Apocalypse Soon?

How Emerging Technologies, Population Growth, and Global Warming Will Fuel Apocalyptic Terrorism in the Future

BY PHIL TORRES

The nature of terrorism has changed over time. The earliest terrorist groups were intimately connected to religious worldviews, but the 19th and 20th centuries were dominated by secular terrorists who espoused nationalist, anarchist, and Marxist/Maoist goals. By the early 1990s, though, the pendulum began to swing back toward religious motives. Today, religious extremism has become the primary cause of terrorism around the world, as the 2014 Global Terrorism Index affirms. This is notable and worrisome, because as the Swedish scholar Magnus Ranstorp puts it, religiously motivated violence is "unprecedented, not only in its scope and the selection of targets, but also in its lethality and indiscriminate character."[1] While secular terrorists often saw violence in instrumental terms—as a means to an end (usually political or economic)—religious groups tend to see it as the end in and of itself.[2] The point of religious terrorism is to engage in the great cosmic struggle between good and evil, and death in service of God's will, or at least each group's interpretation of it, is no deterrent for the true religious warrior.

But something else has happened in the past 15 years or so: not only has religious extremism become the dominant form of terrorism, but it has become increasingly apocalyptic as well. This is seen most clearly within the Islamic world after the 2003 U.S.-led preemptive invasion of Iraq. ISIS, for example, puts a far greater emphasis on eschatology than its parent group, al-Qaeda. Similarly, within Shia Islam, the apocalyptic turn can be found in the literature of Hezbollah, which only recently began to mention eschatological phenomena like the Mahdi; i.e., Islam's end-of-days messianic figure.[3] Even more, after the Iraq War began, several apocalyptic Shia militias were formed in Iraq, such as the revealingly-named Mahdi Army, founded by the influential Iraqi leader Muqtada al-Sadr. The Mahdi Army later spawned the Promised Day Brigade, which is reported to have received training and money from Iran. And while apocalyptic anticipation was exploited by Ayatollah Khomeini during the Iranian Revolution, it became even more conspicuous to the Western eye during the presidency of Mahmoud Ahmadinejad, who was fond of referencing the Mahdi in public speeches, including one to the UN General Assembly in 2012.

Beyond the plot of real estate called the Middle East, apocalyptic movements can be found on nearly every continent. In China, for example, the Eastern Lightning claims that a woman in central China is the reincarnation of Christ and that its followers are engaged in an apocalyptic struggle with the communist government. Just across the East China Sea, in Japan, one finds the now-inactive cult Aum Shinrikyo which believed that it had a special role to play in bringing about the end of the world. In the U.S., eschatological excitement gained a foothold in popular culture with the publication of Hal Lindsey's *The Late Great Planet Earth* in 1970. Indeed, some scholars have used the term "Armageddon lobby" to refer to Christian dispensationalists who not only hope for the world's imminent end, but have some influence over American politics.[4] Ronald Reagan, for example, relied on Biblical prophecy to make sense of world events, and this has become a tradition among some Republican leaders, including George W. Bush, Ted Cruz, Mike Huckabee, and Lindsey Graham. At the extreme there's the shadowy Christian Identity movement, which believes that God commands it to use catastrophic violence to bring about the apocalypse and is associated with terrorist organizations in the U.S. like the Aryan Nation and The Order.

Here I will argue that there are strong historical, demographic, and technological reasons for thinking that apocalyptic terrorism may well become one of the greatest threats to human civilization by the end of the 21st century. For reasons explored below, this threat could become genuinely existential in nature, meaning that it could ultimately precipitate either our species' extinction or a drastic and irreversible decline in the quality of life of future generations.[5] Without addressing the dangers of faith-based religious thought and considering the implications of such thought in a rapidly changing milieu, the probability of a future disaster could be far greater than we might like to admit.

Sources of Apocalyptic Belief

Aside from apocalyptic groups *per se*, convictions that the end is nigh are widespread in both the Christian and Islamic communities. According to a 2010 Pew poll, for example, 41% of Americans believe that Jesus will either "definitely" or "probably" return by 2050. Similar figures apply to Muslims in the Middle East. Most of these eschatological believers don't pose an immediate danger, except insofar as they ignore phenomena like global warming because they fail to fit the prewritten narratives

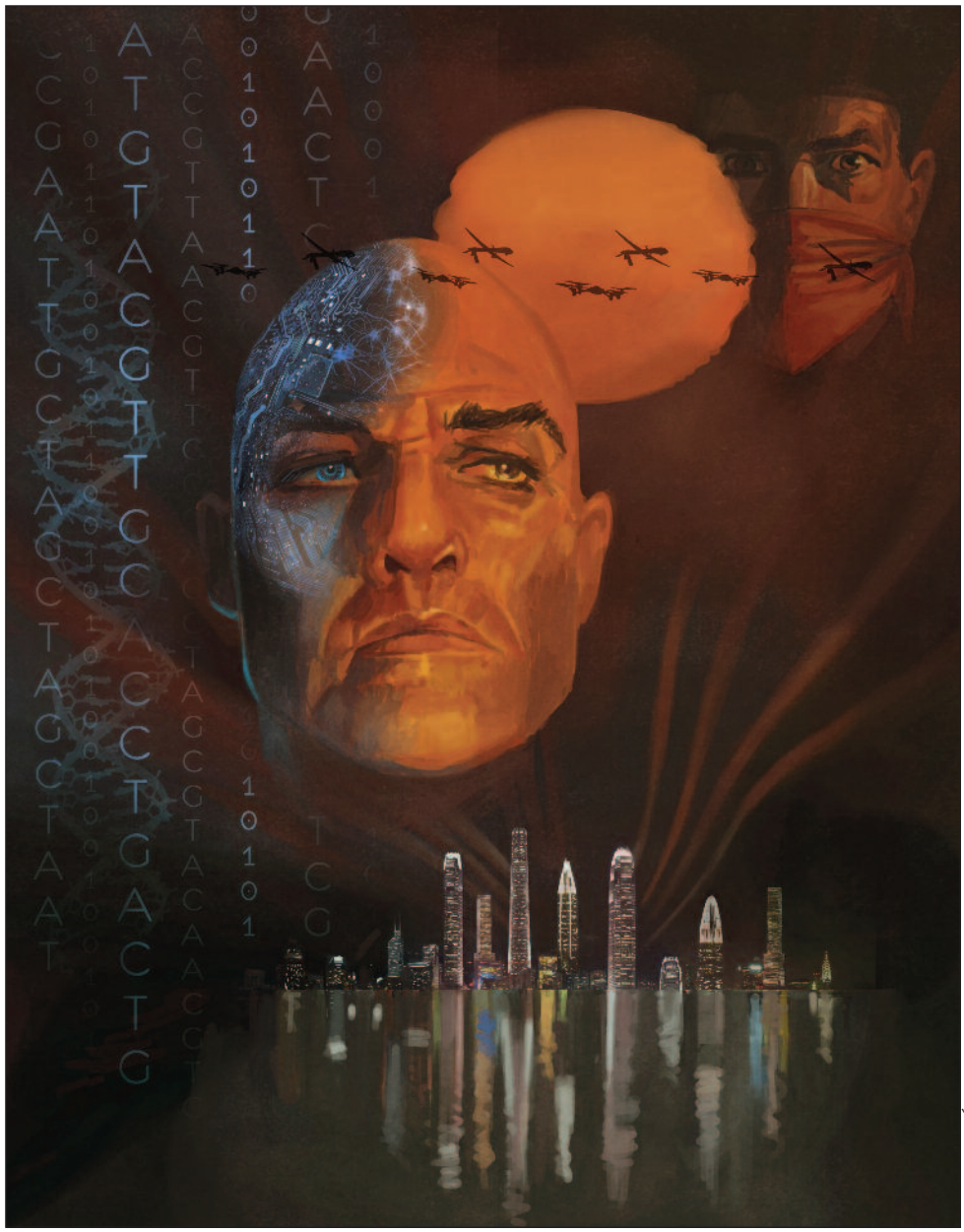

Illustration by Ástor Alexander

of prophetic scripture. Throughout history, though, a certain percentage of religious people have adopted what the historian Richard Landes refers to as an "active cataclysmic" stance towards prophecy.[6] That is to say, they see themselves as active participants in an End-Times narrative that's unfolding in real time. They are what we might call *eschatological activists*. Accordingly, some actually believe it's their duty to either bring about Armageddon or foment the conditions necessary for the Apocalypse to take place. Some groups mentioned above, such as ISIS, Aum Shinrikyo, the Christian Identity movement, and the Armageddon lobby all hold active cataclysmic worldviews.

What concerns us moving forward are the various conditions under which such groups arise and can wreak havoc on society. There is no generalization according to which if conditions X occur, then groups of type Y will emerge. But history does reveal that apocalyptic groups tend to emerge during periods of extreme social change, political instability, and economic uncertainty. Such periods may be the result of oppressive governments, international or civil wars, or natural disasters. As the leading scholar of apocalyptic movements Mark Juergensmeyer puts it, "radical change breeds radical religion."[7]

When people are confronted by overwhelming

stress, some will search for interpretive frameworks that ascribe meaning and value to their suffering. The apocalyptic framework provides possibly the most powerful framework imaginable. It says that in the end, everything will be okay: God's enemies will be banished to the everlasting fires of perdition and his followers rewarded with eternal paradise. Cosmic justice will be exacted on this evil world. This is why theologians have argued that eschatology provides perhaps the ultimate theodicy, that is, a justification for the existence of evil in a world created by an omnipotent and omnibenevolent God.[8] Given this connection between eschatology and theodicy, some especially ardent believers—the activists mentioned above—take it upon themselves to catalyze this process in an effort to hasten the moment of cosmic justice. ISIS, for example, is taunting the West into meeting it on the fields around Dabiq so that Armageddon can be fought, thereby knocking over the first domino of their Apocalypse.[9]

If we accept that particular societal conditions are conducive to the rise of active apocalyptic groups this important question arises: are there reasons for thinking that such conditions will materialize in the future? Are there compelling arguments for anticipating the emergence of new apocalyptic groups in the coming decades? I contend that there are evidentially robust claims that we can make about the future, concerning both the technological and natural environments in which future generations are likely to find themselves, and that these claims directly bear on the issue of apocalyptic terrorism.

Let's start with science and technology, the very foundation upon which modern civilization is built. Nearly all observers of technological trends agree that we're in the beginning stages of a genuine revolution in the fields of genetics, nanotechnology, and robotics—the GNR Revolution. The result could be a flurry of new products that, to quote Arhur C. Clarke's third law, are "indistinguishable from magic." For example, scientists have discussed the possibility of life extension treatments that enable people to live indefinitely; whole-brain emulation techniques that allow people to upload their consciousness to a supercomputer; brain-machine interfaces that establish a direct connection between the brain and the Internet; nanofactories that empower nations and individuals to manufacture virtually any product at virtually no cost; space colonization; iterative embryo selection methods that enable the creation of super-smart designer babies; and even artificial intelligences capable of recursively self-improving their own code, thereby initiating a positive feedback loop of exponential cognitive amplification. While these scenarios remain highly speculative, there are epistemologically respectable reasons for seeing them as probable in the long run. Furthermore, it's worth pointing out that some futurists claim that the GNR Revolution will unfold at something like an exponential rate—along the lines of Moore's Law, which originally described the development of integrated circuits, but has since been applied to entire fields like robotics, biotechnology, synthetic biology, and nanotechnology. The futurist Ray Kurzweil calls this process the Law of Accelerating Returns.

The GNR Revolution will result in rapid and profound changes to human civilization. This is significant because many past revolutions in technology have been quite disruptive, leading to periods of social turmoil, political unrest, and even religious paranoia, as society reorganizes itself. Given that GNR technologies will be far more powerful than past technologies, the GNR Revolution will almost certainly be much more disruptive than prior revolutions. Humans will be a part of this revolution, of course, as many GNR technologies will modify our phenotypes, resulting in technobiological hybrids or cyborgs. But if human psychology remains relatively fixed in certain crucial respects, it is not unreasonable to hypothesize that apocalyptic thinking will become even more widespread amidst the phantasmagoria of GNR-induced societal transformations. Already, mainstream leaders in the Christian and Islamic worlds have pointed to the explosion of human knowledge and growth of technology as clear signs that the end is approaching. Imagine what such figures would claim if any of the above-mentioned technologies were actualized. Surely disruptive phenomena like mind-uploading and space colonization will only fuel eschatological enthusiasm, as such phenomena will mark the close of the human age and the beginning of the posthuman era.

There are additional reasons for thinking that apocalyptic fervor will rise in the future—reasons unrelated to the realization of advanced technologies. Consider the slow-motion catastrophes of climate change and biodiversity loss, the latter of which has led a growing number of scientists to suggest that we're in the early stages of only the sixth mass extinction in the entire 3.5 billion year history of life on Earth.[10] According to the Intergovernmental Panel on Climate Change (IPCC), the consequences of climate change will be "severe," "pervasive," and "irreversible."[11] Such consequences include extreme weather events, megadroughts, flooding, food supply disruptions, famines, malnutrition, the spread of infectious disease, deforesta-

tion, desertification, species extinctions, ecological destruction, mass migrations, social upheaval, and economic collapse. While there is a small (but real) chance that a runaway greenhouse could turn Earth into an unlivable cauldron like our planetary neighbor Venus, global warming is best described as a "conflict multiplier" that will nontrivially elevate the probability of arms races, wars, and terrorism.[12]

In a July 2015 report, for example, the Department of Defense noted that climate change constitutes a major national security risk because it "will aggravate problems such as poverty, social tensions, environmental degradation, ineffectual leadership and weak political institutions that threaten stability in a number of countries." And: "Climate change is a security risk…because it degrades living conditions, human security and the ability of governments to meet the basic needs of their populations."[13] In November 2015, CIA Director John Brennan stated "When CIA analysts look for deeper causes of this rising instability," referring to places like Syria, Iraq, Ukraine, Yemen, and Libya, "they find nationalistic, sectarian, and technological factors that are eroding the structure of the international system. They also see socioeconomic trends, the impact of climate change, and other elements that are cause for concern." At one point, Brennan emphasized that "Mankind's relationship with the natural world is aggravating these problems and is a potential source of crisis itself."[14]

These statements are backed up by peer-reviewed scientific studies. A 2015 paper published in the *Proceedings of the National Academy of Sciences*, for example, concludes that "Century-long observed trends in precipitation, temperature, and sea-level pressure, supported by climate model results, strongly suggest that anthropogenic forcing has increased the probability of severe and persistent droughts in [Syria]."[15] This is a significant conclusion because the record-breaking 2007-2010 drought in Syria caused mass migrations into urban centers that have been linked to the outbreak of the Syrian civil war, which itself has been linked to the rise of the Islamic State.[16] In other words, if the drought hadn't happened, then the Islamic State probably wouldn't have consolidated its forces in Syria, and the drought very likely wouldn't have happened if not for anthropogenic global warming. Here we have a robust chain of possible causes and effects, beginning with climate change and ending with the largest terrorist organization in history. Such studies suggest that even more terrorist groups will arise in the future, as the consequences of global warming become increasingly severe.[17]

Finally, it's worth noting that many religions identify natural disasters as precursors of the Apocalypse. Famines, earthquakes, infestations, biodiversity loss, heat waves, landslides, and burning rain are all seen by certain traditions as harbingers of the end. It follows that climate change, which will likely have global catastrophic consequences, could actually reinforce religious people's eschatological convictions that the world's end is imminent. Not only will global warming likely cement people's prior beliefs, it may well even lead to an *increase* in the number of religious adherents. After all, people often convert during periods of personal or societal stress, and history provides numerous examples of natural disasters boosting the membership of religions. For instance, the plague of Cyprian, which "is estimated to have killed 5,000 people a day in the city of Rome alone," may have played a critical role in the early spread of Christianity.[18] Climate change could have a similar effect on religious adherence in the future.

The Demographics of Apocalyptic Belief

According to a 2015 Pew poll on the changing demographics of religion, the percentage of religiously unaffiliated people around the world is shrinking, despite trends toward secularization in Western Europe and North America. (In fact, religion is expected to go "extinct" in nine Western countries.[19]) Islam is the fastest growing religion, followed by Christianity. The Pew poll projects that by 2050 there will be 2.92 billion Christians and 2.76 billion Muslims, or 31.4% and 29.7% of the global population, respectively (there are currently about 2 billion Christians and 1.5 billion Muslims).

If we project statistics about apocalyptic beliefs among Christians and Muslims on to the Pew poll figures above, it follows that there will literally be *billions* of believers in 2050 who will expect Armageddon to be just around the corner. If 41% of Americans continue to believe that Jesus' return is "definite" or "probable" in the near future (as noted above), then we can expect some 1.2 billion Christians with apocalyptic beliefs by the middle of this century. Another poll finds that apocalypticism is similarly widespread within the Muslim community. While the large majority of believers with apocalyptic expectations see eschatology as something akin to a spectator sport, a small percentage of radicals at the fringe have, throughout history, tended to interpret world events through a more active apocalyptic lens. These are the eschatological activists cited above, often spurred on by societal conditions of radical change, instability, and uncertainty.

The point is that the total number of believers at the fringe is likely to increase as the total number of religious adherents grows. In a world with 9.3 billion people by 2050, approximately 8.1 billion of whom will be religious, "the fringe" will constitute a rather sizable community. Consider Ayaan Hirsi Ali's "conservative" calculation that 3% of Muslims worldwide are sympathetic with jihadism.[20] If this figure were to remain fixed moving forward, there would be a total of 82.8 million Muslims with radical, violent ideologies in less than four decades. Now, imagine that a mere 10% of this figure were to espouse active cataclysmic worldviews. The result would be roughly 8 million Islamic extremists actively working to bring about the apocalypse. By comparison, the Islamic State has about 50,000 to 250,000 fighters as of November 2015, and they've become a major source of terror for much of the Western world.

The growth of religion worldwide, in both relative and absolute terms, means that the opportunity for extremist movements at the periphery of mainstream tradition will increase. We thus have reason for expecting either more apocalyptic groups to emerge in the future or for the apocalyptic groups that emerge to have more members. When considering such demographic changes in the context of the GNR Revolution and global warming, it should be clear that apocalyptic terrorism could very well exceed historical norms in terms of size and frequency. *A perfect storm of social, political, and economic transformations plus larger religious populations will likely lead to more violent movements driven by radical apocalyptic ideologies.*

There is one more consequence of the Pew poll's demographic projections worth examining. A growing number of scholars in the field of Existential Risk Studies believe that the likelihood of an existential catastrophe is higher today than ever before in our 200,000 year history. For example, Sir Martin Rees, co-founder of Cambridge University's Centre for the Study of Existential Risks (CSER), writes in his 2004 book *Our Final Hour* that there is a 50/50 chance of civilization being destroyed before the 22nd century. This may sound like hyperbolic alarmism, but to paraphrase the Russell-Einstein Manifesto, those who know the most tend to be the most gloomy. Indeed, similarly pessimistic figures can be found in the work of John Leslie, Sir Nicholas Stern, and Nick Bostrom, the founder of the Future of Humanity Institute at Oxford University, all of whom have dedicated portions of their academic career to studying the various big picture threats that haunt our collective future.

The point is that we're entering a new epoch in which human extinction appears to be an increasingly likely outcome. Yet the metaphysics and eschatologies of religion exclude the possibility of human extinction. It simply doesn't exist. According to the end-times narratives of Christianity and Islam, for example, a small portion of humanity—the believers, the elect, the righteous—will survive a series of apocalyptic catastrophes and enter into a new, gloriously remade world: Heaven on Earth. Life in this new world will be everlasting and blissful. This is the great promise of religion. It's why eschatology constitutes the ultimate theodicy—a select group of God's followers will survive "the end" and the rest will be judged by God in the hereafter where ultimate justice is served.

From the secular perspective this is a very dangerous view. Given the heightened threat of annihilation this century, it's critical that humanity recognizes its precarious plight in a hostile, morally indifferent universe. The rise of religion could thus interfere with the work of existential risk analysts by negating their work as irrelevant. This is already happening: religious believers, such as the Republican congressman John Shimkus, have rejected concerns about global warming on Biblical grounds. As Shimkus argued during a 2009 House Energy Subcommittee on Energy and Environment hearing, global warming ought not to shape U.S. policy because God promised to Noah after the great deluge that "never again shall there be a flood to destroy the earth" (Genesis 9:11). One must believe that extinction is possible in order to hope for our continued survival.

The Technologies of Doomsday

Although the number of apocalyptic movements could increase in the future, this by itself doesn't warrant existential anxiety. After all, history is littered with active apocalyptic groups that failed to bring civilization to an end. Why would the future be any different? The answer pertains to a triad of properties of the GNR Revolution. To begin, most or perhaps all of the products, technologies, instruments, artifacts, techniques, data, and theories of this revolution are dual-use in nature; that is, they can be employed for both good and bad ends. For example, the very same instruments that could enable scientists to create a cure for Ebola could also enable terrorists to weaponize this virus.[21] And the very same nanofactories that could result in what Eric Drexler calls "radical abundance" could also be used by rogue actors to manufacture weapons. The point is that dual usability is a package deal: one use comes with the other, and to eliminate either is to eliminate both.

Another feature of GNR technologies that makes them especially worrisome is that they're becoming more powerful along something like an exponential trajectory. By nearly all accounts, such technologies will enable future humans to manipulate and rearrange the physical world in increasingly profound ways. Synthetic biology, for example, is making it possible to design entirely novel microbes, some of which could be pathogenic. Several years ago, J. Craig Venter and his team created the first instance of "synthetic life" by altering the genetic sequence of a bacterium on the computer, synthesizing a DNA strand from scratch, and then injecting it into a cell. The resulting bacterium proceeded to replicate over a billion times. And molecular manufacturing promises to allow future humans to build a huge range of commodities from the ground up by grabbing and repositioning single molecules at a time. Perhaps most intriguingly, molecular manufacturing could enable nanofactories to print out other nanofactories, thereby proliferating the means for individuals and societies to satisfy their own material needs. There's also the possibility that a "Seed AI" (an artificial intelligence that can rewrite itself without human intervention) could improve itself at an exponential rate until its cognitive abilities tower above ours in the same manner that our abilities tower above those of a cockroach. While this may sound farfetched, a growing number of intellectuals—from scholars like Nick Bostrom and Sam Harris to industry leaders like Elon Musk and Bill Gates—are taking this future risk quite seriously.

Finally, a subset of GNR technologies will become not only more powerful but more accessible as well. As such, they'll place more power into the hands of smaller groups—at the extreme, they could empower malicious lone wolves working beneath the surveillance horizon to inflict catastrophic damage on society without us ever having known that they posed a threat. This trend applies most notably to the fields of biotechnology, synthetic biology, and nanotechnology. For example, in 2002, scientists at Stony Brook University succeeded in synthesizing a live polio virus entirely from scratch, relying on commercial DNA providers and publicly accessible online data. The point of this experiment was "to send a warning that terrorists might be able to make biological weapons without obtaining a natural virus."[22] In 2006, journalists at the *Guardian* managed to order "part of [the] smallpox genome through mail order."[23] And anyone with an interest in biohacking—or bioterrorism—can browse the genome of the Ebola virus online here: 1.usa.gov/1JsAqbs.

Similar claims can be made about advanced nanotechnology. Solitary individuals with a nanofactory in their garage could potentially manufacture huge arsenals of unprecedentedly dangerous weapons. More theoretically, an apocalyptic cult with a death wish for humanity might potentially design self-replicating nanobots capable of destroying the entire biosphere—the "gray goo" scenario—and while this remains highly speculative, current physics doesn't appear to rule it out.

Given the dual trends of exponential power and enhanced accessibility, it's not implausible to imagine a future in which a large number of citizens have access to their own doomsday machines—from nuclear weapons to designer pathogens, ecophagic nanobots, and weaponized artificial intelligences—that could wreak extraordinary havoc on civilization.[24] This is precisely why experts like Rees, Leslie, and Bostrom hold relatively gloomy views of the future: the total number of ways that civilization could destroy itself appears to be increasing. Not only are we still haunted by the natural risks that have always threatened our species, such as supervolcanoes, asteroid impacts, and pandemics, but advanced dual-use technologies are introducing brand new threats that we've never before encountered. As I've argued elsewhere, while scholars like Steven Pinker and Michael Shermer are correct that the world has been steadily "getting better" in myriad domains, it's also becoming far more dangerous than ever before.[25] By the end of the 21st century, the apocalyptic possibility of an all-out nuclear war, which engulfed the Cold War era in a miasma of existential angst, may be the least of our concerns.

The point is that active cataclysmic movements have come and gone throughout history, often in response to societal unrest caused by wars or natural disasters. In the past, though, apocalyptic groups that saw themselves as agents with a divine mandate to destroy the world (in order to save it) had limited options for achieving this goal. But our present milieu is different: we're entering a new epoch of advanced technology in which religious fanatics will actually be able to realize their apocalyptic fantasies. In the future, it could take only a single apocalyptic movement to ruin the party for everyone, given that advanced technologies are raising the stakes immensely.

The Need for New Atheism

The argument that I've outlined above should be of particular interest to the New Atheist movement, whose central message is that religion is not merely wrong, but dangerous. There is a profusion of historical evidence for this conclusion, from the Crusades to the current wave of Islamic terrorism. What I want to

emphasize here is that we are creating a new environment that will almost certainly amplify the dangers posed by religious dogmatism—perhaps quite significantly. If this is correct, it infuses the New Atheist movement with a special urgency and importance: we simply cannot expect to navigate the wilderness of risks before us by relying on faith-based beliefs in revealed "truths" about what reality is like, and more important, about how it ought to be. Our future depends upon humanity tethering its worldviews to reality by use of the best available evidence. In a phrase, *if the rationality of our ends fails to match the rationality of our means, then doom for our feeble species may be all but guaranteed.*

Secularists in the future will need to pay special attention to apocalyptic groups, whether state or nonstate actors. Those who actively hope for the apocalypse will be empowered like never before, and societal conditions may inspire them to act with greater fervor. The great tragedy is that if an apocalyptic event were to occur, it would not result in a new Heaven on Earth as religion promises. Rather, it would bring about an irreversible state of severe deprivation, if not our total annihilation.[26] **S**

REFERENCES

1. Ranstorp, M. 1996. "Terrorism in the Name of Religion." *Journal of International Affairs*. 50(1).
2. Hoffman, B. 1993. "'Holy Terror': The Implications of Terrorism Motivated by a Religious Imperative." RAND. http://bit.ly/1PksqQ2.
3. Cook, D. 2011. "Messianism in the Shiite Crescent." Hudson Institute. http://bit.ly/1OJkK5c.
4. Haija, R. 2006. "The Armageddon Lobby: Dispensationalist Christian Zionism and the Shaping of US Policy Towards Israel-Palestine." *Holy Land Studies*. 5(1). 75-95.
5. Bostrom, N. 2002. "Existential Risks: Analyzing Human Extinction Scenarios and Related Hazards." *Journal of Evolution and Technology*. 9(1). http://bit.ly/1Yv9fZK.
6. Landes, R. 2011. *Heaven on Earth: The Varieties of the Millennial Experience*. Oxford: Oxford University Press. Frances Flannery uses the related term "active eschatology" in her comprehensive and insightful 2016 book *Understanding Apocalyptic Terrorism* (New York, NY: Routledge).
7. Personal communication. See Juergensmeyer, M. 2003. *Terror in the Mind of God: The Global Rise of Religious Violence*. California: University of California Press.
8. Walls, J. 2008. "Introduction." In the *Oxford Handbook of Eschatology*, ed. Jerry Walls. Oxford: Oxford University Press, p. 10.
9. McCants, W. 2015. *The ISIS Apocalypse: The History, Strategy, and Doomsday Vision of the Islamic State*. New York, New York: St. Martin's Press.
10. Ceballos, G., Ehrlich, P., Barnosky, A., Garcia, A., Pringle, R., and Palmer, T. 2015. "Accelerated modern human-induced species losses: Entering the sixth mass extinction." *Science*. 1(5).
11. IPCC. 2014. "IPCC Press Release." http://bit.ly/1NK76yW.
12. Mayoral, A. 2012. "Climate Change as a Conflict Multiplier." United States Institute of Peace. 120. http://bit.ly/1QFAZGZ.
13. DoD. 2015. "DoD Releases Report on Security Implications of Climate Change." *DoD News, Defense Media Activity*. http://1.usa.gov/1JI4vYW.
14. CNS. 2015. "CIA Director Cites 'Impact of Climate Change' as Deeper Cause of Global Instability." *CNS News*. http://bit.ly/1O7r6iz.
15. Kelley, C., Mohtadi, S., Cane, M., Seager, R., and Kushnir, Y. 2014. "Climate change in the Fertile Crescent and implications of the recent Syrian drought." *Proceedings of the National Academy of Sciences of the United States of America*. 112(11). 3241-3246.
16. Holthaus, E. 2015. "New Study Says Climate Change Helped Spark Syrian Civil War." *Slate*. http://slate.me/1wGKf4J.
17. Mark Juergensmeyer discusses this very connection in a forthcoming chapter called "Radical Religious Responses to Global Catastrophe."
18. Moss, C. 2014. "How an apocalyptic plague helped spread Christianity." *CNN*. http://cnn.it/1ZnPq3F.
19. Abrams, D., Yaple, H. and Weiner, R. 2011. "A mathematical model of social group competition with application to the growth of religious non-affiliation." *Physics and Society*. 1-5. http://arxiv.org/abs/1012.1375.
20. Taylor, J. 2015. "Ayaan Hirsi Ali vs. John Stewart: Islam, liberals, and the media's dangerous double standard." *Salon*. http://bit.ly/1MfOF58.
21. Pamlin, D. and Armstrong, S. 2015. "12 Risks that Threaten Human Civilisation." Global Challenges Foundation. http://bit.ly/1L3qYLG.
22. Pollack, A. 2002. "Traces of Terror: The Science; Scientists Create a Live Polio Virus," *New York Times*. http://nyti.ms/1UifE47.
23. Randerson, J. 2006. "Revealed: the lax laws that could allow assembly of deadly virus DNA." *Guardian*. http://bit.ly/1QJnDJu.
24. A similar idea can be found in Fearon, J. 2003. "Catastrophic terrorism and civil liberties in the short and long run." Unpublished manuscript. http://stanford.io/1m6gDty. As Wittes and Blum comment in *The Future of Violence*, "Fearon's description of a future in which everyone carries around a button on his phone to destroy the world—we might call it today a 'killer app'—is a crude metaphor, but it may be a crudely accurate one." Wittes, B. and Blum, G. 2015. *The Future of Violence: Robots and Germs, Hackers and Drones—Confronting a New Age of Threat*. Basic Books.
25. Pinker, S. 2012. *The Better Angels of Our Nature: Why Violence Has Declined*. New York: Penguin Books; Shermer, M. 2015, *The Moral Arc: How Science Makes Us Better People*. New York, New York: Henry Holt.
26. This article borrows phrases from Torres, P. 2016. *The End: What Science and Religion Tell Us About the Apocalypse*. Charlottesville, Virginia: Pitchstone Publishing. For more, go to www.risksandreligion.org.