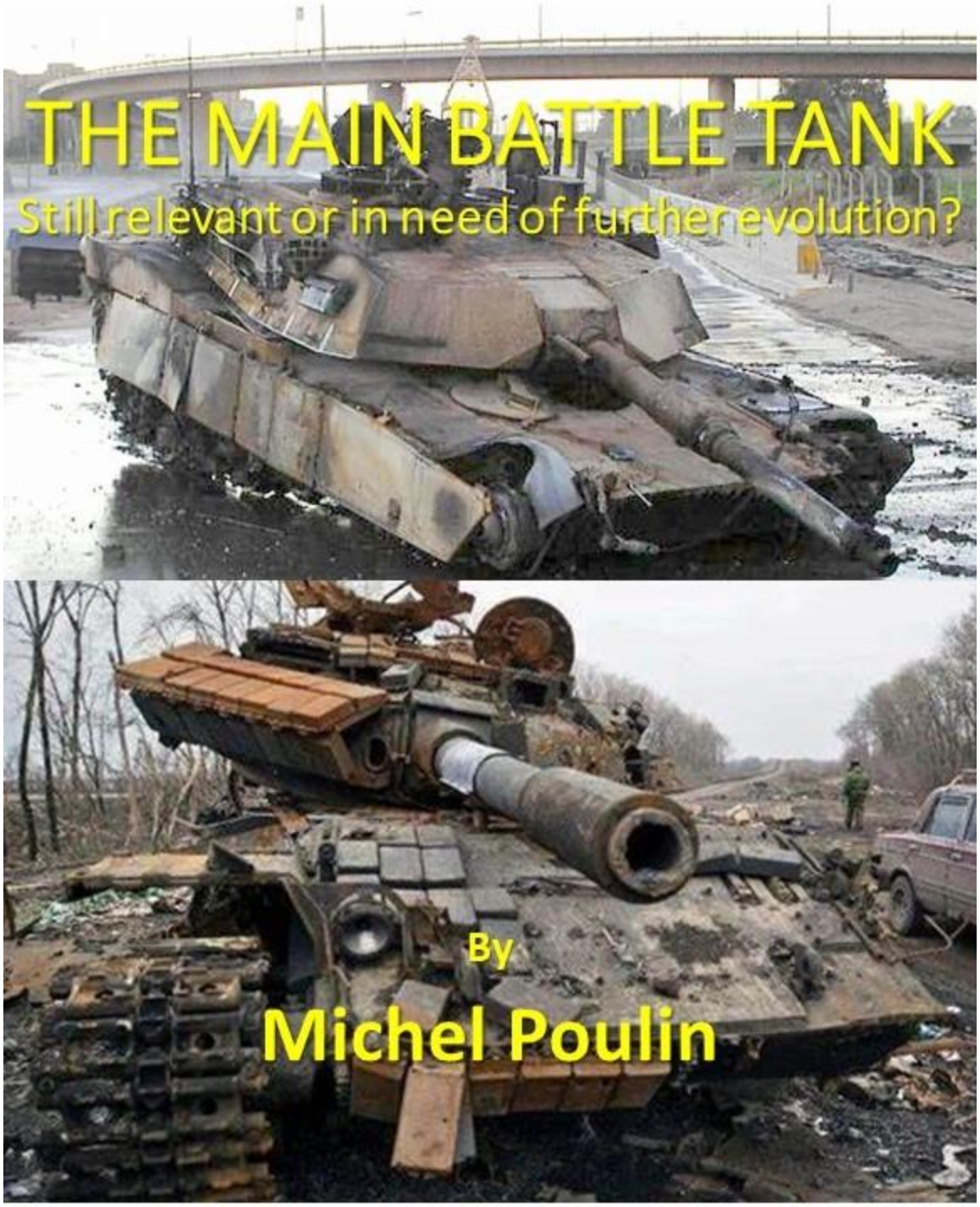
THE MAIN BATTLE TANK
Still relevant or in need of further evolution?
By
Michel Poulin

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A NON-FICTION MILITARY ESSAY

BY

MICHEL POULIN

NOTE TO POTENTIAL READERS

THIS NON-FICTION ESSAY IS MEANT TO EXAMINE THE FUTURE OF MAIN BATTLE TANKS IN LIGHT OF THE COMBAT LESSONS FROM PAST AND PRESENT WARS. IT IS NOT MEANT TO DESIGNATE A PARTICULAR TYPE OF MAIN BATTLE TANK AS 'BEST OF THE LOT' BUT RATHER TO EXAMINE IF THE CONCEPT OF MODERN TANKS AS KNOWN TODAY IS STILL VALID OR IF IT NEEDS TO EVOLVE UNDER THE PRESSURE OF MODERN ANTI-TANK WEAPONS.

ABOUT THE AUTHOR

The author is a retired member of the Canadian Forces with 32 years of service, first as an infantryman, then as an intelligence specialist. These 32 years of service include a total of five and a half years served overseas (Germany, Cyprus, Lebanon, Bosnia) and exposure to active war conditions (Lebanon Civil War, the 1982 Israeli invasion of Lebanon, the conflict in Cyprus in 1975). The author was qualified on and fired numerous types of weapons during his military career, including the M40 106mm recoilless gun, the CARL GUSTAV 84mm recoilless gun, the M72 anti-tank rocket launcher and the TOW anti-tank guided missile, on top of being qualified on numerous types of small arms (rifles, pistols, submachine guns, machine guns, grenades) and as a driver for the M-113 armored personnel carrier. He also was a foreign weapons instructor at the Canadian Forces Security and Intelligence School and made the analysis and study of weapons and of wars his specialty. While now retired from the service, he continues to closely follow the various developments in modern weapons systems, along with the military and geopolitical events around the World.

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British Mark IV tank of the First World War.

THE FIRST WORLD WAR: APPARITION AND FIRST STEPS.

What we now call a 'Tank' was mostly born out of the butchery of World War 1 trench warfare, when soldiers were faced with the murderous task of attacking through a no-man's-land of open terrain swept by machine gun and artillery fire and with deep lines of barbed wire blocking the approaches to enemy trenches. Both the Allied armies and the German army repeatedly lost thousands and tens of thousands of soldiers in order to gain only insignificant amounts of ground. While searching for a way to diminish those painful losses, the British, inspired by Winston Churchill, then First Lord of the Admiralty, set up in 1915 the 'Landships Committee', to explore the subject of cross-country armored vehicles. The name 'tank' was used by the Landships Committee to hide the real purpose of their work. The first iteration, 'Little Willie', appeared in 1915 but did not see combat. The first armed 'landships' to be successfully tested appeared in early 1916, armed with two naval 57mm guns and three machine guns. Nearly simultaneously and quite independently from the British efforts, the French also started developing their own models of tanks. Those British and French first tanks were crude affairs, lightly armored, very slow and unreliable and with very limited autonomy. Their

main task was to help the infantry assault enemy trenches, not to fight other armored vehicles.

The first use of tanks in combat by the British was on 15 September of 1916, at the Battle of the Somme, when 49 tanks went on the attack. However, they were committed in small groups and not as a coherent, concentrated unit and they achieved little success, apart from terrorizing the German soldiers who first saw them. The British learned their lessons from that failure and struck in force at Cambrai on 20 November of 1917, when 476 British tanks attacked on a concentrated front in a surprise assault which achieved a spectacular success. However, that success in Cambrai also demonstrated the slowness and lack of range of the early British tanks. The British then introduced into service a lighter and faster tank, the Medium A, which was first used in combat in Amiens in August 1918 as part of a 600-strong tank force. In the meantime, the French Army produced over 3,000 of its own tanks, the great majority of which were **Renault FT** light tanks, designed and built to accompany and support assaulting infantrymen. It did well in that role but had no capability to engage other armored vehicles. While the first tanks were mostly immune to rifle and machine gun fire, their first serious enemy proved to be artillery guns, firing either in indirect or direct fire mode, a fact that the Germans were quick to seize on. A direct artillery shell impact on an early model of tank invariably resulted in the utter destruction of the vehicle. The slowness and lack of agility of those tanks only made them easier targets to artillery gunners, resulting in significant losses, with the notorious mechanical unreliability of the early tanks adding to the casualty count.

THE INTERWAR YEARS: INFANTRY TANK; CRUISER TANK; HEAVY TANK.

When World War One ended in 1918, the Allies found themselves with thousands of early tank models in their inventories. The United States and Italy had also built tanks copied from British and French designs. Military thinkers then started working on improving both the designs and the combat doctrines and uses of tanks. In Great

Britain, the British tank doctrine evolved into classifying tanks in two main categories: the infantry tank, slow but well armored, meant to accompany assaulting infantrymen; and the cruiser tank, a faster vehicle meant to push into enemy lines and penetrate deeply. One such infantry tank developed during the interwar years was the French Renault R-35, which became the most numerous French tank type by 1940.

The concept of using tanks in massed, concentrated units rapidly spread, but the notion of dividing tank designs in 'infantry tanks' and in 'cruiser tanks' remained, especially in Great Britain. The British formed tank brigades, meant to closely cooperate with the infantry, and armored divisions designed to exploit in-depth penetrations of enemy lines. The French similarly adopted two types of tank formations: the 'Divisions Légères Mécaniques[1]', meant to rush through holes in enemy defenses; and the heavier, more powerful 'Divisions Cuirassées'[2], whose principal role was to assault enemy positions. On their part, the Soviets divided their tank forces into light tank battalions, maneuver brigades and mechanized brigades. In contrast, the German Army created its first Panzer divisions in the mid-1930s, but also adopted new doctrines meant to closely integrate the operations of all its arms, combining great firepower and high mobility. Its defined roles were rapid concentrations of fighting power, breakthroughs, deep penetrations on wide fronts and destruction of the enemy.

Before the First World War ended in 1918, work had started on the development of much heavier tanks than before, armed with 75mm guns and weighing twenty tons or more. In France, this eventually produced by 1937 the 27-ton CHAR B.1, designated as a 'Char de Bataille'[3]. On their part, the British produced the INDEPENDENT heavy tank, an aberration with no less than five separate turrets, with the Soviets following suit with their own T-35 heavy tank.

WORLD WAR 2: EVOLUTION FROM COMBAT EXPERIENCE.

By the time World War 2 started in 1939, Great Britain operated two main types of tanks: the MATILDA II infantry tank and the CRUSADER cruiser tank. The Germans, on their part, operated a mix of light and medium tanks at first, then concentrated on

[1] Divisions Légères Mécaniques : French for Light Mechanized Divisions.

[2] Divisions Cuirassées : French for Armored Divisions.

[3] Char de Bataille : French for 'battle tank'.

producing medium and heavy tanks of increasingly more powerful and better armored designs. In 1939, the mainstays of the German Panzer divisions were the PANZER II light tank, armed with a 20mm cannon, the PANZER III medium tank, armed with a short 50mm gun, and the PANZER IV, armed with a short 75mm gun.

On the French side, the war was started with a mix of light, medium and heavy tanks: the Renault R-35 light tank; the Somua S-35 medium tank and the CHAR B1-bis heavy tank. Of them, the CHAR B1-bis proved the most troublesome to the Germans, while the S-35 also gave a good account of itself. Unfortunately, the French doctrine concerning the use of tanks greatly hindered their efficiency in combat by diluting them into small groups while facing the concentrated punch of the German Panzer divisions.

The Soviets, who were attacked by the Germans in 1941, also started the war with a mix of light, medium and heavy tanks, the most famous of which was the T-34 medium tank, which would prove to be a very nasty surprise to the Germans, as its design philosophy was quite close to that of the modern main battle tank, with a good balance of firepower, mobility and protection. It also was one of the first tanks to fully use the concept of sloped armor in order to augment the protection against armor-piercing projectiles. Its only main drawbacks were its 2-man turret, which overloaded its crew and particularly its commander, and its total lack of crew comfort features. In turn the apparition of the T-34 pushed the Germans into hastily designing and producing a counter, the PANZER V PANTHER, which would itself become famous (or infamous, depending on whose side of it you ended up). At about the same time as the PANTHER entered service at the end of 1942, the German Army fielded a new heavy tank, the PANZER VI TIGER, another tank that would make a lot of ink (and blood) flow. At the same time, the Germans rearmed their older medium tanks with longer, higher velocity guns, so they could pierce the armor of the Soviet medium T-34 and heavy KV-1 tanks.

In comparison, the United States started the war behind the other nations, fielding at first a number of light and medium tanks of dubious designs, before finally settling on the M4 SHERMAN as its main tank type. It had a short 75mm gun, inadequate protection and very high silhouette, the latest a distinct tactical disadvantage in combat. Despite its shortcomings, the SHERMAN was massively produced during the whole war, in order to capitalize on its reasonable weight, which facilitated its transport

overseas, and on the huge industrial capacity of the United States for mass production. While the SHERMAN too often ended with the short end of the stick when facing the PANTHER or the TIGER, it eventually ended up winning through sheer weight of numbers.

By the end of World War 2 in 1945, all the combatants had produced or had designed medium and heavy tanks which incorporated the numerous lessons of the war about armored warfare and tank design and doctrinal use. However, due to the huge number of older models produced during the war and to the high costs of the conflict, which produced large war debts, the widespread fielding of the newer models after 1945 proved to be slow, although much work went into the study and design of more advanced tanks which would conform to what we would now call main battle tanks.

CHAPTER 2 – THE EMERGENCE OF THE MAIN BATTLE TANK

A British CENTURION tank during a field exercise in the 1950s.

WHAT MAKES A MAIN BATTLE TANK?

The official military definition of a main battle tank, or MBT in short, is 'a mobile, protected gun system' possessing a mix of firepower, mobility and protection. The ratio of each of those three elements will vary quite a lot between the various types of modern tanks which entered service after the end of World War 2, with that ratio greatly influenced by the national tank philosophy and thinking about tank design and doctrinal use particular to each country concerned. Ideally, a good MBT would possess all three qualities in a judiciously balanced way. However, what makes a good tank in one country will not always be similar to what is believed or accepted in another country.

FIREPOWER

War is like Christmas: it is better to give than to receive. (CHALLENGER 2)

MOBILITY

How do I get out of here? HELP! (T-72)

PROTECTION

(Or the constant requests for more of it!)

Things are getting a bit hot around here! (M1 ABRAMS in Iraq)

POST – WORLD WAR 2: FIRST TANK COMBAT EXPERIENCES

It didn't take long after the end of WW2 before more wars gave the opportunity to combatants to test their new tanks and doctrines in combat. First came Israel's War of Independence in 1948, pitting the newly created Jewish state of Israel against its Arab neighbors. However, that war, following so close after WW2, involved mostly old, second-hand weapons and vehicles. So, few valuable lessons were taught by it, apart from showing again the importance of resolve and belief in a cause. Next was the Korean War of 1950, a much more vast and complex affair pitting American and British equipment against Soviet equipment. As armored warfare was concerned, the results of tank duels during that war showed again that competent handling and good tactics often gave the edge over a resolute and numerically superior but poorly trained enemy tanker force. The American M-26 and M-47 tanks proved more than a match for the T-34/85s of the North Korean Army and so was the case for the British CENTURION tanks which

fought in Korea. Another lesson relearned then was that tanks fighting without infantry support were vulnerable to infantry swarm tactics, especially at night. In truth, a seasoned infantryman will tell you that a tank with hatches closed may be scary, but that it is also a big but myopic beast when dealing with foot soldiers surrounding it.

The next series of wars, around the Middle East and in Indochina, while bloody and intense, did little to teach new lessons about armored warfare, until the Yom Kippur War of 1973 that is. That war, fought between Israel and a coalition of Arab states during nineteen days in October of 1973, featured two important events which heavily influenced the future of armored warfare. The first one was the successful mass use for the first time of anti-tank guided missiles by the Egyptian Army against Israeli tanks. The second was the intense and bloody fighting opposing hundreds of Israeli and Syrian tanks on the Golan Heights and opposing Israeli and Egyptian tanks in the Sinai Peninsula. While the tank battles on the Golan and in the Sinai, which pitted Israeli CENTURION and SUPER-SHERMAN tanks against Syrian and Egyptian Soviet-made T-54/55 and T-62 tanks, were epic, the true shocker for the tanker world was how Egyptian infantrymen equipped with portable AT-3 SAGGER anti-tank guided missiles and RPG-7 anti-tank rocket launchers managed to stop cold the Israeli tank counter-attacks meant to repel the Egyptian forces which had crossed the Suez Canal. After crossing the Suez Canal, the Egyptian anti-tank teams were told to run as fast and as far as they could and then stop and set up anti-tank ambushes. When the Israeli tankers, mostly equipped with CENTURION and SUPER SHERMAN tanks, rushed forward without proper infantry support, they were decimated and stopped cold by dense AT-3 missile fire from distances of up to 3,000 meters. On its part, the fighting on the Golan Heights featured for the first time the mass use of infra-red night vision equipment mounted on the Syrian tanks. The Egyptian and Syrian forces also showed good interarm tactics by keeping at first their ground forces under a dense anti-aircraft umbrella provided by SA-6 surface-to-air missile batteries and by ZSU-23-4 radar-pointed self-propelled anti-aircraft guns. While Israel eventually prevailed in this conflict, the alert had proved to be an unsettling and costly one for the Israeli forces, especially for their tank units and fighter-bomber squadrons. The lessons from the Yom Kippur War were thus carefully noted around the World and contributed to the development of future main battle tanks.

CHAPTER 3 – NATIONAL EVOLUTION TRENDS OF THE MBT

British CENTURION main battle tank

Soviet T-62 main battle tank

Swedish Strv-103 S-Tank

Israeli MERKAVA main battle tank

BRITISH MAIN BATTLE TANKS

After WW2. the British opted to rely on a mix heavy on firepower and protection, while keeping a reasonable minimum of mobility. They also abandoned at long last their policy of having both infantry tanks and cruiser tanks, which had done so much damage to tank development in Great Britain. They by then relied mainly on the 49-ton CENTURION, armed with an 83.8mm, 20-pounder gun. However, in order to counter the Soviet IS-3 STALIN heavy tank, armed with a 122mm gun, the British also developed a heavy tank of their own armed with a 120mm gun. The result of those studies was the 65-ton CONQUEROR, which entered service in 1956. However, the CONQUEROR did not stay in service for very long, contrary to the CENTURION, and was withdrawn from service in 1966. The successor of the CENTURION, entering service in 1963, was the 56-ton **CHIEFTAIN**, armed with a long and very accurate rifled 120mm gun. When introduced into service, the CHIEFTAIN was considered the most

powerfully-armed and most heavily armored battle tank in the World. However, it was heavily criticized as being too heavy and having poor engine reliability and lackluster mobility. Still, 770 CHIEFTAIN tanks were built from 1966 on into the 70s. The CHIEFTAIN was then succeeded by the new CHALLENGER as the main tank of the British Army. This MBT, weighing up to 70 tons with additional armor modules in its latest variant, entered service in 1983, is armed with a long rifled 120mm gun and is heavily armored, continuing the British trend of emphasizing firepower and protection over mobility. The British Army later fielded the 75-ton **CHALLENGER 2** and is presently working on the CHALLENGER 3 variant, with even better protection and with an improved fire control system.

AMERICAN MAIN BATTLE TANKS

The Americans ended WW2 with a huge number of M4 SHERMAN of various models still in service, thus were fairly slow in procuring more modern tanks in sizeable quantities. The first of the post-war models was the **M-26 PERSHING**, which actually barely had time to be rushed to Europe to participate in the final combats. The M26 was a 42-ton machine armed with a long 90mm gun. It then progressively evolved along the years, with the M47, M48 and M60 following it in production. The **M60** finally introduced into service the 105mm gun, which was also arming numerous other models of European-produced tanks and became a NATO-standard tank gun.

M26 PERSHING

M60A1

In 1980, a new main battle tank entered service with the U.S. Army: the M1 ABRAMS. Its initial version was armed with a 105mm rifled gun, which was soon replaced in the M1A1 variant by the same 120mm smoothbore gun which equips the German LEOPARD 2. The latest variant of the M1, the A2 SEP, tips the scale at a

whopping 66.8 tons, thanks to added armor packages, making it one of the heaviest tanks in existence today. Its 1,500-horsepower turbine engine provides it with good mobility, but also proved to guzzle fuel at a heavy rate, forcing it to pay close attention to its accompanying supply lines, something that adds a certain vulnerability to it in combat operations. With over 10,000 M1 of all variants produced to date and still in production, the ABRAMS is the mainstay of the U.S. Army and has fought in numerous wars around the Middle East through the years, including in Iraq and Afghanistan. It was also exported to a number of allied countries, including Saudi Arabia, Egypt, Kuwait, Iraq and Australia. The United States is presently working on a program for a future main battle tank meant to succeed the **M1 ABRAMS**.

SOVIET MAIN BATTLE TANKS

Post 1945, the Soviets, who continued to rely heavily on their huge fleet of T-34 tanks, now armed with 85mm guns, vied to design their new tanks with a mix of qualities geared towards a well-protected, well-armed and highly mobile combat vehicle. However, ergonomics and crew comfort seemingly never entered that mix, with long-term negative consequences in the long run for the combat efficiency of the poor Soviet crewmen. The successor of the T-34, produced as early as 1948, was the 35-ton T-54, which was progressively improved into the **T-55**. Both the T-54 and the T-55 were armed with a long 100mm gun and had turtle-shaped turrets meant to deflect incoming projectiles. They had good firepower for their time and also had adequate protection but, ergonomically, were very hard and tiring on their crews, with the driver in particular having to constantly fight with a hard-to-operate manual transmission. The T-54/55 went on to be copied and produced in the thousands by other communist countries, including China, Poland and Czechoslovakia, while many other armies around the World also adopted it, particularly in the Middle East. Also produced in some quantity after WW2 was the **IS-3** heavy tank, armed with a long 122mm gun and generally regarded as a formidable tank.