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# One million rounds fired in 12 Hours? An analysis of the account of six guns of the 100th Brigade Machine Gun Company at High Wood in August 1916.

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# One million rounds fired in 12 Hours? An analysis of the account of six guns of the 100th Brigade Machine Gun Company at High Wood in August 1916.

**ABSTRACT**

The Great War saw machine gunnery develop from a direct fire weapon through to mass indirect fire barrages. There is an account from High Wood in August 1916 that represents the pinnacle of these developments – firing one million rounds from ten guns in 12 hours. This research examines that account to determine what happened and the technical and logistical requirements of such a feat. By examining the war diaries and characteristics of the Vickers machine gun, it has been possible to identify what actually took place, what would have been necessary for one million rounds to be fired and the potential of Great War machine gunnery.

During the Great War, machine gunnery was developed from a direct fire capability held within the infantry battalions of the British Expeditionary Force. A pair of guns attached to the battalion headquarters, with the most senior 'specialist' being a subaltern, evolved to full machine gun battalions within a dedicated Corps and with Machine Gun Officers (MGOs) embedded within every layer of the staff from division to general headquarters.

By the time of the account of 100th Brigade Machine Gun Company at High Wood in August 1916, machine guns had been removed from infantry battalions and formed into brigade machine gun companies supporting the infantry battalions of the brigades. This enabled 16 machine guns to be within the same administrative unit and improved their ability to work together on tasks that required more than four guns, and for the skills and technical abilities to be specialised. Each division had three brigades and a brigade machine gun company could have been tasked to support another brigade or division. The word 'brigade' is often omitted ahead of machine gun company but is useful to distinguish from the divisional reserve machine gun companies that were introduced as a fourth company later in 1916 and early 1917.

The machine guns in use at the start of the Great War were the Maxim and the Vickers. The Maxim was being phased out of use with the British Army and gradually replaced by the Vickers, which had been adopted in 1912. Both fired .303-inch ammunition, the same as the Short Magazine Lee Enfield rifle and the Lewis Automatic Rifle (light machine gun) that was introduced from 1915. The machine gun was a water-cooled, tripod-mounted, belt-fed machine gun that had a team of up to eight men – referred to as a sub-section – to serve it and ensure it remained serviceable and supplied. Both the Vickers and the Maxim had the same characteristics but used different mechanics and materials.[1]

This article is an attempt to objectively review one of the key *legends* in the history of the Machine Gun Corps (MGC). It is a story that has been used over the years as an example of the capabilities of machine guns to provide sustained fire over long periods and with great effect. This story has emerged as having a legendary and even folklore status within the machine gun community; however, it is important to explore and scrutinise the facts around the story objectively and to test how much of it is really true, by examining the first-hand accounts of the Officer Commanding (OC) the

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100th Machine Gun Company and secondary contemporary evidence from the war diaries of the various units involved in the action, to ascertain the truth behind the legend of whether the ten guns of the 100th Machine Gun Company fired off 1,000,000 rounds in a twelve hour period. Where is the story told? Is relevant information to be found in the war diary? Were the 10 Vickers machine guns capable of firing 1 million rounds in 12 hours? Once all of the relevant evidence is disclosed and critiqued then, finally, it is possible to come to a conclusion as to the likelihood of this feat having happened.

**Where is the story told?**

The OC of the 100th Machine Gun Company at the time of the attack in August 1916 was Captain Graham Seton Hutchison (often incorrectly written as Hutchinson). In 1914, Scottish-born Hutchison was initially with the 2nd Battalion Argyll & Sutherland Highlanders, before transferring to the MGC. Hutchison would later to rise to the rank of Lieutenant Colonel, becoming the Commanding Officer of the 33rd Battalion MGC and Divisional MGO to the 33rd Division.[2] His account, written in 1919 and credited to 'Members of the Battalion' but promoted and illustrated by him, is the first known record of the story, which took place during an attack on High Wood during the Battle of the Somme in August 1916:

> For this attack, six guns were grouped in the Savoy Trench, from which a magnificent view was obtained of the German line at a range of about 2,000 yards. These guns were disposed for barrage. On August 23rd and the night of the 23rd/24th the whole Company was, in addition to the two Companies of Infantry lent for the purpose, employed in carrying water and ammunition to this point. Many factors in barrage work which are now common knowledge had not then been learned or considered. It is amusing today to note that in the orders for the 100th Machine Gun Company's barrage of ten guns, Captain Hutchison ordered that rapid fire should be maintained continuously for twelve hours, to cover the attack and consolidation. It is to the credit of the gunners and the Vickers gun itself that this was done! During the attack on the 24th, 250 rounds short of one million were fired by ten guns; at least four petrol tins of water besides all the water bottles of the Company and urine tins from the neighbourhood were emptied into the guns for cooling purposes; and a continuous party was employed carrying ammunition. Private Robertshaw and Artificer [armourer] H. Bartlett between them maintained a belt-filling machine in action without stopping for a single moment, for twelve hours. At the end of this time many of the NCOs and gunners were found asleep from exhaustion at their posts. A prize of five francs to the members of each gun team was offered and was secured by the gun team of Sgt. P. Dean, DCM, with a record of just over 120,000 rounds.
>
> The attack on the 24th of August was a brilliant success, the operation being difficult and all objectives being taken within a short time.
>
> Corporal Smith, M.M., Corporal Hendrie, Lance-Corporal Sorbie and Gunners McIntyre and Owden, both the latter acting as runners, were all awarded the Military Medal.
>
> Prisoners examined at Divisional and Corps Headquarters reported that the effect of the Machine Gun barrage was annihilating, and the counterattacks

which had attempted to retake the ground lost were broken up whilst being concentrated east of the Flers Ridge and of High Wood.[3]

This is the first occasion the story is told and all of the key points that follow through further use are in it: one million rounds fired, 12 hours, belt-loading in constant use, Sergeant Dean firing 120,000 rounds on a single gun. One fact of concern is the number of guns involved as both six and ten are used. For the purposes of this analysis, six guns shall be the focus and, as discussed later, this number has evidence to support it. The date of the action also varies from the information in the war diaries discussed later.

The account of this event is next found in 'Machine Guns', also written by Hutchison[4]; however, the purpose of this book is a tactical assessment of the use of the machine gun, influencing doctrine and development of machine gunnery and an arm of the Army rather than within the infantry battalions, which is where it had been returned to with the disbandment of the MGC in 1922. This contains the majority of the same key factual information as the 1919 account but has had many of the individual names removed to make it more appropriate in a technical, rather than regimental, history.

Despite High Wood in the summer of 1916 being dedicated a chapter in Hutchison's autobiography[5] he does not recount this story then so no new information is provided from there. Furthermore, it is not included within any of the battle action reports that were returned to the Machine Gun School and Machine Gun Training Centre for inclusion in their instructors' manual[6].

With an absence of other published literature with first-hand accounts, this story became readily citable within subsequent publications. The first of which to make mention of it was in 1942 by Professor A M Low 'one battery of ten machine-guns, when in a favourable position, fired 1,000,000 rounds in the course of a single day. The gunners themselves had only one casualty'[7]. Repeated again in 1953[8], with some interpretation of the consumption of ammunition, it identifies that 8,300 rounds per gun per hour would need to be fired and that at least 100 barrels would need to be used across the ten guns. These were both publications intended to inform the military on the use of the machine gun for sustained fire. Additional weight is given to the 1953 account as it cites the source as the Official History of the Great War; however, it does not appear in the appropriate volume, if at all.

Reinforcing the story comes again in 1971 by Hobart[9] who cites the 1938 'Machine Guns' as the 'Official History of the Machine Gun Corps' and quotes the account directly. Hobart had been the lecturer on infantry weapons at the Royal Military College of Science, Shrivenham; therefore, his reputation added credibility to the account.

With an increase in the popularity of studying the Great War, the Machine Gun Corps Old Comrades Association published '*Machine Gunner 1914-1918*' compiling personal accounts of machine gun actions, including the High Wood one-million rounds account, identifying it as 'The First Machine-gun Barrage'[sic][10]. No new information was added to the 1919 information but it does identify the names of the soldiers involved rather than just the machine gun related facts used in the 1938 variant.

The 1919 account is quoted directly by Goldsmith in 1994[11], by Ford in 1996[12], summarised by Smith in 2002[13], Cornish in 2009[14] (albeit with a slightly different number of rounds – 900,750 so likely an error in transcription), and then, most recently, by Hutchins in 2015[15]. It is also used in non-weapons publications, including Norman in 1984[16], Griffith in 1994[17], Holmes in 2004[18], and Adkin in 2013[19]. All of these authors had credibility in using the story and have identified it as a 'famous' account; however, it would appear from all of them that they cite Hutchison's own accounts from either 1919 or 1938 and do not establish the facts from any other source.

**Is relevant information to be found in the Company's war diary?**

Despite having entries missing and sometimes completed several days after the events they record, war diaries were a contemporaneous account of the actions of a particular unit. Their object was:

> '(a) To furnish an accurate record of the operations from which the history of the war can subsequently be prepared.
>
> (b) To collect information for future reference with a view to effecting improvements in the organization, education, training, equipment and administration of the army for war.'[20]

They were completed by an officer of the unit and to be signed off and authorised for return by the Officer Commanding the unit concerned. They had to be provided in duplicate and returned at the end of each month, via the Adjutant General's branch of the General Staff, to ensure that they were distributed accordingly. They were considered secret and were classified as unsuitable for immediate release.

The war diaries can be used to identify whether there is support to Hutchison's accounts of 1919 and 1938. The relevant war diaries at divisional, brigade and battalion levels for the MGC units and the infantry battalions it was supporting in the attack of 24th-25th August 1916. It should be noted that in the original account from 1919, the dates are given as the 23rd/24th; however, these appear to be incorrect.

At a divisional level – 33rd Division - there is nothing specific mentioned in the War Diary from 24th/25th August 1916 about a machine gun barrage, but there are several pages devoted to the attack that identify the other units involved across 100th Infantry Brigade.[21] After the attack had finished, a summary report was detailed in Division Order No. 66, dated 23rd August 1916. The Divisional Report outlines the sequence of events and mentions the role of 100th Machine Gun Company:

> '5. During and prior to the assault, six machine guns of the 100th M.G. Company were employed in sweeping our front with long range fire … They also kept up a steady fire on the same objectives for several hours, after our objectives had been gained to cover our consolidation.
>
> 6. The 19th Brigade also brought machine gun fire to bear on the enemy's front, and a most effective smoke barrage was placed on the East corner of HIGH WOOD, which completely obscured that portion of the enemy's line during the advance of our troops.'[22]

The Divisional Report states six rather than ten machine guns were involved in the barrage; however, the numbers of guns employed are identified in more detail in the Brigade diary.

The 100th Machine Gun Company was part of the 100th Infantry Brigade. The battalions of the brigade were the 2nd Battalion Worcestershire Regiment, 16th Battalion King's Royal Rifle Corps, 1st Battalion Queens Regiment, 9th Battalion Highland Light Infantry, and in reserve for this operation was the 1st Battalion Middlesex Regiment.

The Brigade's diary identifies the disposition of the 16 guns of the 100th Machine Gun Company as:

(a) 2 guns will follow closely upon the Right flank of 2nd Worcesters and will be established as soon as possible on FLERS Road to cover that flank.
(b) 1 gun will be pushed forward to junction of TEA LANE and TEA TRENCH.
(c) 1 gun will be pushed forward and established at NORTH STREET on Left flank of 16th K.R.R.
(d) 1 gun on Left flank of 1st Queens objective.
(e) 4 guns will continue to occupy existing positions in our present front line.
(f) 6 guns will be established in SAVOY TRENCH and will cover the advance and subsequent consolidation by direct and indirect fire.
(g) 1 gun will be held in Reserve in CARLTON TERRACE.[23]

In this account, 15 different guns are mentioned, plus 1 in Reserve. Point (f) confirms 6 (rather than 10) guns giving direct & indirect [barrage] fire from SAVOY TRENCH and supports that number originally used in the 1919 account[24] rather than that of the 1938 iteration[25].

The most detail is, as expected, held in the war diary of the 100th Machine Gun Company itself[26]. As OC of the Company, this was signed by Captain Hutchison.

In the diary, Operational Order Nos. 15 and 16 were issued, referring to the attack:

> 'OC [Officer Commanding] took up position at 2am, & placed all guns for assault in position by 7.0am. Organisation of indirect fire Battery for Barrage …. 7 guns in specially constructed & concealed positions in SAVOY TRENCH under personal supervision of OC Coy, commanded by Lt Ellerington & Sgt Barnes.'[27]

It also provides a detailed listing of the immediate and reserve supplies to support the sustained fire that was planned:

1. 'With each gun:
    a. 24 belt boxes filled with ammunition
    b. 2 gallon petrol tins for water.
2. Between each pair of guns:
    a. 1 belt filling machine
    b. 4 boxes SAA
    c. 1 spare parts box
3. At HQ in Centre:
    a. Artificer and tools, spare barrels & spare parts additional
    b. 4 runners per forward line
    c. 4 runners to Dump of SAA etc

d. Working party – 6 men & NCO

4. At Green dump at end of communication trench in touch with limbers and
    a. 20 Reserve water tins filled
    b. 130 boxes SAA 1st Reserve
    c. 4 Cycle Orderlies & NCO in charge.'

At the end of the section on preparation for the attack, Hutchison reports:

> 'Very much thought was expended on this organisation which is important. In order to complete it, work was carried on in night 23rd – 24th carrying and even with large amounts in hand it was not found to be sufficient as will be shown, but all initial difficulties were overcome.'[28]

A hand-written note by Captain Hutchison lists the locations of the guns as of 2pm on the day of the attack. It states that there were 6 guns in SAVOY TRENCH, rather than 10 as mentioned earlier. There were another 9 guns, plus 1 in reserve. The note follows up later with comment that all of the guns were employed in the attack. The barrage is carried out by 6 of the guns but the calculation of the one million rounds could have been across ten of the guns to include those in their existing positions; however, there is no evidence to support this assumption, and it has limited relevance as the greater number of ten guns is considered more likely than six guns to have fired one million rounds.

Additional working parties to carry supplies forward to the guns were also employed and 20 men were available across three groups and the infantry soldiers in the area were also identified to carry belt boxes, small arms ammunition and water.

Moving on to the attack itself, this is preceded by an artillery bombardment commencing at 3pm, with the attack starting at 5.45pm [ZERO HOUR]: 'Intensive fire opened from indirect & direct positions in SAVOY TRENCH'. [29]

A ceasefire commenced at 625pm, after reports 'that "some shots going short". All guns checked and found correct. At this time fire was only given in support of …Division'.

> '640pm Ceasefire. Delay. All up.
>
> 645pm Intense barrage in support of our own troops. Enemy observed the fleeing. One gun kept in hand for special purposes directed at them.
>
> 740pm Water began to grow scarce. No mechanical difficulties. All guns going well. Belt filling machines working well.
>
> 8.0pm Guns stopped and checked alternately. Overhauled, cleaned, new barrels, relaid.
>
> 810pm Urgent messages send for SAA running short. 67,000 rounds fired up to date.
>
> Parties of HLI collected to carry water and SAA. Waterbottles had been sacrificed for 3 guns.
>
> No cessation of fire. Barrage in some cases slightly raised.'

Although a little blurred, the entry for 810pm is clear enough to read '*67000 rounds fired up to date*.'

The next paragraph is probably the crucial part in the whole story:

> '25th August 6.10am Ceasefire. Gunners exhausted. Guns overhauled, relief & sentries posted. Parties from Reserve including transport men bringing 30 boxes SAA and 20 filled water tins.
>
> Total number of rounds fired 99,500.'

This primary contemporary source therefore contradicts all of the accounts of the action cited in the literature by Hutchison and those that followed him. The total number of rounds fired given is 99,500 and would be much more appropriate to the contemporary use of the machine guns in this manner and that given for barrages by the battle actions being learned from[30]. Despite this being a clear error between the accounts and, therefore, bringing into question all of the information carried forward, the detail of the soldiers involved and the recommendations for awards that took place is correct and they were gazetted from the awards on :

> 'Following recommendations made:
>
> 12344 Cpl Smith DCM
>
> 22940 Cpl Hendrie DCM
>
> 2667 L Cpl Sorrie (9th HLI) – MM
>
> 30184 Gnr McIntyre; 42074 Gnr Owden; 27478 Gnr Lamb – all runners – MM'[31]

The war diary of the 100th Infantry Brigade[32] mentions the support given by the 98th Brigade carrying parties and the 9th Battalion, Highland Light Infantry[33] mention that they divided their No. 1 Company into three parties of 50 men each to support the rest of the brigade but it does not specifically mention support to the machine gun company.

There's a further point that has not yet been analysed – the effect of the barrage. It is described as 'annihilating'[34] and that 33rd Division and 100th Brigade Headquarters received this information from interviewed prisoners; however, there is little information to support this statement. There is an appendix to the war diary[35] summarising a prisoner's interview containing information that was specifically passed to 100th Machine Gun Company as it concerned their barrage and was delivered to show the effectiveness of their action.

> 'Prisoner was taken on 25th, E of HIGH WOOD.
>
> "Prisoner states they marched until they came under M Gun fire when they were told to dig themselves in" (Marched at 6.pm) [Our barrage commenced 5.45pm].
>
> "After having dug down for a couple of feet the fire became more intense and the prisoner's Coy moved rapidly off to the left."

Whilst the barrage appears to have had an impact on the activities of the enemy, this interview does not support 'annihilating'.

As the machine gun company war diary identifies only 99,500 rounds fired and makes no mention of the claims of 120,000 from a single gun, or any other figure that could

be considered to have been misinterpreted, this paper could conclude at this point, through a literature review alone, that the account used by Hutchison in 1919 and then 1938 is not supported by the evidence of the contemporary war diaries; however, the war diary could be where the error lies and not with Hutchison, therefore it is useful to undertake a quantitative analysis of the capability of the Vickers machine gun and the supply chain that would have been required to satisfy firing one million rounds in 12 hours.

**Were the 10 Vickers machine guns capable of firing 1 million rounds in 12 hours?**

As identified in the introduction, the Vickers machine gun was a water-cooled and belt-fed machine gun. This means that the main items to maintain supply of for sustained fire would have been ammunition and water. In addition to those, there was a requirement to change barrels to maintain accuracy and repairing any immediate breakages, for which there was a spares parts wallet, case and box available within the machine gun section. This section analyses the technical factors relating to the gun, as it was used in August 1916, and the facts known about the task and 100th Machine Gun Company through the war diary[36].

The first factor to consider is ammunition consumption as it is the most obvious but it also has an impact on subsequent calculations for water consumption and wear on barrels and other parts. The heat produced by the firing process can be controlled by the rate of fire and, therefore, influenced by the firer. The Vickers has a normal rate of fire of 500 rounds per minute[37]; however, practical rates of fire could depend upon the type of task the machine guns were being used for. Although it cannot be proven to have been fully understand in August 1916, it was known by January 1917 with the terms ‘ranging fire’, ‘rapid fire’ and ‘traversing fire’ being used[38]. Ranging fire had bursts limited to between 10 and 20 rounds, rapid fire used long groups of 30 to 50 rounds and traversing fire was only used in short groups of 5 to 10 rounds. Later in 1917, when barrage fire had developed further, ‘rapid’ (maximum rate of fire), ‘medium’ (one belt per gun per two minutes) and ‘slow’ (one belt per gun per four minutes) were being used to control fire more appropriately[39].

Without taking any other factors into account, at the maximum rate of 500 rounds per minute, it would take ten guns just three hours and 20 minutes to fire one million rounds; therefore, theoretically feasible. This feasibility depends upon all ammunition being available in belts ready to use. Each belt held 250 rounds of ammunition and, for one million rounds, this would have equated to 4,000 belt boxes available. An ammunition belt had to be refilled by hand or with a manually-operated belt filling machine[40], with loose small arms ammunition (SAA) supplied in boxes of 1,000 rounds. In preparation for barrage fire, it was estimated that a man could, by hand, fill four belts in the first hour of filling (15 minutes per belt) and three belts in every hour afterwards (20 minutes per belt)[41]. Therefore, to prepare for one million rounds, it would have been necessary for up to 1,333 man hours to be dedicated to belt filling ahead of the barrage. This could be reduced using the belt-filling machines and having two people operating each machine to its best effect. It’s estimated that this would reduce the time to 5 minutes per belt; therefore 333 man hours. Given the tempo of operations described by the war diary of the 100th Machine Gun Company, it’s probable that all belts would have been used in tasks during the preceding weeks[42].

Each sub-section (of two guns) was supplied using a limbered wagon containing 7,000 rounds of ammunition in belt boxes (28 in total) and a further 2,000 rounds in SAA boxes. Each wagon also carried one of the belt-filling machines. Each section (of two sub-sections) had a third limbered wagon with an additional 14,000 rounds of ammunition in SAA boxes; therefore, a total of 32,000 rounds per section as ammunition readily available to it. There were four sections within a machine gun company. Furthermore, the divisional ammunition column carried 72,000 rounds per machine gun company, giving a total of 200,000 rounds per company available within the division[43].

The ammunition available is described by the 100th Machine Gun Company war diary[44] - it is not precise as to whether this appears to all guns or just those in the barrage positions in SAVOY TRENCH but given the preceding information and mobility required for the other guns, it is believed to be those six in SAVOY TRENCH only. It includes 24 belt boxes per gun giving a total of 144 boxes and 36,000 rounds prepared in belts. In addition to this, four boxes of SAA and a belt-filling machine between each pair of guns, thus 12,000 rounds and three belt-filling machines and a further 130 boxes of SAA (130,000 rounds) held in first reserve at 'Green Dump'. A total of 166,000 rounds available at the start of the task.

In contrast, if one million rounds were fired then there would have been an additional 964 SAA boxes needed and filling the 964,000 rounds during the operation would have required 1285 man hours. If all spare men of the six guns were employed as belt-fillers (four men per gun) as well as the six men and non-commissioned officer of the working party as well as the artificer (a total of 32 men), this would equate to approximately 40 hours. There would have been eight belt-filling machines available across the company to help with this, and three were allocated to the six guns, so five could have been used at the headquarters in the centre to reduce the time to 25 hours (based on an estimate that the use of eight belt-filling machines would require two men each to achieve five minutes per belt this would leave only 16 men to fill by hand and they would process 1,600 belts while the machine operators could process 2,400 in the same time) but this is not supported by the evidence. Furthermore, using the men in this manner would have reduced their ability to carry the belt boxes forward to the guns once filled. A man could reasonably cover a short distance carrying four belt boxes each. There were eight runners (four forward and four back) allocated to the headquarters in the centre[45] and they would have needed to take an average of 120 trips each (ten per hour over the course of the task) to move this ammunition to the guns from wherever it was filled – this does not allow for moving any of the SAA boxes from the reserve dump to the HQ or other belt-filling machines. In the later 1917 guidance on barrage fire[46] it's noted that 'it is the belt [filling] problem that imposes the "slow rate of fire" for all long period barrages.'

As identified, the divisional allocation of the ammunition was 200,000 per company. In August 1916 there were three machine gun companies per division so up to 600,000 rounds could have been consolidated in preparation for the task; however, the war diaries of the 19th Machine Gun Company[47] and 98th Machine Gun Company[48] identify their own tasks as part of the divisional operations in this period. Furthermore, it's likely that the divisional ammunition column would have noted their ammunition supply being exhausted and their war diary[49] has 'nothing to note' for the period 20th to 26th August.

In a strategic content, the use of one million rounds of SAA in such a short period would have had a recognisable impact on the General Staff. *The Statistics of the Military Effort of the British Empire during the Great War*[50] identifies that, over the course of the Great War, 8.64 billion rounds of SAA were manufactured, and 1916 saw a total output of 2.96 billion. This gives a weekly average of 56.8 million SAA for 1916, equivalent to 8.1 million per day throughout the whole British Army, across its entire theatre of operations and training units back home. Within that there would also have been periods of higher and lower demand, particularly from July 1916 with the start of the Battle of the Somme. In detail, it shows that for the week commencing 22nd August 1916, there were 243,896,379 (243.9m) rounds on the lines of communication in France[51], meaning that this was in ammunition available for replenishment and in addition to that already held in the units. This figure of 244 million is equivalent to 34.8 million per day. The one million rounds allocated to the ten machine guns is approximately 2.9% of the total reserves of SAA in France that day. This figure would have included all .445-inch revolver ammunition as well as .303-inch ammunition; however, the significant majority would have been .303-inch ammunition and the ten guns would have used a disproportionate amount by firing one million rounds.

The sustained fire capability of the Vickers machine gun was by virtue of its water cooling. The water jacket, in which the barrel sits, contained 7½ pints[52], which begins to boil after firing around 600 rounds, with 1½ pints evaporating for approximately every 1,000 rounds fired after that. With the barrel casing filled, it was possible to fire the gun 'at short intervals' for up to 2,000 rounds but no longer[53]. With these calculations, one million rounds would use 1,491 pints of water, or 186 3/8 gallons.

The water available to the six guns (assumed as described in ammunition consumption) of 100th Machine Gun Company is described in their war diary[54]. There was a two-gallon petrol tin with each gun (a total of 12 gallons) and 20 filled water tins in the 'Green Dump' reserve, giving a total of 32 gallons, sufficient to fire 170,666 rounds; however, the 1919 account[55] identifies only four petrol tins (8 gallons) were used, but also all of the water-bottles of the company. Each soldier carried a two-pint water-bottle as part of his personal equipment. There were 150 all ranks within a machine gun company[56] which would have provided 300 pints, thus 45½ gallons including petrol tins and sufficient for 242,667 rounds to be fired. Furthermore, the account includes the use of the urine tins from the area. It's not possible to calculate their use as the detail is insufficient but it's unlikely to be in a significant quantity if the water bottles of the company were being used for the guns rather than drinking.

An important caveat though is the rate of fire: in an endurance test conducted in May 1917, it was found that a gun firing an average of 471 rounds per minute used six gallons and eight pints for 55 belts of ammunition, roughly equating to one pint per belt, thus dramatically increasing the rate of water usage when firing at this rate[57]. A further caveat is that it was possible to condense the steam given off when firing and re-use the collected water. This practice was not in full use by August 1916 and water bags were being used to ensure the steam did not give away the position of the machine gun rather than collect condensate; however, petrol tins were later used, and became standard practice, to minimise steam loss and collect condensate. Given the comments in the war diary[58] that water 'began to run scarce' and 'waterbottles had to be sacrificed for three guns' then it is unlikely they were condensing to re-use water.

Barrel wear was an issue when firing for long periods; however, in August 1916, it was not yet known, or at least documented, how long a barrel would last. Barrels were gauged by inserting a plug to measure the wear and then determine how worn the barrel was and whether it was safe to continue. The war diary[59] identifies that barrels were changed at 8pm and, by 8.10pm, 67,000 rounds had been fired; therefore, it can be assumed that the barrels were used to fire approximately 65,000 rounds up to this point. Across the six guns, this would be an average of 10,833 rounds per gun, corresponding to the later understanding that a barrel would last between 12,000 and 15,000 rounds for barrage fire[60]. The replacement barrels would have been sufficient to fire the further 32,500 rounds by 6.10am on the 25th August. Were one million rounds being fired in this task, as many as 83 may have been required and this would have required special stockpiling as the guns only carried one spare per gun.

Oil was also a requirement. The endurance trial in 1917[61] used ½ pint for 55 belts. This can be extrapolated to either 99,500 rounds (3 5/8 pints total) or 1,000,000 rounds (36 3/8 pints); the former would have been manageable using the ½ pint oil cans carried in the spare parts cases with each machine gun plus the additional oil can cases, holding a further two-pints for each pair of guns. Oil was needed for the working parts and the barrel itself and was later known to increase barrel life by as much as 3,000 to 5,000 rounds[62].

The other spare parts used with the Vickers machine gun were all carried in the same manner as oil – an initial supply with the gun and further supplies held in the section and then, in the case of the planned barrage by 100th Machine Gun Company, there was an artificer with additional supplies; however, it was likely his role was to repair items not otherwise catered for, such as pierced water jacket casings.

**Could the ten guns of the 100th Machine Gun Company fire one million rounds in a twelve hour period?**

The key points for this argument can be established from the formal record of events – the war diaries and, in particular that of 100th Machine Gun Company itself[63]. This clearly states that 99,500 rounds were fired between the period of 5.45pm on the 24th August and 6.10am on the 25th August, 1916. It sets out, in detail, the preparations made and the dispositions of the guns. There were six guns allocated to SAVOY TRENCH and not the ten later identified in 1938[64].

Despite this clear evidence in the contemporary literature that one million rounds were not fired, it is possible that the number was wrong in the diary rather than in the account from 1919[65], which provides lots of detail, much of which is confirmed throughout the literature. Therefore, it is necessary to consider the quantitative information to determine whether the account could be true and whether Vickers machine guns were capable of firing that amount of ammunition in that 12-hour period. It would appear, from the use of the official training manuals and handbooks for reference information that it is feasible to have six guns fire for an extended period, at the ‘rapid’ rate; however, this would have required substantial preparations far in excess of those described by the contemporary accounts or in the subsequent recollection of the task by Hutchison. Assuming that ten soldiers were available to fill belts during the 12-hour period, 3,959 belt boxes would have been needed to have been prepared prior to it. Even if as many as 32 soldiers were available for belt-filling, there would have still needed 3,159 belt boxes to have been ready prior to the action. No more than four belt boxes could be carried by a single soldier in a single

trip so it would have required many dozens of attached infantry to act as bearers to move the ammunition forward from where it would have had to have been stored, which possibly would have been so large (based on nearly 4,000 belt boxes) as to be out of enemy artillery range. Then there is the fact that it would have accounted for a 3% draw down of the SAA reserves in France for a single action. Although the Somme was the major effort, it is likely that this would have required authorisation from the General Staff and this would have been recorded.

Substantial actions such as this were routinely referred to by the training staff at the Machine Gun Schools in England and France. The MGC was a young branch of the Army and sought out information that it could develop from. Barrage fire tasks from this period (although not referred to as barrage fire) are recorded in the Instructors' Binder[66], including those from High Wood and Delville Wood in July 1916 – the former of which was conducted by 100th Machine Gun Company. Therefore, it can be reasonably assumed that if such a remarkable achievement as one million rounds had been fired, it would have been recorded and the appropriate logistical and supply chain lessons learnt from it. It should be noted that the *Instructional Binder* has been checked to ensure that the action has not been lost or removed due to the 'folio' nature of the binder. It has not: there are actions recorded in September 1916 and there are no gaps in the numerical sequence.

It is very difficult to conclude anything other than the fact that Hutchison elaborated the scale of the machine gun barrage by a factor of 10 but he may have realised that, with the later developments of barrage fire and large-scale attacks, it was technically feasible. The fact that this story has entered machine gun folklore makes it harder to challenge in many ways, because some observers will always prefer to believe the legend than accept the facts behind the story. But by examining the documentary evidence in an objective manner it has proven definitively that the story, whilst partly true, is unfortunately a dramatic overstatement of what really happened in August 1916.

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# One million rounds fired in 12 hours? An analysis of the account of six guns of the 100th Brigade Machine Gun Company at High Wood in August 1916

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