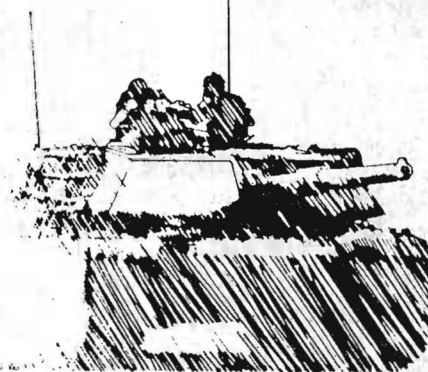


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Museum Ordnance

*The Magazine for the
U.S. Army Ordnance Museum*

Promoting the preservation and collection of information and artifacts of military ordnance from around the world.



The Curator's Column

A lot has occurred this spring and a lot more is taking place this summer. Perhaps the biggest undertaking has been the repainting of "Anzio Annie" or "Leopold." The entire gun has been sandblasted, primed and painted thanks to our friends in the Combat Systems Test Activity (CSTA). They did a first class job of work and the gun has never looked better. At the time of this writing (the middle of July) the lettering on the side of the gun has not been painted. We expect CSTA to come back shortly and camouflage the gun the way it was when first captured. They will use an earth red paint to recreate the original paint scheme. This particular scheme was uncovered when we sandblasted the gun and we have photographs to show us what it looked like. Once that job is complete, we will re-letter "Leopold" using a computer generated lettering system. Hopefully, we will be able to recreate the original lettering so close that you will not be able to tell it has been done on a computer.

I am also very pleased with the way the 43,000-pound bomb came out. It was repainted for the first time in many years and numerous small holes were patched in the tail assembly. The lettering on the bomb was turned out by our new computer assisted lettering set.

(Continued on Page 13)

Museum Ordnance
Volume 1, Number 1
September 1991

Jeffrey D. McKaughan
Editor

Museum Ordnance

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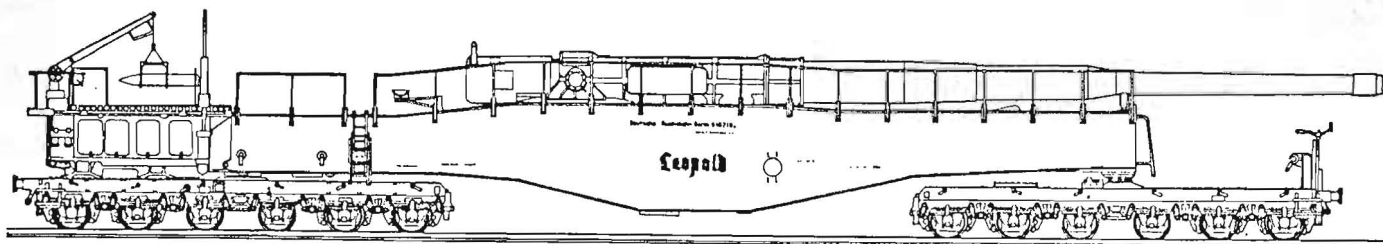
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This publication serves the interests and needs of the Aberdeen Proving Ground Ordnance Museum at Aberdeen Proving Ground, Aberdeen, MD. A donation is made to the Museum for each copy of this magazine sold either by subscription or as a single copy.

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Anzio Annie Gets a Facelift

By Jean Morganthal

In early February of 1944, with the Italian campaign well underway and the fate of the Anzio beachhead still very much in doubt, the German High Command searched for a solution that would help counter-balance the naval gunfire that they expected in and around the salient. Their concerns were not unwarranted as their experiences at Salerno illustrated.

Part of their answer was in large railway guns from northern Italy and

Western France. The most famous single artillery piece to come out of World War II was about to enter history.

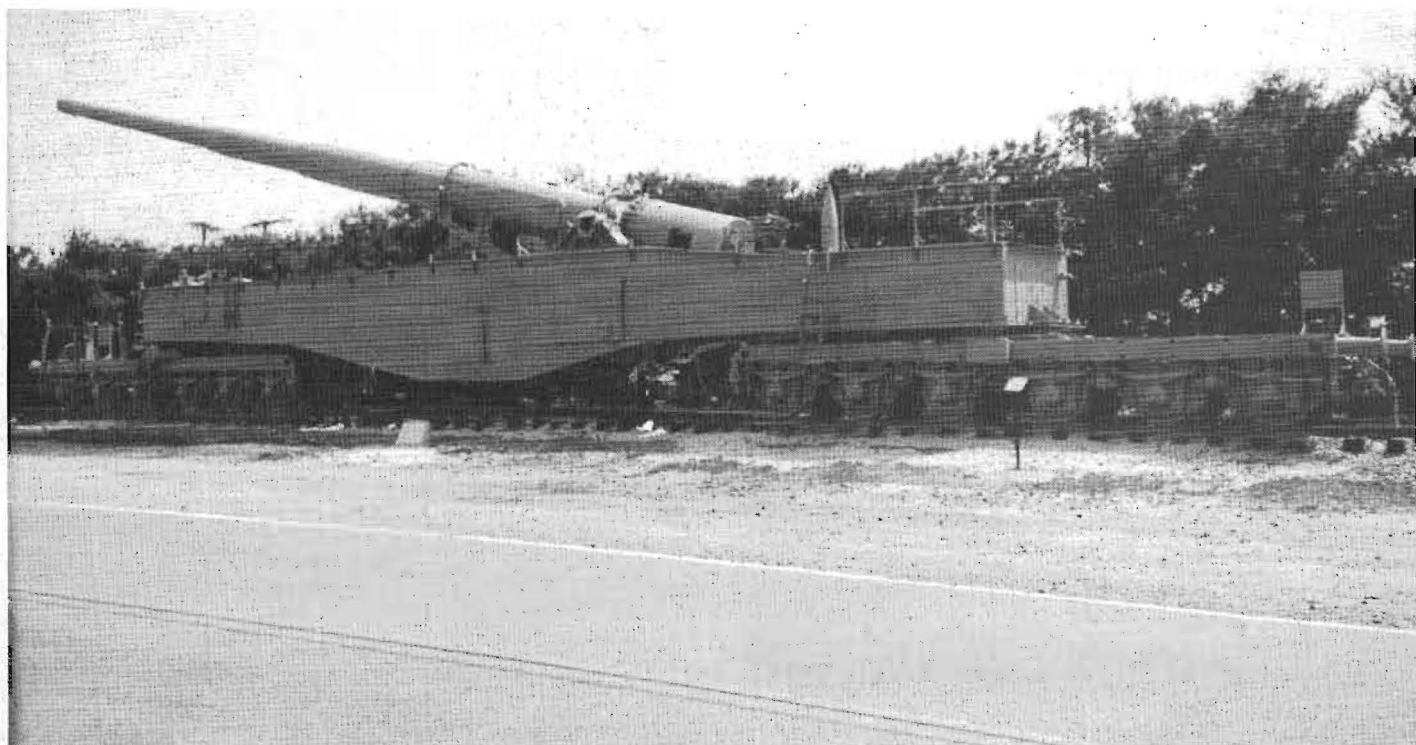
The Germans employed a large number of heavy guns in this theater of operation, moreso than any where else. From 170mm, 210mm (the most widely used railway gun in the region) and 220mm guns, the Germans could hurl projectiles much farther than any piece the Allies could field. But by far the grand-daddy of all were the 280mm K5 (E) railway guns. With the ability to fire 550-pound shells more than 30 miles, the guns quickly earned their own distin-

guishing name—Anzio Annie.

Firing from positions in the St. Alban hills south of Rome, the K5's became a source of concern for every soldier in their path. While their use was sporadic, the myth of their destructive ability and accuracy grew daily. Every large explosion was blamed on Anzio Annie. Although unknown at the time, there were only two of these mobile menaces, one named Robert, the other Leopold.

Much of the mystery surrounding these two brothers resulted from the continual failure of the Allies to destroy

(Continued on Page 21)



Anzio Annie as she appears today. Before applying the letterings and markings to the gun, the CSTA will first camouflage the railway gun with the colors and pattern that adorned her in Italy. Elusive until the end, Leopold's design, ballistics and engineering was studied for years after the war.

Obiekt 162 Yubileniy

By Steven Zaloga

Sitting in front of the Ordnance Museum in desert camouflage colors is a Soviet T-62 tank. Although its more modern cousin, the T-72 hogged the limelight during the recent fighting in the Gulf, the T-62 formed a large part of the Iraqi tank force during Operation Desert Storm.

The Soviet T-62 tank was developed in the late 1950s by a design group under Arkadiy Kartsev, and was first known by its secret codename, Obiekt 162 Yubileniy (Object 162-Jubilee). It was intended as a successor to the earlier T-55 tank. The main difference between

the T-62 and the T-55 was its new 115mm smoothbore gun. Until the T-62, Soviet tanks had all used conventional, rifled tank guns. In the mid-1950s, the Petrov Design Bureau in Perm experimented with the Rapira (Rapier) smoothbore guns in an attempt to boost the anti-armor penetration of tank weapons.

The novel smoothbore design permitted the use of a more efficient shaped charge projectile (called HEAT in the US Army), and also saw the first use of the APFSDS (armor-piercing, fin-stabilized, discarding sabot) projectiles. This type of projectile, which is now the standard type of projectile for tank fighting, resembles a large finned dart. The dart is enclosed in a sabot (from the French for

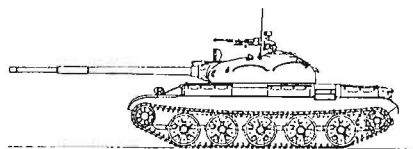
"shoe") which permits the small caliber dart to pass smoothly down the much longer gun tube. On exiting the gun tube, the sabot falls away. The dart projectile has proven to be a very efficient anti-armor projectile as it has less air resistance than conventional projectiles, and concentrates its impact energy on a very small area.

To mount the U-5T Rapira gun on the T-55 chassis, it was necessary to stretch the hull. This was done to increase the turret ring diameter to better absorb the heavier recoil forces of the gun, and to provide additional volume for ammunition stowage of the larger 115mm projectiles. A few years after it entered production, a new variant of the T-62 was developed, the T-62M, which added a DShK 12.7mm machine gun over the loader's hatch.

The T-62 first entered Soviet Army service in 1961, about the same time the US Army began receiving the M-60A1 tank. Although the US Army and the Soviet Army were never involved in any head-to-head confrontations, the M-60 and the T-62 have been involved in a number of wars. The T-62 was exported in significant numbers to Syria and Egypt, and saw extensive fighting in the 1973 war. In fact, the Aberdeen example is probably a veteran of the 1973 war. The T-62 proved to be a very tough tank in combat, with excellent armor protection and a very potent gun. But the combat effectiveness of a tank is largely dependent on the quality of the crews in opposing tanks. The Israelis held distinct advantages in this area. A great many T-62s were lost in the 1973 fighting. Syrian T-62s were also involved in the 1982 Lebanon war with Israel, though by this time, newer tanks like the Syrian's Soviet-manufactured T-72, and the Israeli Merkava attracted most of the attention.

The T-62 has been widely exported to over 20 countries. Although it's best known for its role in the 1973 Mid-East War, it has seen combat in many other conflicts including the war between Chad and Libya in the 1980s. It saw its

Soviet T-62 MBT Specifications



Crew: 4

Armament: 1 x 115mm, 1 x 7.62 MG (coaxial), 1 x 12.7mm MG (anti-aircraft)

Ammunition: 40 x 115mm, 2,500 x 7.62mm, 500 x 12.7mm

Length gun forwards: 9.335m

Length hull: 6.63m

Width: 3.3m

Height: 2.395m (without AA MG)

Ground clearance: 0.43m

Weight, combat: 40,000kg

Weight, empty: 38,000kg

Power-to-weight ratio: 14.5hp/ton

Ground pressure: 0.83kg/cm²

Engine: Model V-55 V-12 water-cooled diesel developing 580hp at 2,000rpm

Maximum road speed: 50km/hr

Maximum road range: 450km

Maximum road range (with auxiliary tanks): 650km

Fuel capacity: 675 + 285 lit

Fording: 1.4m, 5.5m (with preparation)

Vertical obstacle: 0.8m

Trench: 2.85m

Gradient: 60%

Side slope: 30%

Source: Jane's AFV Recognition Handbook



A view of the T-62M currently preserved at the Ordnance Museum. The distinctive 12.7mm DShK machine gun mount on the loader's hatch on the right side of the turret is obvious in this view. Along with an M1 Abrams and a Bradley IFV, the T-62M guards the Museum front and welcomes its visitors (Steven Zaloga)

combat debut in sub-Saharan Africa during the fighting between Cuban and South African tank units during Operation Hooper in January 1988.

The Iraqis began purchasing the T-62 from the Soviet Union and Czechoslovakia beginning in the 1970s and it eventually became one of the most common types. Production of the T-62 was short-lived in the Soviet Union due to the arrival of the superior T-64 tank. But, it continued in Czechoslovakia from 1972 until 1978 for the export market, and was also started in North Korea in the 1980s. It was widely used in the long, drawn-out war between Iran and Iraq which ended in 1988. The Iranian forces were equipped with American M-60A1 tanks at the outset of the war, and it is entirely possible that the old adversaries encountered one another on the desert battlefield of the

Gulf war.

In the final years of the Gulf war, the Iraqis began receiving T-62 tanks license manufactured in North Korea. These tanks are identifiable by the addition of a Chinese laser rangefinder over the gun mantle and Chinese-pattern side skirts. Some of the Soviet and Czechoslovak-built T-62s were modernized in the late 1980s by the Iraqis with the addition of a Dutch Delft laser rangefinder/night vision system.

Some of these modernized T-62s showed up in the battle for Khafji when the Iraqi 5th mechanized Infantry Division attempted to capture the town as part of an abortive offensive by the Iraqi 3rd Corps. The attack was a fiasco. The tanks and troop carriers of the Iraqi task force were mauled by Qatari AMX-30 tanks and by US Marine AH-1W Super

Cobra gunships firing Hellfire and TOW missiles. Several T-62s fell victim to the coalition forces during this battle and were later recovered by the Marines.

The T-62 underwent continual modernization in Soviet service. During the war in Afghanistan, Soviet T-62s were rebuilt with a special applique armor kit. These versions are sometimes called the T-62E, though the actual Soviet designation is not certain. This applique armor kit consisted of two curved plates for either front side of the turret, another plate on the glacis and a special anti-mine plate on the belly. This applique armor kit was sufficient to protect the T-62 from hits by contemporary infantry anti-tank weapons like the RPG-7s which were so popular with the *mujihadeen* resistance fighters. In recent years, the Soviets have added explosive reactive



This T-62M is currently preserved and on display at the Armor Museum (Musee des Blindes) at Saumur, France. The Saumur Armor Museum is located next to the French Army's armor and cavalry school in the scenic Loire Valley of central France, hardly the place one would expect to find a Soviet tank! This particular vehicle formerly served in the Syrian Army. (Steven Zaloga)

armor to the T-62 instead of this applique armor kit, and these versions are known as the T-62V and the T-62MV.

Considering the widescale export of the T-62, it will not be surprising to see this robust vehicle continue service well past the year 2000, especially in the Third World.

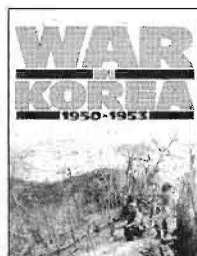
Another view of the T-62M at the APG Ordnance Museum. The Obiekt 162 Yubileniy, as the design project was codenamed, was a further development of the T-55 with a longer body and it introduced the first smoothbore main weapon on a Soviet main battle tank. (Steven Zaloga)



A History of the American

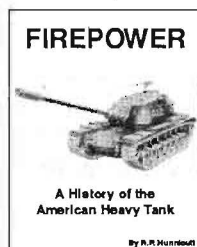
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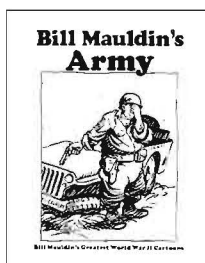
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Book Review

FIREPOWER IN LIMITED WAR

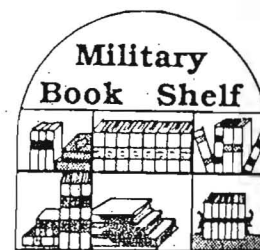
Colonel Robert H. Scales, Jr.

291+ xv pp, illustrated

National Defense University Press, Washington, D.C.

1990

Available from the U.S. Government Printing Office



Reviewed by Peter A. Frandsen

The elusive search for decisive results through the heavy use of firepower without the use of maneuver forces in limited or small wars is one of several themes of this interesting book. In his survey of the use of firepower of four limited wars of the 20th century, Col. Scales found no army capable of winning a war through the use of firepower alone, try as it might. As good and necessary as firepower is in the force structure, it is not good enough alone. Firepower must be combined with the maneuver forces to achieve victory. Each combat branch; armor, infantry, artillery and supporting troops each have strengths and weaknesses that when put together the sum of the parts exceeds the whole. The combined arms concept is, of course, nothing new and was understood by Alexander the Great some 2,300 years ago.

If a combined arms approach is widely understood and perceived as a necessary prerequisite for success, why do so many wars leave one combatant, usually a major industrial power, expending ever larger amounts of firepower against weaker non-industrial power for naught? The answers to that question is a theme which underlies much of the analysis and discussion of the book. The author sadly points out that when a country becomes dependent on firepower as a substitute for strategy and maneuver, that country surrenders the initiative to the enemy. This bankrupt strategy does not lead to success.

The major power faces an enemy who is willing to trade territory, resources and time while fighting for victory. The smaller power is often motivated by strong political or national forces which are usually not present with the major power. The smaller power will not and cannot fight on the terms of a major power. Dien Bien Phu and Khe Sanh are two notable exceptions. Dien Bien Phu was a situation where the smaller power could

temporarily, but decisively, come to grips with the major power. Khe Sanh, an attempted repeat of Dien Bien Phu, was a situation where the smaller power mistakenly believed it could take on a major power on their terms as it prefers.

Frustration mounts for the major power as it becomes ever more reluctant to accept the continuing casualty lists and lack of any apparent end to the conflict. The politics at home drives the military forces to reduce casualties as much as possible. Firepower is expended instead of lives. Ground forces give up mobility and armor themselves more and more for protection. The combination of these strategies, paradoxically, extends the conflict and leads to greater use of firepower and the cycle continues. The ensuing failure of that strategy is painfully described by the author.

The four limited wars surveyed in this book, with one chapter per conflict, are the First Indochina War, The Second Indochina War, The Soviet Intervention into Afghanistan and the Falklands Campaign. In the Falklands campaign both combatants were more industrialized and employed western concepts of war not typical of the smaller combatants in other wars in the book. Further, the use of firepower and maneuver were much more balanced which speaks volumes against relying on firepower alone to win.

The chapter on the American involvement in Vietnam is, not surprisingly, the largest, the most detailed and the most developed. The author has drawn upon a wealth of sources to support his description and analysis. With the amount of firepower employed in that war, it probably is not a limited war, but his analysis of the proper use (Scales illustrates examples where the heavy use of firepower can be quite decisive) and the misuse is still valid. His analysis of American military strategy and tactics, which was driven by political forces at home, is unusually blunt and critical. It

will not make pleasant reading for many.

There are perhaps several books here. The examples, the discussion and analysis range from first-hand battle accounts of tactical actions to strategy at the military and command levels. He discusses the causes and consequences of the addiction to firepower at many levels in limited wars. That analysis applies to other conflicts as well. Many of the same things could be said about World War I, where the misuse of firepower went horribly astray, but involved major industrial powers on both sides. Nonetheless, small wars may have more immediate poignancy because of the recent easing of tensions between the super-powers and the lower probability of heavy battles of annihilation in Europe that have been planned since the end of World War II. The U.S. intervention in the Mid-East and the extensive and apparent success of firepower is only the latest example.

Regardless of the scenario, artillerymen need to understand the use and misuse of firepower and the political implications. While other books have discussed these topics before, the focus of this book is on firepower and artillery and is an excellent contribution to that field of study.

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Armored Systems Modernization Program

By Gregory Fetter

The United States Army has decided that a "family of vehicles" concept would represent a major reduction in overall costs associated with the next generation of armored vehicles. This idea is being embraced by a number of other nations including Austria, France, Germany, Italy, Sweden and United Kingdom. In fact, some senior officials of the United States Army are on record as stating that the savings would amount to around nine billion dollars. Therefore, the United

States Army is proceeding with the "family of vehicles" concept to meet its requirements for its next generation of combat vehicles. Usually considered as a part of the Air-Land Battle 2000/Armor 2000/Air-Land Battle-Future and Armor/Anti-Armor concepts, the overall program for new combat vehicles has been known under several names:

1984- "Future Close Combat Vehicle Family"

1986-88- "Armored Family of Vehicles"

1988-90- "Heavy Forces Modernization"

1990-?- "Armored Systems Modernization"

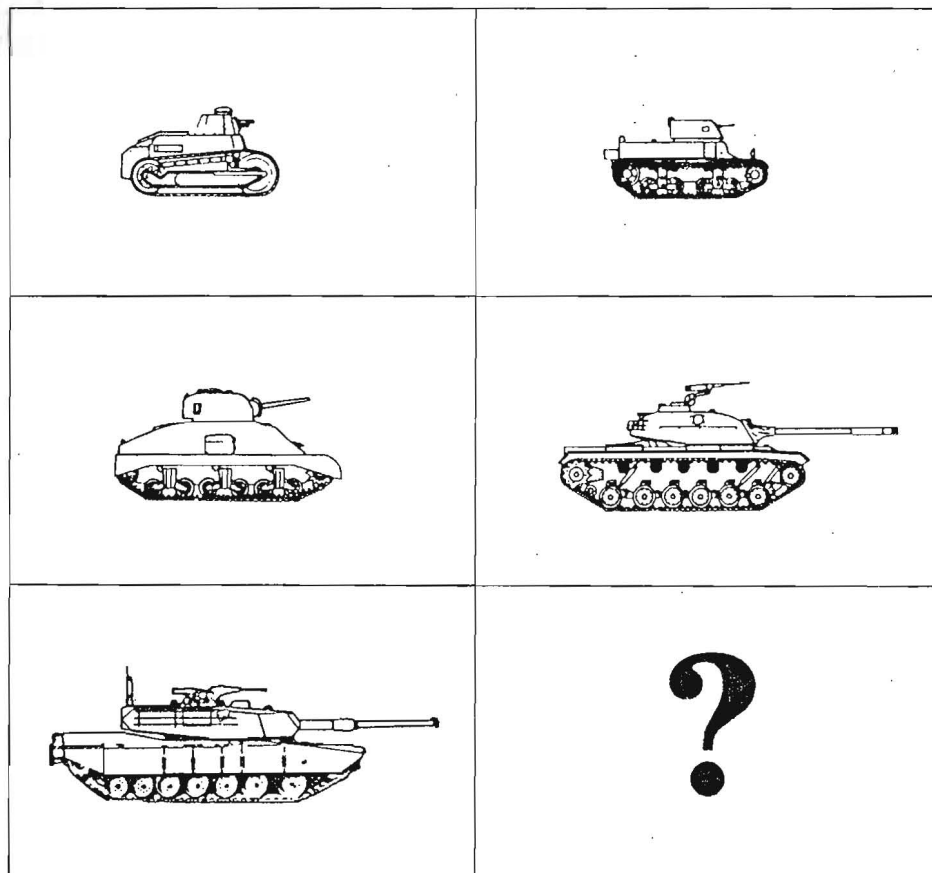
Associated with these programs, which are often abbreviated by someone so everybody is confused, are a number of research and development programs, also often abbreviated. Included are the following programs, listed in alphabetical order.

Advanced Integrated Propulsion System- The effort to develop a new common engine for the next generation of combat vehicles. The General Electric, with the LV100 gas turbine and Cummins Engine Company with the XAP-100 adiabatic diesel engine. Research indicates that the advanced diesel engine is the favorable system to be selected for the Army's next generation of combat vehicles.

Advanced Tank Cannon System- Program to develop the XM291 140mm tank cannon for the Block III tank but also for possible retrofit to the M1A1/A2. There is probably some cross feed of technology in this area from one or more European nations, Germany in particular.

Advanced Technology Transition Demonstrator- A surrogate chassis to be initially used for the development of one of the members of the Armored Systems Modernization effort, the Advanced Field Artillery System-Cannon, more on which below.

Common Chassis Advanced Technology Transition Demonstrator- This effort is for additional Advanced Technology Demonstrator chassis (a purpose built M1) to be used for the development of other members of the Armored Systems Modernization program.



What's Next?

Component Advanced Technology Testbed— Another effort at integrating various databus, propulsion and other automotive technologies on a M2 Bradley test vehicle.

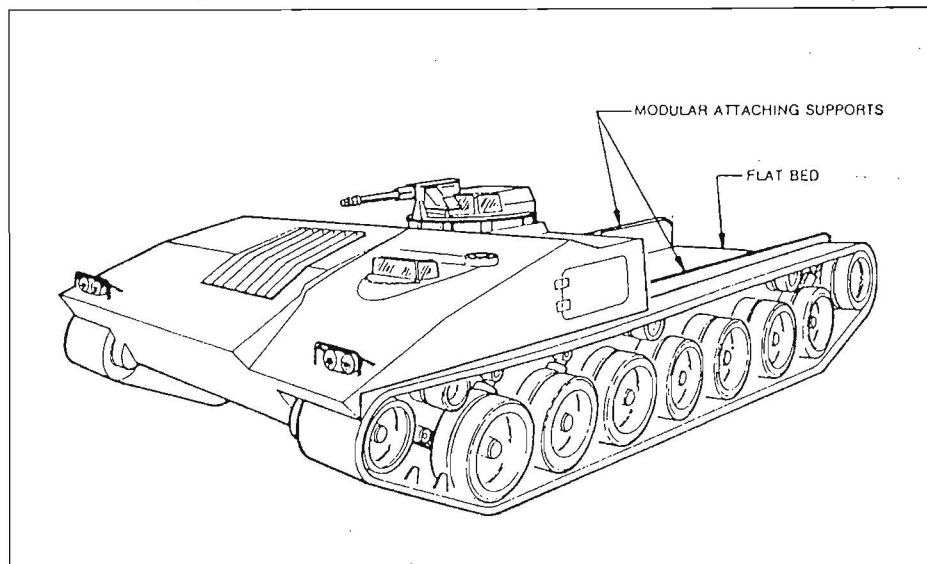
Modular Armored Support Vehicle— A private effort by Bowen-McLaughlin-York for a base tracked vehicle chassis to meet the “medium” portion of the Army’s new vehicle development effort.

Standard Army Vehicle Electronics Architecture— A program to integrate the advanced design electrical and electronics systems of the vehicles being developed under Armored Systems Modernization program. This includes the 1533 data bus, utility bus, video bus and a high speed data bus. A family of modules that are applicable to all members of the new family of combat vehicles are being developed.

Turret Integration Loading System— A program to integrate new technologies into a turret for the Block III tank, described below. Technologies such as automatic loading, advanced fire control components (especially the Multi-Sensor Target Acquisition Sensor) and all electric turret/gun control systems are being investigated.

Automatic Ammunition Loading System— Program name for all of the technologies being developed under the Turret Integration Engineering Support program. This effort is presently attempting to develop a system which, in addition to automatically loading the main armament of the Block III tank, will also be capable of gunner’s selection of ammunition, stores management and the shifting of projectiles and charges between magazines above and below the turret ring. A major difficulty is in making the operation of such an automatic loading system foolproof in operation in the harsh conditions found in the field.

As of the date of this writing, the Armored Systems Modernization program consists of the following elements; each program includes pertinent comments. The programs are listed in declining order of the program (not always unit) cost. The fact that the United States Army has stated that the use of a common chassis and other components for the six vehicles of the Armored Systems Modernization program will save nine billion dollars

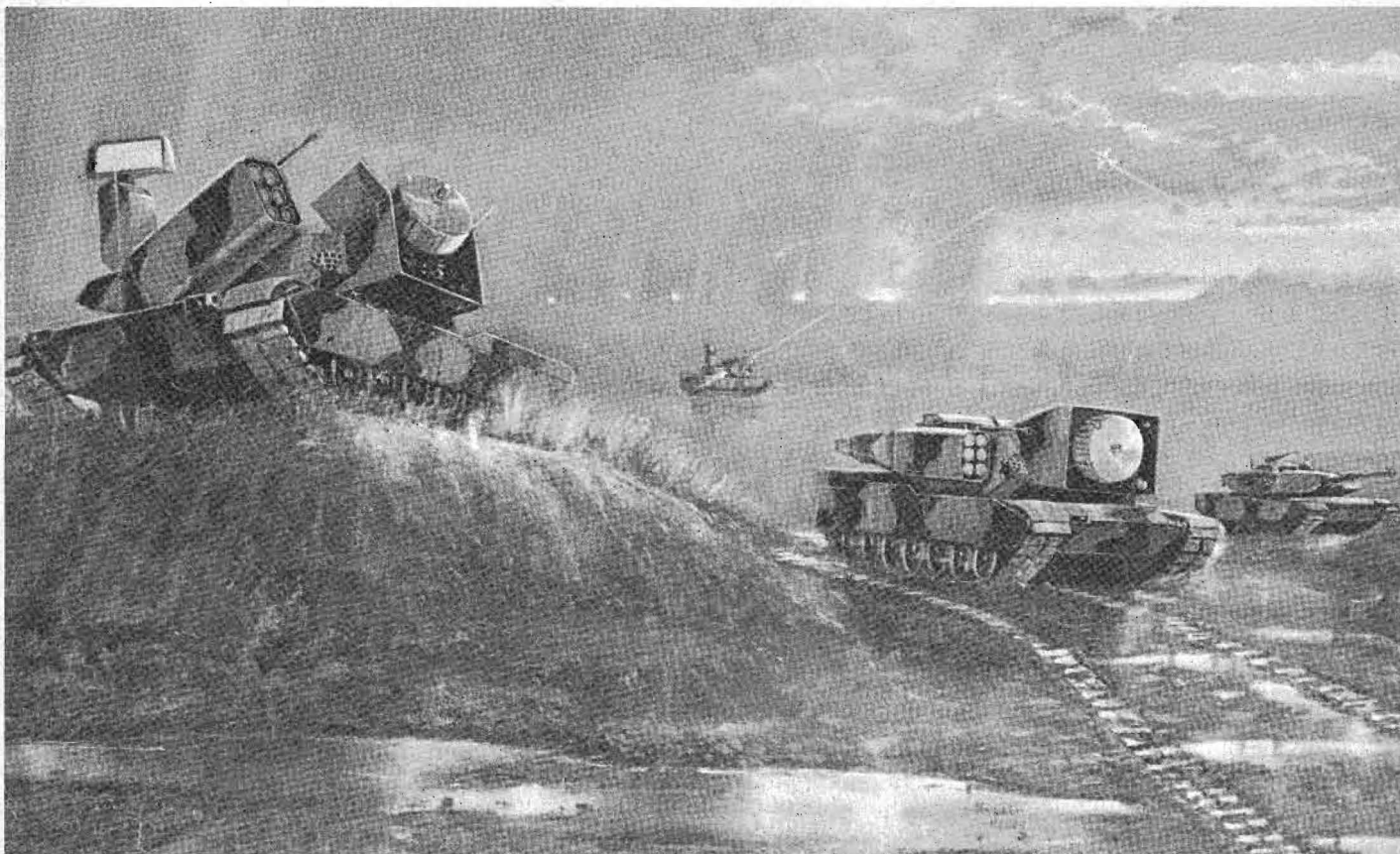


The Modular Armored Support Vehicle (MASV) concept has been developed by BMY-Combat Systems under Independent Research and Development. The intent of the MASV Program was to develop a tracked chassis that would readily accommodate a wide range of discrete mission modules, including electronic warfare, air defense, rearm/refuel, command and control, field maintenance and others. In an effort to minimize the R & D costs, production and the transition to operation, the program attained maximum logistical commonality with the Bradley family of vehicles. Begun in 1986, the Program has been temporarily suspended pending future funding. (BMY drawing)

over the development of separate components is a major driver to this program. The latest total program cost for the approximately 6,000 unit Armored Systems Modernization effort is put at \$63.9 billion. It should be noted that, similar to other programs, the total development and procurement cost of the Armored Systems Modernization program has grown in recent years; the latest projection is some twenty billion dollars over that of some five years ago.

Block III Tank— This is often referred to as the “M1 Block III”; this has caused confusion as it led many people to think that it is a simple follow-on in the M1 Abrams program as that program has used block numbers to denote successive models of that tank. The Block III tank was originally proposed by the Army as a major enhancement to the Abrams but has subsequently been divorced from the Abrams program as it exists today. The Block III tank program is aimed at the development of a totally new tank. However, the constrained defense budgets presently projected through the nineties will probably result in a modified Abrams hull and chassis being used as the base for the “heavy” portion of the

Armored Systems Modernization program. The new tank will almost certainly incorporate the XM291 140mm tank cannon, automatic loading as well as other advanced features. It may or may not have a turret. Officially, the Block III has the highest priority with the Army in the Armored Systems Modernization program and the highest priority of all Army programs. The latest projected cost for this portion of the program is \$21.8 billion with the unit cost put at “over five million dollars”. The planned procurement was originally 3,349 tanks but in light of the changing threat scenario, and other factors, has been reduced to 1,946 tanks. While some Army officials have stated that they desire this tank to be in service by 1997 and official statements state “late 1990s” we do not feel that this tank will enter service until after the turn of the century or thereafter. It is apparent that the United States Army wants the most sophisticated, state-of-the-art tank it can get, something like the XM803, a forerunner of the M1. However, this high technology has an equally high price and the prospect of several (or even one) thousand Block III tanks costing around \$6 million each is going to be difficult at best. Probably the major thing working



This artist rendering depicts an LOS-F-H air defense system proposed by LTV's Missile Division. Named Liberty, the proposal mates the hull and chassis of the M1A1 Abrams with a turret subsystem which includes two six-packs of missiles and two 25mm cannons. The new turret also contains two separate and independent sensor systems, radar and optronics for target acquisition. A key survivability point is that the turret systems are independent of each other. The missile and guns systems will function even if the other system is damaged or rendered out of service. This project was jointly developed by LTV and Thompson-CSF. Status and progress of development for this program are unknown, partly due to the bankruptcy filing of the LTV parent corporation.

against the early introduction of the Block III tank is the changing threat scenario which does not seem to dictate such a rapid introduction of a totally new tank. Also working against an introduction in the nineties is the large growth potential left in the Abrams, especially in the A1/A2 model. There is also tremendous growth potential left in the M256 120mm cannon; the present state of development of the M256 is approximately where the M68 was in the mid seventies. However, the future growth in the ballistics and penetration performance of the M256 will be pushing the state-of-the-art.

Future Infantry Fighting Vehicle— This vehicle is the designated follow-on to the M2/M3 Bradley program. The latest official expected initial, in-service date is 1999; we do not feel it will be in service until 2009. With the Army,

the Future Fighting Vehicle has the lowest priority of all Armored Systems Modernization programs although Congress, still worried about the survivability of the M2/M3 Bradley, places it as second after the Advanced Field Artillery System-Cannon. A missile only, cannon only or combination of the two for the armament of this vehicle has yet to be decided. The latest program cost is \$15 billion. The original 1,893 unit procurement objective has been reduced to 1,321.

Line of Sight Anti-Tank— This member of the Armored Systems Modernization program is the designated replacement for the M113/TOW and the M901 Improved TOW Vehicle. It will mount the Advanced Anti-armor Weapon-Heavy anti-tank missile system, the replacement for the BGM-71 TOW anti-tank missile system. Since this missile

has yet to be selected, the type of missile will dictate whether a heavy or medium chassis will be used. The Army wants this system in service by "the late nineties"; the latest cost projection for this portion of the Armored Systems Modernization program is \$10.2 billion. The original procurement objective of 1,404 systems has been reduced to 907. This program is viewed as having the second priority by a number of senior officials and military observers.

Advanced Field Artillery System-Cannon— The designated replacement for the M109 155mm self-propelled howitzer. This program has been in and out of the overall Heavy Forces Modernization/Armored Systems Modernization several times with Congress on record as desiring that it be given the highest priority within the overall program, ahead of

the Block III tank. Therefore, the Advanced Field Artillery System-Cannon will probably be the first member of the Armored Systems Modernization program to enter service; we are forecasting a 2000 in-service date with the Army stating 2001. The latest cost projection for this portion of the Armored Systems Modernization program is \$9.4 billion; 782 units is the latest revised procurement objective, down from 888. In light of the dramatic changes in Europe, some observers are questioning the need for the Advanced Field Artillery System-Cannon as well as the Future Armored Resupply Vehicle-Artillery member of the Armored Systems Modernization program.

Future Armored Resupply Vehicle-Artillery- This is the designated replacement for the M992 Field Artillery Ammunition Support Vehicle which supplies the M109 155mm howitzer with ammunition. The Army wants this system in service by "the year 2000"; the latest cost projection for this portion of the Armored Systems Modernization program is \$4.8 billion. Like the Advanced Field Artillery System-Cannon, the procurement objective for the Future Armored Resupply Vehicle-Artillery has been reduced from 888 to 782.

Combat Mobility Vehicle- An advanced engineer type vehicle capable of defeating advanced and complex obstacle systems as well as creating roads, ditches and defilade positions. Such a vehicle is especially helpful in creating defensive positions for tanks. The expected initial operating capability is 2003 and the latest cost projection for this portion of the Armored Systems Modernization program is \$2.7 billion. The procurement objective has been raised from 249 units to 258 units. Some senior staff officers, especially those associated with the infantry, feel that the Combat Mobility Vehicle should have a much higher priority in the Armored Systems Modernization program. This is due to the lack of modern technology in this area that is presently held by the U.S. Army. A number of other nations, among them France, Germany and the United Kingdom are considered as having a lead over the United States in this area of military technology.

Armored Gun System- This program for a new light tank to replace the lamentable M551 Sheridan, under a

number of names, has been kicking around for about 15 years. The Marine Corps was an on again-off again participant in the seventies and early eighties before it selected the LAV-25. Meanwhile, the Europeans have developed and fielded several successful designs. A new light tank was originally considered a part of the overall effort to develop and field new combat vehicles when the program was known as the Armored Family of Vehicles; it was also originally included in the Armored Systems Modernization program. But the events in Panama in late 1989 prompted the Congress to push for an acceleration of this particular effort. The Army was directed to get a system in the field as soon as possible; this dictated an off the shelf system. This route is being followed so the Armored Gun System is no longer a part of the Armored Systems Modernization program.

Advanced Scout Vehicle- This is another on again-off again program that had been considered as part of the old Heavy Forces Modernization program. A number of years ago, this type of vehicle had a very high priority, especially in relation to the idea of a rapid deployment force. The Army's High technology Light Division was especially interested in a new scout vehicle and tested several concepts. Both tracked and wheeled vehicles were considered as potential answers to fill this mission requirement. However, the Army has decided to separate this effort from the Armored Systems Modernization program. If this mercurial program moves ahead, it may well be an off the shelf item.

Gregory Fetter is a Weapons Group Supervisor with Forecast International, a Connecticut-based defense and military affairs information organization.



Article Search

All of the articles that you see in *Museum Ordnance* are from people just like you. Some have written articles before, others are just interested in the general field of armor and artillery.

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While we can't pay for any of your articles, we do offer 2 and 3 issue subscriptions (depending on the article's length) as our way of saying thank you and you get the chance to see your name in print!

The Curator's Column

(Continued from Page 2)

The parking lot adjacent to the museum has been resurfaced and repainted thereby improving that eyesore. Additionally, the museum staff has planted the area around the new artifacts storage wing with various plants and the median divider in the parking lot has come in for a similar planting. Within the next few years, these plants will take root and spread thereby improving the outside appearance.

Shortly, the NCO Academy will start to volunteer time and labor to improve our outside exhibits. The three-inch coastal gun is first on the list to be repainted, followed in short order by the V-2 rocket and the shed it sits under.

We have, at long last, begun to execute our new exhibit plan. We will start to tell the story of the Ordnance Corps in photographs using the wall that used to contain the very large sign that announced the building was the U.S. Army Ordnance Museum. Once this project is complete we will then continue to renovate the interior of the museum by telling the Ordnance Corps story using appropriate artifacts and, in a parallel storyline, tell the story of the technology of war. This is a project that we have wanted to start a long time ago but we have been held up because of termite damage that came to light when we did a preliminary survey. That damage has now been repaired and the engineers have given us a clean bill so we can now start on our interior renovation.

Recent visitors to the museum will have noticed that the TIGER II is missing. The TIGER is moving to Fort Knox, Kentucky where it will undergo a renovation and then will be placed on exhibit in the Patton Museum of Cavalry and Armor. In return, the Ordnance Museum will be

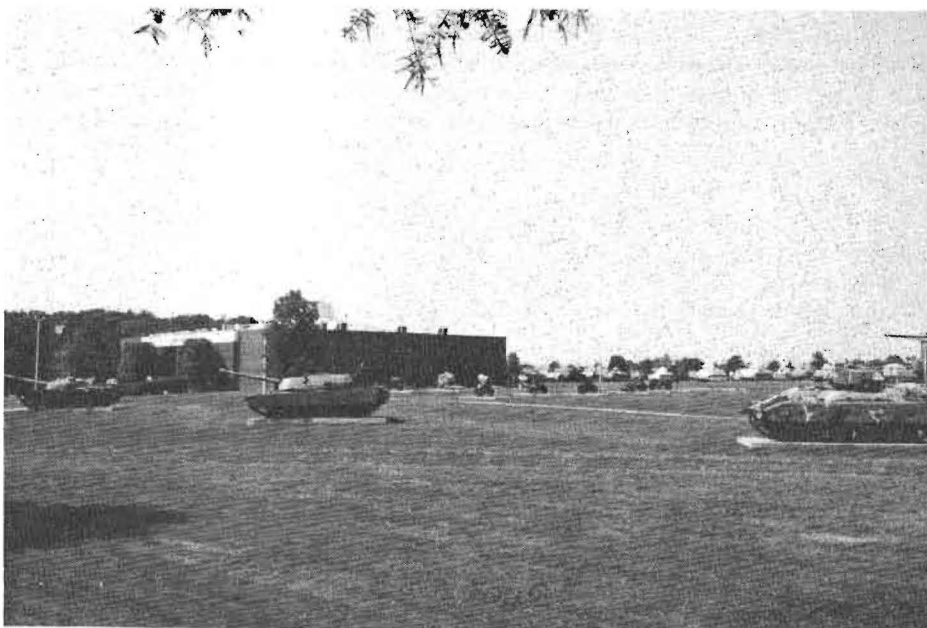
getting a MBT-70 from the Patton Museum. While we are sad to see the TIGER depart Aberdeen, we are anxious to get the MBT-70 to help complete our collection of U.S. Army vehicles that the Ordnance Corps helped develop. In the future there will be further deletions and additions to our collection.

With the end of DESERT STORM a great deal of speculation has been generated as to what and when the museum will add to its collection. We have asked for a T-72 and a BMP-2. So far there has been no "official" word as to when or if the museum will receive these vehicles. Unofficially, I am fairly confident that at some future point in time the museum will add to its collection a T-72 and a BMP-2 along with other vehicles from the desert. The problem is, of course, money to ship these vehicles to the museum.

We are exploring new and innovative ways in which to raise money for the museum. The museum is funded as an appropriated fund activity of the School Secretary of the United States Army Ordnance Center and School. As such, the USAOC&S pays the salary of the staff and we reap numerous other benefits such as having the installation pay the electric bill. USAOC&S also sets aside a

substantial amount of money to pay things like contracts we need to enter into to ship vehicles, order supplies, maintain equipment, paint artifacts, etc. Alas it is never enough and we depend a good deal on nonappropriated monies to get us through the year. These funds come from donations and the gift shop. We need to increase the number and amounts of donations. To this end we are exploring the legalities of forming a tax-free corporation to go out and solicit monies from the defense industry. As it now stands we can accept quite large bequests of funds from private individuals and those funds can be earmarked for the museum exclusively, however, under the current system we cannot solicit. With the formation of a tax-free corporation we hope to be able to go out and ask for funds.

There are many more subjects which need to be addressed so that we can keep you up to date as to what we are attempting to do and improve, however, I think at this point I will cease and save that information for the next edition. For visitors—we hope to see you again soon so you can see our progress. For those of you that have never visited—come on down and see us. The Ordnance Museum has the makings of a world class museum. You can help us realize that goal!



The 25-acre tank and artillery park can almost seem to dwarf the Ordnance Museum building itself. If you have not visited the Museum lately, the number of improvements that have taken place recently are tremendous. Come out and see us!

Directions to the U.S. Army Ordnance Museum

Interstate 95 (Kennedy Highway)

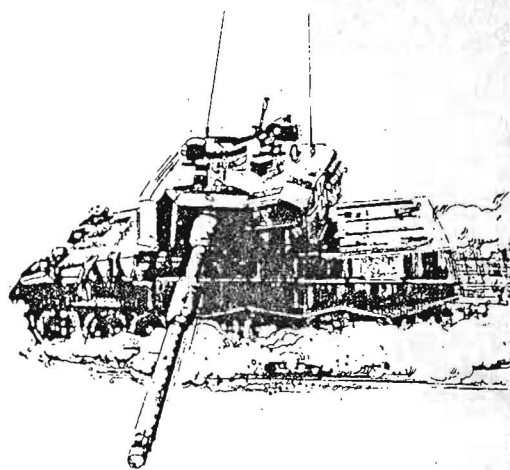
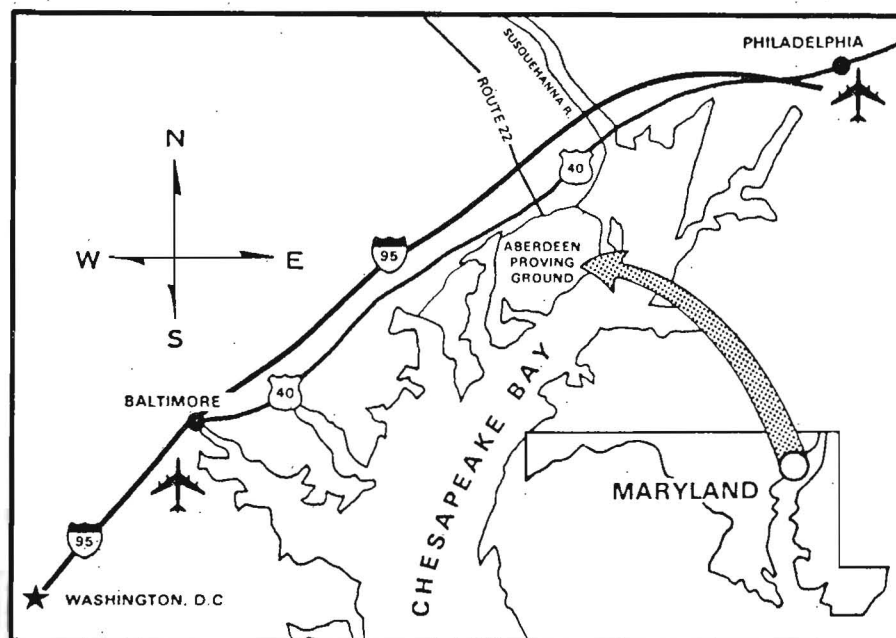
Traveling South: Leave the highway at Aberdeen interchange (85), turn left onto State Route 22 (Aberdeen Thruway) and proceed straight to the Aberdeen Proving Ground Harford Military Police Gate. (Approx. 3 miles)

Traveling North: Leave the highway at Aberdeen Interchange (85), turn right onto State Route 22 (Aberdeen Thruway) and proceed straight to the Aberdeen Proving Ground Harford Military Police Gate. (Approx. 3 miles)

U.S. Route 40 (Pulaski Highway)

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Sat. & Sun.
10:00 a.m. to 4:45 p.m.

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Memorial Day
Independence Day
Veterans Day

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Look, but Don't Touch!

Sergeant York: A Teaser

By Jerome Matthews

From time to time we want to give you a sneak-peek at the new arrivals and acquisitions that the Museum has in store for you. This time I will admit that this peek is more of a 'tease' than most.

Parked behind the main Museum building, fenced in and looking quite lonely is Sergeant York—DIVAD that is. With its armed turret still shrouded, the much touted and then disgraced Division Air Defense System (DIVAD) is a brand new recruit for the Museum collection.

Secretary of Defense Caspar Weinberger cancelled the Sergeant York program in September of 1985 after the Army had already invested \$1.8 billion on the system. Originally conceptualized in 1977 as an inexpensive and effective way to meet the Soviet air threat, the program failed to meet any of its prime objectives. At the beginning to keep costs down Sergeant York used the existing chassis from the M-48, Swedish 40mm Bofors antiaircraft guns and the radar from the F-16.

Not only did costs skyrocket, but the performance became suspect. The radar was ineffective in tracking helicopters and the 40mm Bofors lacked the range to combat the Soviet heavy ground attack helicopters.

These factors, combined with a slowly changing threat level in Europe, axed the infamous weapon with a famous name.

The Museum's Sergeant York is due for much work before it will be displayed for the public. It is hoped that the system can be displayed indoors, fully opened up for viewing. However, the current facility is too small for that kind of presentation so we are hopeful that the Museum's expansion plans proceed. Until then Sergeant York can only tease us again!



The Sergeant York air defense system was cancelled after years of controversy. The performance of the 40mm guns was particularly disturbing. Ammunition consumption was so high that a special logistical support system would have been required and when they were not firing huge volumes of shells— the guns jammed. The guns were also out-ranged by the Soviet's HIND M-24 helicopters by about 2 kilometers, a helicopter that the DIVAD was supposed to defend against.



Focus on ESCI's T-55 Series & Building a Unique Iraqi T-55/125

By Nafi Segal

With the explosion of modern Soviet armor kits today there have been a number of choices presented to the modeler. One of the most recent releases was the T-55 from ESCI. In keeping with Ertl/ESCI's philosophy of developing kits that have three variations, ESCI actually produced the following variations: an early T-55 without the DShK machine gun, a T-55A

(M), and a Ti-67 (Israeli T-55). The first part of this article will deal with the differences between the three kits.

Kit no. 5044, the T-55, is a straight forward representation of the early vehicle. The only real items of note are the flush mount and the loader's hatch which, unfortunately, is designed to be built in the closed position. The other most distinguishing feature of this kit is the choice of an unusual camouflage pattern used by the Syrian army in 1973 which adorns the box art.

The second vehicle is no. 5045, the T-55A(M). This kit comes with a commander's NBC cupola, loader's NBC hatch, DShK machine gun ring, but does not include an NBC cupola for the DShK ring. Parts of the DShK mount are well executed but on the whole the DShK mount and gun are of lesser quality than, say, Tamiya's T-62. Again there are a number of after market DShKs available allowing the modeler to upgrade this particular deficiency.

The third release is no. 5048, the



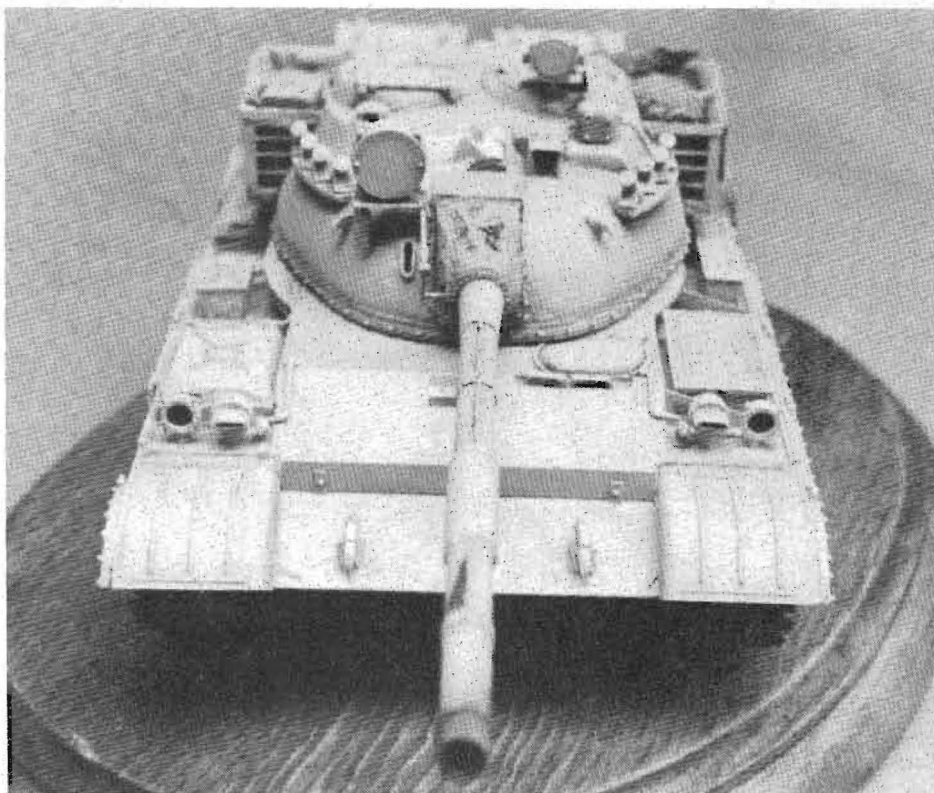
Israeli Ti-67. Notable features are NATO 105mm gun tube, IDF pattern infantry comm box, various Israeli fender storage boxes, diverted exhaust reminiscent of the late 60s to early 70s, Israeli pattern mud flaps, Israeli turret storage basket and box, machine gun mounts and 30 and 50 caliber machine guns. The rear hull storage basket is of the early Ti-67 configuration (late 60s). Ample reference exists for the builder to build the later version (early to mid 70s) or it can be robbed from the Lindberg kit.

To discuss the kits in detail, let's look at the positives. The bogies are the best of the star fish pattern that have been offered to date by any injection molder or resin caster. The lower hull is one piece with correct spacing on no. 1 and no. 2 bogie positions. The final drive housing on both the side and rear of the hull are nicely done. The upper front glacis and fender assembly is one piece. And, many of the fender supports are molded separately and of skeletal design. The turret shape is of the "other" T-55 family. As a note, I've personally crawled over a dozen T-54s, T-55s and Ti-67s and have noticed two distinctive shapes. One represented by this kit, the other by the Lindberg kit. No one seems to be able to explain the history of these two distinctive differences so we will leave it where it is.

Some of the drawbacks of the kit: the fender storage boxes have the earlier latch system and are also a little heavy on the details. These can be easily replaced from after market resin manufacturers or by robbing from the Tamiya T-62 kit. Likewise, all of the lights, driving, IR and commander's are malformed and the detail is heavy. There are sink holes on the hull and in the gun tubes, but most of these can easily be filled with putty. Now for the one BIG problem—the vehicle itself is five mm too narrow. Normally I do not count millimeters but this represents almost nine percent of the total width, and is most noticeable when this vehicle is placed next to a Lindberg T-55 or a Tamiya T-62. Overall this kit builds up quickly (approximately three hours) and if standing by itself is quite attractive.

W i d e n i n g the Kit

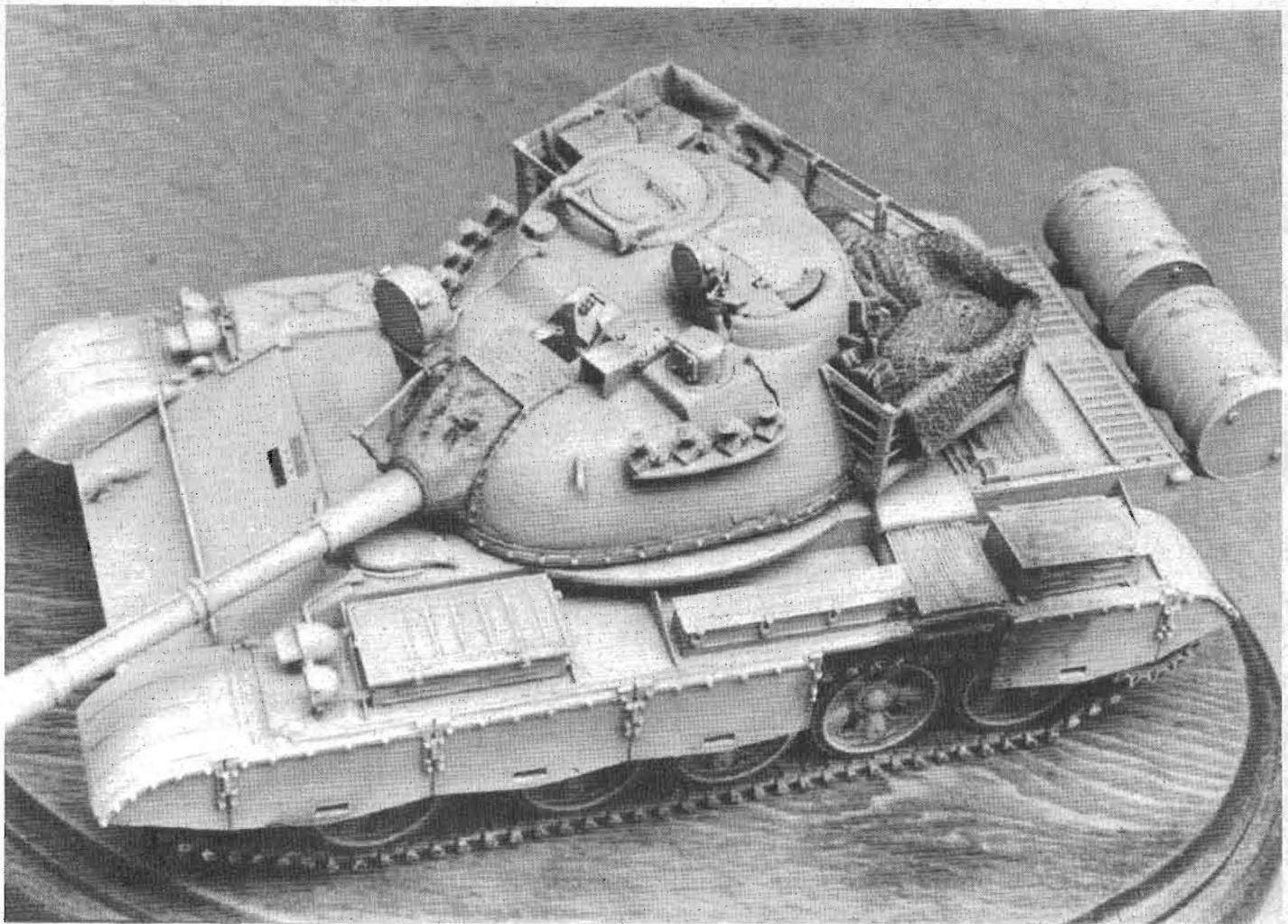
There is virtually not a kit out today that doesn't need a little fine tuning out of the box. The second part of this article will be to describe the correction process. This is



Front view highlights the raised area around the commander's and loader's cupola. Also note the raised area at the bottom of the turret.



This Iraqi T-55/125 is based on ESCI's 1/35 scale kit. It was modified to correct the width of the hull and AEF Designs' resin conversion kit was used for the turret and other assemblies.



Although the whereabouts of the only two examples of the T-55/125 are unknown, there is no evidence to indicate that they saw action in the KTO. This example was painted to depict what they might have looked like had they been in the thick of it.

“easily” affected and my suggestion is that it only be applied if one is either doing a collection of ’55 family vehicles or a history of Soviet armor showing the evolution from the T-54 through the T-80.

Start by finding the center point of the upper hull, lower hull and rear hull plate. Draw a fine pencil line from end to end (front to back). Start your cutting line with a fresh Xacto blade, making two or three clean passes and then finish with a razor saw. Now splice in a 5mm, 40

thousandth thickness section of white styrene. Work the two halves of the plug until the outside is even and level. Set aside and let harden for a few minutes. Once the altered pieces have hardened enough that they can be worked with, cement heavy styrene reinforcing strips on the inside of the kit. This entire process, for all three parts, took me two hours from start to finish.

The second area of correction is not as important but has a significant

impact on the completed model. That is the adding of 3mm to the bottom of the turret correcting a minor height deficiency, and the adding of a loader’s periscope.

Iraqi T-55/125

After these corrections were made I decided to build the kit using AEF Designs’ Iraqi T-55/125 conversion. This consists of a completely new turret assembly with

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the appropriate modifications including 125mm gun, side skirts in Chi-com saw tooth pattern and other minor details. AEF Designs appears to be the leader at this time with a number of turret conversions for the T-55 kit, including a full selection of Iraqi used T-55 family conversions and detailing parts along with other items such as a BTU-55 dozer blade or Afghan armor details.

First, a brief history on the T-55/125. Two of these vehicles were on display at the Baghdad Arms Show in 1985. One vehicle was apparently built off a T-69 turret whereby the area around the commander's and loader's hatch was raised significantly to accommodate the 125mm gun tube and auto loader. The second vehicle was apparently built off a

T-55 turret where, once again, the area around the commander's and loader's hatch was raised but the base of the turret was also raised presumably to aid in the adaptation of the T-72 gun system. This is the version that AEF Designs chose for their kit. Indications are that neither of the vehicles were seen in the KTO (unlike the applique armor version which was also seen at the Arms Show) so at this point there is no readily available information as to where these vehicles have gone.

On to the specifics of the kit. The turret is one piece and hollow molded with details throughout inclusive of the bolts around the base of the turret, conduit for smoke mortars and weld marks around the mantle. Hatches are molded

separately for either open or closed construction. This particular vehicle did not have a DShK machine gun ring so a "hardened" loader's cupola of apparent Iraqi design, resembling the T-62 pattern hatch, is supplied with the kit. The gun tube is one piece and seamless with white styrene provided for the rib that runs down the upper surface. Eight injection molded styrene smoke candles are also included along with the unusual rear basket base and vertical supports. AEF has also provided brass wire to finish off the basket. Chinese pattern saw tooth side skirts are provided for the vehicle and are keyed to fit the ESCI kit.

Remember what I said about every kit needing some fine tuning, a few comments are helpful for this conversion.

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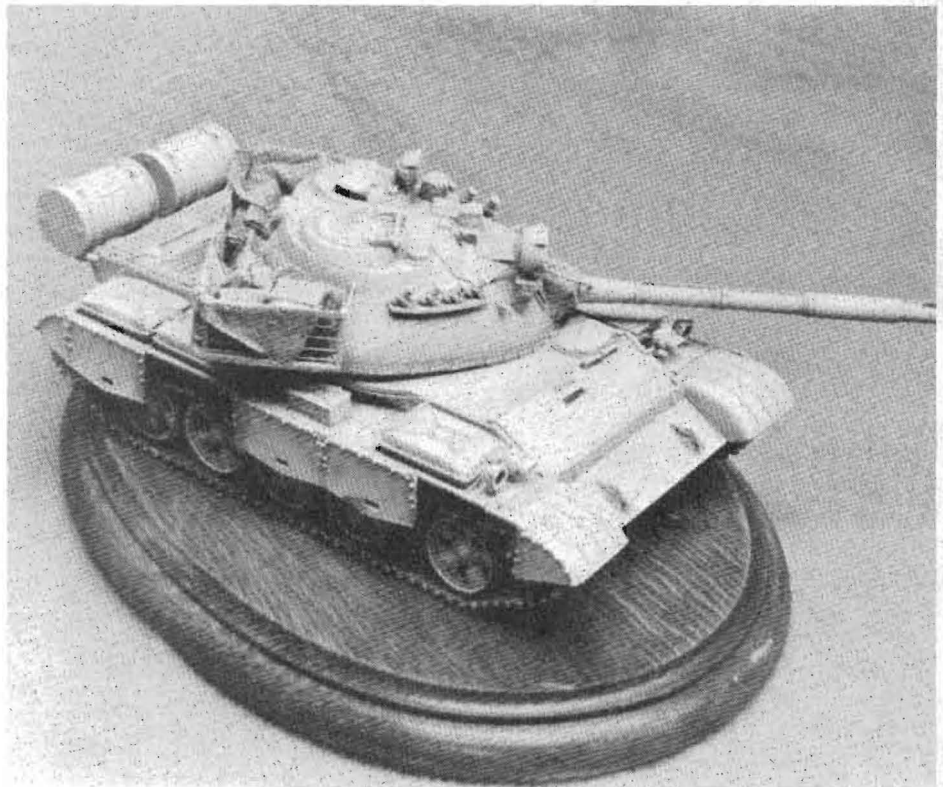
A little work needs to be done on the side skirts around the drive sprockets to let them fit snugly and the basket work is somewhat tedious. I suggest stringing all of the basket supports and brass wire together first and then working them into position on the turret basket. Other than these notes the building of the kit is straight forward and dove tails nicely with either the ESCI or the Lindberg kit. As mentioned I used the ESCI kit for this particular version. A little work had to be done with the turret race ring since the hull had to be widened. Rear mud flaps were fabricated from sheet styrene to finish out the overall appearance of the kit. Decals were taken from one of the Lindberg kits for the Arabic markings, slogans and Iraqi flag. The picture of the emir of Kuwait doubled as a wanted poster for the invading Iraqis, or a sign of liberation for the reoccupying of Kuwait. The vehicle was painted overall in AEF Designs' "NBS" Iraqi Armor Sand and then weathered with oils.

As stated earlier there is no evidence to indicate that this vehicle was used in the KTO but I could not resist the attractiveness of the overall sand color and the uniqueness of the vehicle itself.

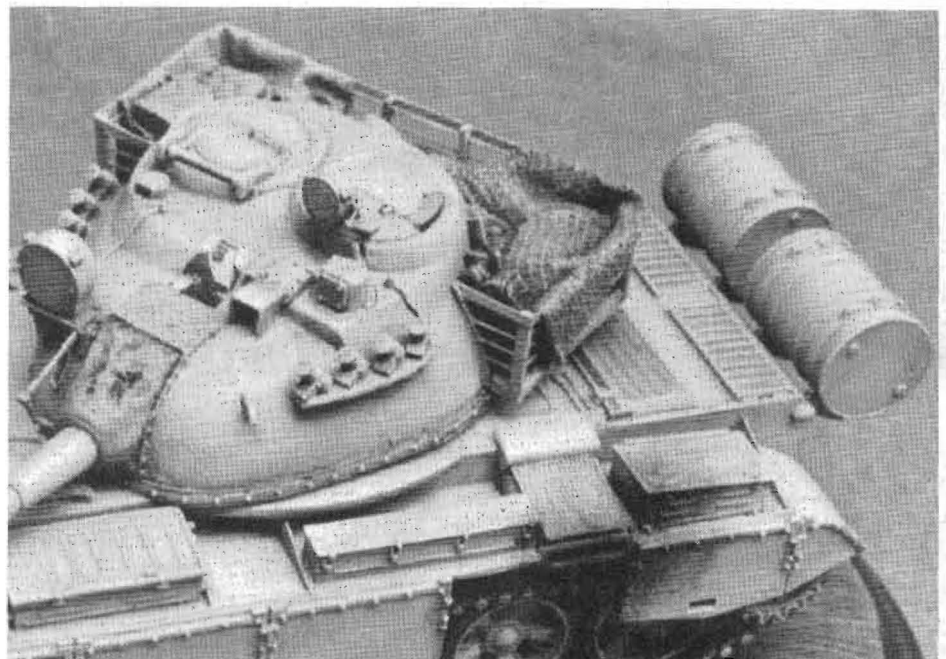
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**Give
till it helps.**



An indication that Saddam Hussein expected his armored forces to spend extended periods of time out in the field can be deduced from the oversized turret basket. Large enough to store both equipment and living supplies, the tank could stay away longer from its logistical support and still fight effectively. Obviously that was only theory!!



A poster of the Emir of Kuwait decorates the turret of this tank. Whether it is there from respect or disdain—only the modeler knows. All photographs included in this article are from the collection of Nafi Segal.

Anzio Annie

(Continued from Page 3)

them. Despite knowing the general operating area the guns were in, and in numerous air strikes targeted specifically at the guns, they eluded everyone. One report actually pinpointed the location of the tracks and tunnel for one of the guns, but even with such information they failed to permanently destroy the gun.

Ironically, it was Allied air superiority which forced the Germans to adopt their tactics in the first place. The railway guns (both the 280mm and the more numerous 210mm) were hidden in tunnels scattered throughout the countryside. The guns would be moved out of their tunnels via a diesel locomotive (usually at night or on bad weather days), fire a few rounds and then disappear again.

In fact at least one additional 280mm and a larger 320mm railway gun were offered to the German commanders but were declined because there were not enough suitable tunnels remaining to hide the behemoths.

When the Allies finally broke

out of the Anzio beachhead on May 23, Anzio Annie was not heard from again. Despite the Allied effort to destroy the guns, both Leopold and Robert were found damaged and abandoned on a railroad siding in Civitavecchia. When and how they were moved from positions south of Rome to Civitavecchia, north of Rome, remains unknown. Most of the damage was apparently inflicted by the Germans to render the weapons useless to the Allies.

Leopold, whose condition was the better of the two, was moved to Naples and dismantled for shipment to the United States in March of 1945. Once here it became a monumental task to send the pieces to Aberdeen. In fact, one local



This view, taken in 1946 shows the variety of artillery pieces being stored, reviewed and tested at the Aberdeen Proving Ground. The German 28cm K5 (E) (a.k.a. Leopold, Anzio Annie, Anzio Express...) can be seen in the lower left of the photo. (U.S. Army photo)

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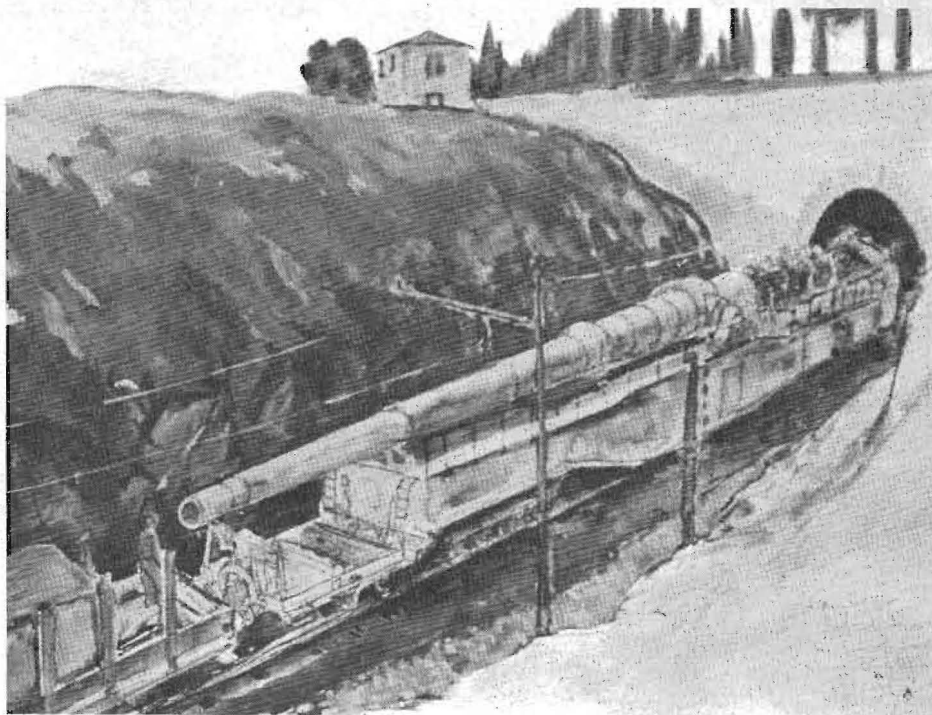
newspaper reported that the gun, chassis and assorted cars were to be sold for scrap where they sat because of the time, effort and expense of transferring the pieces from Baltimore up to Aberdeen.

Leopold's Latest Makeover

Periodically, as with most pieces in the Ordnance Museum collection, Leopold is repainted and cleaned up. Recently the U.S. Army's K5 received her new look for the 90's.

Instead of just painting over the existing layers of paint and grim, Leopold was sandblasted to improve her looks. That process took about 300 manhours and then the task of painting began. Using a color that came as close as could be duplicated to German sand-yellow, the base color was applied. Earth red will be used for the camouflage pattern and will be applied in the very near future.

"Anzio Annie" continues to be a proud centerpiece to the museum's collection of important and historic ordnance.



This unknown German Artist has captured in a watercoloring, the method of operation that the German command was forced to adopt for their big railway guns. The guns were fired from just outside of tunnels and quickly moved back inside after their fire mission. Despite knowing their exact locations, the Allies were unable to destroy the guns. (U.S. Army photo)



One of the big guns on the move. From this angle you can see some of the other railroad cars necessary to support these huge guns. Although the original photograph was in black and white (and this copy was "colorized"), you can see the camouflage pattern on the gun sides. Also note the frame work on the barrel for camouflage netting or canvas coverings used when transporting. (U.S. Army photo)



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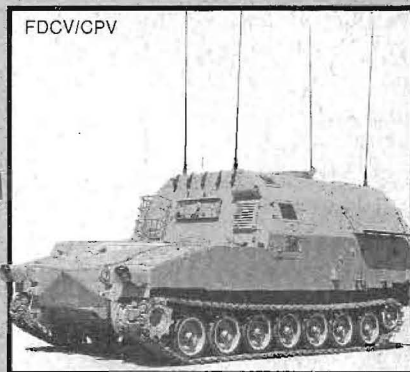
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