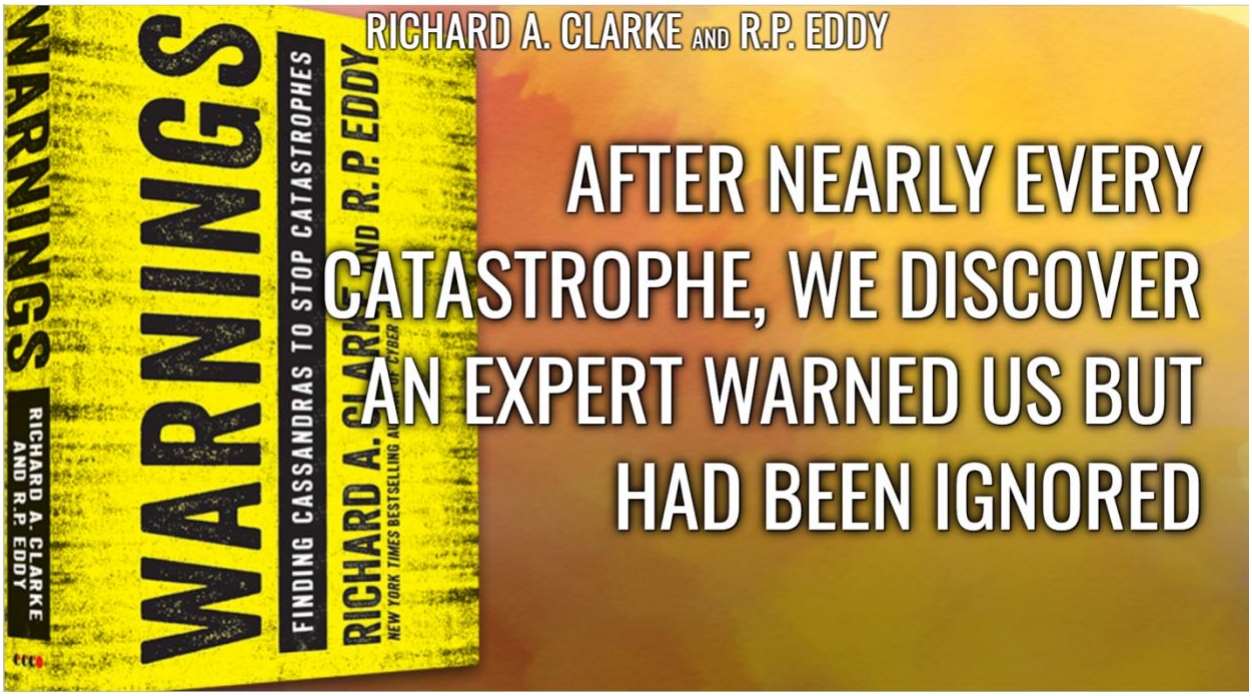
Warnings — Excerpt




## Chapter 1 – Cassandra: From Myth to Reality

There are people among us who can see the future. Often they clamor for our attention, and just as often they are ignored. We are right to discount most soothsayers, but horrible things happen when accurate warnings of specific disasters go unheeded. People die because we fail to distinguish the prophet from the charlatan. This book tries to find those rare people who see the future, who have accurate visions of looming disasters. Cassandra was a beautiful princess of Troy, cursed by the god Apollo. He gave her the ability to see impending doom, but the inability to persuade anyone to believe her. Her ability to pierce the barriers of space and time to see the future showed her the fiery fall of her beloved city, but the people of Troy ridiculed and disregarded her. She descended into madness and ultimately became one of the victims of the tragedy she foretold.

Are there Cassandras among us today, warning of ticking disasters, whose predictions fall on deaf ears? Is it possible to figure out who these seers are? Can we cut through the false warnings to tune in to the correct visions,

saving millions of lives and billions of dollars? That question is not about Greek mythology. It is about our ability today, as a nation, as an international community, to detect impending disaster and act in time to avoid it, or at least to mitigate the damage. Buried in billions of pages of blog posts and tweets, academic research, and government reports, Cassandra figuratively calls to us, warning of calamity. Often she is unheeded, sometimes unheard. Frequently she is given only a token response or dismissed as a fool or a fraud. Her stories are so improbable, so unprecedented, that we cannot process them or believe them, much less act upon them. The problem is, of course, that Cassandra was right, and those who ignored her may have done so at the cost of their own lives and that of their state.

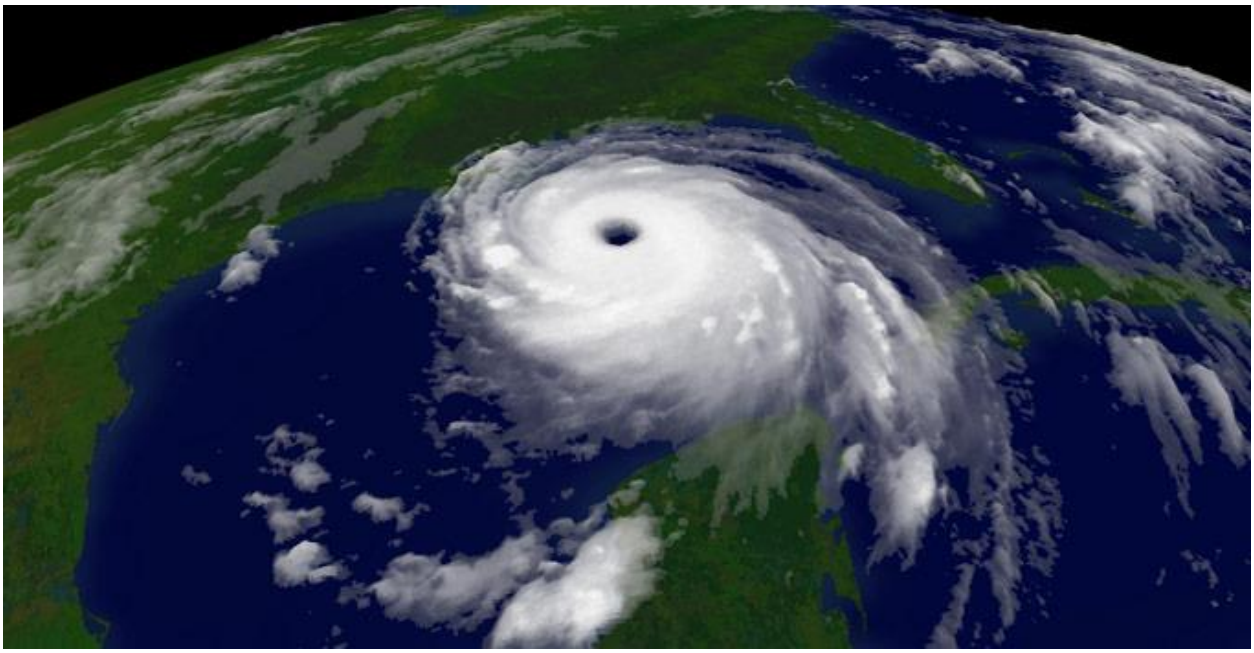
## Chapter 2 – The Spook: The Invasion of Kuwait

Charlie Allen wasn't planning a summer vacation. He hadn't taken one in years. July was just like any other month to him, days that began with him arriving at the office around five thirty a.m. and leaving some fourteen hours later. There were so many intelligence reports to read, so much intelligence collection to task. He didn't want to miss anything, and he certainly did not want to be surprised. Some colleagues thought him compulsive, obsessive, but he had not made it this far by overlooking any information of significance. Weeks, months, and years of work had culminated in this moment, a moment when he would be forced to exercise his authority to the fullest extent. It was a risky move, but he had been selected for this position precisely because he had such resolve. He let the intelligence guide his actions, and the intelligence had clearly spoken. Charlie reached for a red pen and his legal pad and, in big block letters, began to scrawl out the words, "Warning of War" at the top. This message would be delivered directly to the President of the United States.

That July, in 1990, Charlie was fifty-four and had worked exactly half of his life for the Central Intelligence Agency. Technically, he had been on loan from the CIA since 1986 to something called the National Intelligence Council (NIC). The NIC was a small organization housed in CIA headquarters, but in the larger government hierarchy, it actually sat above the dozen or more intelligence agencies. The Council was comprised of ten national intelligence officers (NIOs), each of whose job it was to coordinate among the various agencies on one set of issues and report anything significant to the White

House. But Charlie's issue was not a single issue at all. Charlie was the man in charge of an ominous portfolio called "Warning."

That morning, July 25, Charlie had been at work for over an hour, but the CIA parking lot was still empty, as were most of the offices in the headquarters complex. He was on his second cup of coffee, staring at a stack of photographs of Iraqi Republican Guard divisions that had initially moved south toward the Kuwaiti border on July 15. The camera that had taken their pictures was hundreds of miles up in space, spinning around the globe at thousands of miles an hour, and Charlie Allen had aimed it. Before he had left the office the night before, Charlie had ordered the satellite to image those elite armor divisions. Now, looking at the results of the imagery collection, he did not like what he saw



## Chapter 3 – The Rebuilder: Hurricane Katrina

After gaining strength during its relentless march through the Caribbean, the massive Category 3 hurricane swung north toward Louisiana. The small coastal communities in Plaquemines Parish and on Grand Isle would be the first to fall victim to the pounding rain, shearing winds, and most dangerous, the massive, fifteen-foot storm surge. Many longtime residents of the bayou had successfully ridden out past storms and refused to leave; even if they changed their minds at the last minute, the few roads heading north were already jammed with traffic. Barely further inland, the city of New Orleans, the Crescent City, the Big Easy, one of the cultural gems of the United States, was nearly as vulnerable. As the slow-moving storm made landfall over southeast Louisiana, emergency response officials huddling in the Louisiana State Emergency Operations Center braced for the worst. The looming catastrophic impact of the hurricane was beyond question. Ironically, the network of drainage canals that slice through New Orleans and are instrumental in pumping storm water into Lake Pontchartrain, just to the north, would help funnel the storm surge right into the heart of the city. Only the series of decades-old levees, floodwalls, canals, and pumps, constructed by the Army Corps of Engineers, stood between metropolitan New Orleans and complete devastation.

But the levees, never built to withstand a storm of this magnitude, were woefully inadequate. As the hurricane tracked slowly west past New Orleans, the storm surge flooded into Lake Pontchartrain, easily overtopping the levees. Within hours, the damage to metropolitan New Orleans was catastrophic. In addition to the rising floodwaters,

twenty inches of rain and 120-mph winds leveled buildings and homes, rendered major roads and canals unrecognizable as well as impassable, inundated hospitals with both victims and water, knocked out power and phone service, and flooded the region with sewage and hazardous chemicals. The human cost: 175,000 injured, 200,000 sickened, and at least 60,000 dead, many of whom were simply unable to evacuate because they were too old, sick, or poor to arrange reliable transportation out of New Orleans before disaster struck.

This was the hurricane New Orleans had long feared, but it was not Hurricane Katrina. It was a disaster-preparedness simulation called Hurricane Pam run by the U.S. Federal Emergency Management Agency (FEMA) in late July 2004, just over thirteen months before Katrina made landfall over the same part of the country. The exercise combined the expertise of some of Louisiana's foremost hurricane and disaster experts with emergency management officials from the federal, state, and local levels. The Cassandras hoped, after decades of halfhearted fixes punctuated by willful neglect, that their warnings to seriously plan for and mitigate the hurricane threat to New Orleans had finally been heeded. Tragically they learned, barely a year later, they were wrong.

## Chapter 4 – The Arabist: The Rise of ISIS

The Arab Spring came in winter. It was mid-December 2010 when a final act of protest by a street vendor, protest by self-immolation, uncorked widespread, pent-up frustration against the aging dictator of Tunisia. Few people in Washington noticed. The Senate was closing for the holidays, leaving much work incomplete. On the list was President Obama's request to fill the long-vacant U.S. Ambassador's slot in Damascus. As soon as the senators left town, Obama used his right to make recess appointments, designating Robert Ford, the Foreign Service's leading expert on Arab affairs, the new U.S. Ambassador to Syria.

As Ford was unpacking in Damascus a month later, protests in Tunisia reached a crescendo, and President Ben Ali fled the country. Around the Arab world, people stopped in amazement and watched on television news what they would later call the Arab Spring. No one could seem to remember any Arab ruler being driven from office by street protests in recent history. The only long-serving Arab dictator recently run out of town was the one who had been expelled by American tanks almost eight years earlier. Could what just happened in Tunis occur elsewhere? That's what people in Damascus were asking as Ford made his introductory calls around town. Unspoken was the question: could it happen here? It seemed very unlikely, Ford heard people say. Tunisia was a one-off. That was what all the self-proclaimed experts said over little glasses of hot tea and demitasses of thick Arab coffee. Every Arab country is different from the others,

after all. That is what Syrian President Assad told Ford directly, dismissing any parallel, any similarity.

Ford had been to most of the countries in the Arab world during his twenty-nine years in the U.S. Foreign Service. He previously served as U.S. Ambassador to Algeria and deputy ambassador to Iraq. He was not sure that the those who saw Tunisia as an aberration were right. He was acutely aware of the frustration in most Arab countries, the perception in the "Arab street" that many of the ruling regimes could not successfully do anything to improve the living conditions and futures of their people. The numbers of disaffected were ever increasing. Many were young and unemployed. Ford had already served half a decade in U.S.-occupied Iraq, where he dealt with the violence and factionalism that had come rushing out of every nook when Saddam Hussein was deposed. Only now, eight years later, were U.S. forces getting to the point where they thought that the insurgents had finally begun to give up and accept the U.S. presence.

In those first few months of 2011, while Ford was settling into Damascus, protests began to form elsewhere around the Arab world, tentatively at first, then in unprecedented crowds, seen on television and followed on the new social media apps. By the time winter ended, the dictators in Egypt, Libya, and Yemen had been deposed. It seemed like a tsunami in the desert. The Spring was infectious. In March, protests began in Damascus.

For many in Syria, it seemed that it was time, time to protest against the rule of the Assad family and the minority Alawite sect that had gone on for over forty years. Maybe the Syrian dictator, like those in Yemen, Egypt, and Libya, could also be scared out of office by a few weeks of mass protest. Maybe the Americans and Europeans would bomb him, as they had done to Qaddafi in Libya. The rallies spread to other Syrian cities. In Hama, over three hundred thousand people took to the streets. Ford was not just watching; he was collecting information and intelligence, talking to everyone he could throughout the country, judging the depth and direction of the movement, and reporting back to Washington. He urged the State Department to make clear that the U.S. supported the peaceful protests. Washington agreed and authorized the U.S. Embassy to continue expanding contact with human rights groups and other elements of civil society, as well as opponents of the Assad regime.

## Chapter 5 – The Seismologist: Fukushima Nuclear Disaster

Waves and castles, high waves and castles destroyed, the images kept going through Yukinobu Okamura's mind. Images of destruction from the distant past haunted him, but he feared for the future, the very near future. It was June 2009.

Dr. Okamura listened carefully as a panel reported on the readiness of Japan's Fukushima Daiichi nuclear power plant to withstand a severe natural disaster. Okamura was a noted seismologist whose opinions and warnings the panel ought to heed. At least he hoped they would. He had something new and important to share.

Japan's Nuclear and Industrial Safety Agency (NISA) was holding meetings to discuss the particular safety needs of each of the country's seventeen nuclear power plants. The nuclear reactor campus in the Fukushima Province lay outside of the small provincial capital city of the same name, a seaside city of three hundred thousand people about 125 miles north of Tokyo, on Japan's east coast. Fukushima Daiichi, the six-reactor nuclear power plant complex, was owned and operated by Tokyo Electric Power Company (TEPCO). For TEPCO, safety at Fukushima meant focusing on earthquakes.

Earthquakes are a very real and significant risk to nuclear power plants, warranting special measures. Memories of the Chuetsu offshore earthquake of 2007 were still fresh. The magnitude 6.6 quake had sent tremors from Niigata, in western Japan, all the way to Tokyo.

It caused a fire to break out in a transformer building at the world's largest nuclear complex, Kashiwazaki-Kariwa, another nuclear plant run by TEPCO. Radioactive gases

leaked. Water from a pool of spent nuclear fuel entered the sea. The plant was effectively shut down for two years. TEPCO did not want that to happen again. Neither did the government.

With this recent event in the forefront of everyone's mind, the Fukushima panel's focus on earthquake geology was understandable. Its members sought to assess whether and to what extent Fukushima faced similar vulnerabilities. Before presenting its findings at the larger meeting where Okamura voiced his concerns, the panel had met twenty-two times. Tsunamis were never on the agenda. NISA, which predetermined most of each panel's considerations, did not see tsunamis as likely enough in the Fukushima region to warrant consideration. "An operator of nuclear plants needs to take a precaution even against an extremely rare natural disaster," Okamura later asserted. "Even if there was only a slight chance," he added, TEPCO "should have taken action."1 But the seven-member panel did not include a tsunami expert.

In creating safety guidelines for Fukushima, the panel used data from the largest earthquake recorded in the area, a major one from 1938, one that measured 7.9 on the Richter scale. That earthquake had caused a small tsunami and, at Fukushima, the reactors were close to the sea. Therefore, TEPCO thought that a seawall was necessary at Fukushima, in case that kind of tsunami happened again. They built a wall about nineteen feet above ground. It would have stopped the 1938 tsunami from flooding the reactor complex.

Dr. Okamura is a short man with a quiet voice, and it took considerable effort to convince him to share any of his story with us. He is a well-respected expert, director of Japan's Active Fault and Earthquake Research Center, but not a famous scientist. Okamura had been what many Japanese call a salary man throughout his respectable career, doing his work well, without any splash or complaint, and slowly rising through the ranks. But on this day in June 2009, this quiet little man had something big to say, and since then Okamura has regretted not saying it louder. Considering the threat of a significant tsunami in the region, he later reflected, "The truth is, I felt it was high time to speak up."


## Chapter 6 – The Accountant: Madoff's Ponzi Scheme

A snub-nosed .38 revolver, the kind of gun that Jack Ruby used to kill Lee Harvey Oswald in the basement of the Dallas police headquarters, is an old-school handgun, a relic, the stuff of 1940s mobsters in fedoras, but it's reliable and shoots straight. It will do just fine in a close ambush where you have to move fast and it's all over in a shot or two. After all, that's the kind of situation Harry Markopolos figured he'd be facing if somebody was going to be coming after him. Markopolos checked the cylinder, snapped it home, and tucked the revolver back into his holster. He was ready for the day.

Harry Markopolos was a certified financial advisor, working as a portfolio manager for a good-size investment company in Boston. Men in his line of work do not normally need to fear hit men, but there was nothing normal about where Markopolos found himself. He was the leader of a small group of finance professionals who were secretly investigating Bernie Madoff. They knew Madoff was running a secretive, exclusive, money-management service, with clients ranging from Palm Beach princesses to European royalty to Russian mobsters. But Harry also knew Madoff was nothing but a hollow sham.

In 2008, Madoff was arrested and confessed to the FBI. After the bottom fell out, $65 billion vanished overnight. Thousands of investors were wiped out—lost their retirement savings, forced to sell homes, flung overnight from security to desperation. Three people, if not more, died violently.

But this was 2002, and Harry Markopolos was desperately trying to convince the Securities and Exchange Commission (SEC) to bust Madoff. For two years, Markopolos had been trying to get the watchdog agency to do something. Then he would keep on trying for six more years, bombarding the S.E.C. with letters, meetings, mathematical proofs. It didn't do any good.

Meanwhile, Madoff's elaborate fraud was still getting larger. His investors had already entrusted more than $12 billion to him. He was earning them great returns, at least on paper, reporting profits that ran into the hundreds of millions for some, even billions. And Markopolos was pretty sure some of them would kill to keep it that way.


## Chapter 7 – The Inspector: Mine Disaster

On Easter the mine was shut. The steep hills and secluded valley towns of southern West Virginia were covered in blooming redbud trees and brilliant forsythia, signaling the end of the long winter. Miners and their families dressed up a bit more than usual for church that day. Easter Sunday was special, and for twenty-nine of the miners, it would be their last.

Returning to the Upper Big Branch Mine early Monday morning, the miners noticed that the air was unusually still. Miners are always attentive to air flow, to ventilation. A few hours later, an explosion and fireball roared down those miles of tunnels, flaming forward at a thousand feet per second, scorching the mine and killing the miners. Joe Mackowiak had feared it would happen. He had tried to stop it.

In this chapter we examine another example of the federal government's attempts to institutionalize warning. Like the U.S. intelligence community's attempt to institutionalize warning by creating a national intelligence officer for warning, the government's efforts to set up a bureaucratic system to predict and prevent mine disasters had succeeded only in predicting, not in preventing. Joe Mackowiak was a key part of the federal government's attempt to create a Cassandra-like system, an agency to warn of impending disasters in the mines. Why did he see the disaster at Upper Big Branch coming when the company did not, and why was he ignored? How is it that, even when a calamity is predicted by government officials, the very people who presumably have access to the resources and authority needed to avert it, the tragedy occurs anyway?

What happened in West Virginia at the Upper Big Branch Mine began well before Easter weekend in 2010. The system and the disaster are part of a broader narrative of the U.S. mining industry that goes back more than a century.


## Chapter 8 – The Market Analyst: The 2008 Recession

In August of 2007, Meredith Whitney overheard a comment at a cocktail meet-and-greet for financial analysts at Citigroup's New York City headquarters that inspired her to do something that shattered the world's financial markets.

Whitney was a junior associate at a relatively small investment firm, and owing to Wall Street's predominance of males, was "one of the only chicks in the room," as she told us. That didn't intimidate her, though. "It's not like I don't add value to a conversation."

The host of the event was Gary Crittenden, the chief financial officer of Citigroup. At the time, Wall Street was being rocked by the unraveling of hedge funds, the meltdown of the mortgage industry, and problems with trusted investments like money market funds and previously secure firms like Bear Stearns. As the analysts chatted with Crittenden, one of the highest ranked analysts on Wall Street said he had given up trying to analyze Citigroup because it was too difficult. Hearing that, Whitney said, "I fell back on my heels." Why should it be harder to analyze the largest bank in the world than any other financial institution? And how could any self-respecting analyst intentionally avoid doing so? "That's your job. How could you have given up?" she asked.

"I thought, he may not have been able to do it, but I can do it." she said. "It kind of put a bee in my bonnet, though that's an uncool way to put it. I had a point to prove that any company is analyzable. How can you take Citigroup, such a revered institution, and say you don't understand it? You can't say they're off limits because you don't understand."

In mid-September, Whitney set about scrutinizing Citigroup's balance sheets and was astonished by what she found. Though the bank was known to have problems, the extent of those problems was much greater than anyone had acknowledged—so great, Whitney realized, that it had the potential to shake the global economy.

## Chapter 9 – The Cassandra Coefficient

The preceding chapters were stories of gloom, and made more painful by the fact that in each instance a Cassandra was pounding the table and warning us precisely about the disasters that came as promised. The people with the power to respond often put more effort into discounting the Cassandra than saving lives and resources. Thus, each of these predictions turned into Cassandra Events: warning given, warning ignored, and, of course, catastrophe.

There are many systems and techniques being used today by governments, financial advisors, investors, and futurists to look over the horizon to detect disasters. We are unaware, however, of anyone who is using a technique to seek out possible Cassandras and vetting them and their warnings against the qualities and experiences of past Cassandras. We think that such a technique should be developed and employed. In this chapter we suggest how that might be done, and in the rest of the book we apply our technique to some people and issues that today may be exhibiting the telltale signs of future Cassandra Events.


## Chapter 10 – The Computer Scientist: Artificial Intelligence

Twenty of the wing-shaped drones launched from the deck of the supercarrier U.S.S. Gerald R. Ford and quickly disappeared over the horizon toward the Chinese-held islands. Communications with the drones were lost quickly due to the Chinese military's jamming the command and control frequencies. Instantly, the drones switched into autonomous mode. They communicated with each other using lasers that could not be jammed. Soon, the swarm of drones, acting as one integrated attack force, spotted the ships. Matching their multispectral collections with on-board data sets, they identified the assorted destroyers, frigates, and one aircraft carrier as enemy combatants. Almost instantly, the drones ran millions of calculations and decided which of the ships were the biggest threat and would be attacked first. Then they decided which drone would attack what target. Then the assault began, with the swarming drones launching missiles at the Chinese Navy squadron from seemingly every direction and altitude.

The U.S. Navy had that scenario in mind when it developed the X-47B, the first drone to be launched from and recovered on an aircraft carrier. The Northrop Grumman aircraft was designed to fly in swarms, identify enemy targets, and attack them autonomously, without a human in the loop.

The U.S. Air Force has also been planning for lethal autonomous drones, writing in its "Unmanned Aircraft Systems Flight Plan 2009– 2047" that it was only a matter of time before drone aircraft would be making life-and- death decisions on their own using artificial intelligence (AI) software.

Those U.S. military plans for autonomous lethal systems using AI came to a halt, at least for now, when then Secretary of Defense Leon Panetta issued Department of Defense Directive 3000.09 in November 2012. That Pentagon policy banned the use of lethal autonomous systems. The directive was needed because the technology to create such "killer robots" had already been achieved. Indeed, ten years ago the Department of Defense had developed the LOCASS, the Low Cost Autonomous Attack System, a jet-powered bomb that would fly around until it saw what it thought was an enemy vehicle and then attack it, again without a human in the loop. While technology exists for AI-driven weapons, we humans are not quite up to speed on how safe they are or will be, or how to use them.

## Chapter 11 – The Journalist: Pandemic Disease

The virus was so deadly that the entire populations of some Alaskan Inuit villages were killed before word made it out that they needed help. Sled dogs, now abandoned, broke their tethers, roamed wild, and survived on the frozen human remains scattered where the sick dropped in the streets and the houses of the town.

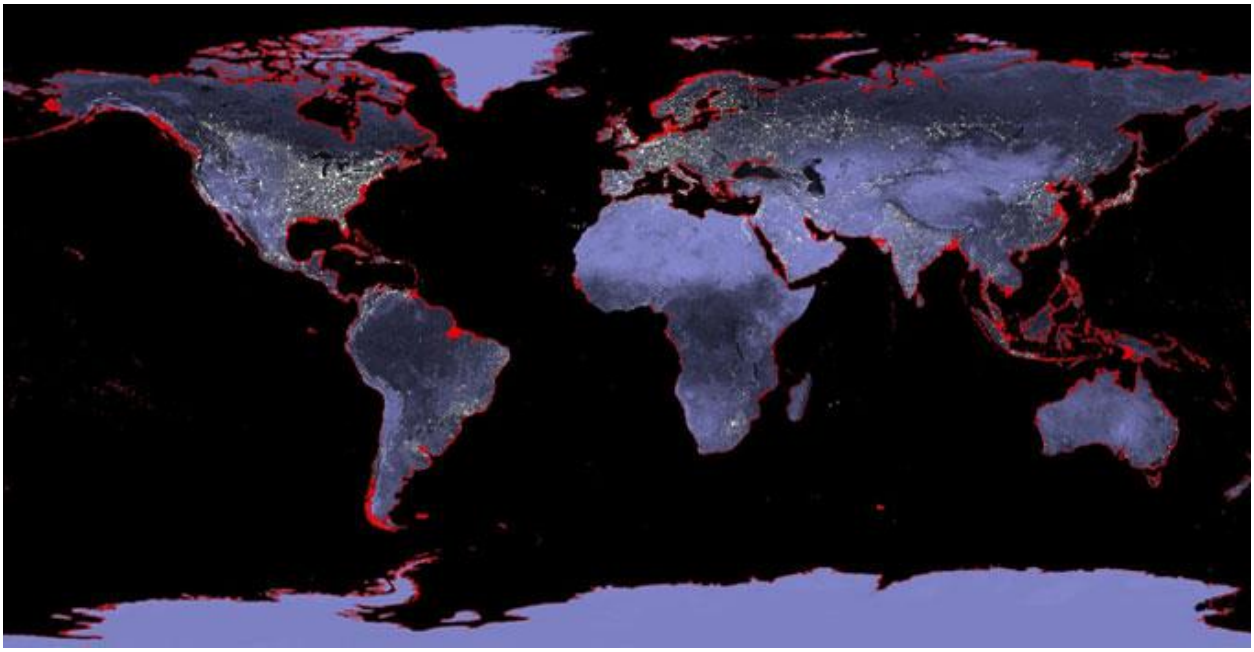
The bug emerged after jumping from birds to pigs, then infecting French soldiers on the battlefields of World War I. It took twenty-four months to make it to Alaska, and before it was over, the Spanish flu (1918-1920) had killed more people than the Great War. In 2009, an outbreak of a nearly identical virus spread rapidly through Mexico and the southwestern United States. The World Health Organization (WHO) declared a pandemic; President Obama declared a national emergency. Four strains of influenza had incubated and reasserted in their animal hosts: American ducks and chickens, Mexican and Asian pigs, even northern sea otters of Washington state, before jumping to humans in Veracruz, Mexico. Within twelve months, the virus had struck every nation of the world.

Spanish flu was not on R.P.'s mind in the mid-1990s. Overseas, after meetings with foreign defense officials, he escaped to a bar to test the local beer. An older man came in behind him, sat down, and sparked up a conversation. Beyond his short haircut, nothing was notable other than the man's steady persistence at conversation. They shared a beer's worth of small talk, then he put his hand on R.P.'s elbow, lowered his voice, and confided that he had followed him into the bar.

The man hoped to trade highly classified secrets for U.S. asylum. An active-duty, senior military scientist working on the covert weapons program of a state we had long suspected of violating the Biological Weapons Convention, he wanted out. This scientist was terrified of the impact from the germs he had been ordered to design. Ebola . . . anthrax . . . chimeras . . . recombinants. The beer got suddenly less interesting.

With some calls back to D.C., R.P. arranged for the appropriate agencies to vet and handle this walk-in. Having worked the bioweapons and disease portfolio on the National Security Council, he was amazed by the disclosure and was curious to hear what our biological weapons experts thought. Our scientists at the U.S. Department of Defense were startled and found the information hard to believe. The source told a tale of hidden labs mixing and matching bacterial and viral DNA to brew up the diseases of doctors' nightmares: a superbug that's transmissible by air (perhaps via a sneeze) and kills a large percentage of the infected. A new disease that spreads like the flu and kills like smallpox could wipe out a billion people in six months with no reason to think it would stop there.

Our brightest minds felt the scientific tools at that time were simply not available to create these chimeras. They didn't think the walk-in's nightmare Andromeda strains could be real. They weren't sure if he believed what he was saying, but they didn't. That was then.



## Chapter 12 – The Climate Scientist: Sea-Level Rise

Symposium is a small Greek restaurant just off the Columbia University campus in the Morningside Heights neighborhood of New York City. It has all the makings of a New York ethnic restaurant, with exotic smells and a Greek staff churning out hummus and gyros, eggplant and baklava. Dr. James Hansen, wearing a denim button-up shirt and a leather-brimmed cap, arrived promptly at noon looking more like Indiana Jones than the planet's leading mind on climate change.

When we asked people for names of potential future Cassandras now among us, one name kept coming up: James Hansen. The problem was that he had already proven himself as a Cassandra, maybe the Cassandra of the last forty years. He put the issue of climate change on the world's agenda, over the yelling-and- screaming objections of two Bush Administrations and those in the oil and gas industries. He had risked his career but had ultimately been proven right. Now he was at it again. This time he is predicting rapid and massive sea-level rise, and again he is being criticized. If he is right once more, we are in very deep trouble, for sea-level rise will be faster and higher than even leading climate change experts believed possible.

Hansen is currently the director of the Climate Science, Awareness, and Solutions program at the Earth Institute of Columbia University. Before his time with the Earth Institute, he was the director of the NASA Goddard Institute for Space Studies (GISS) from 1981 to 2013. There he built the center into a global leader in atmospheric modeling and climate change studies. He was trained in physics and astronomy at the

space science program of Dr. James Van Allen at the University of Iowa, but has focused his research on Earth's climate, an interest slowly evolving out of his planetary study of Venus's atmosphere. He was elected to the National Academy of Sciences in 1995 and was named one of the 100 most influential people on Earth by Time magazine in 2006.

We thought that spending some time with Hansen would give us an opportunity not only to probe him on his predictions about sea-level rise, but also to understand how being the Cassandra on climate change in the 1980s and '90s had affected him. We wanted to know how this Cassandra stood up to criticism, what drove him, how he approaches the issues he deals with, and more generally, who he is as a person. We quickly found out.