currently used tanks; and therefore, the infantry was best qualified to develop tank doctrine. The conservative leadership of the high ranking Infantry officers only allowed tank doctrine to develop along principles that fulfilled the Infantry's role within the Army's future war concept.

The Army's new mechanization policy forced the Cavalry to think about and implement its own mechanization. General MacArthur, as Chief of Staff, directed the Cavalry to develop combat vehicles (tanks and armored cars) that enhanced the cavalry's roles of reconnaissance, counter-reconnaissance, flank actions, exploitations, and other traditional cavalry missions. The "General

Principles" of Mechanization disbanded the Mechanized Force and temporarily settled the issue of developing alternative theories for employing tanks as a mobile and independent force. With the issuing of the "General Principles" on May 1, 1931, the Cavalry became responsible for developing mechanized theories that employed mobility, shock action and firepower, the mission that was previously assigned to the mechanized force.* It was only through the Cavalry that tank theory continued to advance in the United States.

Cavalry officers did not accept tank units into their branch without reservations. Mechanized units employing outdated equipment had not displayed performances to convince all that tanks were the only future for the Cavalry. Skeptics in the Cavalry cited that noise, problems during night marches, and uselessness in swampy terrain limited the employment of tanks. These were valid criticisms of the tank; but machines did have certain advantages over the horse. The one common denominator was that they were governed by the same principles in combat. Most Cavalry officers agreed, and the point of dissension centered on the extent to which tanks could operate with Cavalry units. There were those who opposed integrating tanks into the Cavalry at all. Prejudiced for sentimental reasons, they did not see the horse as having limitations on the battlefield; nor did they want the Cavalry or the horse to be replaced.

*Funding was previously allocated for the establishment and training of a mechanized force in fiscal year 1931 which actually began in 1930. This is why the Mechanized Force continued to exist in 1931 after the change of policy.

The pro-mechanization faction in the Cavalry found an important supporter in the Chief of Cavalry, General Guy V. Henry, Jr. When mechanization policy changed, he gladly accepted the addition of mechanized units into his arm and thought that tanks could augment horse units without changing the traditional mission of the Cavalry.⁵ Because horses were not bullet proof and tank performance still cast doubts on its range of employment, the Cavalry embraced the employment of mechanized and horse units.

The principles and theories that were studied in the Experimental Mechanized Force in 1928 and by the Mechanized Force in 1931 became the legacy of the mechanized cavalry regiment after the Army's change of mechanized policy. The mechanized cavalry regiment was the primary mechanized formation of the decade in the United States. From the experiments that had been conducted, the officers assigned to the mechanized cavalry regiment eventually developed the tactical and operational doctrine employed by American armored divisions during World War II.

Prior to 1931, the Cavalry as a branch had done little toward mechanization except to make observations. They did experiment with an armored car troop for enhancing the reconnaissance element. When the Cavalry was given tanks for developing mechanization from within its own branch, it turned to traditional cavalry values for guidance. Mechanized cavalry units were instilled with the cavalry philosophy of making quick estimates and decisions. Mounted men have an advantage over dismounted opponents because they possess superior mobility, and are better able to maneuver for position.

Additionally, a stationary target is easier to hit, so movement increases safety by decreasing hit probability. Robert Grow, who served with the Mechanized Cavalry Regiment and commander of an Armored Division in France during World War II, echoed the desire to think mounted, because on the battlefield there were no fox-holes for horses.⁶ The flexible command structure that developed bore these imprints.

The Cavalry's plans for mechanization was to equip one regiment immediately and another as soon as funding permitted, thus establishing the strength at brigade level. This is significant because brigade size units had not been employed since the war by the infantry, the decision indicates the Cavalry was interested in using tanks in large formations rather than parceling them throughout the cavalry.

Before the Cavalry could activate its first mechanized regiment a few changes had to be made. Briefly, the 1st Cavalry regiment, stationed at Fort Russell, Marfa, Texas was chosen for mechanization. A year passed, however, before this actually began. Fort Eustis was deemed to be inadequate for the regiment's purposes, so a new station was chosen at Camp Knox, Kentucky. Camp Knox contained 33,000 acres within which to conduct exercises. Politically it was not acceptable to move the 1st Cavalry to Kentucky until the elections in the fall of 1932 were over. The loss of civilian jobs associated with the closing of the military installation would not make the area voters happy, and might express their disapproval the next time they voted. Meanwhile, a Mechanized Cavalry Detachment

was formed from the troops in the Mechanized Force. The Mechanized Cavalry Detachment conducted further training during the summer of 1931 and moved the unit to Camp Knox in November. Just after Christmas 1932, part of the detachment supervised the movement of the 1st Cavalry to Kentucky. The Mechanized Cavalry Detachment gained additional training and experience in conducting long marches, and it became the instructing cadre when the 1st Cavalry arrived. Colonel Van Voorhis was appointed the Regimental Commander and Chaffee became the Regimental Executive Officer. Colonel Van Voorhis brought experience from commanding the Mechanized Force with him, and he provided leadership and exceptional administrative skills during the early days; but he had little effect on the direct development of doctrine. Adna Chaffee had become a strong supporter of mechanization, and he was the strongest driving force in the evolution of tank theory in the United States after 1932. His promotion of larger mechanized forces, and his influences in organization and development of tactics earned him the label "the father of the Armored Force."

The original tables of organization for the regiment contained a "covering squadron" composed of an armored car troop and a tank troop (scouting). This squadron's assignment was to do reconnaissance and to screen the combat formations from enemy detection. The other squadron was the "Combat Car squadron," containing two troops of tanks that formed the striking power of the regiment. A machine gun troop functioned as a holding section to increase defensive power. A headquarters troop and supply vehicle composed the

remainder of the unit. From the composition we see that the force was structured to seek an opponent and then strike at it. The organization also illustrates the design to use the regiment along with horse cavalry in the traditional role rather than an independent one. The artillery and support echelons were dropped from the Mechanized Force organization, so essentially the mechanized cavalry regiment was similar to the heavy cavalry of Napoleon.

Based on observations of other countries' attempts at mechanizing, American studies, and field testing, the Cavalry began to study mechanization academically. The Cavalry School at Fort Riley, Kansas based a 1933 manual entitled, Mechanized Cavalry, on these past experiences. The manual specified that "the principle duty of tanks in cooperation with cavalry is to assist the advance of the latter when held up by machine gun fire."⁷ Mechanized regiments were considered as an extension of that branch and were not seen as a new or independent force. The manual clearly stated this in a sentence following the description of the mechanized duty: "they [tank units] will be given definite localities to subdue and will not be sent out with a roving commission to seek out objectives."⁸ The manual also makes a distinction between armored cars, combat cars, and tanks. According to the Cavalry

those motor vehicles essentially of high road mobility and long radius of action, having firepower and protective armor, and whose mission is essentially reconnaissance, are hereafter designated armored cars. . . . Those types of armored vehicles having essentially fighting missions, including shock-action, and possessing firepower and comparatively heavier armor protection, and a high degree of cross-country mobility, are hereafter designated combat cars. . . . Those motor vehicles having a comparatively short range of action, greater power of

shock action, and a greater amount of protective armor are designated as tanks. Tanks are normally employed by infantry.⁹

The mechanized cavalry regiment centered on the employment of fast tanks, and the organization was structured to meet the tactical and administrative requirements in a self-contained fighting unit. Built around the combat car squadron, all other elements provided assistance for the squadron on the battlefield. The smallest tactical unit was the tank platoon composed of a command tank, three other tanks, and a self-propelled gun.

Experts acknowledged the lack of holding power of tanks (a lesson demonstrated conclusively in World War I) and sought to remedy this with the addition of machine gun units. Machine gun troops supported tanks by establishing fire superiority in holding attacks or defensive hold missions. Suitable missions included temporarily occupying the ground secured by a combat car troop, and covering the reorganization of that troop or, if necessary, its withdrawal. The machine gun troop contained three platoons, making it possible ". . . to utilize one to follow up and consolidate the gains of each combat car troop, while the third is available to cover an exposed flank, to reenforce either of the first two, or to assist in the consolidation of the entire position."¹⁰ The inclusion of machine gun units provided firepower from a fixed position to support tanks or free them to regain their mobility.

The mechanized cavalry regiment was an integrated fighting force designed to operate together. One element sought out the enemy, one provided striking power and another the holding power.

Organized in this way, the mechanized cavalry regiment was not ". . . susceptible to subdivision into two or more independent tactical units without materially weakening the effectiveness of the whole."¹¹ The Cavalry was attempting to follow Army guidelines of mechanizing its branch as far as possible.

Mechanized cavalry sought to apply Cavalry characteristics of mobility, firepower, and shock to motor-propelled fighting units equipped predominantly with armored vehicles.¹² From this base, proper tactics and doctrine, composition of force, and compatibility with horse formations were examined. One deficiency that continued to occupy the attention of officers was establishing a balance between combat vehicles and supply vehicles. The 1st Cavalry Regiment had not been at Fort Knox for four months before it became apparent some changes were needed in the unit's tables of organization. The unit lacked acceptable firepower and its supply vehicles proved to be awkward to control. To increase firepower a third squadron of tanks was organized. All supply vehicles were removed from the combat squadrons and organized into a separate echelon. The number of supply vehicles were reduced. In the first year the top priority of the regiment was to expand the facilities at Fort Knox and to construct adequate housing for the troops. The opportunity to study employment and doctrine came in 1934 when the regiment marched to Fort Riley, Kansas to conduct maneuvers.

Analysis of the Fort Riley maneuvers and exercises held at Fort Knox during 1934 highlighted deficiencies in flexibility and offensive power. Solutions were attempted when the Secretary of War

approved new tables of organization on April 26, 1934. The recommendations had the support of the Regimental officers and the Chief of Cavalry. Under reorganization, the number of tanks increased from forty-two to fifty-six, a battalion of the 68th Field artillery and a 4.2 inch mortar unit were added to increase the firepower of the regiment. The holding power of the machine gun troop improved by adding a rifle platoon. These changes sought to improve the offensive power of the unit. Improvements to facilitate better command and control reduced the number of tanks in a platoon from five to three tanks. Eliminating the scout troop and reassigning its units to the combat car and machine gun squadrons allowed better reconnaissance within the regiment. The last change consolidated all supply and maintenance vehicles from the headquarters and combat car troops into a service troop.¹⁹

These changes did provide more offensive power and flexibility to the unit, but they also indicate a slight modification of doctrine. Before the new tables were issued, the regiment was divided into three separate functioning squadrons--reconnaissance, strike (tanks), and holding. The new tables of organization eliminated the reconnaissance squadron and gave reconnaissance capability to the strike and holding squadrons. For the tank units, this meant a reduced time between locating an opponent and engaging in combat. Doctrine was beginning to shift from seeking and striking operations to two self-contained independent strike formations with a holding contingent. The combat car squadrons were no longer composed solely of tanks, but contained reconnaissance and

artillery elements for support. Having two squadrons of tanks with support elements attached was the beginning of the Command striking unit concept that developed into the Combat Command structure of the later thirties.

The Fort Riley maneuvers also produced results other than those on the tables of organization of a mechanized unit. The maneuvers sought to explore the question: to what extent could mechanized cavalry units replace horse cavalry? Relevant to the answer was another question: could horse and mechanized cavalry operate together? These inquiries arose in those forms because most military pundits did not believe that the era of the horse was at an end. The strategic mobility of the mechanized unit proved to be far superior to the horse units. In fact, one exercise was cancelled because of the condition of the horses. The different rates of march also necessitated bivouacking mechanized three times further behind the horse regiment in order to ensure the arrival of both at the objective at precisely the same time.¹⁴ Few observers recognized the limitations of the horse units.

The maneuvers revealed deficiencies in supporting units and exposed many young officers to the possibilities of mechanized cavalry. In seeking solutions, the idea of mechanized units was suppressed by the desire to fit mechanization into the existing structure of the different branches. Just as theories about using independent mechanized forces sprang up in the late twenties, theories and articles again raised the question of exploiting the full potential of mechanized cavalry through independent actions.

While arguments and maneuvers did not change Cavalry or Army policy, officers who agreed did occupy higher positions in the Army than in 1928 or 1920, when similar recommendations were advanced; and could exert the influence of their positions to advance mechanized policy along acceptable lines. The acceptance of a unit resembling an Armored division still had a long, hard way to go. Before the Army began thinking in these terms more basic elements and principles needed to be developed and perfected.

The larger numbers of antitank guns and greater penetration of shells mandated improved training and awareness for tankers about antitank guns. Major Robert W. Grow, the Regimental Executive Officer in 1934, noted that ". . . combat cars tended to stop in exposed positions to fire rather than to move forward continually, firing at targets as they appeared. If the vehicle must stop, it should do so in a defilade position or at least under cover to lessen its chances of being destroyed by antitank guns."¹⁵ The threat of antitank guns and artillery was well remembered from World War I. Firing on the move to provide a more difficult target to hit for antitank gunner was also an accepted practice. By 1934, smoke was seen as the way to neutralize antitank weapons, that during maneuvers, no attack was initiated without first firing a simulated smoke screen.¹⁶ The Cavalry continued to refine tactical doctrine before dealing with larger formations.

After the addition of the second combat car squadron, a new combat command arrangement began to take form in order to improve the combat flexibility and performance of the regiment. The

conception of "combat commands" was the idea of Chaffee, and originated from maneuvers and exercises, especially those in Kansas.¹⁷ Combat commands were tactical headquarters to which any number of battalions could be attached. In this way, the regiment could temporarily be reconfigured to meet different assignments which probably required a different composition of troops. Flexibility was increased and the more economical employment of troops enhanced the strength of the unit. Because the commanding officer was assigning tactical headquarters, the subordinate in command received greater tactical responsibility. This placed the officer making decisions relatively closer to the action and situation, allowing orders according to the situation to be effected quicker. Radio, aerial command, and ground communication (messengers) became increasingly important for the commanding officer to maintain overall command of the regiment and to keep informed of changes in the developing situation. The system that evolved, and while carried over into armored divisions, was the establishment of combat commands A, B, and Reserve within the Regiment.

The Second Army maneuvers of 1936 held in Allegan, Michigan, and Fort Knox, Kentucky, produced significant changes in the structure and employment of mechanized cavalry. The maneuvers established the soundness of the regiments' tactical organization and command. However, the continued deficiencies of support element was also illustrated. Like the 1934 Fort Riley maneuvers, the need for engineering, motorized infantry, and additional artillery as organic units to the regiment remained. An engineer detachment was

necessary for overcoming obstacles, especially water courses, and to reinforce bridges. Motorized infantry were essential to increase holding power and to perform infantry functions that mounted troops could not accomplish--such as delaying attacking infantry, mopping up operations, guarding prisoners, and protecting artillery from attack.¹⁰ Mechanized Cavalry officers saw these changes as necessary to round out and balance the mechanized cavalry regiments. Prior to the addition of motorized infantry for maneuvers, mechanized cavalry had conducted only two forms of attacks--assault in echelon or fire fights. Assault in echelons employed similar tactics as the leading tank doctrine of the infantry. Tanks attacked in waves or in line depending on the organization of the defense. A fire fight utilized the main armament of tanks to fire directly on an objective. Fire and movement were used to gain fire superiority against a target in order to destroy or force the defenders to withdraw. Foot troops accompanying tank formations increased the combat potential of the force.

By 1936, it became evident to officers in the 1st Cavalry that to perfect mechanized cavalry it should contain a similar composition as the disbanded Mechanized Force. Note that a great number of the Mechanized Force officers and enlisted men formed the nucleus of the 1st Cavalry (Mechanized) Regiment. From the Infantry's viewpoint, the specter of an independent mechanized force was beginning to materialize again, though not in exactly the same form. Mechanized cavalry was evolving away from its original concept of operating with horse cavalry units, and moving in the direction of

independent operations and a new branch. While the mechanized regiment was based on cavalry principles, doctrine was combining infantry and artillery, along with support functions, to create a self-contained fighting unit that employed basic concepts from all branches.

The refining of mechanized cavalry doctrine in 1935-37 occurred during a time when the Chief of Cavalry supported mechanization. Chaffee, as Chief of the Budget and Legislative Planning Branch of the War Department, was in a very influential position to channel funds for mechanization. The Cavalry in 1936 added signal, ordnance, quartermaster, and more artillery to the 1st Regiment. Later that year, the 13th Cavalry at Fort Riley was mechanized and moved to Fort Knox. For the first time since World War I, the U.S. Army was consolidating tanks in Brigade strength. In contrast the largest infantry tank organization was the battalion. The mechanized Brigade would not participate in Army maneuvers until the First Army maneuvers in 1939. Until then development concentrated on perfecting tactics and organization.

Chaffee possessed the charisma and tactical ability to provide a continuing motivating force. But mechanized cavalry doctrine evolved from the labors of many officers, mostly within the mechanized cavalry units. Sereno Brett (infantry tanks), an instructor at the Command and General Staff School at Fort Leavenworth, continued to advocate a powerful mobile force, strong in firepower and armor, for use in rapid attacks against hostile rear areas.¹⁹ Timothy Nenninger, in his thesis, was able to correspond with and

interview a number of officers formerly associated with the mechanized cavalry. They contended that it was Chaffee, Van Voorhis, Palmer, Scott, Crittenberger, and Grow who collaborated to develop doctrine. Mechanized Cavalry doctrine, while based on traditional horse cavalry principles, evolved more out of discussions, tests, and maneuvers.²⁰ The First Army maneuvers held in Plattsburg, New York proved that the doctrine they were developing followed sound and workable principles. During maneuvers (the first to use a mechanized brigade), the 7th Cavalry Brigade outflanked the Black Army and attacked with decisive results their lines of communication and supply. Even though the Black Army was short of antitank guns, the exercise proved to many that the 7th Cavalry Brigade could affect an entire Army. The utility of the Brigade was partially lost because the idea of mechanized units was officially unpopular as a few years before.

The surge of a more independent role for mechanized units occurred just before leadership within the Army changed to restrict the growing independence of mechanized cavalry. In 1938 Major General John K. Herr became Chief of Cavalry. General Herr was much less friendly toward mechanized cavalry than the previous Chiefs of Cavalry had been. The war in Spain and the independent nature of the 7th Brigade prompted a reassessment of the War Department's mechanization policy. During this reassessment, inter- and intra-branch rivalries surfaced again to slow mechanized development and expansion.

The Chief of Staff, General Marlin Craig, ordered the study of

Army mechanization in order to determine whether infantry and cavalry tank units were accomplishing their assigned missions and whether mechanized units required further expansion. General Craig was concerned that obvious duplication of tanks, and to a certain extent of mission, was wasting funds. From his viewpoint, ". . . dividing responsibility for tank development between the two branches led to a wide variety of technical ideas and no clear-cut policy of development."²¹ These were exactly the same concerns Colonel Van Voorhis had expressed six years earlier when Army policy changed. If mechanization was not being developed to its fullest potential, the Chief of Staff was contemplating a return to an independent mechanized force to ensure that developments kept pace with developments in other nations. This only resurrected fears of independent forces (or new branches) and started branch rivalries. The new Chief of Cavalry, who opposed mechanized cavalry, created an intra-service rivalry within the Cavalry. These events stalled the expansion of the Mechanized Brigade to division strength until 1940, and they retarded doctrinal growth for the rest of the decade.

The inter-service rivalry centered on the desire of both Arms to retain control over their tank units. Neither the Infantry nor the Cavalry, especially after General Herr became Chief of Cavalry, wanted to expand its own tank units at the expense of foot or horse troops. Both Chiefs refused to admit that mechanized troops constituted an entirely new arm or an independent force. Because the Branch Chiefs determined the priorities for allocating funds, they could exert influence on the rate of development.

Brigadier General George P. Tyner, the Assistant Chief of Staff, prepared the study on tanks and mechanized units for the Chief of Staff. The report encompassed history, the current status of units, the impact of the war in Spain, trends in mechanized warfare in other countries, and recommendations for the future of U.S. mechanized units. Evidence supported that the U.S. Army was lagging behind in mechanization; and the report recommended that current Army mechanization policy be altered slightly in order to keep pace with developments in European countries. Action favored restating War Department policy to apply mechanization only to certain units instead of a general mechanization throughout the Army. The tactical doctrine governing the employment of tank, mechanized units, and anti-mechanized defense needed clarification.²² The report advocated reorganizing existing tank structures. Infantry tank companies were removed from control of Infantry division and reformed into an Infantry tank division for administrative purposes. Another cavalry regiment was to be mechanized to create and organize a mechanized division. The division was to be self-contained and consist of a divisional headquarters troop, a mechanized reconnaissance squadron, a mechanized cavalry brigade composed of three regiments, and the necessary supporting and service troops.²³ The development and participation of attack and observation aircraft was highly recommended.

Based on these recommendations the War Department modified its mechanization policy to allow the tanks in both arms to develop better their full potential. Under the new policy, infantry tanks

still were to engage in close combat and to overcome strongly organized resistance. Yet the leading tanks were not allowed to operate beyond the range of infantry or artillery, that is to conduct independent missions. The assigned role for mechanized cavalry departed from the 1931 policy, and exhibited the characteristics of an independent, self-contained force capable of distant strategic employment.²⁴ Both the Infantry and Cavalry retained control over the tanks in their respective branches. This directive, "Policies Governing Mechanization," sanctioned the development of mechanized cavalry as a more independent strategic force. But, because the new Chief of Cavalry was opposed to the expansion of mechanized cavalry or its role, little progress was made toward catching up to other countries. With both the Chiefs of Cavalry and Infantry opposed to the idea of independent mechanized formations, it took a combined effort of all pro-mechanization officers to make any progress in expanding the mechanized cavalry. In fact, it took the German invasions of Poland and France to produce speedy results.

The war in Spain affected the development of American tank doctrine very little, but it did influence significantly American tank design. The Spanish Civil War was one of the reasons prompting General Craig to question the current state of American mechanization, which resulted in the study by Brig. General Tyner. The reports from Spain had little effect on the development of tank doctrine because American officers concluded that the tanks were not employed correctly or in sufficient numbers. The most important impact of the Spanish Civil War was on the design of American tanks.

Light tanks were proven to be highly susceptible to antitank guns, thus stimulating the development of the medium class of tanks. In general, tanks employed in Spain outgunned and outweighed all American designs. Future designs added armor and centered on the 37 mm. tank gun as a main armament. Tanks armed with only machine guns were observed to be inadequate to meet conditions on the modern battlefield. The war in Spain furnished much technical data on the characteristics of tanks in combat conditions. Too few tanks were used in combat to provide conclusive data about tank operations to cause changes in doctrine.

The Second Army maneuvers in 1939 clearly demonstrated the potential of mechanized forces. The Brigade demonstrated it was capable of performing deep strategic penetrations that could have decisive results. Supporters of mechanized cavalry lobbied that the command structure of the Brigade had not reached its command limits, and they recommended the expansion to division level. In combat, the tank remained the striking power of the unit. But the combat car squadrons were most effective as a combat team with other supporting elements. The inclusion of infantry, artillery, aviation, and engineers in support of tanks continued to be more heavily stressed. The search for proper composition to create a self-contained force capable of conducting deep operations against the enemy's strategic command and communications occupied the officers of the Brigade.

Tank doctrine again stalled when certain high ranking officials opposed mechanization in some key respects. General Herr refused to

sanction the expansion of the Mechanized Brigade at the expense of any horse units. Between the 1939 Second Army maneuvers and the Third Army maneuvers in May 1940, the Chiefs of Infantry and Cavalry competed for funds to expand their own tank units without reducing infantry or horse units. The desire for expansion was prompted by the German success against the Poles. Chaffee and other officers were advocating a more powerful formation to carry out strategic missions of an independent nature for more than a year.

Brig. General Chaffee tirelessly lobbied for the continued expansion of the mechanized cavalry force. Chaffee called for immediate action in an address before the Army War College on September 29, 1939. He expressed the opinion that it was "imperative that we do so without much delay, but I do not believe it absolutely essential that we follow either the German, the French or the British in the organization."²⁵ The Army agreed that mechanized cavalry was developing along sound principles. Mechanized Cavalry officers believed that the expansion of the 7th Brigade would keep the U.S. Army current with their contemporaries in Europe--actually only a little behind. Chaffee, along with other officers, believed that "a Mechanized Brigade or armored division is essentially an instrument for the offensive. Its holding power is both limited and temporary. When on defense it holds with only a small fraction and counterattacks locally with its mobile elements."²⁶ The Polish Campaign merely provided American officers with a graphic example of the decisiveness of mechanized forces, a principle that already became apparent during the Second Army maneuvers.

American concepts about a mechanized or armored division were based on traditional American principles--those that emerged from the experiences with the Experimental Mechanized Force, Mechanized Force, and mechanized cavalry. Any future development would happen along similar lines. Chaffee's War College address analyzed the German Armored Division and found it comparable to the proposed mechanized division.

We have examined the proposed mechanized cavalry division in comparison with the German armored division and found that it contains all of the essential basic elements of the latter. Numerically, it is not as strong, either in tanks or in the holding or supporting elements, as the German armored division, but in quality of its armor vehicles, on the average I believe it excels the German armored division, and in proportion it has more gun power. Under our conception I believe it to be a more mobile and easily directed organization than the German armored division.²⁷

With the experience of the maneuvers, plus the analysis of the Polish Campaign, heavy pressure by Brigade officers mounted for the immediate expansion of the 7th Cavalry Brigade to a mechanized division. Because the Cavalry Brigade possessed more experience with higher echelons, it was assumed the cavalry would supervise the expansion. Direct expansion of mechanized units waited as branch rivalries continued to flare.

The mechanized cavalry was able to expand temporarily to division status for participation in the Third Army maneuver being held during May 1940 in Louisiana. Chaffee and Third Army Commander Major General Stanley D. Embick successfully persuaded War Department officials to form a provisional tank regiment from the existing Infantry tank companies, and an infantry regiment to the 7th Cavalry

Brigade. The improvised Armored Division contained the personnel of a structured division, but was not balanced in composition. There were too many tanks and not enough infantry, artillery, or engineers. The habitual need for more infantry and support echelons during maneuvers, provided further evidence that combined arms formations were more powerful than strictly all tank formations. The Provisional Tank Brigade (Infantry) was attached to the 7th Cavalry Brigade and was commanded by Brig. General Bruce Magruder. The Provisional Brigade contained one regiment and two battalions of light tanks, and one company of medium tanks. The Improvised Armored Division contained all the tank units the Army possessed except for a company stationed in Washington and one in Hawaii. The command and control structure worked effectively, proving that larger formations could be commanded under this system of organization.

The structuring of the mechanized cavalry Brigade, and consequently the mechanized division, to perform in an independent role in order to participate in deep penetrations to achieve strategic decision denotes some changes in American tank doctrine. The Americans were developing their own version for mechanized units to operate along the principles set forth by Liddell Hart. The nature of the tank was allowed to change under Cavalry control from a weapon reducing strong points to a force to find and break through weak spots so as to penetrate into the rear areas in order to cut supply and communication lines, and to attack reserve areas and command posts. This principle was made official in the 1941 Cavalry

Field Manual, FM 2-10, which defined the Armored troops combat mission as seeking ". . . to go where the going is good, and to outflank enemy centers of resistance rather than to attack directly. This rule applies to both the armored platoon and troop."²⁸ The traditional elements of mobility and shock are still evident values.

One remaining problem was the proper proportion of infantry to tanks. Chaffee noted in 1939 that the 7th Brigade was ". . . in need of additional holding power and of supporting power in the form of additional machine gun and rifle units."²⁹ Exercises were conducted to determine the proper proportion. Cavalry officers feared that if too much ground support was added the unit might be drawn into a prolonged combat, which eliminated the advantage of maneuverability the Mechanized Brigade possessed.³⁰ Adjustments to the ratio were not solved by the Third Army maneuvers, and changes continued throughout World War II.

The performance and potential of the improvised armored division impressed commanders and observers with the need for large mechanized or armored divisions. The opening of the German offensive in the West underscored this point and strengthened the belief that America needed mechanized/armored divisions immediately. On May 25, 1940, a group of officers met in the basement of a high school in Alexandria, Louisiana to discuss the future of mechanization. In attendance were Chaffee, Magruder, Brett, Patton, and Frank M. Andrews, the Assistant Chief of Staff G-3. Assessing the maneuvers and developments in France and Belgium, they determined that the War Department could no longer delay the development of

independent mechanized divisions free from both Infantry and Cavalry control. Andrews expressed the conclusions of those present to General George C. Marshall, the current Chief of Staff. On June 10, 1940, General Marshall convened a meeting to determine plans for the organization of a separate armored force. The different terminology indicated that a new approach was contemplated and signified a break with past Army Infantry and Cavalry doctrine on mechanization. In attendance were the Chief of Staff, Assistant Chiefs of Staff, the branch chiefs, representatives of the War Plans Division of the General Staff, and mechanized cavalry and infantry tank officers. Over the objections of the Chiefs of Cavalry and of Infantry, a separate Armored Force was created from all existing tank units. In practice, a new branch was created but was termed "armored force" to avoid legislative restrictions (only congress had the power to create a new branch). General Chaffee was appointed Chief of the Armored Force, and given the powers and responsibilities of a branch chief. The Armored Force was officially established on July 10, 1940. The 7th Mechanized Brigade became the 1st Armored Division under the command of Colonel Bruce Magruder. The infantry tank units at Fort Benning formed the nucleus of the 2nd Armored Division under Colonel Charles L. Scott. Together they formed the 1st Armored Corps.

The new division was organized with an armored brigade containing two regiments of light tanks, one regiment of medium tanks in two battalions, and a regiment of field artillery for support. The division contained a mechanized infantry regiment and one extra

battalion of artillery, plus support units (i.e., engineers, signal company, etc.). The Brigade commander was responsible for structuring the combat units composition according to the missions assigned. Infantry and artillery would be assigned to tank units as the mission might require. In the Army's rush to create an Armored division, it extended the mechanized brigade structure to the division level. The composition of the division reveals that the Army was accepting a combined arms approach to tank warfare at a division level, rather than strictly an all-tank division. The divisional command structure contained flaws that became apparent when the 1st Armor Corps participated in Army maneuvers in 1941. The Brigade organization formed an extra link in the chain of command and reduced the quickness of decision of the division. This resulted in a restructuring of the division in 1942, which entailed replacing the brigade structure with a regimental form. Instead of combat teams being assigned by the brigade command, there were now two combat commands under the direction of a brigadier general. The combat commands contained no permanent troops, but the brigadier general of a command was allotted a tactical force suitable for the mission assigned by the divisional commander. This command structure proved to be more flexible; and delegating duties to the combat command leaders released the division commander to plan the overall strategy and command the reserve.³¹ In 1940 and 1941 the Army and officers associated with the armored divisions suffered from a lack of experience handling large units because no large scale maneuvers took place during the inter-war years. Armored officers had just

participated in the first division maneuvers in 1940, while Germany had fielded Corps level units in 1935.

The 1941 Army maneuvers produced field data that resulted in some changes in the composition of the Armored divisions. The Armored Force structure and mission was defined in 1942 with the issuing of Field Manual 17-10: Armored Force Field Manual, Tactics and Technique. This was the culmination of the United States' peace-time experience with tanks. The purpose of the Armored Force remained offensive combat as tank missions always had been. The force was to operate by rapidly thrusting ". . . into vital parts of the hostile rear followed by immediate exploitation to complete enemy demoralization."⁹² Infantry, artillery, engineers, and other support units performed their previous functions.

Most changes affected the employment of tanks. The new tables under regimental organization reduced the number of regiments to two, each composed of three battalions. A significant change occurred in the battalion composition. Wartime observations in Europe and Africa acknowledged the shift to heavier tanks, which resulted in regiments containing two battalions of medium tanks and one battalion of light tanks. Light tanks became the light maneuvering element of the regiment, and the medium tanks comprised the striking force. The manual continued the refinement of larger units into an efficient fighting machine.

The role that armored divisions held within the Army was different than German or Soviet armored units, and this role prevented the development of a true operational doctrine. The Army

fit armored divisions into its future war concept. FM 17-10 made a distinction between missions of armored divisions and the GHQ tank reserve: ". . . armored divisions are seldom used to effect the actual operation of break-through. Their primary mission in such operations is to push through the gap created and to exploit success gained. GHQ reserve tank units operate with units detailed to breach the hostile defenses."²⁹ Armored units were part of a combined arms strategic doctrine that the Army established at all levels of command. Armored Divisions and Corps were to be assigned to predominately Infantry Corps or Armies. Unlike the Germans and Soviets, no concentrated armored formations at Corps or Army levels were to be employed. In combined arms doctrine a breach would be made in enemy lines through which armored divisions would surge, a mechanized cavalry to exploit the gap, to pursue the enemy, and attack his reserves and lines of command and supply. The Army did not adopt an operational doctrine to control units fighting in enemy territory. It did develop general principles as guidelines for tanks in the rare occasions when tanks did operate in enemy territory. Since the Army was committed to combined arms warfare, tanks would seldom be out of infantry and artillery support. From the Infantry point of view, an operational doctrine was unnecessary. The Army had the beginnings of an operational doctrine in mechanized cavalry units and the Armored Force. The idea of employing forces behind enemy lines was more acceptable to the Cavalry. The expansion of mechanized cavalry forces reached the point by 1939-1940, that officers began actively theorizing of employing large units in

enemy territory. German campaigns in Poland and the West helped to stimulate American thoughts about conducting mobile warfare and deep battles. Yet, the Army's future war concept did not need a concentration of armored units, and the lack of large-scale field maneuvers removed any catalyst to develop an operational doctrine. The Army shaped tank doctrine to fit into its plan to employ large infantry-dominated armies along parallel routes. The tank was seen as a support weapon that could breach the line and bring decisive strategic results by attacking the enemy's line of command and supply. The American environment synthesized the infantry-based close support doctrine with the cavalry exploitation doctrine to produce a U.S. Army tank doctrine that continued to be refined by mechanized cavalry, and later by armored divisions.³⁴

CONCLUSION

The evolution of the operational doctrine the of U.S. Armored forces between 1917-1942 developed only within the conservative and narrow parameters set by the Army's future war concept. The genesis of American tank doctrine was an assimilation of British and French theory. After the war, based on tank performance--as an infantry support weapon--the Army's future war concept, and due to economics, an independent Tank Corps was abolished. The Infantry was charged with the responsibility for developing tanks and tank doctrine. Under Infantry control these stagnated as only a support weapon to assist the advance of the foot soldier. The Infantry clung to this position until the Germans rolled through France and the Low countries in May 1940.

Yet in the same period the technological performance of tank improved and opened new possibilities concerning the employment of tanks in combat. Faster tanks with a larger radius of operation allowed the application of cavalry tactics to the tank. Prompted by the British use of an Experimental Mechanized Force in 1927, the U.S. Army began to study mechanization and created its own Experimental Mechanized Force in 1928. Acting upon these recommendations based on testing and the capabilities of new tanks, the Army ventured on the path of an independent mechanized force. This only served to spark branch rivalries between the Cavalry--which feared being replaced by tanks and/or mechanized forces--and the Infantry--which feared losing control over tanks. In 1931, General Douglas

MacArthur, the new Chief of Staff, sought to eliminate disputes between the branches and to compel the Cavalry to undertake mechanization. This new mechanization policy required all branches to mechanize to the fullest extent. The Infantry would develop tanks to better enable infantry to advance under fire from machine guns. The Cavalry was to develop tanks that would assist the horse units on the modern battlefield.

New and improved tanks being tested made the adaptation of traditional cavalry principles to the tank plausible. While the Infantry dealt with the better tactical mobility, the Cavalry explored how and to what extent could mechanized units could replace the horse. No one at this point contemplated the total elimination of the horse. As mechanized cavalry units demonstrated their potential, there was pressure to expand mechanized units size. But in peacetime Army budgets were always tight, and mechanized units had not displayed the results necessary to begin replacing horses with tanks. The mechanized cavalry continued to demonstrate tactical and strategic mobility in conducting operations. This led to the conclusion that the best utilization of the Mechanized Cavalry Brigade's mobility, firepower and shock power was not along conventional cavalry employment but in an independent role. This caused inter- and intra-branch rivalries to surface. Neither branch desired to see the creation of an independent force, especially at the expense of the units within their respective services.

By 1939 the 7th Cavalry Brigade (Mechanized) had become proficient enough to take part in Army maneuvers. The Brigade had

developed to a point that it was able to demonstrate its strategic capability when it outflanked the opposing Army, deeply penetrating its rear areas and disrupting its command, supply, and reserves. The results of the exercise and the German invasion of Poland, increased pressures for expansion. Mechanized Cavalry had already been given the role of deep strategic penetrations, but it had not yet been given the troops necessary to explore its full potential. The German use of armored divisions caused a reexamination of Army mechanized policies. The result was the formation of an improvised Armored Division for the Third Army Maneuvers in 1940. The principle upon which the division was based was adequately demonstrated and more refinements were applied. The German success in France and the Low Countries dispelled any reservations about the successful employment of Armored divisions. At this point Army officials unequivocally realized the need for the United States to organize and employ larger tank formations. The Louisiana Maneuvers had utilized every tank that the U.S. Army possessed.

There were a number of reasons why American operational doctrine had lagged behind that of other countries. The parameters of the American future war concept were sufficiently strong to keep tank doctrine within its confines and indirectly eliminate the need for an independent or armored force beyond the mission of exploiting a gap produced by infantry with the support of other arms. Relegating the armored divisions to this role in 1941/42 also prevented the continued expansion of a full operational doctrine. Branch rivalries continued throughout the interwar period to restrict doctrine

from developing beyond the support of the different arms. The refusal to expand mechanized units at the expense of foot soldiers or horses kept the scale of mechanized units, therefore doctrine, on the tactical level. The incentive to develop an operational doctrine occurred when tanks were envisioned in independent roles of conducting missions deep behind enemy lines. The first two times the Army thought of independent tank units were at the end of World War I (the Tank Corps), and with the Mechanized Force (1930-1931). Both of these units were disbanded and their tanks integrated into the Infantry and/or the Cavalry. The only period in which any progress was made towards developing an operational doctrine was in the late 1930s, under the direction of the Mechanized Cavalry Brigade. The advances it did make were slow and against stiff opposition.

The evolution of tank doctrine was impeded by the lack of a suitable tank. Before the Ordnance Department could develop proper tanks, it needed a clear mission statement. A vicious circle existed, which because both of a shortage of funds and of the decision to split armor development between the two politically powerful branches in the U.S. Army, tank development stagnated. Because of this there never were enough of the new tanks, nor enough evolving designs in a learning period, to demonstrate what reliable vehicles might accomplish. By 1934, technology produced engines with greater horsepower, and reliable track and suspension systems to create tanks that possessed the characteristics necessary to conduct tank operations as Fuller and Liddell Hart advocated. Great

Britain, Germany, and the Soviet Union adopted policies which took more advantage of the tank's potential than did the United States or France.

Conservatism within the Army, and the desire to fit tanks into the existing Army structure limited tank development. This was increased as the Army pursued its future war concept. Given the political, social, economic, and military climate of the times, the evolution of the operational doctrine of U.S. Armored forces failed to develop along lines that took best advantage of its theoretical possibilities. Instead the U.S. Army sought to limit its development within the traditional Army structure to participate in its future war concept. The result was a unique evolution that was a product of the American system.

NOTES

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¹²Ibid., p. 3.

¹³Nenninger, "Development American Armor," pp. 145-146.

¹⁴Ibid., p. 154.

¹⁵Donald E. Houston, Hell on Wheels: The 2d Armored Division (San Rafael: Presidio Press, 1977), p. 19.

¹⁶Ibid., p. 23.

¹⁷Nenninger, "Development American Armor," p. 157.

¹⁸Colonel Bruce Palmer, "Mechanized Cavalry in the Second Army Maneuvers," The Cavalry Journal 45 (November-December 1936), p. 475; see also Houston, Hell on Wheels, p. 23.

¹⁹Gillie, Thunderbolt, p. 71.

²⁰Nenninger, "Development American Armor," p. 161.

²¹Memorandum from Chief of Staff to Assistant Chief of Staff G-3, 14 October 1937, cited by Nenninger, "Development American Armor," p. 169.

²²Brig. General George P. Tyner, "Memorandum for the Chief of Staff: Tanks and Mechanized Units," 25 October 1937, Modern Military Records Division, Record Group 177, Records of the Chief of Arms, Mechanized Cavalry Board, Box 1, National Archives, Washington, D.C., p. 24.

²³Ibid., pp. 24-25.

²⁴Memorandum from Adjutant General to all Branch Chiefs, Schools, Corps Area Commanders, "Policies Governing Mechanization," 25 March 1938, Record Group 94, National Archives, cited by Nenninger, "Development American Armor," pp. 170-171.

²⁵Brig. General Adna R. Chaffee, "Mechanized Cavalry," Address before the Army War College, 29 September 1939, Modern Military Record Division, Record Group 177, Records of the Chief of Arms, Mechanized Cavalry Board Box 1, National Archives, Washington, D.C., p. 32.

²⁶Brig. General Adna R. Chaffee, "The 7th Cavalry Brigade in the Third Army Maneuvers," The Cavalry Journal 49 (July-August 1940), p. 318.

²⁷Chaffee, "Mechanized Cavalry," p. 31.

²⁸United States, War Department, Cavalry Field Manual, FM 2-10: Mechanized Elements (Washington: Government Printing Office, 1941), p. 95.

²⁹Chaffee, "Mechanized Cavalry," p. 12.

³⁰Ibid., p. 15.

³¹Gillie, Thunderbolt, p. 216.

³²United States, War Department, FM 17-10: Armored Force Field Manual, Tactics and Technique (Washington, D.C.: Government Printing Office, 1942), pp. 5-6.

³³Ibid., pp. 114-115.

³⁴Steadman, Tank, p. 1.

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Dwight D. Eisenhower

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Courtney H. Hodges

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John W. Leonard

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THE EVOLUTION OF OPERATIONAL DOCTRINE
OF U.S. ARMORED FORCES, 1917-1942

by

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B.A., Miami University, 1984

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF ARTS

Department of History

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1988

ABSTRACT

In general, my thesis demonstrated how the Army intended to use tanks in combat, how that doctrine emerged, and some of the influences that shaped it. The unique environment in the United States determined the direction of U.S. Army tank doctrine. During the inter-war years, the Army planned to fight the "next war" with large infantry armies advancing along parallel routes with support from the other arms. My thesis is that it was not so much technology and equipment, but, that branch rivalries, conservatism in the Army, economics, and politics were the influential and motivating forces that shaped American tank doctrine.

Both Mildred Gillie's Forging the Thunderbolt: A History of the Development of the Armored Forces, and Timothy Nenninger's Master's Thesis, "The Development of American Armor, 1917-1940" are solid, general works on the origins and evolution of American armored units, and the interrelationship between equipment organization, doctrine, and politics. While both authors give an accurate account of the formation of U.S. armored units, their presentations minimize the development of doctrine. It is true that organization and technology affect the formation of doctrine, but a detailed study of the evolution of the operational doctrine of U.S. Armored Forces is necessary for a more complete understanding of American armor history. The expansion of U.S. Armored Forces has been sufficiently detailed in existing literature, as noted in my bibliography.

My methodology is to establish a solid base in World War I tank

warfare from which to begin. From there, the reader was able to see how American doctrine evolved and the controlling influences upon it. U.S. tank theory had its foundations in British doctrine. Major (later General) George S. Patton Jr. and General Samuel D. Rockenbach were the premier influences on American wartime and early post-war doctrine. During the doldrums and stagnation of the 1920s thinking was again stimulated by the British Experimental Mechanized Force of 1927. From this emerged American experimentation with mechanized cavalry units and new tank designs. The Infantry had attained official control of tanks after World War I, but had developed little theoretical work because it failed to accept the tank as anything more than an infantry-support weapon. In 1931 mechanization policy was changed to apply mechanization gradually throughout the Army. Both the Infantry and Cavalry experimented with tank doctrine that best assisted them in performing their traditional missions on the battlefield. Infantry tank doctrine remained essentially unchanged. Mechanized Cavalry doctrine became more mobile and independent as tank performance improved. Once again the late 1930s and early 1940s saw U.S. tank doctrine and organization hurriedly trying to catch up with the British, Germans, and Soviets, while striving to fit armored units into the existing Army structure.

Themes that emerged were that branch rivalries, economics, politics, and the integration of new technology into an already existing Army structure shaped the evolutionary path of operation doctrine of U.S. Armored Forces in the period between 1917 and 1941.

Conservatism within the Army to use tanks as only support weapons to assist the advance of large infantry armies along parallel routes stifled theoretical development in the United States.