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Realizing The Dream! – Give us a student, we give back a Bureaucrat
Sciences and War

Bertrand Russell

The connection of science with war has grown gradually more and more intimate. It began with Archimedes, who helped his cousin the tyrant of Syracuse to defend that city against the Romans in 212 B.C. In Plutarch Life of Marcellus there is a highly romantic and obviously largely mythical account of the engines of war that Archimedes invented. I quote north.

(Before war had begun)

The king prayed him to make him some engines, both to assault and defend, in all manner of sieges and assaults. So Archimedes made him many engines, but King Hieron never occupied any of them, because he reigned the most part of his time in peace without any wars. But this provision and munition of engines served the Syracusans marvelously at that time (when Syracuse was besieged). When Archimedes fell to handle his engines, and to set them at liberty, there flew in the air infinite kinds of shot, and marvelous great stones, with an incredible great noise and force on the sudden, upon the footmen that came to assault the city by land, bearing down and tearing in pieces all those which came against them, or in what place soever they lighted, no earthly body being able to resist the violence of so heavy a weight: so that all their ranks were marvelously disordered. And as for the galleys that gave assault by sea, some were sunk with long pieces of timber, which were suddenly blown over the walls with force of their engines into their galleys, and so sunk them by their overgreat's weight. Other being hoist up by their prows with hands of iron, and hooks made like cranes' bills, plunged their poops into the sea. Other being taken up with certain engines fastened within, one contrary to another, made them turn in the air like a whirligig, and so cast them upon the rocks by the four walls, and splitted them all to fitters, to the great spoil and murder of the persons that were within them. And sometimes the ships and galleys were lift dean out of the water, that it was a fearful thing to see them hang and turn in the air as they did: until that, casting their men within them over the hatches, some here, some there, by this terrible turning, they came in the end to be empty, and to break against the walls, or else to fall into the sea again, when their engine left their hold. In spite of all this scientific technique, however, the Romans were victorious, and Archimedes was killed by a plain infantry soldier. One can imagine the exultation of Roman Blimps at the proof that once more these newfangled devices of long-haired scientists had been defeated by the old tried traditional forces by means of which the Empire's greatness had been built up.

Nevertheless science continued to play decisive part in war. Greek fire kept the Byzantine Empire in existence for centuries. Artillery destroyed the feudal system, and by making English archery obsolete created the myth of Joan of Arc. The greatest men of the Renaissance commended themselves to the powerful by their skill in scientific warfare. When Leonardo wanted to get a job from the Duke of Milan, he wrote the Duke a long letter about his improvements in the art of fortification, and in the last sentence mentioned briefly that he could also paint a bit. He got the job, though I doubt if the Duke read as far as the last sentence. When Galileo wanted employment under the Grand Duke of Tuscany, it was on his calculations of the trajectories of cannon-balls that he relied. In the French Revolution, such men of science as were not guillotined owed their immunity to their contributions to the war effort. I know of only one instance on the other side. During the Crimean War Faraday was consulted as to the use of poison gas. He replied that it was entirely feasible, but was to be condemned on grounds of humanity. In those inefficient days his opinion prevailed. But that was long ago.

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The Crimean War could still be celebrated by Kinglake in the romantic language of the ages of chivalry, but modern war is a very different matter. No doubt there are still gallant officers and brave men who die nobly in the ancient manner, but it is not they who are important. One nuclear physicist is worth more than many divisions of infantry. And apart from applications of the latest science, what secure success in war is not heroic armies but heavy industry. Consider the success of the United States after Pearl Harbor. No nation has ever shown more heroism than was shown by the Japanese, but they were defeated by American industrial productivity. It is to steel and oil and uranium, not to martial ardor, that modern nations must look for victory in war.

Modern warfare, so far, has not been more destructive of life than the warfare of less scientific ages, for the increased deadliness of weapons has been offset by the improvement in medicine and hygiene. Until recent times, pestilence almost invariably proved far more fatal than enemy action. When Sennacherib besieged Jerusalem, 185,000 of his army died in one night, "and when they arose early in the morning, behold they were all dead corpses" (II Kings xix. 35). The plague in Athens did much to decide the Peloponnesian War. The many wars between Syracuse and Carthage were usually ended by pestilence. Barbarossa, after he had completely defeated the Lombard League, lost almost his whole army by disease, and had to fly secretly over the Alps. The mortality rate in such campaigns was far greater than in the two great wars of our own century. I do not say that future wars will have as low a casualty rate as the last two; that is a matter to which I will come shortly. I say only, what many people do not realize, that up to the present science has not made war more destructive.

There are, however, other respects in which the evils of War have much increased. France was at war, almost continuously, from 1792 to 1815, and in the end suffered complete defeat, but the population of France did not, after 1815, suffer anything comparable to what has been suffered throughout Central Europe since 1945. A modern nation at war is more organized, more disciplined, and more completely concentrated on the effort to secure victory, than was possible in pre-industrial times; the consequence is that defeat is more serious, more disorganizing, more demoralizing to the general population, than it was in the days of Napoleon. But even in this respect it is not possible to make a general rule. Some wars in the past were quite as disorganizing and as destructive of the civilization of devastated areas as was the Second World War. North Africa has never regained the level of prosperity that it enjoyed under the Romans. Persia never recovered from the Mongols nor Syria from the Turks. There have always been two kinds of wars, those in which the vanquished incurred disaster, and those in which they only incurred discomfort. We seem, unfortunately, to be entering upon an era in which wars are of the former sort.

The atom bomb, and still more the hydrogen bomb, has caused new fears, involving new doubts as to the effects of science on human life. Some eminent authorities, including Einstein, have pointed out that there is a danger of the extinction of all life on this planet. I do not myself think that this will happen in the next war, but I think it may well happen in the next but one, if that is allowed to occur. If this expectation is correct, we have to choose, within the next fifty years or so, between two alternatives. Either we must allow the human race to exterminate itself, or we must forgo certain liberties which are very dear to us, more especially the liberty to kill foreigners whenever we feel so disposed. I think it probable that mankind will choose its own extermination as the preferable alternative. The choice will be made, of course, by persuading

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ourselves that it is not being made, since (so militarists on both sides will say) the victory of the right is certain without risk of universal disaster. We are perhaps living in the last age of man, and, if so, it is to science that he will owe his extinction.

If, however, the human race decides to let itself go on living, it will have to make very drastic changes in its ways of thinking, feeling, and behaving. We must learn not to say: "Never! Better death than dishonor." We, must learn to submit to law, even when imposed by aliens whom we hate and despise, and whom we believe to be blind to all considerations of righteousness. Consider some concrete examples. Jews and Arabs will have to agree to submit to arbitration; if the award goes against the Jews, the President of the United States will have to insure the victory of the party to which he is opposed, since, if he supports the international authority, he will lose the Jewish vote in New York State. On the other hand, if the award goes in favor of the Jews, the Mohammedan world will be indignant, and will be supported by all other malcontents. Or, to take another instance, Eire will demand the right to oppress the Protestants of Ulster, and on this issue the United States will support Eire while Britain will support Ulster. Could an international authority survive such a dissension? Again: India and Pakistan cannot agree about Kashmir, therefore one of them must support Russia and the other the United States. It will be obvious to anyone who is an interested party in one of these disputes that the issue is far more important than the continuance of life on our planet. The hope that the human race will allow itself to survive is therefore somewhat slender.

But if human life is to continue in spite of science, mankind will have to learn a discipline of the passions which, in the past, has not been necessary. Men will have to submit to the law, even when they think the law unjust and iniquitous. Nations which are persuaded that they are only demanding the barest justice will have to acquiesce when this demand is denied them by the neutral authority. I do not say that this is easy; I do not prophesy that it will happen; I say only that if it does not happen the human race will perish, and will perish as a result of science.

A clear choice must be made within fifty years, the choice between Reason and Death. And by "Reason" I mean willingness to submit to law as declared by an international authority. I fear that mankind may choose Death. I hope I am