RETHINKING THE UNTHINKABLE:
WHY FAILURES OF IMAGINATION, PROJECTION, AND STRATEGY COURT NUCLEAR CATASTROPHE

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THE SATURDAY FROM NUCLEAR HELL

On Saturday, October 27, 1962, Cuban dictator Fidel Castro concluded that a U.S. invasion of his island would be launched within hours. Castro urged Soviet premier Nikita Khrushchev to preempt the invasion by launching an all-out nuclear first strike. Sergei Khrushchev, son of the premier, recounted what then transpired.[1]

Wanting to convey the response he had drafted as rapidly as possible, the Soviet leader proposed sending it by radio. A colleague volunteered to bring the message to the Moscow Radio Center. But neither he nor his driver knew exactly where the center building was located. When, finally, they arrived, the messenger rushed into the elevator. But the elevator was old, and stopped between floors. A repairman was sent for. But it was Sunday and no repairman was available. The messenger tried to slip the envelope with the message through the crack. But the raised red official seal blocked access. So he started passing pages through the crack to the radio room, one at a time. Then the elevator restarted and completed its ascent.

Already on “Black Saturday” an American U-2 reconnaissance plane had been shot down over Cuba, killing the pilot. And at the other end of the United States a second U-2 had flown off course while trying to gather atmospheric data on nuclear tests. The jet penetrated hundreds of miles into Soviet airspace, but returned to base without being shot down. President Kennedy said: “There’s always some sonofabitch who doesn’t get the word.”[2]

But that fateful Saturday there was another "sonofabitch" who didn't get the word: the captain of a Soviet diesel submarine, one of four being tracked by the U.S. Navy. An American destroyer captain was using charges to force the sub to surface. Unbeknownst to him the sub's armament included a nuclear-tipped torpedo carrying a 10-kiloton warhead—roughly 70 percent of the explosive yield of the Hiroshima atomic bomb and half that of the A-bomb dropped on Nagasaki. *A lieutenant had the authority to arm the warhead*. Though the captain was under strict orders from Moscow to get explicit authorization before using the weapon, he was so angry at what the American ship was doing that he resolved to fire the torpedo. Only strong argument from his fellow officers dissuaded him. Communications with Moscow would have required that the sub first surface.

Coincidentally, that very Saturday saw the U.S. conduct a routine scheduled atmospheric test of a hydrogen bomb yielding 800 kilotons—40 times the power of the Nagasaki bomb. The mushroom cloud rose 60,000 feet—over 11 miles. And—you can't make this up—the code name for the test was . . . CALAMITY.[3]

Castro, told by Moscow that in event of a nuclear exchange his island would disappear and him with it, still wanted a first strike. According to former Soviet ambassador to the United States Anatoly Dobrynin, Castro "even suggested that our ambassador withdraw with him to the bunker built at the command post in a cave near Havana."[4] Had Fidel somehow survived he'd have come out of his bunker to see a landscape without Havana; B-47 bombers based in Florida carried

bombs with yields ranging from 10 to 20 megatons, 500 to 1,000 times that for the Nagasaki bomb.

All this, mind you, with Khrushchev having moved missiles into Cuba as a gigantic bluff. He knew that the United States had overwhelming nuclear superiority in long-range strategic warheads, some 18 to 1. But he had told his son, Sergei, that Kennedy would "make a fuss, make more of a fuss, and then agree" to permit the missiles.[5] In 1960 Sergei, who worked in rocket design, asked his dad at dinner about his boast that the Soviet Union was turning out rockets "like sausages": "How can you say we are producing rockets like sausages, father? We don't have any rockets." His dad replied: "That's all right. We don't have any sausages either."[6]

The wily Khrushchev had bullied JFK at the June 1961 summit in Vienna; the young president told columnist James Reston that the Soviet leader "beat the hell out of me."[7] Emboldened, on August 13, 1961, Moscow and its East German satellite began stringing barbed wire across the heart of Berlin, in flagrant violation of the four-power treaty that gave all signatory parties access to all sectors. What became the Berlin Wall would divide the city for over 28 years, until November 9, 1989. Kennedy told his advisers that he was not prepared to risk World War III to stop it.[8] However defensible his cautious calculus, it convinced Khrushchev—described by U.S. intelligence as a "chronic, optimistic opportunist" with "resourcefulness, audacity, a good sense of political timing and showmanship, and a touch of the gambler's instinct"[9]—that he could get away with placing missiles in Cuba, in violation of the Monroe Doctrine. (Khrushchev's

psychological traits are also abundantly present in Vladimir Putin.)

We have witnessed within the past few years the virtual disintegration of the postwar *Pax Americana* that for nearly seven decades dominated global geopolitics. Forces are rushing into the vacuum: we face a nuclearizing, revolutionary Iran; a revanchist Russia under a 21st-century tyrant who patterns himself after imperialist Romanov tsars; and a Chinese gerontocracy presiding over the world's now-largest economy, committed to restoring China to the position of global dominance it held for most of the 2,000 years since the end of Augustan Rome. Growing global disorder evokes the second law of thermodynamics: "In all energy exchanges, if no energy enters or leaves the system, the potential energy of the state will always be less than that of the initial state." In other words, absent physical work performed to maintain order, a system moves from order towards disorder—its entropy (instability and hence uncertainty)—increases, making the system less stable. The post-1945 global order disintegrates with no stabilizing force in sight; alliances erode as rogues conspire. Nuclear proliferation—known 50 years ago as the "N+1 country problem"—could easily spawn nuclear novices N+1 through N+10; geopolitical entropy would increase accordingly.[10] Leaders unschooled in nuclear matters, with small, vulnerable arsenals, will raise nuclear risks.

Which brings us to nuclear black swans and white doves in the making. *The former arise when our imaginations fail us; the latter arise when we project our cultural values onto people in alien cultures*.

BLACK-SWAN SARAJEVOS: FAILURES OF IMAGINATION

The term “black swan” refers to seemingly improbable events that nonetheless happen, especially at times when universal assumptions run against their occurrence. Call it Murphy’s law for math majors. For a century “Sarajevo”—where Archduke Francis Ferdinand and his wife were assassinated, thus triggering a black-swan sequence of interlocking mobilizations, then a war that brought an end to the old European order—has symbolized the potentially catastrophic consequences of clueless leadership. The war claimed 16 million lives and shattered four empires.[11] It also accelerated the decline of the fabled British Empire on which the sun was never to set. It spawned two totalitarian tyrannies: the Nazi Third Reich, which started World War II and perpetrated the Holocaust before being defeated; and the Marxist-Leninist Soviet state, which proved decades more durable, spinning off several genocides—in Ukraine, Cambodia, Ethiopia, and, on the vastest scale in human history, Mao Zedong’s China.

Leaders whose formative and early adult years were in the 19th century lacked meaningful understanding of the destructive power of emerging military technologies, especially the artillery barrage and machine-gun fire. Perhaps more significant, technologies of destruction simply outran technologies of command, communications, and control. Once troop trains left their home depots, those authorizing departure could not reverse their passage without risking a surprise counterattack. Between the trenches messengers sprinted on foot or rode on horseback, as had been done for thousands of years. There were some (though not many) telegraph lines suitable for fixed

installation for intermittent communications with battlefield commanders, but hardly any radio communication links to enable real-time communication.

The prescient Winston Churchill was among the few who understood the direction of modern warfare. In 1900, his first year in Parliament, Churchill envisioned a European war far more costly than colonial wars. It would involve a long, all-out effort engaging the entire population and suspending operation of peaceful industries. Churchill warned his colleagues: "Democracy is more vindictive than Cabinets. The wars of people will be more terrible than the wars of kings."[12]

This failure to imagine what modern warfare would look like was pervasive, Churchill being a rare exception. Another pervasive failure of imagination can be seen in the strategic intelligence failures of the nuclear age—notably serial surprises when countries suddenly tested a nuclear weapon.[13] Harking back to Japan's 1941 surprise attack on Pearl Harbor, nuclear strategist Thomas Schelling noted:

> *The danger is not that we shall read the signals and indicators with too little skill; the danger is in a poverty of expectations—a routine obsession with a few dangers that may be familiar rather than likely.*[14]

In her Bancroft Prize–winning 1962 study, *Pearl Harbor: Warning and Decision*, Roberta Wohlstetter explained why Japan's bold move achieved complete surprise: First, despite having cracked Japan's top diplomatic code, intelligence officers were unable to separate wheat from chaff—in communications parlance, to distinguish signals from background noise.[15] Second, given ambiguous information susceptible of multiple good-faith interpretations, people naturally

leaned towards one consonant with their own instinctive preferences and values.[16]

Further compounding such failures was the problem of "stovepiping." Recipients of strategically decisive information were unable to get the information to President Roosevelt and senior military leaders because disparate agencies did not share critical data with one another. Twentieth-century history is full of examples of strategic surprise, in which enemies launch successful attacks by acting contrary to expectation.[17]

There are notable examples of nuclear intelligence failures besides Moscow's Cuban nuclear power play that "genuinely shocked" the Kennedy administration.[18] Successful predictions of nuclear plans and the progress of hostile states are in fact rare. Thus, we were surprised by the 1949 Soviet, 1964 Chinese, 1974 India, and 1998 Pakistani tests. Though North Korea had told us in 2002 it had an A-bomb capability, only with its 2006 test could we be sure of it. And we were surprised to learn after the 1991 Gulf War how close Saddam was to the bomb.[19]

Strategic surprise can also be gradual; Roberta called this phenomenon a "slow Pearl Harbor" in a 1979 essay.[20] She cited her husband Albert's pioneering work showing that from 1962 to 1969, U.S. intelligence consistently underestimated Soviet intercontinental ballistic missile (ICBM) deployment, with even high-end estimates often below the actual Soviet numbers. *Far from improving with experience, these estimating errors grew worse with time*. *Thus the 1962 CIA estimate proved 85 percent of the actual number; but the 1969 estimate turned out to be less than 20 percent of the actual*

number. Convenient assumptions guided intelligence policy, rather than logical inferences from incoming evidence. Albert used to criticize optimistic views of how much of America's nuclear force would survive a surprise attack, calling such projections "U.S.-preferred attacks."[21]

Sadly, nuclear policy black swans often fly with white doves.

WHITE-DOVE MUNICHS: FAILURES OF PROJECTION

Perhaps the most treacherous foreign policy trap into which leaders and publics can fall is the analytical fallacy called “mirror-imaging.” Logicians explain this as the projecting of one’s “personal feelings, beliefs, or attitudes” onto another person, without supporting empirical evidence.[22] Western leaders are ever on the lookout for leaders seeking peace; even hawks at times see peace doves in the wrong places. The most obvious 20th-century example is British prime minister Neville Chamberlain, who believed that he could make peace with Hitler and Mussolini. To pick a current example, Secretary of State John Kerry called Vladimir Putin’s seizure of Crimea an “incredible act of aggression,” adding: "You just don't in the 21st century behave in 19th century fashion by invading another country on completely trumped up pretext."[23] Alas, where Kerry sees flocks of peace doves filling the sky, Putin sees flocks of prey.

Nor should Kerry be surprised. If one can know people by their heroes, consider Putin’s: a portrait of Tsar Nicholas I hangs in the vestibule to his office. Nicholas, known to his suffering subjects as “the cudgel,” came to power in December 1825 by crushing the social democratic Decembrist revolt; intensified persecution of the Jews in mid-term; and started the Crimean War near his end. Note that Putin also has a portrait of Peter the Great, whose imperial designs included the Baltic. I’d feel safer if he had a portrait of Tolstoy.

Our culture is one in which conciliation is often seen as a sign of strength and confidence. Make a gracious gesture, and see it

reciprocated. This works fine if at the portal of New York's fabled 21 Club, a gentleman steps aside and lets a lady enter first. But consider a different approach, that of 1960s light-heavyweight contender Frankie De Paula. On the first day of a stretch in prison for robbery, De Paula found the biggest guy in the prison yard and knocked him out cold; this won him respect for his entire stay. At 21 such behavior would lead to the constabulary being summoned. Put plainly, the larger world more resembles the prison yard than the genteel 21.

It is in our civilizational DNA to seek out signs of humanity in improbable places. After Soviet leader Leonid Brezhnev died in 1982, he was succeeded by Yuri Andropov, then KGB chief, who had been instrumental in crushing the 1956 Hungarian revolt. Stories suddenly surfaced that he liked scotch and jazz, hinting that he was a closet liberal. In fact, there is no evidence he liked either. One look at Andropov's grim visage suggests that he was an unlikely candidate to sing "Satin Doll" while Duke Ellington—hugely popular in Russia—played piano backup. To cite another example: Harry Truman initially liked "Old Joe" Stalin, genocidal mass murderer of millions, perhaps for his quip at the postwar Potsdam Conference. During a break in the proceedings Stalin asked Winston Churchill what should be done with the German fleet. The prime minister replied that the fleet should either be shared or destroyed. Stalin shot back: "Let's divide it. If Mr. Churchill wishes, he can sink his share."[24] President Obama offers a more recent example: his tepid response to Putin's invasion of Ukraine ignored the security guarantee in the 1994 Budapest Memorandums, signed by the United States, United Kingdom, and Russia,[25] in

exchange for Ukraine's surrender of its 5,000-warhead nuclear stockpile, then the third-largest extant. No wonder the Baltic nations have implored NATO to send troops to act as a Cold War era "trip wire"; they want NATO—and especially the United States—to honor the NATO treaty's pledge that an attack on any member country is deemed an attack on all.

In judging how an Iranian nuclear weapon could change geopolitics, consider who holds the high cards: Supreme Guide Ali Khamenei. Is he more likely to behave like Nikita Khrushchev in 1962, who sought from the second day to pull back from the brink when he realized JFK would not fold; or is he more likely to emulate Fidel Castro, a fanatical ideologue who was prepared to see his 7.5 million subjects and his island incinerated, rather than surrender power? Will conciliation mollify Iran's leaders, who continually insist that Iran has a legal right to enrich uranium—a right not found in the Nonproliferation Treaty, which Iran signed the first day it was released? Or will conciliation embolden them, as it did Vladimir Putin, who recently placed tactical nukes in Crimea?[26] The mullahs have yet to honor a major bargain with us. So bet on the latter.

Experience shows us that civilizational value systems play a role in how different cultures and countries view catastrophic events. For example, the massive losses sustained in World War I by Britain and France irremediably scarred those countries, while Soviet Russia's far greater losses in World War II did not prevent the conflict from being remembered as the "Great Patriotic War"—a grand victory over the fascist foe.[27] Or consider the calculation of Ali Akbar Hashemi

Rafsanjani, a former president of Iran considered by many in the West to be a relative moderate. He stated in 2001 that a nuclear exchange with Israel would work in Iran's favor: if Israel lost 5 million people it would be obliterated, while Iran could lose 15 million people and survive.[28] No Western country would consider a 3 for 1 nuclear exchange—or any such war—a "victory."[29] Were America hit even in a single city, the impact could easily shatter morale.[30]

Would America survive a devastating strike on its ally, Israel? Literally, yes, but in no other way. As stock markets cratered, the gold price soared thousands of dollars, and oil prices skyrocketed, America's credibility as an ally would evaporate. Numerous allies of ours would "go nuclear" in the geopolitical equivalent of a "Teller light" flash.[31]

If the above scenario seems extreme, that is because nuclear war is the ultimate man-made extreme event. As for resilience after catastrophe, recall how everyone waited for the next terrorist shoe to drop after September 11, 2001; many people expected another major attack before year-end. Jittery feelings prevailed for several years, before a measure of normalcy was restored. If this was the case with fewer than 3,000 dead, imagine millions dead within 30 days.

But Iran—like North Korea, as well—may be looking at an option even more removed from popular suppositions in the West. Both are emerging with the ability to end America's status as a world power via an esoteric phenomenon generated by a nuclear explosion, known as "electromagnetic pulse" (EMP). *Detonating a single nuclear warhead over the country's midpoint at high altitude* would generate a series of

powerful pulses that would wreak havoc with modern electronics. In a worst case it could take down all or nearly all of America's electric grid and communications fabric in the lower 48 states.

In a few days, as backup power ran out, America would be returned to its energy status as of 1875, with seven times as many people to support (320 million as opposed to 44 million).[32]

Knowledge of low-altitude EMP dates back to the Manhattan Project.[33] High-altitude EMP first revealed its surprising destructive potential in 1962, when the United States detonated its "Starfish Prime" H-bomb 250 miles over Johnston Island in the Pacific Ocean. The pulses of electromagnetic energy emitted by the explosion reached Honolulu, 900 miles to the east, and knocked out 300 streetlights, a telephone microwave radio link, and lots of burglar alarms.[34]

Consider two sobering facts: First, infrastructures driven by modern silicon computer chips are *10 million times more vulnerable to disruption via EMP* than are infrastructures built with 1962's vacuum tube technology.[35] Second, Iran has launched missiles in an EMP trajectory.[36]

Which brings us to startling testimony from former CIA director R. James Woolsey. Testifying before the Congress on May 21, 2013, about Pyongyang's successful long-range ballistic missile test the previous December, Woolsey explained the damage that could occur if North Korea launched a payload into an orbit passing south to north over the poles.[37] This was precisely the path taken by the North's test shot: it put a110-kilogram (240-pound) payload into an orbit approaching the United States directly from the south, where no ballistic missile defense radars currently are in place. Our existing

radar cones of coverage are aimed at launches coming over the North Pole, from launch sites east or west.

Woolsey noted that all North Korean nuclear bomb tests have been very low yield. This is unimpressive if the intended result is maximum high-explosive blast damage. But a super-EMP weapon, based upon the Soviet "neutron bomb" design, can weigh as little as 50 kilograms (110 pounds). Such a weapon sacrifices kinetic energy—irrelevant in an EMP weapon—in exchange for emission of high-energy gamma rays. These rays emit highly radioactive neutrons that cover huge areas if released by a nuclear detonation in space. Thus the North's three tests, perceived as dud city-buster bombs, may have been successful tests of super-EMP bombs.

A super-EMP warhead at 20 miles' altitude can cover a 600-kilometer (375-mile) area centered over Pennsylvania. Such an explosion could take down the Eastern Interconnection, which supplies 70 percent of the country's electric power. An EMP weapon need not meet the extreme accuracy requirements of an ICBM.[38]

One final example of our tendency to project our values onto others who do not in fact share them is our view as to nuclear superiority. By our values nuclear war is unthinkable; sadly, not all our adversaries agree—or at least they are more likely to improvise and elect to run greater risks during a crisis. Despite mutual desire to avoid all-out war, large powers can find themselves involved in a crisis that becomes nuclear. Thus the 1973 Yom Kippur War—unlike the Cuban confrontation 11 years earlier—began not as a nuclear power play but rather as a regional war over diplomatic influence.

The Soviet Union, smarting from having had to back down in the

face of overwhelming U.S. nuclear strategic superiority in the Cuban Missile Crisis, vowed via a post-crisis diplomatic exchange never to be caught in a similarly weak position again.[39] Over a quarter century, it accelerated its nuclear and conventional force buildup, as America partially pulled back. As its arsenal swelled, the Soviet Union became more aggressive in moving across the global geostrategic chessboard.

At a Communist Party conclave in Prague in 1973, the Soviet leader, General Secretary Leonid Brezhnev, predicted:

> We are achieving with détente what our predecessors have been unable to achieve using the mailed fist. . . . Trust us comrades, for by 1985, as a consequence of what we are now achieving with détente, we will have achieved most of our objectives in Western Europe. . . . A decisive shift in the correlation of forces will be such that come 1985, we will be able to extend our will wherever we need to.[40]

Although ultimately this prediction proved untrue, Brezhnev acted more boldly than did Khrushchev over Cuba. He threatened to introduce Soviet troops into the Mideast, as Russian ships shadowed our fleet in the Mediterranean. Brezhnev did this at least in part because of the vast increase in the Soviet nuclear arsenal since Cuba. President Nixon told his national security adviser, Henry Kissinger, that the two powers had been "close to a nuclear confrontation." Unlike Khrushchev in 1962, Brezhnev's initial reaction was not to pull back, but press on.[41]

The 1973 Yom Kippur War crisis confirmed a hard truth about the strategic nuclear balance: the balance matters if *any power* in a major confrontation acts as if it *does* matter. For such action will affect how

a conventional crisis unfolds and how it ends. We responded sharply to Soviet escalation and prevailed, because the Soviets had not attained the position Brezhnev foresaw the regime attaining by 1985. But the Soviets acted boldly, partly because they had nearly caught up with our strategic nuclear warhead count. They surpassed it in 1978. After the Cold War, Moscow's arsenal fell below ours, but by the end of the third quarter of 2014, it had again topped ours.[42]

We should bear in mind that several times during the Cold War years preemptive nuclear strikes were considered. Henry Kissinger wrote that after border clashes in 1969, Moscow so seriously weighed a nuclear preemptive strike against China that it sounded out parties via back channels. The United States publicly warned against such a move, albeit obliquely by voicing concern about possible war between the twin totalitarian titans. Beijing took the threat to be real, and evacuated senior officials from the capital. Kissinger cites fear of a Soviet preemptive nuclear strike as a key factor in China's decision to reopen diplomatic relations with the United States.[43]

The great nuclear strategist Herman Kahn cautioned us that gambles by leaders have been frequent in the past:

> We tend to forget that throughout history many decision-makers were delighted to accept "double or nothing" tactics if the odds looked sufficiently favorable.[44]

But can "nuclear zero" prevent nuclear gambles, or is it utopian?

UTOPIAN GOALS: FAILURES OF STRATEGY

The fundamental goal of nuclear policy is to avoid what I call the apocalyptic trinity of nuclear genocide, suicide, or surrender. Rather than reach for the stars, avoid the abyss.

We saw idealist pushback against development of the hydrogen bomb as the superpower Cold War rivalry heated up. President Truman directed at the start of 1950 that the "Super" be built, not knowing if Russia had an H-bomb program. Truman's decision to build the Super was guided ultimately by fear that Stalin would pursue an H-bomb if advised such a device were technically feasible.[45] In fact, Stalin had authorized the Russian H-bomb program two months after the Soviet Union's first atomic test—*three months before* Truman authorized the American one.

For decades the myth persisted that if only the United States had refrained from developing the hydrogen bomb, the Russians might well have reciprocated. But the memoirs of Andrei Sakharov, considered the father of the Soviet hydrogen bomb and later a prominent anti–nuclear weapons activist, demolish that theory. Sakharov makes clear that had America held back, Stalin and his secret-police chief, the legendarily sadistic Lavrenti Beria, would have exploited such restraint:

> The Soviet Government (or, more properly, those in power: Stalin, Beria and company) already understood the potential of the new weapon, and *nothing could have dissuaded them from going forward with its development.* Any U.S. move toward abandoning or suspending work on a thermonuclear weapon would have been perceived either as a cunning, deceitful maneuver or as evidence of stupidity or weakness. In any case, the Soviet reaction would have been the same: to avoid a

possible trap, and to exploit the adversary's folly at the earliest opportunity.[46]

The U.S. won the race to detonate a thermonuclear device, but at 62 tons it was not a deliverable weapon. "Ivy Mike" was tested November 1, 1952, demolishing a Pacific atoll.

The first Russian H-bomb test followed on August 12, 1953. It was a deliverable weapon dropped by a bomber. America did not test such an operational H-bomb until May 1956.

During the 1962 Geneva disarmament conference, Soviet delegation leader Valerian Zorin called for total superpower disarmament—"Let's disarm overnight . . . and we'll enter a bright new peaceful world." During a break Elmo Zumwalt, later chief of naval operations, asked Zorin a question: What would happen if, after both powers totally disarmed, the Soviets were to discover—innocently—that they had neglected to destroy 100 missiles with nuclear warheads? Zorin replied: "First we would tell you that we had found them. Then we would deliver our ultimatum."[47]

Idealism motivated President Eisenhower's December 1953 "Atoms for Peace" proposal: nuclear technology would be transferred to nations around the globe in return for a promise to use it solely for civilian purposes. American policymakers already knew that a civilian capability is quite close to weapons-grade bomb fuel.[48]

In 1968, U.S. ambassador to the United Nations Arthur Goldberg, a former Supreme Court justice and a renowned expert on international law, said that it would be "unthinkable" and "unacceptable" to withhold "the benefits of this extremely promising energy source, nuclear power—simply because we lack an agreed means to safeguard that

power for peace."[49]

The astonishing fact that he made this statement during a debate on the Nonproliferation Treaty gives a sense of how deeply rooted was the idealism behind Atoms for Peace. In the idealist view, nuclear countries were *morally obligated to place their civilizations at risk* so as to provide poor countries with access to a source of electric power that then was thought to be cheaper than alternatives.

But not all 20th-century statesmen were Utopians. Two decades before atomic weapons existed, Winston Churchill intuited the direction towards which modern war technology was heading. In a 1924 article entitled "Shall We Commit Suicide?," he wrote:

> Might not a bomb no bigger than an orange be found to possess a secret power to destroy a whole block of buildings—nay, to concentrate the force of a thousand tons of cordite and blast a township at a stroke? Could not explosives even of the existing type be guided automatically in flying machines by wireless or other rays, without a human pilot, in ceaseless procession upon a hostile city, arsenal, camp or dockyard?
>
> . . . Such, then, is the peril with which mankind menaces itself. Means of destruction incalculable in their effects, wholesale and frightful in their character, and unrelated to any form of human merit: the march of Science unfolding ever more appalling possibilities; and the fires of hatred burning deep in the hearts of some of the greatest peoples of the world, fanned by continual provocation and unceasing fear and fed by the deepest sense of national wrong or national danger![50]

As our current nuclear policy aims for us to "set an example" by leading the way in arms reductions, events are taking place that suggest the futility of that approach:

- Russia and China are developing suites of new ballistic missiles; their arsenals are growing as ours shrinks (and small-power

arsenals are growing too).[51]

- Japan and India sit on plutonium and uranium stockpiles that could be used to rapidly manufacture thousands of bombs.[52]

- The number of countries with ballistic missiles capable of delivering a Hiroshima bomb has grown from two in 1962 (the two superpowers) to 24 today.[53]

- Vladimir Putin has warned of "surprising the West with our new developments in offensive nuclear weapons about which we do not talk yet."[54] Russia has also been caught violating the 1987 Intermediate-Range Nuclear Forces (INF) Treaty, which had been hailed as the first successful nuclear arms reduction pact[55] and which bans ground-launched theater ballistic and cruise missiles with ranges between 500 and 5,500 kilometers (312 and 3,438 miles).

- China is building a new mobile ICBM fleet that could carry 360 to 720 warheads, the latter number well above the low-hundred warhead estimate of its nuclear stockpile.[56] It has revealed its 3,000-mile "Underground Great Wall"—a vast network of huge tunnels through which mobile ICBMs travel.

- Pakistan is seeking to double its existing arsenal.

"Setting an example," it seems, works better with Australia and Canada than it does with the bad guys.

This does not mean we should shun arms control entirely. But we should see it as a tool rather than a sacrament in the nuclear-free "religion." We can make deals, too, even with those we cannot trust. The Hot Line, established after the Cuban Missile Crisis, shows as much. Even our enemies fear *accidental* nuclear war. A facsimile of same might have come to pass within China during the Cultural Revolution, when a renegade faction conducted an unauthorized

atomic bomb test, with the missile overflying populated areas.[57]

But arms control idealism can lead us astray by presuming excessive commonality of interest.[58] In particular, *we often confuse a **parallel** desire to survive with a **mutual** desire to coexist*. Iran no more desires that "Great Satan" America and "Little Satan" Israel survive than Hitler desired that the Allies survived—other than, perhaps, as servile subjects. Hitler and the Allies both wanted to survive, but each side had a vital interest in destroying the other and thus ending the mortal threat posed. Does anyone think that the United States and its allies have an interest in mutual coexistence with al-Qaeda? With ISIS? With Hamas?

It is not too late to act. But we must act decisively and soon, focusing on the threats of today, understanding the past as it actually unfolded and the lessons it teaches, and deferring indefinitely utopian projects designed to bring about a nuclear-free future. Without the ability to detect what Herman Kahn called a "clandestine cache" of nukes,[59] and with no deterrent substitute, we must persevere.

In the words of the strategist Raymond Aron:

> Let us have the courage to admit that the fear of war is often the tyrant's opportunity, that the absence of war, that is of open conflict between legally organized political units, is not enough to exclude violence between individuals and groups. Perhaps we shall look back with nostalgia to the days of "conventional" wars when, faced with the horror of guerilla warfare and the atomic holocaust, the peoples of the world submit to a detestable order provided it dispels the agonies of individual insecurity and collective suicide.[60]

Let me raise one final scenario, openly discussed in nuclear strategy circles. Suppose terrorists set off nukes in several American

cities, but for want of sufficient nuclear data, our nuclear forensics—hardly an exact science[61]—are unable to verify whether the weapons were supplied by Pakistan, Iran, or North Korea. Suppose further that we ask all three and—surprise—each denies culpability. And each denies permission to inspect its facilities. The countries ignore calls from international bodies. Do we bomb one, without knowing if we would kill millions in a country whose leaders did not launch the attack? To be certain, do we destroy all three? Or invade them to verify the culprit, and then act? Do we hold them all equally responsible because they have closely cooperated on nuclear weapon programs? Can we do so without violating international law—such as it is? Should we pass up retaliation rather than violate such law?

The specific course we should take depends on the exact shape of events as they unfold, as well as our ability to ascertain what is going on behind the scenes. Substantial uncertainty is inevitable, making decisional paralysis a real prospect.[62] About all one can say with confidence is that if we use law as a reason not to act, victory could well go to those who have never been constrained by civilized norms.

In the end, of course, we are all guessing. The hope of those who formulate nuclear strategy is to have a better chance of making better guesses. Still, anyone's guess—on any side of nuclear policy arguments—could prove catastrophically wrong.

One limitation attending guesses is the small crisis sample size history offers us. We should be grateful for this, as we would be far worse off given a large sample size. One or more crises could well have ended in a nuclear war. In the case of nuclear warfare, the predictive incertitude arising from a paucity of pertinent empirical

examples has hidden virtues.

Every now and then the deities send us unmistakable signals that remind us of our world as it really is. Natural disasters remind us that we can be made at any moment prisoners of the fates—whether one perishes in, or survives, an earthquake, tornado, or tsunami.

But other signals—nonrandom events arising out of malicious human agency, such as terrorism—remind us of the jungle our geopolitical universe is and encapsulate what life so often is like on our planet. An inauspicious omen appeared January 27, 2014. In Rome, Pope Francis—getting ready to call for peace in Ukraine—watched as a boy and a girl each released a white "peace dove." The doves were immediately set upon, one by a black crow and the other by a white sea gull. Feathers flew. The fate of the doves is unknown.

And so, too, is our fate in these perilous, momentous times. Before we release any more nuclear peace doves, let us scan the sky with *extra* care for nuclear birds of prey.

ENDNOTES

[1] Sergei N. Khrushchev, *Nikita Khrushchev and the Creation of a Superpower* (University Park, PA: Penn State University Press, 2000), p. xvi.

[2] Michael Dobbs, *One Minute to Midnight: Kennedy, Khrushchev and Fidel Castro on the Brink of Nuclear War* (New York: Knopf, 2009), p. 270.

[3] Ibid., pp. 251–53.

[4] Quoted in Brian Latell, *Castro's Secrets: Cuban Intelligence, the CIA and the Assassination of John F. Kennedy* (New York: Palgrave MacMillan, 2012), pp. 59–60.

[5] Quoted in Frederick Kempe, *Berlin 1961: Kennedy, Khrushchev, and the Most Dangerous Place on Earth* (New York: Putnam, 2011), p. 491.

[6] The anecdote is related in Thomas C. Reed, *At the Abyss: An Insider's History of the Cold War* (New York: Presidio Press, 2004), p. 95.

[7] Kempe, *Berlin 1961*, p. 258.

[8] Even during the Cuban Missile Crisis, Kennedy told speechwriter and confidante Ted Sorensen: "If we solve the Berlin problem without war, Cuba will look pretty small. And if there is a war, Cuba won't matter much either." Quoted in Arthur L. Cyr, "The Cuban Missile Crisis after Fifty Years," *Orbis* 57, no. 1 (Winter 2012): 9.

[9] Kempe, *Berlin 1961*, pp. 5–6.

[10] Henry Sokolski, *Underestimated: Our Not So Peaceful Nuclear Future* (Arlington, VA: Nonproliferation Policy Education Center, 2014), p. 59, fig. 7. Sokolski notes that in the early 1960s only 3 countries—the United States, Soviet Union, and United Kingdom—had operational nuclear reactors; today 31 states do (p. 97). On the positive side, the United States and Russia are blending down (de-enriching from weapons grade to commercial grade) 683 tons of enriched uranium and disposing of 34 tons of weapons-grade plutonium (p. 120).

[11] The four are the Hohenzollern, Hapsburg, Romanov, and Ottoman Empires.

[12] Paul Johnson, *Churchill* (New York: Viking, 2009), p. 21.

[13] In *Seven Deadly Scenarios: A Military Futurist Explores War in the 21st Century* (New York: Bantam Dell, 2009, pp. 1–8), strategist Andrew Krepinevich tells the story of a little-known but chilling 1932 episode—an air raid on U.S. Navy ships in Pearl Harbor a decade before the famous Japanese attack. After a week of sailing north of shipping lanes, using rain squalls for visual shelter in the stormy Pacific,

several carriers launched 150 planes to strike Pearl Harbor and nearby Hickam Field on Sunday, February 7, 1932. Appearing over the target areas at dawn, the planes caught soldiers and sailors by complete surprise.

That day the carriers were American, under the command of Rear Admiral Harry Yarnell, and the bombs dropped into Hawaiian waters were flour bags. An army-navy war game called Grand Joint Exercise was being conducted, and the air mission was Raid Plan No. 1.

Were the army and navy so alarmed at the results of the war game and Admiral Yarnell's brilliant masterstroke that they began serious preparations to guard Pearl Harbor against possible Japanese surprise attack? Not really. The defenders claimed that there had been minimal virtual damage to Hickam Field, and that they had found and sunk the carriers. Further, they complained that the attack was illegal under rules of the war game, because it had taken place on a Sunday.

Fast forward 70 years to the 2002 Millennium Challenge war game played in the Persian Gulf. The Red Team used "swarm" and other asymmetric, unorthodox tactics to "sink" an aircraft carrier. The Blue Team protested. After the rules were changed to bar such tactics, Blue won the second round.

[14] Thomas Schelling, foreword to *Pearl Harbor: Warning and Decision* by Roberta Wohlstetter (Stanford, CA: Stanford University Press, 1962), p. viii.

[15] One instance of background noise during the run-up to the Cuban Missile Crisis came on September 9, 1962, when a U-2 spy plane was downed over China; a U-2 Cuba mission was cancelled the next day, giving the administration time to assess world reaction. Unlike the toxic reaction to the 1960 U-2 shootdown over Soviet Russia that derailed a Paris summit meeting between President Eisenhower and Khrushchev, the China U-2 incident proved a diplomatic blip. Roberta Wohlstetter, "Cuba and Pearl Harbor: Hindsight and Foresight," Memorandum RM-4228-ISA, Rand Corporation, Santa Monica, CA, 1965, p. 14.

[16] The speed with which the Russians deployed offensive missiles and bases in Cuba caught U.S. intelligence by surprise. Further, after the Bay of Pigs intelligence fiasco analysts were reluctant to jump to conclusions in 1962. Wohlstetter, "Cuba and Pearl Harbor," pp. 18–20.

[17] American intercepts and translation of Japan's "Purple" code—dubbed MAGIC—were so efficient that U.S. officials often had a decrypted copy before the intended recipients. Wohlstetter, "Cuba and Pearl Harbor," p. 7. Collectively the problem of extracting and then acting on the correct signals from the flood of intelligence data has been nicknamed by intelligence officials the "Roberta problem."

In the days before December 7, U.S. decision makers who made the fatal strategic call placed higher value on the fact that Japan's diplomats were still talking in

Washington than on the interception of the message "east wind rain" extracted from MAGIC, a signal that a possible attack operation was underway. A Japanese attack on American bases in the Philippines was thought a real prospect, but the U.S. commanders did not seriously consider the far more daring strike at Pearl Harbor a possibility. Weren't its waters too shallow to allow torpedo planes to attack? The only alert that military officials ordered for the Pearl Harbor area was to watch out for local saboteurs.

Noteworthy surprise attacks in the 20th century, besides Pearl Harbor, include Japan's destruction of Russia's fleet in the 1904 Russo-Japanese War, Israel's preemptive strike on Egyptian airfields at the start of the 1967 Six-Day War, and Egypt's attack to start the 1973 Yom Kippur War. In the run-up to the June 22, 1941, massive Nazi invasion of Russia, Stalin ignored warnings from Winston Churchill, choosing instead to trust Hitler, with whom he had made a nonaggression pact one week before Hitler started World War II. Hitler's pivot to the Eastern Front surprised Russia completely. Similar problems surfaced when Congress examined the intelligence provided during the run-up to the September 11, 2001, attacks.

[18] The degree of shock was vouchsafed to Roberta Wohlstetter and is quoted in Cyr, *Cuban Missile Crisis after Fifty Years*, p. 11.

[19] Russia's first nuclear explosion, in 1949, shocked the United States—intelligence estimates published days *after* the blast placed the probable Russian A-bomb test date years later. Similarly unexpected were China's 1964 blast and India's 1974 "peaceful" nuclear explosion. As to the latter, the consensus among U.S. intelligence experts—a year earlier, in 1973—was that India would not explode a nuclear device. And in 1981—even *after* Israel had destroyed the Iraqi reactor that was to be loaded with weapons-grade fuel—U.S. intelligence and diplomatic officials refused to concede that Saddam had been running a nuclear weapons program.

Western observers had noted Pakistan's nuclear progress since the 1970s, but had not predicted the timing of its actual manufacture of a nuclear weapon. Analysts were caught unawares when Pakistan conducted its first tests, in 1998, just after India's second tests (which also were unexpected by U.S. intelligence).

South Africa clandestinely developed a nuclear weapon in the 1970s and 1980s with Israeli assistance. North Korea's clandestine nuclear program, begun in 1981, was only unmasked in 1994. In 2002 North Korean diplomats told the United States that their country had built a nuclear device, but no one in the West knew the assertion to be true until Pyongyang's underground test in 2006.

[20] Roberta Wohlstetter, "Slow Pearl Harbors and the Pleasures of Self-Deception," in *Intelligence Policy and National Security*, edited by Robert L. Pfaltzgraff, Jr., Uri Ra'anan, and Warren Milberg (London: MacMillan Press, 1981).
[21] Herman Kahn, *On Thermonuclear War* (Princeton, NJ: Princeton University Press, 1960), pp. 128–29.

[22] Jacob E. Van Vleet, *Informal Logical Fallacies: A Brief Guide* (Lanham, MD: University Press of America, 2011), p. 28.

[23] "Face the Nation" (CBS), March 2, 2014.

[24] David McCullough, *Truman* (New York: Touchstone), p. 423.

[25] Council on Foreign Relations, Budapest Memorandums on Security Assurances (1994), http://www.cfr.org/arms-control-disarmament-and-nonproliferation/budapest-memorandums-security-assurances-1994/p32484.

[26] Bill Gertz, "Russia Deploying Tactical Nuclear Weapons in Crimea," *Washington Free Beacon*, October 10, 2014, http://freebeacon.com/national-security/russia-deploying-tactical-nuclear-arms-in-crimea/.

[27] On the first day of the Battle of the Somme, July 1, 1916, seven waves of British soldiers rose from their trenches after a week-long British artillery bombardment that proved utterly ineffective. By the day's end roughly 60,000 Brits had fallen, and 20,000 were dead. The website firstworldwar.com estimates 58,000 casualties, one-third dead and two-thirds wounded. firstworldwar.com, "Battles—The Battle of the Somme, 1916," August 22, 2009, http://firstworldwar.com/battles/somme.htm.

To translate that carnage into contemporary numbers for America, which has 320 million people, we multiply the 1916 numbers for Britain, which then had 47 million people, by seven: 410,000 fallen, with 140,000 dead. See Mark Jefferson, "Population Estimates for the Countries of the World from 1914 to 1920," *Bulletin of the American Geographical Society* 46, no. 6 (1914): 401 ff., 409, table II, http://www.jstor.org/stable/201369.

In all, Britain mobilized 5.4 million troops, of whom some 700,000 were killed and 1.7 million wounded; in other words, 44 percent of those mobilized were casualties. The figures for France are even more horrific: 7.5 million mobilized, 1.4 million killed, and 4.3 million wounded, a 75 percent casualty rate. Robert Wilde, "Casualties of World War 1," About.com, http://europeanhistory.about.com/cs/worldwar1/a/blww1casualties.htm.

France's population going into World War I was some 40 million. See Jefferson, "Population Estimates," pp. 401 ff., p. 409, table II.

Russia lost an estimated 25 million in World War II. Dan Alex, "World War 2 Statistics," Second World War History, May 5, 2014, http://www.secondworldwarhistory.com/world-war-2-statistics.asp. Its population in 1940 was roughly 190 million. See Tacitus.NU.com, http://www.tacitus.nu/historical-atlas/population/russia.htm. In other words Russia lost 13 percent of its population in World War II. Yet it considered the

outcome a triumph—albeit costly. During a May 1985 visit to Russia, the author personally witnessed how the Soviets indoctrinated their children. In Leningrad (now St. Petersburg), about one week after the Soviets marked the 40th anniversary of V-E Day, our group visited an elementary school. We listened (via a translator) as the teacher asked the students to describe the patriotic fight against the fascists. The students dutifully recited the Party victory line.

[28] Bruce Rubin, "Dec 14 2001 Iran's Rafsanjani Says Muslims Should Use Nuclear Weapon Against Israel," CNN Online, Feb. 6, 2012, http://ireport.cnn.com/docs/DOC-742815. For the Iran-Israel nuclear war dead scenarios, see Daniel Pipes, "The Unthinkable Consequences of an Iran-Israel Nuclear Exchange," danielpipes.org (blog), November 21, 2007 (updated August 2, 2013), http://www.danielpipes.org/blog/2007/11/the-unthinkable-consequences-of-an-iran.

[29] For a modern American scenario, project the impact of a terrible day when terrorists detonate Hiroshima-size A-bombs in New York, Washington, D.C., and Chicago during the workday. Assume that 500,000 people instantly perish in each blast, and that another 500,000 in each city die over the following 30 days, mostly for want of needed medical care. *America would then after one month have lost more people than the roughly 1.3 million killed in all America's wars from the Revolutionary War to the present*. American war casualties are calculated based on U.S. Department of Veterans Affairs, "Fact Sheet: America's Wars," November 2014, http://www.va.gov/opa/publications/factsheets/fs_americas_wars.pdf (for the Revolution through 1991) and Costs of War, "US Military Battlefield Casualties and Post-Combat Disability Claims," October 2014, http://costsofwar.org/article/us-and-allied-wounded (for the global war on terror).

[30] Suppose Iran sends a ship through the Suez Canal to launch nuclear-tipped missiles at Tel Aviv, Haifa, and the western portion of Jerusalem from 300 miles offshore. Within minutes Israel's three main cities would be devastated. The death toll in Tel Aviv alone, in a span of 30 days, could reach 100,000. If adjusted for relative population size, this would translate into four million Americans killed—equal to nearly 1,500 times America's loss due to the September 11, 2001, attacks. *The Tel Aviv figure alone—converted to U.S. population equivalence—would equate to 3.7 million, more than the roughly 2.8 million killed* ***and wounded*** *in all U.S. wars from the Revolutionary War to the present*. American war casualties are calculated based on U.S. Department of Veterans Affairs, "Fact Sheet: America's Wars" (for the Revolution through 1991) and Costs of War, "US Military Battlefield Casualties" (for the global war on terror).

Add in similar tolls for Jerusalem and Haifa, and 300,000 Israelis would be killed and another 300,000 wounded—equivalent to 12 million dead and 12 million wounded for the United States. The Jewish state would suffer what its leaders promised would never happen again, and what its allies promised not to allow again: a second holocaust. An Israeli retaliation, which would include megaton-yield

H-bombs, could easily kill 15 million Iranians. See John Wohlstetter, "The Day America Died," Daily Caller, October 17, 2012, http://dailycaller.com/2012/10/17/the-day-america-died/.

One military expert, Anthony H. Cordesman, estimates 200,000 to 800,000 Israelis would be killed in an Iranian nuclear first strike; Cordesman estimates between 16 million and 28 million Iranians would be killed by an all-out Israeli retaliatory nuclear strike. See Pipes, "Unthinkable Consequences," August 2, 2013 update. I have distributed those Israeli casualty figures between its three major cities, as one illustrative possible result. Results could, however, vary widely, depending upon myriad factors.

[31] "Teller light" is a fluorescence—change in ambient light color—that flashes within picoseconds (trillionths of a second) after atomic bomb fuel reaches critical mass; it appears before the actual atomic detonation. It is named for famed nuclear physicist Edward Teller, often called the father of the hydrogen bomb.

[32] The population figure for 1875 is from Office for Mathematics, Science, and Technology Education, College of Education, University of Illinois, https://mste.illinois.edu/malcz/ExpFit/data.html.

[33] Enrico Fermi shielded all nearby electronics before the Trinity test in 1945 in expectation of an electromagnetic pulse. When it came, the pulse knocked out some electronics despite the shielding. But the phenomenon was at first highly localized and dwarfed by blast, heat, and lethal radiation effects. Nuclear explosions in the 17 years afterwards either were surface bursts or low-altitude airbursts. Thus it was not until July 9, 1962, that EMP's long-range effects were discovered. See Jerry Emanuelson, "EMP History," Futurescience, LLC, http://www.futurescience.com/emp/EMP-history.html.

[34] An in-depth examination of EMP issues is found in two books by Dr. Peter Vincent Pry: *Electric Armageddon* (CreateSpace Independent Publishing, 2011) and *Apocalypse Unknown* (CreateSpace Independent Publishing, 2013). For vacuum tubes being more resistant to EMP disruption than silicon chips, see Jerry Emanuelson, "Getting Prepared for an Electromagnetic Pulse Attack or a Severe Solar Storm," http://www.futurescience.com/emp/emp-protection.html.

[35] "Starfish Prime," Wikipedia, http://en.wikipedia.org/wiki/Starfish_Prime.

[36] In 1998, Iran, which lacks strategic bombers and missile subs, test-fired a missile from a floating barge in the Caspian Sea, validating its ability to launch a ballistic missile from a platform less stable than a ground launch pad (and thus more susceptible to inaccurate guidance). In 1999, Iran tested an armed ballistic missile in an "EMP mode": this means that the missile was fired in a steep trajectory whose angle of ascent matched that required for an EMP attack.

[37] R. James Woolsey, "Testimony Before the House Committee on Energy and Commerce," May 21, 2013, http://highfrontier.org/r-james-woolsey-testimony-before-the-house-committee-on-energy-and-commerce-may-21-2013/#sthash.Bt2FJKtE.dpbs.

[38] An ICBM warhead must survive reentry, a requirement that imposes a substantial payload weight penalty, and must land within well under a mile of a blast-hardened missile silo to kill it.

[39] The post-crisis diplomatic exchange was between Soviet deputy foreign minister Vasily Kuznetsov and U.S. special envoy John McCloy, noted in Paul Nitze, *From Hiroshima to Glasnost: At the Center of Decision—A Memoir* (New York: Grove, 1989), p. 235. In 1962 America had 24,000 operationally deployed warheads, nearly 10 times as many as the Soviet Union. Sokolski, *Underestimated*, p. 48.

[40] Martin Anderson and Annelise Anderson, *Reagan's Secret War: The Untold Story of His Fight to Save the World from Nuclear Disaster* (New York: Three Rivers Press, 2009), p. 187.

[41] Soviet leaders ignored repeated stern public warnings aimed at Fidel Castro from President Kennedy, issued in mid-September after the administration revealed it had detected surface-to-air missiles on the island. Wohlstetter, *Cuba and Pearl Harbor*, pp. 22–24. The Soviets had misled American policymakers by bragging publicly that they did not need offensive ballistic missiles in Cuba to hit the United States. Thus upon the missiles' deployment U.S. leaders expressed "genuine outrage" (ibid., pp. 31–32).

[42] Bill Gertz, "For the First Time, Russia Has More Deployed Warheads than U.S.," *Washington Times*, October 1, 2014, http://www.washingtontimes.com/news/2014/oct/1/inside-the-ring-compromise-of-classified-documents/.

According to William J. Broad ("Which President Cut the Most Nukes?," *New York Times*, November 1, 2104, http://www.nytimes.com/2014/11/02/sunday-review/which-president-cut-the-most-nukes.html), the U.S. nuclear stockpile grew over twentyfold in the Eisenhower years; the number was 841 at the end of the Truman administration, and production peaked in Ike's final full presidential year, 1960, at 6,340 warheads. It then increased 51 percent under JFK and 5 percent under LBJ. The stockpile then began a sustained decline: under Nixon, it declined 5 percent; Ford, 7 percent; Carter, 7 percent; Reagan, 4 percent; George H. W. Bush, 41 percent; Clinton, 22 percent, George W. Bush, 50 percent; and Obama, 10 percent. The largest annual cut was 5,300 in 1992, the final year for Bush 41, under the START I Treaty (Strategic Arms Reduction Treaty) ratified in 1991. The largest percent cut, 63 percent (from 6,000 to 2,200 warheads) was under Bush 43, per the 2002 Moscow Treaty (Strategic Offensive Reductions Treaty). *As of September 30,*

2014, the U.S. nuclear weapon stockpile stood at 4,766 warheads—25 percent less than the 6,340 warheads added in the peak warhead production year of 1960.

The cost of developing, managing, and maintaining the stockpile, in 2014 dollars, rose to $2 billion under Truman; to $5 billion under Eisenhower; and to $7.8 billion under JFK and LBJ. It then fell under presidents Nixon, Ford, and Carter. It peaked at $9.1 billion under Reagan, fell under Bush 41 and Clinton, and then rose under Bush 43 and Obama to $8 billion.

[43] Henry Kissinger, *On China* (New York: Penguin, 2011), pp. 216–20. Nuclear proliferation expert Henry Sokolski (*Underestimated*, p. 38) notes the China case; he also adds that in 1949 the United States considered a strike against the Soviet Union's nuclear facilities and in 1964 "gave serious thought" to destroying China's nuclear complex. In 1976 Moscow asked the United States for permission to strike South Africa's facilities, but permission was not given. In 1994, the Clinton administration updated a preemptive strike option against North Korea's Yongbyon nuclear reactor—a full 8 years before Pyongyang declared a nuclear capability and 12 years before it proved it by testing. Two senior Clinton administration officials confirm this; they recommended against this option because the North would likely have initiated a full-scale conventional war that would have inflicted hundreds of thousands, perhaps millions, of casualties on South Korea. See William J. Perry and Ashton Carter, *Preventive Defense: A New Security Strategy for America* (Washington, DC: Brookings Institution, 2000), pp. 129–30. To delay the North's military nuclear program for several years, those officials publicly advocated a preemptive strike against a North Korean ICBM sitting on the launch pad. Ashton B. Carter and William J. Perry, "The Case for a Preemptive Strike on North Korea's Missiles," *Time*, July 8, 2006, http://belfercenter.hks.harvard.edu/files/060708_time_veiwpointnk.pdf.

[44] Herman Kahn, *Thinking about the Unthinkable* (New York: Avon, 1962), p. 270.

[45] Truman and the H-bomb decision are discussed in Nitze, *From Hiroshima to Glasnost*, pp. 87–92.

[46] Andrei Sakharov, *Memoirs* (New York: Vintage, 1990), p. 99. The emphasis is added.

[47] The exchange is recounted in "Interview: Admiral Elmo Zumwalt," *Playboy*, June 1974, p. 78.

[48] *Acheson-Lilienthal Report on the International Control of Atomic Energy* (Washington, DC: Government Printing Office, 1946), p. 4.

[49] Quoted in Albert Wohlstetter et al., *Swords from Plowshares: The Military Potential of Civilian Nuclear Energy* (Chicago: University of Chicago Press, 1974), p. ix.

[50] The article appeared in the September 1924 issue of the British magazine *Nash's Pall Mall*.

[51] As of mid-July 2014, U.S. deployed warheads stand at 1,930, plus 200 tactical nuclear warheads stored in Europe. Russia has an estimated 1,600 strategic and 2,000 tactical nuclear warheads. Smaller nuclear arsenals are estimated at a few hundred warheads each. While most estimates put China's arsenal in the low hundreds, it has an estimated 16 tons of highly enriched uranium, which could be used to build hundreds of bombs; it may build a plutonium recycling plant large enough to produce 2,000 bombs *annually*, beginning in 2016. This facility alone could *each year* match America's entire current deployed arsenal. Sokolski, *Underestimated,* pp. 49–52, 69–72, 79.

[52] Japan alone sits on enough plutonium to build 2,000 bombs. India has enough plutonium to build 1,300 bombs. Sokolski, *Underestimated*, pp. 52–53.

[53] Ibid., p. 56.

[54] Jeffrey Tayler, "Vladimir Putin Goes Rouge: Ukraine, NATO, Nuclear Weapons—and a Very Dangerous New Reality," Salon, August 28, 2014, http://www.salon.com/2014/08/28/vladimir_putin_goes_rogue_ukraine_nato_nuclear_weapons_and_a_very_dangerous_new_reality/.

[55] Bill Gertz, "Russia Stonewalls U.S. on Charges of Nuclear Missile Treaty Breach," *Washington Free Beacon*, September 16, 2014, http://freebeacon.com/national-security/russia-stonewalls-u-s-on-charges-of-nuclear-missile-treaty-breach/.

[56] Former chief of the Russian Strategic Rocket Forces, Viktor Yesin, believes China's arsenal to be at least 1,800 nuclear warheads. Matthew Robertson, "Nuclear Arsenal in China Much Bigger Than Believed, Says Expert," *The Epoch Times*, June 28, 2012, http://www.theepochtimes.com/n2/china-news/nuclear-arsenal-in-china-much-bigger-than-believed-says-expert-258565.html. A more traditional view of China's nuclear forces is found in the *2014 Annual Report to Congress* by the U.S.-China Economic and Security Review Commission (Washington, DC: Government Printing Office, 2014), pp. 314–22, http://www.uscc.gov/Annual_Reports/2014-annual-report-congress.

[57] Sokolski, *Underestimated*, pp. 71–72. The crisis began in September 1966, seven months after Mao launched the Cultural Revolution. In October 1966 the renegades fired a medium-range ballistic missile (MRBM—defined in U.S. parlance as a ballistic missile with a range of 1,000 to 3,000 kilometers, or 625 to 1,875 miles). The missile traversed densely populated areas to land in China's remote western province, Xinjiang. With order restored on June 17, 1967, China conducted a hydrogen bomb test. By 1969 Mao's forces had fully regained control and secured the nation's nascent arsenal. The central government established a secure central storage area, with six remote bases linked by transport rail. This more detailed

account is provided in Mark A. Stokes, "Securing Nuclear Arsenals: A Chinese Case Study," in *Nuclear Weapons Security Crises: What Does History Teach?,* ed. Henry Sokolski (Carlisle, PA: Strategic Studies Institute and U.S. Army War College Press, 2013), pp. 65–85. (Coincidentally, China regained control over its arsenal just before clashes with Russia along the Ussuri River began in 1969. These led to Moscow's considering a nuclear first strike against China's nuclear facilities.)

[58] A counterintuitive example of excess arms control idealism is the case of Ronald Reagan. Legendary for his fierce commitment to defeat Communism—"We win, they lose" was his famous summary of America's Cold War strategic goal—President Reagan's earnest desire for a nuclear-free world led him to conditionally accept Mikhail Gorbachev's nuclear-zero-by-2000 offer at the 1986 Reykjavik summit. Only Gorbachev's refusal to agree to allow unrestricted missile defense R&D led "the Gipper" to reject Gorbachev's deal. British prime minister Margaret Thatcher wrote in her memoirs: "My own reaction when I heard how far the Americans had been prepared to go was as if there had been an earthquake beneath my feet." Margaret Thatcher, *The Downing Street Years* (London: Harper Press, 1993), p. 471.

[59] Kahn, *On Thermonuclear War*, pp. 5-6. Kahn wrote:

> It has probably always been impractical to imagine a completely disarmed world, and the introduction of the thermonuclear bomb has added a special dimension to this impracticality. Given the large nuclear stockpiles in the Soviet Union, the United States, and the British Isles, it would be child's play for one of these nations to hide completely hundreds of these bombs . . . . The violator would then have an incredible advantage if the agreement ever broke down and the arms race started again. . . . Even if the problem of what we may call the "clandestine cache" were solvable . . . one could not disarm the world totally and expect it to remain disarmed. But the problem of the clandestine nuclear cache itself makes total disarmament especially infeasible.

[60] Raymond Aron, *On War* (New York: W.W. Norton & Company, 1968), p. 59.

[61] In *Seven Deadly Scenarios*, pp. 67–90, Krepinevich posits an Islamist nuclear terror detonation series that leads to nuclear blackmail, in the form of a threat to detonate more undetected nuclear devices if the group's demands are not met. Krepinevich notes our inability to definitively identify the source of a nuclear attack.

[62] Roberta Wohlstetter noted of Cuba that "action could be taken on ambiguous warning because the action was sliced very thin." Further: "The response chosen kept to a minimum the actual contact with Russian forces, but a minimum compatible with assuring Khrushchev that we meant business." *Cuba and Pearl Harbor*, p. 40.