Waging war and scientific progress

Geoff Norman

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I am a fan of wars. I love to read anything, fiction or non-fiction, about the wars of the twentieth century, hot or cold. I love to watch spy movies. I've seen *The Dambusters* 29 times. However macabre this may seem, I am not alone, as the steady stream of books, movies and documentaries about war that emerge year after year attests. And far and away the most popular topic is World War 2.

What does all this have to do with research in health sciences? May I ask a little patience, while I describe a bit more about the profession of war. In due course, all will be revealed.

Of course, however fascinating, war is also abhorrent. When you add up the enormous loss of life, both military and civilian, in this war, one can only be appalled at man's inhumanity to man. Most estimates place it at about 50 million; about 2 % of the world's population in 1945 (http://en.wikipedia.org/wiki/World_War_II_casualties#Total_deaths).

But of course these losses were not distributed proportionally. Russia lost far more (23 million), in absolute and relative terms than any other country, although China (10–20 million) was a close second. Civilian losses in Germany (3 million) and Japan (1 million) were appalling, thanks to the perfection of the bombing campaign but not as serious as Poland, (5 million) or the Soviet Union (13 million). Britain and the U.S. got off quite lightly with 400–500,000, mostly military, each. And within the military, losses were not uniform. An artillery soldier had a relatively good chance of survival. Conversely, U boat and Bomber Command crews had about a 40% mortality rate. And geography was also a factor. The Eastern front accounted for the vast majority of losses, about 30 million (which include the 11–17 million victims of the Holocaust). The Western front was far smaller, and the Pacific war smaller still, as measured by military casualties.

What determined the outcome of any battle, or the war? To some degree, the training of the individual soldier, sailor or airman mattered. Russian troops, and German and Japanese troops towards the end of the war, were very poorly trained, and were truly cannon fodder, suffering enormous losses. But perhaps as important as training to the individual was the intangible aspect called courage. Japanese and German troops were far fiercer in combat

G. Norman (✉)
McMaster University, Hamilton, ON, Canada
e-mail: norman@mcmaster.ca

than Allied troops, probably as a consequence of the Prussian code of absolute obedience as well as the status of Hitler as cult hero, and the “bushido” code in Japan where surrender amounted to complete dishonour. The Russian soldier was also far “braver” than his western counterpart, likely because of a much simpler calculus—advance and risk the probability of death from a German bullet, retreat and risk the certainty of death from a Russian bullet. By contrast the democratic ideals of the western nations appeared to reduce the individual soldier’s willingness to sacrifice himself for his country (Hastings 2011).

Of course courage alone did not win battles. Success required ample supply of good equipment and good infrastructure. The Battle of Britain was won, not from better airplanes, but from better communication using radar in Fighter Command. Tank battles were won or lost based on both quantity and quality. The Russian T34 was far superior to the German Tiger and Panther; these were superior to the American Sherman. And eventually the war was won by the industrial might of the U.S. Hastings (2011) notes that by 1941 the German High Command had calculated on economic grounds that if the U.S. entered the war, it was lost.

But courage and weaponry were not sufficient. Without good leadership, superior forces could be routed. The British lost Malaya and Singapore in a few days despite overwhelming superiority in arms, as a result of appallingly bad generalship. In the Desert War, Rommel often overwhelmed larger numbers of British troops, and was ultimately beaten from lack of supplies and decryption of the Ultra codes, not from superior strategy. There are two aspects to generalship. On the one hand there are generals who know their profession well. There is no question that commanders like Rommel, Slim, Marshall, Bradley and Zhukov, succeeded through brilliant and creative strategy. On the other, they must provide inspiration to those who serve them. In the cold light of history, many of the most famous—Montgomery, MacArthur, were appallingly bad generals who could, however engender affection in their charges and the population (and who maintained well-oiled PR departments).

In many details, war provides an interesting metaphor for academic research. The infantry soldier of the scientific enterprise is the original study. All of us who get into research go through a kind of “boot camp” where we learn the basic skills of scientific soldiering—statistics, research design, measurement. And in due course we find our papers on the front line of science. But like the infantryman on the battlefield, many of our efforts will vanish without a trace (a citation). A few of these original articles may, through individual attributes, be noted and rise above the fray, just like the courageous soldier who wins the Military Cross—perhaps in part because of better training but more often because of some unique individual characteristic.

The systematic review is the equivalent of the logistical totaling. We can add up studies supporting and refuting a hypothesis or theory, just like adding up the balance of mortars, machine guns or tanks each side. We may even rate the quality of the scientific weaponry. But the systematic reviews fall prey to deciding the winner of a battle purely on logistical grounds. It takes far more than a lot of guns or a lot of studies to make notable battles or good science.

Which brings us to the generals. The scientific equivalent of the generals’ strategy is the critical review article. Here we see a combination of good judgment based on extensive experience and real creative and unexpected insights. And to complete the metaphor, the scientific equivalent of leadership is perhaps the position paper, where a respected individual espouses a point of view that may just reorient the field. While very occasionally, individual studies may change our thinking, and sometimes a systematic review may result in a recommendation that goes against conventional wisdom, far and away it is the careful

and creative literature review that redefines the field. We editors know that; we encourage review articles because of both their intrinsic worth and also their ability to increase download counts and impact factors. A recent review (systematic + critical) by Rotgens (2011) shows this clearly for our field. Of the ten most cited articles, nine are review articles, but of these; only one is a systematic review. Of the 11 most prolific authors, in terms of total publications, only about half are also in the 10 most cited list. The correlation between citation counts and publication counts in this short list is $-.10$. So publishing productivity does not necessarily result in equivalent citations.

And what does that have to do with the current issue? When AHSE began, we decided that each issue would end with a review article or position paper. Initially far too many were created by me or my cronies, but more recently more and more folks have taken up the challenge. Now we are faced with an embarrassingly long queue for Reflections and Review articles—about 2 years. To clear the glut, we have decided to create a special issue of Reflections and Review articles that have been sitting at the bottom of the Online First (Online Last?) list. We hope you enjoy them.

References

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