

The U.S. Marine Corps' Tank Doctrine, 1920–50

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Abstract: Major Joseph DiDomenico's study of U.S. Army influence on U.S. Marine Corps tank doctrine appeared in the Summer 2018 issue of this journal, titled "The U.S. Army's Influence on Marine Corps Tank Doctrine." Mobilizing an impressive array of primary and secondary sources, DiDomenico laid considerable credit for the Corps' improvements to its nascent World War II tank and amphibious tractor doctrine on the Army's Armor School at Fort Knox as well as the improved Army doctrinal publications that had emerged by 1944. Major DiDomenico excoriated the Marine Corps' neglect of "critical vulnerabilities for armor supporting amphibious operations." The benchmark for Marine Corps tank doctrine's failures to "synthesize" Army tank doctrine for Marine Corps missions is unsurprisingly the Battle of Tarawa. According to DiDomenico, the failures registered at Tarawa "indicated an institutional ignorance in the operational art of combined arms." This article presents some common misconceptions of Marine Corps tank policy and doctrine and aims to correct those misconceptions.

Keywords: tanks, Battle of Tarawa, tank doctrine, tank policy, combined arms, armor

"Sometimes the absence of doctrine is doctrine."

—Eugenia C. Kiesling¹

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¹ Eugenia C. Kiesling, email to Kenneth W. Estes, 27 June 2019. Kiesling is a professor in the History Department of the U.S. Military Academy, West Point, NY, and is the author of *Arming against Hitler: France and the Limits of Military Planning*.

Major Joseph DiDomenico's study of U.S. Army influence on U.S. Marine Corps tank doctrine appeared in the Summer 2018 issue of this journal, titled "The U.S. Army's Influence on Marine Corps Tank Doctrine." Mobilizing an impressive array of primary and secondary sources, he laid considerable credit for the Corps' improvements to its nascent World War II tank and amphibious tractor doctrine on the Army's Armor School at Fort Knox, Kentucky, as well as the improved Army doctrinal publications that had emerged by 1944.

As far as the learning experiences accumulating to Marine Corps units during the initial years of operations in the Pacific Theater, Major DiDomenico excoriated the Marine Corps' neglect of "critical vulnerabilities for armor supporting amphibious operations. The Marine Corps focused primarily [during the interwar period] on developing amphibious doctrine to allow infantry to efficiently assault a beach and



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The first armored fighting vehicle accepted into Marine Corps service was the King Armored Car produced by Armored Motor Car Company of Detroit, MI. Eight of these formed with the Armored Car Squadron, Headquarters, First Marine Regiment, at Philadelphia in 1918 with a few drivers and mechanics. The headquarters staff never advanced any concept for their operation and no evident doctrine emerged, but the assignment of the unit to the First Regiment indicated that the armored cars would serve in the defense of advanced naval bases. Later use focused on mobile patrolling in Haiti as the primary mission for the armored car.

thereby failed to synthesize the Army's tank doctrine and apply it to Marine Corps operations.²

The benchmark for Marine Corps tank doctrine's failures to "synthesize" Army tank doctrine for Marine Corps missions is unsurprisingly the Battle of Tarawa, "the first large-scale opposed landing of forces in the Pacific theater to test armor in opposed amphibious doctrine." According to DiDomenico, the failures registered at Tarawa "indicated an institutional ignorance in the operational art of combined arms."³

² Maj Joseph DiDomenico, USA, "The U.S. Army's Influence on Marine Corps Tank Doctrine," *Marine Corps History* 4, no. 1 (Summer 2018): 41.

³ DiDomenico, "The U.S. Army's Influence on Marine Corps Tank Doctrine," 31–32.

Herein lay some common misconceptions of Marine Corps tank policy and doctrine. The Marine Corps has operated tanks and other armored fighting vehicles from 1917 to the present day. It may seem curious to Army personnel, but there has never been a Marine Corps *armor* force in existence, except in the case of certain ad hoc efforts. In the Corps, one refers to tanks, amphibious assault vehicles, light armored vehicles, or armored cars, all operating variously with infantry, combat engineers, and artillery on the battlefield. In contrast to the evolution of armored doctrine in the Army, there are to date no Marine Corps armored infantry, armored engineers, armored cavalry, or self-propelled artillery, although the last oper-

ated from World War II to the 1980s as reinforcing artillery.

The Marine Corps' priorities concerning the development of amphibious warfare capabilities necessarily limited any evolution of armored forces of any description. Primarily, this characteristic stemmed from the nature of ship-to-shore landing operations and the characteristics of the shipping involved. One cannot underestimate and dismiss amphibious warfare doctrine as unrelated to Marine Corps tank doctrine, because nothing of the sort existed at the time. Careful reading of the sources also shows that Marine Corps procurement and doctrinal decision-making had little to do with the acquisition of Army tank technology and its manuals.

The Early Days

Although many Marine Corps officers serving in World War I with the 4th Brigade under the Army's 2d Division had some experience with French and U.S. Army tank support, the enduring interest in tanks within the Corps accompanied the Corps' new postwar mission of amphibious warfare, derived from the early Advanced Base Force of 1913. Only at this point did the Marine Corps begin to consider acquiring tanks and employing them to partly solve the landing force's most challenging issue at its weakest moment: mustering adequate firepower as landing craft closed the beach in the amphibious assault. The extensive naval campaign that brought amphibious assaults to bear would also require secure bases that would resist opposing operations of the same nature. Because Marine Corps leaders had experienced the employment of tanks by other land forces during the Great War, it became a common assumption that tanks would continue to support and defend infantry in the course of amphibious warfare.⁴

After a few officers and enlisted Marines received training at the Army Tank School at Camp Meade, Maryland, in 1922, a light tank platoon hastily assembled at Quantico, Virginia, in late 1923 for evaluation along with amphibious equipment in the Navy's winter maneuvers of 1924. By 5 December 1923, the light tank platoon, Marine Corps Expeditionary Force, formed at Quantico, initially consisting of 2 officers, 22 enlisted, and 3 M1917 6-ton tanks. The Army provided the tanks upon informal request by the secretary of the Navy.

The light tank platoon returned to Quantico after gaining experience from the Culebra maneuvers. Although it saw no more landing exercises, it participated in annual land maneuvers of the Expeditionary Force. It gained six more tanks from a formal loan agreement with the Army. Deployed to China in 1927, it saw little more than ceremonial use, returning the next year to be disbanded.⁵

On 7 December 1933, the Fleet Marine Force (FMF) replaced the old Marine Corps Expeditionary Force, reflecting the concentration on amphibious operations and forward naval base defense steadily evolving since World War I as Marine Corps policy.⁶ The new *Tentative Manual for Landing Operations* (1934) made noteworthy mention of light tanks, calling for landing them early in the amphibious assault. Unfortunately, the only available U.S. light tanks—Army M2A4s—already weighed in excess of 10 tons, while the cargo-handling booms of most Navy ships seldom exceeded a 5-ton limit. Accordingly, an early Marine Corps requirement focused on designs for a *very* light tank.⁷

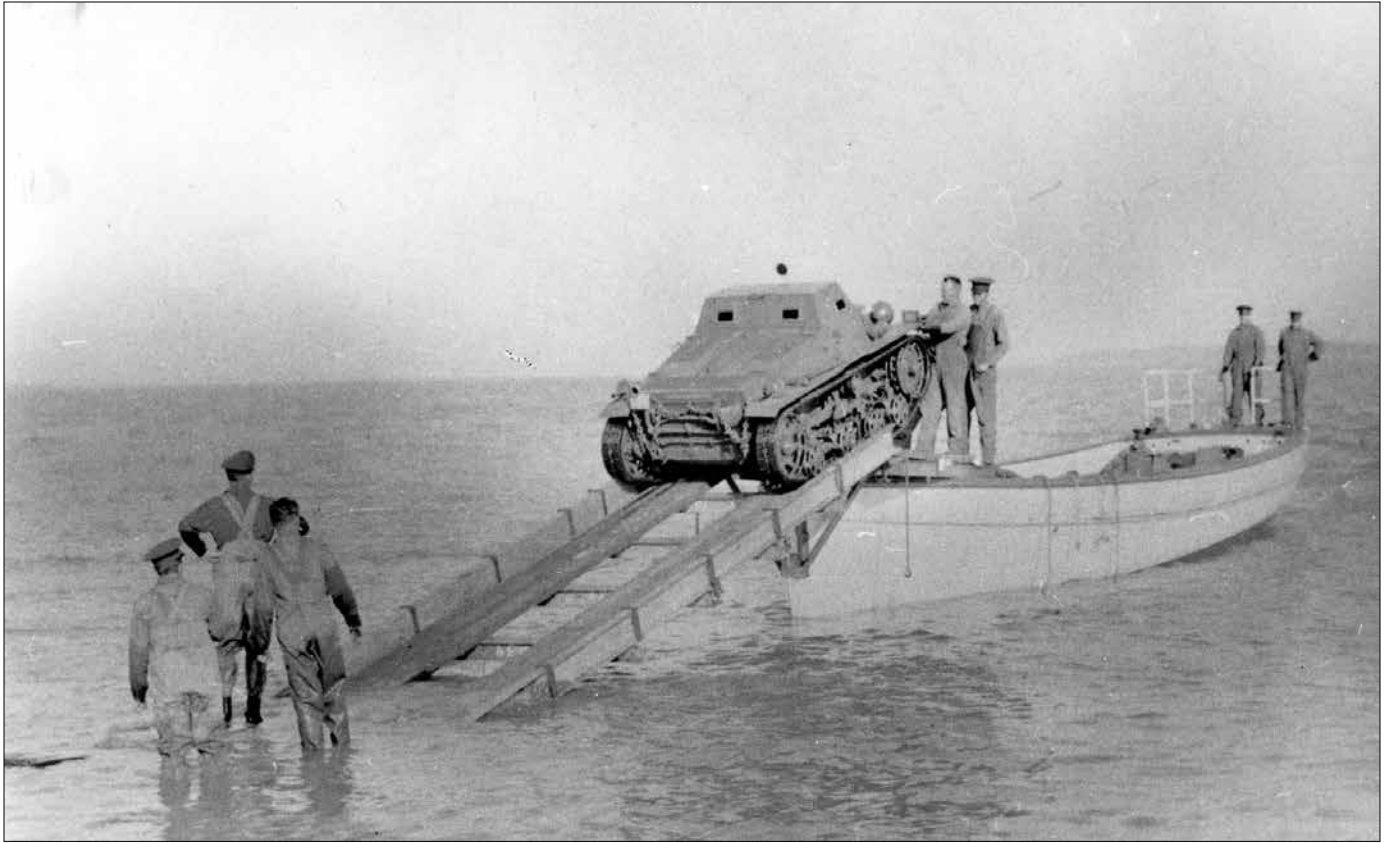
Funds available for the new forces permitted only the Quantico-based 1st Marine Brigade to form up and receive all arms in its first three years. The 2d Marine Brigade, based at San Diego, Califor-

⁴ Tank instruction formed part of the curriculum of the first field officer's course conducted postwar at Quantico. "Professional Notes: Recruiting and Distribution of the Marine Corps," *Marine Corps Gazette* 5, no. 4 (December 1920): 410, as cited (incorrectly as "Marine Corps Schools") in Arthur E. Burns III, "The Origin and Development of U.S. Marine Corps Tank Units: 1923–1945" (student paper, Marine Corps Command and Staff College, Quantico, VA, 1977), 2.

⁵ Kenneth W. Estes, *Marines under Armor: The Marine Corps and the Armored Fighting Vehicle, 1916–2000* (Annapolis, MD: Naval Institute Press, 2000), 5–8.

⁶ Allan R. Millett, *Semper Fidelis* (New York: Macmillan, 1980), 336; and LtCol Kenneth J. Clifford, *Progress and Purpose: A Developmental History of the United States Marine Corps, 1900–1970* (Washington, DC: History and Museums Division, Headquarters Marine Corps, 1973), 43–46.

⁷ Clifford, *Progress and Purpose*, 54.



Courtesy of the General George Patton Museum of Leadership, Fort Knox, KY

A 5-ton Marmon-Herrington CTL-3 of the 1st Tank Company, 1st Marine Brigade, backs off a Navy motor launch at Quantico, VA. The initial Marine Corps requirement that landing force equipment use large ships' boats—in the event landing craft were not available—drove the Corps to order this diminutive tankette as its first choice.

nia, remained only an infantry regiment. Thus, only one Marine Corps tank company featured in the 1934 planning. The Marine Corps Equipment Board (MCEB) approved in concept a 3-ton tank, armed with a 1.1-inch automatic gun, or a 37mm cannon and standard light machine guns. Vehicle armor would need to resist .50-caliber rounds and a 25- to 30-mph speed was specified. No such vehicles existed. Simply put, the ambitious specifications (i.e., a 37mm gun on a 3-ton chassis, with protection as specified) could not be accommodated.⁸

Serious decisions concerning the formation of the FMF contributed toward the creation of a Marine Corps tank arm in 1935. Despite having no tanks on

hand, the Commandant gained approval for a Marine Corps officer to attend the Army's tank course, then taught at the Infantry School, Fort Benning, Georgia. Headquarters set this task for Captain (later brigadier general) Hartnoll J. Withers, a 1926 graduate of the Naval Academy who had enlisted in the Corps in 1920. His significant contributions to the Marine Corps tank arm marked him as a pioneer in the field.⁹ Most of the World War II tank battalion commanders in the Marine Corps trained at Fort Benning rather than the later Armor School at Fort Knox. Accordingly, they had little knowledge of later improvements in Army armor doctrine.

⁸ CMC to Cdr Special Service Squadron, USN, 19 June 1934, Record Group (RG) 127, Entry #18, box 76, National Archives and Records Administration (NARA), Washington, DC.

⁹ BGen Hartnoll J. Withers biographical file, Historical Resources Branch (HRB), Marine Corps History Division (HD), Quantico, VA; Army C/S letter to CNO, 18 July 1935, RG 127, Entry #18/57, NARA; and Message, Asst CMC to USS Chicago, 25 July 1935, RG 127, Entry #18/57, NARA.



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Another advantage of the CTL-3 brought up in sessions of the Marine Corps Equipment Board emphasized that two of them could be carried in the new Bureau of Ships medium landing craft compared to a single Army light tank.

On 29 November 1935, the Commandant General, Major General John H. Russell, ordered his Quartermaster to “initiate steps for the procurement of five (5) light fighting tanks.” The Marine Corps thus accepted the tank as a significant component of its still-forming amphibious doctrine.¹⁰

The Marine Corps’ light fighting tank of 1935 took form in the Marmon-Herrington combat tank, light, CTL-3, a two-person turretless tankette fitted with dual driving controls and three machine guns, weighing 9,500 pounds and capable of a 33-mph top speed on band tracks. Because of the inevitable teething problems of a new tank, the first five machines did not arrive at Quantico and the 1st Brigade until 22 February 1937. The 1st Tank Company stood up on 1 March 1937 and immediately prepared to deploy to the Caribbean for the Navy’s Fleet Exercise No. 4 (FLEX4), scheduled for January and March 1938. Only a single Navy landing craft prototype was available, but once on shore, the platoon of CTL-3s attacked the beach defenses and in turn defeated the defender’s reserve as it arrived in trucks. The observers agreed that

the little CTL-3s had registered excellent potential in every phase of the exercise.¹¹

Deliveries of the CTL-series vehicles remained painfully slow and the MCEB began to investigate the suitability of Army-type tanks for the landing force missions. However, on 19 October 1938, the Headquarters Marine Corps staff reiterated the Commandant General’s guidance that the Marine Corps only acquire the lightest possible tanks, especially given the dearth of landing craft in the fleet and the lingering requirement that all FMF equipment be capable of landing from 45- to 50-foot ships’ boats of the fleet. Thus, despite the favorable demonstration of an Army M2A2 light tank and M1 combat car at Quantico, there was no relief in sight, although the Navy was known to plan landing craft carrying tanks in the 20-ton range.¹²

The 1st Tank Company, 1st Marine Brigade, participated in the 1939 Fleet Exercise No. 6 (FLEX6) with its two platoons of CTL-3 tankettes and a single Army M2A4 light tank, a new vehicle borrowed for the exercise from Aberdeen Proving Ground where an officer and five crew had become familiar with it. New landing craft models were available for testing and the CTL-3 and M2A4 vehicles all operated well from them, although the suspension of the latter proved vulnerable to salt water. The improved

¹⁰ Quartermaster (QM) Quantico letter to QMMC, 26 February 1937, RG 127, Entry #140A/128, NARA; and QM Quantico letter to CG, FMF, 20 February 1937, RG 127, Entry #140A/128, NARA, reporting acceptance of the CTL, factory numbers 1329–33 (Marine Corps numbers were T-1 through 5) for use by 1st Tank Company, 1st Marine Brigade, FMF, upon its formation. “Tanks in test run have demonstrated ability to: 1. Run a hundred and twenty-five miles without addition of gas, oil or water. 2. Make a complete three hundred and sixty degree turn in either direction within a circle of eighteen feet in diameter by turning on one locked track. 3. Bridge a trench fifty inches wide. 4. Negotiate a forty-eight inch vertical drop without turning over. 5. Negotiate a twenty-two inch vertical rise.” CMC to CG Marine Barracks Quantico, 10 March 1937, RG 127, Entry #140A/128, NARA, directs installation of one Navy radio receiver, type RU in one of the CTL. Photographs of the period show only one tank per CTL-3 platoon fitted with a radio.

¹² CMC to President, MCEB, 19 October 1938, RG 127, Entry #E18/164, NARA.

¹⁰ CMC to the Quartermaster of the Marine Corps (QMMC), 29 November 1935, RG 127, Entry #140A/128, NARA.



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The obvious limitations of the CTL-3 led to the development of the companion medium version produced by the Marmon-Herrington Company as the CTM-3TBD. A turreted tank weighing more than 21,000 pounds, it used a diesel engine to attain a speed of 30 mph. The turret mounted a pair of .50-caliber Browning machine guns, the standard U.S. antitank weapon of the 1930s. With the three .30-caliber machine guns in the hull forward, the three-person crew seemed almost contradicted. In the end, only five were built for the Corps.

Marmon-Herringtons also performed well with a new 10.5-inch-wide band track.¹³

By now, the budget for the Marine Corps was increasing and Commandant General Thomas Holcomb decided to finish building up the first tank company. He anticipated that better light tanks were now available and instructed the MCEB to prepare specifica-

tions for a new order of 18–20 new tanks by mid-April 1940.¹⁴

On 3 April 1940, the board held its decision meeting to determine the future direction of the Marine Corps tank program, inviting representatives of the FMF commands to contribute. Despite the earlier decision of the board to increase permissible vehicle weight to 18,000 pounds with the discovery of improved handling equipment on board naval shipping, the members and visitors voted to buy improved Marmon-Herrington 12,500-pound tankettes (CTL-6) and a new, three-person turreted Marmon-Herrington combat tank, medium, the CTM-3TBD tank of 18,000

¹³ QMMC file on FLEX6, notes general satisfaction with tanks, especially the second series of five with its improved track, RG 127, Entry #140A, file 169-1, NARA. See also Burns, "The Origin and Development of U.S. Marine Corps Tank Units: 1923–1945," 32. Compare Frank O. Hough, Verle E. Ludwig, Henry I. Shaw, *Pearl Harbor to Guadalcanal: History of U.S. Marine Corps Operations in World War II*, vol. 1 (Washington, DC: Historical Branch, G-3 Division, Headquarters Marine Corps, 1958), 23–32, and Clifford, *Progress and Purpose*, 52–53, on lighters, although both erroneously note that the Corps had "given up" on the Marmon-Herrington tank by 1939.

¹⁴ CMC to President, MCEB, 23 February 1940, RG 127, Entry #18/1229, NARA.

pounds. They rejected the current Army light tank of 24,000–25,000 pounds. The board also endorsed its earlier operational concept that provided for landing the smaller tank first to overcome the beach defenses in the assault phase, with the heavier, more capable medium tank reserved for operations inland. General Holcomb signed the order on 8 April.¹⁵

Continuing Experiences

To this point in 1940, no pronounced influence of Army doctrine or armor schools may be discerned in the Marine Corps' search for tanks suitable for its planned amphibious assault concepts. This is not surprising given the Army's own eclectic experiences prior to the creation of its Armored Force (10 July 1940), Armor School (1 October 1940), and units. Marine Corps officers still attended the Army's Tank Course, convened under the Infantry Branch at Fort Benning. Tanks ordered by the Marine Corps included no contemporary Army tanks until the secretary of the Navy formally requested 36 Army light tanks from the secretary of the Army on 8 July 1940.

Yet, the entire armored fighting vehicle strength of the Corps that same July consisted of the 3 officers and 46 enlisted Marines of the 1st Tank Company, 1st Marine Brigade, and their 10 CTL-3 series tankettes. The 2d Marine Brigade still had no tank company, yet the planning now focused on expanding these brigades to division strength, including their planned tank battalions. Clearly, the fledgling tank arm of the Marine Corps would have to accelerate its growth from the platoon-a-year rate it had thus far experienced.

What had happened? Peacetime planning had failed to keep up with world events. The Battle of France saw the Allied armies routed in Europe and the British Army withdrawn to the home islands. At the same time, Brigadier General Charles D. Barrett, the Commandant's chief planner, wrote him a disturbing memorandum on 24 June 1940. Barrett had guided the 1930s amphibious doctrine and now sounded an alarm for the tank program. At this time, the Corps had 35

Marmon-Herrington tanks in operation or on order. He asserted that the situation now required stronger and faster measures:

Several factors have recently arisen which materially affect the policy of the Marine Corps with respect to tanks. First. The present war has demonstrated the great effectiveness of tanks, and the relative numbers of tanks to other arms has been greater than formerly thought desirable. Second . . . it seems probable that in a number of cases, that the FMF could land without opposition and would then be called upon to defend a relatively large area. In this event a fast striking force would constitute the best defense. Third. The possibility of being ordered on operations before new tanks can be built has been increased. In this case, Army tanks actually on hand would constitute the only supply. It is believed that Army tanks could be secured if the emergency were sufficiently great.¹⁶

Brigadier General Barrett called for the immediate transfer from the Army of five light tanks, sending two to each brigade for training and keeping a fifth tank as a spare. Commandant Holcomb approved the request, signaling the conversion of the Corps to Army sourcing. The Marmon-Herrington tanks, both turreted and tankette type, might have developed into successful vehicles, however, only acquisition through Army channels could provide the quantities of tanks now required for the rapid expansion of the FME. Moreover, the Marine Corps now appeared in strategic plans of hemispheric defense, including action against the Vichy French bases in the Caribbean. In addition, a proposed landing in the Azores might find U.S. forces in contact with the German Army, which

¹⁵ Director Plans and Policy [P&P] to CMC, 8 April 1940, decision memorandum on number, types of tanks, RG 127, Entry #140B/154, NARA.

¹⁶ Director P&P Div to CMC, memorandum, 24 June 1940, RG 127, Entry #140B/154, NARA.



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In its haste to acquire light tanks from the Army to fill out the three divisional tank battalions ordered for 1941, the Corps picked up many diesel engine versions such as this M3A1, shown exiting a Navy LCM-2 craft at Camp New River, NC. Still painted in olive drab, the Army ordnance number can be seen on the hull side. The evident speed of the vehicle exiting the landing craft may be seen on the raised hull front and blurred track shoes and sprocket wheel, indicating a green tank or craft crew, or both. The Army had decided to ban most diesel tanks from overseas service as a logistic shortcut, leaving them easy acquisitions for the Corps.

had already defeated the collective forces of Poland, Norway, France, and Great Britain. Instead of the Pacific island naval campaign considered by Marine Corps planners since World War I, the Marine Corps might face the European blitzkrieg.¹⁷

Marine Corps decisions such as forming an organic tank battalion in each Marine Corps division,

fielding unarmored amphibious tractor (amtrac) battalions for resupply of landing beaches, and adding an antitank battery of M3 75mm guns mounted on halftrack vehicles to each divisional special weapons battalion reflected no Army influence, concept, or doctrine. The Marine Corps Quartermasters viewed Army weapons developments with varied interest, but no transfer of doctrine took place when “Army technology [was] purchased by the Marine Corps Equipment Board in 1938 [sic],” as DiDomenico incorrectly wrote. He later clarified this statement: “In 1938, the Marine Corps Equipment Board met to discuss the fu-

¹⁷ CMC to QMMC, 2 July 1940, RG 127, Entry #140B/154, NARA, orders 5 light tanks M2A4 (\$165,000) and 31 light tank, combat, 13.5-ton (M3) (\$1,023,000); and Letter, Chief Bureau of Ordnance, Navy Dept 7, August 1940, RG 127, Entry #140B/154, NARA, notes that verbal orders of CMC on 31 July 1940 modified the above order to 36 M2A4 at \$1,188,000.



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The varied tank models received by the first two tank battalions were sorted into companies. Here, on Guadalcanal, light tanks of Companies A and B of the 1st Tank Battalion exit a refueling point, likely on Henderson Field. The first and third vehicles are M2A4s of Company A, where that type had its sole combat use of more than 500 manufactured, and the middle tank is an M3 of Company B. Note the fixed machine guns in the right and left sponson boxes, for use by the driver, if needed, while operating at the same time the engine, transmission, and steering controls.

ture of Marine tanks. They concluded that the Marine Corps would purchase some tanks from the Army's arsenal of M2A4 light tanks and test their abilities during FLEX 6 in January 1940.¹⁸ However, as previously noted, the actual Navy request for 36 Army light tanks wasn't made until 8 July 1940. U.S. Army infantry divisions had no organic tank battalions in World

War II, using instead a pool of field Army level tank battalions as required. The Army initially ordered amphibian tractors with armor, intending them to carry assault troops in amphibious landings. Yet, the major landings conducted in the North African and European campaigns made no use whatsoever of these versatile machines. The Army, not the Marine Corps, dubbed the cannon-armed and armored variants to be amphibious tanks (amtanks), capable of operations inland, whereas the Marine Corps intended their "ar-

¹⁸ DiDomenico, "The U.S. Army's Influence on Marine Corps Tank Doctrine," 24, emphasis added, 27–28. The authors would like to correct another inaccuracy in Maj DiDomenico's article: the invasion of Poland began on 1 September 1939, not "in 1940." DiDomenico, "The U.S. Army's Influence on Marine Corps Tank Doctrine," 25.

mored amphibians” to fight the beach defenses only until the tanks could be unloaded from landing craft.¹⁹

The new Army Armored Force doctrinal publications appeared in late 1942, with perhaps the most useful one, *Tank Platoon*, Armored Force Field Manual 17-30 (FM 17-30), disseminated last in October. These would not have reached units arriving in the South Pacific in the summer of 1942, least of all the A and B Companies of 1st Tank Battalion that landed on Guadalcanal on 7 August 1942.²⁰

The tank units of the Marine Corps accompanied their divisions into the Pacific War starting in 1942, except for Company B, 2d Tank Battalion, and Company C, 1st Tank Battalion, which attached to the 2d and 3d Marine Brigades, respectively, which garrisoned in Samoa in 1942–43. One must take care, however, not to infer too much from the initial operations of the tank battalions and companies of the 1st and 2d Marine Divisions in 1942–43. The tank companies had assembled rapidly after the battalions stood up in November and December 1941, but the battalions were heavily burdened with the flow of inexperienced troops and numerous tanks of different models and capabilities from Marine Corps depots. If that were not enough, the infantry units of the divisions had barely finished basic squad tactics training before shipping out on long voyages to the South Pacific, where they were to train for the expected 1943 Allied counteroffensives.²¹

¹⁹ Compare Harry Yeide, *The Infantry's Armor: The U.S. Army's Separate Tank Battalions in World War II* (Harrisburg, PA: Stackpole, 2010); and Maj John T. Collier, “Development of Tactical Doctrine for Employment of Amphibian Tanks,” Headquarters 776th Amphibian Tank Battalion, 1944, World War II Operational Documents Collection, Armor School Research Library, Ike Skelton Combined Arms Research Digital Library.

²⁰ DiDomenico, “The U.S. Army's Influence on Marine Corps Tank Doctrine,” 28. 1stLt Robert M. Neiman was *executive* officer of Company D, 1st Tank Battalion (not 2d Tank Battalion, as stated by DiDomenico), which did not organize at Camp Pendleton, as the 1st Marine Division was stationed on the East Coast until its deployment to the South Pacific. Neiman, as captain, later commanded Company C, 4th Tank Battalion, which stood up at Camp Pendleton on 8 June 1943, and he sent *some* officers and his maintenance officer to Fort Knox. Robert M. Neiman and Kenneth W. Estes, *Tanks on the Beaches: A Marine Tanker in the Pacific War* (College Station: Texas A&M University Press, 2003), appendix 3, 195–96. Most enlisted Marine Corps tankers trained at California bases under Marine Corps instructors, a practice continuing to 1974.

²¹ Estes, *Marines under Armor*, 37–51.

Consequently, the rifle companies of these two Marine divisions had no experience of operating with tanks—and vice versa—when they disembarked on Guadalcanal in August 1942 and 4 January 1943, respectively. It was therefore unlikely that Guadalcanal “became the testing ground for Marine armored units of the 1st and 2d Tank Battalions.”²² In fact, Companies A and B of 1st Tank Battalion remained on the vital Henderson Airfield as divisional reserve for the entire campaign. The battalion headquarters and its Company D remained in New Zealand for the entire campaign.²³

Improvisation Yields Results

In the absence of published doctrine, nothing prevented the units themselves from organizing tank-infantry tactics, techniques, and procedures throughout the Pacific Campaign. The Guadalcanal and Tanambogo (Solomon Islands) actions demonstrated that the light tanks had clear vulnerabilities in close action against the enemy and crews could not maneuver or see well in a jungle environment. They had, however, executed the landing doctrine of 1936–40, as presented in deliberations of the MCEB: landing and taking out (very few) beach defenses, then supporting further advances inland. Defensively, the tanks had constituted a counterattack force, as prescribed for base defense forces in the prewar exercises in the Caribbean. These did not occur frequently, however, since the infantry units held their lines well, and the few Japanese tanks used in the Guadalcanal campaign had been readily handled by the antitank guns of the division. The problem of tank-infantry cooperation had not been examined before the war and was now found totally wanting. For all the criticism of the light tank, the tanks could not operate reasonably well

²² DiDomenico, “The U.S. Army's Influence on Marine Corps Tank Doctrine,” 29. At the Battle of the Tenaru River (not Ridge), the Marine Corps' M2A4 platoon from Company A, 1st Tank Battalion, fought unsupported to mop up Japanese remnants, after the infantry battalions had completed the encirclement of the Japanese. There was only one Marine Corps tank battalion at a time employed on Guadalcanal, as their parent divisions fought separate campaigns there.

²³ Neiman and Estes, *Tanks on the Beaches*, 47.

without trained infantry support in the confined terrain over which the 1st Marine Division had fought.

Neither the jungle nor the Japanese soldiers would disappear soon. Ironically, the continuing operations in the Solomon Islands saw the tank platoons of a few defense battalions first beginning the long and arduous process of developing tank-infantry tactics and equipment. The drive through the Central Solomons fell to the Army to execute, as the 2d Marine Division prepared for action in the Central Pacific. However, the Marine Corps defense battalions in the theater continued to provide antiaircraft and coastal defense functions for most island battles. After the fall of Wake Island, most defense battalions added an organic tank platoon of up to eight light tanks under their reorganization of 1942. In the Central Solomons, these tanks proved remarkably handy and essential to newly arrived Army forces fighting Japanese detachments defending their bases from roadblocks and bunker complexes.²⁴

The campaign in the New Georgia Islands seized Munda Airfield, making full use of three defense battalion tank platoons. Later, when the 43d Infantry Division took casualties on nearby Arundel Island, with Japanese reinforcements arriving, the call for Marine Corps tanks again brought in the 9th, 10th, and 11th Defense Battalion tank platoons, then totaling 13 tanks ready, reporting on 16 September 1943. Their surprise attack the next day pushed the Japanese troops back, advancing 500 yards with Army infantry support. After losing two tanks to 37mm antitank guns, the accompanying infantry covered the retreat of the chastised crews. On 19 September, the remaining 11 tanks attacked in two lines in front of their supported infantrymen, using 37mm canister and ma-

chine gun fire to clear the way. The Japanese Army evacuated Arundel the next day.²⁵

These actions constituted essential operational experience for the Marine Corps tankers. They learned to improvise ways to operate light tanks in the jungle, trained with and coordinated tank-infantry tactics, and also began a long series of technical innovations that carried through the end of the Pacific War. Marines rigged field telephones on the rear of their tanks because the tank radios operated on different frequencies than infantry radios. On separate occasions, different organizations tried to mount the infantry flamethrower on the tank. These improvisations rarely succeeded but indicated desired technical improvements. The experiences they gained and improvisations they attempted in the field revealed the never-ending instincts among the crews to tinker with their machines.²⁶

Company B of the 1st Tank Battalion did not join its battalion at the 1st Marine Division's landing operations in New Britain. Instead, it reinforced the Army troops landing at Arawe, Papua New Guinea, on 12 January 1944. Supporting the 158th Infantry Regiment, the company provided tank platoons, leading the assaulting infantry companies into a typical 1,000-yard attack on 16 January. Here, the forces practiced the new close support tank-infantry techniques in use by the 1st Marine Division, wherein a rifle squad protected each tank in the advance. Although successful, the attacks proved once again that the light tank could not handle the main attack mission very well. They had difficulty pushing through undergrowth and knocking over trees. The 37mm tank cannon lacked explosive power and tankers mostly fired machine

²⁴ Marine Corps tank operations in New Georgia are best covered in Maj John N. Rentz, *Marines in the Central Solomons* (Washington, DC: Historical Branch, Headquarters Marine Corps, 1952), 77–131; and "Tank Platoon Defense Battalion," Table No. D-125, approved 7 May 1942, author's files.

²⁵ LtCol Frank O. Hough, Maj Verle E. Ludwig, Henry I. Shaw Jr., *Pearl Harbor to Guadalcanal: History of U.S. Marine Corps Operations in World War II*, vol. 1 (Washington, DC: Historical Branch, G-3 Division, Headquarters Marine Corps, 1958), 254–359.

²⁶ Burns, "The Origin and Development of U.S. Marine Corps Tank Units: 1923–1945," 53. These early innovative experiments with field telephones on tank fenders for tank-infantry communications by Marine Corps tankers were confused by Maj DiDomenico with Army experiments using the EE-8 field telephone, which was not available in Europe or the Pacific until post-summer 1944. This Marine Corps innovation predated that of the Army. DiDomenico, "The U.S. Army's Influence on Marine Corps Tank Doctrine," 30.

guns and 37mm canister to overwhelm the defenses with volume of fire. Here again, tankers experimented with the infantry flamethrower, using it successfully in mop-up operations. The tanks had again proved essential for offensive operations in close terrain, but even these new M5A1 Stuart light tanks fell short of the needs of the troops.²⁷

The Marine Corps tankers of the 1st and 2d Tank Battalions and the separate companies assigned to Samoan defense forces operated with the pre-war equipment, tactics, and techniques. If these had proven inadequate for the tasks at hand, that experience remained no different than it had for most other military organizations when first encountering the novelties of combat in 1942–43. Their tracked vehicle brethren of the amtrac battalions also found the predictable limitations and teething problems of their equipment and organization. The question remained what the Marine Corps would do with the armored fighting vehicle based on the combat experiences of the Solomons and the defense of island bases to date.

Into the Cauldron

The later landings in the Solomon Islands and New Britain by the Marine Corps and Army divisions inaugurated close support tank-infantry teams as well as the valuable contributions of the amphibious vehicle, tracked (LVT) as a logistics carrier over the beaches and in marginal terrain inland. Because they were practically unopposed landings, further lessons became necessary to prove the light tank's marginal value as an infantry support combat vehicle. For the FMF, the necessary changes in doctrine and equipment would come out of the close encounter with disaster that the 2d Marine Division experienced at Tarawa. The fighting for that atoll demonstrated the standard required for the rest of the Pacific War as the Central Pacific drive began for the FMF forces. Marines understood that serious fighting would be re-

quired to take Betio, the major island of the Tarawa atoll. The aerial photographs revealed much of the enemy defenses, and few of the 2d Marine Division leaders thought that air and naval bombardments would facilitate an easy landing. For example, the threat of the few major-caliber shore batteries against the assault troop transports contributed to the decision to assault the island across beaches inside the lagoon, from transports anchored outside the atoll, requiring the landing craft and amtracs to cover a still-record 16 kilometers from ship to shore. In addition, the lagoon featured extensive reefs obstructing landing craft, plus a seawall immediately on shore behind which waited the surviving enemy and their weapons.²⁸

The 2d Amtrac Battalion still operated 75 well-worn LVT-1 amtracs taken with the division from Guadalcanal, plus 50 new LVT-2 models newly received after that campaign. The amtrackers worked hard in their New Caledonia base to install bolt-on improvised armor and an additional machine gun mount on the open cabs of the amtracs. Their success in operation remained vital to the assault phase and continued support. The division staff dedicated 84 of these vehicles to landing the first waves of assault infantry, fearing that the reefs would impede the Navy landing craft. This logistics vehicle would thus become a combat infantry carrier, carrying 18–20 troops in each, a doctrinal change specifically denied by the Marine Corps since their introduction.²⁹

With the specialized armored amtracs just arriving on the West Coast for the outfitting of three new battalions, none would be ready for the division's 20 November 1943 assault on Betio. However, a company of the 1st Corps Tank Battalion (Medium) reinforced the division. The key introduction of the Navy's landing ship, dock (LSD), provided the means to introduce the Army medium tank to the amphibious operation in World War II. The LSD served as a mobile drydock for carrying landing craft, mechanized (LCM-3) and

²⁷ Arthur B. Alphin, "A Bigger Hammer" (instructional manuscript, Fort Knox, Armor Center Monograph, May 1990), 155–57; and Henry I. Shaw Jr. and Maj Douglas T. Kane, *Isolation of Rabaul: History of U.S. Marine Corps Operations in World War II*, vol. 2 (Washington, DC: Historical Branch, G-3 Division, Headquarters Marine Corps, 1963), 392–93.

²⁸ Estes, *Marines under Armor*, 67–71.

²⁹ Maj Alfred Dunlop Bailey, *Alligators, Buffaloes, and Bushmasters: The History of the Development of the LVT through World War II* (Washington, DC: History and Museums Division, Headquarters Marine Corps, 1986), 83–86.



Norm Hatch Collection, Nimitz Education and Research Center, National Museum of the Pacific War

At Tarawa, communications between tank crew and infantry were rudimentary. Here, an infantryman (see inset in bottom left corner) uses his rifle butt to get the tank's attention by knocking on the tank's pistol port. This photograph was taken on Red Beach Three and shows the last tank survivor of the 3d Platoon, Colorado.

their preloaded cargos of tanks, artillery, or other equipment ready to disgorge over its stern gate once the well deck flooded using the ships' internal ballast tanks. The Corps' new M4A2 Sherman medium tanks could be landed from their preloaded landing craft much faster than the M3 series light tanks could be craned from stowage holds of the assault shipping into their own landing craft. The first of these ships, USS *Ashland* (LSD-1), loaded the 14 M4A2 mediums of First Lieutenant Edward L. Bale's Company C, 1st Corps Tank Battalion (Medium), for the assault. Bale would take the M4 series medium tank into combat for the first time with the Marines.³⁰

The Corps' decision to acquire the M4 series medium tank stemmed not from any influence of Army

doctrine but from a simple upscaling of the existing concept of employment of tanks in the landing force. Recall that the MCEB considered the light CTL-3 type tanks as suitable for the initial landing and defeat of the beach defenses, as they were understood in 1940, with the larger "medium" 9-ton Marmon-Herrington CTM-3 turreted tanks to be landed later to exploit the assault inland. Two years later, with the acquisition of larger and heavier Army light tanks and the Navy's procurement of landing craft to handle the new M4 series mediums, it became a simple matter in the Corps of scaling up its tandem tank doctrinal concept to use Army light and medium tanks. Given the competition for all the new production M4 mediums among the U.S. Army and Allied armies, the Marine Corps staff found that they could get the M4A2 variant earlier than any other model amid all this competition and

³⁰ Estes, *Marines under Armor*, 71.

recommended the procurement of 112 tanks, plus 56 replacement tanks, to meet the initial requirement for the two corps medium tank battalions scheduled to stand up in January and March 1943.³¹

Tarawa, 20–23 November 1943

Upon arrival in New Caledonia, Company C was ordered to support the assault of the 2d Marine Division on Betio in the Tarawa atoll. USS *Ashland* loaded the company on 3 November 1943 and sailed for the French New Hebrides, where two rehearsals took place. This was the first time Bale's company held exercises with infantry. The island selected for the exercises resembled Betio in no way: it was covered with dense tropical vegetation. When tanks were landed, the infantry had long moved forward and the thick jungle prevented any move inland by the tanks. As a result, tanks were landed and the tankers simply sat on the beach and waited to reembark. Medium tanks were scheduled to land at H+20 with the fifth wave. The Headquarters Section and the 1st Platoon were assigned to Red Beach One, the westernmost landing site, in support of the 3d Battalion, 2d Marines. The 2d Platoon was to land on Red Beach Two, in the center, in support of the 2d Battalion, 2d Marines, and the 3d Platoon was to land on Red Beach Three, on the east, in support of the 2d Battalion, 8th Marines. A single 2d Tank Battalion light tank platoon able to load its landing craft in time from transport holds was to disembark at H+26 on Red Beach One to provide direct support to 3d Battalion, 8th Marines.³²

D-day at Tarawa proved to be disastrous from the very beginning. Contrary to what planners had expected, the Japanese defenders and defenses had not been reduced by the preliminary ship and aircraft shelling. Worse, the uncoordinated phases of bombardment allowed the Japanese to reorient their forces on the lagoon side. The smoke raised by the shelling blinded gunfire support, which could not detect tar-

gets anymore. The resulting bomb and shell craters dotted the reef and shore and proved to be deadly traps to the supporting tanks.

Due to the low tide, LCMs were forced to deliver the tanks some 800–1,200 yards away from the assigned beaches. In crossing the reef, two tanks were lost to unseen holes despite the presence of guides in the water. Two more vehicles were lost that way while searching for an opening in the almost continuous seawall around the island. Tanks employed at Tarawa could have benefitted from deepwater fording kits. Unfortunately, the top-secret Army program developing such devices remained unknown to the Marine Corps until April 1943.³³

On all three beaches, once the tanks found a way to cross the log wall, they cruised the objective as previously ordered. As they moved inland unsupported, tanks fell victim to more shell holes and to intact Japanese defenses. Three tanks were knocked out by concealed Japanese 75mm guns and another by several 37mm antitank guns. One tank was a victim of a close-in attack by Japanese infantry using magnetic mines. Bale's personal tank was hit in the gun tube by an enemy Type 95 tank. By the end of that day, only three tanks were operational—one with an incapacitated main gun and only two fully operational M4A2s.³⁴ The absence of a tank recovery vehicle prevented rapid use of the drowned vehicles on the reef.³⁵ The light tanks fared no better. The tank lighters transporting the M3A1 light tanks of the 2d Tank Battalion were unable to land due both to the unsuitable landing site and to the sinking of four boats.³⁶

The next morning, one tank was extricated from a shell hole inland from Red Beach Two and an M4A2 suffering mechanical issues since the previous morning on Red Beach One was back into combat order,

³¹ P&P memoranda, 28 and 30 November 1942, RG 127, Entry #18/1228, NARA; and Ordnance Section, QMMC penciled memorandum, 13 January 1943, RG 127, Entry #18/1228, NARA.

³² Oscar E. Gilbert and Romain Cansiere, *Tanks in Hell: A Marine Corps Tank Company on Tarawa* (Havertown, PA: Casemate, 2015), 99–106.

³³ P&P memorandum, 12 April 1943, RG 127, Entry #18/1226, NARA. The first use of such fording kits for the Army took place at Casablanca on 8 November 1942, and for the Marine Corps at Roi-Namur on 1 February 1944.

³⁴ Gilbert and Cansiere, *Tanks in Hell*, 151.

³⁵ The absence of a tank retriever was due to the lack of space aboard the LSD-1. Such logistics issues would occur until late 1944 at Peleliu.

³⁶ Oscar E. Gilbert, *Marine Tank Battles in the Pacific* (New York: Da Capo Press, 2001), 86.



National Archives and Records Administration

On D-day at Tarawa, the executive officer's tank, *Commando*, forged well ahead of infantry, but in absence of coordination it found itself isolated in a clearing and destroyed by several Japanese antitank guns. Miraculously, none of the crew was killed.

making a total of five operational Shermans. Though some previous mistakes were repeated that day, 21 November 1943 marked the birth of new tank-infantry techniques. In the first daylight hours, it was decided to send two tanks in the water to silence a Japanese strong point between Red Beach One and Two. Without guides or fording gear, both medium tanks converged toward the objective but were lost in underwater shell holes. Behind Red Beach One, Major Mike Ryan of 3d Battalion, 2d Marines, had requested naval gunfire support to pound the area behind Green Beach prior to a mop up operation he planned with Edward Bale, who later recalled, “[I] ran into an infan-

try company commander and we designed, in about sixty seconds, the tank-infantry tactics the Marine Corps would use the rest of WWII.”³⁷

When Ryan judged the naval bombardment had lasted long enough to suppress enemy defenses, he ordered the destroyers to cease fire and launched his attack. At 1120, Ryan's infantry, led by Bale in his tank (dubbed *China Gal*), moved on a 100-yard-wide front to the south. The progress slowed to allow the infantry to check every emplacement and keep contact with

³⁷ Gilbert and Cansiere, *Tanks in Hell*, 160; and Gilbert, *Marine Tank Battles in the Pacific*, 49.

the tank. When a suspect position was encountered, Bale recounted, “[We] fired the tank gun into whatever entrance, or opening there was. The infantry would get as close to that enemy position as they could, so as soon as we fired they could throw in whatever they had [grenades, satchel charges, flames, etc.].” When the position had been cleaned, the advance resumed. To maintain liaison between the tank and the advancing infantry, “it was either some infantryman crawling up on the back of that tank and talking to me, or me getting out on the ground and talking to the infantry. It was about half and half.” By 1235, Green Beach was declared secure. It allowed fresh troops from the 6th Marines to land without opposition. The 1st Battalion was sent into battle the next day and was highly instrumental in clearing the island’s southern shore.³⁸

In the Red Beach Two sector, the day’s objective for the 1st and 2d Battalion, 2d Marines, was to cut the island down its center. With the help of the last surviving tank in the area, named *Conga*, retrieved during the night, Marines would cross the dangerously exposed airfield to the southern shore. An infantry officer (whose identity remains obscure) ordered the tank crew to move ahead and silence the strong positions that could slow the process. But the tank commander, Private Donald Pearson, suggested that the tank and infantry progress as a team: “We go up with and keep ’em pinned down, you come up. You keep ’em pinned down and we go again.”³⁹ The unidentified officer agreed and the group reached the opposite side of the island before friendly mortar fire put a hasty end to the adventures of the *Conga*.

Red Beach Three

On Red Beach Three, 2d Battalion, 8th Marines, struggled to expand the beachhead and silence heavy Japanese strong positions south and east of the front line. That morning, a new tank commander, Second Lieutenant Louis Largey, took over the last M4A2 in the area, the *Colorado*. He hailed a reconnaissance man to guide the tank inland. Largey demonstrated

what would later be emphasized in training and in the field by future tank-infantry teams: having the infantry team first sit in every crewmember’s position in order to see what they were able to view in order to better spot the enemy or obstacles for them.⁴⁰ Though rudimentary, the techniques used by the reconnaissance guides to communicate targets (using a rifle to point out targets and hand signals for the range) to the tank crews worked well.

Later, the after action reports emphasized the urgent need to increase tank-infantry coordination and training. This was successfully undertaken when the divisions prepared for the next operations in the Marshall Islands and the Marianas. Bale later criticized the tank tactics taught at the Army tank school:

But this madness of going out front and run around and cruising and all, that all got started with the Army . . . and it was picked up by Marine officers who went to school there. Cruising on the objective: That was the term that was used for running around on the objective. That was a tactic that the Army taught. I don’t know whether it came from the horse cavalry running over a hill and riding around on the hilltop, or what the hell it came from! But that was the term. “Cruise on the objective.”⁴¹

Wartime Evolutions Continue

Tarawa brought about the cancellation of the light tank in Marine Corps service and the decision to field the M4A2 medium tank as the sole standard issue tank. This action interrupted the ongoing procurement of hundreds of M5A1 light tanks, and only the 1st, 2d, and 4th Tank Battalions received an initial issue of them. The standardization of the medium tank within organic tank battalions led to the dissolution of the 1st Corps Tank Battalion. Proper deepwater fording

³⁸ Gilbert and Cansiere, *Tanks in Hell*, 160.

³⁹ Gilbert and Cansiere, *Tanks in Hell*, 163.

⁴⁰ Gilbert and Cansiere, *Tanks in Hell*, 165–69.

⁴¹ Ed Bale, interview with Oscar E. Gilbert and Romain Cansière, 25 July 2013.



National Archives and Records Administration

The tank-infantry telephone proved a major improvement in tank-infantry coordination. By mid-1944, all tank battalions had adopted the telephone to coordinate with infantry, now emphasizing the tank-infantry team. On Hawaii in 1945, a squad leader uses the tank-infantry telephone to communicate directions to the crew of a Company A, 4th Tank Battalion, vehicle that had previously served on Iwo Jima, now functioning as a training aid.

kits and waterproofing materials ensured safer and more rapid landing of the new tanks, now able to ford 7 feet of water. Eventually, newer Army Signal Corps radios solved the lack of communications with the infantry, further enhanced by tank-infantry telephones installed on the rear of the tanks. In tandem with the medium tank fielding, the Commandant, now General Alexander A. Vandegrift, approved a new battalion organization for April 1944 with fewer men and all medium tanks. The medium tank company would have 15 tanks, using five platoons of three each, and the tank battalion would field only three medium tank companies, with a battalion commander's tank bringing the total to 46.⁴²

⁴² Estes, *Marines under Armor*, 76–80; and Victor J. Croizat, *Across the Reef: The Amphibious Tracked Vehicle at War* (London: Blandford Press, 1989), 67–68. This new organization was actually adopted after the Marianas operations by the units in the field.

The amphibious tractor was now armored and armed as an infantry assault vehicle, supported by the armored amphibians ordered in 1943 to equip the three battalions in the FMF that would lead the assault waves to the beach and assist tanks in defeating fixed defenses, using 37mm and short 75mm turret weapons. There was no attempt to organize for mounted warfare and the organization for the landing remained in effect until the assigned beachhead had been secured by the landing force. These changes, together with the standing operating procedures for tank-infantry coordination developed in similar but not identical fashion by each Marine division, virtually ensured no repetition of the worst Tarawa experiences for the rest of the war. No doctrinal publication emerged, because the standing operating procedures of each Marine division provided guidance and supplementary instructions to the Army's 1944 *Armored Employment of Tanks with Infantry*, FM 17-36, which



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A Marine Corps M4A1 medium tank of Company A, 1st Tank Battalion, breaks through the jungle growth at Cape Gloucester, leading the infantry into the airfield objective. The Corps' leadership realized the limitations of its light tank inventory, demonstrated by the Solomon Islands campaign, and ordered the eventual conversion to an all-medium tank battalion, accomplished by mid-1944. The M4 series medium tanks could handle best the varied terrain and increasingly well-built Japanese field fortifications that had so hampered the effective employment of the light tank. This tank company temporarily operated M4A1 mediums for that operation drawn from Army stocks in Australia.

alone found use in Marine Corps tank units. As would happen so many times in the Pacific War, no sooner had the Marine Corps oriented to a new set of operational challenges than the situation changed. From attacking isolated Japanese garrisons on atolls, the III and V Amphibious Corps now turned to confronting major units of the Japanese Army, defending large Pacific islands that presented all possible variations of terrain.⁴³

With the last armored vehicle battalions departing the United States in 1944, the Marine Corps moved its tank and amtrac schools to Camp Pendleton, California, along with their headquarters, the former Training Command, San Diego Area. The schools' new missions concentrated on replacement training. The amtrac schools had consolidated at Camp Pendleton in early 1944, except for the LVT maintenance courses continuing at the original amtrac school site at Dunedin, Florida. As the burden of forming the new battalions eased, specialty courses commenced: the tank dozer course (April 1944), the tank platoon

⁴³ Estes, *Marines under Armor*, 79, 103.



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There was no effective amphibious tank of World War II, but the Marine Corps armored amphibian (called the amtank in Army service). Here, a six-person landing vehicle, tracked—an LVT(A)-4—demonstrates its agility in a seaway. It remained well-suited to lead troop-carrying LVTs to the water's edge, where it was best employed as supporting direct fire artillery rather than in close combat.

leader course of 70 days and 700 hours instruction (27 September 1944), and the armored amphibian gunnery course for the LVT(A)-4 (June 1944). The Commandant approved a tank noncommissioned officer (NCO) refresher course on 12 April 1945, paralleling an earlier order for the amtrac NCOs. Tank School gunnery changed the 75mm for the 105mm howitzer on the M4A3 in June 1945, at which point the Ma-

rine Corps achieved virtual independence from Army schools for its fighting vehicle troops.⁴⁴

Such was not the case for equipment procurement, however. The Army notified the Marine Corps in March 1944 that the M4A2 medium tank's days were numbered (production was terminated in May 1944). Only the Marine Corps, the Russian Army, and the Free French Forces predominantly used the

⁴⁴ The commanding general, San Diego area, reported the capacity of the Tank Operators Course as 850 on 24 November 1943. Files of the tracked vehicle schools, RG 127, Entry #18, boxes 532, 533, and 497, NARA.

diesel-powered Sherman tank, and the Army had standardized the M4A3, with its gasoline-fueled Ford GAA engine for its own mass production. At this point, only the M4A3 series received improved mechanical and engineering modifications in the Army system, leaving the Marine Corps medium tank fleet (more than 500 vehicles) approaching obsolescence. The situation continued to sour. The Army wanted to shift production on 1 July to the M4A3 with the high-velocity 76mm tank cannon, needed for defeating the latest German tanks. That measure posed a conflict to the Marine Corps tank ammunition supply then accumulating in the Pacific theater. The Marine Corps rejected the upgunned Sherman, as the current 75mm cannon ably destroyed all opposing Japanese tanks and remained valuable against field fortifications. The Commandant accordingly ordered replacement of all diesel M4A2s with the M4A3 (75mm) gasoline-engine medium tank to maintain up-to-date technical characteristics. But the problem then worsened. The Commandant's staff informed him that Army plans made initially for 1945 called for replacing the M4 with the new M26 medium tank, with its 90mm gun, as the standard production tank. M4A3 production would continue, but only with the new 105mm howitzer turret, intended as a close support tank for infantry.⁴⁵

These apparent realities caused the Commandant to order the 105mm M4A3 tank in 1945. However, this proved premature, as production of the M4 series tank—mostly armed with the high velocity 76mm tank cannon—continued to the end of the war. As Allied forces gathered for the 1945 campaign for the Japanese home islands, the FMF Pacific headquarters sponsored a tank summit conference on Oahu, Hawaii, designed to review and assess the experiences to inform changes necessary for amphibious invasions yet to come. Designated the Conference on Tank Matters, it contained the potential for a wholesale reassessment of tank doctrine, tactics, and techniques. Since the early days of the MCEB meetings at Quantico, no formal guidance or doctrine had been



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The M4A2 medium tank with its twin diesel engines performed first-line duty in the Corps for the second half of the Pacific War. Here, a crew from Company C, 4th Tank Battalion, loads one of the company's two Japanese minitank war trophies taken at Roi-Namur for shipping to their interim base at Maui, HI, in early 1944.

agreed on Corps-wide, while a total of six tank battalions had stood up and fought several key actions during the 1942–45 Pacific campaign. Various combat experiences had produced divisional and lesser-level tactics, techniques, and procedures, but many of these had been devised ad hoc, with the minimal assistance of the Marine Corps Headquarters staff, which alone authorized the weapons and organizations that the FMF would use. For the first time since the war's beginning, Marine Corps leaders formally took stock of their armored fighting vehicles and assessed their tactical value and employment in the conditions of warfare they expected to find in 1945.⁴⁶

The tank matters conference began on 25 April 1945, attended by tank battalion representatives and staff and ordnance officers. While combat continued on Okinawa, they discussed a full catalog of topics. Most brought with them the written expectations and recommendations of their highest commanders up to Amphibious Corps level. One result was a new

⁴⁵ P&P decision memorandum, 16 September 1944, RG 127, Entry #18/2148, NARA.

⁴⁶ R. K. Schmidt memo for C/S, FMFPAC, Conference on Tank Matters, 3 May 1945, RG 127, Entry #46A/18, NARA, hereafter R. K. Schmidt conference memo; and CG FMFPAC, report of conference, 21 May 1945, RG 127, Entry #46A/18, NARA, hereafter CG FMFPAC conference report.



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By 1944, each division of the Marine Corps had developed the tactics, techniques, and procedures for tank-infantry combat based on experiences and dedicated training. Here, tanks of 3d Tank Battalion roll out of their concealed positions on Guam and advance toward Japanese lines, linking with the infantry that had closed in while artillery support flailed the enemy positions.

standing operating procedure (SOP) manual for tank-infantry coordination, planned to *supplement* the Army's *Armored Employment of Tanks with Infantry*. The meeting also produced an improved tank battalion organization, with maintenance echelons shifted primarily to battalion headquarters. Each of the three tank companies would be increased to 17 tanks, comprising three platoons, each with 5 tanks. The proposed battalion also included a new 13-tank flame-thrower tank company. The veteran tankers attending the conference forcefully urged the Corps to acquire the new Army heavy tank (the M26 Pershing), as it was

well protected against the standard Japanese 47mm antitank gun and infantry close assaults with shaped charge demolitions. They also wanted its 90mm tank cannon, considered essential for cracking the enemy field fortifications expected in the future. Pending their procurement, they insisted that the current M4 series medium tanks be up-armored according to a standard design shared by all tank battalions, with the additional plating removable for fording rivers or crossing other poor terrain. The jointly staffed Chemical Warfare Service office on Hawaii demonstrated the new H-5 version of its flamethrower tank built on

the M4 chassis, which retained the 75mm main gun and included improved flamethrower system capacity and range. Though it still lacked a 360-degree traverse for the converted turret, the H-5 was universally acclaimed.⁴⁷

The Marine Corps Headquarters staff rejected the conference recommendations. The procurement of flamethrower tanks remained a priority and the six tank battalions would receive the 105mm howitzer-armed M4A3 medium tank for the assault landings on Japan. As approved by the Commandant in May, the reorganization of the tank battalion added three flame tanks in each of its medium tank companies. While the new FMF SOP standardized tactics for Marine Corps tank units, each Marine divisional SOP embraced similar tactics, techniques, and procedures. It made standard a dispatching methodology by which tank control was centralized under the tank battalion once all the tanks had landed with the supported infantry regiments. This meant that day by day tank units would be assigned to infantry regiments according to tactical requirements signaled by the division staff. The new document cautioned that

limited command facilities, maintenance and service equipment and inadequate personnel practically preclude the possibility of Marine Corps tank battalions engaging in armored attacks as such. Lack of facilities for moving large infantry units to close support of an armored attack further precludes this possibility, except in



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The tanks pick up their close support teams of riflemen and lead the combined forces into the final assault, while eliminating any prepared positions or fieldworks by direct fire.

missions far in advance of supporting infantry.⁴⁸

⁴⁸ Burns, "The Origin and Development of U.S. Marine Corps Tank Units: 1923–1945," 141; draft SOP, enclosed in CG FMFPAC, report of conference, 21 May 1945, RG 127, Entry #46A/18, NARA. Amazingly, Maj DiDomenico appears to have missed the *rejection* of the Tank Matters Conference findings and recommendations in their entirety by the staff of Headquarters Marine Corps. Equally, he missed the numerous objections by Amphibious Corps and division commanding generals over that course of events. Instead, he commented that "commanders were almost unanimous in accepting the revisions and updates to tank matters from the conference. Some comments called for slight changes in organization and communication, but the final revision provided the table of organization and SOP that would serve as the foundation of armor employment in amphibious operations for the next series of Marine doctrine." DiDomenico, "The U.S. Army's Influence on Marine Corps Tank Doctrine," 40. The circulation of the draft FMF document for tank-infantry coordination was, of course, not a matter of concern for Headquarters Marine Corps. But the Commandant's new table of organization for the tank battalion did not echo that of the conference proceedings or its indicated preference for acquiring the 90mm-gun M26 tank and the urgent requirement for upgrading the armor of the medium tanks. As noted below, the Commandant and the FMFPAC commander labored mightily to stifle the apparent revolt of the tank battalion commanders and their corps and division commanders over the continuing neglect of their wishes in 1945. Finally, Maj DiDomenico characterized the new FMF document for tank-infantry coordination as "the replacement for the Army's Employment of Tanks with Infantry, FM 17-36." DiDomenico, "The U.S. Army's Influence on Marine Corps Tank Doctrine," 40. That event only took place postwar with the issue of *Amphibious Operations: Employment of Tanks*, no. 18 (Quantico, VA: Marine Corps Schools, Marine Barracks, 1948).

⁴⁷ R. K. Schmidt conference memo; and CG FMFPAC conference report.



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The M4 series medium tank provided a decisive margin of superiority over most all Japanese weapons and tactics in the Pacific War. Its flamethrower variant had its debut in 1945 at Iwo Jima, shown here with Company C, 4th Tank Battalion. The flame tank version served in the Marine Corps postwar until 1959. The Sherman tank for many years provided an excellent balance of agility, firepower, and protection with adequate room for its five-person crew and ammunition.

In this way, the new Marine Corps tank doctrine devised by Headquarters, FMF Pacific, *limited* the tank battalion to infantry support missions.

This outcome of the conference produced strong responses from several of the commanders of the amphibious corps and Marine divisions that indicated increasing disgruntlement with the tank situation now imposed by higher headquarters. Major General Harry Schmidt, commander of V Corps, declared, "The number of special-purpose tanks has been inadequate. The recently developed flame thrower as a primary

weapon in the tank proved indispensable in the Iwo Jima operation. . . . Furthermore the tank dozer also proved indispensable for opening routes so that flame thrower and assault tanks could get into firing positions." He recommended a tank battalion of 74 tanks total, including 12 flame and 15 dozer tanks. Schmidt also criticized the 105mm gun tank, saying it provided "neither an advantage of armor nor muzzle velocity and parallels the mission of the M7B1 [self-propelled 105mm howitzer] and LVTA's [armored amphibians] now available to divisions." His representatives at the



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The Marine Corps alone remained dedicated to employment of the flame tank after World War II, and its M67 series variant of the M48 medium tank served actively from 1955 to 1972.

Tank Matters Conference had made the case for the 90mm gun carried in the M26 heavy tank.⁴⁹

Despite these assertions, the Commandant held his ground, responding, "Tanks mounting high-velocity weapons as primary armament as requested in reference [requesting the M26] are not available. . . . It is believed that if a requirement for a heavier tank such as the M26 is fore-seen [*sic*] for a particular operation, that representation could be made to

the theater or other appropriate commander for the attachment of supporting Army units equipped with the desired weapons."⁵⁰

The directive scarcely settled the issues, especially in view of the arrival on Okinawa of Army M26s, after the fighting there was over. The FMF Pacific commander then found a compromise, when he advised his major commanders that sufficient M4A2 and M4A3 tanks with 75mm cannon remained in depots

⁴⁹ CG V Corps to CG, FMFPAC, 19 April 1945, RG 127, Entry #46A/18, NARA; and 24 June 1945, RG 127, Entry #46A/18, NARA.

⁵⁰ CMC letter to CG, FMFPAC, 18 June 1945, RG 127, Entry #46A/18, NARA.



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The Marine Corps operated the only U.S. heavy tank from 1958 to 1972, the M103 series (M103A2 pictured). It functioned as a “destroyer tank” to be landed after the amphibious assault to eliminate resistance centers and armored counterattacks.

to equip the III and V Amphibious Corps for their next operations.⁵¹

In time, the rebellion deescalated, particularly when the commander of the 3d Marine Division informed the FMF Pacific commander that the 105mm gun tank was an acceptable replacement for the M4A2 tanks, provided they came with power turrets, gyro-

stabilizers and the new suspension systems of the late production Shermans.⁵²

Taking Stock: The Aftermath of the Great Pacific War, 1945–50

In the postwar years, a distinctive Marine Corps tank doctrine continued to emerge, and it took form at Quantico’s Marine Corps Schools in the form of the amphibious operations instructional series publica-

⁵¹ CG FMFPAC to CG III, V Corps, 13 July 1945, RG 127, Entry #46A/18, NARA. A cargo ship bearing an emergency Army shipment of 12 M26s arrived at Naha port and put the first of these tanks ashore via LCT craft on 30 July. Richard P. Hunnicutt, *Pershing: A History of the Medium Tank T20 Series* (Berkeley, CA: Feist Publications, 1971), 41–44.

⁵² 3d Marine Division, message to FMFPAC, 14 June 1945, RG 127, Entry #46A/18, NARA.

tion number 18 *Amphibious Operations: Employment of Tanks* (1948). Tanks would continue to play important roles in amphibious operations, but also in continuing operations ashore, as originally proposed by the MCEB in the late 1930s. The Marine Corps divisions had resources for a mechanized attack as well as a mobile antimechanized defense. The Army Field Manual 17 series references were recognized, but this time as *supplementary* to the 56-page Marine Corps doctrinal publication. This level of thinking also influenced the 1949 Armor Policy Board, which revived the MCEB doctrinal notion of distinct tanks for different phases of amphibious operations, defining a heavy tank requirement for equipping corps-level “force tank battalions” that would be landed after the divisional medium tanks operated ashore. This concept initiated the Marine Corps requirement for the T43 (or M103) heavy tank, produced in quantity for the Corps as the M103A1 and A2 heavy tanks, the sole heavy tank to reach sustained operational service in U.S. forces, in this case through 1974. Equally independent of Army practice was the Corps’ insistence on retaining flame tanks in the divisional tank battalion such that its M48 Patton medium tank fleet of 1955–74 included M67 flame tank variants. The board rejected the Army light tank, which was never to return in Marine Corps service.⁵³

Conclusion

Today, the Marine Corps tank force remains almost analogous to the Army’s armor units, sharing the Army training establishment and procuring main battle tanks of almost identical characteristics. Marine Corps tank units and Army armor units worked together in both campaigns against the Iraqi Army in 1991 and 2003. However, the lessons of the Gulf Wars reside mainly in archives and with the collective but fading memories of the units themselves. Just as in 1945, one cannot speak of *armor* in the Marine Corps, just tank, amphibious assault vehicle, and light ar-

mored reconnaissance units, which may or may not be used in modern combined arms or low-level military operations with imagination and verve. Some Army doctrinal manuals continue in use although they often deal with several types of units and organizations not to be found in the Corps.

By 2000, one could discern a search by the Marine Corps for yet another light fighting tank called the Marine Expeditionary Family of Fighting Vehicles, or even a tankless fighting vehicle force, as demonstrated by statements of Commandants of the Marine Corps. General Robert H. Barrow refused to consider a tank purchase during his term of duty. General Alfred M. Gray Jr. and General Carl E. Mundy Jr. equivocated between preferences for armored cars to testifying before Congress that “borrowing” tank units from the Army rather than purchasing more tanks had greater merit.⁵⁴ When General Charles C. Krulak retired in 1999, he stated that he would “eliminate the tank fleet found in the Marine Corps today if [I] could.”⁵⁵ The policy weakness for operating mechanized forces continues, as well as the emphasis on the smallest of units, especially with the reluctance to attempt costly mechanized and amphibious operations or exercises of any appreciable scale. Since 1937, the development and fielding of a technically and tactically superior fighting vehicle force, however small, has remained a marked Marine Corps objective. In the end, only the leaders of the Corps can take advantage of this reality, while it still exists. That said, the Corps leadership now appears to have lost its sense of need for armored combat vehicles. Tanks are being stripped from units

⁵⁴ USMC Future Force, “MAGTF Expeditionary Family of Fighting Vehicles” briefing; Tank Section USMC Development Command 30 October 1998; LtGen Martin R. Steele, deputy chief of staff for Plans, Policy and Operations, interview with author, 1 May 1997; Stephen K. Scroggs, “M1A1 Tank Transfer,” Congress and Military Policy Course 231 (U.S. Army War College, Carlisle, PA, 1998), 58–115; and Gen Mundy letter to Congressman Earl D. Hutto, 2 May 1944, author’s files.

⁵⁵ “Special Report: The 32d Commandant’s Senate Confirmation Hearing,” *Marine Corps Gazette* 83, no. 7 (July 1999): 23–24. Compare with Cmdt Gen Louis H. Wilson Jr.’s statement: “Get a ROC [required operational capability] out on XM1 [tank] as soon as possible. . . . [T]he Marine Corps has paid lip service to Combined Arms Training too long and must take major efforts in Combined Arms Training.” MajGen Keith Smith letter and Headquarters route sheet, 19 January 1975, RG 127 Entry #94-0085, NARA.

⁵³ Armor Policy Board, Report, 15 April 1949, RG 127, Entry #8113/38, NARA. The board also coined the term *destroyer tank* for the desired heavy tank, the T43.

and personnel reassigned (*divested* is the current term) as this article goes to press, based on the current Commandant's sense that war gaming has proven them to be a legacy burden. Thus, a persistent quality in Marine decision-making inclusive of doctrine might be a

"closed system of institutional goals and values, with doubtful feedback loops, seldom extending to foreign practices; exogenous variables, such as army procurement practices, and a cult of personality."⁵⁶

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⁵⁶ Estes, *Marines under Armor*, 200–4; and *Marine Administrative Message (MARADMIN) 302/20, Manpower Force Shaping in Support of Force Design Phase One* (Washington, DC: Headquarters Marine Corps, 5 May 2020).