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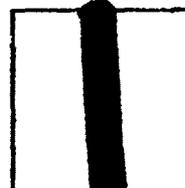
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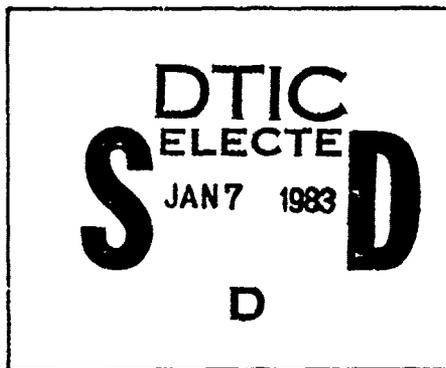
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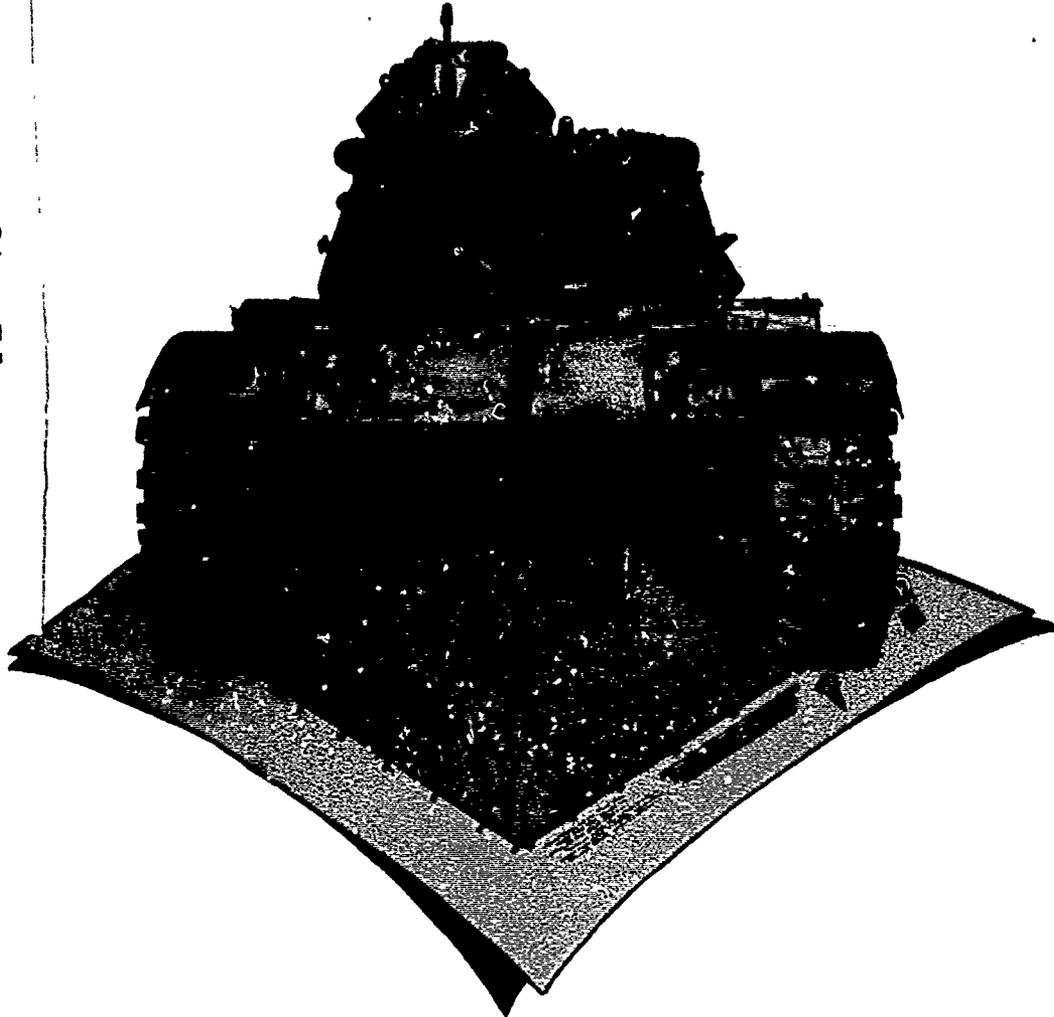
US ARMY

ST 17-1-2

HISTORY AND ROLE OF ARMOR

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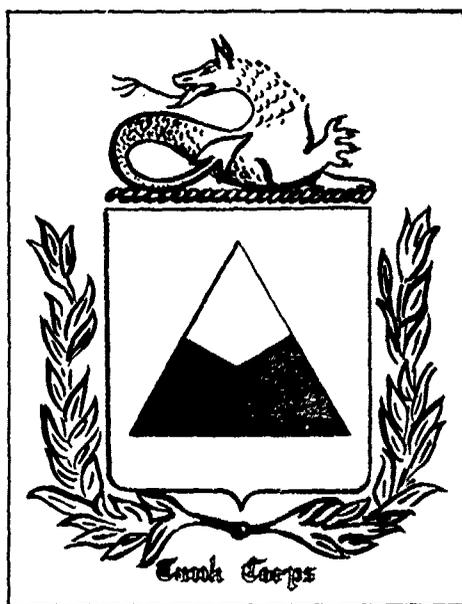
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**US ARMY ARMOR SCHOOL
FORT KNOX, KENTUCKY
APRIL 1974**

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THE SYMBOL OF ARMOR

The familiar three-colored, triangular patch with the symbols superimposed has a specialized significance that appeals to a student of heraldry; it contains a variety of meanings for the historian; and it has special significance for the exponents of a doctrine of combined arms.

The colors of this shoulder sleeve insignia are blue for infantry, red for artillery, and yellow for cavalry—the three basic components of Armor. The superimposed figures, on the insigne on the inside back cover, have symbolic meanings that convey the characteristics of armor. The tank track represents mobility and armor protection; the gun represents firepower, and the lightning bolt represents shock effect. **Mobility, firepower, shock effect;** these are the tank's triple characteristics embodied in the striking power of armor.

It was in January 1918 that the Tank Corps of the American Expeditionary Forces was created, with Colonel S. D. Rockenbach as its chief. At his direction not long after, Lieutenant Wharton designed the original coat of arms (above) which hangs now in Patton Museum at Fort Knox. Notice that the design of the original coat of arms of the Tank Corps followed an old armorial method, a shield (silver) bearing a charge (the three-colored triangle) and a crest (the dragon in silver).

There is evidence in this initial design that Lieutenant Wharton was setting forth symbolically the belief of a few farsighted men. The triangle itself is an old heraldic element of armorial design known as a pile—the head of a spear. Tanks were actually the spearhead element in the

(Continued inside rear cover)

FOREWORD

This pamphlet presents an objective report of the history of Armor, relates it to the present, and considers the prospects for Armor in the future. The pamphlet, well documented and without glorification, although it is difficult not to show Armor's glory in its history, cites the development of the tank from Judah's frustration with the Philistines' iron chariots in the valley of the Jordan River to the present.

We in Armor have exploited the important lessons learned from the past and are searching for new ideas in molding the future. As students of military art and science, you will see in these pages the evolution of the tank and the emergence of our combined arms philosophy which is built around the tank as our principal ground combat weapon. Whatever your conclusions as to this philosophy, you will see continuing changes in Armor in the future, changes that may cause those in the past to pale into insignificance.

Sound organizational and tactical concepts, both employed and championed by Armor in the past, now appear in all Army divisions.

If Armor's superiority on the battlefield is to remain unchallenged, we must continue our efforts to improve our mobility, firepower, and shock effect.



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*This special text supersedes ST 17-1-2, December 1971.

HISTORY AND ROLE OF ARMOR

ARMOR'S EARLY BEGINNINGS

From earliest times man has constantly been striving for decisive battlefield weapons—Weapons causing shock, terror, and destruction. Even in Biblical times, armor filled this role on the battlefield. The tank itself, however, was not the earliest in the use of the principles of mobility, firepower, and shock effect. From the beginning of time, there has been a constant struggle in the fighting man to develop a body protection capable of withstanding the offensive thrusts of an adversary. At the same time, he has been striving to develop a weapon that can defeat the defensive protection of an enemy. The story of these efforts goes back to the time when armored warriors mounted armored horses and equipped themselves with weapons that had ranges greater than those of the conventional hand weapons. The Holy Bible, Book of Judges, chapter 1, 19th verse says; "And the Lord was with Judah, and he drove out the inhabitants of the mountains, but could not drive out the inhabitants of the valley because they had chariots of iron."

In the twelfth century B. C. a Chinese emperor, in order to more easily conquer and subdue his enemies, invented and employed in battle a chariot covered with heavy leather.

The Assyrians, the dreaded conquerors of the period before Christ, also used large, protected chariots. The crew of these vehicles was composed of a driver, an expert archer, and two shield-bearers who protected the other two members of the crew from the missiles of the enemy.

Then in the first century B. C., Ulstermen invaded Connaught with "Three strong, stout, battleproof towers, on wheels." Each of these battleproof towers was propelled by 30 Danish stallions.

In the Bohemian Wars of 1410-1420, Ziska, a great warrior of his day, fought off the

Catholic crusaders by employing his wagon-lagers. These wagons mounted cannon and were so successful that German commanders were forced to develop mobile artillery to be employed against them.

The Scots, in 1456, invented a wooden cart that encased its crew and protected them from the weapons of the day. Motive power was again provided by the horse (fig 1). But this cart had its shortcomings, since the enemy soon learned that the cart was rendered useless when the horse was destroyed. Scots, therefore, went a step further and encased the horse in wood to make it more difficult for the enemy to destroy him (fig 2).

Most of us identify the amazing Leonardo da Vinci as a great Italian painter of the Renaissance period. Few of us know that in 1482 he invented an armored car (fig 3), which resembled a Chinese coolie's hat on wheels, and was propelled by men turning by hand an offset shaft similar to the crankshaft of today. For this vehicle da Vinci outlined tactics that were surprisingly modern and similar to those employed by armor today.

It was in 1756 that Count Richelieu received from Voltaire the plan for a horse-drawn, armored wagon to be used in the war against the Prussians. Such creative efforts continued throughout the centuries as man strived to perfect an instrument of war that would give him the decisive edge on the battlefield.

In all these developments, however, manpower or horsepower was the propelling force. It was not until just before the French Revolution that steam was first tried as the motive power of an armored war vehicle. This vehicle had a big wheel in front and two in back. A boiler was built in the center, and a cannon was mounted on one side. The conveyance had a major limitation—it could



Figure 1. Scotch war cart.

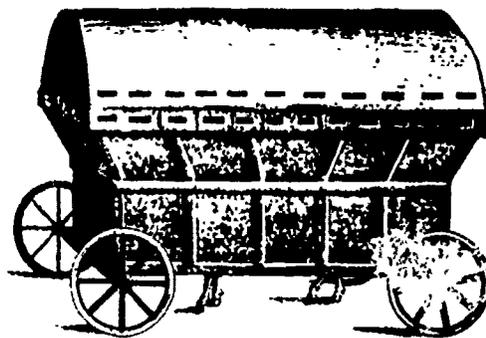
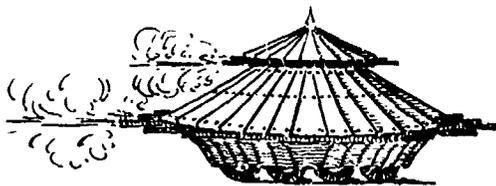


Figure 2. Scotch war cart.



"I am building secure and covered chariots, which are invulnerable, and when they advance with their guns into the midst of the foe even the largest enemy masses must retreat, and behind them the infantry can follow in safety and without opposition."

From the sketch book of Leonardo da Vinci, 1452-1519

Figure 3. Da Vinci's armored car.

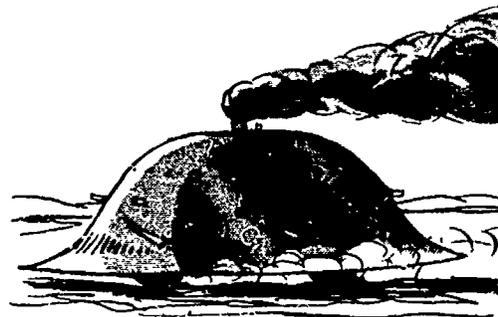


Figure 4. Cowan's armored vehicle, with steam engine.

not be steered; it was capable, however, of knocking down almost any wall that happened to be in the way.

Then in 1854 James Cowan developed a steam engine to be used in an armored vehicle (fig 4). The engine had some critical defects; it was necessary to stop the vehicle every few minutes to replenish the engine water supply and to work up the engine pressure.

Limitations imposed by the level of technology were not the only factors that blocked development of the tank during the nineteenth century. Improvement of explosives,

the development of small arms and artillery, and the lingering appeal of cavalry combined to reduce to a historical footnote this prototype of the tank.

It was possible to develop iron-clad warships before the twentieth century, but the basic requirements of the power plant of the tank could be satisfied only by the internal combustion engine. In fact many of its potentials could not be realized until the introduction of modern chemistry, metallurgy, dynamics, and ballistics. Nor is it possible to ignore the retarding appeal of conventional tactics, of blind devotion to antiquated weapons.

TANKS IN WORLD WAR I

The opening of World War I found both sides without an effective armored vehicle. The Germans in 1913 and again in 1915 had turned down armored caterpillar vehicles demonstrated to them.

World War I soon developed into a costly stalemate. The machinegun drove the individual soldier into the trench. To many it seemed possible that the war would continue for many years. Frontal attacks were the order of the day—frontal attacks supported by concentrated artillery fire. Before the end of 1914, except for a few small breaks, a man could walk by trench, from Nieuport into Switzerland. Movement disappeared from the war. Neither side was able to accomplish much and the loss of life was terrific. The power of the machinegun bullet was dominant on the battlefield. It was a war of artillerymen and infantrymen, neither of whom was able to supply the power necessary for a decision.

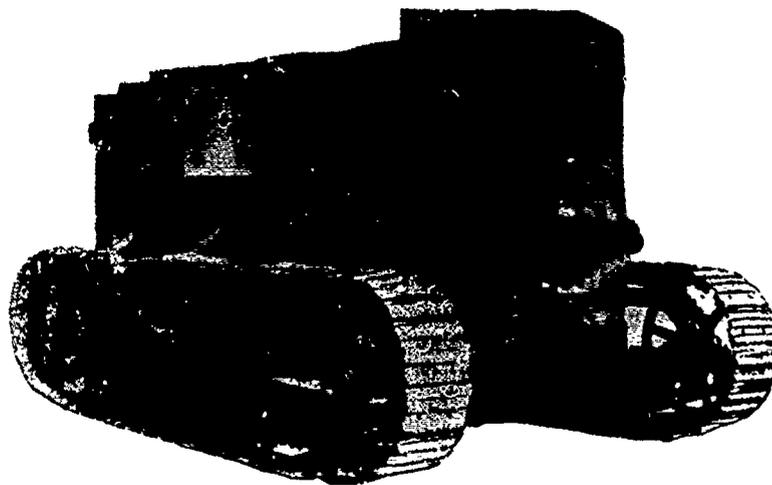
An English officer, Lieutenant Colonel (later Major General) Ernest D. Swinton, observed the futility of artillery and infantry attempts to break the stalemate. He was attached to British General Headquarters in France. Colonel Swinton had often watched, as he walked in meditation over the French countryside, a little American-made Holt caterpillar tractor as it slogged its way through mud and slush which stopped all other vehicles. The little tractor seemed unstoppable. An idea was born. Why couldn't these tractors be armored with enough plate to stop machinegun bullets and be sent across no man's land to crush and destroy the weapons that had stopped the infantrymen?

In October of 1914, Colonel Swinton obtained leave and returned to England. There he explained his idea to the Committee of Imperial Defense, which was composed of the outstanding military people of the Empire. Among these was Winston Churchill, who was the First Lord of the Admiralty. The idea of an armored vehicle was received with

little enthusiasm by all members of the committee except Mr. Churchill. Such a vehicle, these leaders thought, was useless; it would be quickly destroyed on the battlefield by the concentrated artillery fire of the enemy. The discouraged Colonel Swinton, his leave expired, returned to France.

His trip had not been entirely in vain. On 24 February 1915, Colonel Swinton's idea was adopted, not by the War Office, for whose benefit the plan was intended, but by the Royal Navy. Winston Churchill, the only member of the Committee of Imperial Defense in favor of the idea, continued Colonel Swinton's fight. He bombarded the other ministries with notes advocating experimentation with track-laying armored vehicles, but his efforts met with dubious success. The War Office had experimented initially with two Holt tractors and had shelved the idea. Then Mr. Churchill organized his own committee to carry on the experiments within the Royal Navy. Realizing that the track-laying armored vehicle might never go to sea, he called his committee the "Landship Committee" and selected Sir Tennyson d'Eyncourt, a naval designer, as chairman. Because of this naval origin, today, tankers all over the world use a jargon peculiar to the Navy in referring to parts of the tank. We have such nautical terms as the hatch, the ports, the hull, the deck, the bow, and the superstructure.

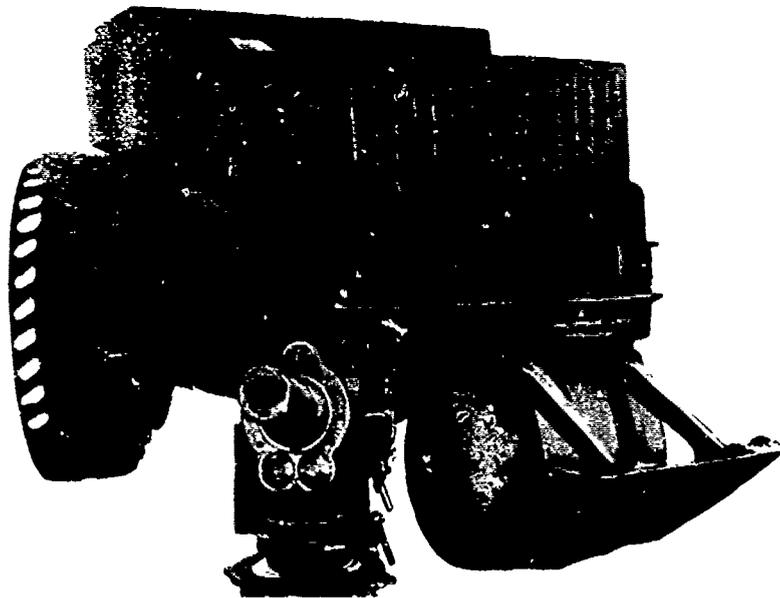
At the beginning, the British War Office was not officially aware of these unusual experiments being conducted by the Royal Navy. However, unofficially, a number of Army officers did keep posted on what was being developed. Finally, after several months, the War Office did combine with the Royal Navy in the research work. Colonel Swinton was invited to return and explain his idea more fully. By this time the godfather of the modern tank, Winston Churchill, had left his high office because of failure of another of his daring schemes—the Dardanelles Campaign.



GENERAL DATA

CREW: 6.	DIMENSIONS: Length, 16 ft 6 in; width, 9 ft 1 in; height, 7 ft 9½ in.
ARMAMENT: One 75-mm (2.95 in.) mountain howitzer and 2 cal .30 machineguns.	WEIGHT: 25 tons.
ARMOR: 0.25 to 0.63 in.	ENGINE: One Holt 4-cylinder, high speed, 90 hp with electric generator, forced water cooling.
MAXIMUM SPEED: 6 mph.	

Figure 5. Holt gas-electric tank.



GENERAL DATA

CREW: 6.	DIMENSIONS: Length, 22 ft 3 in; width, 10 ft 1 in; height, 9 ft 10 in.
ARMAMENT: One 75-mm (2.95 in.) mountain howitzer and 2 cal .30 machineguns.	WEIGHT: 17 tons.
ARMOR: 0.25 to 0.63 in.	ENGINE: Two Doble 2-cylinder, steam engines, combined hp 150.
MAXIMUM SPEED: 5 mph.	

Figure 6. Steam tank, three-wheeled.

Cloaked in secrecy, the experiment continued and the new monster finally appeared on the battlefield. The story of the manufacture and transportation of these new weapons of war reads like a dime-novel thriller. To confuse enemy agents, and even to keep the secret from unauthorized friendly personnel, each part of the vehicle was made at a different factory. These weapons were labeled tanks—tanks for water in Russia, or tanks for water in Mesopotamia. The secret was well kept for, in their initial action, these new weapons did achieve surprise.

On September 1916, modern tanks were used on the battlefield for the first time when, in the battle of the Somme, the British committed 49 of these new "secret weapons," divided into small groups, on a broad front. Few of the tanks, however, fulfilled their missions. The Germans knew nothing about them; the British commanders who employed them knew little more, and no precedent or past experience existed to guide their tactical employment. Mechanical failures hampered them from the beginning. Success was realized, however, with the tanks that did fulfill their mission. There were few casualties among the personnel.

In spite of the large percentage of mechanical failures, it was apparent that impetus was imparted to the attack by the use of tanks. The contending nations immediately recognized the value of this new weapon and began building them. The French soon followed the British, while the Germans salvaged captured tanks and used them against their former possessors. The Germans developed and built tanks of their own as rapidly as they could. The Tank Corps of the American Expeditionary Forces, was created on 26 January 1918, and entered its first engagement 12 September 1918, using French tanks because American tanks were not available in quantity.

Tanks were first employed on a large scale on 20 November 1917, when the British used 378 tanks in their attack on Cambrai. The tanks went forward on a 7-mile front, followed by 6 infantry divisions. At the end of 12 hours, a penetration nearly 6 miles deep

had been made, and 7,500 prisoners and 120 guns were captured. The attack with tanks in the Third Battle of Ypres, although it penetrated deeper than other trench warfare attacks, fell short of complete success because no plans had been made for exploitation, and no reserves, either tank or infantry, were available to keep up the momentum that had been gained.

On 18 July 1918 in the Aisne-Marne offensive, the French Sixth and Tenth Armies employed 478 tanks in their drive on Soissons. The tank units were arranged in depth and gave added impetus to the first day's attack. They advanced as far and as fast as the infantry could follow.

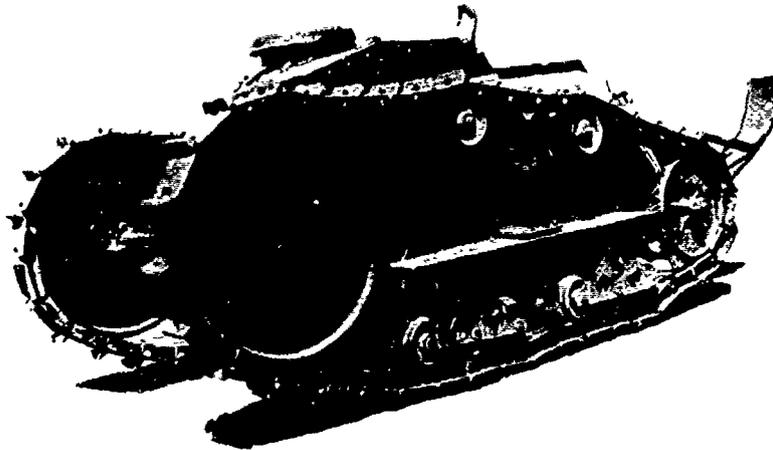
The American Army employed French and American tank units with the infantry in the reduction of the St. Mihiel salient on 12 September 1918. Objectives were reached and the salient was reduced in 36 hours.

In the Meuse-Argonne attack, begun on 26 September, the American 304th Tank Brigade, consisting of the American 344th and 345th Tank Battalions and two French groups, was used in a supporting role. About this time, General Pershing offered "anything in the AEF for 500 additional tanks," but tanks were simply not available in sufficient numbers. The tanks that were available operated successfully. They performed their missions and reduced infantry casualties. (See figures 5-8 for examples of American tanks produced in 1918.)

By the end of World War I, tanks had been employed by the British, French, Germans, and Americans in 91 engagements.

The definitions of light, medium, and heavy tanks at that and up to 1930 were:

1. A light tank is a two-man tank that can be transported by a tank carrier.
2. A medium tank is one weighing not more than 25 tons, but too heavy or too large to be transported by a tank carrier.
3. A heavy tank is one weighing more than 25 tons.



GENERAL DATA

CREW: 2.

ARMAMENT: One cal .30 machinegun; arc of traverse 21 degrees, vertical arc 38 degrees.

ARMOR: 0.25 to 0.5 in.

MAXIMUM SPEED: 8 mph.

DIMENSIONS: Length, 13 ft 8 in; width, 5 ft 6 in; height, 5 ft 3 in.

WEIGHT: 3.1 tons.

ENGINE: Two, Ford, Model T, 4-cylinder, combined hp 45, forced water cooling.

CRUISING RANGE: 34 mi.

Figure 7. Ford three-ton tank.



GENERAL DATA

CREW: 2.

ARMAMENT: One cal .30 machinegun.

ARMOR: 0.5 in.

DIMENSIONS: Length, 25 ft; width, 8 ft 5 in; height, 9 ft 6 in.

WEIGHT: 8 tons.

ENGINE: Two, Peaver, 4-cylinder, combined hp 100, forced water cooling.

Figure 8. Skeleton tank.

Although tanks played an active role in World War I, their implications were not realized. Their potential uses, despite limitations, were not exploited. The dramatic illustrations of the power of the tank revealed at Cambrai were but dimly appreciated. The tank may have restored movement and mobility to the battlefield, may have equalized the one-sided struggle of men against the machinegun, but its arrival was too recent and its technical imperfections too obvious to permit more than limited application. Tacticians assumed that tanks would always play a secondary role, that they would always be used in support of infantry to reduce the strongest points of resistance, to silence that powerful opponent of the infantryman, automatic fire weapons, and to reduce obstacles.

During that period, the infantry was the arm of decision, the "Queen of Battle." The military leaders of France, for example, were apparently bemused by the infantry mass. In combat, the tank was tied to the foot soldier as an auxiliary weapon. As one French general of infantry said: "Any infantry would be dishonored that would subordinate its advance to that of the tanks." Restricted to the slow pace of the infantry, the tank was virtually forbidden to demonstrate its capabilities.

BEGINNING OF THE MODERN ARMOR CONCEPT

The period between the world wars was one of development, of both materiel and tactics. There was sharp disagreement among military men of all countries on the future employment of armor. One group maintained that the only use for tanks was in a supporting role to aid the infantry in reaching and holding its objectives. It had been proved in World War I that tanks so employed were highly effective. Another group maintained that tanks employed in mass, taking full advantage of their mobility, could produce decisive results.

With the idea that the main role of tanks in any future war would be close support of infantry, the National Defense Act of 1920 assigned the Tank Corps to the Chief of

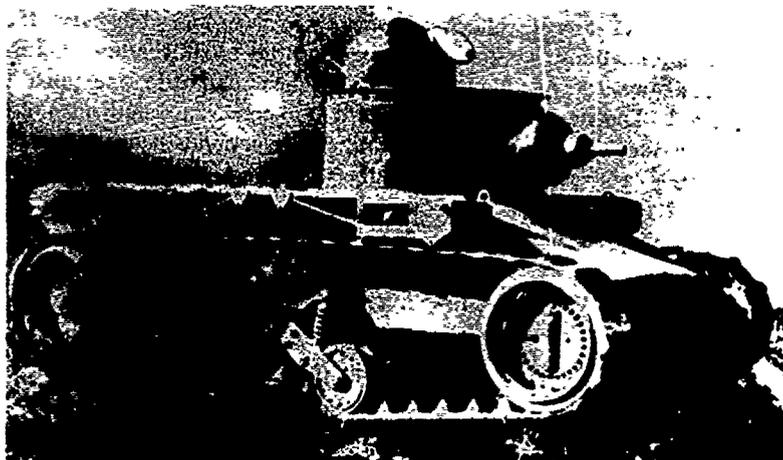
ties. On occasion, however, the rash new weapon did break the law. On 31 May 1918, in the heat of battle, the tanks charged out to the objective far in advance of the infantry. When the generals heard of this, they ordered the tanks back to escort the infantry forward.

But in time and with the calmness that follows conflict, the more discerning military minds, such as General Fuller, DeGaulle, Hart, and General Chaffee, realized that the tank had restored mobility to the battlefield and introduced a new weapon of offense to counteract the machinegun, that infantry now possessed a worthy teammate, and that shock effect, which had disappeared with the exit of the massed horsemen, was again an active battlefield agent.

A few farsighted men believed that the most important role the tank played in its first engagement was one of affecting morale. The tank's shock effect, its ability to stun the soldier until his mind is dominated by his emotion of fear and self-preservation instead of sound judgment and reasoning, was a weapon that commanders used to attack the nerves of an army and to spread terror throughout its organization. With its nerves thus attacked, the army's will to resist was soon replaced by the desire to live.

Infantry. The remnant of the Tank Corps was broken up into separate companies and assigned on the basis of one tank company to each infantry division. A few other units were formed into infantry-tank regiments. The Tank School was first organized at Fort Meade, Maryland, but in 1932 was transferred to Fort Benning, Georgia. In 1933 it was redesignated as the Tank Section of The Infantry School.

The doctrine that the tank would be used solely to support the infantry affected the development of tanks. Their mission required that they be slow, have great crushing power, and be capable of withstanding the weapons of the day. (See figures 9-16 for examples of American tanks produced during this period.)

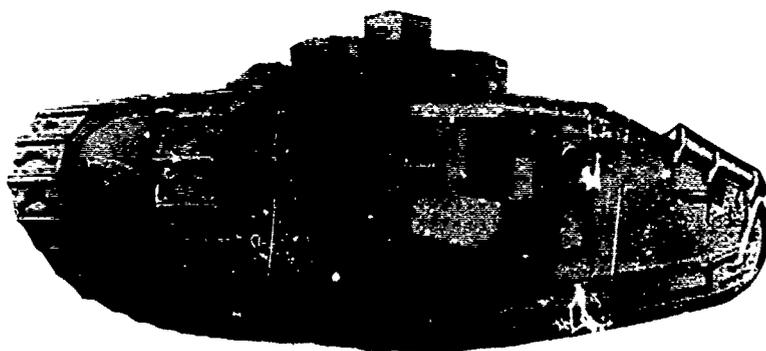


GENERAL DATA

CREW: 3.
ARMAMENT: One 6 pounder (57-mm—2.24 in) gun in main turret and 1 cal .30 machinegun in upper turret.
ARMOR: 0.25 to 1.0 in.
MAXIMUM SPEED: Unknown.

DIMENSIONS: Length, 18 ft 2 in; width, 8 ft 6 in; height, 9 ft.
WEIGHT: 13.5 tons.
ENGINE: Christie, 6-cylinder, 120 hp, forced water cooling.
CRUISING RANGE: 35 mi.

Figure 9. Christie tank.

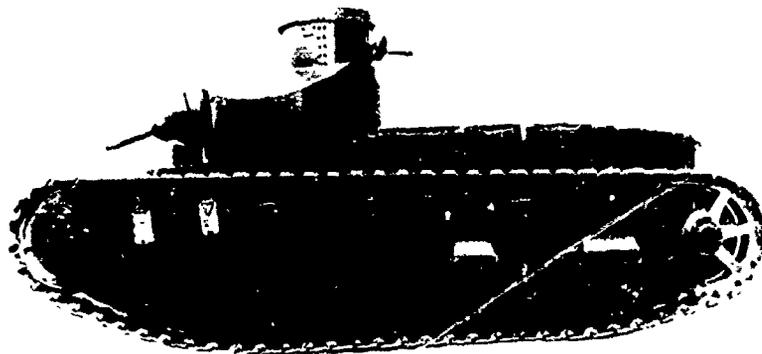


GENERAL DATA

CREW: 11.
ARMAMENT: Two 6 pounder (57-mm—2.24 in) guns and 5 cal .30 machineguns.
ARMOR: 0.236 to 0.63 in.
MAXIMUM SPEED: 6.5 mph.

DIMENSIONS: Length, 34 ft 2½ in; width, 12 ft 5 in; height, 10 ft 2½ in.
WEIGHT: 43.5 tons.
ENGINE: Liberty, 12-cylinder, V-type, 338 hp, forced water cooling.
CRUISING RANGE: 50 mi.

Figure 10. Mark VIII tank.



GENERAL DATA

CREW: 4.

ARMAMENT: One 6 pounder (57-mm—2.24 in) gun and 1 cal .30 machinegun in main turret; 1 cal .30 machinegun in upper turret.

ARMOR: 0.375 to .0 in.

MAXIMUM SPEED: 10.1 mph.

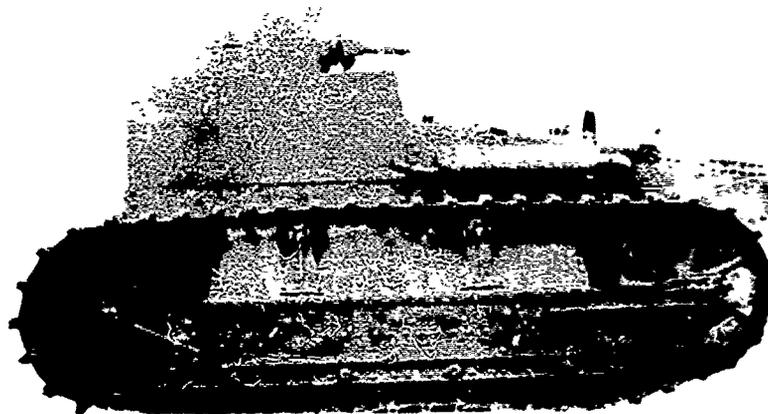
DIMENSIONS: Length, 21 ft 5 in; width, 8 ft; height, 9 ft 9 in.

WEIGHT: 23 tons.

ENGINE: Murray and Iragurtha, marine, 6-cylinder, maximum hp 250, governed hp 170, forced water cooling.

CRUISING RANGE: 50 mi.

Figure 11. Medium Tank A, M1921.



GENERAL DATA

CREW: 2.

ARMAMENT: One 37-mm (1.46 in) gun and 1 cal .30 machinegun in 1 mount.

ARMOR: 0.25 to 0.375 in.

MAXIMUM SPEED: 20 mph.

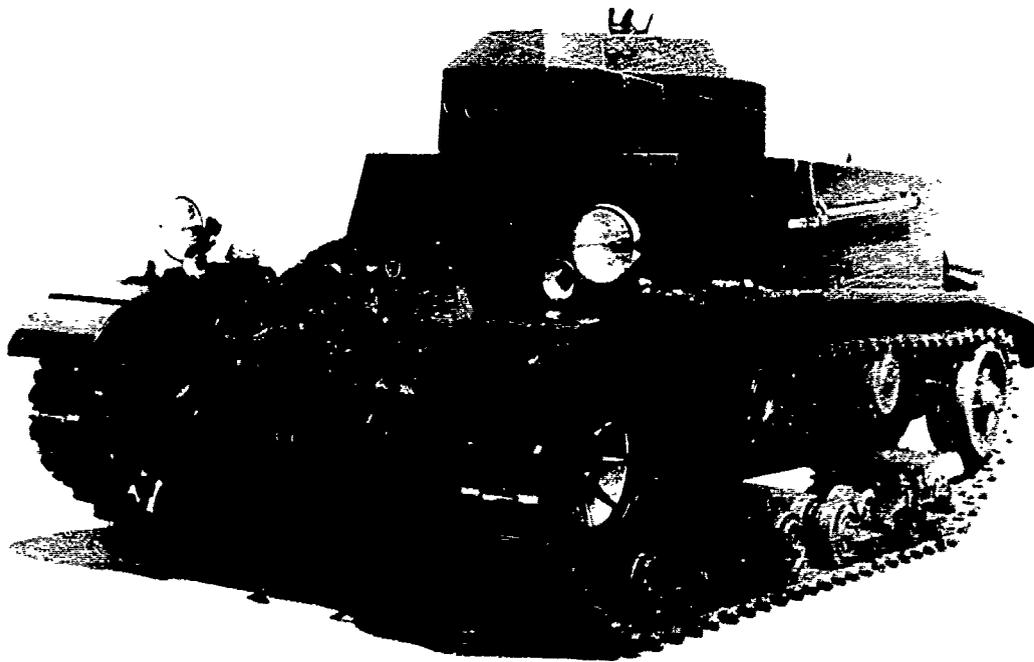
DIMENSIONS: Length, 12 ft 6 in; width, 5 ft 10½ in; height, 7 ft 1½ in.

WEIGHT: 7.5 tons.

ENGINE: Cunningham, 8-cylinder, V-type, 105 hp, forced water cooling.

CRUISING RANGE: 65 mi.

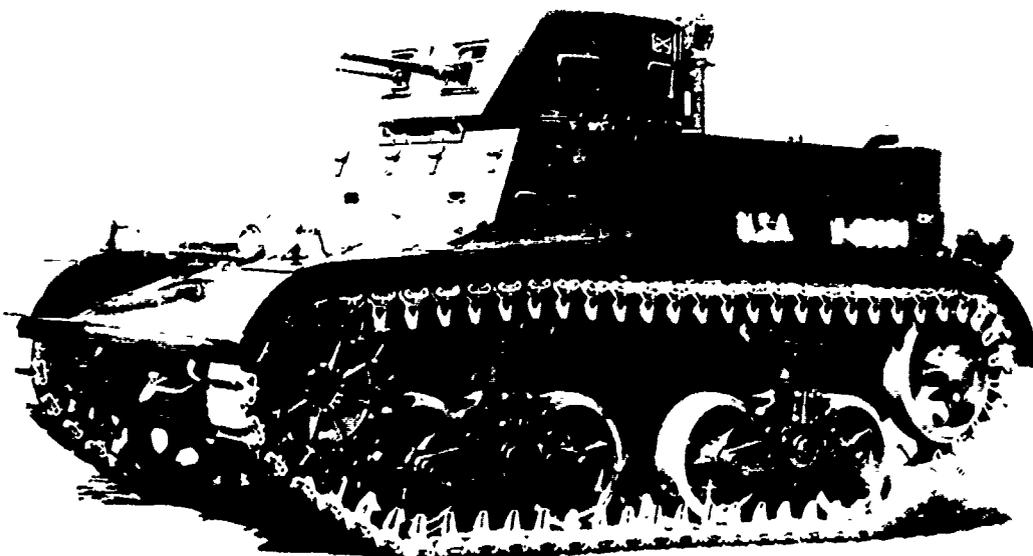
Figure 12. Light Tank, T1.



GENERAL DATA

ARMAMENT: Two cal .30 machineguns, 1 cal .50 machinegun.	MAXIMUM SPEED: 35 mph.
ARMOR: $\frac{1}{8}$ to $\frac{1}{2}$ in.	WEIGHT: 12,705 lb, unloaded.
	ENGINE: Continental aircraft, 7-cylinder, radial.

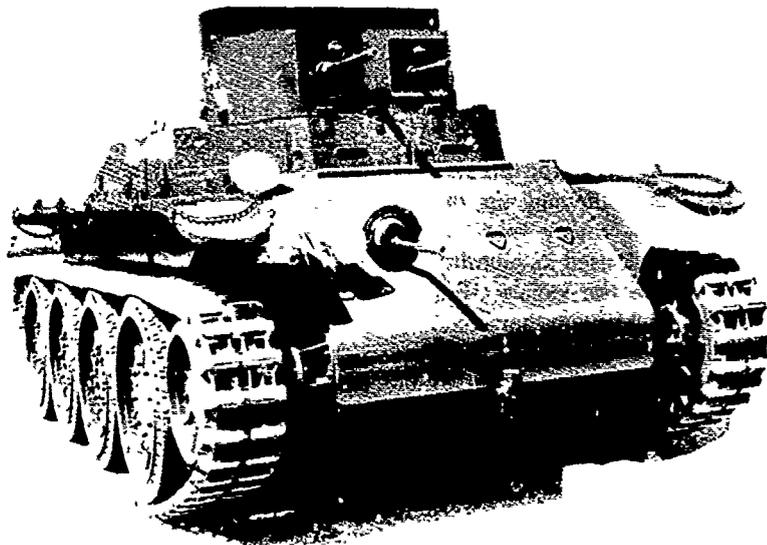
Figure 13. Light Tank, T2.



GENERAL DATA

ARMAMENT: Two cal .30 machineguns and one cal .50 machinegun.	MAXIMUM SPEED: 45 mph.
ARMOR: $\frac{1}{4}$ to $\frac{1}{2}$ in.	WEIGHT: 19,000 lb.
	ENGINE: Continental 7-cylinder, radial.

Figure 14. Combat Car, M1.



GENERAL DATA

ARMAMENT: One cal .50 machinegun; 2 cal .30 machineguns.

ARMOR: 0.25 to 0.63 in.

MAXIMUM SPEED: 35 mph.

WEIGHT: 13.5 tons.

ENGINE: Continental, 7-cylinder, 120 hp.

Figure 15. Medium Tank, T4.



GENERAL DATA

ARMAMENT: Two 37-mm guns, 6 cal .30 machineguns.

ARMOR: 1.0 in.

MAXIMUM SPEED: 30 mph.

WEIGHT: 15 tons.

ENGINE: Continental, 7-cylinder.

Figure 16. Medium Tank, T5, phase 1.

This concept left a very decided gap in our military doctrine. The employment of cavalry troops in mass to provide the shock power, the maneuver element, and the force that could exploit a victory, was even then a thing of the past. Cavalry had the mission from Napoleon's time of following up the victory and preventing the enemy from reorganizing. It did not fire; it used its mobility and shock effect to ensure the victory. But with the advent of the machinegun, horsemen charging with drawn sabres became a thing of the glorious past. There was nothing to take its place.

In 1928, the embryo of a new doctrine was conceived, unknowingly perhaps at first. Secretary of War Dwight F. Davis visited England in 1928, and witnessed a tank demonstration at Aldershot. The British at that time were well advanced in mechanized work, having organized on the Salisbury Plains a small "Armored Force," the forerunner of their Royal Armored Corps. This armored force was built around a battalion of 48 medium tanks, some small tanks, or tankettes, and supporting units of artillery, automatic weapons, engineer, and signal. Mr. Davis was impressed by the massed employment of armor. When he returned to the United States, the Secretary instructed that steps be taken to develop an adequate tank force in the American Army. After 2 years of intensive experimentation, the Army in 1930 assembled at Fort Eustis, Virginia, the first elements of what was to become a permanent mechanized force. This 1930 experiment, although valuable in later years, was soon abandoned and the various arms and services were then directed to carry on their own experiments in mechanization. At that time the infantry was the only combat arm that had any tanks; the National Defense Act of 1920 provided that the tanks would be a part of the Infantry. How would the other branches, the Cavalry for example, develop armor? True, the Cavalry did have some armored cars, but early in the experiments these were deemed inadequate.

To allow the Cavalry to develop armor along lines independent of the Infantry, the mechanized cavalry was formed under the

Chief of Cavalry. Though not equipped with tanks, its so-called combat cars were similar to the infantry tanks. The Cavalry took over the role of developing the reorganized nucleus of the Fort Eustis contingent, with Colonel Daniel Van Voorhis commanding, and Lieutenant Colonel Adna R. Chaffee as executive officer. Camp Knox, Kentucky, was selected as the new home of the mechanized cavalry. The 1st Cavalry Regiment, stationed in Texas, was moved to Fort Knox on 16 January 1933; on 6 September 1936, the 13th Cavalry Regiment, commanded by Colonel Charles L. Scott, was transferred from Fort Riley to Fort Knox, and was mechanized. The 7th Cavalry Brigade (Mechanized) finally consisted of these two regiments and supporting artillery.

These pioneers had a new idea. They visualized the first mechanized force in the United States executing missions based on speed, firepower, shock effect, and a wide operating radius. The new combat cars had speeds exceeding 40 miles per hour and had a radius exceeding 125 miles. They mounted caliber .50 and caliber .30 machineguns, potent weapons of the day. The missions of this type of a force would include exploitation of a breakthrough, seizing distant key point, and making wide flanking maneuvers to strike the enemy deep in his rear areas. This force was visualized also as the ideal weapon for counterattack operations. These early tankers saw the tanks taking over the historic role of Napoleonic cavalry. They conceived of armor as a strategic threat—a weapon that army commanders could use to affect decisively the outcome of any war. They conceived of armor as a weapon of shock, a weapon to paralyze the minds of the enemy with fear.

It was General Chaffee who said, "If fast tanks can operate in this manner, we will greatly aid in restoring mobility to warfare; in keeping with the doctrine of operating on the flanks and rear and through the gap, and in forcing the enemy to make detachments to guard his lines of communication, important bridges, airdromes, and bases, we would so considerably weaken his main forces in battle that a quicker decision will be reached."

A new role for armor was conceived, with the result that now armor had two roles: the tanks of the Infantry would support the riflemen, and the tanks of the Cavalry would be assigned missions requiring independent action, using great mobility and firepower. The War Department, in the meantime, decentralized the development of mechanization, as distinguished from motorization, to all arms and services. It was decided that the Infantry and the Cavalry would get the tanks, since they were the two arms that could best exploit tank potentialities.

The Infantry continued to develop tank units that were organized for close support of the Infantry. These tank units did not need reconnaissance, security, or other organic

supporting weapons; they were merely another Infantry support weapon. But the Cavalry, finally beginning to substitute the tank for the horse, looked to this new mechanization for missions of a more independent type. The Cavalry actually began to expand on its old traditional missions; it visualized a type of organization that would have organically, all the elements needed in modern warfare—tanks, infantry, artillery, air, signal, engineer, and other combat support units.

This conception of a combined arms team, with all its members united in the support of the forward movement of the tank, gave rise to our present term of "armor" and to the type of armor organization that we have in the Army today.

ARMOR IN WORLD WAR II

When Germany invaded Poland in September 1939 it had about 10 armored divisions. The armored divisions were not massed as an armored army; they were initially held in the rear of the attacking armies until a break in the enemy front had been effected, and then were used to exploit the breakthrough. The Germans advanced 40 miles a day and completed their conquest in 18 days. When the Germans began their campaign on the Western front in 1940, the armored divisions were organized into corps and into an armored army. This time they struck with their panzer divisions outflanking the Maginot Line, through country that was considered unsuitable for tanks, and raced to the English Channel in 11 days.

"The important lesson in the French campaign is the use of an armored force as an independent army. This armored army supported by combat aviation made the main strategic and tactical effort of the German Field Forces. Its attack was made through an extremely rugged terrain zone using only the combined arms of its component elements." (Major General Adna R. Chaffee.)

The early success of German armor hurried the creation of our own armor organization. A War Department order of 10 July 1940 created the Armored Force, consisting of the

1st and 2d Armored Divisions and the 70th GHQ Tank Battalion. The Armored Force School and Replacement Center, now the Armor School, was established 1 October 1940 at Fort Knox, Kentucky.

During the early stages of World War II the United States had the opportunity to profit by the German lessons of the Polish and French campaigns, but the logic and imagination of such leaders as General Chaffee were not always used promptly. Before the Congressional Subcommittee on Appropriations, 14 May 1941, General Adna R. Chaffee, the Armored Force Commander, stated: "Even after the experiences of the Polish campaign . . . the French had no concept of the unified tactical action of the combined arms grouped in the armored division, nor of . . . the supreme importance of the role of combat aviation combined with the armored force." He also noted that, prior to the present war, the British ". . . failed to evaluate properly the importance of the combined arms in armored units. Especially did they fail to appreciate the importance of specialist infantry and combat aviation support . . ."

Despite the fact that as late as June 1941 there were only 66 medium tanks in the United States Army, visions of armored armies, corps, and divisions were current. General Chaffee defined the role of the

armored division as "the conduct of highly mobile ground warfare, primarily offensive in character, by a self-sustaining unit of great power and mobility."

With the organization of armored divisions, the long envisioned team of combined arms was now in existence. The original roles of the tank were still considered appropriate; the United States entered World War II with the tank in two basic roles—the separate tank battalions were organized and trained to support the infantry division, and the armored divisions were organized for missions requiring independent action, using great mobility and firepower. In the battles for Poland and for France, German armor performed the same two missions.

The initial doctrine for our armored forces envisioned that our tanks were supposed to avoid battle with enemy tanks. The Germans, in their initial campaigns of 1939 to 1941, met little effective enemy armor. There were few, if any, battles of massed tanks on the European continent up to this time. But in Africa, in the Libyan Desert, because of the wide expanse of terrain, a new theory was developing. There, armored armies were fighting each other. There, battles were fought with as many as 500 tanks on each side. Mobility, surprise, and shock were the deciding factors, and armor provided all of these to the greatest degree possible at the time. Armor provided its surprise by doing the unexpected. This capability to do the unexpected was given to armor by its ability to move great distances and arrive on the battlefield ready to fight instantly. In the Libyan Desert, tanks fought tanks and tanks protected the infantry from other tanks.

The US landing in North Africa began at Safi Harbor, Fedala, Mehdia, and Oran on 8 November 1942. Tank elements of the 1st and 2d Armored Divisions, including the 1st, 13th, 6th and 67th Armored Regiments, participated in the initial assault of the beaches and the establishment of the beachheads. Initial tank vs tank engagement between German and US Forces occurred in Tunisia later in November 1942. It was in these engagements that history was made and lessons learned regarding armor

operations that helped the US Army armor units to achieve success in later battles. From that point and until the completion of the North African Campaign, US Army armor units, principally the 1st Armored Division consisting of the 1st and 13th Armored Regiments, and 6th Armored Infantry Regiment, won and lost battles against the Axis Forces.

Some of the more notable actions that included armor units were the battle of Sidi-Bou-Zid, Medjez El Bab, Kasserine Pass, and Sbiba Pass. The battles at Kasserine Pass and Sbiba Pass were fought against the Forces of Field Marshal Rommel, the famous German armor leader.

The 2d Armored Division and elements of the 1st Armored Division also participated in the Sicilian Campaign. These two divisions had acquired valuable experience in assaulting beaches and establishing beachheads in the North Africa landing in November 1942. This experience, and the opportunity to study the result of the battle of Tunisia and become familiar with captured German vehicles and equipment, helped better prepare them for assault landings at Sicily and the mainland of Italy, which were to come sooner than expected.

The invasion of Sicily involved some 3,000 ships, landing craft, and assault barges for carrying US, British, and Canadian troops and equipment. After a softening of the enemy defenses in Sicily by bombing, the assault began. On the night of 9-10 July 1943, American parachutists landed behind the German-Italian lines. While it was still dark the next morning, landing craft, carrying the 2d Armored Division, among the initial force of 160,000 men, 1,800 guns, and 600 tanks, started the 1st Battalion of the 41st Armored Infantry and the 18th Regimental Combat Team (attached) ashore, along with division headquarters. High surf prevented landing of the rest of the tanks and armored vehicles until daylight. By nightfall the entire division, less Combat Command A, was ashore just east of Gela.

Here on Sicily's shores, tanks were playing almost all armor roles—tank versus tank, in direct support of infantry, and support by fire only—and were reshuffled among these

roles as tactical requirements demanded. Attached to infantry, 2d Armored Division tanks repulsed without loss repeated German tank attacks in the 3 days of establishing a firm beachhead at Gela. Without tanks, the 1st Infantry Division would have had to rely on its cannon companies and artillery for defense against these tank attacks, which included "Tigers." Throughout the Sicilian campaign "the 2d Armored contributed to the success obtained, and its operations stressed mobility and firepower. The capture of Palermo furnished a perfect example of the use of a large armored unit (2d Armd Div) in battle. During the first week of the operation, this unit was held in reserve. Infantry divisions on the flank were ordered to breach the defenses of one of the Sicilian valleys running north to Palermo and the 2d Armored was on a 6-hour alert. When the opportunity presented itself the corps commander shot the armored division through the hole, and Palermo was captured almost on schedule. Box score in Sicily: 21 American, 89 Axis tanks lost. A great deal of credit for success was due to efficient handling of supplies, fuel and ammunition despite constant enemy air attacks, overextended supply lines, and hazardous road conditions." (Maj Gen Alvin Gillem, Jr., in Armored Force News of 9 August 1943.)

On 3 September 1943, the British Eighth Army crossed the Strait of Messina from Sicily and landed near Reggio, Italy, in an effort to divert defending German forces from the site for the main attack. The main allied attack, consisting of the Fifth Army, was launched on the beaches of Salerno on 9 September 1943. The first week in this beachhead pointed up the value of having armor land in one of the first 3 waves, as tanks from the defending German 16th and Hermann Goering Divisions maintained continuous pressure on the assault forces. The slow advance up the mountainous peninsula was an infantryman's war with only occasional bursts by the few armor forces committed.

Two elements of the 1st Armored Division, part of the Fifth Army, participated in the 9 September 1943 assault at Salerno—27th

Armored Field Artillery Battalion, and 16th Armored Engineer Battalion (-). In November the rest of the division arrived from North Africa and joined in the fighting up the mountainous peninsula until January 1944. The 1st Armored Division then split into 2 parts, Headquarters and main body going to the new front opened on the Anzio beachhead under VI Corps, while Combat Command B remained at the Rapido River, where that front was at a stalemate. On 30 January the division (-) landed at Anzio and attacked the German-Italian dug-in defenses 7 miles inland. Again it was armored force against armored force, ambush after ambush by German 88's, and counterattack after counterattack. The steep mountains, which were of great advantage to the enemy, the mud from constant rain, and stubborn enemy resistance caused the VI Corps to go over to the defensive on 3 February, after getting 15-18 miles inland and losing 6,487 killed and wounded. In a month of continued fighting in either supporting roles or limited-objective attacks, although disappointing because of the relatively long time and cost, the 1st Armored had adapted its operations to prevailing conditions. Although the soggy ground severely restricted all tank movement to roads and small groups, the division, reunited in May, was the principal power in the Allied spring offensive that broke the Anzio "wait" and carried through to liberate Rome. The aching work, tedious waiting, nerve-wracking exposure on the Anzio beachhead, the ceaseless attacks that followed the breakout—all were rewarded now with the opportunity to fight as an armored division was meant to fight—pursuit north out of Rome that paused only about one month later, when the Fifth Army reached the Arno River.

In Normandy, on D-day, 6 June 1944, the first armor units to land were elements of the 741st and 743d Tank Battalions, which rolled ashore with the first wave at Omaha Beach, and of the 70th Tank Battalion, which landed at Utah Beach. The mission of these tank battalions after landing was to assist the infantry to drive forward and secure positions from which the armored divisions could

exploit their success. General Dwight D. Eisenhower, Supreme Commander Allied Forces, in his report said, "Comparatively light casualties were, in a large measure, due to the staggering fires and material effect of the mass of tanks landed in the leading waves of the assault." Here we find armor performing magnificently in one of its basic missions—the support of infantry units.

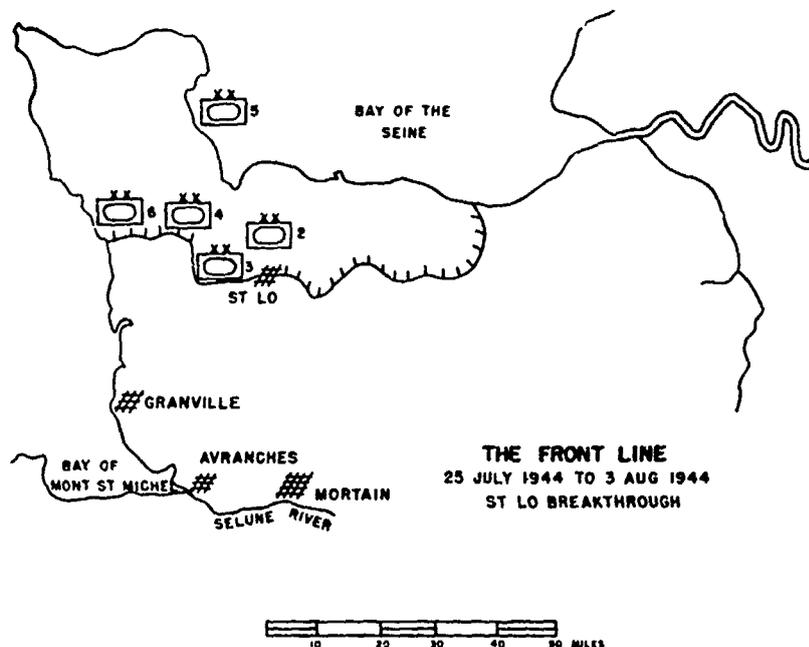
Armored divisions started to land in the beachhead on D plus 4. The 2d Armored Division landed first, followed by the 3d, 4th, 5th, 6th, and 7th Armored Divisions. Elements of these armored divisions were used to support infantry attacks during June and July, before the main Allied effort was made. Certain features of topography, mainly the maze of hedgerows, tended to restrict the mobility of armor. The infantry, however, was materially aided by the firepower of armor.

On 24 July, the American forces were ready for the breakout from the beachhead—Operation COBRA (fig 17). This attack was materially assisted by British efforts on the north, where the British 7th and 11th Armored Divisions were engaging the bulk of the Ger-

man armor. By this time the infantry divisions of the American Army had driven to a line running northwest and southeast of St. Lo.

Operation COBRA was one of the most decisive operations of the war in Europe. It was a successful attack by the team of combined arms, with each arm playing its major role; there were infantry divisions, armored divisions, mechanized cavalry groups, and separate tank battalions; all supported by tactical and strategic air. The operation began with one of the largest air support bombardments of the entire war; 2,500 supporting aircraft flew over St. Lo to saturate an area 6,000 yards wide by 3,000 yards deep. This was followed by close tactical air support. In this operation, the infantry divisions, with separate tank battalions in support, made the initial hole in the enemy's lines and held the shoulders of the penetration. The armored divisions with close fighter support over advancing columns drove over 400 miles into the rear of the German lines, and were finally stopped by a lack of supplies at the German border on 12 September (fig 18).

Only once during this operation had the Germans threatened—at Mortain from 7-10



RENNES## Figure 17. The line through St. Lo, 25 July 1944.

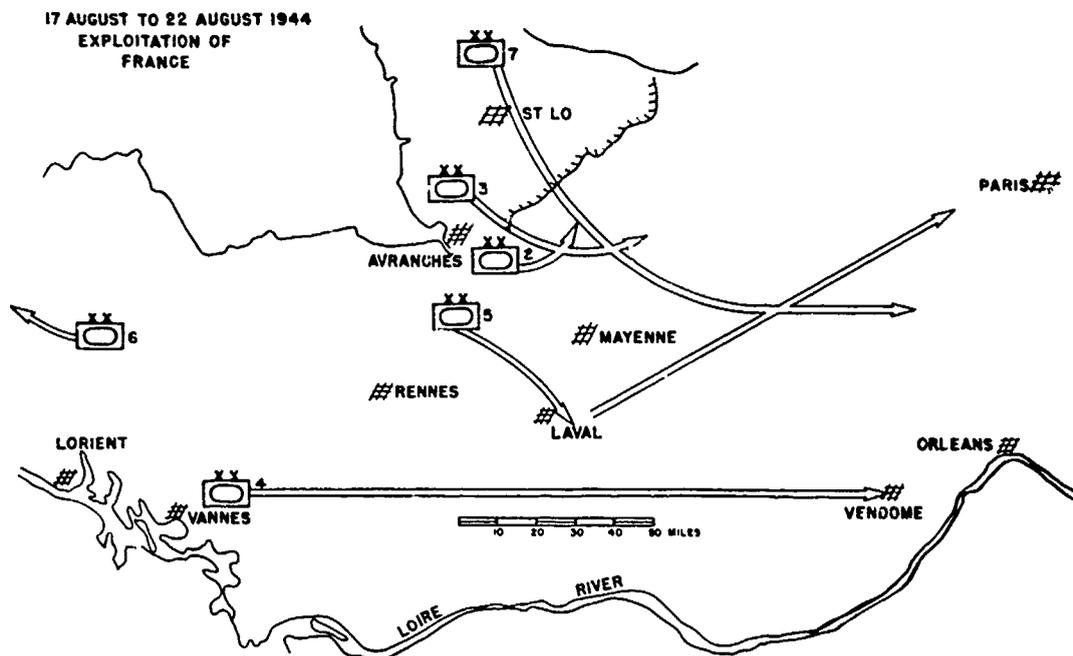


Figure 18. Armor advances through France.



Figure 19. Tank-Infantry Team—US Armor Unit passes through Alzey, Germany, 1945.

August. Here the Germans succeeded in massing four panzer divisions for a drive to the sea. The attack struck the 30th Infantry Division and the Germans took Mortain. At this time, Combat Command B of the 3d Armored Division was moved to the north flank of the 30th Infantry Division. For 4 days the American forces beat off repeated German attacks, and held the German advance to 3 miles. Finally, on the 12th of August, the Germans had to admit failure, and Mortain was retaken.

Cavalry regiments, after the start of World War II, performed the traditional roles of cavalry as fully mechanized units. Many were cited for their outstanding accomplishments on the field of battle.

Mechanized cavalry groups during World War II were the major ground reconnaissance units in our Army. They were lightly armored and performed reconnaissance missions in small teams of armored cars and jeeps. It

was difficult for these light formations to penetrate the security forces of the enemy. It became customary to reinforce them, and, using aggressive tactics, they were able to penetrate the enemy security forces. In the latter stages of the war, mechanized cavalry groups were being employed as light, armored, highly mobile task forces to drive deep into the enemy rear.

Allied employment of armor in the Pacific was similar to that in Italy. The tanks were used mainly to support infantry advances. Flamethrower tanks were used very effectively to reduce field fortifications. There were no wide sweeping land campaigns in the Pacific island-hopping conflict. Tanks were used in a number of landings and in the confined jungle fighting, but these were slow, support-type actions without the spectacular success of the dash across Europe.

At the end of World War II, Armor was recognized as one of the major combat arms.

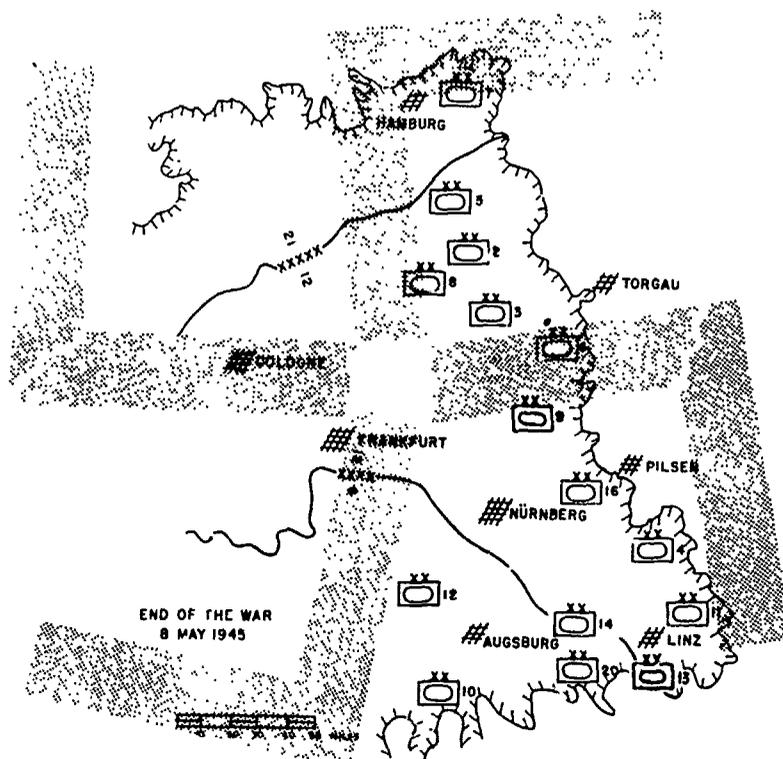


Figure 20. Farthest point of armor advance, 8 May 1945.

In the European Theatre, armor employed in mass proved to be the most effective instrument with which to exploit success. Few decisive victories were gained in World War II in which Armor did not play a part.

Following World War II a study was made of all operations that had been performed by mechanized cavalry groups to determine if the organization was adequate, based upon lessons learned during the war. The cavalry

groups were found to lack sufficient combat power to perform reconnaissance missions using offensive tactics and to provide security by engaging and delaying a superior force. The cavalry groups were reorganized to provide more strength in firepower and armor protection and to increase their cross-country capabilities. The mechanized cavalry groups were first reorganized into armored cavalry regiments (light), but were later redesignated armored cavalry regiments.

ARMOR IN KOREA

On 25 June 1950, the North Korean Communist armies attacked South Korea and the United States Army entered Korea to defend it—without tanks. The infantry divisions that had been on occupation duty in Japan were

immediately into action in Korea, but they did not have their organic medium tank battalion or their regimental tank companies. In fact only a few light-tank companies with obsolescent M24 tanks were available in Japan.



Figure 21. Tank-infantry team in Korea.

But it was not thought initially that the lack of tanks would be a major drawback, for the rugged, mountainous terrain of Korea with its few level areas covered by marshlike rice paddies was not considered suitable for their employment.

The North Koreans, however, employed tanks, and on 5 July 1950 the first US unit from Japan, Task Force Smith, was overrun by 31 T34 Russian-made tanks. The North Koreans continued to employ their tanks in these early days with devastating effect, since the US forces had practically no tanks with which to stop them. A provisional tank unit was quickly organized with the few tanks that were available in Japan, and four tank battalions were hurriedly shipped from the United States. With this minimum of tank support, the US forces were finally able to stop the communists and hold them along the Naktong River line. The Pusan perimeter was established, which permitted the US forces an opportunity to build up an offensive force.

On 16 September 1950, the 1st Marine and the 7th Infantry Divisions, both supported by tanks, effected an assault landing on the west coast of Korea at Inchon. They pushed inland rapidly and retook the capital, Seoul. Concurrently, US forces in the Pusan perimeter launched a violent attack to the north and west to link up with the amphibious forces and split the communists. Led by elements of the 70th Tank Battalion, the 1st Cavalry Division drove 106 miles in 11 hours and made the linkup north of Osan. Armor continued to play an important role in small unit actions until the end of the war.

The lessons of World War II, that tanks are necessary to fight other tanks and to spearhead offensive war, were re-emphasized. It was further demonstrated that armor is able to operate in terrain that is generally unsuitable for tank employment. The Korean campaign also supported the contention that when one force has armor and the other does not, that force without armor will lose.

THE SUCCESS OF ARMOR IN VIETNAM

All past wars, including Korea, demonstrating that the man who possesses the mobility edge and can fight while mounted has a distinct advantage over an opponent who must fight on foot. In the early days of US involvement in Vietnam (prior to the 1965 buildup), it was generally believed that the only units suited to the terrain, enemy, and area warfare environment were unconventional units. It was further believed that armor units in particular, would not play a significant role in the stability operations being conducted there. History, of course, has proved these beliefs invalid.

From 1965 to 1969 we saw a significant increase in the mix of mounted units in our force structure in Vietnam. This increase was brought about by three factors.

First—The nature of the enemy was changed from small guerrilla units to well-trained and equipped North Vietnamese army regiments and divisions. These forces still retain many of the tactics predominant

in guerrilla warfare, but also rely on conventional tactics whenever the need arises. The armament of the enemy has been expanded to include more modern small arms, a greater antitank and antiair capability, more use of mines-antitank as well as antipersonnel; increased use of heavier mortars, and the introduction of artillery, tanks, and free flight rockets. Additional armor, with its inherent protection against small arms, antipersonnel mines, and the mobility and firepower to gain a tactical advantage, was required.

Second—A study of armor operations completed in early 1967 concluded that the enemy, area type war, and especially the terrain in Vietnam were different from those in the more familiar forms of warfare encountered in World War II and Korea. It was found that tactics and techniques were being modified or changed to fit the requirements of area warfare; however, mounted doctrine, organizations, and equipment which evolved from those earlier conflicts *remained valid*. The study further concluded that although the



Figure 22. Armor in Vietnam.

weather and terrain in parts of the country did restrict the mobility of certain items of equipment and certain organizations, some forms of mounted combat could be effectively employed in most areas and under most weather conditions. Subsequent adjustment of mission assignments for armor units, based on the conclusions of the study, increased the effective utilization of those units in active combat. Commanders increasingly altered their approach to the use of mounted units as the success of the far ranging armor units became apparent.

Third—Those few mounted formations in country in 1966 and early 1967 had achieved significant success in combat. Units equipped with the M113 were effectively employed even in the Mekong Delta. The 11th Armored Cavalry Regiment and other units had proved that mounted formations could conduct operations more easily and more effectively than dismounted formations in areas such as the "Iron Triangle" and War Zone C northwest of Saigon. Operations CEDAR FALLS and JUNCTION CITY I and II, in the spring of 1967, dispelled all doubts about the effectiveness of such large mounted formations as the 11th Armored Cavalry Regiment. The air

cavalry squadron of the 1st Cavalry Division (Airmobile) had proved itself, as well as a new concept for use in all types of weather and terrain, and in all forms of combat.

The campaigns of late 1967 found mounted formations playing an increasingly significant and vital role. In II Corps, for example, a battle for the coastal plains of Binh Dinh province saw the 1st Cavalry Division (Airmobile) achieve outstanding results with its air cavalry squadron, one tank company, and a mechanized infantry battalion. The tanks and mechanized infantry were particularly effective fighting in hedgerows and in the fortified villages and hamlets. Farther to the north in I Corps, one air cavalry troop alone killed over 66 enemy in the Chu Lai area during the last 90 days of 1967.

During the Tet offensive of 1968, armor again demonstrated its ability to be flexible and responsive to the immediate needs of the commander. During the night of 30-31 January, (when the enemy initiated his attack throughout the republic) the main thrust of the North Vietnamese attack was directed at the capital city of Saigon, in the III (RVN) Corps area. In response to the attack, the 3d Squadron, 4th US Cavalry, and 1st Squadron, 4th US Cavalry, were immediately directed

from field operations and directed to relieve the intense pressure on the US/RVN Air Base at Tan Son Nhut, in the Thu Duc district north of Saigon. The 3d Squadron moved immediately south on Highway 4, and by day-break had fought its way into the enemy position west of Tan Son Nhut. This action completely disrupted the enemy's intent to seize the airbase and he was forced to withdraw. The 1st Squadron initially conducted offensive operations north of Saigon, then moved to the Thu Duc district to engage enemy units in bitter house to house combat. Throughout the Saigon area, fighting elements of the 3d Squadron, 17th Air Cavalry, supported ground units with close accurate fire and reconnaissance.

Farther north in the III Corps area, the 11th Armored Cavalry Regiment was ordered to move from its area of operations around Loc Ninh to the Bien Hoa-Long Binh area to assist in the defense of the Bien Hoa Air Base and secure the headquarters complex at Long Binh. Marching throughout the night, the 11th moved south through mine fields and road blocks to fight its way into the Bien Hoa area. The 3d Squadron hit the enemy in the city of Bien Hoa at first light and annihilated his forces there. The 2d Squadron moved swiftly into a position between Bien Hoa and Long Binh to thwart any attempt to free the enemy prisoners of war in the III Corps PW compound, while the 1st Squadron surprised

the enemy units attempting to overrun the US II Field Force Headquarters at Long Binh. This latter action completely destroyed the enemy's efforts to seize control of the headquarters complex and disseminated the enemy unit making the attack. The mobility and firepower of the 11th Armored Cavalry Regiment, as shown in this engagement, enabled the embattled command to employ the regiment to its maximum capability.

In the I (RVN) and II (RVN) Corps areas, similar acts were carried out by such units as 1st Battalion, 69th Armor, 1st Squadron, 1st Cavalry, and 1st Squadron, 9th Air Cavalry. As the offensive receded, armored units remained in the field, using their mobility to hunt down and destroy the retreating enemy.

So we saw the pendulum swing from little or no mounted combat elements in Vietnam to the point where they represented a significant percentage of the Army's total combat power. We saw armor capitalize on its extensive mobility and make maximum use of the far-reaching reconnaissance capability and the destructive firepower of its air cavalry elements to crush the enemy during his disastrous Tet offensive and to maintain the whip hand that it gained. Until final withdrawal of all American troops from Vietnam, Armor continued to keep the North Vietnamese forces off balance and to prevent them from mounting any significant offensive actions.

THE FUTURE OF ARMOR

Armor is a concept of employing the characteristics of mobility, firepower, and shock effect to defeat an enemy force by a combined arms team, characterized by a predominance of mounted combat. This team includes tanks, armored cavalry, air cavalry, attack helicopters, mechanized infantry, artillery, and engineers, all supported by a flexible and rapid communication network, and a highly mobile and responsive combat service support system. While the tank is the principal armor-defeating weapon in the armor team, its primary role is not the defeat of other tanks, but

rather, when massed, the destruction of the entire enemy force. The combination of tremendous firepower, armor protection, speed, and mobility provide an effect that crushes and demoralizes the enemy. In concert with the responsiveness and flexibility of the air cavalry, armor ground units have the ability to mount sustained offensive actions necessary for success in combat against a sophisticated or highly motivated enemy.

Armor has seen the adaption of its organizational and operational concepts by all major combat elements of the United States Army

in ROAD (Reorganization Objective Army Divisions). This application of armor doctrine is the inevitable consequence of the now widespread recognition of those characteristics of armor that make it suitable for nuclear or nonnuclear warfare—today or in the future where success continues to demand versatile combat forces, possessed of superior tactical mobility, capable of rapid concentration of strength at the point of decision, and boldly led by aggressive, imaginative, and resourceful commanders in full control at all echelons. These capabilities are embodied in armor, the strongly muscled and highly coordinated warrior of the battlefield, which, led by capable and spirited commanders, will continue to be a highly feared ground-fighting formation on the battlefield, whether the battle is joined with nuclear weapons or not.

Armor confidently looks to the future with the calm assurance that its battle tested concepts and doctrine make it a force in being ready for employment under any of the dynamic conditions of the present or future battlefield and in any type of environment. But particularly is armor suited for operations on the nuclear battlefield where the tank, with its firepower, shock effect, lethality, and mounted combat mobility, provides armor with the responsiveness and rapidity of movement that are envisioned as prerequisites for success in nuclear warfare. Additionally, the tanks' armor protection shields the crews from the effects of nuclear weapons and enables them to traverse contaminated

areas with minimum exposure to harmful radiation.

But the functions and future of armor cannot be considered without some reference to the overall broad US Army missions. Much depends upon the larger framework and technical era within which it operates. The latter is changing rapidly. Nevertheless, the future mission of the Army will be essentially unchanged—to destroy the enemy's armed forces and his will to fight; to seize, occupy, and defend vital land areas; when necessary, to occupy areas of the enemy's homeland; and to conduct operations in conjunction with other services and with allied units. The land, unlike the relatively homogeneous sea and air, is a medium of infinite variety. Its nature is complicated by variations in terrain, by vegetation, and by man-made structures. Within this complex medium, soldiers must live, move, communicate, and fight as teams. Armor has learned that the problems of land combat, therefore, are not susceptible to formulas or simple dogmas.

When one looks at the strategic scene, one is able to detect a noticeable and general trend away from the inflexible attitude that saw no alternative to peace but a total nuclear war. It is now widely recognized that such a total nuclear war could mean mutual annihilation, and that it is unlikely as a deliberate act of policy. However, there has been considerable conjecture about graduated nuclear deterrence, and current doctrines imply the use of tactical nuclear weapons even in limited-scale operations.



Figure 23. Evolution of Armor.

Regardless of the nuclear situation, armor will continue to perform its traditional mobile missions in deep penetration, wide envelopment, exploitation, mobile defense, reconnaissance and security, economy of force, close support of infantry, and destruction of enemy armor. Its capability to deliver devastating assaults during or after friendly or enemy tactical nuclear attacks will remain unchanged. Armor's power is highly selective—it can pierce the enemy with swift, rapier-like thrusts, or it can crush him with sledgehammer blows. This selectivity, which is so important because of the wide scale of environments that may be encountered on the future battlefield, evolves from the flexibility of armor formations.

This flexibility has been further augmented with the addition, in recent years, of air units. Armor's far-reaching and comprehensive research and development program has constantly sought the technological means to meet more responsively the ever-changing conditions and the added mobility demands of the modern battlefield. With expanded use of helicopters in the 1950's, armor directed its research more intensely to the utilization of air space.

Imaginative commanders, in the past, even as early as the first use of a balloon as an observation aid by the Union Army in the Civil War, had visualized and employed progressively new concepts for use of aerial platforms in combat. Utilizing studies on the employment of helicopters during the Korean Conflict and in subsequent field exercises, such as SAGEBRUSH in 1955, Armor pioneered the "Sky Cavalry Concept" for the use of helicopters. Then, based on this concept, the US Army Armor School, in 1958, developed an advance plan TOE, a training text, and a troop test for an organization designated as the "Aerial Reconnaissance and Security Troop." This was the forerunner of the pres-

ent day air cavalry troop, which continues to carry out the traditional cavalry role of reconnaissance and security. Mounted in the helicopter, instead of on the horse, the air cavalry trooper has immeasurably extended the third dimension of the battlefield.

Air cavalry has come of age and all divisional armored cavalry squadrons now have an organic air cavalry troop, and the performance of air cavalry in Vietnam has proved that the doctrine for its employment is sound, and that further development is limited solely by the initiative of the commanders. Armor's flexibility was never more apparent than in its integration of air cavalry into its operations in Vietnam.

Vietnam has also exploded the myth that armored combat vehicles are of little value in remote area conflicts. Tanks were employed effectively in most areas of Vietnam and under most weather conditions, and armor with its firepower and mobility produced massive shock effect. But the search for new and improved fighting vehicles for the arm of mounted combat goes on.

Armor soldiers mounted in superior and highly mobile armored ground and aerial vehicles, and indoctrinated with the spirit of the offensive, capably led by bold, resolute, and imaginative commanders, are the backbone of armor, the mounted Combat Arm of Decision.

Armor will continue to be flexible of mind and add to its potent arsenal by: integrating Army aviation and electronic target acquisition and surveillance means at the lowest level of command; striving to conduct combat tasks under limited visibility conditions at the same speed and tempo as daylight operations; and improving weaponry, communications, and combat vehicle design and performance. From the equipment developed to meet these tasks will evolve new techniques and procedures for the battle-tested combined arms team.

OUR MOUNTED HERITAGE

The heritage and spirit of the United States Cavalry lives today in Armor. Although the horse has been overtaken by technology, the elan, and, above all, the tradition of mounted warfare reside with Armor, now and in the future.

Time has passed the horse but the spirit of the cavalry will live forever. The spirit of the

attack, the shock, the will to fight, the ability and desire to close rapidly with the enemy that were personified in Sheridan and Stuart, rest today in our tank and armored and air cavalry units.

This spirit was perhaps best summed up by Hanson W. Baldwin in the *Baltimore Sun* some years ago:

THE CAVALRY CHARGES ON

BY HANSON W. BALDWIN

Reverse the stirrups, turn out the mounts to pasture; the cavalry has gone. The crepe is on the pommel, the mourning bow upon the sword hilt; the Cavalry has gone.

No more the glint of sunlight on the saber, the sweet music of the creak of saddle harness, the champ of bits. The sound of "Boots and saddles" sings no more across the great plains; the horse has retired from the field of battle. The "Yellowlegs," who won the west with carbine and with colt; the "Garry Owens" of the famous 7th, who died with Custer at the Little Big Horn, ride no longer; for the Cavalry has gone forever

Even the gallant name

Today for the first time in a century and a half of "Progress" there is no Cavalry in the United States Army. A signature last week—that of Harry S. Truman—was its requiem. But the president's endorsement of a bill reorganizing the Army, abolishing the Cavalry as an arm and substituting Armor for it represented merely legal recognition of historical fact.

The Man-Made Horse

Nostalgia for the past, melancholy pride in great achievements, and all the panoply of jingling harness and loopers at the charge could not hide the doom of the horse on the field of battle. Inanimate mechanisms made by men were his undoing; the machinegun, the tank and the plane were the robots which inherited his world.

Not since the 26th Cavalry, harried and bloody, tired but gallant, covered the rear guard of the Army from Damortis to Bataan had the "Yellowlegs" straddled their

mounts. The 1st Cavalry Division, a fighting outfit, was in the van of combat from Australia to Japan, but it fought dismounted, and improvised horsed commands and mule pack trains toiled in small units over the bitter mountains of Italy. In World War II, the horse, in the United States Army, had but a small role.

And so the cavalry, like all things mortal, has died.

But its soul goes marching on.

For the soul of the Cavalry is elan, aggressiveness, the will-to-fight, dash, the debonair, reckless but ordered discipline that took the hundred into the valley of death at Balaklava, that rode with Stuart and with Sheridan, with Custer and with Lee. The spirits of the Cavalry is the spirit basic to any Army, a spirit not exclusive to this arm alone, but one of which it was peculiarly possessed.

A Sense of Tradition

For the Cavalry has a sense of tradition, an awareness of its responsibility to history, to the men who have gone, to standards of the past, to the past, to those who died that the way of life we want, the things for which we fight, might live.

It has been popular in these times of fatalism and doubt to impugn tradition, to cast aside as worthless the bright heritage of valor and hope the past has given us. No more fatal mistake to army or nation is possible, for tradition, sound tradition, both civil and martial, is the inspiration for the past which must light the future.

The history of the Cavalry, gone in name but never in spirit, pro-

vides some of the finest of our Army traditions. The lilt of Von Borcke's songs, he who rode with "Jeb" Stuart, long has been stilled; Pelham's guns thunder no more; "Light Horse Harry" Lee, and Marion, "The Swamp Fox," are long dead; the dragoon with brass helmets and horsehair plumes who fought with Wayne at Fallen Timbers, live only in old prints.

Forgotten, Far-Off Things

Resaca de la Palma and the wild charge with sabers are but an incident in the history books now, and the Indian Wars, when the "Yellowlegs" fought from Red River and the Rio Grande to Montana and the Rockies, are but dates and figures. The Cheyenne, the Sioux, and the Apache are mere ghosts from a dim, forgotten past.

The men are dead, the graves grass-covered, the horses gone, even the monuments weather stained and strange, a bronze or marble charger oddly out of place in this mechanized age.

But the tattered battle streamers and the silver battle rings bear the great names of the past into the future: Bull Run, Chancellorsville, Gettysburg, Comanches, Oklahoma, The Admiralties, Leyte, Luzon, Tokyo. And the great names will not die. From Henry Dodge, the first colonel of the American Cavalry Service, to George Patton, the roll call of the Cavalry will live on.

The Cavalry is not dead; its spirit, its traditions, its immortal intangibles endure. Its tactics, its esprit are the heritage of Armor and of the Army; the "Yellowlegs" are gone but they have left behind them the things that soldiers live by.

Then we in Armor, regardless of our mount, are the preceptors and custodians of the traditions of the Cavalry and mounted combat.

ARMORED VEHICLE DEVELOPMENTS (WORLD WAR II TO PRESENT)

The period since the close of World War II has been one of continued technological developments. The concept of a nuclear battlefield has necessitated the rapid development and improvement of highly mobile armored vehicles. These developments, improvements, and changes were not necessarily caused by deficiencies in existing vehicles, but were the result of a specific program designed to create a family of armored vehicles, to make standard and interchangeable as many parts as possible, and to take advantage of the increased level of technology in the automotive industry. We shall now review the development of the primary armored vehicles organic to tank or armored cavalry units.

TANKS

The two most modern of the standard tanks at the close of World War II were the M24 light tank and the M26 medium tank. The M24 (fig 26) the predecessors of which were the M3 and M5A1 (figs 24-25), was a 75-mm gun tank with a 5-man crew. It was first produced in 1943 and made a significant contribution to the war in Europe. The M24 was subsequently replaced by the M41 light gun tank (fig 33). Its primary armament was a 76-mm gun. The chassis was completely new. It had a wide track and a lower ground pressure. The horsepower was more than doubled, and the speed and cruising range were increased. It had a crew of four.

An improved version of the M41-series tank, the M41A3, featured a fuel injector system on the main engine. The use of injectors increased the cruising range of this tank by about 20 percent.

The M26, the predecessors of which were the M3A1, M4A3, and M4A3E8 (figs 27-29), was a 90-mm gun tank that arrived in Europe in limited numbers in 1945. At that time it was classified as a heavy tank. Its long, low silhouette was a radical change from the exist-

ing Allied tanks. This tank was the result of an effort to build a tank with firepower and protection sufficient to successfully engage German Panther and Tiger tanks. The M26 (fig 30) was the first standard tank using the power package principles and the torsion bar suspension system.

The adoption of a power package principle, which permitted a great reduction in weight and size of the complete power unit, simplified removal and maintenance problems, and facilitated ease of power package exchange.

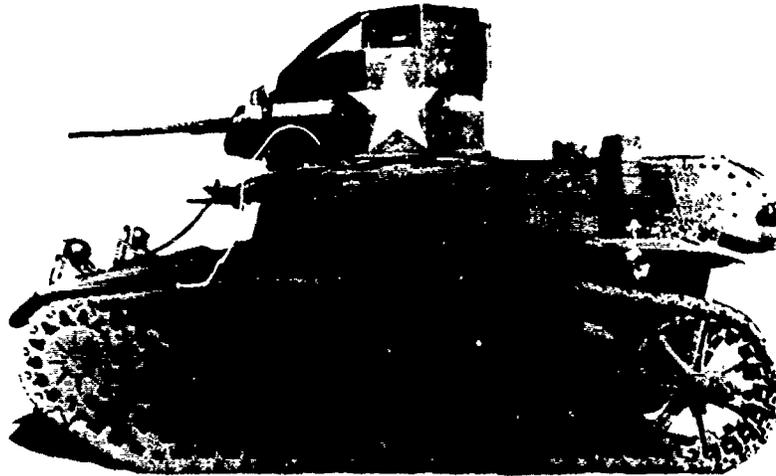
Next to be developed was a modified M26, the M46, with a new power plant and additional improvements in driving controls and operational characteristics. The M46 was used successfully during the Korean campaign (fig 31).

Following the M46 was the M47 (fig 32). While the hull and suspension system were practically the same, the turret of the M47 was new in practically all components, including size, shape, controls, armament, and sighting equipment. The greater slope of frontal armor increased the ballistic protection.

In 1953 the M48, 90-mm gun tank was introduced (fig 34). This tank had an elliptical hull and turret to provide better ballistic protection against antitank projectiles. It also had improved ammunition storage methods and a more efficient fire control system. The M48 provided for a crew of 4 in contrast to the previous 5.

A modification of the M48 was the M48A1. This tank had a cupola for the air defense machinegun, which permitted the weapon to be fired from inside the turret without exposure of the tank commander. The improved turret and fire control systems increased the accuracy of fire and the speed of engaging targets.

The M48A2 (fig 35) was another modification of the M48. This tank had fuel injection



GENERAL DATA

CREW: 4.
ARMAMENT: One 37-mm gun, 5 cal .30 machine-guns.
ARMOR: 1.0 to 1.5 in.
MAXIMUM SPEED: 34 mph.

DIMENSIONS: Length, 15 ft 10½ in; width, 7 ft 6 in; height, 8 ft 2 in.
WEIGHT: 14 tons.
ENGINE: Continental, 7-cylinder.
CRUISING RANGE: 100 mi.

Figure 24. Light Tank, M3.



GENERAL DATA

CREW: 4.
ARMAMENT: One 37-mm gun, 3 cal .30 machine-guns.
ARMOR: 0.5 to 1.5 in.
MAXIMUM SPEED: 40 mph.

DIMENSIONS: Length, 15 ft 10½ in; width, 7 ft 6 in; height, 7 ft 10½ in.
WEIGHT: 16 tons.
ENGINE: Twin Cadillac, 8-cylinder, V-type, 110 hp.
CRUISING RANGE: 100 mi.

Figure 25. Light Tank, M5A1.



GENERAL DATA

CREW: 3.
ARMAMENT: One 75-mm gun, turret-mounted, 2
 cal .30 machineguns, 1 cal .50 machinegun.
MAXIMUM SPEED: 34 mph.

DIMENSIONS: Length, 16 ft 4½ in; width, 9 ft
 7½ in; height, 8 ft 1 in.
WEIGHT: 20 tons.
ENGINE: Two Cadillac, V-type, 8-cylinder, 110
 hp.
CRUISING RANGE: 100 mi.

Figure 26. Light Tank, M2A.

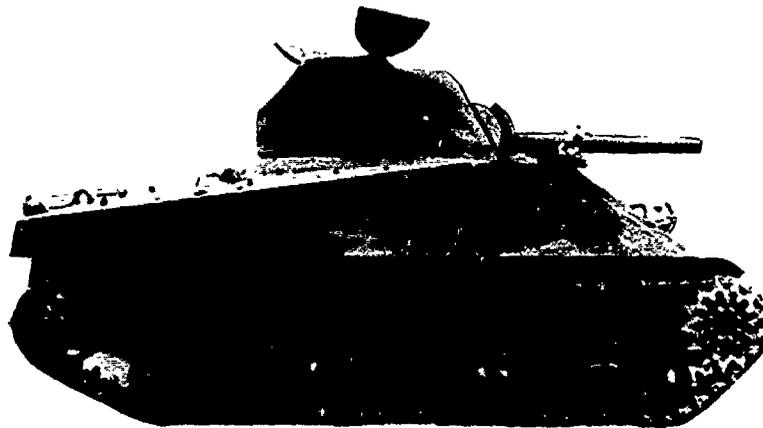


GENERAL DATA

CREW: 4.
ARMAMENT: One 75-mm gun, 1 37-mm gun, 4
 cal .30 machineguns.
ARMOR: 1.5 to 2.0 in.
MAXIMUM SPEED: 22 mph.

DIMENSIONS: Length, 19 ft 8 in; width, 9 ft 6
 in; height, 9 ft 11 in.
WEIGHT: 32 tons.
ENGINE: Gulderson or Continental.
CRUISING RANGE: 100 mi.

Figure 27. Medium Tank, M3A1.



GENERAL DATA

CREW: 5.

ARMAMENT: One 75-mm gun, 2 cal .30 machine-guns, 1 cal .50 machinegun.

MAXIMUM SPEED: 26 mph.

DIMENSIONS: Length, 20 ft 7 in; width, 9 ft 7 in; height, 9 ft 2 in.

WEIGHT: 30 tons.

ENGINE: Ford, 8-cylinder, V-type, 450 hp.

CRUISING RANGE: 100 mi.

Figure 28. Medium Tank, M4A3.



GENERAL DATA

CREW: 5.

ARMAMENT: One 76-mm gun, 2 cal .30 machine-guns, 1 cal .50 machinegun.

MAXIMUM SPEED: 26 mph.

DIMENSIONS: Length, 19 ft 7 in; width, 9 ft 7 in; height, 9 ft 7 in.

WEIGHT: 37 tons.

ENGINE: Ford, 8-cylinder, V-type, 450 hp.

CRUISING RANGE: 100 mi.

Figure 29. Medium Tank, M4A3E8.



GENERAL DATA

CREW: 5.

ARMAMENT: One 90-mm gun, 2 cal .30 machine-guns, 1 cal .50 machinegun.

MAXIMUM SPEED: 30 mph.

DIMENSIONS: length, 20 ft 3 in; width, 11 ft 5 in; height, 9 ft 1 in.

WEIGHT: 46 tons.

ENGINE: Ford, 8-cylinder, V-type, 500 hp.

CRUISING RANGE: 92 mi.

Figure 30. Medium Tank, M26.



GENERAL DATA

CREW: 5.

ARMAMENT: One 90-mm gun, 2 cal .30 machine-guns, 1 cal .50 machinegun.

MAXIMUM SPEED: 30 mph.

DIMENSIONS: length, 23 ft 1 in; width, 11 ft 6 in; height, 9 ft 3 in.

WEIGHT: 48.5 tons.

ENGINE: Continental, 12-cylinder, V-type, 810 hp, air-cooled.

CRUISING RANGE: 70 mi.

Figure 31. Medium Tank, M48.



GENERAL DATA

CREW: 5.

ARMAMENT: One 90-mm gun, 2 cal .30 machine-guns, 1 cal .50 machinegun.

MAXIMUM SPEED: 37 mph.

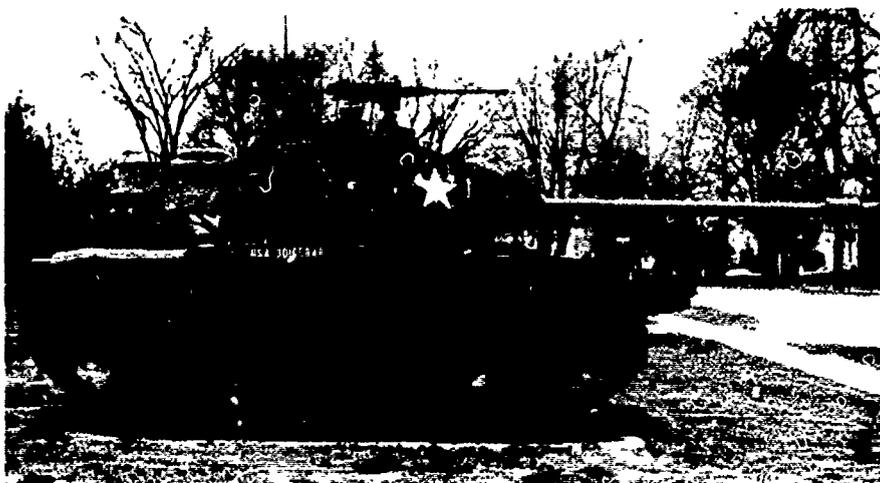
DIMENSIONS: Length, 20 ft 10½ in; width, 11 ft 6 in; height, 9 ft 8 in.

WEIGHT: 48 tons.

ENGINE: Continental, 12-cylinder, type, 810 hp, air-cooled.

CRUISING RANGE: 100 mi.

Figure 32. Tank, 90-mm Gun, M47.



GENERAL DATA

CREW: 4.

ARMAMENT: One 76-mm gun, 1 cal .50 machinegun, 1 cal .30 machinegun.

MAXIMUM SPEED: 40 mph.

DIMENSIONS: Length, 18 ft 6 in; width, 10 ft 8½ in; height, 9 ft 4 in.

WEIGHT: 25.5 tons.

ENGINE: Continental, 6-cylinder opposed, 500 hp, air-cooled.

CRUISING RANGE: 120 mi.

Figure 33. Tank, 76-mm Gun, M41A3.



GENERAL DATA

CREW: 4.

ARMAMENT: One 90-mm gun, 1 cal .50 machine-gun, 1 cal .30 machinegun.

MAXIMUM SPEED: 28 mph.

DIMENSIONS: Length, 22 ft 10 in; width, 11 ft 11 in; height, 9 ft 10 in.

WEIGHT: 49.5 tons.

ENGINE: Continental, 12-cylinder, V-type, 810 hp, air-cooled.

CRUISING RANGE: 70 mi.

Figure 34. Tank, 90-mm Gun, M48.



GENERAL DATA

CREW: 4.

ARMAMENT: One 90-mm gun, 1 cal .50 machine-gun, 1 cal .30 machinegun.
(A3: One 7.62-mm machinegun.)

MAXIMUM SPEED: 32 mph.

DIMENSIONS: Length, 22 ft 10 in; width, 11 ft 11 in; height, 9 ft 10 in.

WEIGHT: 49.5 tons.

ENGINE: Continental, 12-cylinder, V-type, 825 hp, air-cooled. (A3: 750 hp diesel.)

CRUISING RANGE: 160 mi. (A3: 300 mi.)

Figure 35. Tank, 90-mm Gun, M48A2, (A3).

on the main engine, increased cruising range, and greater in-board fuel capacity. Modifications and improvements in the fire control system made the M48A2 one of our most combat-effective tanks. The M48A3 was an improved version of the A2. The M48A3 had a diesel main engine and the fire control system of the M60.

The M103 (fig 36) is a 120-mm gun tank. It was the result of efforts to produce a tank of greater firepower and armor protection without losing mobility. It has been replaced by the M60 series tanks.

The M60 series tank (fig 37) is the current main battle tank of the Army. It replaced the M48-series tank and incorporated all the best characteristics of previous medium gun tanks. Also, its diesel engine greatly reduces fuel consumption and improves cruising range, and its 105-mm gun provides increased armament effectiveness. Sighting instruments have been simplified by use of a coincidence range finder and an articulated telescope. The cupola has been enlarged and mounts a new, short-receiver caliber .50 machinegun. The coaxial machinegun is the 7.62-mm (NATO) machinegun. The requirement for adjusting head space and timing is eliminated in each of these machineguns.

The M60A1 (fig 38) is an improved version of the M60. Improvements on the main gun, fire control system, engine, and armor have increased its fighting capabilities. Night fighting capabilities have been increased through the use of the Xenon searchlight.

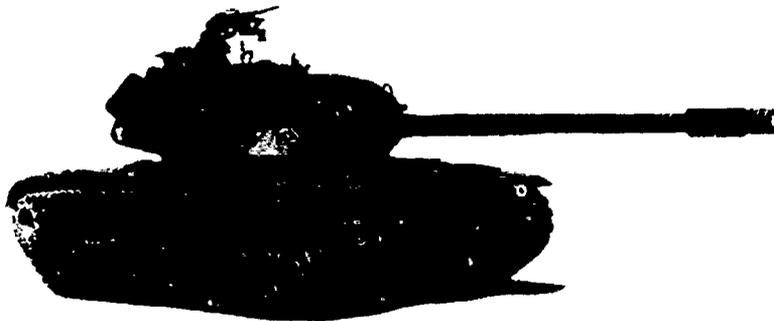
The M60A2 (fig 39), has been introduced into the inventory in limited quantities. It will incorporate armament similar to that of the M551, armored reconnaissance/airborne assault vehicle.

OTHER ARMORED VEHICLES

At the end of WW II the standard armored carrier chassis for personnel and equipment was the M3 (fig 41). It was a half-track vehicle with limited cross-country mobility, and no overhead protection for the passengers.

The first step in the search for an adequate armored vehicle was the M39 (fig 42). This was a full-track vehicle, the basic chassis being the M18, 76-mm gun motor carriage. The M39 was also open with no overhead protection. A limited number of these vehicles were produced, and only a few were available for issue to troops.

The requirement for a full-track, highly mobile infantry carrier, offering all-round armor protection for the personnel, in addition to being a member of a family of armored vehicles providing maximum interchange of standardized parts, resulted in the development of the M75 (fig 43) mechanized infantry vehicle. Characteristics of this vehicle were subsequently incorporated into the M59 (fig 44). The M59 was a full-track, fully enclosed, armored personnel carrier that had amphibious characteristics and was air transportable. The



GENERAL DATA

CREW: 4.

ARMAMENT: One 120-mm gun, 1 cal .30 machinegun, 1 cal .50 machinegun.

MAXIMUM SPEED: 21 mph.

DIMENSIONS: Length, 22 ft 11 in; width, 12 ft 4 in; height, 9 ft 5 in.

WEIGHT: 60.5 tons.

ENGINE: Continental, 12-cylinder, V-type, 810 hp, air-cooled.

CRUISING RANGE: 80 mi.

Figure 36. Tank, 120-mm Gun, M103.

primary armament of this vehicle was a caliber .50 machinegun.

The M113 and M113A1 (fig 45) armored personnel carriers have replaced the M59. The M113 has an aluminum hull, which greatly reduces vehicle weight. Its cubic measurement is approximately two-thirds and its weight is approximately one-half that of the M59. In spite of its reduced size, loading space has not been appreciably sacrificed. The M113 is air transportable and air droppable. It has an amphibious capability, and a cruising range of approximately 200 miles on 80 gallons of gasoline.

The M113A1 differs from the M113 primarily in that it is diesel fueled. This characteristic reduces the requirement for gasoline in units where diesel powered vehicles, such as the M48A3, the M60A1, or the M551, predominate. It has a cruising range of 300 miles and can be employed in all types of terrain. It has the highest degree of mobility among all vehicles employed in Vietnam. However, for employment in Vietnam, certain modifications were desirable. These are the addition of

armor shielding, a cupola for vehicle commander, and pedestal mounts with shields on either side of the cargo hatch to accommodate M60 machineguns. With these modifications this vehicle is known as the armored cavalry assault vehicle or more popularly, ACAV (fig 46). As reconfigured it was employed in lieu of the standard M113 carrier by all armored cavalry and mechanized infantry units in Vietnam.

The M577 (fig 47) command post vehicle, is basically an M113 armored personnel carrier, modified to be adaptable to a variety of field uses. It is used at division and lower levels as a communication vehicle or as a mobile medical treatment facility.

The M84 (fig 48), a 4.2-inch mortar carrier, was a modified M59. The top of the vehicle had a cutaway section to allow firing the mortar. This vehicle was organic to the tank and mechanized battalions and to the support squad of the armored cavalry platoon of the armored cavalry squadron. Its primary use was to provide close, indirect fire support for its parent unit.



GENERAL DATA

CREW: 4.

ARMAMENT: One 105-mm gun, 1 cal .50 machinegun, 1 7.62-mm machinegun.

MAXIMUM SPEED: 30 mph.

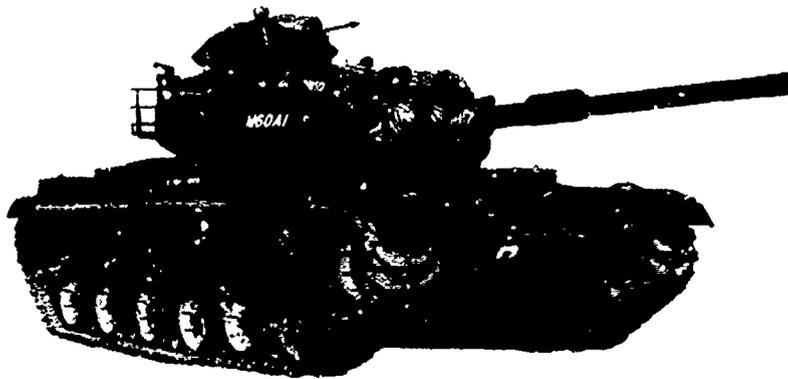
DIMENSIONS: Length, 22 ft 9½ in; width, 11 ft 11 in; height, 10 ft 5 in.

WEIGHT: 51 tons.

ENGINE: Continental, 12-cylinder, V-type, 750 hp, air-cooled.

CRUISING RANGE: 310 mi.

Figure 37. Tank, 105-mm Gun, M60.



GENERAL DATA

CREW: 4.

ARMAMENT: One 105-mm gun, 1 cal .50 machinegun, 1 7.62-mm machinegun.

MAXIMUM SPEED: 30 mph.

DIMENSIONS: Length, 22 ft 9½ in; width, 11 ft 11 in; height, 10 ft 9½ in.

WEIGHT: 53 tons.

ENGINE: Continental, 12-cylinder, 750 hp, air-cooled, diesel.

CRUISING RANGE: 310 mi.

Figure 38. Tank, 105-mm Gun, M60A1.

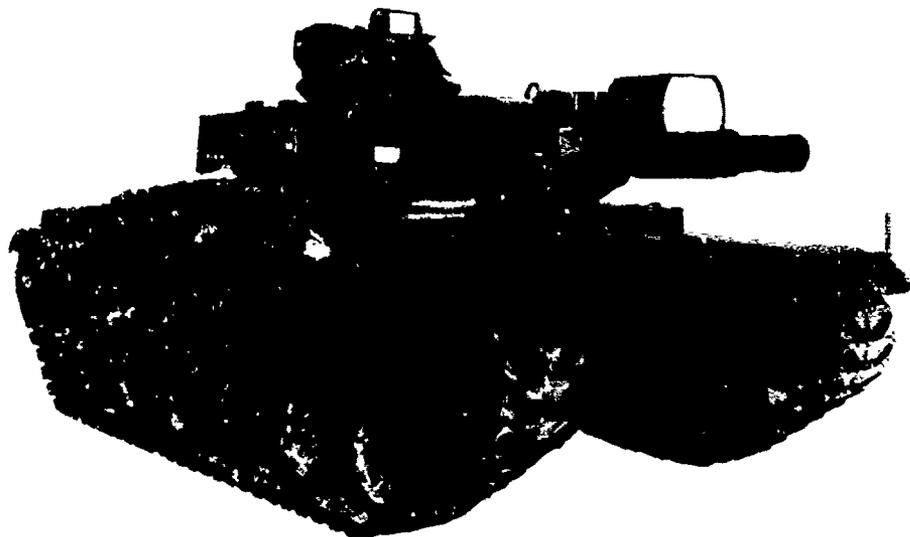
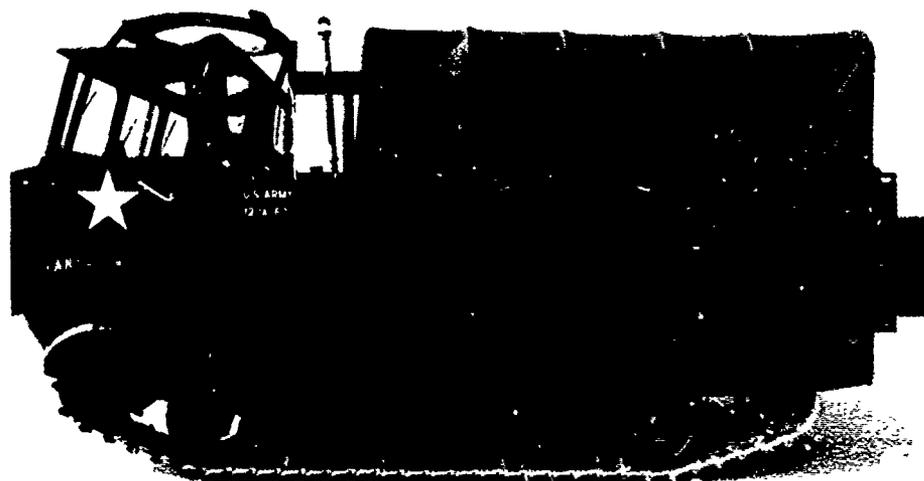


Figure 39. Tank, M60A1E2 with Xenon searchlight.

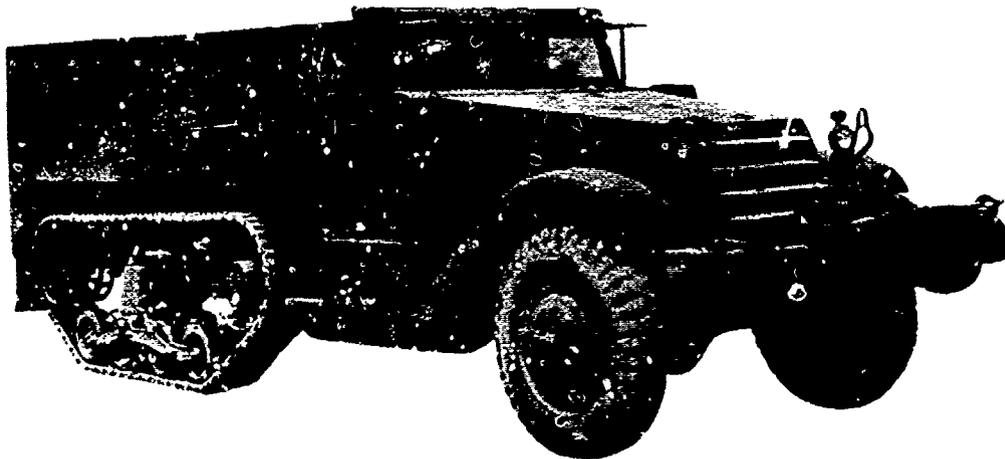


GENERAL DATA

CREW: 1.
ARMAMENT: One cal .50 machinegun (ring-mount).
MAXIMUM SPEED: 38 mph.
DIMENSIONS: Length, 18 ft 2½ in; width, 8 ft 9¼ in; height, 8 ft 9½ in.

WEIGHT: 8 tons
ENGINE: 6V53, 6-cylinder, 2-cycle, diesel.
CRUISING RANGE: 300 mi.

Figure 40. Carrier, Cargo, M548



GENERAL DATA

CREW: 1 (12 personnel).

ARMAMENT: One cal .30 machinegun.

MAXIMUM SPEED: 45 mph.

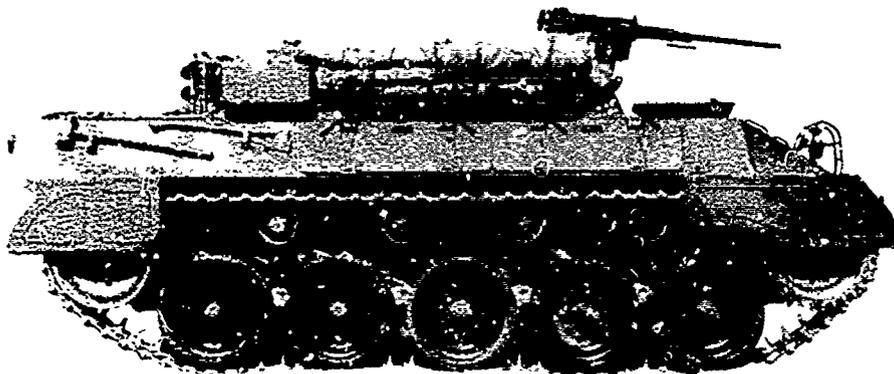
DIMENSIONS: Length, 20 ft 9 in; width, 7 ft 3 in; height, 8 ft 2 in.

WEIGHT: 10 tons.

ENGINE: White, 160 AX.

CRUISING RANGE: 200 mi.

Figure 41. Carrier, Personnel, Half-Track, M3.



GENERAL DATA

CREW: 1 (9 personnel).

ARMAMENT: One cal .50 machinegun.

MAXIMUM SPEED: 60 mph.

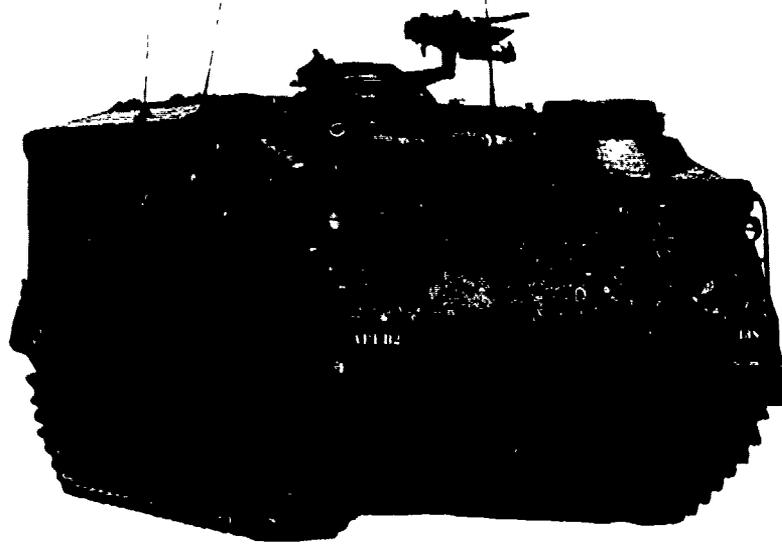
DIMENSIONS: Length, 17 ft 1 in; width, 9 ft 5 in; height, 6 ft 8½ in.

WEIGHT: 17.75 tons.

ENGINE: Continental, 9-cylinder, radial, 400 hp.

CRUISING RANGE: 155 mi.

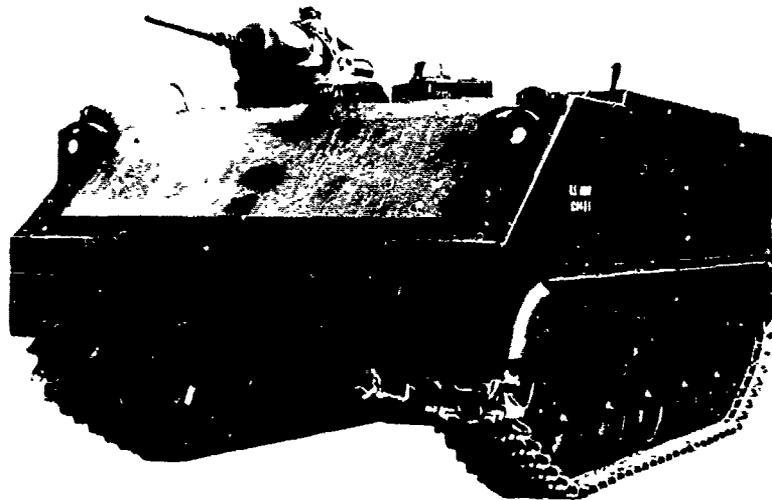
Figure 42. Vehicle, Armored, Utility, M39.



GENERAL DATA

CREW: 1 (11 personnel).	WEIGHT: 21 tons.
ARMAMENT: One cal .50 machinegun.	ENGINE: Continental, 6-cylinder opposed, 375 hp, air-cooled.
MAXIMUM SPEED: 45 mph.	CRUISING RANGE: 115 mi.
DIMENSIONS: Length, 17 ft ½ in; width, 9 ft 4 in; height, 9 ft ½ in.	

Figure 43. Carrier, Personnel, Armored, M75.



GENERAL DATA

CREW: 1.	WEIGHT: 21 tons.
ARMAMENT: One cal .50 machinegun.	ENGINE: General Motors Corp., 6-cylinder, inline, water-cooled.
MAXIMUM SPEED: 32 mph.	CRUISING RANGE: 120 mi.
DIMENSIONS: Length, 18 ft 5 in; width, 10 ft 8½ in; height, 7 ft 10 in.	

Figure 44. Armored Personnel Carrier, M59.



GENERAL DATA

CREW: 1.	WEIGHT: 11.3 tons.
ARMAMENT: One cal .50 machinegun.	ENGINE: Chrysler, 8-cylinder, V-type, 215 hp. (A1: GMC, 215 hp, diesel.)
MAXIMUM SPEED: 40 mph. (A1: 42 mph.)	CRUISING RANGE: 200 mi. (A1: 300 mi.)
DIMENSIONS: Length, 15 ft 11.5 in; width, 8 ft 9 in; height 8 ft 2 in.	

Figure 45. Armored Personnel Carrier, M113, (A1).



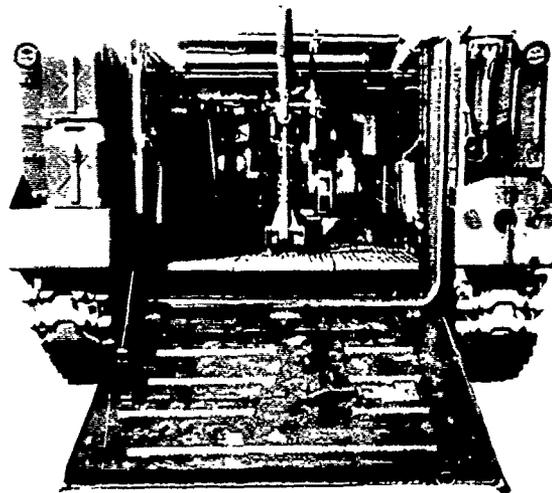
Figure 46. Armored Personnel Carrier (Modified) (ACAV) M113A1.



GENERAL DATA

CREW: 5.	WEIGHT: 11.5 tons. (A1: 12 tons.)
ARMAMENT: None.	ENGINE: Chrysler, 8-cylinder, V-type, 215 hp. (A1: GMC, 215 hp, diesel.)
MAXIMUM SPEED: 40 mph. (A1: 42 mph.)	CRUISING RANGE: 200 mi. (A1: 300 mi.)
DIMENSIONS: Length, 15 ft 11½ in; width 8 ft 9 in; height, 8 ft 3 in.	

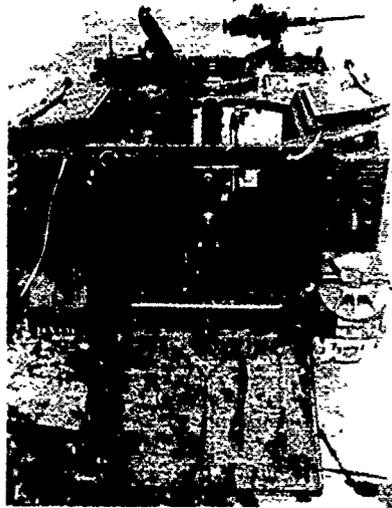
Figure 47. Carrier, Command Post, Light, Tracked, M577, (A1).



GENERAL DATA

CREW: 6.	WEIGHT: 23.5 tons.
ARMAMENT: One Mortar, 4.2-inch, 1 cal .50 machinegun, 1 cal .30 machinegun.	ENGINE: General Motors Corp, 6-cylinder, in-line, water-cooled.
MAXIMUM SPEED: 27 mph.	CRUISING RANGE: 100 mi.
DIMENSIONS: Length, 18 ft 5 in; width, 10 ft 8 in; height, 9 ft 1 in.	

Figure 48. Armored Mortar Carrier, M84.



GENERAL DATA

CREW: 6.

ARMAMENT: One 4.2-inch mortar, 1 cal .50 machinegun.

MAXIMUM SPEED: 38 mph. (A1: 41.5 mph.)

DIMENSIONS: Length, 15 ft 11 in; width, 9 ft 11 in; height, 7 ft 2 in.

WEIGHT: 12.5 tons. (A1: 13 tons.)

ENGINE: Chrysler, 8-cylinder, V-type, 215 hp, liquid-cooled. (A1: GMC, 215 hp, diesel.)

CRUISING RANGE: 200 mi. (A1: 295 mi.)

Figure 49. Armored Mortar Carrier, M106A1.

The M106 (fig 49), 4.2-inch mortar carrier, replaced the M84. The M106 has the M113 hull, suspension, and power pack. Combat-loaded, the M106 weighs 1,500 pounds more than the M113. Its ammunition load consists of 90 rounds of 4.2-inch shells.

The M114 (fig 50) command and reconnaissance vehicle, replaced the $\frac{1}{2}$ -ton truck for command and reconnaissance in armor and mechanized units. It weighs approximately 7 tons, combat-loaded; is powered by a 120-hp engine; and has a top speed of 34-50 miles per hour.

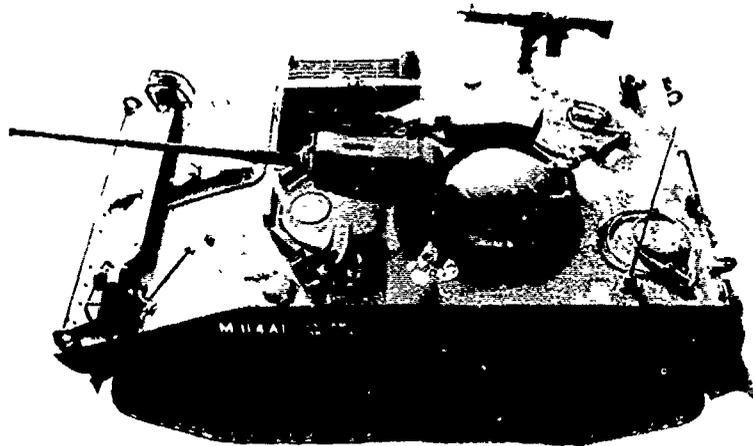
The M551 (fig 51), armored reconnaissance vehicle (General Sheridan) replaced the M41 light tank and the M56 self-propelled, airborne, antitank gun. This amphibious vehicle is organic to the armored cavalry platoons in armored cavalry organizations.

A necessary component vehicle for an armor formation is a recovery vehicle. The general purpose of this type vehicle is to recover disabled tanks and other vehicles from the battlefield, and to provide equipment capable of hoisting turrets, engines, or final drives. The

basic tank recovery vehicle of World War II was the M32 with its subsequent modifications, the final vehicle of that series being the M32B3. They were all mounted on the M4 series medium tank chassis.

The M32 was replaced by the medium recovery vehicle M74 (fig 52). The M51 heavy recovery vehicle replaced the M74 in tank battalions (fig 53). The latest recovery vehicle is the M88, a completely new vehicle incorporating standard tank parts (fig 54). It will be used for medium and heavy recovery operations. The M578, (fig 55) light recovery vehicle, will be used for recovery operations between the capability of the wheeled, M62 wrecker, and the M88 medium recovery vehicle.

Battlefield bridging capability is enhanced by the use of hydraulic bridging equipment mounted on modified armored vehicles. The M113A1 (MTAB) (fig 56) or marginal terrain assault bridge mounts a 33 foot, class 15, folded bridge designed to be emplaced within two minutes with minimum exposure to the two man crew. The M113A1 launcher with bridge mounted in the folded position is amphibious.



GENERAL DATA

CREW: 3.

ARMAMENT: One 20-mm gun, 1 cal 7.62-mm machinegun.

MAXIMUM SPEED: 37 mph.

DIMENSIONS: Length, 13 ft 9½ in; width, 7 ft 7¼ in; height, 7 ft 3 in.

WEIGHT: 7 tons.

ENGINE: Chevrolet, 120 hp.

CRUISING RANGE: 375 mi.

Figure 50. Command and Reconnaissance Vehicle, M114A1E1.



GENERAL DATA

CREW: 4.

ARMAMENT: One 152-mm gun/launcher, 1 cal .50 machinegun, 1 cal 7.62-mm machinegun.

MAXIMUM SPEED: 43 mph.

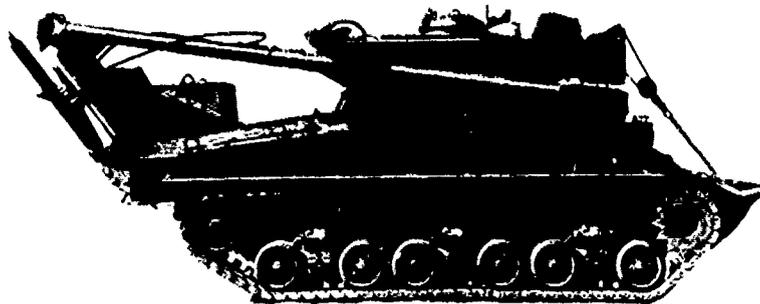
DIMENSIONS: Length, 20 ft 8 in; width, 9 ft 2 in; height, 9 ft 8 in.

WEIGHT: 16 tons.

ENGINE: Detroit Diesel, 6-cylinder, V-type, 225 hp.

CRUISING RANGE: 373 mi.

Figure 51. Armored Reconnaissance/Airborne Assault Vehicle, M551.



GENERAL DATA

CREW: 4.	WEIGHT: 47 tons.
ARMAMENT: One cal .50 machinegun.	ENGINE: Ford, 8-cylinder, V-type, 525 hp, water-cooled.
MAXIMUM SPEED: 21 mph.	CRUISING RANGE: 100 mi.
DIMENSION: Length, 26 ft 1 in; width, 10 ft 1 in; height, 10 ft 2 in.	

Figure 52. Recovery Vehicle, M74.



GENERAL DATA

CREW: 4.	WEIGHT: 60 tons.
ARMAMENT: One cal .50 machinegun.	ENGINE: Continental, 12-cylinder, V-type, 1,020 hp, air-cooled.
MAXIMUM SPEED: 30 mph.	CRUISING RANGE: 200 mi.
DIMENSIONS: Length, 33 ft 3 in; width, 11 ft 11 in; height, 10 ft 9 in.	

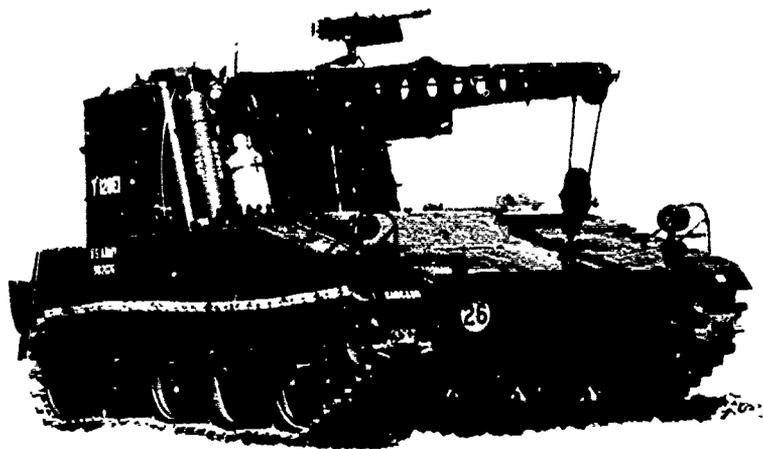
Figure 53. Recovery Vehicle, M51.



GENERAL DATA

CREW: 4.	WEIGHT: 56 tons.
ARMAMENT: One cal .50 machinegun.	ENGINE: Continental, 12-cylinder, V-type, 980 hp, air-cooled.
MAXIMUM SPEED: 30 mph.	CRUISING RANGE: 122 mi.
DIMENSIONS: Length, 27 ft 1 in; width, 11 ft 3 in; height, 9 ft 7 in.	

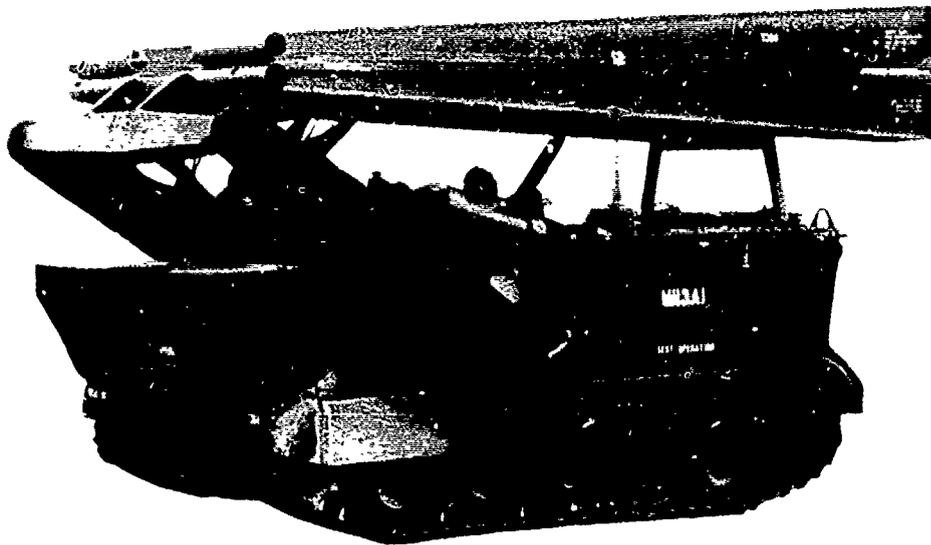
Figure 54. Recovery Vehicle, M18.



GENERAL DATA

CREW: 3.	WEIGHT: 27 tons.
ARMAMENT: One cal .50 machinegun.	ENGINE: Continental, 8-cylinder, V-type, 365 hp, air-cooled.
MAXIMUM SPEED: 34 mph.	CRUISING RANGE: 450 mi.
DIMENSIONS: Length, 20 ft 10 in; width, 10 ft 4 in; height, 9 ft 7 in.	

Figure 55. Recovery Vehicle, Light, M578.



GENERAL DATA

CREW: 2.

ARMAMENT: One cal .50 machinegun.

MAXIMUM SPEED: 42 mph.

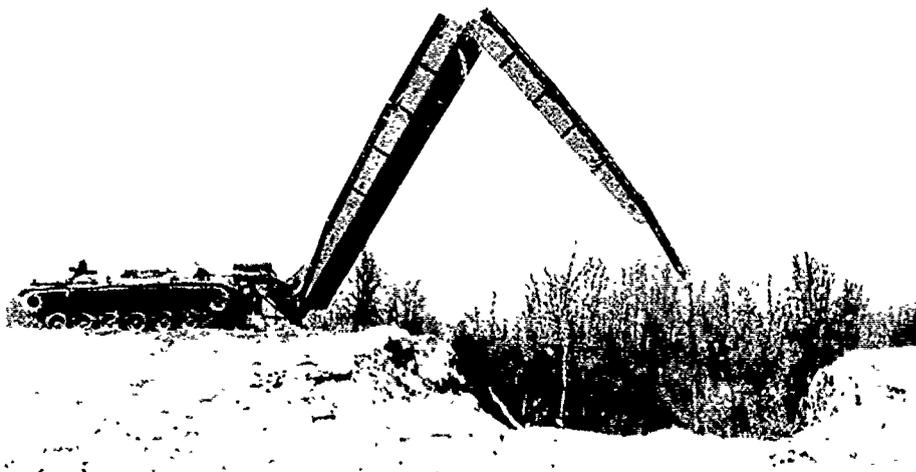
DIMENSIONS: Length, 22 ft 6 in; width, 10 ft 3 in; height, 11 ft 3 in.

WEIGHT: 12 tons.

ENGINE: GMC, 215 hp, diesel.

CRUISING RANGE: 300 mi.

Figure 56. Armored Personnel Carrier, M113A1 (MTAB).



GENERAL DATA

CREW: 2.

ARMAMENT: None.

MAXIMUM SPEED: 32 mph.

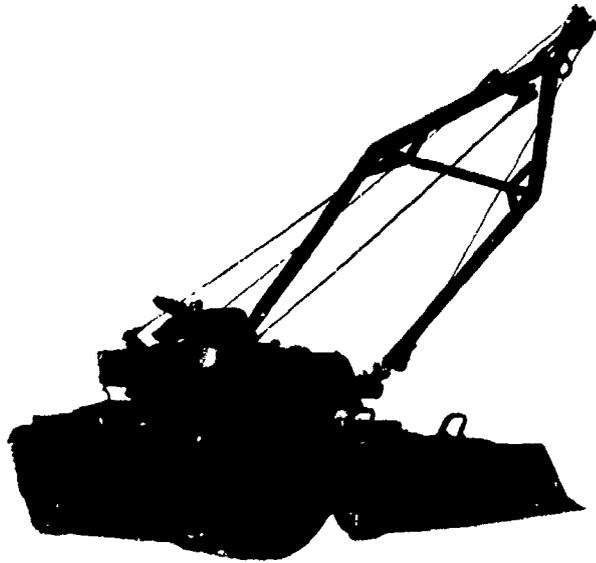
DIMENSIONS: Length, 36 ft 7 in; width, 13 ft 2 in; height, 13 ft 1 in.

WEIGHT: 64 tons.

ENGINE: Continental, 12-cylinder, V-type, 750 hp.

CRUISING RANGE: 310 mi.

Figure 57. Armored Vehicle Launched Bridge (AVLB), M60.



GENERAL DATA

CREW: 4.

ARMAMENT: One 165-mm demolition gun, 1 cal
.50 machinegun, 1 7.62-mm machinegun.

MAXIMUM SPEED: 30 mph.

DIMENSIONS: Length, 22 ft 11½ in; width, 11 ft
11 in; height, 10 ft 6 in.

WEIGHT: 44.5 tons.

ENGINE: Continental, 8-cylinder opposed, 560
hp, air-cooled.

CRUISING RANGE: 280 mi.

Figure 58. Combat Engineer Vehicle, Full-Track (CEV), M728.

The armored vehicle launched bridge (AVLB) (fig 57) is an armored, mobile, assault bridge, employed to cross short gaps in a minimum of time and reduce exposure of bridging personnel to enemy fire. It consists of an M60 launcher, mounting a folded, 63-foot long, class 60, fixed, assault bridge. Two M60 launchers and assault bridges are organic to each tank battalion in the division and additional AVLB's are found in the division engineer battalion.

The CEV M728, full-track combat engineer vehicle (fig 58) replaces the tank dozer in the combat engineer company of the current divisions. This vehicle is designed to provide a mobile and maneuverable weapon for combat support of ground troops and vehicles. It is used for breaching and removing obstacles, and pioneering operations. The turret can be traversed 360 degrees, either manually or hydraulically. A boom and winch are attached to the turret for lifting and carrying. A caliber 7.62-mm machinegun is coax-

ially mounted with the main gun, a 165-mm demolition gun, and a caliber .50 machinegun is cupola-mounted and operated by the commander. A driver-operated dozer blade is front-mounted.

ARTILLERY

During World War II, the only howitzer organic to an armored division was the M7, 105-mm howitzer, self-propelled. The development of the torsion bar suspension system resulted in the development of the M37, 105-mm howitzer (fig 59) and the M41, 155-mm howitzer (fig 60). Both of these artillery pieces used the basic chassis of the M24 light tank. The M41, however, was not organic to an armored division until after World War II. These two vehicles provided a lighter degree of armor protection for crew and ammunition. The mobility was greatly increased with a net result that artillery could be speedily deployed and fired, especially in forward areas.

Two self-propelled howitzers were standardized in 1955: the M52, 105-mm howitzer (fig 61) and the M44, 155-mm howitzer (fig 62). Both are designed to be members of the family of armored vehicles, thereby obtaining maximum use of standard tank parts. In both the M44 and M52, the track width was increased, the ground pressure lowered, and the horsepower more than doubled. These improvements provide even greater cross-country mobility over more difficult terrain. The general purpose of both vehicles is to provide high mobility for the howitzer in giving close support to rapidly moving armored columns.

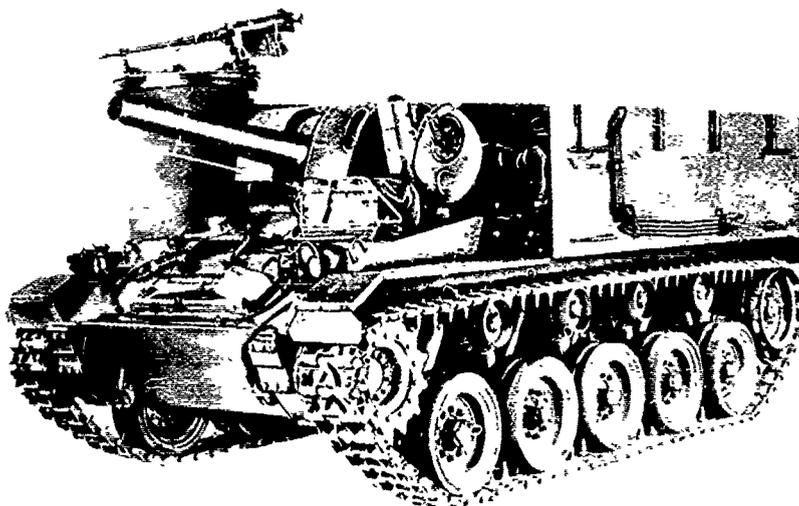
The M52, 105-mm howitzer has been replaced by the M109 (fig 63), 155-mm, full-track, self-propelled howitzer. This vehicle weighs approximately 22 tons, has a cruising range of approximately 200 miles, and is powered by a 360-hp engine. It has a crew of six. In addition to its primary armament, the M109 howitzer mounts a caliber .50 machinegun. Its 155-mm ammunition storage capacity is 30 rounds. The M109, in turn, is being replaced by the 155-mm full-track how-

itzer, M109A1, with an extended tube length and increased range (fig 67).

Another weapon in the armored division is the 8-inch howitzer, self-propelled M55 (fig 64). This was a full-track, armor protected, self-propelled, heavy artillery piece, normally employed in general support of armor operations. The artillery piece was capable of firing both a nonnuclear projectile and a tactical nuclear projectile.

The M110, 8-inch, self-propelled howitzer (fig 65) replaced the M55. Its vehicular characteristics are similar to the M107 (fig 66). Both use the same carriage.

The M107, 175-mm, self-propelled gun is a new artillery weapon for corps artillery units and will be available to support armor operations. This weapon weighs approximately 30 tons. The M110 and M107, the newest members of the family of self-propelled artillery weapons, will increase armor's mobility as well as provide fire support for fast-moving armor columns.



GENERAL DATA

CREW: 7.

ARMAMENT: One howitzer, 105-mm, 1 cal .50 machinegun.

MAXIMUM SPEED: 30 mph.

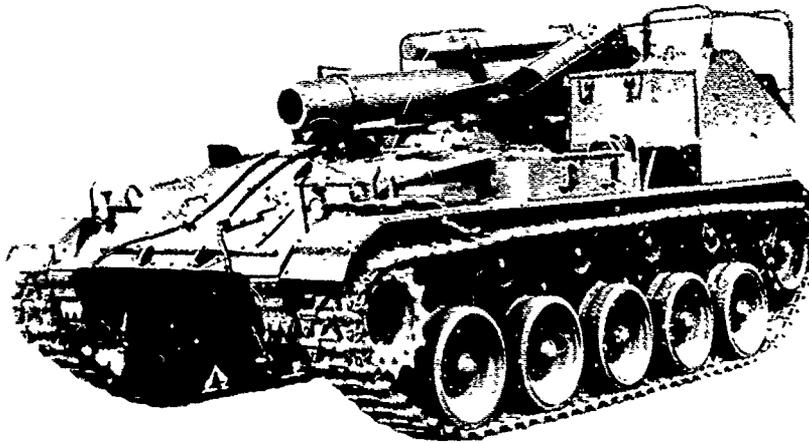
DIMENSIONS: Length, 18 ft 0 in; width, 9 ft 10 in; height, 7 ft 11 in.

WEIGHT: 23 tons.

ENGINE: Cadillac, 8-cylinder, V-type, 110 hp, liquid-cooled.

CRUISING RANGE: 100 mi.

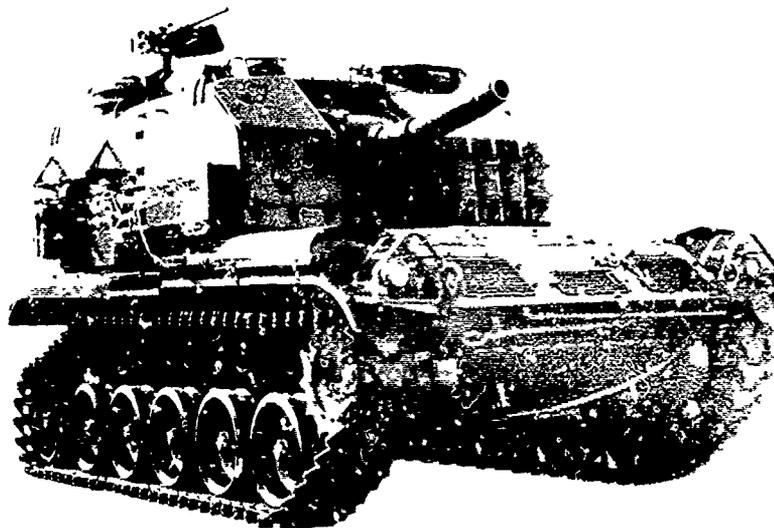
Figure 59. Motor Carriage, 105-mm Howitzer, M37.



GENERAL DATA

CREW: 12.	WEIGHT: 21.5 tons.
ARMAMENT: One 155-mm howitzer.	ENGINE: Two Cadillac, 8-cylinder, V-type, 110 hp.
MAXIMUM SPEED: 30 mph.	CRUISING RANGE: 96 mi.
DIMENSIONS: Length, 19 ft 2 in; width, 9 ft 4 in; height 8 ft 0 in.	

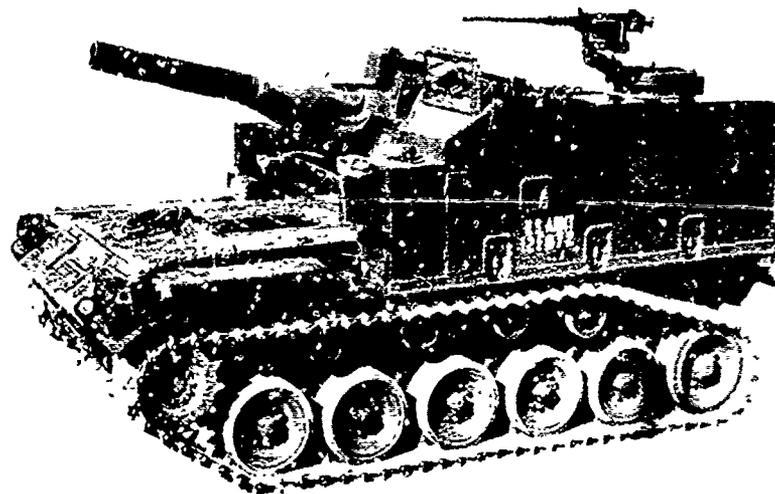
Figure 60. Motor Carriage, 155-mm Howitzer, M41.



GENERAL DATA

CREW: 5.	WEIGHT: 26.5 tons.
ARMAMENT: One howitzer, 105-mm, 1 cal .50 machinegun.	ENGINE: Continental, 6-cylinder, opposed, 500 hp, air-cooled.
MAXIMUM SPEED: 35 mph.	CRUISING RANGE: 100 mi.
DIMENSIONS: Length, 19 ft; width, 9 ft 3 in; height, 10 ft 8 in.	

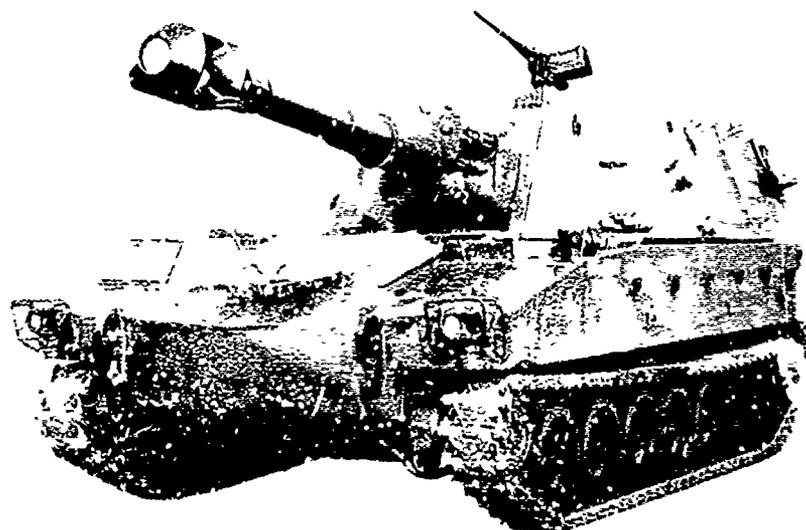
Figure 61. Motor Carriage, 105-mm Howitzer, M52.



GENERAL DATA

CREW: 5.	WEIGHT: 32 tons.
ARMAMENT: One 155-mm howitzer, 1 cal .50 machinegun.	ENGINE: Continental, 6-cylinder, opposed, 500 hp, air-cooled.
MAXIMUM SPEED: 35 mph.	CRUISING RANGE: 76 mi.
DIMENSIONS: Length, 20 ft 2½ in; width, 10 ft 0 in; height, 10 ft 8 in.	

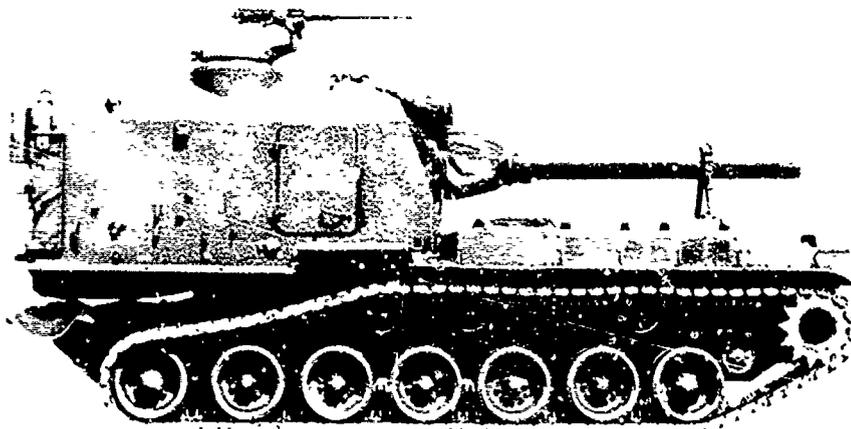
Figure 62. Motor Carriage, 155-mm Howitzer, M44.



GENERAL DATA

CREW: 6.	WEIGHT: 21.5 tons.
ARMAMENT: One 155-mm howitzer, 1 cal .50 machinegun.	ENGINE: Detroit Diesel, 8-cylinder, V-type, 360 hp.
MAXIMUM SPEED: 38 mph.	CRUISING RANGE: 204 mi.
DIMENSIONS: Length, 21 ft 2 in; width 10 ft 8 in; height, 9 ft 2 in.	

Figure 63. Howitzer, Medium, Self-Propelled, 155-mm, M109.



GENERAL DATA

CREW: 6.	WEIGHT: 49 tons
ARMAMENT: One 8-inch howitzer, 1 cal .50 machinegun.	ENGINE: Continental, 12-cylinder, V-type, 704 hp.
MAXIMUM SPEED: 30 mph.	CRUISING RANGE: 160 mi.
DIMENSIONS: Length, 25 ft 11 in; width, 11 ft 1 in; height, 11 ft 4 in.	

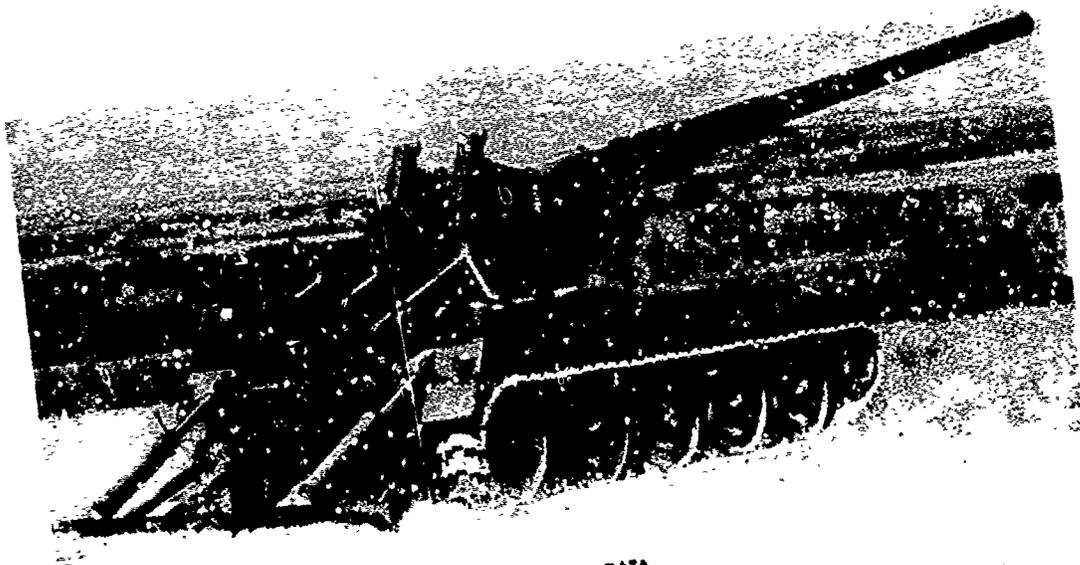
Figure 64. Howitzer, Heavy, Self-Propelled, 8-inch, M55.



GENERAL DATA

CREW: 5.	WEIGHT: 29.5 tons.
ARMAMENT: One 8-inch howitzer.	ENGINE: Compression ignition, 8-cylinder, V-type, 235 hp, liquid-cooled.
MAXIMUM SPEED: 35 mph.	CRUISING RANGE: 450 mi.
DIMENSIONS: Length, 24 ft 6 in; width, 10 ft 4 in; height, 9 ft 2 in.	

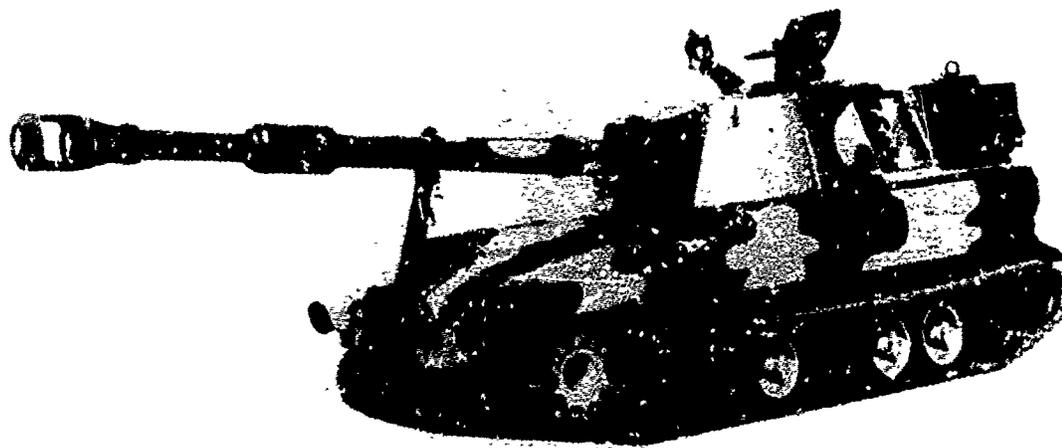
Figure 65. Howitzer, Heavy, Self-Propelled, 8-inch, M110.



GENERAL DATA
 C. W.: 5.
 ARMAMENT: One 175-mm gun canon.
 MAXIMUM SPEED: 35 m.p.h.
 DIMENSIONS: Length, 37 ft, 1 in; width, 10 ft 4 in; height, 11 ft 4 in.

GENERAL DATA
 WEIGHT: 29.5 tons.
 ENGINE: Compression ignition, 8-cylinder, V-type, 235 hp, liquid-cooled.
 CRUISING RANGE: 450 mi.

Figure 66. Gun, Heavy, Self-Propelled, 175-mm, M107.



GENERAL DATA
 CREW: 6.
 ARMAMENT: One 155-mm howitzer, 1 cal .50 machinegun.
 MAXIMUM SPEED: 35 mph.
 DIMENSIONS: Length, 29 ft 8 in; width, 10 ft 4 in; height, 10 ft.

GENERAL DATA
 WEIGHT: 26.3 tons (combat loaded).
 ENGINE: Detroit Diesel, 8-cylinder, V-type, 360 hp.
 CRUISING RANGE: 217 mi.

Figure 67. Howitzer, Medium, Self-Propelled, 155-mm, M109A1.

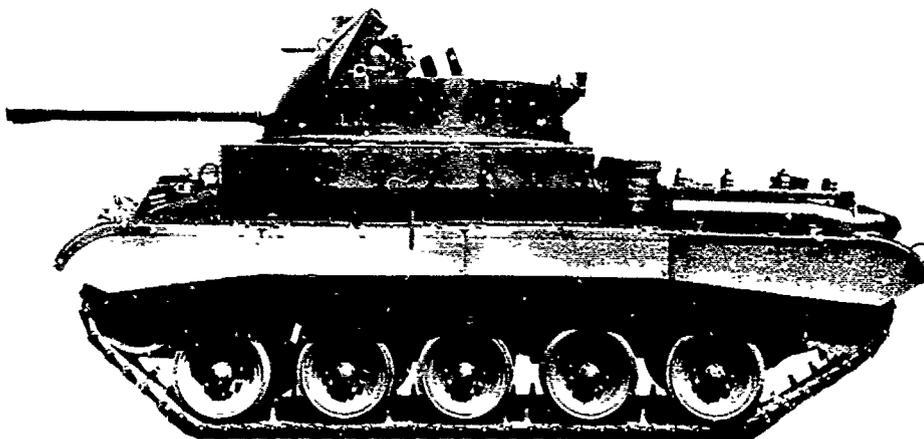


CREW: 6.
ARMAMENT: Dual 40-mm guns.
MAXIMUM SPEED: 30 mph.

GENERAL DATA

DIMENSIONS: Length, 18 ft 2 in; width, 9 ft 7 in; height, 9 ft 9 in.
WEIGHT: 20.6 tons.
ENGINE: Cadillac, 8-cylinder, V-type, 110 hp.
CRUISING RANGE: 100 mi.

Figure 68. Motor Carriage, Twin 40-mm Gun, M19A1.



CREW: 6.
ARMAMENT: Dual 40-mm guns, 1 cal .30 machinegun.
MAXIMUM SPEED: 45 mph.

GENERAL DATA

DIMENSIONS: Length, 19 ft 1 in; width, 10 ft 6 in; height, 9 ft 4 in.
WEIGHT: 25 tons.
ENGINE: Continental, 6-cylinder, opposed, 500 hp, air-cooled.
CRUISING RANGE: 100 mi.

Figure 69. Motor Carriage, Twin 40-mm Gun, M42.

WW II armored divisions had no organic air defense artillery but were supported by units having self-propelled twin 40-mm guns. The M19A1 in use in 1945 (fig 68) was mounted on the M24 light tank chassis. This was a very adequate vehicle, but the increased technological developments, plus the requirement for a faster, more powerful vehicle to support armor units against aircraft, resulted in standardization of the M42 in 1953 (fig 69). The basic chassis for the M42 is the M41 light-gun tank. As in the case of all other new vehicles, the M42 is superior to its predecessor in all departments.

DEFINITION, ROLE, AND BASIC MISSIONS OF ARMOR

1. Definition Armor is a concept of employing the characteristics of mobility, firepower, and shock effect to defeat an enemy force by a combined arms team characterized by a predominance of mounted combat. This team consists of tanks, armored cavalry, air cavalry, attack helicopters, mechanized infantry, artillery, and engineers, all supported by a flexible and rapid communication network and a mobile logistical system.

Armor is in fact the full expression of the philosophy of flexible organization, armor-protected firepower, mobility, shock effect, and teamwork.

2. Role The role of armor is the conduct of decisive, highly mobile warfare, in a ground environment, through the use of both ground vehicles and aircraft. It is primarily *offensive* in nature, and characterized by a predominance of *mounted combat*. This role is performed by armored and mechanized divisions, armored cavalry regiments/brigades, separate armor brigades, and the armor elements of infantry and airborne divisions.

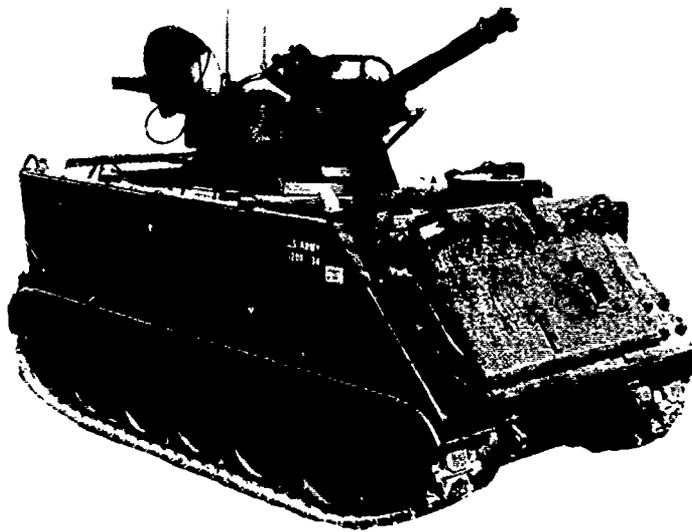
3. Missions In performing its role, armor is capable of executing all types of ground combat in either nuclear or nonnuclear warfare. Armor is suited to a nuclear environment because its armor protection attenuates the effects of blast and radiation from a nuclear burst and, even at close ranges to such a burst, completely shields personnel

Current division organization includes one air defense artillery battalion armed with the Chaparral/Vulcan weapons systems. The Vulcan weapons system is mounted on the Armored Carrier, M163 (fig 70) and includes both the 6-barrelled automatic 20-mm gun and its radar fire control system. The Chaparral guided missile system is mounted on a Full Tracked Vehicle, M48 (fig 71) that carries four missiles on a movable launcher. Future air defense concepts envision increased numbers of surface to air missiles on the battlefield, such as the Chaparral, to enhance ground defense against aerial attack.

from thermal effects. Armor can maneuver and fight when other troops are dug in or must avoid contaminated areas. Armor's inherent characteristics of mobility, armor protection, flexibility, shock effect, and responsiveness to command endow it with optimum capability for successfully accomplishing the following missions:

a. Deep Penetration and Wide Envelopment. Large armor formations with battlefield mobility and the ability to maneuver in whole or by element, controlling tremendous nuclear and nonnuclear fire support, provide forces with power and momentum for deep penetrations and wide envelopment. In the enemy's rear areas, these forces attain great freedom of action as they maneuver to seize decisive objectives; disrupt communication; destroy command posts, missile sites, artillery, and troop reserves; and capture or destroy supplies.

b. Exploitation. Armor has the fighting power to create its own opportunities for exploitation as well as provide the higher commander with a destructive force he can use to rapidly exploit the successes of other formations. For example, the armored division, as part of the corps fighting team, may be used by the corps commander to expand offensive successes or the effects of nuclear preparations. Objectives appropriate for the armored division are those decisive ones that are beyond reach of less mobile troops,

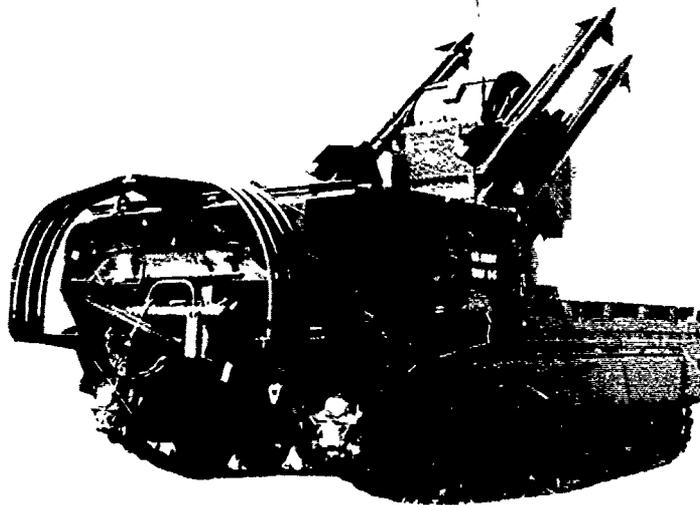


GENERAL DATA

CREW: 4.
ARMAMENT: One 6-barrel 20-mm gun.
MAXIMUM SPEED: 42 mph.

DIMENSIONS: Length, 15 ft 11.5 in; width, 8 ft 9 in.
WEIGHT: 12 tons.
ENGINE: GMC, 215 hp, diesel.
CRUISING RANGE: 300 mi.

Figure 70. Gun, Air Defense Artillery, SP, M163.



GENERAL DATA

CREW: 5.
ARMAMENT: Four guided missiles.
MAXIMUM SPEED: 40 mph.

DIMENSIONS: Length, 19 ft 10 in; width, 8 ft 10 in; height, 9 ft.
WEIGHT: 13.7 tons.
ENGINE: GMC, 210 hp, diesel, 6-cylinder, V-type.
CRUISING RANGE: 300 mi.

Figure 71. Guided Missile System, Aerial Intercept (Chaparral) M48.

and that will ensure successful accomplishment of the corps mission. Armor/airborne or airlanded linkup operations may best use the abilities of each force in certain of these situations.

c. Defense. Armor is ideally suited to conduct a mobile defense over extended frontages. However, since it is designed primarily for offensive action, it is best employed in defensive operations as the counterattack force or reserve of a higher command. The armored division, alone or in conjunction with nuclear weapons, provides the corps commander with a powerful reserve to be employed in destroying enemy attacking forces. The armor unit's capability to move, live, and fight on the nuclear battlefield permits its employment in compressing or canalizing enemy forces into suitable dispositions for destruction by attack with nuclear weapons or armored formations.

d. Destruction of Enemy Armored Formations. Destruction of enemy armor is essential to successful ground combat and is a continuing requirement in all offensive and defensive operations. The tank is our primary mobile armor-defeating weapon.

e. Reconnaissance/Security. As the range of weapons is extended, the battlefield becomes less populated, units are more widely dispersed, and the need for reconnaissance and security becomes more acute. Cavalry units provide reconnaissance for the higher commander by ground and air means.

Reconnaissance and security missions demand highly mobile forces with a ground combat capability. In addition to detecting enemy forces and providing warning, these forces must destroy enemy elements within their capabilities. The characteristics of armored cavalry and air cavalry units provide the higher commander with forces well-suited to conduct reconnaissance in force or covering, screening, and rear area security operations. These units may also act as advance, flank, or rear guards, or be used to support air-mobile operations, and are uniquely suited for anti-airborne, anti-airlanded, and antiguerrilla operations.

f. Close Support of Infantry. This mission is most frequently fulfilled by the tank battalions of the mechanized and infantry divisions, and by separate armored brigades. Whether employed as units or as tank elements attached to infantry or mechanized brigades, tank battalions greatly increase the firepower and mobility of the infantry or mechanized attack and defense and provide a powerful armor-defeating capability.

g. Economy of Force. Armored cavalry regiments and separate armored brigades are ideally organized and equipped to perform economy of force missions, thus permitting a commander to maneuver the preponderance of his forces to another area for a decisive blow. Armored cavalry regiments and separate armored brigades are eminently suited for employment in areas not requiring the fighting power of the armored division.

CHARACTERISTICS AND CAPABILITIES OF ARMOR

4. General Armor units fight normally as combined arms forces of two or more arms, each complementing the other and aiding the forward movement of the force by employing its own special capabilities. The organization of these combined arms forces is tailored by cross-attachment to use the favorable characteristics of each type unit to complement the strengths and compensate for the weaknesses of other units. Commensurate with its intended employment, the resulting force varies in degree of armor protection, mobility, and

ability to deliver fire. Armor operations are conducted by fire and maneuver, combined and controlled to create a preponderance of combat power that culminates in a powerful and violent action at the decisive time and place. Commanders avoid rigid adherence to the original plan in the face of significant changes in the situation that provide opportunities to destroy the enemy. The cross-country mobility, firepower and communications of armor units allow the armor commander to rapidly mass or disperse his

combat power for the accomplishment of any given task. The armor commander seeks every opportunity to employ his combined arms force in mass and thus bring maximum combat power to bear against the enemy. Every effort is made to gain knowledge of the enemy before, during, and after engagement. Commanders and leaders at all levels must make continuous estimates and react rapidly to changes in the situation. Armor operations are mobile in nature, violent in action, and calculated to obtain decisive results.

5. Characteristics Successful operation of armor units depends upon the proper utilization of their characteristics of armor-protected firepower, mobility, shock effect, extensive and flexible communication, and responsiveness to command.

a. Armor-protected Firepower. Armor units contain mobile, armor-protected machineguns, mortars, artillery, and tank guns. Armor employment is based on an integrated weapons system composed of the weapons of tanks, mechanized infantry, armored and air cavalry, artillery, and other supporting elements. The tank is the principal weapon of armor; it is a weapons system in itself designed to engage all types of enemy targets in mounted combat. The tank gun is a direct-fire weapon used primarily against enemy tanks and other "hard-shell" targets; the tank machineguns are used to neutralize or destroy enemy personnel and other "soft" targets. Mechanized infantry provides the basic weapons to close with and destroy the enemy by dismounted close combat. Armored and air cavalry provide the eyes and ears for locating the enemy. Artillery and other supporting weapons provide fire support that assists tanks and mechanized infantry to close with and destroy the enemy. The combat and combat support elements of armor units have sufficient vehicular armor protection to afford a substantial degree of protection against enemy small arms and mortar and artillery shell fragments. This armor protection provides, too, a significant degree of protection against the effects of nuclear weapons. This characteristic of armor equipment permits the commander to maneu-

ver his combat forces under enemy fire and to fully exploit the effects of friendly supporting fires.

b. Mobility. Armor units are 100 percent mobile. Each person and item of equipment has an assigned place in a vehicle. The combat and combat support elements possess great cross-country mobility. The mobility of armor enables the commander to rapidly shift firepower and change task organization. It multiplies the effective strength of an armor unit that can be applied against the enemy at several points within a short period of time. Army aviation elements, which are available to the divisions, armored cavalry regiments, and separate brigades, increase the mobility of these organizations by providing surveillance, reconnaissance, limited medical evacuation, supply, and troop movement for fast-moving armor formations.

c. Shock Effect. Shock effect is the combination of destructive physical and psychological effect on the enemy produced by the violent impact of mounted and mobile armor-protected firepower of tanks and supporting mechanized troops. Armor combines tremendous concentrated firepower with rapid movement of its fighting vehicles to produce severe shock effect on the enemy. The shock effect of armor increases greatly as the number of tanks, employed in mass, is increased. This shock effect, in a properly executed armor assault, can have a decidedly adverse effect on enemy morale and a favorable effect on friendly troop morale.

d. Extensive and Flexible Communication. The primary means of communication for armor units is radio, which provides armor with an immediately available and highly flexible communications system to higher, lower, adjacent, and supporting elements. Supplementary means of communication are installed and employed whenever required by the tactical situation.

e. Flexibility. Armor is flexible; armor units can be grouped or regrouped quickly to meet the demands of the tactical situation. The battlefield mobility of armor units permits rapid changes in task organization, even

when the units are engaged with the enemy, over nearly any type terrain. Many factors contribute to the flexibility of armor—cellular-type organization, highly flexible communication system, mobile combat support and combat service support units, and the mental mobility of the armor commander.

f. Responsiveness to Command. Because of its mobility, flexibility, and extensive and flexible communication, armor is extremely responsive to command. Armor units respond quickly and easily to mission-type orders requiring changes in mission, task organization, or direction of movement. Their communication facilities provide for rapid means of transmission of instructions, while their flexibility and mobility permit orderly alteration of tactical groupings and rapid movement to a more critical or decisive area.

ARMOR IN OFFENSIVE OPERATIONS

7. General Armor is a decisive tactical combat force capable of attacking rapidly over extensive distances and then committing its forces swiftly from either the march formation or from static positions with equal violence. Its role indicates that it is primarily offensive in nature; therefore, the key to success in armor operations is offensive action. Even when conducting a defense, the armor commander can often best accomplish his mission by employing offensive tactics.

The purpose of the offensive is threefold, to seek to destroy the enemy's armed forces, to impose the commander's will on the enemy, and to seize territory or terrain from which to conduct further operations against him. On the battlefield, offensive action provides the commander with the advantage of the initiative and the opportunity to create or exploit favorable situations. To facilitate the accomplishment of this purpose, the commander will select for his attack, a physical objective; this objective may be a dominating terrain feature, a key communications center, or perhaps an operation of pursuit, in which case it will be the hostile main body. The objective provides the commander with a basis for the preparation of not only his plans,

6. Capabilities Armor is capable of covering broad fronts and deep zones of action. The following specific capabilities should be exploited for most effective use of armor units—armor's ability to:

a. Maneuver and control armor-protected firepower on the battlefield.

b. Move rapidly from one area to another and decisively engage the enemy at a critical point.

c. Disperse and concentrate rapidly.

d. Withstand, to a significant degree, the effects of a nuclear explosion.

e. Rapidly engage the enemy and to quickly disengage from the enemy.

f. Conduct heavy assault actions against enemy positions.

but also the plans of his subordinate units as well. The objective then is the focal point toward which the efforts of all attacking units are directed.

The philosophy of armor includes bold, aggressive action, capitalizing to the maximum on mobility, firepower, and shock effect, to gain the most effective results with minimum losses to our forces. Armor plans boldly but thoroughly, and executes its attacks with violence. Plans for Armor offensive operations will involve large spaces and careful timing, and must, of necessity, include detailed plans for logistical support. The commander must ensure that the attacks of his subordinate units are coordinated and contribute to the accomplishment of the mission. He does this by assigning specific tasks, allocating combat power, and applying other necessary controls. In his planning, the commander must take maximum advantage of the inherent characteristics of his force to ensure a concentration of superior combat power at the decisive time and place. This combat power is achieved by the formation of and application against the enemy of mobile responsive combined arms forces . . . the attack is the vehicle by

which this concentration is effected. These combined arms forces include combat, combat support, and combat service support units.

Armor will attack by employing fire and maneuver. Fire and maneuver are accomplished by a base of fire and a maneuver force. The base of fire pins the enemy to the ground and neutralizes his weapons, thereby permitting freedom of action by the maneuver force. The base of fire consists of organic mortars, supporting artillery, nuclear weapons if allocated, tactical air if available, and, under certain circumstances, may also include naval gunfire and naval aviation as well. Tanks are assault weapons and are not included in the base of fire. The maneuver force has the mission of closing with the enemy and destroying him. The maximum possible strength is placed in the maneuver force, and whenever possible, it should be a combined arms element of tanks and mechanized infantry.

Planning should take maximum advantage of terrain. Armor attacks are frequently directed toward the early domination of key terrain features that give an advantage. Advantages accruing from these terrain features may include observation, cover and concealment, and fire; they may enhance maneuver, support, and security, or control routes required by friendly and enemy forces, and allow control without placing forces in static postures.

Plans must provide for the exploitation of any advantage accruing during the attack. This requires forces that provide the commander with the means to exploit successes. Whenever an opportunity for decisive action does present itself, the commander must then commit his total resources and demand the ultimate from his troops. Any failure on the part of the commander to capitalize on these opportunities may result in slow, inconclusive attacks in which the attacking force usually suffers heavy losses.

Shock effect cannot be obtained without violent execution. Once the attack is launched, armor units gain their objectives rapidly, employing all the speed, violence, and savagery that can be obtained from men, machines

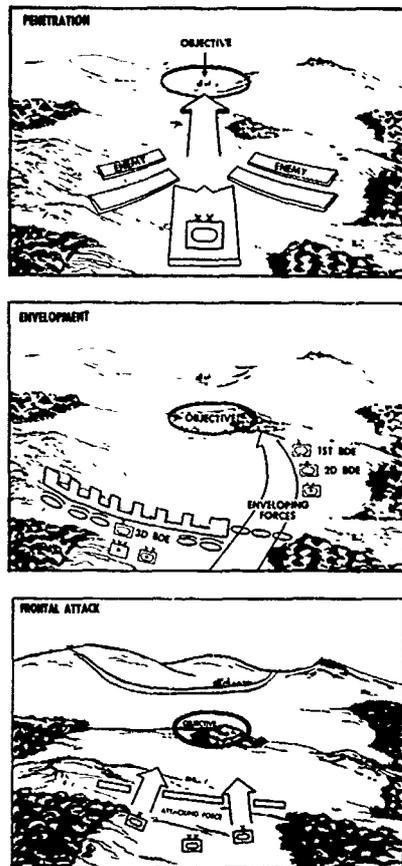


Figure 72. Basic forms of maneuver.

and fire. Every effort is made to crush, kill, and annihilate enemy forces in contact, and to disrupt and neutralize enemy support and reinforcement actions . . . this is shock effect. Fire superiority by the base of fire and local fire superiority by the maneuver forces are gained early and maintained throughout the attack to permit freedom of maneuver without prohibitive loss. The attacker maneuvers to exploit the effects of the base of fire, to avoid excessive losses, and to close with and destroy the enemy by assault.

8. Employment

a. Types of Offensive Operations. Armor units may be employed in the offense in a movement to contact, a reconnaissance in force, a coordinated attack, an exploitation, or a pursuit.

(1) Movement to contact is an offensive operation to gain or reestablish contact with the enemy. Its purpose is the early development of the situation to provide a tactical advantage prior to decisive engagement.

(2) A reconnaissance in force is carried out by armor units to discover and test enemy disposition, composition, and strength. Although its primary aim is reconnaissance, the forces conducting this type of operation may discover weaknesses in enemy dispositions that, if promptly exploited, may permit tactical success. Aggressive employment of armor units maximizes the chance for contact and identification of enemy units and positions at the earliest opportunity to set him up for destruction.

(3) Coordinated attacks are characterized by the coordinated employment of firepower and maneuver by armor units to close with and destroy or capture enemy forces. Movement to contact and reconnaissance in force operations can develop the situation sufficiently for the commander to employ his forces decisively in a coordinated attack.

(4) In the exploitation, hard charging armor units seek to follow up the gains of a successful offensive operation. The attacking force drives with maximum speed deep into the enemy's rear to destroy his means to reconstruct an organized defense or to initiate an orderly withdrawal. Armor leaders employ nuclear or nonnuclear fires to liquidate enemy opposition. Frequent meeting engagements are common in this type of operation, as armor units seek to bypass and cut off large enemy formations, and destroy his lines of communications, support elements, and reinforcements.

(5) The pursuit normally is an extension of the exploitation. The objective of the pursuit is the destruction of the enemy force through maintenance of unrelenting pressure on the enemy and imaginative use of encircling forces to get behind his rear to prevent his further withdrawal. Rapidly moving armor units flank and strike the enemy, forcing him to dissipate his combat strength and increase his risk of destruction.

b. Forms of Maneuver. The forms of maneuver are the resultants of the two basic movements or directions of attack with respect to the enemy—the flanking movement and the frontal movement. These forms of maneuver provide the armor commander with the configuration to best employ his unit and utilize his fires to defeat the enemy, while conducting one of the offensive operations described above. The three basic forms of maneuver are the penetration, the frontal attack, and the envelopment (fig 72).

(1) An attacking force utilizes the penetration to break through an enemy's position on a narrow front and to widen the created gap. The purpose of the penetration is to destroy or neutralize the enemy's forces, installations, and positions in order to break up the continuity of his defenses. This maneuver divides the enemy force, presents the opportunity to the attacking force to defeat the enemy in detail, and normally creates a situation permitting exploitation by friendly mobile forces. This is done by rupturing the enemy position, holding or widening the gap, destroying the continuity of the defense, and exploiting the penetration. Normally, infantry units will force the penetration and widen the gap sufficiently to permit the massive employment of large armor formations. These armor-heavy forces will be employed in mass to maximize the shock effect of firepower and mobility inherent in such units. Armor commanders make maximum use of artillery fires to destroy enemy counterattacks and to make further gaps in the enemy positions in an effort to create conditions for further penetration.

(2) The frontal attack is a form of maneuver that utilizes the most direct route to strike the enemy's entire front within the zone of the attacking force. The purpose of the frontal attack is to overrun, destroy, or capture a weaker enemy in a static position, or fix his forces in such a position as to ensure the success of another form of maneuver. This frontal attack is the least desirable form of maneuver for armor units, but may be used when the enemy is weak and disorganized.

(3) The envelopment seeks to avoid the enemy's main defensive strength by passing around or over his principal defensive positions, using air and/or ground movement. An attacking force utilizes a ground envelopment as a form of maneuver to direct its main attack against an assailable flank. An assailable flank is one that can be circumvented without fighting a decisive engagement. The air envelopment is a vertical envelopment where, utilizing air mobility, the attacking force passes over or around the enemy's main defensive positions. The envelopment, in avoiding the enemy's main strength, drives to seize objectives in his rear that will cut his escape routes, disrupt his communications, and subject him to destruction in a static position. Armor units, therefore, are well suited for employment as the enveloping force because of their mobility and firepower which are needed in operations of this type. When the attacking force has sufficient strength, it may use either the turning movement or the double envelopment to capture positions deep to the enemy's rear.

c. Support. In the offense, commanders aggressively use highly mobile field artillery units to provide for close nonnuclear or nuclear support for the attacking force. Combat engineer elements are placed well forward with the leading elements to destroy obstacles, bridge gaps, and clear minefield. In all operations, air defense artillery is positioned to deny the enemy opportunity to use his air capability to interdict the forward movement of the advancing forces. Air cavalry, attack helicopters, and tactical air elements are used extensively to search for, find, report, and ensure destruction of enemy positions and columns seeking to impede the advance of friendly forces. To ensure rapid collection, analysis, and dissemination of intelligence for tactical planning and execution, the commander relies on extensive communications to assist him in conducting his operations. Thus, through the proper use of the supporting elements, armor in the offense is successfully employed to defeat or destroy the enemy at the earliest opportunity possible.

ARMOR IN DEFENSIVE OPERATIONS

9. Purpose of Defense In the defense, armor units concentrate primarily on destroying enemy forces. Armor adopts a defensive posture to gain time pending the development of more favorable conditions before resuming offensive combat, or to economize forces in one area to concentrate superior forces for decisive offensive action elsewhere.

10. Doctrine of Defense The doctrine of defense by armor units envisions the use of security forces to provide early warning to detect, delay, deceive, and disorganize an enemy attack; forward defense forces to organize the forward defense area to repel the attacker and develop the situation; and a strong tank-heavy counterattack force to destroy the attacker by offensive action. This doctrine requires the armor commander to maintain an offensive spirit, capitalizing on mobility and firepower to establish a defense which retains the initiative.

11. The Mobile Defense Armor units conducting defensive combat employ a combina-

tion of offensive, defensive, and delaying action tactics, with success depending upon offensive action. This is the type defense conducted by forces capable of engaging in mounted warfare. The primary objective of the mobile defense is *destruction* of the enemy by offensive action without regard to the retention of specific terrain as an end in itself. The nature of this defense requires the retention of a large tank-heavy counterattack force to accomplish the destruction mission. First, however, the enemy must be detected, forced to mass, and fixed or canalized. Armor units conducting the mobile defense are organized into *security forces*, *forward defense forces*, and a *reserve*.

a. Security forces are employed to provide early warning of the enemy approach, to develop the situation, and to prevent surprise. The security forces consist of a GOP force, observation posts, listening posts, patrols, and a rear area security force. Security is extended throughout the battle area by employment of

tactical air, organic Army aircraft, and ground radars. The security forces must be highly mobile, capable of operating on a wide front, and have communication facilities for the rapid warning of enemy approach.

b. The forward defense forces, or fixing forces, are in the forward defensive area. The mission of these forces is to warn of impending attack; delay, disorganize, and inflict maximum destruction upon the enemy; and canalize him into an area suitable for attack by the reserve and/or nuclear weapons. Sufficient forces, tailored to meet the situation, are assigned missions that are likely to ensure that the reserve may be employed to deal decisively with the enemy. Forward defense forces are normally mechanized infantry-heavy and accomplish their mission by the establishment of observation and listening posts, patrols, occupation and defense of blocking positions or strongpoints, limited offensive action, and delaying action. Forces varying from a few tanks and mechanized infantry to a battalion task force occupy and defend blocking positions. Forces assigned to the defense of the blocking position or critical area do not always hold their initial position and frequently fight offensive- and delaying-type actions from one position to another.

c. The reserve is organized tank-heavy to destroy the enemy by offensive action in front of, within, or behind the forward defensive area. Maximum combat power con-

sistent with requirements for the fixing force and security force is assigned to the reserve. This combat power includes maximum fire support, with nuclear weapons if available. The reserve prepares counterattack plans for the destruction of the enemy anywhere within its area of responsibility, and must be prepared to conduct a counterattack wherever the enemy presents a target. Ideally, the reserve is employed following a nuclear strike against previously canalized enemy forces.

d. Mobile defense is the normal and preferred type of defense for armor units. Its adoption is favored when:

(1) The mission and the area of operation permit the battle to be fought in sufficient depth.

(2) Terrain permits relatively free movement by the defending force.

(3) The mobility of the defending forces is equal or superior to that of the attacking force.

(4) The enemy has the capability of employing nuclear weapons.

(5) Friendly air superiority will prevent enemy air interference with the movement of major forces.

(6) Time available for planning and preparation of defensive positions is relatively short.

(7) The mission is to destroy enemy forces.

(8) The frontage assigned exceeds the defenders' capability to establish an effective area defense.

ARMOR IN RETROGRADE OPERATIONS

12. General A retrograde operation is an organized movement to the rear or away from the enemy. Retrograde operations are conducted only with the approval of the next higher commander.

a. Delaying Action. A delaying action is a retrograde operation in which maximum delay and damage are inflicted on an advancing enemy without the delaying force becoming decisively engaged in combat or being outflanked. In executing a delaying action, minimum space is traded for maximum time. A

preponderance of armor retrograde movements will be delaying actions.

b. Withdrawal. A withdrawal is a retrograde operation in which part of a deployed force disengages from the enemy. It may be executed either under enemy pressure or not under enemy pressure and may be undertaken as the preliminary to a retirement, such as movement to a rear area for reorganization and refitting before employment in another area, or as the movement from one delaying position to the next in a delaying action.

c. Retirement.

(1) A retirement is a retrograde operation in which a force not in contact marches away from the enemy to avoid combat under the existing conditions.

(2) A retirement may be made following a withdrawal or when there is no actual contact with the enemy. When a withdrawal precedes the retirement, the retirement begins after the main forces have broken contact with the enemy and march columns have been formed.

(3) In conducting a retirement, the main body is organized in a manner inverse to that employed in an advance to contact. Definite routes and march objectives or rearward positions are assigned to each of the major commands moving with the main body. During the initial stage of the retirement, control may be decentralized to subordinate commanders. However, as the main body increases the distance between itself and the enemy, the overall commander resumes centralized control.

(4) Security for the main body may be provided by advance, flank, and rear guards or a covering force. When the retirement is preceded by a withdrawal, a strong rear guard normally will be required. The rear guard employs delaying action tactics to delay the advancing enemy and to prevent interference with the movement of the main body. The commander is especially alert for attempts by the enemy to envelop the retiring force. Tactical air reconnaissance and air cavalry are

employed to obtain early information of such enemy attempts.

d. Forces in the Delaying Action. Because of their mobility, large volume of long-range, flat-trajectory fires, and extensive communications, armor units are particularly well-suited to conduct a delaying action. Forces in the delaying action are disposed in three echelons: Security forces, delaying forces, and reserves.

(1) *Security forces.* A covering force or other security forces may be employed forward of delaying positions when the situation permits. Such security elements may include maneuver battalions or armored cavalry units. Security is extended to the front, flanks, and rear through employment of tactical air, air cavalry, and ground radars.

(2) *Delaying forces.* The bulk of the unit's combat power is normally in the delaying force. Maximum firepower is oriented forward and concentrated on likely avenues of enemy approach. Delaying forces must also be prepared to shift units or fires (as appropriate), to engage advancing enemy units to the flanks and rear. The delaying force is deployed in width with little depth.

(3) *Reserves.* Because of the composition of the delaying forces, reserves will necessarily be relatively small. Reserves are maintained normally at brigade and higher echelons of command, and should be tank heavy. This provides the commander with a force highly responsive for the conduct of counterattacks or tank sweeps.

ARMORED CAVALRY OPERATIONS

13. **General** Reconnaissance and security operations have played an integral part of every successful military operation from the earliest recorded battle, and will continue to be even more important on the present day nuclear battlefield. No military commander, no matter what the level of command, can make a sound tactical decision or a good estimate of the situation without basic information of the enemy and the area of operations. Most of this information is gained

through reconnaissance. Reconnaissance is the directed effort in the field to gain information of the enemy and the area of operations by both ground and air means. Note that we have included the air means available to the commander, which includes not only air cavalry, but also other Army aviation and Air Force support.

Security includes all measures taken by a command to protect itself from espionage,

observation, sabotage, annoyance, or surprise. Security is considered so important in military operations that it is classified as one of our principles of war.

Although we have made a clear distinction between reconnaissance and security in definition, a careful analysis of these two missions, and of the techniques employed in the accomplishment of the missions, clearly shows that reconnaissance and security are intertwined and, in application, cannot be separated. Reconnaissance by its very nature provides the commander with a certain degree of security, and in all types of security missions we perform continuous reconnaissance.

Logic establishes the fact that if a commander were required to provide for his own reconnaissance and security effort, using his organic combat power, he would be forced to employ a significant part of the combat strength of his unit. Cavalry units are specifically designed, trained, and equipped to perform these missions, and total about 20 percent of the combat strength of the army corps. This may sound rather high, but a study of our US Army organization shows that, except for the divisional brigade, we have a cavalry element at each command level from the combat maneuver battalion to the corps.

Modern armored cavalry, the direct descendant of our colorful horse cavalry, came into its own during the second world war when cavalry units were for the first time fully mechanized. These units were equipped with light combat vehicles, as it was envisioned that they would be employed primarily as reconnaissance elements and would accomplish their mission by stealth, infiltration, and movement. Shortly after our entry in World War II it was found that the combat power of these units was not sufficient to penetrate the strong security forces of the enemy. As a result, these units were organized and equipped as required in the various theaters of operation.

Shortly after World War II two conferences were held to study the combat actions of

Armor. The conferences concluded that although the cavalry units were designed primarily for reconnaissance, they actually participated in more security missions than any other type, with a ratio of about 4 to 1. To provide the armored cavalry units with the essential combat power to accomplish these various security missions and to fight for information when required during a reconnaissance mission, it was determined that new organizations were required. It was recommended that, at the platoon level, the integrated platoon organization should be adopted. Additional combat power for the divisional armored cavalry squadron in the form of infantry, tanks, and artillery, was not recommended, as this squadron operates in the proximity of divisional elements and could be suitably reinforced when required. However, it was recommended that the squadron of the armored cavalry regiment be given additional combat power in the form of tanks and artillery because it was envisioned that this regiment would operate semi-independently and at extended distances from the main battle forces.

The smallest cavalry unit, and the basic unit for all organizations, is the armored cavalry platoon. It consists of scouts, tanks, infantry, and an indirect-fire support element forming the smallest combined arms force in the US Army.

The newest and most versatile addition to armored cavalry is air cavalry. Air cavalry provides the third dimension to armored cavalry operations. It extends and complements the capabilities of armored cavalry units to which it is organic. Air cavalry units are not aviation units but are in fact cavalry combat organizations with a potent and flexible variety of air delivered weapons for fire support against a variety of ground targets, extended surveillance capability and a limited ability to seize and hold ground.

The largest of the armored cavalry organizations are the armored cavalry regiments, whose history dates back to the Dragoon and Mounted Rifle Regiments of the past century.

14. Missions The missions of armored cavalry are reconnaissance, security, and economy of force operations.

a. Reconnaissance. Armored cavalry combat formations are frequently assigned route, zone, or area reconnaissance missions. They orient on the intelligence objective, report all information, positive and negative, avoid decisive engagement, maintain enemy contact, and develop the situation.

b. Security. Armored cavalry units have much greater mobility, both on the ground and in the air than the unit or units that they are securing. The types of security missions performed by armored and air cavalry units are:

- (1) Advance guard.
- (2) Flank guard.
- (3) Rear guard.
- (4) Screening forces.

(5) Advance, flank, and rear covering forces.

(6) Rear area security forces.

To perform these missions, cavalry units will orient on the force they are securing, perform continuous reconnaissance, provide timely and accurate warning, provide space for maneuver, and maintain enemy contact.

c. Economy of Force. Cavalry units may be employed in an economy of force role in offensive, defensive or retrograde combat to fill gaps or to conduct semi-independent operations.

d. Need for Armored Cavalry Units. As the range of weapons is extended, as the battlefield becomes less densely populated, and as units are more widely dispersed, the need for armored cavalry units becomes more acute. Armored cavalry units are specifically organized, trained, and equipped to accomplish reconnaissance, security and economy of force missions.

TYPES OF ARMOR UNITS

15. Armored Division

a. General. The armored division is a combined arms force of essential combat, combat support, and combat service support elements organized and equipped to make it tactically and administratively self-contained for mobile ground combat operations (fig 73). The division consists of a relatively fixed command, staff, combat support, and combat service support structure or division base. To the division base are assigned mechanized infantry and tank battalions in proportion to and in numbers appropriate to the division's mission and its anticipated operational environment. The armored division will normally be assigned an equal or greater proportion of tank battalions. However, if the mission and operational environment so indicate, the division may have infantry, mechanized infantry, and tank battalions assigned with the total number of combat battalions varying from 6 to 15. A type armored division—6 tank battalions and 5 mechanized infantry battalions—provides a tank strength of over 300 main battle tanks in the tank battalions. Once organized for a

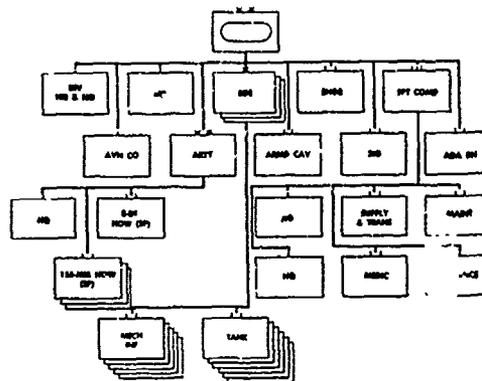


Figure 73. The armored division.

particular strategic mission and operational environment, the composition normally remains relatively stable.

b. Division Base. The division base includes the command and control elements, reconnaissance elements, combat support, and combat service support elements:

- (1) Division headquarters and headquarters company.

- (2) Division military police company.
- (3) Division aviation company.
- (4) Division air defense artillery battalion.
- (5) Division engineer battalion.
- (6) Division signal battalion.
- (7) Divisional armored cavalry squadron.
- (8) Division artillery.

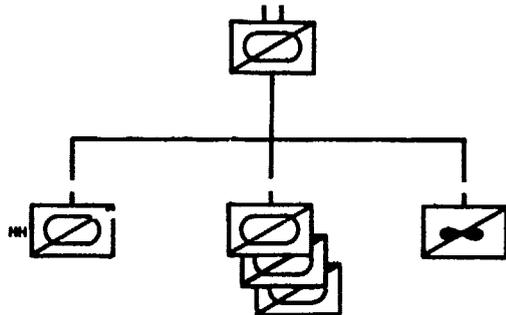


Figure 74. Armored cavalry squadron.

- (9) Divisional support command.
 - (10) Brigade headquarters (three).
- c. Division Armored Cavalry Squadron (fig 74).

(1) The headquarters and headquarters troop provides command, administration, communications, supply, medical, transport and maintenance support for the squadron. It contains two M114's, which are located in the squadron staff section for use by the squadron commander and his staff. A Redeye section provides limited air defense for the squadron.

(2) The three armored cavalry troops of the squadron are identical in organization (fig 75). They perform reconnaissance, provide security, and engage in offensive, defensive, and retrograde combat, in an economy of force role. The troop consists of a troop headquarters and three identical armored cavalry platoons.

(a) The troop headquarters contains a headquarters section, which is the operations and administrative center of the troop; a ground surveillance section, which provides short

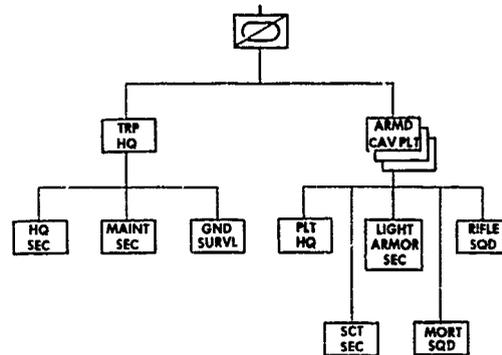


Figure 75. Armored cavalry troop.

range ground radar for the troop; and a maintenance section, which performs organizational maintenance on the vehicles, radios, and weapons of the troop.

(b) The armored cavalry platoon is the basic tactical unit of the troop. It performs reconnaissance, provides security, and executes combat missions as an economy of force unit. The platoon is organized and trained to operate as a team and should be employed as a unit. It will rarely be detached for independent missions. It is organized with a platoon headquarters, which is the command and control element; a scout section of 2 scout squads; a light armor section, a rifle squad, and a mortar squad, with a mortar mounted in an armored carrier. So organized, the armored cavalry platoon forms the smallest combined arms element in the United States Army.

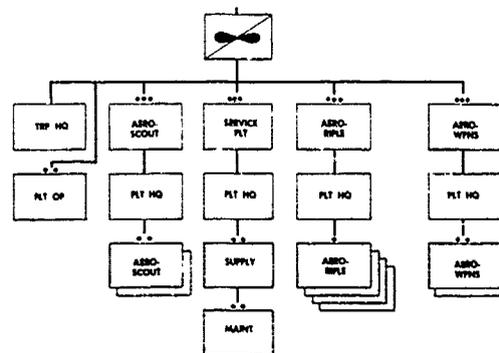


Figure 76. Air cavalry troop.

(3) The air cavalry troop (fig 76) extends and complements by air means the reconnaissance and security capabilities of the squadron, engages in offensive, defensive, or delaying actions within its capabilities, and seizes and dominates lightly defended areas or terrain features. The air cavalry troop is a combat force with combat elements mounted completely in organic aircraft. The troop operates largely in the ground environment (nap of the earth), which is the air space extending from the ground to a few feet above, but generally below the surrounding terrain formation. The aircraft are armed with antipersonnel, anti-materiel, and area- and point-fire weapons capable of destruction and suppression of enemy forces. The troop is organized and equipped to operate as a unit or with one or more teams composed of aeroscouts, aero-weapons, and aerorifle elements. The flexibility of the organization permits rapid organization of platoon teams specifically tailored to accomplish the mission. The troop is organized with a troop headquarters, flight operations section, an aeroscout platoon, aerorifle platoon, aeroweapons section, and a service platoon.

(a) The troop headquarters contains the personnel and equipment, including ground

vehicles and aircraft (UH-1D/H), (fig 81) to command and perform troop level administration.

(b) The operations section includes the personnel and equipment (including communications means) to exercise control over combat operations of the troop.

(c) The aeroscout platoon consists of a platoon headquarters and two aeroscout sections. The platoon accomplishes the normal scout reconnaissance missions, using the OH-58A (fig 78), which replaced the CH-6A (fig 77).

(d) The aerorifle platoon consists of a platoon headquarters and 4 identical aerorifle squads of 2 fire teams each, transported in the UH-1D/H (fig 81).

(e) The aeroweapons platoon provides attack helicopter fire support, AH-1G (fig 79), for all elements of the troop or squadron and may be employed intact or in pure and mixed teams.

Task organization. This section is equipped with the AH-1G Huey Cobra, the first helicopter designed specifically as a weapons

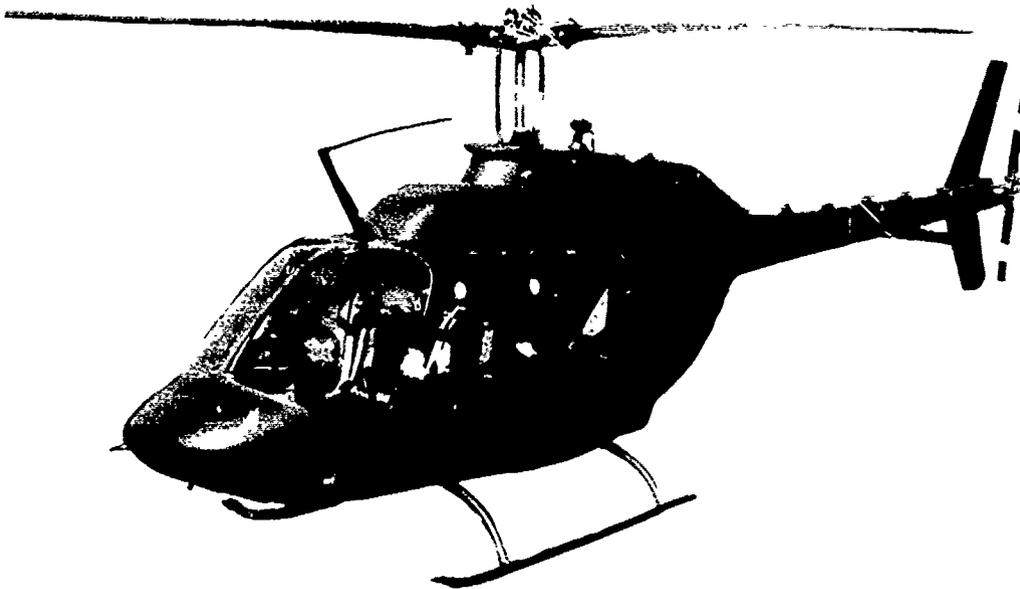


GENERAL DATA

CREW: 1.
PASSENGER CAPACITY: 3.
MAXIMUM SPEED: 170 mph.
ARMAMENT: 7.62-mm minigun.

DIMENSIONS: Length, 30 ft, 2 in; width, 6 ft, 3 in; height, 8 ft, 4 in.
WEIGHT: 2,100 pounds.
RANGE: 320 mi.
ENDURANCE: 2 hrs, 25 min.

Figure 77. Light Observation Helicopter, OH-6A.

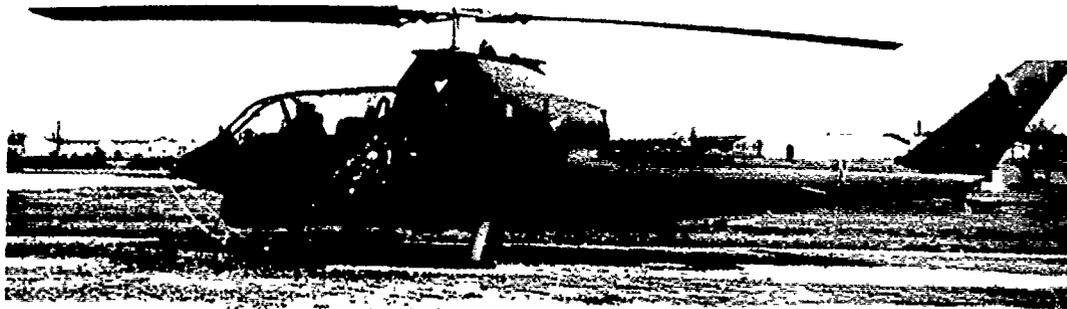


CREW: 1.
 PASSENGER CAPACITY: 3.
 MAXIMUM SPEED: 138 mph.
 ARMAMENT: None.

GENERAL DATA

DIMENSIONS: Length, 40 ft, 11 in; width, 6 ft,
 5 in; height, 9 ft, 7 in.
 WEIGHT: 2,970 lb.
 RANGE: 320 mi.
 ENDURANCE: 2 hrs, 15 min.

Figure 78. Light Observation Helicopter, OH-58A.



CREW: 2.
 PASSENGER CAPACITY: 0.
 MAXIMUM SPEED: 157 knots.
 ARMAMENT: Miniguns, grenade launcher, rockets,
 SS-11, in some configurations.

GENERAL DATA

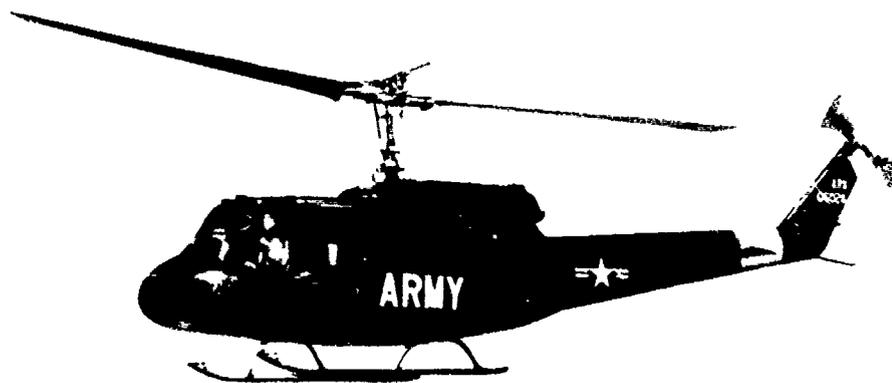
DIMENSIONS: Length, 53 ft; width, 7 ft; height,
 13 ft, 6 in.
 WEIGHT: 4,200 pounds.
 RANGE: 330 nautical mi.
 ENDURANCE: 2 hrs, 15 min.

Figure 79. Attack Helicopter, AH-1G.



CREW: 2.	GENERAL DATA	DIMENSIONS: Length, 52 ft, 11 in; width, 8 ft, 4 in; height, 13 ft, 2½ in.
PASSENGER CAPACITY: 7.		WEIGHT: 4,468 pounds.
MAXIMUM CRUISE SPEED: 138 mph.		RANGE: 254 mi.
ARMAMENT: 7.62-mm machineguns, and SS-11 antitank missile, or 2.75-inch rockets, or 40-mm grenade launcher, or .50 cal machinegun.		ENDURANCE: 1 hr, 45 min.

Figure 80. Utility Helicopter, UH-1B.



CREW: 2.	GENERAL DATA	DIMENSIONS: Length, 52 ft, 1 in; width, 9 ft, 7 in; height, 13 ft, 2 in.
PASSENGER CAPACITY: 11.		WEIGHT: 4,594 pounds.
MAXIMUM CRUISE SPEED: 142 mph.		RANGE: 338 mi.
ARMAMENT: 7.62-mm machineguns, and can be armed with weapons found on UH-1B.		ENDURANCE: 2 hrs, 15 min.

Figure 81. Utility Helicopter, UH-1D/H.

system. It is an improved armed helicopter with a greater range, speed, and weapons payload than the UH-1B (fig 80) which it replaces.

(f) The service platoon provides the necessary mechanics and equipment to supervise and accomplish the troop's maintenance, including limited second-echelon air vehicle maintenance and certain supply functions. This platoon is equipped with the UH-1H aircraft.

d. Division Artillery. The division artillery is the primary source of fire support organic to the division. It supports the division by delivery of nuclear and nonnuclear fires, target acquisition, and coordination of fire support matters. The division artillery is organized with a headquarters and headquarters battery; three field artillery howitzer battalions, 155-mm, SP; and a field artillery battalion, 8-inch SP.

e. Division Support Command. The division support command is a major subordinate unit at the same echelon as the brigade and division artillery. It provides functionalized division-level combat service support (supply; direct support maintenance, with minor exceptions; medical service; and miscellaneous services) to all assigned or attached elements of the division. The support command consists of a headquarters and headquarters company, AG company, a finance company, a medical battalion, a supply and transport battalion, and a maintenance battalion. The support command is tailored to support the armored division consisting of a division base and a mix of tank and mechanized infantry battalions.

f. Brigade Headquarters and Headquarters Company. Each of the 3 brigade headquarters is a tactical headquarters with the mission and capability of commanding up to 5 attached combat maneuver battalions, as well as combat support elements that may be attached in offensive, defensive, and retrograde operations.

g. Combat Maneuver Battalions. The combat battalions, which are assigned to the division base in proportion to and in numbers appropriate to the division's mission and its anticipated operational environment, are as near the same in organization as possible consistent with their individual roles. Some characteristics are common to all the battalions. They are administratively and tactically self-sufficient, and all battalions are organized around a headquarters and headquarters company, three line companies, and a combat support company. All battalions are essentially one combat arm—armor in the tank battalion and infantry in the mechanized infantry battalions. A type armored division would have 6 tank battalions and 5 mechanized infantry battalions, organized as follows:

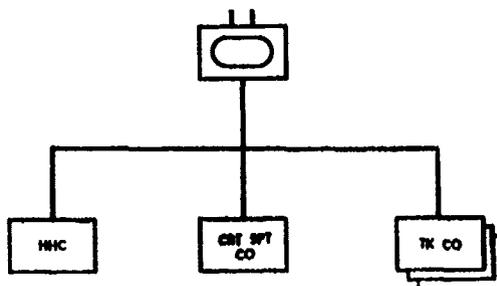


Figure 82. Tank battalion.

h. Tank Battalion. The tank battalion organization is the same in the armored, mechanized, and infantry divisions (fig 82).

(1) Headquarters and headquarters company furnishes command control, and combat service support for the tank battalion. It contains a headquarters tank section of three tanks for use by the battalion commander and his staff, a company maintenance section, a battalion communication platoon, a battalion support platoon, a battalion maintenance platoon, and a battalion medical platoon.

(2) The combat support company provides reconnaissance, ground surveillance, indirect fire support, and limited air defense for the tank battalion. It contains a maintenance section, a ground surveillance section, an armored vehicle launched bridge (AVLB) section, a heavy mortar platoon, a scout platoon, and a Redeye section that provides limited air defense.

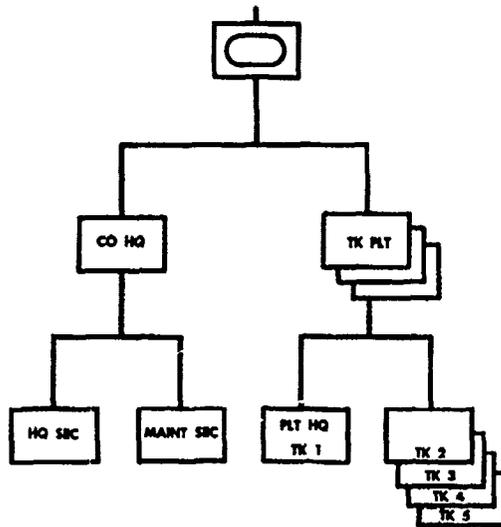


Figure 88. Tank company.

(3) Each of the 3 tank companies consists of a company headquarters and 3 tank platoons (fig 88).

(a) The company headquarters provides the command, and control and administrative support for the tank platoons. To accomplish this, it has a headquarters section, which includes 2 tanks, administrative and supply elements, and a maintenance section.

(b) The tank platoon consists of 5 tanks. Each tank has a 4-man crew. The platoon leader is included in the crew of number 1 tank and the platoon sergeant in number 4 tank.

i. Light Armor Battalion. A new organization to armor is the light armor battalion. This organization, equipped with the M551 (AR/AAV), provides the capability of strategic deployment of an armor force by air. Its mission is to close with and destroy enemy forces using fire, maneuver, and shock effect in coordination with other arms. It is organized to conduct all types of combat operations and forms of maneuver, and is capable of independent operations when augmented with additional combat, combat support, and combat service support elements.

(1) The battalion can accomplish the following:

(a) Conduct operations requiring tactical and strategic mobility.

(b) Attack or counterattack under hostile fires.

(c) Destroy enemy forces to include enemy armor and mechanized forces.

(d) Support infantry or airborne infantry by fire, maneuver, and shock effect.

(e) Move rapidly cross-country or swim inland waterways to exploit the effects of mass destruction weapons.

(f) Conduct combat operations under limited visibility conditions, employing night vision devices and ground surveillance equipment.

(g) Participate in strategic air transported operations.

(h) Participate in airborne operations.

(i) Provide company and battalion level organizational maintenance for organic and attached units.

(2) The light armor battalion is organized similar to the tank battalion. It has a headquarters and headquarters company, a combat support company, and three light armor companies. In addition to the AR/AAV, the battalion is equipped with other highly mobile vehicles in lieu of many wheeled vehicles such as are found in the tank battalion. For example, in the battalion transportation section, full-tracked armored cargo carriers have been substituted for a part of the wheeled cargo vehicles.

(3) Headquarters and headquarters company. The headquarters and headquarters company of the light armor battalion is organized similar to that of the tank battalion. The notable difference is the lack of the armored vehicle launched bridge section. Other elements are the same and have similar missions and functions.

(a) Combat support company. The organization of the combat support company of the light armor battalion is similar to that of the

tank battalion. The functions and responsibilities of the combat support company's organic elements are similar to those of the tank battalion's combat support company.

(b) Light armor company. The light armor company organization is identical to that of the tank company. The missions and functions of its elements are the same as those of the tank company.

j. Mechanized Infantry Battalion. The mechanized infantry battalion is the same in the armored and mechanized divisions.

(1) Headquarters and headquarters company furnishes command, control administration, supply, mess, and maintenance for the battalion.

(2) The combat support company has a headquarters section, and also contains a heavy mortar platoon for close, indirect-fire support; a scout platoon for conducting reconnaissance type operations; a ground radar surveillance section for medium and short range battlefield surveillance; an antitank platoon for antitank protection; and a Redeye section for limited local air defense.

(3) Each of the 3 mechanized rifle companies consists of a company headquarters, a weapons platoon, and 3 rifle platoons.

(a) The company headquarters provides command and control, and administrative support for the line platoons. To accomplish this it has a headquarters section, which includes administrative and supply personnel, and a maintenance section.

(b) The weapons platoon was designed to provide combat support to the rifle platoons and is organized with a platoon headquarters, three 81-mm mortar squads and two tow missile antitank squads.

(c) The rifle platoons consist of a platoon headquarters, three rifle squads which are organized into two fire teams each, and a weapons squad which provides the rifle elements with machinegun fire from two light machinegun teams, and antitank protection from two 90-mm recoilless rifle teams.

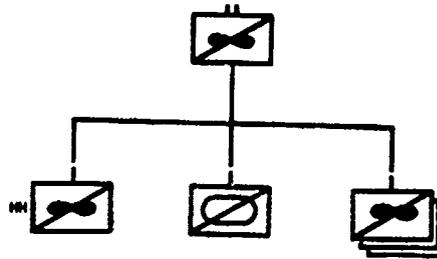


Figure 84. Air cavalry squadron.

16. Air Cavalry Squadron Recent addition to the armor team is the air cavalry squadron (fig 84). This organization has been created to assist the battlefield commander in carrying out far-ranging reconnaissance and security missions by maximizing the use of the helicopter. The squadron consists of headquarters troop, three air cavalry troops, and one armored cavalry troop. This type of unit is well suited for employment in low and mid-intensity conflicts because of its flexibility and responsiveness to widely varying combat situations. Capitalizing on the speed and maneuverability of the helicopter, squadron elements can move over large areas at low altitude to observe, identify, report, and destroy. The squadron also has the capability to airlift its organic aerorifle platoons into suspicious locations for ground reconnaissance and surveillance.

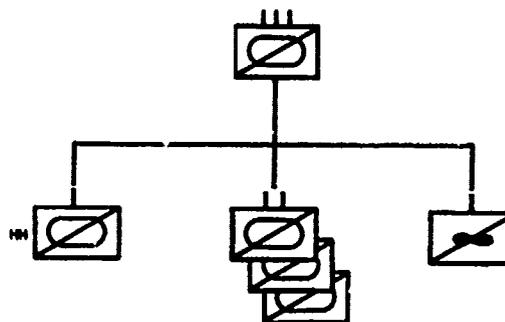


Figure 85. Armored cavalry regiment.

17. Armored Cavalry Regiment

a. The armored cavalry regiment (fig 85) is another of the major armor organizations. One regiment is assigned to each corps.

b. To ensure that the armored cavalry regiment can accomplish its assigned missions, it is organized into a self-sufficient tactical and administrative unit. This permits the regiment to operate independently over a wide area and at extended distances from other units. The regiment is organized around three armored cavalry squadrons, (fig 86) the fighting elements of the regiment. A regimental headquarters and headquarters troop, and an air cavalry troop are organized to support these squadrons in combat.

(1) *Headquarters and headquarters troop.* The regimental headquarters and headquarters troop provides the necessary personnel and equipment to assist the regimental commander in the command, control, supervision, and administrative functions of the regiment. The troop is organized into platoons and sections. This troop is the nerve center of the regiment and provides the staff and necessary personnel and equipment to establish the command post from which the regimental commander directs the operations of the regiment.

(2) *Air cavalry troop.* The air cavalry troop has the same mission as, and is organized similar to the air cavalry troop of the division armored cavalry squadron (fig 76), but additionally has its own organic mess. It extends and complements the efforts of the ground units, or is capable of independent operation as required by the regimental mission.

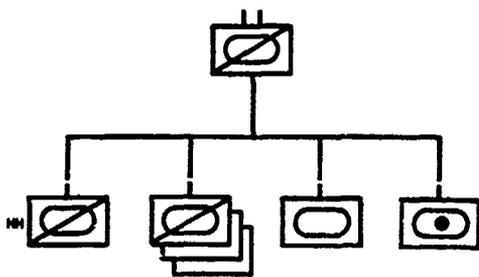


Figure 86. Regimental armored cavalry squadron.

(3) *Armored cavalry squadron.* The squadron (fig 86) is self-sufficient administratively as well as tactically. Each of the 3 squadrons is organized into 3 armored cavalry troops, a tank company, an artillery battery, and a headquarters and headquarters troop. The headquarters and headquarters troop of the squadron has much the same function as the regimental headquarters and headquarters troop has for the regiment.

(a) Each armored cavalry troop is organized similar to the troop (fig 75) in a division armored cavalry squadron except that it also has its own organic mess team. The platoon is the basic fighting element of the regiment. It consists of a light armor section, one rifle squad, a mortar squad, and a scout section consisting of two scout squads. Each armored cavalry troop has three of these small combined arms teams. It has a troop headquarters to support the troop administratively as well as logistically.

(b) The tank company furnishes the squadron commander with a powerful striking force that is capable of closing with and destroying the enemy. It also furnishes antitank defense for the squadron.

(c) The squadron frequently operates independently and at extended distances from other supporting troops. To ensure adequate artillery support an artillery battery is organic to the squadron. The artillery battery furnishes fire support from its six 155-mm self-propelled howitzers.

18. *Separate Armored Brigade* A unit not as well known as either the armored division or the armored cavalry regiment but one that will serve an important function is the separate armored brigade.

a. The separate armored brigade (fig 87) has as its primary mission, the destruction of enemy forces. Additionally, it may be assigned missions of controlling enemy land areas, populations, and resources. Unlike its counterpart, the armored division brigade,

which has no organic troops other than its headquarters and headquarters company, the separate armored brigade has the following organic troops: headquarters and headquarters company, support battalion, armored cavalry troop, engineer company, and field artillery battalion (155-mm, SP). These organic troops are referred to as the brigade base. The brigade base provides the necessary command and control personnel and facilities, combat support units, and combat service support units to sustain operations for up to five combat maneuver battalions, including any combination of tank and mechanized infantry units.

b. The techniques and methods of employing the separate armored brigade are essentially the same as for the armored division brigade. The organic and attached units are tailored to accomplish the specific mission at hand. The principal difference is that the separate armored brigade has a larger staff with which to exercise command and control, and its organic brigade base.

c. The separate armored brigade is a highly mobile, decisive force that, because of its increased organic units, exceeds the capabilities of its counterpart, the armored division brigade.

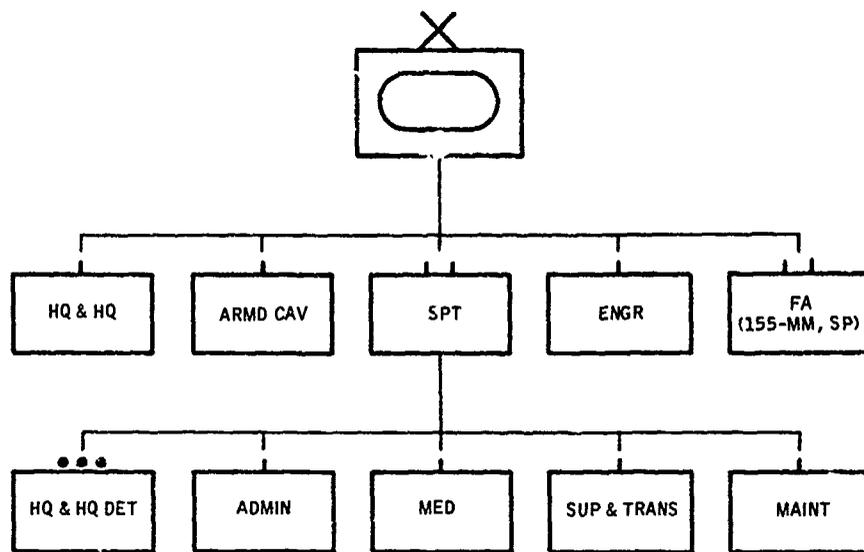


Figure 87. Separate armored brigade base.

19. **Attack Helicopter Company** The most recent addition to the armor team is the attack helicopter company. The company is organized (fig 88) with a company headquarters, a flight operations platoon, a service platoon, and three attack helicopter platoons. Each attack platoon consists of a platoon headquarters, scout helicopter section, and attack

helicopter section. Capable of providing quick reaction direct aerial fires against armored and mechanized forces, accomplishing rapid movement, deep penetrations and pursuit, and becoming a mobile counterattack force when operating in conjunction with ground forces, this unit adds a versatile fourth dimension to the armor team.

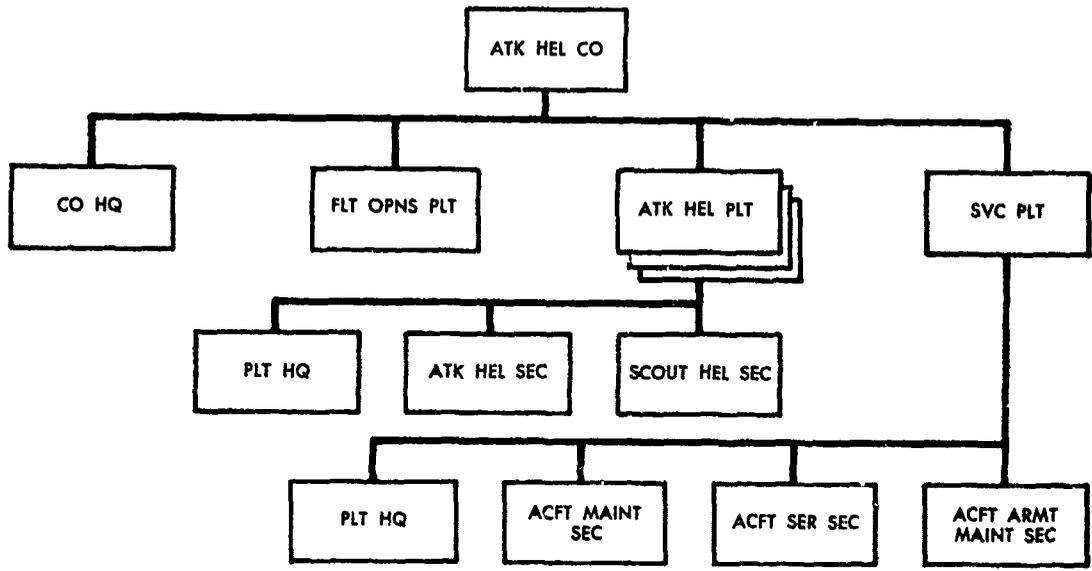
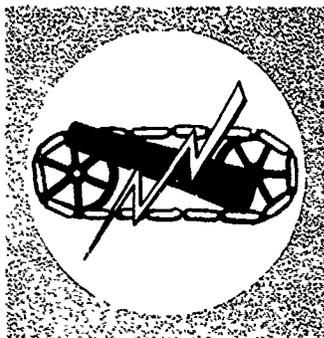


Figure 88. Attack helicopter company.



(Continued from inside front cover)

engagements in which they took part in World War I, though their inherent force was vitiated, for the most part, by their employment in long, thin, and scattered lines. And the dragon at the crest of the design was also the charge on the coat of arms for the 1st Cavalry.

It was the 7th Cavalry Brigade (Mechanized) that contributed the other part of the present Armor shoulder patch. This brigade, formed out of the 1st Cavalry Regiment (led from Marfa, Texas, on 16 January 1933 by General Van Voorhis, then a Cavalry colonel), the 13th Cavalry, and the 68th Field Artillery, was organized expressly for training in mechanized warfare. In the shoulder patch of the 7th Cavalry Brigade (Mechanized) (above) one can see the development, even under suppression, of a doctrine of Armor. Designed and drawn by Colonel Linthwaite, Retired (then private first class), in collaboration with Major General Robert W. Grow (then major), the patch was designated the official brigade insignia by General Van Voorhis, despite the War Department's indifference to repeated requests to have it designated.

The patch symbolizes firepower, mobility, and shock effect with its three figures, the track gun, and bolt of lightning on a yellow, oval background. Thus the patch served not only a decorative purpose but definitely characterized the unit that wore it.

After the formation of the Armored Force in 1940 under Major General Chaffee, the triangle of the old World War I Tank Corps and that of the 7th Cavalry Brigade were combined, thus giving the Armored Force patch a historical significance—definitely linking its origin with the Tank Corps and the coat of arms designed for it by Lieutenant Wharton in 1918. The function of the shield that once bore the Tank Corps charge was now taken over by the charge itself and the triangle became the field upon which are borne the symbolic figures characterizing the mission of the Armored Force. Thus the present-day patch, designated official in November 1940 by the War Department, represents a stage in the development of combined arms theory just as surely as does Armor doctrine. Any of its wearers should be conscious of the continuous history its design represents, and proud of the thinking and doctrine it characterizes. It is a union of separate arms which yet preserves the integrity of those units in a new and vital organization with a high degree of esprit de corps traditional to the mounted soldier.