

18

MILITARY ROBOTS AND THE LIKELIHOOD OF ARMED COMBAT

Leonard Kahn

Hegel once pointed out that the “abstraction of one man’s production from another’s makes labor more and more mechanical, until finally man is able to step aside and install machines in his place” (Knox 1942, 58). We have not yet removed ourselves entirely from war and installed machines in our place, and we might never do so. But we have reached the point where machines not only are able to support combatants, but are capable of taking our place in war. This curious fact has many important ethical implications (Brunstetter and Braun 2011; Halgarth 2013, 35ff.). I focus here on some rather underexplored repercussions that concern the relationship between the rise of military robots and the likelihood of armed conflict.

In section 18.1, I offer a working definition of a military robot. In section 18.2, I outline a simple model that explains the relationship between armed conflict and the cost one pays for it. I then argue in section 18.3 for the claim that the use of military robots is likely to lead to more armed conflict. In section 18.4, I make the case that the increase in armed conflict caused by the use of military robots will be, all things considered, morally bad. I briefly conclude in section 18.5 by contending that we should create legal and other social norms that limit the use of military robots.

18.1 Military Robots: A Working Definition

Talk of military robots can be misleading. For some, the expression “military robot” brings to mind such icons of science fiction as the T-800s from the *Terminator* series or the Super Battle Droids from the *Star Wars* films. But my subject in this chapter is not something that happened a long time ago in a galaxy far, far away; it is about

something that is happening in the here and now. So let me begin by sketching a working definition of what a military robot is.

According to George Bekey a robot is “a machine, situated in the world, that senses, thinks, and acts” (2012, 18). For the purposes of this chapter, I accept Bekey’s definition with a few minor qualifications and elucidations, to which I now turn. To begin with, the sense in which a robot is “in the world” is meant to distinguish a robot from a computer program, which, of course, resides solely in cyberspace. Some (e.g., Searle 1984; Webb 2001) take exception to the idea that anything other than a biological organism senses, thinks, acts—indeed, has any mental life at all. However, I understand all three terms in a minimal sense that should not raise philosophical concerns. Let me explain. First, when I say that robots “sense,” I mean only that they take inputs from their environment. Such inputs might be quite primitive, for example determining the ambient temperature in a small room. Or they might be quite sophisticated, for example determining small fluctuations in temperature from several miles away. But these inputs do not need to be direct analogs of anything that biological organisms experience. Second, when I say that robots “think,” I mean no more than that they can take their sensory input and process it, applying programmed rules, learned rules, or both (Himes 2016, 12). Thinking, in the sense of the term I have in mind, amounts to no more than information processing. Plausibly, biological organisms are said to think when they too process information (Hunt 1980). But I leave it to others to decide whether human thinking goes beyond this model. Third, when I say that robots “act,” I mean that on the basis of their sensing and thinking, they can both traverse and manipulate their environments. Whether robots can or do act intentionally or with free will is a fine source for speculation, but it is not my concern here.

Note that it is not the case that everything a robot does must be a result of its own sensing and thinking. At the moment, most robots at least occasionally act as the result of being controlled by a human agent, though some do not require this help. I will adopt the practice of calling a robot “autonomous” if all of its actions are the result of its own sensing and thinking, but “semi-autonomous” if some, not necessarily all, of its actions are the result of its own sensing and thinking (Lucas 2013). Nevertheless, we should not lose sight of the fact that some semi-autonomous robots are *more* autonomous than others, inasmuch as the former act autonomously to a greater degree.

What, then, distinguishes a military robot from other robots? Let us say that a military robot is designed and used for military applications, that is, applications that typically and intentionally advance the aims of a participant in war or a similar military conflict. The practice of war, it almost goes without saying, is conceptually messy and does not encourage the search for anything

like a neat and tidy definition. Nevertheless, examples can help to clarify the concept of a military robot. At the moment, perhaps the most widely recognized example is the drone or, more properly, the uninhabited aerial vehicle (UAV). The U.S. military's MQ-1 Predator is one such military robot, and the more recent MQ-9 Reaper is another. These semi-autonomous military robots are capable of tracking and attacking targets from the air and, in the case of the Reaper, are able to use 500-pound laser-guided bombs to attack their targets. However, it is vital to note that military robots need not be as flashy or as deadly as the Reaper. Another example of a semi-autonomous military robot is the iRobot 510 Packbot, celebrated by Peter W. Singer in his *Wired for War* (2009, 19–41). The Packbot was designed to help identify and dispose of improvised explosive devices. It has no weapons system and does not constitute a direct threat to enemy combatants. However, the Packbot was designed for, and is used for, military applications—namely, protecting U.S. soldiers in the battle-space from injury and death.¹ There are, to be sure, many other types of military robots, such as the fully autonomous Goalkeeper CIWS, which defends ships from airborne and surface-based missiles, the Samsung SGR-A1, which partially replaces combat soldiers in the demilitarized zone between North Korea and South Korea, and the Gladiator Tactical Unmanned Ground Vehicle, which supports battle-space operations in lieu of larger non-autonomous artillery pieces. I will return to some of these specific kinds of robots later in this chapter. But for now we have a working definition of a military robot; it is a machine, situated in the world, that senses, thinks, and acts and that is designed and used for military applications.

18.2 Apples and Armed Conflict

One of the main claims of this chapter is that the use of military robots is likely to lead to more armed conflict. In this section I provide a simple model that relates the quantity of armed conflict to its price, and in the next section I use that model to provide an argument for this claim.

Begin with the simple idea, familiar from any Economics 101 class, that, for any given good, the price of that good and the quantity demanded of that good are inversely related, all other things being equal. Take apples as an example. If the price of a single apple is very high—say, \$100—the quantity of apples that is demanded by those who desire apples will be very low. Only the wealthiest among us could splurge on a piece of fruit at that price. Conversely, if the price of a single apple is very low—\$0.01, for instance—then the quantity of apples that is demanded by those who desire apples will be exceedingly high. Almost anyone could afford to buy apples at this price, and, even after our desire to eat apples was

satiated, we might continue to buy them for other reasons, for example as decorations or to feed to our pets.

While the inverse relationship between price and quantity demanded is rather prosaic, I shall explain its relevance to military robots in a moment. However, before I do so, let me stress that the inverse relationship between price and quantity demanded holds all other things being equal, or *ceteris paribus*. When factors other than price change, quantity demanded might not change in the way suggested above. For instance, suppose it were discovered that apples cure cancer. Even if each apple cost \$100, the quantity of apples demanded might still be higher than it was when they were, say, only \$1 each but their health benefits were unknown. In much the same way, suppose that we learned that apples *cause* cancer. Even at the price of \$0.01 the quantity of apples demanded would likely fall well below the quantity demanded when they were only \$1 a piece but their carcinogenic nature was unknown. This *ceteris paribus* qualification will be important later in this chapter, and I shall return to it then.

With these qualifications in mind, let us use our simple economic model to help us understand the important effect of military robots on the likelihood of armed conflict.² Instead of imagining our rather banal demand for apples, let us turn to the demand for armed conflict between states. Like individual agents, states have a complex set of shifting and sometimes contradictory desires. But it is fair to say that states very often want greater control of territories and greater control of natural resources. Furthermore, they habitually desire that other states and international actors acquiesce to their wishes.³ Just as apples are goods for those who desire them, so greater control of territories is a good for states that desire it, as many do. The same is true, *mutatis mutandis*, of greater control of natural resources and of the deference of other states and international actors to one's wishes. But like apples, these goods are rarely to be had without a price being paid.

While the price that we pay for apples is usually some amount of money, the price of the goods that states seek is more complex. While states sometimes purchase land from other states (as the United States did from France in the case of the Louisiana Purchase), this kind of transaction is unusual. Most transactions are what Aristotle called "involuntary" (Ross 1980, 111–12). States *take* land, *take* natural resources, and *force* other states to do as they bid by using armed conflict and the threat of armed conflict. In a very real sense, then, the price that states pay for these goods is to be understood in terms of creating, maintaining, and using military forces. More tangibly, the price that states pay for the goods they seek is the military materiel and personnel sacrificed for the good in question. If Canada wanted, for instance, to annex Baja California from Mexico, then the price it would have to pay is to be understood in terms of the lives of its own citizens and the resources it currently owns that would be destroyed in conquering

and occupying Baja California.⁴ In a moment, I will add some nuance to the picture that I have just painted. But let me stress the point that should be increasingly clear: just as the quantity of apples that we demand is, *ceteris paribus*, inversely related to the price of apples, so too the quantity of goods such as increased territory that states demand is, *ceteris paribus*, inversely related to the price they must pay in terms of armed conflict.

Earlier I promised a little more nuance. Let me begin by pointing out an important addition that must be made in the case of states that either are democracies or depend in important ways on the consent of the governed, which I shall call “near-democracies.” States of this kind have to pay a further price when going to war. While a totalitarian regime need worry less about public opinion (Malinowski 1941), states that are democracies or near-democracies do not have this luxury. The loss of a soldier in a democracy or near-democracy is often quite costly in terms of public opinion,⁵ and an especially loss-averse electorate can force a state to cease military action after a fairly low number of casualties, as arguably occurred in the United States after nineteen U.S. soldiers were killed in the 1993 Battle of Mogadishu, famously portrayed in Mark Bowden’s *Black Hawk Down* (1999) and Ridley Scott’s film that was based on it. Of course, we should also note that democracies and near-democracies are not always so loss-averse and are sometimes willing to pay enormous costs in terms of lives to carry out military operations, as the United States and Great Britain did during World War II.

Let me turn now to a second addition that must be made to our understanding of the price that states pay when engaging in armed conflict. Autarkic states need not worry very much about what other states and the citizens of other states think of them, but there are few autarkies today. States whose economies depend on the economies of other states have to give at least some thought to international opinion. If Canada did try to annex Baja California, it would, I think it is safe to say, spark outrage not only among its own citizens but also among right-thinking people the world over. Behavior of this kind would likely cost Canada in terms of the willingness of other states to do business with it. Canada would be forced into economically unfavorable terms that could be quite costly, as its exports would fetch less on the world market, and its imports would be dearer. It should be noted, however, that states that wield a disproportionately large amount of economic power might be able to discount significantly the importance of international opinion, as the United States appears to have done before the beginning of the Second Gulf War (Goldsmith and Horiuchi 2012).

This nuancing, however, does not invalidate the underlying logic described above. On the contrary: states desire goods that only war is likely to bring, and the amount of armed conflict they are likely to be willing to accept depends on the price they will have to pay to fight this armed conflict, and this cost can

include both, in the case of democracies and near-democracies, public opinion and, in the case of non-autarkies, international opinion and what follows from it.

18.3 Military Robots and the Likelihood of Armed Combat

An important claim for the subject of this chapter is that the development of military robots is almost certainly decreasing the price that technologically sophisticated states like the United States must pay to get what they desire by means of armed conflict. I make the case for this claim in broad brushstrokes here, and leave the fine detailed work for another time. A little more specifically, it is simply not feasible to offer a detailed comparison of a large-scale military operation involving robots with a military operation not involving robots. However, it is possible to get a clear idea of why the use of military robots is likely driving the price of armed conflict down and, therefore, causing us to arrive at a point where the quantity of aggressive behavior demanded by technologically sophisticated democratic and near-democratic states is higher.

The first and most important point to which we should attend is that the use of military robots allows states to substitute the loss of these robots for the loss of the lives of their own military personnel. We have already noted the general (if not exceptionless) unwillingness of citizens of democracies and near-democracies to support military operations that cost the lives of their own soldiers. In the case of the United States, this unwillingness seems to grow stronger by an order of magnitude each generation (Berinsky 2009). Nearly half a million U.S. service members died during the 1940s in World War II without breaking the country's willingness to fight, but roughly a tenth of that number of deaths was too much for the public during the War in Vietnam in the 1960s and 1970s. Roughly another tenth as many deaths was seen by many as too costly during the wars in Afghanistan and in Iraq during the 2000s. While it is easy to make too much of this trend, it is not an exaggeration to say that the U.S. public has become far more loss-averse and shows no sign of becoming less so soon. As a result, every substitution of a robot for a U.S. soldier who is at risk of being killed in a conflict significantly lowers the price that the state must pay to use military force. That is as true when it comes to substituting a UAV for a piloted airplane as it is when it is a matter of substituting a Packbot for a member of a bomb disposal detail.

Yet even if we set aside the lower price that democratic and semi-democratic states pay in terms of the opinion of their citizens, there are considerable cost savings to be had by substituting military robots for soldiers and other military personnel. We already noted that the MQ-9 Reaper is capable of delivering 500-pound

laser-guided bombs. The unit cost of this robot is estimated to be \$17 million (U.S. Department of Defense Budget 2013). The unit price of a piloted airplane, such as the F/A-18F, capable of delivering a 500-pound bomb is much higher; in fact, the F/A-18F's unit cost is more than \$60 million (U.S. Department of Defense Budget 2015). To be sure, there are many differences between an MQ-9 Reaper and an F/A-18F, in addition to the fact that the former is an UAV and the latter is not. And I am not suggesting that the U.S. government could replace *all* of its F/A-18Fs with Reapers. But dropping a 500-pound bomb is something both of these aircraft do well, and one of them costs almost a quarter as much as the other. There are, therefore, considerable cost savings to be had through substitution.

Furthermore, the difference in cost does not stop with the price of the aircraft. F/A-18Fs need pilots. While it is difficult to acquire recent estimates of the amount of money that the United States spends to train a pilot of an airplane like the F/A-18F, it already cost in excess of \$9 million less than two decades ago (U.S. GAO Report 1999). There is no good reason to think that this number has diminished since then. In contrast, the training necessary to become proficient as an operator of a UAV is about \$65,000 (Defense News 2014). Much has been made about U.S. Air Force's offer of a \$25,000 per year bonus to operators of UAVs (Bukspan 2015), but this amount of money is a mere 1/360,000th of what it costs to train a pilot of an F/A-18F or similar aircraft.

It would be possible, at least in principle, to perform similar rough-and-ready calculations with a wide variety of situations in which a robot can take the place, wholly or partially, of a member of the military service and the non-autonomous machines that he or she uses. But the point is clear enough: military robots do many jobs much more cheaply than humans and human-controlled machines. Additionally, further technological advances will only serve to intensify this trend. The price of armed conflict, at least for technologically sophisticated states, is falling fast and will continue to fall. And we have already seen that at a lower price point, quantity demanded is higher.

Of course, it is important to recall that this analysis holds only *ceteris paribus*. As the price that states must pay to use violence in order to get what they want continues to fall, it is at least possible that other exogenous forces might cause the demand for these goods to fall as well. Indeed, there would be little point in writing a chapter like this one if there were not ways in which it might be possible to help prevent an increase in armed violence. I return to how this might occur in the final section of this chapter.

Finally, let me stress that I am not simply claiming that the use of military robots makes it *easier* for states to engage in armed combat. That fact is probably true but has been argued elsewhere (Sharkey 2012). The fact that something is easy is neither a necessary nor a sufficient condition for its being cheap. It would

be quite easy for me to steer my car into oncoming traffic, but it would be far from inexpensive to do so. Likewise, it is free to run up Pikes Peak but far from easy to do so. Moreover, it is the increasing cheapness, not the easiness, of armed conflict that is driving (and likely will continue to drive) its frequency.

18.4 More War Is Morally Worse War (Mostly)

Philosophers and other thoughtful observers often point out that armed conflict need not be, on balance, bad. Aquinas wrote, “Manly exercises in warlike feats of arms are not all forbidden” (2012, 6525). And Suarez maintained, “[W]ar, absolutely speaking, is not intrinsically evil” (Williams 1944, 800). While acknowledging that “[w]ar is an ugly thing,” Mill claimed it is “not the ugliest thing: the decayed and degraded state of moral and patriotic feeling which thinks nothing worth a war, is worse” (1862, 141).⁶ Nevertheless, there is good reason to think that armed conflict is usually morally objectionable. In this section, I provide a brief argument meant to show that the increase in armed conflict caused by the use of military robots will be, all things considered, morally bad.

While this is not the time to dive deeply into an exposition of conventional just war theory, let us begin by noting one of its axioms: a war is fought justly by state S only if S’s use of armed force is a response to unjust aggression against S. As Walzer puts it, “Aggression is the name we give to the crime of war.” Walzer continues:

The wrong the aggressor commits is to force men and women to risk their lives for the sake of their rights. . . . [T]hey are always justified in fighting; and in most cases, given that harsh choice, fighting is the morally preferred option. The justification and preference are very important: they account for the most remarkable features of the concept of aggression and for the special place it has in the theory of war. (1977, 51)⁷

It follows that, for any given war, no more than one state can fight justly, and at least one state must be fighting unjustly.⁸ Hence, an increase in war means, *a fortiori*, an increase in states that are fighting war unjustly. This fact alone provides good reason to think that any increase in armed conflict is morally problematic unless there are very strong grounds for thinking that we are dealing with special cases.

However, matters are considerably worse than they might first appear. For it is extremely difficult for any state to fight a war justly. To begin with, states must meet a number of stringent conditions (*jus ad bellum*) in order to begin the war justly. These conditions include proportionality, right intention, final resort, probability of success, and public declaration by a legitimate authority. Even

when states respond to unjust aggression, they often fail to meet one or more of these conditions and, therefore, wage war unjustly. In point of fact, it is hard to find many wars that have been fought over the past few centuries that unambiguously meet all of these conditions. It is arguable, for instance, that every war the United States has fought in the past seventy years violates at least one *jus ad bellum* condition. With one's back against the wall, one might point to the role of the United States and of Great Britain during World War II—and with some plausibility. But even if it is true that the United States and Great Britain each entered the war justly, it is almost certain that both states went on to fight the war *unjustly*. Why? In addition to meeting the conditions of *jus ad bellum*, states must also prosecute the war (*jus in bello*) in a way that is both discriminate—that is, it must not target non-combatants—and proportional—that is, it must not use more force than necessary to attain its goals. The sad fact of the matter is that even on those rare occasions when states meet all of the conditions of *jus ad bellum*, they often violate the conditions of *jus in bello*. For instance, both the United States and Great Britain regularly targeted non-combatants and used far more force than necessary to achieve their aims (Anscombe 1939, 1956), especially late in the war (Walzer 1977, 263–8; Rawls 1999).

In short, more war is likely to mean, for the most part, more *unjust* war, and that is a morally worse state of affairs. I have limited myself in this section to a discussion of war in particular rather than armed conflict in general for the simple reason that war has received the lion's share of attention by moral philosophers. But the points I have made can be generalized, *mutatis mutandis*, to armed conflict as a whole.

Let me take a moment to consider a possible line of response to the argument I have just offered. I said that there might be grounds for thinking that we are dealing with special cases when it comes to military robots. According to this line of response, the increased use of military robots will lead to fewer violations of *jus in bello*, both by increasing the degree to which we can discriminate between combatants and non-combatants and by fine-tuning the amount of force that we use.

Strictly speaking, this outcome is possible. However, it seems quite unlikely. Drawing the distinction between combatants and non-combatants is a difficult and context-sensitive task—precisely, the sort of task that artificial forms of intelligence struggle with the most (Guarini and Bello 2012). It is something of a fantasy to think that military robots will do this sort of work any better than humans in the near future. While there is some reason to think that the use of UAVs in Pakistan has led to more appropriate levels of proportionality (Plaw 2013), the data is somewhat ambiguous, and discussion of the details of the study obscures the larger point: the use of UAVs in Pakistan is already morally problematic from the point of view of just war theory since the United States is not fighting

a just war with this state (O'Connell 2015, 63–73). The question is not simply whether military robots will be used within the requirements of *jus in bello*; it is also whether technologically sophisticated states like the United States will be tempted to use military robots in ways that contravene the requirements of *jus ad bellum* simply because there is very little cost to doing so. Indeed, it should not come as a surprise that UAVs are often used for assassinations (Whetham 2013), something that is traditionally considered a violation of the requirements of just war (de Vattel 1758, 512; Walzer 1977, 183). Even some of those who show sympathy for the practice of so-called targeted killings have strong moral qualms about its current practice (Himes 2016, 121–68).

My claim is not, of course, that military robots can never be used justly. As a means of waging war they are not, for example, inherently indiscriminate and disproportionate in the way that nuclear, chemical, and biological weapons are (Lee 2012, 225). It is surely possible to imagine military robots being used, for instance, in a justified humanitarian intervention (Beauchamp and Savulescu, 2013). Just as cheap and readily available handguns might occasionally be used to save an innocent life, so too cheap military robots might also occasionally be used to save an innocent life. Nevertheless, the overall effect of cheap and readily available handguns is likely to be increased violence, which is morally problematic to say the least. Likewise, I have argued, the lower cost of military robots will also lead to more armed conflict, which is also morally problematic.

18.5 Military Robots: What Is to Be Done?

The economic logic by which military robots appeal to technologically sophisticated states is inexorable. Left to their own devices, states will almost certainly use military robots to increase the amount of armed conflict in the world. If it is difficult to imagine the U.S. government assuming the role of villain, one need only remind oneself that military robots are increasingly within the reach of many states, some of whom are hostile to the United States and its interests.

However, states are responsive to more than just economic logic. While I have no simple solution for the moral problems raised by the emergence of military robots, I want to conclude on a positive note by suggesting a few ways in which the use of military robots might be curbed. First, the U.S. public has raised few objections to the use of military robots, but there is a fairly recent history of successful public resistance to the U.S. military policy. Public opposition to the Vietnam War helped bring this conflict to an end, and a similarly motivated resistance might be able to do something comparable. Though the current opposition to the use of UAVs, for example, is next to nonexistent, so too was opposition to the Vietnam War in the early 1960s. Second, international opinion can also be used to motivate constraints on the use of military robots. As noted earlier, there are

few autarkies among modern states, and it is possible for some states to put economic and diplomatic pressure to bear on states like the United States that use military robots. While the size of the U.S. economy makes this unlikely to have much of an effect here, it is possible that it could be more successful when wielded against incipient robotic powers such as Russia and Iran. Finally, international legal norms against the use of military robots are also a possibility, though at this point a rather dim one. If some or all uses of military robots were considered to be a war crime by the International Criminal Court in The Hague, we would probably see far less of it. That said, social norms against the use of military robots must first exist before it is codified as a legal norm. The prospects are daunting, but we should keep in mind that states face a similar kind of economic logic regarding the use of biological, chemical, and nuclear weapons. The development of social and legal norms has helped to prevent these weapons from being used on a wide scale. Perhaps such norms can do so with regard to military robots as well.

Acknowledgments

I am grateful for comments and questions to conference audiences at the Association for Practical and Professional Ethics (2016) and the Humanities and Educational Research Association (2016), to my Loyola University colleagues Ben Bayer, Drew Chastain, and Mary Townsend, and to the editors of this volume.

Notes

1. Interestingly, the Packbot has recently been adapted for non-military purposes, including use in areas infected by naturally occurring biohazards where humans would be at great risk. This fact suggests that it might be more accurate to speak of “robots with military uses” than “military robots.” However, this locution is cumbersome and adds little value here, so I eschew it.
2. I focus in this chapter on military conflict rather than war because the term “war” is usually too narrow for my purposes. Even if, following Brian Orend, we understand war as “actual, intentional, and widespread conflict between political communities” (2006, 2), we exclude unidirectional conflict in which all of the violence is directed by one side of the conflict, as arguably occurs with the use of UAVs in places such as Yemen as I write this.
3. Hegel is, once again, edifying here: “War is the state of affairs which deals in earnest with the vanity of temporal goods and concerns” (Knox 1942, 324). I hope these claims will not seem cynical or, worse still, unscrupulous. It is far beyond the scope of this chapter to argue either that states in fact often act out of self-interest or that their conceptions of self-interest reliably include controlling territory and

natural resources, as well as getting their way with other international actors. By the way, the recognition that states often act in this way should, under no circumstances, be taken as a justification of this behavior. It is one thing, for instance, to acknowledge that humans sometimes rape and murder; it is another to endorse such actions.

4. It would be slightly more accurate to say that states purchase a chance at getting what they want, since they cannot simply exchange materiel and personnel for, say, territory, and they might well lose the war and get little or nothing (or worse). Wars can be better thought of as small lotteries in which all of the states (or statelike participants) pay for a chance to win (or keep) some good. Each player is likely to be willing to pay something close to what it thinks the good is worth. However, since there are multiple players, the total amount spent on playing the lottery is, therefore, likely to far exceed the value of the good. But we can ignore these depressing complications here.
5. See Mueller (1973) as well as the voluminous literature that Mueller's classic continues to spawn, especially the articles in the *Journal of Conflict Resolution* (1998) 42 (3).
6. Cadets at the U.S. Air Force Academy are still required during their first year of study to memorize this quote from Mill.
7. See also Walzer (1977, 51–73) and Orend (2006, 31–65). I hope it is fairly obvious that COIN and R2P are not exceptions to this axiom, since they too involve protection from and response to aggression. The familiar utilitarian approaches to the ethics of war are also outside what I have in mind when I speak here of conventional just war theory.
8. Or if the war involves coalitions, then at most one side can be fighting justly. I ignore this complication here in order to avoid unnecessary prolixity.

Works Cited

- Anscombe, G. E. M. 1939. "The Justice of the Present War Examined." In *Ethics, Religion, and Politics: Collected Papers*. Vol. 3, 1991. Oxford: Blackwell Press.
- Anscombe, G. E. M. 1956. "Mr. Truman's Degree." In *Ethics, Religion, and Politics: Collected Papers*. Vol. 3, 1991, 61–72. Oxford Blackwell Press.
- Aquinas, Thomas. 2012. *Summa Theologica, Part II-II*. Translated by Fathers of the English Dominican Province. New York: Benziger Brothers.
- Beauchamp, Zack and Julian Savulescu. 2013. "Robot Guardians: Teleoperated Combat Vehicles in Humanitarian Military Intervention." In *Killing by Remote Control: The Ethics of an Unmanned Military*, edited by Bradley J. Strawser, 106–25. Oxford: Oxford University Press.
- Bekey, George A. 2012. "Current Trends in Robotics: Technology and Ethics." In *Robot Ethics: The Ethical and Social Implications of Robotics*, edited by Patrick Lin, Keith Abney, and George A. Bekey, 17–34. Cambridge, MA: MIT Press.

- Berinsky, Adam J. 2009. *In Time of War: Understanding American Public Opinion from World War II to Iraq*. Chicago: University of Chicago Press.
- Bowden, Mark. 1999. *Black Hawk Down: A Story of Modern War*. New York: Signet Press.
- Brunstetter, Daniel and Megan Braun. 2011. "The Implications of Drones on the Just War Tradition." *Ethics & International Affairs* 25 (3): 337–58.
- Bukszpan, Daniel. 2015. "Job Hunting? Drone Pilots Are Getting \$125,000 Bonuses." *Fortune*, December 19. <http://fortune.com/2015/12/19/drone-pilots-bonuses/>.
- Defense News. 2014. "GAO Tells Air Force: Improve Service Conditions for Drone Pilots." http://defense-update.com/20140417_gao-improve-service-conditions-drone-pilots.html.
- de Vattel, Emer. 1758. *The Law of Nations*. Excerpted as "War in Due Form" in *The Ethics of War: Classic and Contemporary Readings*, edited by Gregory M. Reichenberg, Henrik Syse, and Endre Begby, 2006, 504–17. Oxford: Blackwell Press.
- Goldsmith, Benjamin E. and Yusaku Horiuchi. 2012. "In Search of Soft Power: Does Foreign Public Opinion Matter to U.S. Foreign Policy?" *World Politics* 64 (3): 555–85.
- Guarini, Marcello and Paul Bello. 2012. "Robotic Warfare: Some Challenges in Moving from Noncivilian to Civilian Theaters." In *Robot Ethics: The Ethical and Social Implications of Robotics*, edited by Patrick Lin, Keith Abney, and George A. Bekey, 129–44. Cambridge, MA: MIT Press.
- Halgarth, Matthew W. 2013. "Just War Theory and Military Technology: A Primer." In *Killing by Remote Control: The Ethics of an Unmanned Military*, edited by Bradley J. Strawser, 25–46. Oxford: Oxford University Press.
- Hunt, Earl. 1980. "Intelligence as an Information Processing Concept." *British Journal of Psychology* 71 (4): 449–74.
- Himes, Kenneth R. 2016. *Drones and the Ethics of Targeted Killing*. New York: Rowman & Littlefield.
- Knox, T. M., trans. 1942. *Hegel's Philosophy of Right*. Oxford: Oxford University Press.
- Lucas, George R., Jr. 2013. "Engineering, Ethics, and Industry: The Moral Challenges of Lethal Autonomy." In *Killing by Remote Control: The Ethics of an Unmanned Military*, edited by Bradley J. Strawser, 211–28. Oxford: Oxford University Press.
- Lee Steven P. 2012. *Ethics and War: An Introduction*. Cambridge: Cambridge University Press.
- Malinowski, Bronislaw 1941. "An Anthropological Analysis of War," *American Journal of Sociology* 46 (4): 521–50.
- Mill, John Stuart. (1862) 1984. "The Contest in America." In *The Collected Works of John Stuart Mill, Volume XXI—Essays on Equality, Law, and Education*. Edited by John M. Robson. Toronto, ON: University of Toronto Press.
- Mueller, John E. 1973. *Wars, Presidents, and Public Opinion*. New York: John Wiley.
- O'Connell, Mary Ellen. 2015. "International Law and Drone Strikes beyond Armed Conflict Zones." In *Drones and the Future of Armed Conflict*, edited by David

- Cortright, Rachel Fairhurst, and Kristen Wall, 63–73. Chicago: University of Chicago Press.
- Orend, Brian. 2006. *The Morality of War*. Calgary: Broadview Press.
- Plaw, Avery. 2013. “Counting the Dead: The Proportionality of Predation in Pakistan.” In *Killing by Remote Control: The Ethics of an Unmanned Military*, edited by Bradley J. Strawser, 106–25. Oxford: Oxford University Press.
- Rawls, John. 1999. “Fifty Years after Hiroshima.” In *John Rawls: Collected Papers*, edited by Samuel Freeman, 565–72. Cambridge, MA: Harvard University Press.
- Ross, David, trans. 1980. *Aristotle: The Nicomachean Ethics*. Oxford: Oxford World Classics.
- Searle, John R. 1984. *Minds, Brains, and Science*. Cambridge, MA: Harvard University Press.
- Sharkey, Noel. 2012. “Killing Made Easy: From Joystick to Politics” In *Robot Ethics: The Ethical and Social Implications of Robotics*, edited by Patrick Lin, Keith Abney, and George A. Bekey, 111–28. Cambridge, MA: MIT Press.
- Singer, Peter Warren. 2009. *Wired for War: The Robotics Revolution and Conflict in the 21st Century*. London: Penguin Press.
- U.S. Department of Defense. 2012. *Fiscal Year (FY) 2013 President’s Budget Submission February 2012*. <http://www.saffm.hq.af.mil/shared/media/document/AFD-120210-115.pdf>.
- U.S. Department of Defense. 2014. *Fiscal Year (FY) 2015 Budget Estimates March 2014*. http://www.dod.mil/pubs/foi/Reading_Room/DARPA/16-F-0021_DOC_18_DoD_FY2015_Budget_Estimate_DARPA.pdf.
- U.S. General Accounting Office. 1999. *Report to the Chairman and Ranking Minority Member, Subcommittee on Military Personnel, Committee on Armed Services, House of Representatives, August 1999*. <http://www.gao.gov/archive/1999/ns99211.pdf>.
- Walzer, Michael. 1977. *Just and Unjust Wars: A Moral Argument with Historical Illustrations*. New York: Basic Books.
- Webb, Barbara. 2001. “Can Robots Make Good Models of Biological Behavior?” *Behavioral and Brain Sciences* 24: 1033–50.
- Whetham, David. 2013. “Drones and Targeted Killings: Angels or Assassins.” In *Killing by Remote Control: The Ethics of an Unmanned Military*, edited by Bradley J. Strawser, 69–83. Oxford: Oxford University Press.
- Williams, Gladys L., trans. 1944. *Selections from the Collected Works of Francisco Suarez, SJ*. Vol. 2. Oxford: Clarendon Press.