

Ubique, Always

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Nothing seems more cliché than the assertion that artillery is somehow obsolete, yet the opinion is often voiced in some form or another.¹ Whether it be the end of siege warfare, the advent of aerial bombardment or the innovation of unmanned aerial vehicles, no single event has so far outdated the sum of things that the artillery represents: its strategic value, its mission and its people. Artillery remains a more versatile and far more cost-efficient bombardment option when compared to close air support (CAS) provided by strike fighters. Proposed alternatives to towed artillery, such as mounted artillery, mortars, unmanned combat aerial vehicles (UCAV) and mounted multiple rocket launcher systems (MRLS) remain more relevant to the artillery mission than to that of any other force component. Last but not least, the artillery mission, regardless of equipment, is dependent on skill and discipline developed by the artillery trade. True to our Royal Canadian Artillery (RCA) motto, artillery has been everywhere. It has been so for two thousand years, and that is not likely to change anytime soon.

Due to its long lineage, it is indiscernible from recorded history whether artillery was born in the field or in a siege. What we can know, with relative certainty, is that the word was first used for ballistae, catapults and other war engines at least a century before it started commonly referring to ordnance.² Thought to predate even Alexander's ancient conquests, ancient siege engines are in any event spiritual predecessors to medieval cannon and modern howitzers: massive engines of war with stopping power unparalleled by the small arms of the day, requiring forethought, discipline and teamwork for effective deployment and use. It is in this tradition, or so I like to think, that today we use "artillery" to refer not only to an artillery piece but also to the time-honoured skills, attitudes and discipline that make up the artillery trade fundamental to the Canadian artillery force component.

This is not a difference without distinction, as detractors like to point out that CAS, coupled with GPS-guided munitions, has superior operational qualities such as effective range and precision when

compared to artillery systems. So argued one Donald Rumsfeld, then US Secretary of Defence, when the US Department of Defence slashed the XM2001 Crusader program (which was to procure a modernized self-propelled howitzer to replace the US's M109A6 Paladin weapons system), by citing the virtues of aerial precision strikes in Afghanistan that "reduced the number of friendly fire incidents, as well as incidents of civilian collateral value".³ Like Rumsfeld, many artillery detractors are likely to point to air-to-surface strike capabilities as the reason for artillery's perceived demise. Tactical bombing and CAS are indeed means of achieving, with aircraft, very similar effects to those of an indirect fire mission: engaging a distant target with a heavy payload meant to eliminate all resistance between weapon and target. On the surface, this is an American debate, but given the US's leadership in collective defense pacts such as NORAD and NATO, it quickly becomes a Canadian concern even though the Canadian public record hardly evidences this.

Of course, aircraft have superior deployability, a characteristic that is *par excellence* the domain of strategic long-range bombers rather than aircraft limited to in-theatre deployment, such as strike fighters or assault helicopters. While the latter carry smaller payloads, loiter time on target (directly proportional to the ability of the aircraft to handle well at low speeds and its fuel efficiency) is far superior for strike fighters – and even more so for turboprop planes and assault helicopters. When it comes to CAS missions, it is no surprise that ground forces prefer support from aircraft with superior loiter time on target, as good loiter capability significantly increases bombardment precision regardless of the availability of electronic targeting assistance.⁴ Needless to say, both traditional and modern land-based systems have infinite loiter time on target and are, if only in this respect, infinitely superior to air-based systems.

An even more evident differentiator between tactical bombing and CAS on one hand and land-based artillery application of fire on the other is the question of weapon cost effectiveness. Given increasing budget pressures on military procurement in modern democratic governments like Canada's,

weapon systems need to be cost effective. Back in 2010, when the F35 appeared to be the strike fighter of choice for the Royal Canadian Air Force (RCAF), the government estimated that the cost of a plane could be as much as \$ 140million.⁵ A typical GBU-31 guided bomb suitable for tactical air-to-surface applications composed of a Joint Direct Attack Munition (JDAM) kit and a dumb bomb costs about \$ 23,100 and packs 945lbs of explosives.^{6,7} By comparison, in 2008, when the RCA acquired 37 M777 light-weight towed howitzers, the approximate cost was \$3 million a piece.⁸ Modern 155mm high explosive munitions cost about \$ 300 a piece, and pack 23.8 pounds of explosives.⁹ A battery of four guns firing for effect ten times can deliver the GBU-31's explosive charge for \$ 128million less in systems costs and \$ 10,000 less in munitions costs. Moreover, the battery has more flexibility in the amount and spread of explosives used in its application of fire, thus being able to restrict collateral damage without the use of guided munitions (although guided munitions are available, but are far less cost-efficient). Assuming that there is seldom any significant difference between types of targets engaged via tactical air-to-surface missile weapons and those engaged via surface-to-surface projectile or missile weapons, the higher cost of tactical bombing and CAS would only be warranted in a limited number tactical situations, such as when speed and deployability are of the essence in an improvised, unplanned action.

In many other cases, it is ground-controlled artillery that has a tactical advantage over airpower. In the battlefield of the future, ground-controlled artillery includes not only towed and self-propelled howitzers but also mortars, man-portable air-defense systems (MPADS), MRLSs and UCAVs. Already, towed artillery is highly mobile, with lightweight M777s capable of deployment via helicopter or C130 airlifts¹⁰ and able to rapidly redeploy at short distances while towed on the ground. For obvious reasons, self-propelled guns and MRLSs benefit from additional in-theatre mobility with minimal logistical hassle, and UCAVs even more so. Some environments allow ground-controlled artillery to benefit from forest cover and other ground stealth, which allows for surprise attacks to be initiated before counter-battery radars have a chance to alert the enemy to the position of hidden guns. Portable systems such as

mortars and MPADS benefit from additional stealth due to their small size. Capable of carrying out specialized anti-air defense missions, some MLRSs are dedicated surface-to-air missile (SAM) batteries while some, like the HIMARS system, are common launchers for surface-to-surface artillery rockets and SAMs.¹¹ UCAVs combine the stealth benefits of ground control and aerial deployment, with ground control stations capable of stealthy in-theatre deployment and an aerial delivery system capable of maximizing the range of weapon mobility, and of alternating between air-to-surface and air-to-air outfitting. Like manned aircraft however, UCAVs are incapable of sustained application of fire.

Whatever the characteristics that make artillery a fitting force component for a given mission, theory is perhaps less important than practice. Although the CAF undertook significant operations in Afghanistan, and in particular in the Kandahar region, there is unfortunately very little on record about the CAF echoing the experiences of US and US-led forces with respect to the role of artillery in the War in Afghanistan. For the US, Operation Anaconda (March 2-18, 2002) was a somber reminder of the importance of general suppressing fire and close fire support provided by artillery that is organic to a task force. US forces and allied Afghan forces, organized as Coalition and Joint Task Force Mountain (TF Mountain), stormed the Shakihot Valley where Taliban and Al Qaeda forces (anti-Afghan forces, or AAF) had gathered.¹² The battle plan called for a “hammer and anvil” attack formation, and split the coalition forces between a hammer task force that would assault enemy positions, led by an Afghan commander, and an anvil force that would prevent retreat, led by US Army commanders.¹³ Battle plans gravely underestimated the resistance encountered. During the initial assault, AIF fired heavy mortars at the hammer force, while TF Mountain as a whole lacked all but the most rudimentary artillery: on the day of the hammer’s strike, it had deployed with only a single heavy mortar.¹⁴ As a result, the hammer force suffered significant losses and failing morale, and it retreated, leaving the anvil force to fend for itself against higher enemy numbers.¹⁵ CAS was used as an emergency measure¹⁶ and, after a couple of kinks in the unplanned, inorganic joint land and air operations were ironed out,¹⁷ the anvil force was finally

successful in completing Operation Anaconda. TF Mountain's deficiencies in artillery deployment ultimately caused it to abandon its battle plan, prolong ground engagement, and sustain significant casualties before CAS pressure started slowly building and turning the tide of the battle.

The battle of Fallujah (November 8-20, 2004) is the antithesis of artillery deficiencies. The after-action review (AAR) published by officers from Task Force 2d Battalion, 2d Infantry (TF 2-2) for the battle of Fallujah offers perspective and praise when it comes to the role played by artillery organic to their force.¹⁸ The mission was a citywide sweep in an urban environment meant to clear the city, house by house of anti-Iraqi forces (AIF) insurgents and re-establish Iraqi government control.¹⁹ The AIF had improvised obstacles and fortifications, rigged vehicles and buildings with explosives and emplaced IEDs and mines along key routes. By TF 2-2's estimates, the two M109A6 Paladins and the heavy mortars assigned to the task force contributed heavily to the mission's success in this urban environment. Artillery was able to serve "in doctrinal roles, such as screening the initial point of penetration, preparatory fires, close fire support and disruptive deep fires, as well as in non-doctrinal roles, such as clearing routes of IEDs and breaching minefields".²⁰ Many of the 925 155mm rounds fired by the Paladins were fired in danger-close missions, often within 200m of friendly forces; AAR authors estimate that this was so successful that it "re-defined" danger-close fire (doctrinally defined at under 600m).²¹ The ease of supplying a variety of munitions to artillery allowed the Paladins to select the smallest available munitions and to keep friendlies safe. The low number of guns made massing fires difficult (although where possible, massed fires were orchestrated with the help of heavy mortars), and CAS was used to supplement bunker busting and other deep support effects that the two Paladins were primarily conducting, but the AAR found issues with CAS reliability and concluded that CAS was "not a substitute for responsive artillery and mortars".²² UAVs were also used for deep support effects, with noted success.²³

Yet, however crucial to fire missions, the equipment itself is not the reason to favour artillery, nor the focus of the AAR's praise. The tactics, techniques and procedures cultivated by the artillery trade, such as fire discipline and forward observation, have been developed over centuries of artillery supporting other ground troops and are purpose-made to facilitate full integration into task forces, which in turn allows for organic coordination with other ground force components under a single command-and-control element. This doctrinal ease of interoperability with other ground force components makes artillery far more suitable for a responsive fire support role in any environment where circumstances are fluid and danger can appear on all sides.²⁴ FOOs supporting intelligence-driven targeting make for ideal use of Army tactics, techniques and procedures, such as surveying the entire battlefield and collecting interoperable intelligence²⁵ usable for various aspects of mission coordination beyond the scope of artillery targeting. The tactics, techniques and procedures of the artillery need to continue to be developed and deployed for the benefit of a versatile ground force component with maximal capabilities.

Clearly, artillery is here to stay, and far from obsolete. Field artillery, in particular, may feel somewhat dated, but even towed artillery is superior to aircraft in terms of ground troop interoperability and its ability to cost-effectively pour effects on targets. If artillery's best tactical strength in comparison to CAS is its responsiveness and adaptability, then National Defence planners would likely do well to invest in a diversification of artillery systems, including more mobile weapon platforms like the HIMARS (which Canada appears to have been pursuing in 2008-2009²⁶) and self-propelled M109 artillery, but also more heavy mortars and more UCAVs which have their own specialized applications.

There is no doubt that the artillery must and will change. It will *evolve*, as it has done for hundreds of years and will for hundreds more. Yet, in contemporary pragmatic terms, most doubts about the future of artillery stem from an issue of limited resources. Globally, a prevailing anti-war

sentiment in modern democratic nations (in and of itself a good thing!) means that military procurement generally enjoys limited resources and limited enthusiasm, while artillery procurement, specifically, has to compete for these limited resources with the politically-favoured flavour of the day, be that strike fighters or tactical armoured patrol vehicles.²⁷ For this reason and this reason alone, Canada's women and men in gunner's dress do not yet have the opportunity to train and gain operational proficiency in the use of self-propelled guns, UCAVs and MRLSs – but that opportunity will come, sooner or later. Meanwhile, we will be standing by with our trusty guns, our time-honoured doctrine, and our can-do attitudes. We will be standing by, *ubique*, always.

¹ “The emergence of airpower made coastal artillery obsolete since aircraft easily flew over traditional coastal defenses, performed the same function as siege artillery, led to the end of those artilleries,

and caused anti-aircraft artillery to assume a greater importance.” Boyd L. Dastrup, “Artillery”, in *Encyclopedia of War* (2011) (accessed at <http://onlinelibrary.wiley.com/>, November 7, 2017).

² Kevin Morton, *Artillery Through the Ages: an etymology* (2014), p.2 (accessed at <http://ejournals.bc.edu>, November 6, 2017)

³ “Congressional Response” in “33. Military and Defense Lobbying: A Case Study”, in Dennis W. Johnson, *Routledge Handbook of Political Management* (2009).

⁴ John Ismay, Adrian Bonenberger, and Damien Spleeters, “The WWII-Era Plane Giving the F-35 a Run for Its Money”, *Motherboard* (September 18, 2016) (accessed at <http://motherboard.vice.com>, November 8, 2017).

⁵ Campbell Clark and Steven Chase, “Canada’s \$9-billion jet fighter deal raises questions”, *Globe and Mail* (July 17, 2010) (accessed at <http://theglobeandmail.com>, November 8, 2017).

⁶ Federation of American Scientists – Military Analysis Network, “Joint Direct Attack Munition (JDAM) GBU-29, GBU-30, GBU-31, GBU-32”, (accessed at <http://fas.org>, November 9, 2017).

⁷ GlobalSecurity.org, “MK84” (accessed at <http://www.globalsecurity.org>, November 9, 2017).

⁸ Defense Security Cooperation Agency, “Canada - M777 155mm Light-Weight Towed Howitzers” (Press Release, transmittal no. 08-68) (accessed at <http://www.dsca.mil>, November 9, 2017).

⁹ GlobalSecurity.org, “M795 Projectile 155mm High Explosive HE” (accessed at <http://www.globalsecurity.org>, November 9, 2017).

¹⁰ CAF, “M777 Howitzer” (May 15, 2017) (accessed at <http://www.army-armee.forces.gc.ca>, November 9, 2017).

¹¹ GlobalSecurity.org, “XM142 High Mobility Artillery Rocket System (HIMARS)”, (accessed at <http://www.globalsecurity.org>, November 9, 2017).

¹² Richard Kugler, “Operation Anaconda in Afghanistan - A Case Study of Adaptation in Battle”, No. 5 in *Case Studies in National Security Transformation* (Center for Technology and National Security Policy, 2007), p.8.

¹³ Kugler, p. 12.

¹⁴ Kugler, p.10.

¹⁵ Kugler, p. 15.

¹⁶ Kugler, p. 17.

¹⁷ Kugler, p. 19.

¹⁸ Capt. James T. Cobb, 1st Lt. Christopher A. LaCour and Sgt. 1st Class William H. Hight, “TF 2-2 IN FSE AAR: Indirect Fires in the Battle of Fallujah”, Field Artillery (March-April 2005).

¹⁹ Cobb et al., p. 23.

²⁰ Cobb et al., p. 23.

²¹ Cobb et al., p. 26.

²² Cobb et al., p. 26.

²³ Cobb et al., p. 27.

²⁴ Cobb et al., p. 24.

²⁵ Cobb et al., p. 25.

²⁶ Defense Industry Daily, Canada Seeks MLRS Rocket Systems (January 7, 2017) (accessed at <http://www.defenseindustrydaily.com>, November 9, 2017).

²⁷ DND and CAF, “Current Projects” (accessed at <http://www.forces.gc.ca>, November 9, 2017).