

S.L.A. Marshall and the Ratio of Fire

History, Interpretation, and the Canadian Experience

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In April of 2011 readers of the *Winnipeg Free Press* may have been surprised to learn that most American soldiers in the Second World War would not fight or kill in battle. A column by Gwynne Dyer, one of Canada's best-known military writers, likely gave many lay-readers their first exposure to what is actually a very old idea, that soldiers would not participate in battle.¹ Although the article is about post-traumatic stress disorder, it refers to the famous observations of American military icon Samuel Lyman Atwood Marshall on the widespread non-participation of infantrymen in battle, which he supposedly observed during the Second World War. Dyer's opinion piece is the latest in a large body of scholarship that treats Marshall's work as authoritative and ensures its prominent place in discussions on the human dimensions of warfare. However, Marshall's work has also been severely criticized. This article joins the debate by introducing new historical evidence and reconceptualising some of the assumptions surrounding human behaviour in warfare.

S.L.A. Marshall needs little introduction to a military audience. Best-remembered for the work he did with the US Army's Historical Section during the Second World

Abstract: The famous "ratio of fire" data proposed by S.L.A. Marshall claims that no more than 15-20 percent of soldiers fired their weapons in combat. This article examines whether or not historians can treat Marshall's ratio of fire data as veracious, and if so what interpretations one can assign to the phenomenon of combat non-participation. The article contends that based upon the Canadian experience it is premature to universalize Marshall's findings beyond his specific historical subjects, and that studies of human behaviour in war need to look beyond the ratio of fire data as a paradigm for understanding the conduct of soldiers in battle.

War, he was a military writer who helped shape the mid-20th century American fighting forces and the writing of their history. Although he authored many major works, Marshall's modern pre-eminence rests upon just one: the "modern classic" *Men Against Fire* (1947) and the extraordinary claims it made about the propensity of infantrymen not to do any actual fighting in battle. Marshall's core thesis was that only 15 to 20 percent of combat infantrymen ever fired their weapons in battle; he was the first to document that most riflemen were spectators. Marshall extrapolated his findings

into a universal law of human behaviour in warfare, claiming that the disinclination of most soldiers to fight was actually ubiquitous throughout history, underreported only because "in earlier wars there had never existed the opportunity for systematic collection of data."²

This data on non-firing and non-fighting soldiers, for which Marshall coined the term "ratio of fire," became extremely popular, and some — including Dyer — have credited him with revolutionizing postwar infantry training through his studies.³ However, since the 1980s more critical scholarship has called attention to Marshall's desultory, some say nonexistent, evidence, his propensity for exaggeration, the testimony of witnesses claiming Marshall never systematically collected data, and his personal character.⁴ Marshall's academic supporters have in turn defended him, attempting to prove the accuracy of *Men Against Fire's* claims, often by citing the numerous and very important individuals who believed what he wrote.⁵ At times the debate has descended to the level of muck-raking and in some quarters has taken on the characteristics of a personal feud.⁶

Unfortunately, this academic quarrel has strayed from the evidence; not just whether there



US Army Photo

S.L.A. Marshall

is evidence to buttress Marshall's extraordinary claims, but what that evidence actually means. *Men Against Fire* succeeded in shaping the assumptions of this debate, and these assumptions have rarely been questioned. For instance: what does it really mean when soldiers are not firing their weapons in battle? Is this non-firing unconscious — cowardice, combat fatigue, a genetic instinct to do no harm to others? Or is it deliberate — malingering, tactical necessity, or (something rarely considered) a part of soldiers' training? Are these meanings stable and static — are they roughly the same across the breadth of human experience — or are they unstable and historically specific? Can one place non-firing soldiers into different categories or does this phenomenon always indicate the

same thing? These are all questions stemming from the presumption that Marshall's ratio of fire argument is a truly accurate portrayal of combat; the issue is complicated further if one accepts the critics' challenge to treat Marshall's evidence as compromised and untrustworthy.

This article is part of a wider effort to explore the validity of Marshall's ratio of fire data, and to further the debate further by grounding it in the historical evidence. It explores the meaning of fire ratios rather than simply arguing about whether Marshall's specific claims are correct or not, and will hopefully add depth to the questions posed above. This discussion will be based heavily upon Canadian military archival records detailing land warfare in the Second World War, the basis of my own

research. Marshall studied American soldiers, but the Canadian and US armies fought in the same theatres of war against the same enemy with similar equipment from 1943 to 1945. The Canadian Army provides a test for the validity of Marshall's claims to the universality of his ratio of fire theory; there are good Canadian sources that speak to this issue.

Why is this important? The ratio of fire numbers remain in popular circulation today, forming the empirical evidence for the "killology" scholarship spearheaded by Lieutenant-Colonel (ret.) Dave Grossman. This sustained influence is in large part because it has been difficult to prove or disprove the ratio of fire with documentary historical evidence. Meanwhile, Marshall's defenders have argued that raising these issues is tantamount to attacking, for the sake of academic snobbery, an old soldier who cannot fight back.⁷ But this impassioned defence misses the point of scholarly inquiry altogether. Marshall's ratio of fire, and the singular interpretation derived from it, has had a considerable effect on the scholarship and has influenced military policy. This alone is good reason to explore and test some of these assumptions. The recent criticisms that have shown Marshall's work as potentially untrustworthy add a further imperative to this task.

If Marshall Was Right: Interpreting Non-Firing

Marshall's interpretation of his own evidence begs definition. Marshall argued the low ratio of fire he observed in combat was due to an inborn "fear of aggression" he believed to be "part of the normal man's emotion make-up." He wrote in *Men Against Fire* that the average, healthy individual, even one who can endure the stresses of combat, "still has such an inner

and usually unrealized resistance toward killing a fellow man that he will not of his own volition take life if it is possible to turn away from that responsibility.”⁸ Marshall postulated from his observations on the Second World War a revolutionary idea that he considered applicable to the entire history of human warfare. Soldiers were not firing because of an innate resistance to killing others.

Marshall’s interpretation can be summarized as follows: that soldiers not using their weapons is a) a bad thing, and b) represents a failure on the part of the military training system and the soldiers’ personal motivation

to overcome an assumed human internal resistance to inflicting harm on others. *Men Against Fire* stated that infantrymen were unable to use their weapons because of a conscious or unconscious unwillingness to act aggressively, to threaten, or to kill others — even enemies attempting to kill them. Only those soldiers on crew-served weapons such as machine guns would reliably fight all the time; individual riflemen would not. The subsequent popularity of this interpretation is quite easy to understand. It flatters humanists because it affirms that most people are inherently good and would

(could?) never hurt another person, even a stranger or an enemy. It simultaneously flatters those who do fight and kill, affirming that they are part of an elite group of warriors who are either culturally or biologically superior in this way to the rest of the humanity, who are the “sheep” waiting to be rescued, protected, and turned into collateral casualties. This argument has been enthusiastically expanded by Grossman in recent years, who claims that through proper training and conditioning techniques the number of shooting soldiers in combat can be raised to virtually 100 percent, but without

Soldiers of the US 2nd Infantry Division advance into Brest, France under German machine gun fire, 9 September 1944.

US Army Photo





US National Archives 111-SC-197367

A US Army anti-tank platoon searches for the position of a German machine gun that had fired on their vehicle, the Netherlands, 4 November 1944.

these techniques only a bare handful of soldiers will act in an aggressive manner or in self-defence.⁹

As an intellectual exercise, let us ignore Marshall's critics for a moment and take as a given that his evidence is accurate: that in the Pacific and European Theaters of Operations no more than 15 to 20 percent of riflemen would ever take an active role in combat. Still, Marshall's interpretation of the data is not self-evident. During his work with the army's G-2 Historical Section, Marshall carried out hundreds of after-action interviews with American rifle companies, using a group-interview process to reconstruct the action. He claimed to have interviewed over 600 different companies, though as Roger Spiller pointed out, going by Marshall's own estimation of the time needed to carry out a group interview that number was impossibly high and would have had him interviewing rifle companies

well into the postwar years, which he did not.¹⁰ He certainly did not have time to carry out follow-up interviews with the same soldiers, and could not have performed multiple interviews with many companies. So what we really have from Marshall is a set of data examining how thousands of soldiers fought, in one action apiece. If he made inquiries about weapon usage to find out who did and did not fire their weapons in a given action, then he would have found out who used their weapons in that one combat action. Even the most generous commentator must admit that there is no way to use that data to forecast whether the same soldiers would fire or not in future actions, or if they had behaved similarly in past instances. All that Marshall's data does, assuming it exists and is accurate, is establish that *in any given action, most soldiers would not use their weapons*. But without follow-up interviews with

the same rifle companies in which individual soldiers' behaviour in subsequent combat was mapped against the behaviour noted during the initial interview, Marshall had no way of knowing if the ratio of fire was accounted for by the same soldiers not firing every time, or if it was a steady group average with different riflemen firing in each instance. Because detailed follow-up interviews were unlikely (Marshall's historical reporting responsibilities took him where the main action was, and he rarely spent more than a few days with a company), Marshall's "resistance to killing" theory is not self-evident from his data.

The inherent inability of human beings to kill posited by Marshall becomes only one of several plausible scenarios that can be read into this data. A partial list might take into consideration the following without exhausting the possibilities: soldiers did not fire because they were afraid;

because they were passively resisting; because they were suffering from combat stress reactions, so-called “battle exhaustion”; because they did not want to provoke enemy retaliation; because of a “live and let live” mentality; because the tactical situation or the terrain did not call for or allow effective small arms fire; because they had been trained to exercise strict fire discipline; because they had been ordered not to fire. Other possibilities exist. One can place these interpretations into two rough categories:

The notion of an inborn resistance to killing is extremely difficult to prove and relies upon indirect and usually ambiguous evidence.¹¹ Conversely, there is credible documentary historical evidence supporting all of the other reasons for not firing charted above. There is no space, unfortunately, to go over each interpretation in detail, though they are all familiar topics in military studies. In Canada excellent work has been published on battle exhaustion, fear reactions, and military malingering and

insubordination.¹² All of them present potential explanations for why soldiers might elect not to fire, or might have no choice in the matter. The development of “live and let live” systems in combat and the meanings behind them is more controversial. The phenomenon is certainly documented, and informal cease-fires on quiet areas of a front had as much to do with not wanting to die for no reason as they did with not wanting to kill, and could be a rational response to the challenge of surviving in combat completely divorced from notions of a resistance to killing.¹³ There have also been excellent studies showing that on the ghostly, dispersed battlefields of the Second World War, it could sometimes be difficult to locate a target to engage at all, and soldiers trained to fire on a living, breathing

Deliberate Non-Firing	Involuntary Non-Firing
Malingering / passive resistance “Live and Let Live” No opportunity to fire Fire discipline	Resistance to killing Fear reactions Battle exhaustion

Canadian soldiers occupy slit trenches shortly after the D-Day landings.



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A rifleman in the Regina Rifles mans a firing position in Cardonville Farm near Bretteville-l'Orgueilleuse, Normandy, 8-10 June 1944.

target might rarely have the opportunity to do so.¹⁴

One subject that is seldom treated in relation to Marshall's work is fire discipline, the deliberate withholding of fire in a combat situation. This is unfortunate, as fire discipline has impressive explanatory power for non-firing during the Second World War. It is worth going into in some detail.

In the Canadian Army between 1939 and 1945 the tactical ideal being taught and trained for was controlled and highly-disciplined infantry small arms fire, not the saturation of the battlefield with fire (though it should be mentioned that the latter often happened anyway in battle).

Doctrine and training manuals from before, during, and after the war stressed that fire should be held until it could be brought to bear with maximum effectiveness, and in places these publications discouraged riflemen from firing.¹⁵ A Canadian Officer Training Corps instructors' manual from 1944 explained that, "To produce one casualty in the last war some statistician has figured out that it cost 75,000 rounds of small arms ammunition. This was in static warfare when the troops were stationary. What will it require in this mobile warfare when speed varies from 15 to 40 miles per hour? Accuracy is doubly important, Volume of Fire is not."¹⁶ A I Canadian

Corps training letter from Lieutenant-General H.D.G. Crerar in March 1943 articulated the point further, quoting officers returned from combat in North Africa:

everyone I've spoken to on the subject agrees that we always open fire too soon which has no effect except to give away one's position... an early waste, and a subsequent shortage at a later critical moment, of precious ammunition, is typical of inadequately trained troops, the first time in action. The results can be disastrous.¹⁷

Training for fire discipline, as it was carried out in the Canadian military,

seems to have been conditioned by the fact that inexperienced soldiers could blaze away too freely with their weapons, firing when panicky and nervous rather than making intelligent and controlled use of their small arms. The *Canadian Army Training Memoranda* issued during the Second World War frequently had disparaging remarks on the tendency of troops to fire too soon and too much, and in a May 1944 article tried to invoke the feelings of battle:

You are trained to shoot straight, you have plenty of ammunition to hand back for the killing of your chaps; but make sure of it – wait – wait and again wait even if you are frantically excited – WAIT!¹⁸

With training and experience there ideally came the tendency to fire *less* and more accurately, rather than *more*. Marshall would have seen this as a problem, but these ideas underwrote the training of Canadian infantrymen for battle.

Canadian accounts from the fighting in the Second World War, in the form of detailed after-action battle experience questionnaires and war diary extracts compiled by Canada's own Army Historical Section, frequently discuss how fire discipline was being achieved and employed or to bemoan its absence. When comment on the volume of small arms fire was made in the infantry questionnaires it was typically to criticize too much undisciplined fire; no mention was ever made of insufficient shooting or infantry non-participation.¹⁹ Historical Section extracts from Canadian regimental war diaries, circulated during the fighting as "lessons learned" briefs, reveal similar attitudes towards fire discipline. Soldiers were urged to maintain the forward momentum of an attack by holding their fire and bypassing pockets of the enemy rather than stopping to exchange fire

with them.²⁰ Other reports observed despairingly that this was not always being carried out, and that recklessly large amounts of small arms fire was standard procedure in some infantry units.²¹ A balance always had to be struck. The enemy seldom revealed his presence, and firing at possible positions could inflict casualties or, more likely and just as useful, compel him to keep his head down and thus be incapable of firing back. Yet this also risked betraying one's own position. As Roger Spiller pointed out in his original critique of Marshall, revealing your location to a battle-hardened enemy could mean death, and the production of too much small arms fire was the surest way to broadcast your precise whereabouts.²²

Platoon and company leaders had different reactions to official policies of fire discipline. Many favoured tightly-controlled infantry fire, while others had no problem with their men scavenging extra automatic weapons from wrecked carriers to supplement the amount of fire they could produce.²³ Widespread trigger-happiness and excessive firing among the other ranks was often cited as a concern in contemporary analyses, but how serious a "problem" this was is uncertain because Canadian infantry fire tactics relied upon the ability of rifle sections to generate small arms fire in volume when needed.²⁴ Generally speaking, for Canadians the problem was too much wasteful firing, not failures to fire. There is a high probability that many instances of non-firing may be attributable to deliberate tactical decisions, rather than being indications of non-participation or of an innate resistance to killing. Other instances of non-firing could well have been the result of a combination of factors, both deliberate and involuntary.

There is some limited evidence independent of Marshall

documenting infantry non-firing in battle and indicating it was considered a problem at some points in the Second World War. Most of these complaints seem almost entirely to originate from US Army reports.²⁵ A handful of postwar (and therefore potentially influenced by Marshall) Canadian accounts discuss infantry non-firing, but overall there is very little mention in Canadian sources of non-firing as a problem which raises questions about whether there was a difference between the Canadian and American experiences. Some of the American sources that mentioned non-firing as a problem also praise fire discipline or, as is more typical of Canadian reports, criticize excessive shooting.²⁶ What can be taken from these apparent contradictions is that the violence of combat gives rise to confusion as few other experiences can. In all likelihood some soldiers did not fire their weapons or actively participate in every battle, but for a wide variety of reasons well beyond the scope of a simplistic cultural or biological "resistance to killing" that determined who would or would not fire. Even if S.L.A. Marshall was entirely correct in his observations, his interpretation of his own data is weak and replete with difficulties.

If Marshall Was Wrong: Assessing the Source

The case for Marshall's work is further compromised when one abandons the assumption that his ratio of fire data represent trustworthy evidence. There is little evidence to support the claims made in *Men Against Fire* about infantry non-firing being a universal phenomenon. Contemporary Canadian evidence of weapons' usage on the battlefield does not correlate with how Marshall claimed soldiers behaved in battle. There are also troubling questions about Marshall's reliability as a



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The available evidence concerning the actions of Canadian infantry in battle does not fit with Marshall's observations regarding US infantry. Here, soldiers of the Fusiliers Mont-Royal attack near Oldenburg, Germany supported by British Churchill tanks, 29 April 1945.

scholarly source. A real possibility exists that the famous ratio of fire numbers were fabricated on the basis of Marshall's preconceptions of combat.

For all his fine historical work – and there was much of it – Marshall was a man who suffered from a scholarly myopia, and saw precisely what he wanted to see. In his memoirs Marshall described how during his very first assignment as a combat historian, at the US amphibious assault on Makin Island in 1943, he witnessed not the “universal” low firing ratio he later championed, but green US Marines with jittery nerves hitting the beach and blazing away with their weapons at anything that moved and many things that did not. It was the opposite of the ratio of fire: frightened soldiers employing too much fire to help calm themselves and assert power over their situation. Most importantly, Marshall wrote

that he decided not to report on this at the time, because at that point he believed it was *low* firing ratios that were the most serious problem of modern infantry warfare.²⁷ Marshall wilfully disregarded important evidence because he had already made up his mind that non-firing was the “real” problem – at his very first deployment as a combat observer! He allowed his preconceptions to govern his findings. According to those who knew him, this was not unusual for Marshall. Colonel E.M. Parker, a fellow analyst during the Korean War, wrote that Marshall conducted his interviews and research in such a way as to support his tendentious ideas.²⁸ One of his aides during the Second World War, John Westover, made similar comments: “Marshall was an intuitive thinker. He did not gather evidence, weigh it ponderously, draw tentative hypotheses, then test them. If he did, it was not in an organized

manner. Usually, from ‘out of the blue’ he stated a principle. Then he marshalled his evidence and statistics to back his concepts. Some of his statistics are subject to grave question as to source.”²⁹ Another former aide was David Hackworth, who wrote in his controversial memoir that, “Veterans of many of the actions [Marshall] ‘documented’ in his books have complained bitterly over the years of his inaccuracy or blatant bias. It was a conscious effort on his part to give the audience the impression he was there...he didn't seem to care that what he wrote was totally inaccurate and easily disproved. He seemed to have relied (and successfully so) on the notion that no one would ever dare to correct him.”³⁰ Serious issues of academic credibility are at stake.

The literature on infantry combat has also discussed the tendency of inexperienced soldiers to shoot wildly. The classic American study of

social psychology in the Second World War, carried out by Samuel Stouffer and his team, surveyed American GIs to identify (among many other things) combat errors frequently made by inexperienced soldiers. "Shooting before they are able to see their targets" was perceived as an error far more prevalent among inexperienced replacements than others such as "freezing" or "not being aggressive enough in combat." Stouffer commented: "Shooting before they are able to see their target, or being 'trigger happy,' is usually interpreted as a sign of improperly controlled anticipatory anxiety or nervousness, which of course was high among replacements." The Stouffer study concluded that "seasoned combat men made all these errors much less frequently."³¹ Other sources have likewise discussed how the tendency of "green" soldiers is to shoot to excess, and that training and experience are required to bring "trigger-happiness" under control.³² Marshall observed this phenomenon firsthand on Makin Island, though he ignored it. It is possible that a reduction in a unit's firing rates could be an indicator of discipline, experience, and good training, the opposite of Marshall's conclusion that more fire was what won battles. This possibility certainly deserves further study.

It is also interesting to note that studies were carried out during the Second World War which investigated infantry weapon usage in detail. The British Weapons Technical Staff Field Force (WTSFF) and its Canadian wing carried out methodical post-combat reviews of infantry weapon use, misuse, and technical difficulties. The WTSFF staffs began their work with the British Eighth Army in North Africa in 1942, and conducted studies of infantry weapons in over 100 rifle companies in North West Europe between June 1944 and May 1945, interviewing commanding

officers, junior officers, and private soldiers.³³ In many ways the WTSFF teams carried out the kind of studies that S.L.A. Marshall took credit for. A report summarizing their findings in May 1945 wrote:

From the Normandy beaches, through the hedge-rows and woods of the "Bocage" country, over the flat Dutch country-side, to the tree and hedge covered German plains, fields of view have been short. Defensive positions have been easily concealed and usually sited with short fields of fire. [Canadian] Units have sought to achieve surprise in defence by holding their fire until the enemy were near.³⁴

The report stresses the short ranges and limited fields of fire that Canadians had to deal with throughout the campaign in Normandy and Northwest Europe, an environment in which survival meant not giving away your position by premature fire. The WTSFF commentary on individual weapons' usage and capabilities were quite thorough: the Sten machine-carbine was heavily criticized as unreliable, whereas the standard-issue Lee-Enfield No.4 Rifle was popular, having "performed well" throughout the campaigns.³⁵ The WTSFF teams investigating British and Dominions' weapons' usage did not appear to have uncovered any indication of widespread non-participation in battle, and they were as well-positioned as Marshall himself to have observed such a phenomenon.³⁶ While the absence of such comments is not positive evidence, it stands to reason that a military staff devoted to researching how infantrymen were or were not employing their small arms in battle would have discovered the "ratio of fire" problem Marshall wrote about had it been present and observable.

Conclusion: The Marshall Paradigm

Even if Marshall was entirely correct, his arguments and interpretations present problems. Conflicting evidence makes it impossible to make a strong case that Marshall's ratio of fire was based on fact, or that it was a universal phenomenon rather than an historical phenomenon. That such errors were ever made is troubling, but moreso is the support that *Men Against Fire* enjoys in military and scholarly establishments. The ratio of fire continues to attract supporters despite two decades of criticism and compelling contrary evidence, and has undergone a recent renaissance and resurgence.

The underlying problem with this body of work is that Marshall's evidence on ratio of fire does not meet the criteria for trustworthy historical evidence. It is frequently reproduced and cited not because of its accuracy but because many important people believe in it. But compelling evidence shows that Marshall was factually incorrect in his assertions that only 15-20 percent of riflemen fired their weapons in the Second World War. Even if he was wholly correct, his interpretation of the meaning of this phenomenon does not stand up well to scrutiny. The best case one can make for Marshall is that he might have discovered low volumes of fire in American rifle companies at certain times, but even this possibility represents the beginning of a scholarly discussion rather than a self-evident endpoint. If a low volume of fire was a significant phenomenon, what may have accounted for differences between the American and Canadian experience? Were the differences attributable to varied training schemes? To personal motivation and the conscript/volunteer divide? To cultural or institutional forces?

To perceptions of “correct” behavior in combat? These questions have not been answered, and to universalize Marshall’s findings beyond the specific subjects he studied is premature. New understandings of fire ratios and human behaviour in warfare will have to look beyond Marshall’s narrow paradigm.

Notes

1. Gwynne Dyer, “Post-Traumatic Theory Stressed: Why American troops suffer PTSD at seven times the rate of Brits inexplicable,” *Winnipeg Free Press*, 30 April 2011.
2. S.L.A. Marshall, *Men Against Fire: The Problem of Battle Command in Future War* (New York: William Morrow, 1968, c1947), p.53.
3. Dyer, “Post-Traumatic Theory Stressed.”
4. See Roger J. Spiller, “S.L.A. Marshall and the Ratio of Fire,” *RUSI Journal* 133 (1988); Frederic Smoler, “The Secret of the Soldiers Who Didn’t Shoot,” *American Heritage* 40, no.2 (March 1989); Terry Copp, *Fields of Fire: The Canadians in Normandy* (Toronto: University of Toronto Press, 2003), pp.5-15; John Whiteclay Chambers II, “S.L.A. Marshall’s Men Against Fire: New Evidence on Fire Ratios,” *Parameters* (Autumn 2003).
5. Dave Grossman, “S.L.A. Marshall Revisited?” *Canadian Military Journal* 9 no.4 (Winter 2009).
6. David H. Hackworth and Julie Sherman, *About Face: The Odyssey of an American Warrior* (New York: Simon and Schuster, 1989), pp.548-86.
7. Grossman, “S.L.A. Marshall Revisited?”
8. Marshall, *Men Against Fire*, p.79.
9. Dave Grossman, *On Killing: The Psychological Cost of Learning to Kill in War and Society* (New York: Back Bay Books, 1996).
10. Spiller, “S.L.A. Marshall,” p.68.
11. Robert Engen, “Killing for their Country: A new look at ‘Killology,’” *Canadian Military Journal* 9, no.2 (Summer 2008).
12. See Terry Copp and Bill McAndrew, *Battle Exhaustion: Soldiers and Psychiatrists in the Canadian Army, 1939-1945* (Montreal & Kingston: McGill-Queen’s University Press, 1990); Anthony Kellett, *Combat Motivation: The Behavior of Soldiers in Battle* (Boston: Kluwer-Nijhoff, 1982); Craig Leslie Mantle, ed., *The Unwilling and the Reluctant: Theoretical Perspectives on Disobedience in the Military* (Kingston: Canadian Defence Academy Press, 2006).
13. For further discussion, see Tony Ashworth, *Trench Warfare, 1914-1918: The Live and Let Live System* (New York: Holmes & Meier, 1980).
14. For an excellent scholarly discussion of infantry behaviour in the US Army that alludes to this, see Michael D. Doubler, *Closing with the Enemy: How GIs fought the war in Europe, 1944-1945* (Lawrence, KS: University of Kansas Press, 1994).
15. The Canadian Army used British doctrine and training manuals during the war. See Great Britain, War Office, *Field Service Regulations 1937* (London: 1937), p.131; Great Britain, War Office, *Infantry Training: Training and War 1937* (London: 1937), pp.3-5. This was still a part of doctrine and training postwar too. See Great Britain, War Office, *Infantry Training, Volume 1: Infantry Platoon Weapons Fieldcraft*, Pamphlet 2 (London: September 1948), pp.30-2.
16. Officer Training Corps manual, “Modern Methods of Coaching,” 1944, Library and Archives Canada [LAC], RG 24, vol.9832, file 2/pubns/1.
17. H.D.G. Crerar to 1 Canadian Corps commanders, 30 March 1943, LAC, RG 24 vol. 10769, 222C1.(D207).
18. “The Fight,” Canadian Army Training Memorandum No.38 (May 1944).
19. Robert Engen, *Canadians Under Fire: Infantry Effectiveness in the Second World War* (Montreal & Kingston: McGill-Queen’s University Press, 2009), pp.133-43. This section of the book is devoted to a discussion of fire discipline in the context of Marshall’s ratio of fire claims.
20. Canadian Operations in North-West Europe, Extract from War Diaries Series 5 (July 1944), LAC, RG 24, vol.12748.
21. Ibid., Series 29 (Aug-Oct 1944), LAC, RG 24, vol.12748.
22. Spiller, “S.L.A. Marshall and the Ratio of Fire.”
23. Engen, *Canadians Under Fire*, p.135.
24. Ibid., pp.139-40.
25. Great Britain, War Office, Current Reports from Overseas No.34 (22 April 1944) and No.61 (1 November 1944), LAC, RG 24, vol.20348.
26. Ibid., Current Reports from Overseas No.77 (21 February 1945) and No.15 (11 September 1943).
27. S.L.A. Marshall, *Bringing Up The Rear: A Memoir*, Cate Marshall, ed., (San Rafael: Presidio Press, 1979), p.70.
28. F.D.G. Williams, *SLAM: The Influence of S.L.A. Marshall on the United States Army* (Fort Monroe, VA: United States Training and Doctrine Command, 1994), p.28.
29. Letter to F.D.G. Williams, quoted in: Williams, *SLAM*, p.30.
30. Hackworth, *About Face*, pp.548-86.
31. Samuel Stouffer, et al., *The American Soldier Volume 2: Combat and its Aftermath* (Princeton: Princeton University Press, 1949), pp.282-4.
32. Ben Shalit, *The Psychology of Conflict and Combat* (New York: Praeger, 1988), p.141; Theodore Nadelson, *Trained to Kill: Soldiers at War* (Baltimore: Johns Hopkins University Press, 2005), p.46.
33. Weapons Technical Staff Field Forces, report on infantry questionnaire circulated to formations and units of 1st and 8th Armies on conclusion of North Africa Campaign, May 1943, United Kingdom National Archives, WO 169/24845; War Diary, No.1 Canadian Weapons Technical Staff Field Force, LAC, RG 24, vol.17498.
34. Report on Small Arms Weapons, 20 WTSFF, May 1945, LAC, RG 24, vol.10581, 215C1.(D169).
35. Ibid. The WTSFF findings are congruent with findings from the War Office questionnaires on infantry battle experience that also studied weapons’ usage. See Engen, *Canadians Under Fire*, pp.166-9.
36. Report on Small Arms Weapons, 20 WTSFF, May 1945.

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